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THE  
IMMIGRANTS' GUIDE  
AND  
SETTLERS' HANDBOOK.

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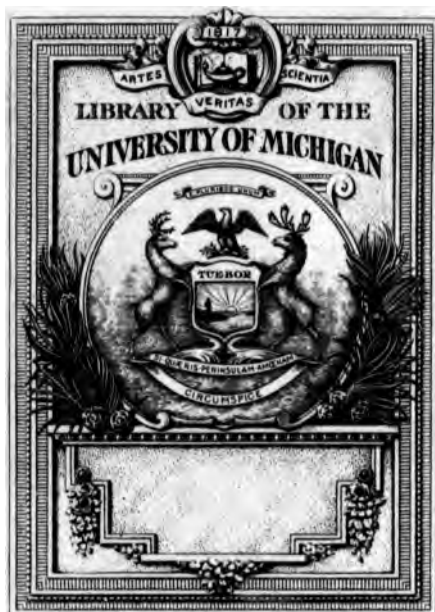
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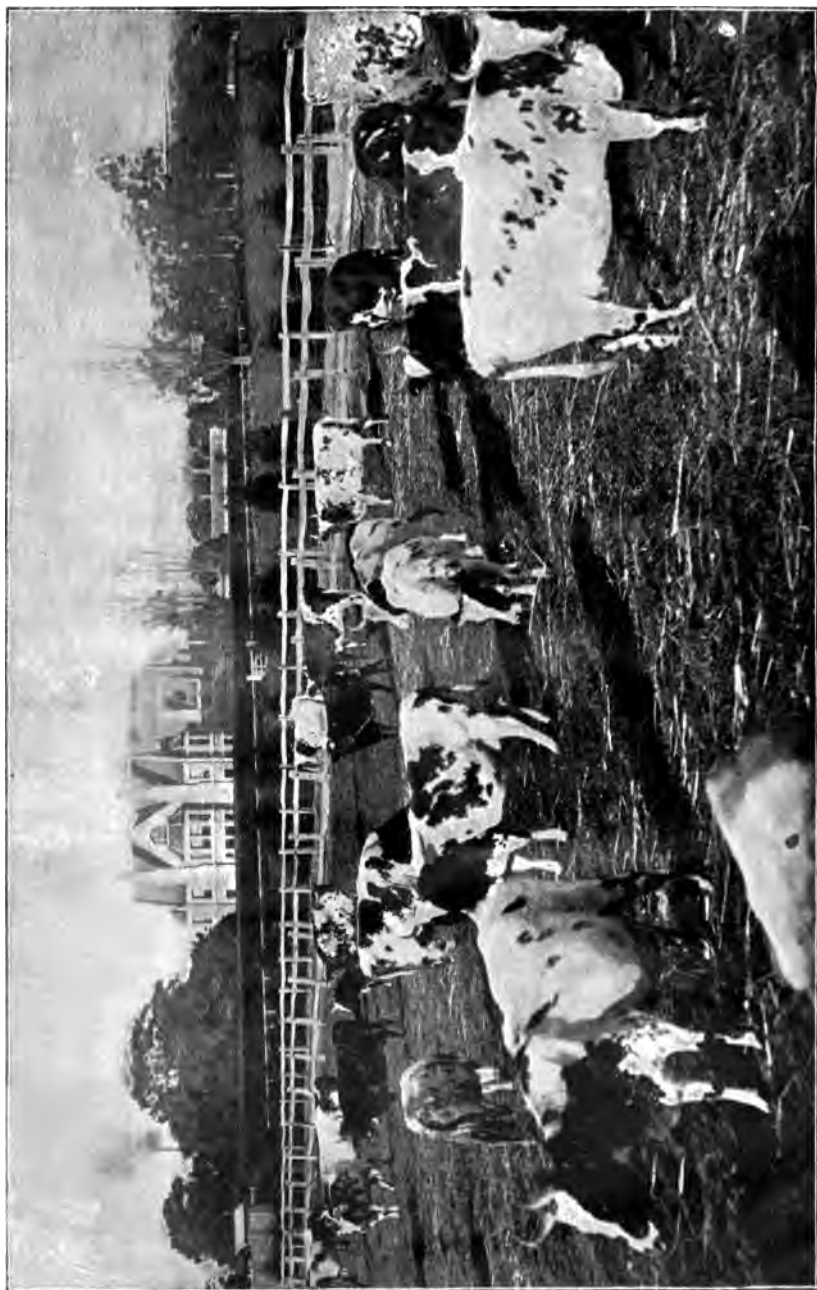
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*Immigrants' Guide.*



THE  
IMMIGRANTS' GUIDE

AND  
SETTLERS' HANDBOOK.

*New Zealand Dept. of Lands and Survey.*

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*Compiled by direction of the Hon. the Minister of Lands.*

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## P R E F A C E .

THE issue of the first edition of "The Settlers' Handbook" having partially supplied a pamphlet of reference which has found wide circulation both throughout Great Britain, the Commonwealth of Australia, and New Zealand, it has been decided by the Hon. the Minister in charge of the Lands Department to issue a second edition, conveying more ample information and traversing a wider range. This edition has therefore been rechristened the "Immigrants' Guide and Settlers' Handbook," and the information in it has been compiled as much for the immigrant who may reach these shores from the Mother-country of Great Britain, as the settler who is manfully facing the difficulties and enduring the privations at first attending the making of a home in the far-back forest or fern country in this not inaptly termed "Britain of the South."

A country so happily named, because of the similarity of climate, productions, and geographical position, appeals specially to the people of the United Kingdom. They, on their side, will naturally require the fullest information about all things relating to the country—discovery, acquisition, productions, conditions of life, government, and particularly as to the inducements it offers to the settler. Such information it is the object of this handbook to supply as copiously as the space at command permits.

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# THE IMMIGRANTS' GUIDE

AND

## SETTLERS' HANDBOOK.

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### PART I.

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#### COLONY OF NEW ZEALAND.

NEW ZEALAND was practically discovered by Captain Cook in October, 1769. It was not, however, until 1840 that the Islands were formally made a part of the British Empire, although irregular colonisation proceeded intermittently from 1814.

The sovereignty of the British Crown was established by the Treaty of Waitangi—signed 5th February, 1840, by the Maori chiefs and Captain Hobson, Lieutenant-Governor—and Proclamation of the Royal sovereignty over the Islands was made on the 21st May of the same year.

New Zealand consists of the North Island, the Middle Island, and Stewart Island (a small island at the southern extremity), with the Chatham, Auckland, Antipodes, and Kermadec Islands 480, 289, 458, and 614 miles respectively from the mainland. The main group extends in latitude from  $34^{\circ} 25'$  to  $47^{\circ} 17'$ , and in longitude between  $166^{\circ} 26'$  and  $178^{\circ} 36'$  E., being the nearest land antipodes to the British Isles. The antipodes of this territory in the Northern Hemisphere extend from Gibraltar to Brest, and include France, Spain, and Italy. The superficial area of the land of the colony is 104,471 square miles, or about one-seventh less than that of Great Britain and Ireland. Its length is 1,000 miles, with an average width of 150 miles. There are over 3,000 miles of coast-line.

In 1842 the outlying islands were added to the colony; in 1877 the Kermadec Islands were added; and in 1901 the "Cook and other Islands" were annexed by Royal Proclamation.

The population of the colony at the 31st December, 1905, was estimated at 882,462, not including the Maori race, estimated at 43,000. These numbers, together with 13,000 (estimated) for the "Cook and other Islands," form a population of 938,000 under the sway of the Governor of New Zealand.

The North Island extends over a little more than seven degrees of latitude—a distance in a direct line from north to south of 430 geographical or 498 statute miles; but, as the northern portion of the colony, which covers more than three degrees of latitude, trends to the westward, the distance in a straight line from the North Cape to Cape Palliser, the extreme northerly and southerly points of the Island, is about 515 statute miles.



Cook Strait separates the North Island from the Middle Island. It is sixteen miles wide at its narrowest part, but in the widest about ninety. The strait is invaluable for the purpose of traffic between different parts of the colony.

The extreme length of the Middle Island, from Jackson's Head in Cook Strait to Puysegur Point at the extreme south-west, is about 525 statute miles; the greatest distance across at any point is in Otago (the southernmost district), about 180 miles.

The factors that tend to advance national interests are climate, soil, resources, scenery, and geographical position. The climate is temperate; its soil produces the grains and fruits of the Temperate Zone; and its resources are forests of good timbers, various minerals (at the head of the list being gold, silver, and coal), many varieties of fish, and kauri-gum.

The position of New Zealand in the Pacific Ocean, standing twelve hundred miles from the Continent of Australia, is threatened by none, while it commands the trade-routes across the Pacific from Panama. The country thus has the position of an important commercial centre. It possesses, moreover, all the requisites of successful manufacture—viz., much available water-power, large deposits of iron and coal, a clear atmosphere, and an extensive seaboard, within easy transit distance of the remotest inland places. In addition, the possibilities of irrigation in certain parts of the territory are important, and have far-reaching possibilities.

The climate, to speak in detail, is variable, seldom very cold and never very hot, everywhere invigorating, and one can always sleep of nights. A comparison of the mean annual temperatures with other countries gives New Zealand 57° Fahr., North Island, and 52°, Middle Island; England, 45·5°; Scotland, 47·5°; Ireland, 50°; Paris, 51·2°; Rome, 59°; New York, 51°. But it is necessary to point out that New York has a winter in which the thermometer goes a long way below zero and stays there for weeks, that skating and curling are regular fixtures of every winter in most of the countries named; but that in New Zealand, below the altitude of 1,000 ft. these pastimes are almost unknown, that the snow falls seldom and by no means every winter in the low country, and that when it does fall it does not lie long.

To the energetically inclined and in fair health, nothing can be more invigorating or beneficial than a course of climbing and mountaineering in the Middle Island, in a climate similar to that of England; while to invalids and others who are unable to win their way to the wilds there is the warm climate of the North Island, with its hot springs and other means of health-restoration.

Droughts are unknown, in the sense in which they are sometimes endured in other countries. At the same time, there is much diversity of rainfall; for example, from 26 in. (average for thirty years) at Christchurch to 119 in. at Hokitika, on the other side of the Island. At Mangonui, in the extreme north, the mean is 56 in., and at Auckland, 42 in.; at Nelson, 59 in.; at Queenstown, 31 in.; at Napier, 37 in.; at Taranaki, 58 in.; at Wanganui, 37 in.; and at Wellington, 50 in. In the thirty years of the observation period (1864–95) the greatest rainfall was 154 in., at Hokitika, and the smallest at Christchurch, 13 in. The climate is, besides, a climate of bright sunshine

for the most part, with constantly changing winds, as might be expected from the insularity and the shape of the country.

The soils vary more than the climate and the rainfall. There are large alluvial tracts, much limestone country, and volcanic areas. Clays are met with in abundance; among them the papa formation, which is a calcareous blue clay, noted for the fine grass it carries for long periods. There is much shelly limestone, many gravels, and peat in plenty. "Light and sandy" is a common description in many districts; and there are large areas of pumice in the North Island. All this soil is grouped in plains, valleys, terraces, downs, and vast mountain-ranges, the greater portions of the latter, especially in the Middle Island, affording fine grazing for a large portion of the 18,000,000 sheep of the Government returns.

How imported animals thrive on these soils the rabbit has shown in his disastrous way; but his day is drawing to a close. A better object-lesson is given by the various agricultural shows of the country; by the export of meat, which in one year (1903) reached an aggregate of nearly five million carcasses of mutton, and maintains a high reputation in the meat market; by the quality of the dairy-produce exported, the value of which last year nearly reached two millions sterling; by the stamp and condition of horses of all breeds; and by the average grain-yields, which are as follow, viz.: Wheat, 24·4 bushels; oats, 40 bushels; barley, 37 bushels; maize, 38 bushels; potatoes, 7 to 10 tons; turnips and mangolds, 10 to 20 tons; pulse, 30 bushels; beans, 40 bushels; and 13,000,000 acres of English grasses. The above are averages for ten years, and in the more fertile localities the yields are often greater.

New Zealand is a picturesque country. The North Island has much mountain scenery, a wide and active thermal region, several large lakes, many forests, and a good deal of river scenery. The Middle Island has the Southern Alps, a large lake system, the sounds of the south-west coast, and also much forest country.

The hot springs form a remarkable feature of the North Island. They are found over a large area, extending from Tongariro, south of Lake Taupo, to Ohaeawai, in the extreme north—a distance of some three hundred miles; but the principal seat of hydrothermal action is in the neighbourhood of Lake Rotorua, about forty miles north-north-east from Lake Taupo. By the destruction of the famed Pink and White Terraces, and of Lake Rotomahana, during the eruption of Mount Tarawera on the 10th June, 1886, the neighbourhood has been deprived of attractions of unrivalled beauty; but the natural features of the country—the numerous lakes, geysers, and hot springs, some of which possess remarkable curative properties in certain complaints—are still very attractive to tourists and invalids. The world-wide importance of conserving this region as a sanatorium for all time has been recognised by the Government, and it is now dedicated by Act of Parliament to that purpose.

The mountains in the North Island are estimated to occupy about one-tenth of the surface, and do not exceed 4,000 ft. in height, with the exception of a few volcanic mountains that are more lofty. Of these, the three following are the most important:—

1. The Tongariro Range, situated to the southward of Lake Taupo. It consists of a group of distinct volcanic cones, the lava-streams from

which have so overlapped in their descent as to form one compact mountain-mass. The highest of these cones is called Ngauruhoe, and attains an elevation of 7,515 ft. The craters of Ngauruhoe, the Red Crater (6,140 ft.), and Te Mari (4,998 ft.) are the three vents from which the latest discharges of lava have taken place, the most recent having occurred in 1898. These craters are still active, steam and vapour issuing from them with considerable force and noise, the vapours, charged with pungent gases and acids, making it dangerous to approach too near the crater-lips.

2. Ruapehu. This mountain lies to the south of Ngauruhoe and Tongariro. It is a volcanic cone in the solfatar stage, and reaches the height of 9,008 ft., being in part considerably above the line of perpetual snow. The most remarkable feature of this mountain is the crater-lake on its summit, which is subject to slight and intermittent eruptions, giving rise to vast quantities of steam. Recently—in March, 1895—such an eruption took place, forming a few hot springs on the margin of the lake, and increasing the heat in the lake itself. This lake lies at the bottom of a funnel-shaped crater, the steep sides of which are mantled with ice and snow. The water occupies a circular basin about 500 ft. in diameter, some 300 ft. below the enclosing peaks, and is quite inaccessible except by ropes. This lake and the three craters previously mentioned on Tongariro are all in one straight line, which if produced would pass through the boiling springs at Tokaanu on the southern margin of Lake Taupo, the volcanic country north-east of that lake, and White Island, an active volcano in the Bay of Plenty, situated about twenty-seven miles from the mainland.

3. Mount Egmont. This is an extinct volcanic cone, rising to a height of 8,260 ft. The upper part is always covered with snow. This mountain is situated close to New Plymouth, and is surrounded by one of the most fertile districts in New Zealand. Rising from the plains in solitary grandeur, it is an object of extreme beauty, the cone being one of the most perfect in the world.

The highest peak of the Southern Alps is Mount Cook, 12,349 ft. Mount Tasman comes next, with something over 11,000 ft. Many peaks, chief of which is Mount Sefton, are between 10,000 ft. and 11,000 ft.; and the New Zealand Matterhorn, Mount Aspiring, near Lake Wanaka, is 9,949 ft.

For beauty and grandeur of scenery the Southern Alps of New Zealand may worthily compare with, while in point of variety they are said actually to surpass, the Alps of Switzerland. In New Zealand few of the mountains have been scaled; many of the peaks and most of the glaciers are as yet unnamed; and there is still, in parts of the Middle Island, a fine field for exploration and discovery—geographical, geological, and botanical. The wonders of the Southern Alps are only beginning to be known; but the more they are known the more they are appreciated. The snow-line in New Zealand being so much lower than in Switzerland, the scenery, though the mountains are not quite so high, is of surpassing grandeur.

There are extensive glaciers on both sides of the range, those on the west being of exceptional beauty, as, from the greater abruptness of the mountain-slopes on that side, they descend to within about 700 ft. of the sea-level, and into the midst of the evergreen

forest. The largest glaciers on either side of the range are easily accessible.

The following gives the sizes of some of the glaciers on the eastern slope :—

Name.			Area of Glacier.	Length of Glacier.	Greatest Width.	Average Width.
			Acres.	Miles ch.	Miles ch.	Miles ch.
Tasman	..	..	13,664	18 0	2 14	1 15
Murchison	..	..	5,800	10 70	1 5	0 66
Godley	..	..	5,312	8 0	1 55	1 3
Mueller	..	..	3,200	8 0	0 61	0 50
Hooker	..	..	2,416	7 25	0 54	0 41

The Alletsch Glacier in Switzerland, according to Ball, in the "Alpine Guide," has an average width of one mile. It is in length and width inferior to the Tasman Glacier.

Numerous sounds or fiords penetrate the south-western coast. They are long, narrow, and deep (the depth of water at the upper part of Milford Sound is 1,270 ft., although at the entrance only 130 ft.), surrounded by giant mountains clothed with foliage to the snow-line, with waterfalls, glaciers, and snowfields at every turn. Some of the mountains rise almost precipitously from the water's edge to 5,000 ft. and 6,000 ft. above the sea. Near Milford, the finest of these sounds, is the great Sutherland Waterfall, 1,904 ft. high.

In both the North and Middle Islands there is ample sport at the right time of the year for rod and gun, horse and hound.

By the present system of ocean steam navigation New Zealand is in regular communication with Australia, the South Pacific Islands, India, Africa, America, and Europe. There are many steamers of the various lines—the New Zealand Shipping Company, the Shaw-Savill and Albion Company, the Shire Line, the Federal Line, and the White Star, which bulk from 8,000 to 12,000 tons—in every way up-to-date boats. Calling as they do at Plymouth, Teneriffe, and Cape Town (outward bound), and at Hobart and Rio de Janeiro on the road Home, these steamers avoid the Red Sea heats. They have a record of safe and prosperous voyages. The length of the passage averages about forty-five days, and the first-class fare is about £60. Mail-steamers run monthly to San Francisco, *via* Hawaii, in thirty-one days. The cost of this passage is about £65. The Union Steam Ship Company and Huddart-Parker Company run steamers on the coast, and to Sydney and Melbourne, connecting with the P. and O., Orient, Messageries Maritimes, and other steamship companies for all parts of the world.

The seasons of summer and winter are the reverse of those in northern latitudes. The tourist season commences in November and extends to March in the Middle Island; in the North Island it commences in October and may be extended to April. During these months the weather is as nearly perfect as any country can produce—days of light sunshine, with pleasant breezes and cool nights. On board the steamer, in the railway-carriage, on the box-seat of a coach, on

horseback, or in the stern of a Maori canoe, health and pleasure are inhaled with every breath. Visitors to New Zealand will find the travelling-accommodation by rail and coach and steamer in a fair state of efficiency. The geographical position of the principal towns facilitates access to the principal tourist districts of the colony. The railway-fares in New Zealand are 1½d. per mile first class, but first-class tourist excursion tickets are obtained for £7, available over the whole of the Government railways for six weeks; over the North Island railways only, £4 for four weeks; and over the Middle Island only, £5 for four weeks. The local fleet of steamers run short and rapid voyages from port to port, thus rendering to those who prefer sea-travelling in calm waters a view of charming coastal scenery.

## CLIMATE.

## COMPARATIVE TEMPERATURES OF NEW ZEALAND.

## I.—GENERAL ABSTRACT.

Stations.	S. Lat.	Long. E. from Greenwich.	Number of Years of Observation.	Year.					Autumn.	Difference of the Warmest and Coldest Months.	Averages of Yearly Extremes.		Yearly Fluctuation.
				Year.	Winter.	Spring.	Summer.	Max.			Min.		
<i>North Island.</i>	"	"	"	"	"	"	"	"	"	"	"	"	"
Mangonui ..	35 1	173 28	10	59-90	53-06	58-28	66-56	61-52	15-12	89-10	31-82	57-28	
Auckland ..	36 50	174 51	20	59-54	52-34	57-56	66-92	61-16	16-02	88-52	33-26	55-26	
New Plymouth	39 4	174 5	14	57-56	50-90	55-94	64-58	58-82	15-66	86-90	30-02	56-88	
Napier ..	39 29	176 55	10	57-56	49-10	57-74	66-20	57-02	19-26	90-00	32-10	57-90	
Wellington ..	41 16	174 47	14	55-58	48-74	54-50	62-24	56-66	14-76	78-44	32-18	46-26	
Wanganui ..	39 56	175 6	3	55-90	48-71	53-31	63-31	57-12	16-70	86-00	29-00	57-00	
<i>Middle Island.</i>													
Nelson ..	41 16	173 19	11	54-86	46-58	54-50	62-78	55-76	17-10	82-04	27-32	54-72	
Hokitika ..	42 42	170 59	10	52-34	45-50	51-62	59-18	53-06	14-76	74-12	28-22	45-90	
Bealey*	43 2	171 31	9	46-76	37-40	46-04	54-86	48-56	18-18	78-08	12-38	65-70	
Christchurch..	43 32	172 39	12	52-88	43-52	53-24	61-52	53-60	18-72	88-16	25-16	63-00	
Dunedin†	45 52	170 31	17	50-72	43-52	50-54	57-20	51-80	15-39	84-74	29-84	54-90	
Invercargill ..	46 17	168 29	14	50-36	42-26	51-26	58-10	50-00	16-92	83-84	20-12	63-72	
Queenstown‡	45 2	165 39	3	51-01	40-01	50-92	64-02	52-31	21-25	84-60	23-21	61-39	

\* Height above sea-level, 2,104 ft. † Height above sea-level, 550 ft. ‡ Height above sea-level, 1,070 ft.

## II. — DAILY RANGE OF TEMPERATURE.

## Difference of the Mean Daily Extremes.

Stations.	Jan.	Feb.	Mar.	Apr.	May.	Jun.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
<i>North Island.</i>	Fah.	Fah.	Fah.	Fah.	Fah.	Fah.	Fah.	Fah.	Fah.	Fah.	Fah.	Fah.	Fah.
Mangonui ..	16-74	15-30	19-08	18-18	16-92	15-30	15-66	16-92	16-02	14-58	16-74	15-48	16-38
Auckland ..	19-80	20-88	19-80	19-08	16-92	15-30	15-48	16-74	15-84	16-56	18-00	18-90	17-82
New Plymouth	21-60	20-16	21-42	19-44	15-84	15-30	14-40	16-56	18-00	16-74	18-54	19-62	18-18
Napier ..	21-60	21-78	17-82	15-12	14-94	13-86	15-30	15-12	18-00	18-18	19-08	18-72	17-46
Wellington ..	18-50	12-42	12-42	11-70	11-16	10-62	10-62	11-52	11-88	12-24	13-50	13-32	12-06
<i>Middle Island.</i>													
Nelson ..	23-40	20-70	21-24	17-10	17-82	19-08	19-08	19-62	21-06	21-42	22-14	20-34	20-16
Hokitika ..	11-16	13-32	12-60	12-78	13-86	14-58	13-68	14-76	15-66	12-24	11-52	11-34	13-14
Christchurch..	18-36	16-56	17-46	17-10	16-38	14-94	16-56	16-02	16-20	18-54	19-08	17-10	17-10
Dunedin ..	15-66	15-66	15-12	13-68	11-52	10-44	10-62	12-06	13-32	13-68	15-30	16-20	13-68
Invercargill	21-78	22-50	22-68	18-00	16-02	17-64	16-92	19-44	22-32	21-06	21-06	22-50	20-16

## III. — RAINFALL.

The annual average rainfall at the chief stations in New Zealand since 1864 has been :—

<i>North Island.</i>				<i>Middle Island.</i>			
		Inches.				Inches.	
Mangonui .. ..	..	56·44		Nelson .. ..	..	59·56	
Auckland .. ..	..	42·33		Christchurch ..	..	26·11	
Napier .. ..	..	37·30		Hokitika .. ..	..	119·66	
Taranaki .. ..	..	58·38		Dunedin .. ..	..	36·38	
Wanganui .. ..	..	37·30		Queenstown ..	..	31·68	
Wellington .. ..	..	50·80		Invercargill ..	..	45·18	

The greatest rainfall for any one of these years was 154·45 in., at Hokitika, in 1878; and the smallest was 13·54 in., at Christchurch, in the same year.

New Zealand exported during the year ended the 31st December, 1905, products of the country to the value of fifteen and a half millions sterling; while its imports were over twelve millions; and in the previous year the Registrar-General made a statistical decennial comparison, which is here subjoined as an interesting statement of values :—

NEW ZEALAND STATISTICAL COMPARISONS, Years ended December,  
1894 and 1904.

—	1894.	1904.	Increase or Decrease.*	
			Numerical.	Centesimal.
Population, excluding Maoris and residents of Cook and other Pacific Islands .. ..	686,128	857,539	171,411	24·98
Occupied holdings .. .. No.	46,676	68,680	22,004	47·14
Land in cultivation, including grasses .. .. acres	10,128,076	13,868,074	3,739,998	36·93
Live-stock—				
Horses .. .. No.	237,418	314,322	76,904	32·39
Cattle .. .. "	964,034	1,736,850	772,816	80·16
Sheep .. .. "	20,230,829	18,280,806	-1,950,023	-9·63
Postal money-orders issued £	776,783	1,476,887	700,104	90·13
Railways, Government—				
Open for traffic (March, 1895-1905) .. .. miles	1,993	2,374	381	19·12
Receipts (March, 1895-1905) £	1,150,852	2,209,231	1,058,379	91·96
Shipping—				
Vessels, inwards .. .. tons	631,100	1,154,569	523,469	82·95
" outwards .. .. "	631,250	1,144,764	513,514	81·35
Export of New Zealand produce—				
Wool, quantity .. .. lb.	144,295,154	144,647,376	352,222	0·24
" value .. .. £	4,827,016	4,678,826	-158,190	-3·17
Grain, quantity .. .. bushels	2,434,295	3,775,604	1,341,309	55·10
" value .. .. £	226,183	392,250	166,067	73·42
Frozen meat, quantity .. cwt.	1,025,243	1,912,979	887,736	86·59
" value .. .. £	1,194,545	2,798,599	1,599,054	133·86
Butter, quantity .. .. cwt.	60,771	314,360	253,589	417·29
" value .. .. £	251,280	1,380,460	1,129,180	449·37
Cheese, quantity .. .. cwt.	55,655	84,526	28,871	51·87
" value .. .. £	115,203	185,486	70,283	61·01
Phormium fibre, quantity .. tons	4,677	26,936	22,259	475·92
" value .. .. £	66,256	710,281	644,025	972·25

\* Minus sign signifies decrease.

NEW ZEALAND STATISTICAL COMPARISONS, Years ended December,  
1894 and 1904—*continued.*

	1894.	1904.	Increase or Decrease.*	
			Numerical.	Centesimal.
Export of N.Z. produce— <i>contd.</i>				
Gold, quantity .. oz.	221,614	520,323	298,709	134·79
" value .. £	887,865	1,987,501	1,099,636	123·85
Gum, Kauri-, quantity tons	8,338	9,203	865	10·37
" value .. £	404,567	501,817	97,250	24·04
Provisions, tallow, timber, &c. £	1,112,233	2,008,052	895,819	80·54
Total exports New Zealand produce .. £	9,085,148	14,633,272	5,548,124	61·07
Imports .. £	6,788,020	13,291,694	6,503,674	95·82
Output of coal .. tons	719,546	1,537,838	818,292	113·72
Banks—				
Deposits (average of four quarters) .. £	13,927,217	19,074,960	5,147,743	36·96
Assets ditto .. £	17,746,421	20,893,096	3,146,675	17·73
Liabilities ditto .. £	14,930,791	20,643,359	5,712,568	38·26
Savings-banks, Post Office and private—				
Number of depositors No.	154,405	297,569	143,164	92·72
Amount to credit .. £	4,066,594	8,839,307	4,772,713	117·36
Life Insurance, Government—				
Number of policies in force No.	32,907	44,194	11,287	34·30
Amount insured (with bonuses) £	9,232,543	11,261,080	2,028,537	21·97

\* Minus sign signifies decrease.

The country, in addition, showed at the end of 1903 the following balance-sheet:—

	£	£
Public property,—		
Crown lands .. ..	17,031,927	
Local authorities' lands .. ..	5,581,480	
Educational lands .. ..	4,012,795	
Church and other lands .. ..	2,975,684	
		29,601,886
Government railways .. ..	23,003,000	
Other public works (local and general)	5,060,000	
		28,063,000
Native lands (with improvements) ..	..	8,684,284
Private wealth (net), estimated on accepted lines and checked ..	..	240,223,000
		£306,572,170
Less public debt—		
Portion of general debt raised outside the colony .. ..	48,842,742	
Portion of local bodies' debt raised outside the colony .. ..	5,529,500	
		54,372,242
Surplus balance of material resources .. ..		£252,199,928

### COLONIAL LIFE.

New Zealand has well-sheltered harbours and a fairly lighted coast. There is a railway system of nearly 2,400 miles, and a network in both Islands of many thousands of miles of roads, electric lines, and telephone lines. Regular steam services are established on the coasts, and, as has been explained on a previous page, there is sufficient communication with the outside world, with which the country is also in close touch by submarine cable. Negotiations are, it may be added, on foot for the establishment of a system of wireless telegraphy; and not the least of the achievements of the colony is the successful installation of the system of universal penny postage.

Town life is organized everywhere in municipal fashion, and in many cities is up to date with Town Hall, gas and water supply, electric traction, libraries, wooden pavements, and drainage systems. The whole of the water-power available for electric purposes has been conserved for the public service, and plans are under consideration for the supply by the State of electric power for both public and private enterprise.

Country life is in various stages, from the well-appointed homestead of the large landowner to the hut of the pioneer hewing his home out of the forest. In the pastoral districts are the homes of the large pastoral tenants of the Crown; farmhouses, with all usual out-buildings, and well-grown plantations dot the long-settled agricultural country, all enclosed by live or wire fences; and the resources of the country may every year be gauged by the agricultural shows, which are in most essentials, including buildings and grounds, up to the most recent standard of modern requirement, with the best breeds of sheep, cattle, and horses, the labour-saving machinery, the agricultural implements, and the produce of all departments of agricultural and pastoral life.

The New Zealand railways are built to the 3 ft. 6 in. gauge. The carriages are modelled on the American saloon cars, with reversible seats. Special compartments for invalids or special parties are obtainable on payment of four first-class ordinary fares. Each passenger is allowed to carry free 112 lb. of personal luggage, and, in addition, tourists', sportsmen's, or artists' gear, and one bicycle or tricycle. There are dining-cars on the principal trains, and refreshment-rooms are established at the principal stopping-stations. The principal coach-routes of the colony are comfortable to travel. Coach-fares average about £1 10s. per day. Special conveyances or saddle-horses are obtainable at the terminal stations on the railway-lines, the cost being about 7s. to 10s. per horse per day. The accommodation for tourists in hotels and boardinghouses in the chief cities is exceptionally good, and the food is good and abundant. In all the large inland towns, and in various places of tourist resort, the hotels and accommodation-houses are yearly being extended and improved. First-class hotel tariffs vary from 8s. to 12s. per day.

The nine chief business centres of the colony are all sea-ports except Christchurch, picturesquely situated, all well laid out and built, and possessing healthy and invigorating climates. Their sanitary arrangements are good. Each has its own institutions, social, literary,



scientific, and artistic, and the Press is supplied daily with cabled news from London. The postal and telegraph service of the colony is most efficient. The total average expense for a six-weeks tour through New Zealand is £1 5s. per day. A trip round the world, *via* Gibraltar, Suez, Ceylon, and Melbourne or Sydney, with a six-weeks excursion through New Zealand, returning *via* America, can be accomplished for £200 first class; by the direct route, *via* Cape of Good Hope and Hobart, returning by Rio de Janeiro, will cost about £170. The tourist is advised not to carry with him more luggage than he can himself comfortably handle for a short distance, but he should be provided with field-glasses, and clothes for any weather—ample, at any rate, to guard against chills.

Manufacturing industry has already an output of the value of seventeen millions sterling, and mining contributes to the exports of the country some two millions' worth of gold, most of which is obtained by various quartz-mining processes, dredging, and hydraulic working, all of which represent an outlay of several millions in plants, approaches, &c.

### *Education.*

There is a comprehensive education system in New Zealand, with upwards of two thousand primary schools—in which the education is free, secular, and compulsory (with permission of education outside, as an alternative; but education there must be somewhere)—attended by 125,000 scholars, costing some £600,000 a year. The next grades are the district high schools and the subsidised secondary schools (eleven and twenty-five in number respectively), having between them fifteen thousand scholars. At the apex of the system is the New Zealand University, whose degrees in arts and science are everywhere recognised, the teaching-work being done in four affiliated colleges, one at each of the four centres, Auckland, Wellington, Christchurch, and Dunedin. The primary and district schools are administered by Boards of Education, and the details of the former are supervised by locally elected School Committees. The Boards issue over two hundred scholarships in the year, and the State gives over sixteen hundred National Scholarships, which entitle the holders to free places in the district or subsidised schools. Lastly, regular provision is made for technical education, which is under the Education Boards, the controlling authorities of secondary and university colleges, and the managers of "special classes," the latter system being applicable in the way of classes for dairy-work and agricultural instruction, with a capitation of half as much again as for all other classes. The classes (some five hundred) are conducted in some twenty technical schools, attended by between five and six thousand students. There are five schools of mines; and the Otago University College has a chair of mining. Canterbury College has a chair of engineering and a school of engineering and technical science. Knowledge of the science and practice of agriculture is imparted in the Agricultural College at Lincoln. "Although in itself only an examining institution" (the quotation is from the Calendar for 1900), "the University is enabled, by the prescriptions made in its statutes for the courses of study necessary to obtain degrees, to control very effectually the whole colonial system of education. In fact, from the primary schools

to the colleges the lines upon which the teaching is carried on are directed towards the university standard." This exactly describes the educational position in New Zealand.

#### *Labour Laws.*

Labour laws have been passed with the object of regulating the conditions affecting employer and employed. Their scope embraces many difficult positions into which the exigencies of modern industrial life have forced those engaged in trades and handicrafts. The general tendency of these laws is to settle on equitable bases the many problems which are incidental to modern industrial life. The most important of all these labour laws is the Industrial Conciliation and Arbitration Act, which substitutes the arbitrament of reason and facts for the old method of force and desires. The manufacturing population in New Zealand differs from that in some of the Australian States by its wide dispersion. Not only in the large cities, but also in towns such as Nelson, Napier, Invercargill, &c., many important works are being carried on, while even in the villages and rural districts the progress of new settlement necessitates the manufacture of articles which in older communities are produced in specialised localities. The factory legislation is complete: The hours of shop-workers are regulated; there is protection for the lives and wages of workers; the liabilities of employers are firmly defined; and the question of compensation for accidents is placed on the well-understood footing of compulsory insurance. Mines are regulated in minute detail, and women and boys may not be engaged.

#### STATE ENTERPRISE.

New Zealand has a Life Insurance Department (which in 1903 was noted as having issued 43,116 of the 104,982 policies in force at the end of that year, insuring £10,060,262 of the aggregate colonial insurance of £25,878,909), and had by the end of 1905 started, and done effective work with, a Fire Insurance Department.

Public Trust Department, with an increasing business, which now manages for the public something over two millions' worth of property.

Advances to Settlers Department, which has lent four millions to settlers on a security-value of nine millions.

Land Purchase Department, which has resumed three-quarters of a million acres (136 estates) from the freeholders at prices mutually agreed on, except in the case of five estates, where the Compensation Court was left to decide. Between four and five million pounds have been spent on these properties (purchase included); eight thousand souls are settled on the land; the annual profit is £27,000; the arrears of rent (5 per cent. on cost-price, roading, and surveys) are small; and the improvements erected by the new owners amount in value to £833,000.

The Agricultural Department is very extensive and complete. For the benefit of the settler this Department maintains four experimental farms, and is divided into several main divisions, of which one deals with the stock of the colony; another supervises the dairy industry, and grades the produce; another is veterinary and pathological, being concerned *inter alia* with original research in a very close and

useful degree; and a fourth is chemical and analytic. Pomology, viticulture, and poultry have their several divisions, worked by experts specially engaged. Biology and horticulture have especial attention, and useful information of moment to settlers is issued regularly from the publications department. The leaflets of this department cover considerable ground in the matter of pests, parasites, and all things incidental to plant-life.

The Forest Department is under the Lands Department.

These various agencies place much information within reach of the settler, and the various experts are constantly travelling about giving practical demonstrations. This Department is under the Minister for Agriculture, who also is Minister of Lands.

New Zealand, in conclusion, it must not be forgotten, has an old-age-pension system, which gives to unfortunate old age an allowance of 10s. per week.

## PART II.

### THE LAND LAWS.

#### METHODS OF ACQUIRING LAND.

THE Crown lands of the colony are administered by the Hon. the Minister of Lands, at the head of the Department of Lands. The Acts affecting the administration are the Land Acts of 1892, 1893, and 1895; the Land for Settlements Acts, 1900, 1901, and 1904; "The Land Improvement and Native Land Acquisition Act, 1894"; "The Bush and Swamp Crown Lands Settlement Act, 1903"; "The Crown Settlers' Rent Rebate Act, 1900"; the Workers' Dwellings Acts, 1905 (Nos. 42 and 57); "The Mining Districts Land Occupation Act, 1894"; and (incidentally) "The Mining Act, 1905," and "The Coal-mines Act, 1905."

For convenience the colony is divided into ten land districts, each being under the local direction of a Commissioner and a Land Board. The Commissioner's office is known as the principal land office, and in some of the larger districts there are one or more local offices. It is with these land offices the selector has to transact all business, from the first consultation of the maps to the final receipt of the Crown title.

#### CLASSIFICATION OF LANDS, ETC.

Crown lands are practically divided into four classes:—

- (1.) Town and village lands, the upset prices of which are, respectively, not less than £20 and £3 per acre; such lands are sold by auction:

- (2.) Suburban lands, the upset price of which may not be less than £2 an acre; these lands are also sold by auction:
- (3.) Rural lands, which may be disposed of at not less than £1 per acre for first-class, and 5s. an acre for second-class lands; such lands may be sold or leased by auction, or sold or leased on application:
- (4.) Pastoral lands—i.e., rural lands unsuitable for cultivation, mountainous, not immediately required for settlement; these are leased by auction as pastoral runs of various extent, as the nature of the country may require.

Lands of special value are sold or leased by auction at such prices as the Board may determine; the cause for which such land is deemed of special value being stated for public information.

Where there is valuable timber on the land, the estimated value of such timber is added to the upset price.

No rural section may be larger than 640 acres of first-class land, or 2,000 acres of mixed qualification, not more than 640 acres of the same being first class.

Landless persons may select up to the above maximum; landholders only to an extent which will not bring their aggregate holding over the maximum.

Small grazing-runs may not exceed—first class, 5,000 acres; second class, 20,000 acres.

Pastoral runs are limited to areas of a carrying-capacity of 20,000 sheep or 4,000 cattle.

No person can select more than one run.

#### MODE OF ACQUIRING CROWN LANDS.

Crown lands may be acquired as follows:—

- (1.) By auction, after survey, in which case one-fifth of the price is paid down at the time of sale, the balance within thirty days.
- (2.) By application, after the lands have been notified as open for selection, in which case the applicant fills up a form (to be obtained at any of the land offices) and makes the declaration and deposit required by the particular system he wishes to select under.

All applications, whether for surveyed or unsurveyed lands, are deemed to be simultaneous if made on the same day; and, if there be more than one applicant for the same land, the right of selection is determined by ballot.

Lands thrown open for application may be either surveyed or unsurveyed, and rural lands not selected the first day remain open.

#### THE OPTIONAL SYSTEM OF SELECTION.

Lands for selection are notified as open for application on and after a stated day, and, *at the option of the applicant*, may be obtained on any of the three following tenures: (a) Cash; (b) occupation with the right of purchase; (c) lease in perpetuity.

After the land has been classified the Board appoints a day when applications may be received at the Land Office. Plans and descriptions of lands open for sale or selection are distributed broadcast

over the colony. If on the day appointed only one application has been received for any piece of land, the applicant, if eligible, gets it without any further trouble, at the discretion of the Land Board. When there are more applicants than one, the applications are determined by ballot. The process of balloting consists of drawing marbles representing applicants and numbers representing sections in the usual way. The successful applicant gets the section under the tenure chosen in his application.

#### THE TENURES.

There are eight tenures, and also four separate systems of settlement in which some of those tenures are applied—in all, twelve methods of acquiring land.

The tenures are—

- (1.) Freehold for cash ;
- (2.) Occupation with right of purchase ;
- (3.) Lease in perpetuity ;
- (4.) Small grazing-runs ;
- (5.) Pastoral runs ;
- (6.) Grazing licenses in goldfields ;
- (7.) Occupation leases in mining districts ;
- (8.) Workers' dwellings.

The systems are :—

- (a.) The special-settlement system ;
- (b.) The improved-farm-settlement system ;
- (c.) The village-settlement system ;
- (d.) The lands-for-settlement system.

Of the above twelve methods of acquiring land,—

I. Seven are under the Land Act only—(1), (2), (3), (4), and (5) ; and (a) and (c).

II. One is under “The Lands Improvement and Native Lands Acquisition Act, 1894,” and the Land Act—viz., (h).

III. One is under the Land Act and the Mining Act—viz., (6).

IV. One is under the Land Act, the Mining Act, and the Mining Districts Land Occupation Act—viz., (7).

V. One is under the Land for Settlements Acts—viz. (d).

VI. One is under the Workers' Dwellings Act—viz., (8).

#### DETAILS OF THE TWELVE METHODS OF ACQUISITION.

##### I.—UNDER THE LAND ACT.

###### (1.) *Cash System.*

*Application.*—Lands may be selected for cash after they have been notified as open for selection. In the case of surveyed land one-fifth of the price is to be paid immediately after the application has been approved, and the balance, together with the Crown-grant fee, within thirty days. If the land is unsurveyed the cost of survey must be paid immediately after the application has been approved, and goes towards the purchase of the land. The balance of the purchase-money has to be paid within thirty days of notice that survey is completed.

Improvements to the extent of £1 per acre for first-class land, and 10s. per acre for second-class land, must be made within seven years.

A certificate of occupation will issue to the purchaser on final payment, which will be exchanged for a Crown grant so soon as the Board is satisfied that the improvements have been completed within the specified time. Transfer of certificates of occupation may be authorised by the Board, the transferee being bound by the original conditions.

DECLARATION TO BE MADE ON APPLYING FOR CASH LAND.

I, A. B., do solemnly and sincerely declare—

1. That I am the person who, subject to the provisions of "The Land Act, 1892," am applying for the purchase of the above-mentioned land solely for my own use and benefit, and not directly or indirectly for the use or benefit of any other person or persons whomsoever.

2. That, including the land now applied for, I am not the holder, directly or indirectly, either by myself or jointly with any other person, of any land anywhere in the colony exceeding in the whole 2,000 acres of land, inclusive of not more than 640 acres of first-class land.

And I make this solemn declaration conscientiously believing the same to be true, and by virtue of an Act of the General Assembly of New Zealand intituled "The Justices of the Peace Act, 1882."

(Signature of A. B.)

Declared at \_\_\_\_\_, this \_\_\_\_\_ day of \_\_\_\_\_, 19\_\_\_\_, before me \_\_\_\_\_, a Justice of the Peace in and for the Colony of New Zealand.

(Signature of Justice.)

(2.) *Occupation-with-Right-of-Purchase System.*

Lands selected on this tenure are held under a license for twenty-five years. At any time subsequent to the first ten years, and before the expiration of the license, after having resided and made the improvements hereinafter described, the licensee can, on payment of the upset price of the land, acquire the freehold or exchange his license for a lease in perpetuity (section 152, subsection (3), "Land Act, 1892"). If at the end of the term of the license there has been neither purchase nor exchange, the licensee has the prior right to a lease in perpetuity.

The rent is 5 per cent. on the cash price of the land; a half-year's rent has to be paid at the time the application is approved, if surveyed land, which represents the half-year's rent due in advance on the 1st day of January or July following the selection. If the land is unsurveyed, the cost of survey is to be paid, and is credited to the selector as so much rent paid in advance, counted from the 1st day of January or July following thirty days' notice of the completion of survey.

Residence and improvement of the land are compulsory, as hereinafter described.

*Application.*—The rent is 5 per cent. on the cash price, and any person seventeen years of age and upwards may apply for any section or sections up to the limit stated below. Applications must be accompanied by a statutory declaration in the form set out further on, and six months' rent at the rate of 5 per cent. on the capital value must be paid immediately after the application has been approved, together with £1 ls. for the license and registration thereof in the case of surveyed lands, and the survey fee in the case of unsurveyed lands.

More than one section of contiguous surveyed land up to the limits given below may be applied for by one person at the same time; but, unless they are contiguous sections, only one can be leased.

Lands are notified as open for application on a stated day, but, should no application be received on that day, any eligible person may at any time thereafter apply for any of the land opened, and should there be no other applicant on the same day he may be declared the lessee at the upset rental, upon complying with the other conditions as to application.

*Limit of Holding.*—The limit of holding is 2,000 acres, inclusive of 640 acres of first-class land, and including land already held. Leases held otherwise become forfeited and absolutely void.

During the first three years of his tenancy the holder of an occupation with right of purchase is not capable of acquiring other land under a similar license, or a lease in perpetuity, unless the lands adjoin each other. After three years, and fulfilment of the conditions, he may do so up to the above limits for his entire holding.

The above forfeiture provision does not apply to those who become licensees by marriage or by inheritance.

*Execution, &c., of Licenses.*—Licenses are prepared and executed by the Commissioner of Crown Lands, and registered under the Land Transfer Acts.

*Term of License, Rent, &c.*—The term is fixed so as to expire on the 31st December or 30th June, twenty-five years after commencement. The rent is payable half-yearly in advance, on the 1st January and the 1st July, to the Receiver of Land Revenue, subject to a rebate (at the discretion of the Commissioner of Crown Lands and the Receiver of Land Revenue) of 10 per cent. on payment within a month of due date. The licensee is liable for all rates, taxes, and assessments.

There are exemptions, under "The Bush and Swamp Crown Lands Settlement Act, 1903," from rates for a period up to four years in case of heavy-bush lands, three years in light-bush or swamp lands, and two years in case of scrub; from rent (after payment of the first half-year's rent) for the same periods, on the same conditions; from residence at the discretion of the Land Board (in case of swamp lands) up to five years on condition of putting up double the amount of the statutory improvements. See summary of "The Bush and Swamp Crown Lands Settlement Act, 1903," page 54.

*Transfers, Mortgages, &c.*—No transferee, sub-licensee, mortgagee, trustee in bankruptcy, or officer of a Court may take possession until a statutory declaration, in the same form as hereinafter referred to, has been deposited with the Commissioner of Crown Lands.

*Residence.*—Residence on the land licensed must commence within four years of the beginning of the term on bush or swamp lands, and within one year on open or partly open land, and is continuous thereafter for six years on bush and swamp lands, and for seven years on open or partly open lands; but may be dispensed with altogether in case of the selector residing on contiguous land, and for four years in case of youths residing with their parents or relatives. Lands are deemed to be contiguous which are only separated by a road or stream.

The Land Board may dispense with residence in case of youths who may become licensees, and who are living within the land district,

and are residing with their parents or near relatives, until after four years after the commencement of the term.

When any two lessees intermarry, residence may be dispensed with on the part of either of such lessees on the lands comprised in one of the leases.

*Improvements.*—Every licensee must, within one year from the date of his license, put on substantial improvements to a value equal to 10 per cent. of the price of the land; within two years another 10 per cent.; and within six years another 10 per cent. And in addition thereto shall, within six years from the date of his license, put substantial improvements of a permanent character on first-class land to the value of £1 per acre, and on second-class land to an amount equal to the net price, but not more than 10s. per acre.

The term "substantial improvements" includes reclamation from swamps, clearing of bush, gorse, broom, sweetbriar, or scrub, cultivation, planting with trees or live hedges, the laying-out and cultivating of gardens, fencing, draining, making roads, sinking wells or water-tanks, constructing water-races, sheep-dips, making embankments or protective works of any kind, or in any way improving the character or fertility of the soil, or the erection of any building.

*Right of Purchase.*—Should all the conditions of the license be fulfilled, the licensee may, after ten years and before the end of his license, purchase for cash the freehold at the capital price on which he is paying rent, or he may at the end of the term exchange his license for a 4-per-cent. lease in perpetuity.

*Default.*—In default of payment of rent or performance of other conditions, or on conviction of making false declaration, the license may be determined in a summary way.

*Resumption of Land for Public Purposes.*—The whole or any portion of the land included in a license may be resumed for public purposes, or should it be found to be auriferous or argentiferous. Upon resumption rent will be proportionately reduced, and the licensee would be entitled to compensation for substantial improvements which he may have made on land resumed. A licensee may also surrender land severed by such resumption if in his opinion it has been so separated from the rest of the land included in his license as to greatly diminish its value.

#### DECLARATION ON APPLYING FOR A LICENSE FOR OCCUPATION WITH RIGHT OF PURCHASE UNDER PART III.

I, A. B., do solemnly and sincerely declare—

1. That I am of the age of seventeen years and upwards.
2. That I am the person who, subject to the provisions of "The Land Act, 1892," am applying for the purchase\* of a license.
3. That I am acquiring such license solely for my own use and benefit, and not directly or indirectly for the use or benefit of any other person or persons whomsoever.
4. That, including the lands now applied for, I am not the owner, tenant, or occupier, directly or indirectly, either by myself or jointly with any other person or persons, of any land anywhere in the colony exceeding in the whole 2,000 acres of land, inclusive of not more than 640 acres of first-class land.

And I make this solemn declaration conscientiously believing the same to be true, and by virtue of an Act of the General Assembly of New Zealand intituled "The Justices of the Peace Act, 1882."

A. B.

Declared at \_\_\_\_\_, this \_\_\_\_\_ day of \_\_\_\_\_, 19\_\_\_\_, before me \_\_\_\_\_, a Justice of the Peace in and for the Colony of New Zealand.

\* In case of transfer, &c., substitute for "purchase" the necessary word.



### (3.) *Lease-in-Perpetuity System.*

This is the essentially distinct feature of the New Zealand system.

*Application.*—Lands are notified open for application at a rent of 4 per cent. on the cash price, and any eligible person seventeen years of age and upwards may apply.

Applications must be accompanied by a statutory declaration in the form given further on, and six months' rent; and £1 ls. for the lease and registration thereof in the case of surveyed lands, and the survey fee in the case of unsurveyed lands, must be paid immediately the application has been approved.

Any area up to 640 acres of first-class or 2,000 acres of second-class land may be applied for by one person at the same time if surveyed lands, but unless sections are contiguous only one can be leased at one time.

Lands are notified as open for application on a stated day, but, should no application be received on the day the land is first opened for selection, any eligible person may any day thereafter apply for any of the land opened, and, should there be no other applicant on that day, be declared the lessee.

*Limit of Holding.*—The limit of holding is 2,000 acres, inclusive of not more than 640 acres of first-class land, and including land already held. Leases held otherwise are to be forfeited and become absolutely void.

*Execution, &c., of Leases.*—Leases are prepared and executed by the Commissioner of Crown Lands, and, after execution by the lessee, are registered by the Commissioner under the Land Transfer Acts. They must be executed by the lessee within thirty days after notice has been given him of their being ready, otherwise the sums deposited with the application will be forfeited.

*Term of Lease, Rent, &c.*—The term of lease is 999 years from the 1st January or 1st July next ensuing after the day of selection. The rent is payable half-yearly, in advance, on the 1st January and the 1st July, to the Receiver of Land Revenue. To encourage punctual payment, the Act of 1900 gives the Commissioner of Crown Lands and the Receiver of Land Revenue the discretionary power of making a remission of not exceeding 10 per cent. if the rent is paid within a month of the appointed date. The lessee is liable for all rates, taxes, and assessments.

In the case of bush and swamp lands the remissions of the rate, rent, and residence conditions are the same as under the "occupation-with-right-of-purchase tenure," which see.

*Surrenders.*—Lease may be surrendered with the consent of the Board, whereupon valuation is made as if the lease was about to be determined by effluxion of time; but it will not be competent, for a period of one year, for the person surrendering to become in any way the lessee under the new lease if there is another applicant.

*Transfers, Mortgages, Residence, Improvements, &c.*—The conditions as to transfers, mortgages, surrenders, residence, and improvements are the same as under the occupation-with-right-of-purchase system.

*No Right of Purchase.*—The lessee has no right to at any time acquire the freehold.



PIONEER FARM, SETTLER AND HIS FAMILY.

*Immigrants' Guide.*



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*Default, &c.*—The conditions as to default and resumption are the same as in the system of occupation with right of purchase.

The holder of a lease in perpetuity at first hand saves immediate outlay for purchase, and retains all his capital beyond the first half-year's rent for the erection of his house and outbuildings, the fencing of the land, and the purchase of implements, seed, stock, &c., without the necessity for borrowing and payment of interest. He pays, of course, a guinea for lease and registration.

DECLARATION ON APPLYING FOR A LEASE IN PERPETUITY UNDER PART III AND PART IV.

I, A. B., , do solemnly and sincerely declare—

1. That I am of the age of seventeen years and upwards.
2. That I am the person who, subject to the provisions of "The Land Act, 1892," am applying for the purchase of a lease.
3. That I am acquiring such lease solely for my own use and benefit, and not directly or indirectly for the use or benefit of any other person or persons whomsoever.
4. That, including the lands now applied for, I am not the owner, tenant, or occupier, directly or indirectly, either by myself or jointly with any other person or persons, of any lands anywhere in the colony exceeding in the whole 2,000 acres of land, inclusive of not more than 640 acres of first-class land.
5. That I have not, within one year from the date hereof, surrendered a lease with perpetual right of renewal or lease in perpetuity of the lands for a lease whereof I am now applying.

And I make this solemn declaration conscientiously believing the same to be true, and by virtue of an Act of the General Assembly of New Zealand intituled "The Justices of the Peace Act, 1882."

A. B.

Declared at , this day of , 19 , before me, , a Justice of the Peace in and for the Colony of New Zealand.

(4.) *Small Grazing-runs.*

These are divided into two classes—up to 5,000 acres, and 20,000 acres—according to quality. The rent is not less than  $2\frac{1}{2}$  per cent. on the capital value of not less than 5s. an acre. Leases are for twenty-one years, dating from 1st March or 1st September, and are renewable for a similar period at not less than  $2\frac{1}{2}$  per cent. on the amount of a new valuation as ascertained by arbitration, exclusive of improvements. The terms of renewal must be notified to lessee twelve months before the expiry of his lease. If the lessee refuse to accept renewal, the lease at its new valuation is put up to auction. In the event of the lessee not acquiring, the incoming tenant pays the Receiver of Land Revenue, for the ex-lessee, the valuation of improvements. The outgoing man has no redress against the Crown in case of failure on part of the incomer to pay for the improvements. He has the usual remedy at law, in the name of the Receiver, to whom he must first give an indemnity.

The lease gives grazing rights, and also cultivation rights to a certain extent; is subject to the mining laws; and, under pain of forfeiture, no holder of a pastoral run, and no holder of 1,000 acres or more can hold under this tenure. Persons becoming lessees by marriage, or under a will, or by virtue of an intestacy, are exempt from these restrictions.

These runs are notified as open for application on a stated day, but, should no application be received on that day, they remain open

until applied for. Applications must be accompanied by a statutory declaration in form as set forth further on; and six months' rent, and £1 ls. for the lease and registration thereof, must be paid immediately after the application has been approved. Rents are paid half-yearly, and terms of renewal must be notified to lessee twelve months before the expiry of his lease.

Residence on the run is compulsory, and commences within three years in bush and swamp land, and within one year in open or partly open land, and is continuous to the end of the term. The residence condition may be relaxed on the same terms as for the occupation-with-right-of-purchase and lease-in-perpetuity tenures.

Permanent improvements, if not already made, must be effected equal to one year's rental by the end of the first year, two years' rental by the end of the second year, and four years' rental at the end of the sixth year; and on bush land, in addition thereto, improvements must be made to the value of 10s. an acre if first-class land, or of 5s. an acre if second-class land.

The lessee has no right to purchase any part of the land; but he can select 150 acres around the homestead, through which no road can be taken or other public privilege exercised without compensation.

These runs may be divided, after three years' compliance with the conditions, among the members of the lessee's family not being under the age of seventeen years.

In the case of ordinary small grazing-runs, one-fourth of the rent paid during the first fifteen years is returned to the local body, to be spent in improving the access to the land.

The runs are declared open for selection, and applications and declarations on the forms provided have to be filled in and left at the land office, together with the deposit of one half-year's rent, which represents that due on the 1st day of March or September following the selection.

#### DECLARATION ON TAKING A LEASE OF A SMALL GRAZING-RUN.

I, \_\_\_\_\_, of\* \_\_\_\_\_, do solemnly and sincerely declare—

1. That I am of the age of seventeen years and upwards.
2. That I am the person who, subject to the provisions of "The Land Act, 1892," am desirous of becoming the purchaser of a lease of Run No.† \_\_\_\_\_.
3. That I am purchasing such lease solely for my own use and benefit, and not directly or indirectly for the use of any other person or persons whatever.
4. That I am not already the holder of any such lease in any part of the colony, nor have I any interest in any such lease.
5. That I am not the holder of any run under Part VI of the aforesaid Act, nor have I any interest in any such run.
6. That I do not own any freehold land or land held by lease or license of any kind whatever anywhere in the colony, either by myself or jointly with any other person, which, exclusive of the land I am now purchasing the lease of, will exceed in area 1,000 acres.

And I make this solemn declaration conscientiously believing the same to be true, and by virtue of an Act of the General Assembly of New Zealand intituled "The Justices of the Peace Act, 1882."

(Signature.)

Declared at \_\_\_\_\_, this \_\_\_\_\_ day of \_\_\_\_\_, 19\_\_\_\_, before me, \_\_\_\_\_, a Justice of the Peace in and for the Colony of New Zealand.

\* Place of abode or occupation.

† Here specify.

(5.) *Pastoral Runs.*

Pastoral country is let by auction for varying terms not exceeding twenty-one years; and, excepting in extraordinary circumstances and on the recommendation of the Board with the approval of the Governor, runs must not be of greater extent than will carry 20,000 sheep or 4,000 head of cattle. Runs are classified from time to time by special Commissioners into: (1) Pastoral lands, which are suitable only for depasturing more than 5,000 sheep; (2) pastoral-agricultural lands, suitable for subdivision into areas of under 5,000 acres, which may be either let as pastoral runs, generally for short terms, or cut up for settlement in some other form. Leases of pastoral lands may not be resumed; leases of pastoral-agricultural lands may be resumed at any time after twelve months' notice, without compensation.

"Pastoral lands" are defined in the Land Act as "lands suitable exclusively for pasturage, and not capable of being used with profit in areas of a carrying-capacity of less than five thousand sheep."

"Pastoral-agricultural lands" are "lands adapted partly for pasturage and partly for agricultural purposes, and suitable for subdivision into areas of not more than five thousand acres."

The first-class "pastoral lands" are laid off in runs of from 5,000 acres to areas capable of carrying 20,000 sheep.

The leases of the runs are offered at auction twelve months before the date of expiry, subject to the liability for compensation to outgoing tenants.

Valuation for improvements at the end of a lease is not to exceed three times the annual rent, or five times when the rent is under £50. Rabbit-proof fences are extra.

The leases are not to exceed twenty-one years, and each run must contain sufficient low ground to insure the proper working of the run.

No person can hold more than one run except when he wants to make his holding big enough for 10,000 sheep or 2,000 head of cattle.

The pasturage lease or license entitles the holder to the sole right of pasturage; gives no right to the soil, timber, or minerals; and is no bar against prospecting or mining.

If any part is granted in any way by the Government the lease over that part at once determines.

A lessee is bound to prevent the destruction of timber and the growth of gorse, broom, and sweetbriar on the land, and he must destroy rabbits and prevent their increase.

The Crown reserves the right to make roads and rights-of-way over the property.

Any fraudulent arrangement or agreement for the purpose of evading the provisions of the Act in any way entails forfeiture of lease. It is well to understand that pastoral or pasturage leases can only be taken up for the "sole use and benefit" of the actual lessee.

The declaration required from pastoral tenants on taking up their pasturage license is as follows:—

I, A. B., , do solemnly and sincerely declare—

1. That I am the person who, subject to the provisions of "The Land Act, 1892," am desirous of becoming the purchaser [or transferee] of a lease or license of pastoral lands.

2. That I am purchasing the lease or license of such land solely for my own use and benefit, and not directly or indirectly for the use or benefit of any other person or persons whomsoever.

3. That I am not the holder of any lease or license in any part of the colony, nor have I any interest in any lease or license in contravention of section 193 of the said Act.

4. That I am not the holder of a small grazing-run in any part of the colony, nor have I any interest in any such run.

And I make this solemn declaration conscientiously believing the same to be true, and by virtue of an Act of the General Assembly of New Zealand intituled "The Justices of the Peace Act, 1882."

Declared at \_\_\_\_\_, this \_\_\_\_\_ day of \_\_\_\_\_, 19\_\_\_\_, before me, \_\_\_\_\_ A. B., a Justice of the Peace in and for the Colony of New Zealand.

*Transfers.*—Subject to the approval of the Land Board, and to performance of all conditions, leases may be transferred on the same conditions. In case of mortgage, power of sale in default must be exercised within two years.

*Re-leases* are made at the option of the Governor. If the holder does not obtain the new lease at auction, the amount of his improvements to the extent of three times the rent, after valuation, is added to the upset price, and paid over to him by the Receiver of Land Revenue. If the run is not re-leased, and there is consequently no offer of sale, the lessee may remove his improvements, except rabbit-proof fences, the value of which, after due appraisement, shall be paid by the Crown, the fences becoming the property of the Crown.

*Subdivision of Leases* is allowable, subject to the recommendation of the Land Board and the Governor's approval.

*Right of Selection.*—The lessee of a run exceeding 5,000 acres in area who has erected a homestead thereon has the right, with the consent of the Land Board, to select and occupy during the currency of his lease 150 acres adjacent to such homestead, which area is exempt from resumption.

*Rent* is payable half-yearly, on the 1st March and 1st September of each year; default for over one month entails a penalty of 10 per cent., and for three months, forfeiture. In case of distraint a warrant from the Commissioner is sufficient authority.

*Boundary disputes* between adjoining runholders are settled by arbitration under the direction of the Land Board, one arbitrator being appointed by each runholder and one by the Board, their decision being binding on all parties.

*Surrenders of leases* may be made with the approval of the Land Board.

*Temporary grazing rights* may be granted over unsold runs up to three years, with right of resumption at any time without compensation, without restriction as to number of holdings, and with reasonable time for removal of temporary fencing.

*Runholders* are not entitled to compensation by reason of alterations or repeal of the Act.

*Travelling stock* may be depastured twenty-four hours on unsold Crown lands.

*Pastoral-agricultural lands* may be leased for any term up to twenty-one years, and on any terms the Government may select, with power of resumption at twelve months' notice, the tenant having the power in case of partial resumption to surrender the whole after giving six

months' notice of his intention to do so. A tenant holding the balance is entitled to proportionate remission of rent.

(a.) *Special Settlement.*

This is a system provided for by Part IV of the Land Act of 1892, which enables those who wish it—to the number of not less than twelve—to club their applications together, to get a special block for themselves of between 1,000 and 11,000 acres in extent, under lease in perpetuity. This they must do by applying to the Minister of Lands, through the secretary of their association, and satisfying him of their *bona fides*. The applicants have to pay the cost of survey up to 2s. 6d. per acre. The size of sections is restricted to 320 acres and under of ordinary land, and 500 acres of swamp.

The right of making reserves for towns, schools, and education rests with the Governor. The upset value is to be not less than 10s. an acre, and the rent for the first two years (*i.e.*, 4 per cent. per annum on the capital value) may be added to the capital value, or may be paid off at any time, at the option of the selector.

The rent and its rebate, conditions of residence, improvement, and occupation, are the same as under lease in perpetuity, including the bearing of "The Bush and Swamp Crown Lands Act, 1903," a summary of which, at page 54, ought to be consulted for exact terms and conditions. The same rule for transfer applies, and non-compliance with conditions may entail forfeiture.

(c.) *Village Settlements.*

Village settlements are disposed of under regulations made from time to time by the Governor.

The system disposes of—(1) Village allotments of one acre or under, (2) homestead allotments up to 100 acres, as follows:—

(1.) *Village Allotments.*—When not offered for sale at auction, they are notified open for sale for cash, for selection for occupation with right of purchase, or for lease in perpetuity, at the option of the applicant. No village allotment may exceed one acre in extent. Applications must be accompanied by a statutory declaration. If for cash at auction, the applicant must deposit one-fifth of the purchase-money immediately after the application has been approved, and if successful at auction the remainder within thirty days of the granting of the application. If for occupation with right of purchase, or for lease in perpetuity, applications are made in the same manner as already described under these systems.

(2.) *Village Homesteads* are open for lease in perpetuity, in sections not exceeding 100 acres each. The rent is 4 per cent. of the cash price of the land, and is payable half-yearly. Applications are to be made in a similar manner to the lease-in-perpetuity system already described. Rent (with rebate), residence, and improvements are the same as under that system.

These leases are exempt from seizure in case of debt or bankruptcy; and the Colonial Treasurer has power to make small advances to the settlers.

Both allotments and homesteads, if less than the maximum size, may be enlarged without competition, if the Board recommends and the Minister approves.



## THE LAND ACTS, 1892, 1893, AND 1895.

The details of provisions of the Land Acts not dwelt on in the above methods of acquisition—1, 2, 3, 4, 5, (a), (c)—are as follows:—

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## SUMMARY.

*General Provisions.*

“*Sole Use and Benefit.*”—All lands must be acquired for the sole use and benefit of the holder. This is the leading principle

of the Act. Offences against it come under the general head of "dummyism."

The penalties are, as will be seen by reference to the list of penalties, very heavy (page 38). These, with the requirement of a declaration from all applicants for land, of their applying for their sole use and benefit, are the safeguards of the leading principle.

*Limit of Holdings.*—The holdings are restricted, so that there may be as many holders as possible. The limit under the Act is, except under the pastoral tenure, 2,000 acres of classed rural land, of which 640 acres may be first class.

Holders of the limited amount or more cannot acquire lands under the Act. Holders of less can only acquire as much as will bring their total holdings up to the limit, if the land is contiguous to or separated from theirs only by a road or a stream.

Holders of land scrip or land orders may use them to their full extent, even if the amount is above the limit. Transferees, however, have not that privilege.

*Limit of Age and Sex.*—Any person of the age of seventeen and upwards, or any married woman having a judicial separation or protection order, can acquire land under the optional system, the special-settlement, the village-settlement, and small-grazing-run systems. For the above, minors are for all purposes of the Land Act and the Fencing Act regarded as legally of full age.

Other married women can be selectors of 1,000 acres, of which 320 may be first-class land, irrespective of the possessions of the husband.

*Resumption of Lands.*—Lands under this Act may be resumed for public purposes, with proportionate abatement of rent, valuation by arbitration of improvements, and compensation for loss or damage. Holders have the right to surrender on similar terms any land cut off by the resumption which they may regard as thereby rendered useless.

*Arbitration.*—Under the Act, arbitrators (who must be disinterested, and sign declaration), one or more, are appointed by the parties on each side, and these arbitrators appoint an umpire.

In case of the failure of either party to appoint an arbitrator, the arbitrator appointed by the other party becomes sole arbitrator, with finality of decision.

If the arbitrators fail to agree within twenty-one days after being requested in writing to act, they must appoint an umpire, with finality of decision.

The parties pay their own expenses, and the expenses incidental to the appointment of an umpire they divide.

*Compensation Court.*—For damages, &c., to freeholds in case of resumption, the procedure is under "The Public Works Act, 1905," which provides for decision by a Compensation Court.

*Valuation of Improvements.*—In resumptions the valuation is by arbitration. In the case of grazing runs, pastoral runs, and all tenures, they are made by appraisers appointed by the Land Board. In the two first the time for the valuation is fixed at twelve months before the expiry of the lease. In the others—in fact, all cases not specifically provided for—they must be at least one month before the expiry of the lease; and in cases of forfeiture the valuations are made on recovery of possession by the Board.

The Board may reduce the valuation if it finds it impeding the disposal of the land. It can deduct from the amount payable to outgoing tenants all sums owing for rent and other matters.

*Payment for Improvements.*—The incoming tenant pays the amount of the valuation to the Receiver of Land Revenue, who pays it to the tenant going out—after deduction of amount due to the Crown by the tenant, if any—and if the land is not offered again, the money is paid to outgoing tenant by the Crown.

In no other cases have the outgoing tenants any claim against either the Crown or the Land Board for their improvements. Their sole remedy is against their successors, the incoming tenants. These they can sue in the name of the Receiver of Land Revenue, after giving him an indemnity against costs satisfactory to a Judge of the Supreme Court.

*Commissioners of Crown Lands.*—They are executive officers of the land districts, having large discretionary powers under the statute. Each is a member and Chairman of the Land Board of his district, and transacts all its routine business in the sale, letting, and occupation of Crown lands. They deal with trespassers and intruders (persons and cattle), removing the former and prosecuting the owners of the latter; they recover all penalties, ascertain and limit the boundaries of Crown lands, enforce all contracts for the disposition of Crown lands, recover rents and other moneys, determine determinable contracts, prosecute and defend suits, and do whatever is necessary in the course of their executive duties.

*Crown Rangers.*—These officers are appointed by the Governor. Under the Commissioners they watch over the provisions of the Land Act, laying informations against offenders, examining and reporting as to the fulfilment of the various conditions under the various leases; they are, in fact, the eyes of the Land Board, and they have the right of entry upon all properties and of answer from the occupiers to reasonable questions.

#### *Land Boards.*

*Constitution.*—In each land district there is a Land Board of from three to five persons, including the Commissioner of Crown Lands. The latter is a member *ex officio*, and Chairman. The others are appointed by the Governor. They hold office for two years at the Governor's pleasure, and may be reappointed.

*Procedure.*—The Chairman has a casting as well as a deliberative vote, and three are a quorum.

The Act provides that the meeting-place must be the principal Land Office of the district, and the Board fixes the dates and frequency of meetings. They meet usually once a week. Special meetings may be called at not less than twenty-four hours' notice by the Commissioner or any two members.

All meetings are open to the Press, with the obvious limitations.

The Board must keep minutes of proceedings, copies of all documents, and records of all business.

*Powers.*—The Boards transact all business connected with the sale, letting, disposal, and occupation of Crown lands, and all matters connected with the management and control of the public lands in their hands.

All questions respecting the disposal of Crown lands, or the meaning of any enactment, or any matter done under any enactment, are heard and determined by them.

They are the sole judges of the fulfilment of conditions in leases and licenses, and they can declare them forfeit.

Doubtful cases are referred to the Minister of Lands.

Boards may refuse any application for land, and, if refusing, must place their reasons on record in the minutes of proceedings.

*Inquiries.*—They can hold inquiries into anything they may regard as a non-fulfilment of conditions of occupation, and may, if they think fit, afterwards (whether they have or have not heard witnesses) declare the lease or license forfeit.

*Witnesses.*—The Chairman of a Board has power to summon witnesses to such inquiries, and require them to bring all necessary books and papers. Neglect of the summons and refusal to give evidence entail penalties (see list herewith), and giving false evidence is perjury, and punishable as such.

The summons must be delivered by personal service, or by delivery of a copy at the usual place of abode.

*Their Expenses.*—No one need obey such summons unless a reasonable sum is tendered him, on personal service of the summons, for travelling-expenses and maintenance, or paid him on demand in case of other service. The allowance for expenses is according to Supreme Court scale.

All expenses are regarded as incident to the administration of Crown lands, and are payable by parliamentary appropriation.

*Fees.*—A Board may charge a fee up to £5 for their decision of disputed questions, and may require payment beforehand from each party, the winner's money to be returned to him.

*Rehearing.*—Within a month after a decision the party concerned can apply for a rehearing, and the Board, if it pleases, may, within two months of the decision, grant the application.

*Appeal.*—Against the Board's decision an appeal, within thirty days, lies to the Supreme Court. It may be in the form of a stated case, if the parties agree. If they disagree, the appeal is heard nevertheless.

The Court may summon a jury to decide questions of fact, settling issues for the purpose.

*Crown Title.*—In questions affecting the title of the Crown there is no appeal from the decisions of the Land Board.

*Points of Law.*—A Board may at any time submit a question of law to a Judge of the Supreme Court, and if it acts upon his opinion it incurs no liability to action.

*Travelling and other Allowances.*—For every day's absence from home on Board's business members receive 10s. They are, in addition, entitled to reimbursement of all fares paid, or to a mileage allowance up to 6d. a mile each way.

Members living within three miles of the Board's meeting-place are not entitled to travelling-expenses.

Members of Parliament, and also members of Waste Land Boards, are permitted the day-allowance without disqualification; but no one who has a free railway pass can receive anything on account of railway fares.

### *Applications.*

*Their Receipt.*—No application is valid unless made at a Land Office in the same district as the land applied for, during business-hours. Applications must be in writing, and forms are provided for the purpose.

All applications addressed through the post to a Commissioner at a Land Office are valid. They must be indorsed with an agreement to pay the necessary deposits in case of success.

*Fees and Deposits.*—These payments are :—

Fee for license and registration ..	..	£1 1s.
Deposit—		
Cash lands (if surveyed) ..	..	One-fifth of the purchase-money.
Cash lands (if unsurveyed) ..	..	The estimated cost of the survey.
Leased rural lands (if surveyed) ..	..	Six months rent.
Leased rural lands (if unsurveyed) ..	..	The estimated cost of the survey.

In case of refusal or delay on the part of the successful applicant to complete the transaction the fee and deposit is forfeited.

After completion the deposit-money is credited to the lessee and licensee as part of the purchase-money, or as a rent instalment, as the case may be.

The deposit may, in exceptional cases—where land is opened for selection before survey—be remitted by the Minister on the recommendation of the Board.

In the case of cash freeholds, the date of the completion of the survey is duly notified to the purchasers, and the date on which the balance of his purchase-money is payable.

*Priority of Application.*—All received on the same day are regarded as simultaneous. All are noted on arrival, and those received at local offices are promptly forwarded to the principal office.

*On Goldfields.*—Where for purchase of lands within goldfields, alienated under lease or license for pastoral purposes, applications must be accompanied by the written consent of the lessee or licensee; also with proof that the land has been accurately described in an advertisement inserted for three consecutive weeks in a newspaper circulating in the district.

*Other Conditions.*—These will be found among the regulations referring to the different tenures.

### *Surveys.*

*Shape of Sections.*—All sections must be rectangular, with due regard to fencing-lines. When fronting roads, rivers, lakes, or the sea, they must have a frontage of at least half their depth.

*Unsurveyed Lands.*—Only those can be applied for which are less than 40 chains from a surveyed frontage-line. The Boards, however, have discretionary power, subject to the Governor's approval.

*Foreshore Reserves.*—Not less than a chain must be reserved of the sea foreshore, of the margins of lakes more than 50 acres in area, and of rivers more than half a chain wide; as to narrower rivers, the Commissioners of Crown Lands make reserves or not at their discretion.

*The Department.*—All surveys of Crown and Native lands are under the direction of the Surveyor-General, and are managed by the Survey Department, which is a part of the Department of Lands and Survey.

The whole cost of the survey is borne by the colony.

*Right of Entry.*—The Department has the right of entry to all lands during the daytime for survey purposes. Reasonable notice beforehand must be given to the owner or occupier, and the authority for the entry must, if required, be shown to the occupier.

#### *Leases and Licenses.*

*Conditions.*—Leases are issued subject to—

- (1.) Compliance with all conditions of the Act.
- (2.) Payment of a fee for lease and registration of £1 1s.
- (3.) Compliance with the form prescribed in the regulations.
- (4.) Payment of rent half-yearly, on the 1st January and the 1st July, the first half-year's rent to be in advance. The Commissioner of Crown Lands and the Receiver of Land Revenue have the discretion of granting a rebate not exceeding 10 per cent. on payment within a month after due date. ("Crown Settlers' Rent Rebate Act, 1900.")
- (5.) Payment of deposit as above.
- (6.) Execution by Commissioner of Crown Lands on behalf of the Crown.
- (7.) Execution by lessee within thirty days, under pain of forfeiture.
- (8.) Registration of the Commissioner under the Land Transfer Act.
- (9.) Freedom from stamp duty.
- (10.) Replacement of lost lease on satisfactory explanation made to the Board.
- (11.) Payment of local rates under pain of forfeiture.

*Exchanges.*—Any deferred-payment license or perpetual lease may be exchanged for a lease in perpetuity within the prescribed limits of area, all conditions having been complied with.

In the case of deferred-payment licenses under former Land Acts, the rent is 4 per cent. of the net price of the land, and the new lease is antedated to the original date of the other instrument. Past payments are adjusted accordingly.

*New Leases.*—Holdings may, with the approval of the Board and the consent of the Minister, be subdivided, transferred under the usual conditions, and new leases issued to give effect to the transfers.

*Registration.*—All leases and licenses are registered under the Land Transfer Act, like Crown grants, but without contribution to the Assurance Fund.

*Improvement Conditions.*—In special cases the Board may, subject to the approval in writing of the Minister, remit up to one-half of the improvement conditions. (For the rest, see the regulations for each tenure.)

*Surrenders.*—Leases may be surrendered with the consent of the Board, and are open for application as new leases after application made. In case of there being any other applicant within a year the surrendering lessee cannot acquire the new lease in any way.

*Tenants in Common.*—Two or more settlers may, under the system of occupation with right of purchase, or on lease in perpetuity, hold as tenants in common and have all privileges, one doing the residence for all; but all remain subject to the same conditions in all other respects as in the case of a single holder.

### *Forfeiture.*

*Causes.*—False declaration; acquisition of land in excess of the maximum area; dummyism; non-fulfilment of the conditions; delay of thirty days in executing lease or license

*Rates.*—As payment of local rates is a condition of all leases and licenses, non-payment of rates is a cause of forfeiture. The Board may declare forfeiture after complaint of local body, and after giving thirty days' notice to pay.

*Procedure.*—Forfeiture is declared by the Board. A *Gazette* notice to that effect is sufficient evidence of the validity of the forfeiture. Appeal to the Supreme Court is open for thirty days.

*Effect.*—The forfeitor is barred from again selecting land for a period of two years, at the discretion of the Board.

He is liable for rent until he gives up possession. Possession is enforceable by Magistrate's order.

If between the acquisition and the forfeiture a holding has been sold, the seller is liable to a penalty of one-fourth of the purchase-money, in addition to any other penalties he may have incurred.

*Forfeited Lands* may be offered again in any manner the Board thinks fit.

*Improvements.*—The value of improvements is not forfeited with the holding. It is liable to deduction for debts due to the Crown by the forfeiting party.

### *Transfers.*

*Validity.*—Leases and licenses are transferable after twelve months, but only with the permission of the Board, and after a statutory declaration from the transferee to the same effect as the one made by the original holder.

The leases of pastoral runs and the title to cash lands may be transferred at any time with the consent of the Land Board.

All leases and licenses may be transferred if the Board is satisfied of the holder's inability to comply with the conditions of the holding.

*Method.*—Transfers are by indorsement on the original document of a memorandum of transfer, with all conditions.

*Registration* is obligatory under the Land Transfer Act in the same manner and with the same fee (£1 ls.) as for leases.

*Pre-existing Rights of Transfer* are all maintained by the Land Act.

*Transfers after Death.*—After the death of lessees or licensees their executors hold their powers of transfer for two years. After two years, these powers not having been exercised, the Commissioner may either sell the lease or license, or transfer it to the widow and children, making due provision for the protection of all separate interests.

The Board may permit the widow, or any one else they approve, to fulfil the conditions of residence.

### *Mortgages.*

*Barred Period.*—No interest in license or lease is assignable in any way during the first twelve months.

Exceptions: Pastoral runs may be assigned at any time.

Village-homestead allotments are neither seizable nor saleable for debt or bankruptcy.

Lands acquired under the Land for Settlements Act are not assignable for five years.

*Conditions.*—The following conditions are implied in every mortgage under this Act :—

(1.) *Restriction of Sale* : There is no power of sale within a month of default.

(2.) *Publicity* :—

(a.) Every sale must be by public auction.

(b.) Every sale must be advertised in at least one newspaper circulating in the district.

(c.) There can be no sale within fourteen days of the advertisement.

(3.) *Power of Redemption* : This is kept open to the last possible moment. At any time before the sale the mortgagor, on tendering the amount of the mortgage, with expenses and interest unpaid up to date of sale, and a commission not exceeding  $1\frac{1}{4}$  per cent., is entitled to a release of the security.

(4.) *Saving Rights of Third Parties* : If the mortgagee carries the sale on nevertheless, the sale is null and void, but the rights of third parties are preserved : for example, the purchaser will be unable to get delivery after the sale, which the mortgagor has recovered by the prescribed payment ; but he will have his remedy at law against the mortgagee.

### *Roads.*

*Opening and Closing of Roads.*—The Governor may proclaim a road on any Crown lands, and, with the consent of the owners, lessees, trustees, or local authorities, on any Crown lands under lease or license, or private lands, or reserves, endowments, or trust lands.

He may also, subject to the same conditions, close any road, and exchange the land for land taken for a new road.

“*User.*”—In the case of lands held by the Crown, or by a local authority, there is no right of way by “user.”

*Roadway Reserves.*—The Governor may exclude from sale, or reserve in any block of land all necessary roadways, and may reserve the foreshores of all lakes, rivers, and seas from sale. (See also “*Foreshore Reserves,*” under the head of “*Surveys.*”)

*Compensation.*—If no land is reserved for roads, then after the sale of lands roads can be taken through them within five years from date of sale, and at a price : For cash lands, double the sum paid for the land in the first instance ; for other lands, a proportionate reduction in the periodical instalment.

Small grazing-runs and pastoral runs are liable to furnish roads always without compensation, the homestead-site of the former being exempt.

### *Towns.*

*Approval.*—The names and plans of all towns outside of a city or borough must, with all particulars, be submitted for the Governor's approval.

*Width of Streets.*—In all new towns the width of every right-of-way must be at least 66 ft. In public and private towns outside of a city or borough the main streets must be 99 ft. wide, excepting in cases where the Minister of Lands authorises them to be laid off a width of 66 ft.



*Reserves* must be set apart for—

- (1.) Recreation : Not less than one-tenth of the whole area ;
- (2.) Endowment : Not less than one acre for every ten sold and available ;
- (3.) Sites for various objects, viz. :—
  - (a.) Refuse and road-metal deposits—the former to be on the lee side of the prevailing summer wind ;
  - (b.) Gravel and stone quarries.
  - (a) and (b) may be in or out of the town area.
  - (c.) Cemeteries : Not less than 2 per cent. of the area, and outside the town area.

#### *Miscellaneous Provisions.*

*Lost Scrip or Orders*, like lost leases and licenses, may be replaced on satisfactory explanation to the Land Board.

*Land unrequired*.—Rural lands not required for settlement may be let from year to year.

*Outlying Lands* may be sold to adjoining occupiers, not exceeding 50 acres, and at not less than £1 the acre.

*Mineral Lands* may be withdrawn from sale and dealt with by special resolutions. The surface may be dealt with under lease in perpetuity, without right to minerals, with right of ingress and egress reserved for miners, and with preservation in all watercourses of water-rights for holders of miners' rights.

*Rates*.—All holders of land acquired under the Act are liable to local rating. No Crown lands under any other than freehold tenure can be sold for rates.

Non-payment of rates in other cases is a breach of the conditions, and involves forfeiture.

*The Islands*.—The outlying islands are included in the ten land districts : the Kermadec Group, in the Auckland District ; the Chat-ham Islands, in the Wellington District.

All the rest, except the Titi Islands, near Stewart Island, are in the Southland District. These are—

Ruapuke, in Foveaux Strait	The Enderby
Solander Island	The Campbell
The Snares	The Antipodes
The Aucklands	The Bounty.

And all others within the limits of the colony south of 47° S.

*Magisterial Jurisdiction*.—In plaints for recovering possession of lands the Magistrate's jurisdiction cannot be ousted, either on the ground that a title is involved, or that the amount in question is above the Magistrate's limit.

*Withdrawals*.—The Board may withdraw lands from sale after applications have been received. Notice with reasons must be sent to the Governor, who may overrule the decision, in which case the applicants are entitled to their original rights. The Governor also has the power of withdrawal.

*Homes, Industrial Reserves, Reformatories*.—A hundred acres or less may be leased, at the discretion of the Minister, to societies for the above purpose for twenty years, with perpetual renewal for a like term, at an annual rent of 5 per cent. on the capital value, subject to the conditions prescribed by the Minister.

Failure to pay rent or to observe conditions entails forfeiture, with reversion of holding to the Crown, without compensation for improvements.

*Timber and Firewood.*—Crown tenants in occupation of treeless land are entitled to a permit from the Commissioner to take what timber they want for domestic purposes and fencing, free of charge, from timbered Crown lands in the possession of the Crown, but not from State forests.

The permit may be cancelled if the timber is put to other use.

*"Thirds" for Road-making.*—One-third of all rents of rural land, and one-fourth of the rents of small grazing-runs, are paid to the local bodies for periods up to fifteen years, to provide access. Lands under the Land for Settlements Act are not in this category.

#### *Licenses for Various Purposes.*

*List of Purposes.*—Licenses may be issued to occupy ground for any of the following purposes (*vide* Forest Laws) :—

Cutting, felling, or removing timber.

Cutting and removing flax.

Removal of sand, gravel, clay, stone, guano, or other substance.

Quarries and their working.

Sites for sawmills, flour-mills, flax-mills, tanneries, fellmongeries, yards, slaughterhouses, brick-kilns, potteries, ferries, jetties, inns and accommodation-houses in thinly inhabited districts (without right to sell liquor), tramways, and rope-walks.

*Conditions.*—The limits are seven years and 80 acres.

The Crown rights of selling and leasing are in no way affected.

Disputes between the holders are heard by the Land Boards.

A lease up to twenty-one years may be substituted for an accommodation-site license by the Board, with the same reservation as to liquor-selling, that being a matter under the liquor laws and the land laws.

#### *Reserves.*

*Power for making them.*—The Governor has power to make reserves on Crown lands for any purpose of public safety, defence, utility, advantage, or enjoyment, and as endowments for public education. The lands may be surveyed or unsurveyed, or under pastoral lease.

*Procedure.*—A reserve is first made temporarily and gazetted as such, and made permanently from one to six months later, duly gazetted, and vested, if necessary, in local authority or trustees.

*Variation.*—Reserves for endowment of education cannot be made permanent without a resolution of both Houses of Parliament.

*Powers of Local Bodies.*—Local bodies may subscribe to the upkeep of any reserve made for the benefit of their people, even if the reserve is outside their district. They may subsidise Domain Boards, and in the management of reserves they may unite with any other local bodies.

*Mineral Springs and Reserves.*—These may be leased for periods not exceeding sixty-three years. The Governor has full power of making regulations for the conservation of springs, and everything pertaining to them. There is a penalty for disobedience to these regulations.

*Endowment Reserves under other Acts.*—These may, with the consent of their titular owners, be brought under the Land Act and leased under its provisions: and they may be sold, saving all existing rights, at the request of the titular owners. When thus sold, the proceeds must be devoted to the purchase of lands for the same endowments.

*Rights of Lessees.*—Lessees who were in possession when their lands came, with the rest of the reserves, under the Land Act, have, at the expiration of their leases, the right to a new lease; for not more, however, than 640 acres.

*Bush Lands* which are educational endowments may be leased for periods not exceeding thirty years, either under their own Acts or the Land Act, as the Commissioner may decide.

These reserves may, at the request of their holders, be brought under the State forest laws.

*Lease-periods.*—All endowment leases may be leased by the Governor for periods up to thirty years, notwithstanding contrary provision in the University Endowment Act of 1868.

*"Thirds."*—All endowment lands leased under the Act are subject to the "thirds" clause, which gives one-third of the rent to the local bodies for roads for access.

#### *Penalties.*

	Penalty not exceeding	Imprisonment: Term not exceeding
Obstructing surveyor .. .. .	£50 or	Three months.
Removing or defacing survey-marks is a misdemeanour*	..	..
Breach of regulations for protecting mineral springs	£50 or	† Six months.
Unlicensed doing of any of the things on the list at page 37‡	£20 or	One month.
Tre-pass of cattle .. .. .	£50	"
Unlicensed taking of kauri-gum .. .. .	£20	"
Taking of kauri-gum in close season (1st October to 30th April)	£20	"
Felling, removing, or selling timber without license	£50§	..
Carelessness, or worse, with fire in or near a forest	£50   or	Six months.
Obstructing Crown Ranger .. .. .	£10	..
Refusing to answer any reasonable question ..	£10	..
Disregard of summons to attend Land Board ..	£50	..
Disregard of terms of summons .. .. .	£50	..
Refusal of evidence¶ .. .. .	£50	..
Bribery—		
Offering bribe to abstain from bidding, &c.** ..	£200 or	One year.
Taking bribe .. .. .	£500 or	Two years.
False declaration .. .. .	£200 or	One year.
Committing or inciting to commit any breach of the Act by obtaining lands "not exclusively for sole use and benefit."	From £100 to £500	"

\* The penalty for this offence committed on lands resumed for public works is fixed in "The Public Works Act, 1894" (1897), at imprisonment not exceeding two years, with or without hard labour.

† Only on the order of a Stipendiary Magistrate.

‡ Crown tenants holding permits to cut timber excepted.

§ And to pay for the timber.

¶ Arrest with or without warrant by any peace officer, and to pay for all damage done.

\*\* Every day's refusal is a separate offence.

Money extorted is recoverable.



PIONEER FARM AFTER ONE YEAR AND EIGHT MONTHS' OCCUPATION (ORIGINALLY HEAVY-BUSH LAND).

*Immigrants' Guide.*



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## II.—UNDER “THE LANDS IMPROVEMENT AND NATIVE LANDS ACQUISITION ACT, 1894.”

### (b.) *Improved-farm Settlements.*

This system, introduced by regulations under “The Lands Improvement and Native Lands Acquisition Act, 1894,” offers blocks for settlement containing areas of from 10 to 200 acres, and the Government pays the holders for clearing at a rate for bushfelling and grassing not to exceed £1 15s. per acre up to 100 acres. Advances up to £30 to married men and £10 to single men are made towards putting up a house and fences.

The tenure is occupation with right of purchase, or lease in perpetuity, at the option of the applicant.

The selection of settlers is made, usually by ballot, from the applicants by the Commissioner of Crown Lands. Residence is compulsory.

## III.—UNDER “THE LAND ACT, 1892,” ETC., AND “THE MINING ACT, 1905,” ETC.

### (6.) *Grazing Licenses on Goldfields.*

On goldfields proclaimed as available for the purpose, pastoral licenses may be granted of areas of between 25 and 1,000 acres.

*General Conditions.*—The licenses are granted by the Commissioner of Crown Lands. Applicants must not be under seventeen years of age. The rent, which is fixed by the Land Board, cannot be less than 3d. per acre, payable half-yearly in advance. The term is twenty-one years, and the license is renewable at the discretion of the Land Board, subject to the approval of the Goldfields Warden, on any terms the Board may think fit, within the scope of the Land Act.

*Timber.*—Licensees may deal with timber on their areas, for domestic use and for fencing, and to clear land for cultivation. They must do so according to the mining regulations, and certain trees are barred.

*Mining.*—Licensees may engage in mining pursuits under the mining laws, under permission of the Warden. When so engaged, the land in their possession for mining purposes cannot be interfered with by any other miners.

*Saving of Mining Rights.*—The whole of every licensed pastoral area—except land used for mining and the sites of homestead and cultivations limited in the aggregate to 15 acres—is open to the ingress and egress of the holders of miners’ rights. These have also the right of prospecting, and of taking timber, under the mining regulations, and for fuel.

*Mining Privileges.*—These may be granted by the Warden, together with anything he may deem conducive to the advancement of the mining interest, on any part of a licensed area, except such parts as are mentioned in the last paragraph. In such cases the licensee is entitled to compensation and proportionate diminution of rent.

*Roads and Reserves.*—Land may be taken on similar terms from a pastoral area for these purposes.

*Transfers.*—They are at the discretion of the Land Board, and may not be permitted unless improvements have been effected to the value of 2s. per acre.

*Forfeiture.*—Failure to pay rent within three months of due date, or failure to make improvements up to 2s. within three years of date of license, may either of them involve forfeiture.

IV.—UNDER “THE MINING DISTRICT LAND OCCUPATION ACT, 1894,”  
“THE LAND ACT, 1892,” AND “THE MINING ACT, 1905.”

(7.) *Occupation Leases in Mining Districts.*

Crown lands and certain reserves within mining districts may be leased by the Land Board, for agricultural and horticultural purposes, in sections of not more than 100 acres, at rentals of not less than 6d. per acre. The leases are for twenty-one years, renewable, with right of preference to the leaseholders, every twenty-one years, provided the land is not required for mining purposes, or, if a reserve, for the purpose for which it was originally reserved.

The rent for renewed leases is fixed by arbitration, and in the event of the original holder refusing to exercise his preferential right, the lease is offered at auction.

All applications must be referred to the Warden for his approval.

Holders of 100 acres under any tenure are debarred; and holders of less cannot acquire more under this system than will bring their holdings up to the 100-acre limit.

Residence is compulsory; but holders of residence areas or business licenses under the Mining Act, or freehold village allotments, leases, or licenses under any Land Act, who have built permanent houses and effected substantial improvements thereon, may have areas (up to 10 acres) leased to them without residential conditions, within a radius of three miles of their original holdings.

A lease gives no right to acquire the freehold. Every area leased is, subject to the Warden's sanction, open to the holders of miners' rights for prospecting, and all operations incidental to mining, and for application for mining privileges, and the lease of every area is determinable (with compensation) for mining purposes.

V.—UNDER LAND FOR SETTLEMENTS ACTS, 1900, 1901, AND 1904.

(d.) *Lands for Settlement.*

In 1892 was inaugurated the policy of purchasing, and in 1894 of taking compulsorily by purchase, large estates for the purpose of closer settlement. The Land for Settlements Act of 1894 repealed the Act of 1892, and after amendment in 1895, 1896, 1897, and 1899, was repealed, with all amendments, by the Act of 1900. “The Land for Settlements Consolidation Act, 1900,” with the amending Acts of 1901 and 1904, contain the whole law on the subject. Of course, all rights under its predecessors are continued.

The law fixes the rent of all lands so acquired at 5 per cent. on their capital value, with rebate of not more than 10 per cent., at the discretion of the Receiver of Crown Land Revenue and the Commissioner of Crown Lands, for payment within a month of due date; directs that such value be fixed high enough to cover the cost of acquisition and of survey, roading, subdivision, and of administration as estimated; and specifies that all lands acquired must be, whatever their classification—urban, suburban, or rural—disposed of under lease in perpetuity—with the exception of those rural lands classed as pastoral, which must be offered as small grazing-runs.

The acquisition of lands under the Land for Settlements Act has proved beneficial in providing homes for a large class of persons who, from inexperience in the breaking-in of new country or other reasons, are in a measure prohibited from occupying the waste lands of the Crown; and, moreover, as the properties acquired are all more or less improved, they certainly afford to the small-farmer class of the colony an opening for building up homes for themselves where their previous experience will be of use.

The law has provisions giving the preference to landless people, and requiring applicants for rural land to satisfy the Land Board as to their means to stock and cultivate the same and erect suitable buildings thereon. It gives the Board, in fact, a discretion as to who shall be entitled to apply for the lands. It also provides, in cases where buildings are on the land to be disposed of, that their value, apart from the capital value of the land, shall, with interest thereon at the rate of 5 per cent. per annum, be paid by the tenant in half-yearly instalments extending over a term of years.

As to dealing with properties acquired, there is an exception to the rule laid down: All lands having deposits of coal, lime, or stone may be worked for a time and developed, and may be leased in various ways at the Minister's discretion.

There are, in addition, various provisions regarding land for churches, halls, creameries, and public purposes.

#### *Regulations.*

All these lands are administered by the Lands Department through the Commissioner of Crown Lands and the Land Board of each land district. The regulations governing the occupation of the lands may be had on application at the land offices throughout the colony. The regulations provide, *inter alia*,—

Rent (not less than 5 per cent. on capital value) to be paid half-yearly in advance on the 1st January and 1st July of each year, subject, at the discretion of the Commissioner of Crown Lands and the Receiver of Land Revenue, to a rebate of not exceeding 10 per cent. if paid within a month of due date; the lease dating from the day the applicant's success is declared by the Land Board, the 1st January or July thereafter being the first due date of the instalments of rent. Rent up to twelve months may be remitted by the Minister in cases of natural disaster or other sufficient cause, on the advice of the Land Board.

Applications to be in the form set forth after these conditions and obligations, and to be accompanied by a declaration in the form next set forth, also by half a year's rent, to be returned to applicant or credited as first payment of rent, according to failure or success of his application; also by one guinea for cost of lease, and, if there are buildings, with a half-yearly instalment on their total cost.

Improvements in case of each lessee must be substantial, namely:—

- (1.) Within one year from the date of his lease, to a value equal to  $2\frac{1}{2}$  per cent. of the capital value of the land;
- (2.) Within two years from the date of his lease, to a value equal to another  $2\frac{1}{2}$  per cent. of the capital value of the land;
- (3.) And thereafter, but within six years from the date of his lease, to a value equal to another  $2\frac{1}{2}$  per cent. of the capital value of the land;



and in addition thereto he shall, within six years from the date of his lease, put on the land substantial improvements of a permanent character within the meaning of section 3 of "The Land Act, 1892" (quoted above in statement of conditions of occupation with right of purchase), to the value of £1 for every acre of agricultural land, and 10s. for every acre of mixed agricultural and pastoral land. For the purposes of this clause the Land Board shall determine and specify in the lease what proportion of the land comprised therein is agricultural, and what proportion is mixed agricultural and pastoral land.

The buildings taken over with the lease are paid for in periods of between seven and twenty-one years, in half-yearly instalments of interest (at 5 per cent.) and principal, on each rent-day. The principal payments may be delayed by the Board for two years if the tenant pleases, but in the meantime he must pay interest at the aforesaid rate by equal half-yearly instalments. Before the final payment, the buildings must be insured in the King's name by the tenant for an amount sufficient to cover the amount due, and the insurance policy deposited in the Land Office.

The obligations of farm-management, as laid down in the Regulations, 16 to 22, are as follows:—

(1.) The lessee shall, within two years from the date of his lease, have the land fenced with a ring-fence; and such fence shall be a sufficient fence within the meaning of "The Fencing Act, 1895." (*Vide Fencing Act.*)

(2.) The lessee shall once a year throughout the term of his lease, and at the proper season of the year, properly cut and trim all live fences on the land at the date of the lease, or subsequently planted thereon, and stub all gorse not growing as fences, and also stub all broom and sweetbriar and other noxious plants.

(3.) The lessee shall not take more than three crops, one of which must be a root-crop, from the same land in succession; and either with or immediately after a third crop of any kind he shall sow the land down with good permanent cultivated grasses and clovers, and allow the land to remain as pasture for at least three years from the harvesting of the last crop before being again cropped.

(4.) The lessee shall at all times during the term of the lease so farm the land, if the area of the whole exceeds 20 acres, as that not less than one-half of the total area shall be maintained in permanent pasture.

(5.) The lessee shall not cut the cultivated grass or clovers for hay or seed during the first year from the time of sowing as aforesaid, nor shall he at any time remove from the land or burn any straw grown upon the land.

(6.) The lessee shall, whenever necessary, but not less than once a year during the term of his lease, properly clean and clear from weeds, and shall at all times during the said term keep open, all creeks, drains, ditches, and watercourses upon the land; and the Commissioner of Crown Lands (hereinafter called "the Commissioner") or any Crown Lands Ranger of the land district shall have the power at any time to enter upon and make through the land any drain that he deems necessary, without payment of any compensation to the lessee.

(7.) In the event of the lessee at any time failing to comply with any of the conditions hereinbefore mentioned relating to the trimming of live fences and stubbing gorse, broom, sweetbriar, or other noxious weeds, and to the cleaning, clearing from weeds, and keeping open

all creeks, drains, ditches, and watercourses, it shall be lawful for the Commissioner to have such work done, and to recover the cost of the same from the lessee in the same manner as rent.

The form of application, and declaration to accompany it, provided at the land offices is as follows :—

APPLICATION FOR RURAL LAND FOR LEASE IN PERPETUITY UNDER "THE LAND FOR SETTLEMENTS CONSOLIDATION ACT, 1900."

To the Commissioner of Crown Lands for the Land District of  
I HEREBY apply for a lease in perpetuity of one of the following allotments :—

Allotment.	Survey District.	Block.	Section.	Area.	Annual Payments.		Capital Value.		Prescribed Deposit.	Remarks.
					For Rent.	For Value of Buildings.	Of Land.	Of Buildings.		
				A. R. P.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	

And I deposit herewith the sum of £ , being the half-year's rent and other payments prescribed in respect of the allotment applied for.\*

In proof of my fitness and qualifications to hold the land applied for, I hereby make the following replies to the undermentioned questions :—

Question.	Answer.
1. How old were you last birthday ? .. .. .	
2. What means (including stock and agricultural implements or machinery) do you possess for stocking and cultivating the land, and erecting suitable buildings thereon ; and what is the total value thereof ?	
3. Have you means sufficient, in your estimation, to enable you to profitably work the land and fulfil the conditions of the lease ? If not, state how you propose to do so.	
4. What experience have you had in cultivating agricultural land or in dairying ?	
5. What is your present occupation ? .. .. .	
6. Are you married ? If so, has your wife (or husband) had any experience in cultivating land, in farm-work, or in dairying ? Give particulars.	
7. Have you any family ? If so, state the number and sex of your children now living with you, and their ages.	
8. What land do you hold or have an interest in ? Give particulars of the block, section, area, and value of such land, and say whether it is freehold, leasehold, or what other tenure, specifying also what portion (if any) is rural and what portion (if any) is town or suburban land.	
9. What land does your wife (or husband) hold, or have an interest in ? Give particulars as above.	
10. Is the rural land (if any) mentioned in answers 8 and 9 insufficient for the maintenance of yourself and your family ? If so, give your reasons.	
11. Is the town or suburban land (if any) mentioned in answers 8 and 9 insufficient for a home for yourself and your family ? If so, give your reasons.	

\* If more than one allotment is applied for, the deposit should be for the allotment requiring the largest deposit, and the words "which is greatest in value" should be added.

*Declaration.*

- I, \_\_\_\_\_, of \_\_\_\_\_, do solemnly and sincerely declare—
1. That I am of the age of twenty-one years and upwards.
  2. That I am the person who, subject to the provisions of "The Land for Settlements Consolidation Act, 1900," and its amendments, and the regulations made thereunder, am applying for a lease in perpetuity of one of the allotments described in the foregoing application.
  3. That I am acquiring such lease solely for my own use and benefit, and not directly or indirectly for the use or benefit of any other person or persons whomsoever.
  4. That I am not, directly or indirectly, either by myself or jointly with any other person or persons, the owner, tenant, or occupier of any land whatsoever under "The Land for Settlements Act, 1894," or its amendments, the present or former Land for Settlements Acts, nor the owner in fee-simple, nor the tenant or occupier under a lease for a term whereof not less than two years are unexpired, of any other land in the colony which, with the largest allotment included in the foregoing application, would exceed in area 1,000 acres.
  5. That the total value of all the real and personal property owned by me does not, after deducting the encumbrances thereon, exceed the prescribed proportion of capital value (exclusive of buildings) of any allotment comprised in the foregoing application: And I am aware that the prescribed proportion is:—  
 Three times, where the area of the allotment does not exceed 100 acres;  
 Twice, where such area exceeds 100 and does not exceed 500 acres; and  
 One and a half times, where such area exceeds 500 acres.
  6. That my answers to the foregoing questions (Nos. 1 to 11) are true and correct in every particular.
- And I make this solemn declaration conscientiously believing the same to be true, and by virtue of an Act of the General Assembly of New Zealand intituled "The Justices of the Peace Act, 1882."

Declared at \_\_\_\_\_, this \_\_\_\_\_ day of \_\_\_\_\_, one thousand \_\_\_\_\_, before me—

(Signature),

A Justice of the Peace in and for the Colony of New Zealand  
(or as the case may be).

Received on \_\_\_\_\_, at \_\_\_\_\_, Commissioner of Crown Lands.

Applications must be for the whole of the allotments in a group or in the subdivision of a group, and an applicant cannot apply in more than one group or subdivision; but no one can hold more than one allotment. Neither can any one apply who has under any other tenure land enough together with the amount applied for to make over 1,000 acres. Neither can any one who has other property beyond a specified amount become a holder. The specified amount is three times the value of an allotment of 100 acres; double the value of one between 100 and 500; and one and a half times that of one over 500.

All buildings shall be kept in order during currency of the lease. Residence is obligatory from the commencement of lease, and is continuous; and default in the conditions involves forfeiture.

If there is more than one applicant, the applications are decided by ballot; and all the conditions of the lease in perpetuity are, so far as possible, applicable.

These are the main conditions, but applicants should get copies of the whole, and study them carefully.

*Regulations as to Pastoral Lands (under the Land-for-settlements System).*

The main ones provide for the issue of leases under the small-grazing-run system in areas of 5,000 acres and under, at 5 per cent. on the capital value, without the buildings; that no one can hold



In proof of my fitness and qualifications to hold the land applied for, I hereby make the following replies to the undermentioned questions:—

Question.	Answer.
1. How old were you last birthday? .. .. .	
2. What means (including stock and implements or machinery) do you possess for stocking and cultivating the land, and erecting suitable buildings thereon; and what is the total value thereof?	
3. Have you means sufficient, in your estimation, to enable you to profitably work the land and fulfil the conditions of the lease? If not, state how you propose to do so.	
4. What experience have you had in working a run?	
5. What is your present occupation? .. .. .	
6. Are you married? If so, has your wife (or husband) had any experience in working a run? Give particulars.	
7. Have you any family? If so, state the number and sex of your children now living with you, and their ages.	
8. What land do you hold or have an interest in? Give particulars of the number of block, section, area, and value of such land, and say whether it is freehold, leasehold, or what other tenure, specifying also what portion of it (if any) is rural and what portion (if any) is town or suburban land.	
9. What land does your wife (or husband) hold, or have an interest in? Give particulars as above.	
10. Is the rural land (if any) mentioned in answers 8 and 9 insufficient for the maintenance of yourself and your family? If so, give your reasons.	
11. Is the town or suburban land (if any) mentioned in answers 8 and 9 insufficient for a home for yourself and your family? If so, give your reasons.	

*Declaration.*

I, \_\_\_\_\_, of \_\_\_\_\_, do solemnly and sincerely declare,—

1. That I am of the age of twenty-one years and upwards.  
2. That I am the person who, subject to the provisions of "The Land for Settlements Consolidation Act, 1900," and the regulations made thereunder, am applying for one of the small grazing-runs described in the foregoing application.

3. That I am acquiring such run solely for my own use and benefit, and not directly or indirectly for the use or benefit of any other person or persons whomsoever.

4. That I am not, directly or indirectly, either by myself or jointly with any other person or persons, the owner, tenant, or occupier of any land whatsoever under the present or former Land for Settlements Acts, nor the owner in fee-simple, nor the tenant or occupier under a lease for a term whereof not less than two years are unexpired, of any other land in the colony which with the largest run included in the foregoing application would exceed \_\_\_\_\_ acres.

5. That the total value of all the real and personal property owned by me does not (after deducting the encumbrances thereon) exceed one and a half times the capital value (exclusive of buildings) of any run comprised in the foregoing application.

6. That my answers to the foregoing questions (Nos. 1 to 11) are true and correct in every particular.

And I make this solemn declaration conscientiously believing the same to be true, and by virtue of an Act of the General Assembly of New Zealand intituled "The Justices of the Peace Act, 1882."

(Signature in full.)

Declared at , this day of , one thousand ,  
before me,—

(Signature),

A Justice of the Peace in and for the Colony of New Zealand  
(or as the case may be).

Received on , at , Commissioner of Crown Lands.

#### LAND FOR SETTLEMENTS ACTS, 1900, 1901, AND 1904.

The details of provisions of the Land for Settlements Acts not mentioned above are as follows :—

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#### *Powers and Purposes.*

Lands may be purchased by the Government from their owners compulsorily, if necessary, for the following purposes :—

- (1.) Providing land for settlement.
- (2.) Providing sites for homesteads for neighbouring pastoral land.
- (3.) Providing low-lying land necessary to the working of neighbouring pastoral Crown land.
- (4.) Exchanging high pastoral land for low-lying land suitable for settlement.
- (5.) Making special provision for workers' homes.

#### *Machinery.*

*Department.*—There is a Department of land purchase, closely allied to the Lands Department. It consists of the Land Purchase Inspector and a number of subordinate officers, who, like him, are appointed by the Government.

*Land Purchase Board.*—There is a Board of five members for each of the ten land districts of the colony. These Boards consist of—

- (1.) The Land Purchase Commissioner (who is Chairman *ex officio*) ; the Commissioner of Taxes ; the Surveyor-General. These are common to all the Boards.
- (2.) The Commissioner of Crown Lands for the district, and a resident of the district, appointed by the Minister of Lands ; these two are special to the Board of each district.

*Procedure (Voluntary).*

The duty of the Inspector is to inspect all lands proposed to be acquired, and report to the Minister.

The Board, at the direction of the Minister, negotiates with the proprietor for the purchase of the land. It also ascertains, by employment of competent valuers and in any other manner, the values of properties, and reports to the Minister.

The Governor in Council can, upon the written recommendation of the Board, conclude the negotiations with the proprietors for the purchase. If the land to be acquired is under the Land Act, the Governor relies on the report of the District Waste Land Board of its value.

When agreement is made between the parties, and possession given up by the seller, the land is prepared under the Act for settlement, and disposed of under lease in perpetuity, under regulations further on.

*Procedure (Compulsory).*

*Powers.*—If the parties fail to agree, the Governor can take any land, not being an endowment or a reserve.

*"Prescribed Maximum."*—This guides the procedure from the outset. The "prescribed maximum" is—

Land for settlement not more than four miles from any of the four centres	Acres.
.. ..	200
Beyond the above—	
First-class land .. ..	1,000
Second-class land* (mixed agricultural and pastoral) .. ..	2,000
Third-class land* (pastoral) .. ..	5,000

*Exemptions.*—No land can be taken compulsorily for workers' homes in a borough of less than fifteen thousand inhabitants, or more than fifteen miles from the same.

All estates below the prescribed maximum are exempt from compulsory purchase for settlement.

*Owner's Right of Retention.*—In case of land taken for workers' homes, the owner has the right to retain 4 acres in the borough, and in the fifteen-mile radius 20 acres.

In case of land for settlement, when estates are over the "prescribed maximum," the owner has the right (forfeited if not early asserted) to retain a quantity equal to it.

*Right of surrender.*—In all cases of compulsory purchase the owner, if part only of his estate is taken, may insist that the whole shall be.

*The Requisition.*—The Minister gazettes his intention to take the land, this notice being known as "the requisition," and within twenty-one days serves the owner with a copy.

*The Reply.*—The owner, within forty-two days (a hundred and fifty in the case of owner absent from the colony at the gazetting of the requisition), serves the Minister with a claim for compensation, with all particulars, together with assertion of the right to the "prescribed maximum" and the demand for its exercise; also the claim to surrender the whole. He must file a copy in the Supreme

---

\* Including a homestead-site of 200 acres of first- or second-class land.

Court within twenty-one days, with a notice of name and address of his assessor. The Minister must, within twenty-one days, file the name of his assessor and notify the owner.

*The Compensation Court.*—The claim is heard by a Compensation Court, consisting of two assessors appointed by the parties, and the Chief Justice (or any other Judge appointed by him), who presides. The procedure is that prescribed by the Public Works Act of 1894 for the settlement of claims of compensation for the compulsory taking of land for public purposes. If default is made in the appointment of assessors, or in any other thing, the Court can supply the needful at the request of the other party, so that the hearing is not prevented.

The hearing over, the Court makes orders declaring—(1) What land can be taken and what retained ; (2) what sum is to be paid, and to whom ; (3) what must be done for the adjustment of all rights. And as soon as convenient after twenty-one days the Governor proclaims in the *Gazette* that the land is taken compulsorily under the Act, and the land thereupon becomes Crown land, and is dealt with as above described.

Before the making of the second of the above orders the Minister may abandon the proceedings, in which case the claimants are entitled to their costs and expenses, including reasonable loss, if any, through the working of the requisition.

During the interval the Court may amend its order, making it clearer or more practical.

The final act is the payment of the compensation, money or paper, or land, as the case may be. It is payable on the day on which possession is given up to the Crown.

The land is then offered for application under the regulations (pages 51 and 52).

#### *The Ballot (Act of 1901).\**

Rural land acquired under these provisions is grouped and classified by the Land Boards at their discretion.

Applicants, who must be not less than twenty-one years of age, must specify the group or subdivision in which they apply.

The Land Board makes inquiry as to the *bona fides* and suitability of applicants, and decides accordingly.

If there are more approved candidates than sections, the excess of candidates is balloted out, and then the sections are balloted among the remaining candidates. The second ballot is thus : A candidate's name is placed in a box, and the number of a section in another box. When all have been put away, the lot is drawn from both boxes simultaneously, and the applicants whose names come out as the number of the sections become the proprietors of them under the Act.

All applicants balloted out by the first ballot have a right to the return of their deposits.

Successful applicants in the second ballot who refuse to take up their sections must show special cause before their deposits can be returned.

Before the second ballot, the applicants who have been balloted in may by agreement allot the sections among themselves, and so avoid the second ballot.

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\* This paragraph must be read with the regulations on pages 51 and 52, as indeed must the whole Act.



*General.*

*Bar to Selection.*—Successful candidates parting with their sections are debarred from the ballot for a year, unless they establish a special case to the satisfaction of the Land Board.

*Examination of Applicants.*—Applicants have the right of examination as to means, suitability, &c., in their own districts, with certificate of approval in case of passing.

*Public Halls and Recreation Purposes.*—Land may be leased for these purposes by the Governor.

The owner must keep everything in order, maintain insurances, pay rates, refrain from subletting, and certain other transactions without the permission of the Minister, and in default is liable to a rent of 5 per cent. on the compensation money.

*Limit of Acquisition.*—The acquisition of land is limited by the Act to a value of half a million a year, to which extent the Government can issue debentures at not more than 4 per cent. interest.

*Payment.*—Lands acquired may be paid for by cash or by debentures, or both, as the retiring owner may agree.

*Homestead-sites.*—Leases of homestead-sites may be granted to lessees of neighbouring pastoral lands for coterminous periods, with compensation for improvements to the outgoing tenant, as provided by the Land Act. In these cases the provisions of the Land Act as to limitation of area and residence are suspended, and the rent and lease conditions are according to the Land for Settlements Act.

*Homesteads.*—In every case of land acquired, the owner may obtain a lease in perpetuity for his homestead and the land about it up to 640 acres of first-class land or 1,000 of mixed, if the Board approves, and is satisfied that the grant will not prejudicially affect the settlement of the rest.

Tenants are subject to the prior rights of the owners in the same position.

In both cases the conditions of the lease as to insurance, maintenance, and repairs must have the Minister's approval.

*"Thirds."*—Lands acquired under the Act are not liable to the "thirds" clause of the Land Act.

*Transfer and Mortgage.*—Without the sanction of the Board and the Minister there can be no transfer or mortgage or charge on any property during the first five years of the lease.

*Surrenders.*—Any lease may be surrendered on such conditions as the Board recommends and the Minister approves.

*Special Sites and Reserves.*—Land may be sold for sites of churches up to 1 acre) and dairy factories (up to 5 acres), and may be granted or leased for public halls; and reserves may be made for State farms, and for public purposes (not endowments). In the latter case, the land may be paid for by money appropriated by the General Assembly, the price in no case being less than the original cost of the land with all expenses.

*Preparation.*—The Minister, after acquiring lands, has the power to prepare them for settlement; and if there is mineral land, he can do everything required to put it in condition for useful development.

*Mineral Lands.*—These the Minister may work himself, or he may lease them for periods up to twenty-one years, on any terms he chooses.

*Trusts.*—When trust lands (not including those held for Maoris) are acquired, the moneys paid and the exchanged lands (if any) remain subject to the trusts and all their conditions.

*Marlborough and Nelson.*—The Governor has power to stop the sale of pastoral lands in these districts.

*Accounts and Reports.*—Full accounts of expenditure under the Land for Settlements Account, and a complete report of all estates acquired during each year, and an account of all the estates in the Crown's possession, must be presented to Parliament every year within twenty days of the opening, or, if Parliament is in session, within twenty days of the end of the financial year.

*Bar against Evasion.*—After notice to owner of the Government's intention to take his land under the Act there can be no subdivision. If the intention is not carried out in twelve months the land is again free.

*Retrospective.*—Leases acquired before 1896 at rentals inclusive of improvements for which the lessees paid may be surrendered, and fresh leases issued under the later system, which bases rental on the land-value alone.

### *Applications, Balloting, &c.*

*Regulations.*—The wording of the regulations is as follows:—

(1.) No application will be considered unless it is accompanied by a deposit consisting of an amount equal to the rent for the first half-year of the term of one of the allotments within the group or subdivision applied for, together with the sum of one guinea to defray the cost of the lease.

(2.) An applicant may indicate his desire to select any one allotment in a group or subdivision, but no person shall be allowed to acquire or to hold more than one allotment.

(3.) If there is only one applicant for any allotment in a group or subdivision, he shall *prima facie* be entitled to the allotment selected by him.

(4.) If the applicant is successful in obtaining an allotment, his deposit, or a sufficient part thereof, shall be retained and applied in payment of the half-year's rent, or of the half-year's rent and sinking fund, in respect of such allotment, or of the interest only, as the case may be; the residue, if any, shall be returned to him, and he shall forthwith complete the payment of the first half-year's rent, or rent and sinking fund, if the deposit is insufficient. There shall not be any right to withdraw any application, or right to claim a refund of any deposit: Provided that the Board may, in its discretion, on application, permit the refund of any deposit on being satisfied that the application was genuine and made in good faith, and that the grounds for withdrawal are *bona fide* and not contrary to the spirit of these regulations.

(5.) In any case where there are fewer applicants than there are allotments in a group or subdivision, then, subject as hereinafter mentioned, each applicant shall have the option of taking the allotment mentioned in his application.

(6.) In cases where two or more applicants indicate their choice of the same allotment, then the Board may, by consent of the parties, adjust the applications; but if the applicants cannot agree to such an adjustment, then a ballot shall be taken by the Board.

10. (1.) In the event of there being more approved applicants for any group or subdivision than there are allotments available, the Land Board shall, by ballot, reduce the number of such applicants to the number of allotments available. A second ballot shall then be taken in each such group or subdivision as follows: The name of each candidate shall be placed separately in one box, and the number of each allotment shall be placed separately in another box, and lot shall be drawn from both boxes simultaneously; and the allotment whose number is so drawn shall go to the applicant whose name is simultaneously drawn, and he shall be deemed to be the successful applicant for that allotment.

(2.) For the purpose of deciding who are approved applicants, preference shall be given by the Land Board to the applications from those who are landless.

11. Every applicant who obtains an allotment under these regulations shall, from the date of the lease, reside continuously thereon.

12. It shall not be lawful for a lessee under this Act to transfer the land comprised in the lease within the period of five years from the date of such lease: Provided that, on the death of a lessee or on the happening of any extraordinary event which in the opinion of the Land Board of the district in which the land is situated renders a transfer necessary or expedient, a transfer of the lease may, with the sanction of the Land Board and the Minister of Lands, be made.

#### *Rebate of Rent.*

A rebate of not exceeding 10 per cent. is obtainable, at the discretion of the Commissioner of Crown Lands and the Receiver of Land Revenue, on payment of interest within a month after due date. ("Crown Tenants' Rent Rebate Act, 1900.")

### VI.—UNDER WORKERS' DWELLINGS ACTS, 1905 (Nos. 42 AND 57).

#### *Workers' Dwellings.*

Crown land may be used and also private land may be taken under "The Land for Settlements Consolidation Act, 1900" (compulsorily if necessary, after all other means have been exhausted), in boroughs of not less than fifteen thousand people, or within fifteen miles of their boundaries, for the purpose of erecting thereon workers' dwellings. These dwellings, costing from £300 to £350 (in the latter case, of brick), may be let or sold to workers on terms set forth in the following summary of the Workers' Dwellings Acts:—

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#### SUMMARY.

*Object.*—To find homes at reasonable rents for the workers, to whom the increased and increasing values of land in congested districts is a cause of great and increasing hardship.

*Sites.*—Government may acquire sites anywhere under the laws governing the process, and may set apart Crown lands anywhere it pleases. The sites are not to exceed in towns  $\frac{1}{2}$  acre; in suburbs, 1 acre.

*Cottages.*—On these sites the Government may erect cottages costing up to £350 or £400 (the latter for brick, stone, or concrete buildings).

*Disposal.*—These may be let to workers, "persons employed in work of any kind," whose annual income is not over £156.

*Rent.*—The rent is fixed at 5 per cent. on the cost (4 per cent. for rent and 1 per cent. for depreciation), with rates and insurance added.

*Tenures.*—The tenures are as follows:—

- (1.) A weekly tenure at the above rent.
- (2.) A lease for fifty years, renewable at a valuation of rent made by three persons, of whom two are chosen by the landlord and the tenant respectively; the third, who presides, by the other two.

- (3.) Deferred purchase of the freehold. Of this there are three modes, as follows :—

Mode A : By a lease for fifty years, as above, with the right to purchase the fee-simple for cash after twenty-five years.

Mode B : (a.) By payment of the freehold price in thirty-two instalments of 8 per cent. on the capital value—5 per cent. for rent, 1 per cent. for depreciation, 2 per cent. for capital. (b.) The same in forty-one years, the amounts being  $\frac{1}{2}$  per cent. for rent, 1 per cent. for depreciation,  $1\frac{1}{2}$  per cent. for capital, or  $6\frac{1}{2}$  per cent. in all.

Mode C : By insurance of tenant's life for a sum representing the capital value, realisable in twenty-five, thirty-two, or forty-one years, according to the three modes of deferred purchase above stated.

*Residence.*—Residence is compulsory, under pain of forfeiture.

*Transfer.*—The disposal of leases requires the consent of the Land Board, which is bound to deal reasonably and forbidden to be arbitrary, being enjoined to be guided by the intentions of the Legislature in the establishment of the system.

*Surrenders* may be arranged by mutual agreement.

#### PRIVILEGES.

##### "CROWN TENANTS' RENT REBATE ACT, 1900."

(a.) A privilege for the encouragement of prompt payment of rent is offered in the shape of a rebate of not exceeding 10 per cent. "The Crown Tenants' Rent Rebate Act, 1900," offers to all tenants of the Crown holding leases or licenses under Parts III and IV of "The Land Act, 1892," and deferred-payment holders under section 126 of "The Land Act, 1885," and perpetual-lease holders under Part IV of the same, who are not in arrears with their rents, a rebate of not exceeding 10 per cent. on each half-yearly payment of rent, at the discretion of the Commissioner of Crown Lands and the Receiver of Land Revenue, whose decision in the matter is final.

(b.) Remission of rent may be granted to any Crown tenant, as above defined, unable to pay through any natural disaster or sufficient cause, provided the Land Board recommend it and the Minister of Lands approves. The limit of remission is one year's rent.

##### "BUSH AND SWAMP CROWN LANDS SETTLEMENT ACT, 1903."

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#### SUMMARY.

*Object.*—The object of the Act is to encourage settlement on the bush and swamp lands of the Crown.

*Exemption from Rates.*—Settlers on such lands as the Governor may (before their offer to the public) declare subject to the conditions are exempt from the general rates of all local authorities for a period

not exceeding four years if their land is heavy bush, three years if light bush or swamp, and two years if scrub, from the date of disposition of the lands by the Crown.

*Exemption from Rent.*—Under the same conditions there is exemption from rent—after payment by the selector of the first half-year's rent—for four, three, and two years; but if a selector disposes of his interest during the first five years of his occupancy, all rent-concessions must be paid up, in which case the Board may make similar concessions to the incoming occupier.

*Residence.*—Occupiers of swamp lands may be relieved for five years, at the discretion of the Land Board, from the residence conditions of "The Land Act, 1892," by putting up double the amount of the statutory improvements.

*Definition.*—The definition of the classes of land—heavy bush, light bush, swamp, and scrub—is within the Governor's province.

### PART III.

#### OBLIGATIONS OF SETTLERS, AND PRIVILEGES, WITH LOCAL GOVERNMENT.

SETTLERS enjoy some privileges, and have duties, under many statutes dealing with local government and other things. They require guidance about such matters as fencing, the rabbit-pest, stock diseases, travelling stock, &c., rates of local bodies, drainage, water-supply, advances to settlers, the shooting and fishing seasons, and other things. For that guidance summaries are given of the principal Acts. At the same time, it should be distinctly understood that the object is simply to give settlers an idea of their various obligations. Any one requiring to get a closer knowledge of the various statutes will have to consult them for himself. This is not a treatise for lawyers, but for settlers.

##### LIST OF PRINCIPAL ACTS REVIEWED.

Animals Protection.  
Birds Nuisance.  
Counties.  
Cruelty to Animals.  
Dairy Industry.  
Dog Registration. (Injuries by dogs, &c.)  
" (Registration.)  
Education.  
Electoral.  
Fencing.  
Fertilisers.

Government Advances to Settlers.  
 Government Valuation of Land.  
 Homing Pigeon Protection.  
 Impounding.  
 Land.  
 Land and Income Assessment.  
 Land Drainage.  
 Land for Settlements.  
 Margarine.  
 Noxious Weeds.  
 Orchard and Garden Pests.  
 Public Works.  
 Rabbit Nuisance.  
 Rabbit-proof Wire-netting Fences.  
 Rating.  
 Road Boards.  
 Slaughtering and Inspection.  
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## ANIMALS PROTECTION ACTS (1880 TO 1903).

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## SUMMARY.

*Object.*—The Act provides for the preservation of game, forbids the importation of noxious animals, and permits the destruction of such noxious animals and birds.

*Shooting Season.*—There is no legal shooting or taking game outside the season, which is : for native and imported game—other than deer and godwit—from the 1st May to the 31st July.

Every third year, commencing on the 1st April, 1901, is made a close season for native pigeons, pukeko, and kaka, the Urewera country being excepted.

*Licenses.*—No one, except on his own land, can take or kill game without a license ; and no one can sell or dispose of game without a license. The first of these licenses lasts for the season ; the second is seven days longer. The penalty for unlicensed conduct in either case is up to £20.

The license for killing or taking game (other than deer) is £1.

The license for coursing is fixable by Governor's Regulation, and may not exceed £1.

The license must be produced to any " authorised person." Those coming under that designation are Rangers, constables, Justices of

the Peace, and the proprietors or occupiers of lands ; also the members of the council of any registered acclimatisation society, and all holders of game licenses.

*Exception to Rule requiring License.*—Every occupier of land, and his sons, and one person appointed in writing by such occupier, may shoot free over the lands of said occupier.

*Powers of Governor.*—He may restrict the season or suspend it altogether on the recommendation of any acclimatisation society ; or vary its character in any district or domain or forest reserve ;

Prohibit the sale of game in any district on being satisfied that it is not sufficiently plentiful ;

Give permission to destroy game that proves itself destructive ;

Prohibit the introduction of any animal or bird ;

Permit imported animals and birds, not game, to be killed at any time in specially proclaimed districts ;

Regulate books of public carriers, such as refrigerating companies, &c., so as to show everything concerning game ;

Fix the season for godwits ;

Fix the season for deer-shooting, with all conditions and fees, and duration of licenses ;

Control the registration and conduct of acclimatisation societies ;

Arrange the duties of Rangers and prescribe the mode of appointment, and prescribe the records of persons privileged to shoot without a license.

*Prohibition.*—The importation is forbidden of foxes, venomous reptiles, hawks, vultures, and other birds of prey ; so is their liberation ; and it is unlawful to keep any such imported animal.

The penalty is up to £100 in cash, and in default imprisonment up to six months.

The penalty for neglect in importing snakes with fruit is from £5 to £50.

Nothing can be imported by societies or individuals without the leave of the Minister for Agriculture.

*Guns.*—The use of swivel-guns is forbidden for game (native or imported). The arm to be used is restricted to shoulder guns, not larger than the size known as No. 10 at the muzzle, not longer than 36 in. in the barrel, and not heavier than 10 lb.

The penalty is up to £10.

*Destruction of Eggs.*—Wilful destruction of the eggs of imported game-birds involves a penalty up to £5.

*Keeping Live Animals and Birds.*—This is allowed at all times, with the exception of those whose importation is forbidden ; but they cannot be sold in the close season under a penalty up to £5.

*Game in Possession.*—Game found in possession without a license is *prima facie* evidence of poaching ; and possession out of season (after the seven days' grace) is forbidden.

*Hen Pheasants.*—The possession of a dead hen pheasant involves a penalty up to £20, and forfeiture of the license if one is held.

*Trespassing* on land in search of game involves a penalty up to £20, and the possession of a gun or dog is *prima facie* evidence of unlawful intent.

*Trapping, &c.*—No game can be taken except by shooting and hunting. Trapping may be specially permitted for acclimatisation purposes only.

*Poisoning.*—Poisoning game is forbidden.

*Administration.*—The law is worked by the acclimatisation societies, who usually recommend the appointment of the Rangers. The latter are appointed by the Governor, and have the same power as constables of seizing game, guns, nets, &c. Constables work with them sometimes, of course.

The penalty for obstruction or disobedience is up to £20.

*Informers.*—Half the fine goes to the informer, and the other half to the Consolidated Fund.

*Minimum Penalty.*—No fine is less than £1.

<i>Penalties.</i>			Not exceeding
Taking game without license .. .. .	..	..	£20
Selling game .. .. .	..	..	£20
Importation of forbidden animals and birds ..	..	..	£100*
Neglect in importing snakes with fruit ..	..	..	£5 to £50
Using guns forbidden by the Act .. .. .	..	..	£10
Destruction of the eggs of imported birds ..	..	..	£5
Selling of live birds in close season .. ..	..	..	£5
Killing hen pheasant .. .. .	..	..	£20
Trespassing after game .. .. .	..	..	£20
Obstructing Rangers and refusing them evidence or giving them false evidence .. .. .	..	..	£20
Other cases, where no specific penalties are provided ..	..	..	£20
Breach of regulations .. .. .	..	..	£20

\* Six months' imprisonment in default of fine.

## BIRDS NUISANCE ACT (1902).

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### SUMMARY.

*Object.*—The Act was passed for the destruction, by combined local public effort, of the birds whose depredations are a serious loss to the cultivator.

*Local Authorities.*—It is worked by local authorities, which are—

(1.) Councils of Counties, Councils of Boroughs, and Town Boards.

(2.) Road Boards where there are no County Councils.

(3.) Where there is no Road Board, the Minister for Agriculture.

*Their Duties.*—They must apply their funds to the destruction of “injurious birds”—i.e., birds so gazetted by Order in Council—on and after the day fixed by the Governor in Council.

*Their Funds.*—The funds are (1) the general funds of the local districts, and in districts in which the Minister for Agriculture has the



status of local authority, the appropriations of Parliament; (2) a general rate of  $\frac{1}{8}$ d. in the pound on capital value, or its equivalent, leviable irrespective of any limit imposed by any Act.

*Their Powers.*—The local authorities may appoint Inspectors, make by-laws, and do all things necessary for the effective performance of their duties under the Act.

*Combined Districts.*—The Governor may group local districts into districts under this Act, with names and boundaries as he pleases, the latter so adjusted as to include whole local districts in the combination.

*Conference.*—Within these combined districts the Governor may summon a conference of delegates from the local authorities having jurisdiction within its boundaries (one from each, at time and place of his own choosing), to select some method of dealing with the bird nuisance, and recommend the date of its application.

The Governor may proclaim the said method and date, or any other method and date he chooses, and the local authorities have to obey forthwith.

*The Method.*—If the method as above enforced proves inadequate, the local authorities may supplement by any additional means they please.

*Failure of Local Authority.*—If the results of action as above in any local district do not satisfy the Minister for Agriculture, he may appoint Inspectors to take the necessary steps for destroying the “injurious” birds in such district, and for such purpose give them the necessary powers and rights of entry. The expenses in such case are charged to the local authority, and may be deducted from moneys in the hands of the Government for payment to the local authorities in question.

*Poison.*—Grain or any other material, poisoned, may be laid by any local authority on any roads or lands within their jurisdiction. They must give previous public notice of their intention, and can lay no poison within 300 yards of any inhabited house without the written consent of its owner.

*Regulations.*—The Governor may make regulations for convening the conferences, defining powers, duties, and functions of all Inspectors, whether appointed by the Minister or the local authorities, the methods of bird-destruction adopted, and generally all matters he thinks necessary for the purposes of the Act.

#### *Penalties.*

	Not exceeding
For obstructing or assaulting Inspectors or using bad language to them .. .. .	£10
(Proceedings for recovery of penalty do not bar any action at law.)	
For breach of regulations of the Governor .. .. .	£10
For breach of regulations of local authority .. .. .	£10

#### *Limitation to Middle Island.*

The operation of the Act is limited to the Middle Island; but on a resolution of any North Island local authority asking him to do so, the Governor may proclaim the Act in any local district, and on similar request may revoke the Proclamation.

## COUNTIES ACT (1886, ETC.).

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## SUMMARY.

*Introduction.*—When the nine provinces were abolished in 1876 the colony was divided for local-government purposes into counties, regard being had to boundaries of existing road districts, and the counties were subdivided into ridings, each riding being empowered to elect a certain number of members of the Council of the county. The Counties Act contained provisions for establishing new counties by the subdivision of old ones, for the amalgamation of counties, and for merging other districts into the counties. The law was consolidated in 1886, the Act of which date contains, with the various amending Acts since passed, the whole of the law on the subject, and is known as the leading Act.

In 1905, after the session of the General Assembly, there were ninety-seven counties in the colony. In eighty-six of these the Counties Act is in full force, in five its operation is partial, and six counties are exempt altogether. These are: Awakino, West Taupo, East Taupo, Sounds, Fiord, and Chatham Islands.

## THE COUNTY COUNCIL.

Each county comprises a certain number of town districts, road districts, and outlying districts, which are all the lands outside the other two with the exception of boroughs, which are not included in counties.

The ridings comprise one or more of the above three districts. They have no governing body—they are simply the electoral divisions of the county, and their maximum number is nine. Their electoral rolls are made up by the County Clerk from the various rate-payers' rolls (town and road district), and from information compiled by order of the Council as to the rateable property in the outlying

districts. From the decision of the Clerk there is appeal to a Magistrate, who hears and determines all appeals in due course.

The County Councils are elected by the ratepayers on the county rolls.

The ridings are 521—312 in the North Island and 209 in the Middle Island.

The road districts are 211—149 in the North Island and sixty-two in the Middle Island.

#### *Functions of County Councils.*

Their powers, which include those of contract, comprise :—

*Public Works*, from branch railways downwards, which they may construct for the Government, for themselves alone, or in combination with each other ; and to the cost of all of which they may subscribe from the County Fund.

*Fire Brigades*.—They may establish and maintain fire brigades, and all their equipment, out of the county funds, and may appoint Fire Inspectors to direct and control the work of fire-prevention, with all necessary powers. They may also arrange with existing fire brigades or other persons to do the work of fire prevention and suppression.

*Harbour-works*.—A Council is eligible, in the absence of a Harbour Board, to be appointed a Harbour Board by the Governor at its request.

*Roads and Bridges*.—The control of county roads, and roads through Native or Crown lands, is in the hands of the Council, together with the duty of construction, maintenance, and repair of such roads, bridges, and ferries ; and, with the Governor's delegation, they may authorise private persons to establish bridges and ferries ; and they may make regulations for their management. The control of county roads remains with the Council through town and road districts, but may be delegated. County roads, moreover, may, on the unopposed petition of at least three-fifths of the ratepayers of any riding, be declared district roads, and within thirty days of such declaration they pass under the control and responsibility of the Road Boards.

In respect of bridges a Council may, with the consent of the ratepayers, establish tolls as security for the money expended on their cost.

*Tramways*.—The Council may not only construct but manage and maintain tramways.

Where the Counties Act is not in force, the Governor may authorise individuals or neighbouring local authorities to take tramways into and through such districts, with all the powers held by local authorities under the Tramways Acts.

*Water-supply*.—They are the chief controllers and purveyors of water-supply and irrigation, with powers set out in the Water-supply Act of 1891 and amending Acts, for summary of which *vide* summary of Water-supply Act.

*Health*.—Under "The Public Health Act, 1900," a county may form a health district by itself, presided over by a District Health Officer, or may be associated with others. The powers of the latter are very extensive, dealing with overcrowded buildings, insanitary premises, noxious trades, &c., and the County Council must adopt his recommendations.

*Miscellaneous.*—Councils may establish, erect, maintain, and manage, or subscribe to the maintenance and management of industrial schools, agricultural schools, and public libraries.

They can subscribe towards the eradication of noxious weeds, and do the work themselves in outlying districts, and make by-laws.

They control and manage public reserves and places of public recreation, making by-laws for the purpose.

Set up, acquire, or subscribe to rifle ranges, or subscribe for these purposes.

Establish markets, and regulate their working by by-laws; but the markets, buildings, &c., must first be certified by a Magistrate or two Justices as complete and fit for use.

Erect and maintain public weighbridges, at which the public are entitled to have their vehicles, loaded or unloaded, weighed and certified by ticket.

The Councils regulate the status and conduct of pedlars and hawkers by by-laws.

They may license and control public billiard-tables not connected with hotels, and make by-laws for the purpose.

They may light streets, roads, bridges, all public places and public buildings.

*By-laws.*—The Councils may make by-laws on subjects other than the above, viz.,—

Irrigation and water-supply;

Licensing and inspection of vehicles;

Regulations for the use of vehicles, width of tires, and weights of engines, &c., to be permitted to use roads and bridges;

Regulation of traction-engines and other vehicular traffic;

Prohibiting the running at large of pigs and goats, &c.; but on this subject the Impounding Act is the leading authority.

#### *Status of Councils.*

*Members.*—They are elected by the ratepayers of the ridings, and number from six to nine. All electors are qualified, subject to the ordinary causes of disqualification, such as insanity, crime, bankruptcy, &c. The general election is on the first Wednesday in November of every third year.

In any county (full of road or town districts), on petition of three-fifths of the ratepayers, elections may be done away with, and the Chairmen of the road and town districts may be declared the County Council; in such case, the old state of things can be brought back again on a petition of similar strength.

*Qualification of Electors.*—Every one is entitled to be on the county roll who is on the ratepayers' roll of the town, road, or outlying districts, or who holds a miner's right.

People not voting are struck off the rolls.

*The Voting-power.*—(1.) The holder of a miner's right must, before he can vote, have resided two months, under a penalty not exceeding £10, in the riding; he has only one vote.

(2.) Rateable property up to £1,000 carries one vote.

(3.) Rateable property from £1,000 to £2,000 carries two votes.

(4.) Rateable property from £2,000 to £3,000 carries three votes.

(5.) Rateable property from £3,000 to £7,500 carries four votes.

(6.) Rateable property of £7,500 and over carries five votes.

### *Finances of Counties.*

*General Rate.*—The rating-power (general) of County Councils is limited to 1½d. annually; and where there are no town and road districts, the limit is 3d.

*Separate Rate.*—There is a power of levying for general purposes a “separate rate,” for any riding or particular district defined by special order. But the sum of general and separate rates must not exceed the above maximum limit.

The separate rates are to be spent in the districts supplying them.

*Special-works Rate.*—On petition of three-fifths of the ratepayers a special-works rate may be levied: (1) generally for some work of benefit to the whole county; (2) or locally for some work of benefit to some special locality. The Council shall first get an estimate of the work, and give thirty days’ public notice. The imposition of the rate must be by special order.

*Special Rate.*—After a loan has been raised in the way authorised, as explained further on, a special rate may be imposed. This rate runs on until the loan is paid up, and is not quashable under any circumstances.

*Special Loans.*—For constructing works of any kind the Council has power to borrow money secured on special rates. The amount is limited to four times the general rate.

*Loan Procedure.*—The proposal for any such loan must be notified publicly for six weeks. It must be submitted to a public meeting of ratepayers not more than ten days after the last notification; and when the poll is taken (from one to three weeks) after the meeting the favourable vote, to be valid, must consist of at least three-fifths of the number of votes polled, which must represent more than a third of the whole voting-strength on the roll.

With consent of ratepayers the borrowing-limit may be locally stretched to six times the local proportion of the general rate.

*Overdrafts* are limited to the amount of one year’s rate, excluding Government grants, proceeds of loans, or of special and separate rates. In new counties the limit is one year’s income, with the same exclusions.

Borrowing in excess of these limits, or otherwise wrongly, involves a penalty up to £100, together with the obligation of repaying the money.

*Receiver.*—In case of default to meet loan obligations, a Receiver may be appointed to receive the special rate until the loan is paid off.

*County Fund.*—Government grants for various purposes, together with the above revenues and loan proceeds, as also all rents and interest on deposits, constitute the County Fund. Its expenditure includes payment to local bodies for work the Council is empowered to arrange with them to do, by delegation of power or otherwise. Cheques are signed by two of the councillors appointed by the Council.

### *Special Orders.*

These are made as follows:—

- (1.) A resolution is passed at a special meeting of the Council;
- (2.) That resolution is confirmed fourteen days later by a subsequent meeting;

(3.) If due public notice has been given in the interval, the confirmation makes the resolution a special order.

Proceedings to quash any special order must, to be valid, be begun within six months.

Special order altering boundaries or districts to take effect by the end of the financial year must be gazetted before the 1st October. In case of gazetting subsequent to that date, the boundaries or districts remain till the end of the following financial year. (N.B.—The financial year ends on the 31st March.)

#### *The Act in Suspension.*

Where the Act is suspended, as in the Counties of Eden, Manukau, Raglan, Ashley, and Peninsula, most of the functions of the County Councils are discharged by the Road and Town District Boards. The Councils of those counties consist of the Chairmen of the Town and Road Boards—not less than six nor more than nine of them; they meet once a year on the statutory day to elect a Chairman, make provision for charitable aid, and divide the County Fund.

The Act may be revived at any time in these counties at the will of the ratepayers.

#### *Miscellaneous.*

*Suspension.*—The Act cannot be suspended in any of the counties in which it is in full force.

*New Counties* can only be established by special legislation.

*Combination.*—Counties may be combined by Governor's Proclamation.

*Boundaries.*—County boundaries may be altered by the same means, of course after petition of ratepayers.

Alterations of boundaries of ridings, road districts, and outlying districts may be made by special order of the Council.

No county or riding can contain parts of road or town districts.

*Merger of Districts.*—Town and Road Boards may be dissolved on petition, and their district merged into the county.

No borough ever forms part of any county, even though within its boundaries.

*Publicity.*—The meetings of County Councils are open to the public, and their accounts and rate-rolls are also open for inspection at any time.

*Remission of Rates.*—Rates may be remitted in cases of extreme poverty.

*New road districts* cannot be made without the consent of the County Council.

*Ouster of Office.*—In case of incapacity, technical or otherwise, Chairmen and Councillors may be ousted from office by the judgment of the Magistrate's Court after due trial. No proceedings can be taken into the Supreme Court.

#### *Penalties.*

These range over a large area. They are for the most part to be found in the by-laws passed by the County Councils, which ought to be in the hands of every one whose interest it is to obey them. A number are in the summary of the Water-supply Act.

**CRUELTY TO ANIMALS: "POLICE OFFENCES ACT, 1884," SECTIONS  
7 TO 14; 1892, SECTION 3.**

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**SUMMARY.**

*Offences.*—The following offences entail a penalty up to £20, or imprisonment up to two months, at the discretion of the Court (a Magistrate or two Justices): Cruelly beating, ill-treating, overdriving, overloading, abusing, or torturing any animal.

Omitting (if owner, or if in charge) to supply any animal with sufficient food, water, or shelter.

Fighting and beating any kind of animal, and everything connected with such things, including aiding and abetting.

Slaughtering, branding, conveying or carrying, or causing to be slaughtered, branded, conveyed or carried, any animal in such a manner or position as to subject such animal to unnecessary pain or suffering.

*Damages.*—Persons responsible for cruelty, as above, are liable for compensation to the owners, but the payment of compensation is not a bar to penal proceedings as above.

*Obstruction to Constable.*—Constables may enter and inspect sale-yards, and obstructing involves a penalty up to £10.

*Apprehension of Offenders.*—These may be arrested by a constable on his own view or on the complaint of any other person, declaring name and place of abode, and taken before a Justice without other authority or warrant.

Justice may issue warrant without previous summons whenever good grounds shall be stated on oath before him.

*Detention of Property.*—When persons are thus taken into custody the constable can detain any vehicle or animal in their possession, to be kept at their cost, as security for penalties and expenses; in the event of conviction, any Justice may, in default of payment, order the property to be sold.

*Merciful Killing of Animals.*—Any animal in a pound or elsewhere in so weak, disabled, or diseased a state that it ought to be killed, may be killed on the order of any Justice or Magistrate.

**DAIRY INDUSTRY ACTS, 1898 AND 1903 (WITH REGULATIONS).**

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## SUMMARY.

*Objects.*—(1.) To regulate the manufacture, sale, and export of dairy-produce, and the inspection of dairies. (2.) To provide for Government advances to dairy factories.

*Method.*—A branch of the Department of Agriculture administers the Act and effects its objects. The branch consists of a Dairy Commissioner and a staff of instructors, graders, inspectors, analysts, &c., and other experts. A number of regulations, drawn up under the Act, are in force.

*Production.*

*Definition.*—A “dairy” is: (a) a milk-house, milk-shop, dairy factory, and any other place where dairy-produce is collected, deposited, treated, separated, prepared, or manufactured, or is sold or offered or exposed for sale; and includes (b) a farm, stockyard, milking-yard, paddock, stable, stall, and any other place where cows from which the milk-supply of a dairy is obtained are depastured or kept.

“Pure milk” means the whole of the milk (including what is commonly known as “the strippings”) drawn at the time of milking; but does not include milk which contains less than 3 per cent. of butter-fat, or is mixed with any preservative or chemical or colouring matter of any kind whatsoever.

*Sanitation (The Six Rules of).*—No pigs may be kept within 50 yards of any dairy, as defined above in paragraph (a).

No fowl-house, manure-heap, cesspool, or closet may be within 30 ft. of any dairy, as defined in (a), or of any enclosed yard or building where cows are kept.

No drainage of “stock or pigs” may flow into or (unless in a properly enclosed drain) within 50 yards of a dairy, as above defined.

Everything must be wholesome and clean—farms, dairies, utensils, tools, carts, railway-trucks, storages, and ships exporting dairy-produce.

Diseased stock must be forthwith separated, and the milk and cream thereof must not be mixed with other produce, or in any way sold for food.

Produce condemned by the Inspector must be destroyed.

*Inspection.*—The Inspectors have the right of entry at all reasonable times, everywhere, from dairy to export ship. They have authority to enforce cleanliness and sanitation, condemn produce, isolate dairies and their produce, get regularly from dairy-keepers lists of their customers, and the persons who supply them with dairy-produce.

*Registration.*—Every dairy, the produce of which is exported, must be registered, and the produce must be marked with the registered brand and number of the dairy, excepting that manufactured only for home consumption, for sale in prints and pats, or for the supply of the packers of milled butter.

Applications for registration are made in prescribed form to the Secretary for Agriculture at Wellington, who before issuing a certificate of registration must be satisfied: (1) That the statements made by the applicant are true; (2) that the dairy is in a sanitary condition.



The certificate has a currency which can be disturbed by nothing but the owner's disobedience to the conditions, which may be summed up as "obedience, within short limits, to the Dairy Industry Act, and the regulations made under it."

*Classification of Dairies.*—Dairies are registered as—

- "Factories" or "creameries"—*i.e.*, milking at least fifty cows;
- "Private dairies," milking less than fifty;
- "Packing-houses"—*i.e.*, establishments which blend butter made elsewhere into milled butter.

If after registration the cattle milked for a dairy get from one of the above classes to another, one of two things must be done: either the number must be restored or a new certificate must be given, with a new classification.

Certificates may be transferred.

*Cancellation of Certificate.*—Certificates may be cancelled by the Secretary,—

- If the owner wishes;
- If he has not used his registered brand for a year;
- If in one year he has been three times convicted of breaches of the Act or regulations.
- If he fails to obey any order of the Inspector about improving the sanitary condition of his dairy;
- If, when required by an Inspector in prescribed form to increase his cattle to the number required by the higher class of his certificate, he fails to do so.

In cases of alteration the Inspector has discretionary power to deal with merely temporary alterations of numbers.

*Forms.*—The prescribed forms are as follows:—

Form 1 (Reg. 5).

APPLICATION FOR REGISTRATION OF DAIRY AS A PRIVATE DAIRY [or A FACTORY or CREAMERY, or A PACKING-HOUSE].

To the Secretary for Agriculture, Wellington.

APPLICATION is hereby made for the registration of the under-mentioned dairy premises as a private dairy [or a factory or creamery, or a packing-house], particulars whereof are as follows:—

1. Name of dairy premises:
2. Where situated:
3. Name of owner or company:
4. Name of secretary of company:
5. Postal address:
6. Name, and distance to nearest—
  - (a.) Post-office:
  - (b.) Telegraph or telephone office:
  - (c.) Railway-station:
  - (d.) Shipping port:
7. Milk-supply—
  - Average number of cows from which daily milk-supply is obtained:
  - Average number of milk-suppliers:
8. Description of brand desired:
9. Description of brand now in use (if any):

Dated at , this day of , 19 .

A. B.,  
Owner [or Secretary].

Form 2 (Reg. 6).

CERTIFICATE OF REGISTRATION.

THIS is to certify that, pursuant to application in this behalf, dated the day of , 19 , the under-mentioned dairy premises are registered as a , under the number .

The registered owner is \_\_\_\_\_, and the registered brand is as specified below.

Situation and particulars of the dairy premises:

Description of registered brand:

Dated at Wellington, this \_\_\_\_\_ day of \_\_\_\_\_, 19 \_\_\_\_\_.

Secretary for Agriculture.

Form 3 (Reg. 10).

NOTICE [to amend bad conditions].

To \_\_\_\_\_

TAKE notice that the \_\_\_\_\_, registered number \_\_\_\_\_, whereof you are the registered owner, is in an unsatisfactory state by reason of the following defects in the sanitary condition of the dairy and its appliances, that is to say: [*Set out the defects*]; and you are hereby required to remedy these defects within \_\_\_\_\_ days after the service upon you of this notice.

If you fail or neglect to comply with this notice, the registration of the dairy is liable to be cancelled.

Dated at \_\_\_\_\_, this \_\_\_\_\_ day of \_\_\_\_\_, 19 \_\_\_\_\_.

Inspector.

Form 4 (Reg. 12).

NOTICE TO INCREASE NUMBER OF CATTLE [*according to classification of dairy*].

To \_\_\_\_\_, registered owner of the factory [*or creamery*] registered as

No. \_\_\_\_\_, situate at \_\_\_\_\_

TAKE notice that the number of cows from which the milk-supply of the above-mentioned factory [*or creamery*] is drawn is less than the number required in order to entitle your dairy premises to be registered as a factory [*or creamery*]: therefore you are required to increase the number to not less than fifty within the space of \_\_\_\_\_ days.

Should you fail or neglect to comply with this notice the registration is liable to be cancelled.

Dated at \_\_\_\_\_, this \_\_\_\_\_ day of \_\_\_\_\_, 19 \_\_\_\_\_.

Secretary for Agriculture.

**Branding and Stamping.**—Nothing can leave a registered factory without a correct brand, or without the inscription of the true net weight, and may have the owner's trade-mark.

The brands must be stencils or rubber stamps, and must either be supplied by the Agricultural Department (at 6s. and 8s. respectively), or be approved by the same.

It is an offence against the Act for unregistered persons to use registered brands, or the distinctive names occurring in them; for any one to use a brand not his; for any one to permit his brand to be used by any one else.

**Stamps.**—The following stamps are prescribed by the regulations:—

In the case of a private dairy—

Form 5 (Reg. 14).

<p>NEW ZEALAND Produce. Pure DAIRY BUTTER. No. 0 Regd.</p>
--

Form 6 (Reg. 14).

<p>NEW ZEALAND Produce. Full Cream DAIRY CHEESE [or, as the case may be, Half Skim Dairy Cheese]. No. 0 Regd.</p>
---

In the case of a creamery or factory—

Form 7 (Reg. 14).

NEW ZEALAND  
Produce. Pure  
CREAMERY BUTTER.  
No. 0 Regd.

Form 8 (Reg. 14).

NEW ZEALAND  
Produce. Full Cream  
FACTORY CHEESE  
[or, as the case may be, Half Skim Factory Cheese].  
No. 0 Regd.

All brands or marks on “dairy,” “creamery,” or “factory” made butter or cheese shall be in some dark colour other than red.

In the case of a packing-house—

Form 9 (Reg. 14).

NEW ZEALAND  
Produce. Pure  
MILLED BUTTER. ✓  
No. 0 Regd.

### *Sale and Export.*

*Prevention.*—No dairy-produce that has been condemned, or is affected with disease, or suspicious, can be sold. Neither can any which is improperly branded either as to character or weight.

Milk which is not “pure milk” as defined can only be sold with a written statement of the fact.

*Adulteration.*—Dairy-produce must not be in any way adulterated, except by admixture of the ordinary harmless preservatives and colouring matters, and pure sugar and common salt.

*Storage.*—Dairy-produce for sale must not be stored in rooms used for domestic purposes, or in unwholesome places.

*Analysis.*—Buyers of milk and cream can take samples for analysis. In that case the seller may insist on division of the sample equally into two bottles, sealed with the seals respectively of buyer and seller, the buyer taking the seller’s bottle for analysis and the seller keeping the buyer’s.

*Export.*—The Government appoints the ports of export, and the cold-stores to be used therein for inspection, grading, &c.

*Ports.*—At present the ports appointed are Auckland, New Plymouth, Wellington, Lyttelton, Port Chalmers, Dunedin, Bluff.

*Stores.*—They are prescribed in the regulations.

*Conditions of Export.*—The produce must be sound, in good condition, and free from disease.

It must have been duly inspected and graded, and properly marked.

Its shipment can only be permitted in ships fit to receive it and carry it to its destination in good order and condition.

**Regulations.**—The following are the subjects concerning which the Governor may make regulations :—

- (1.) Registration of dairies.
- (2.) Registration or licensing of persons engaged in the manufacture or sale of dairy-produce.
- (3.) Registration of marks, &c.
- (4.) Inspection of dairy stock.
- (5.) Inspection and sanitation of dairies and everything connected with the manufacture and conveyance of dairy-produce.
- (6.) Inspecting, grading, and marking of dairy-produce.
- (7.) The export of dairy-produce, and the sanitation of ships carrying the same.
- (8.) Preventing infection or contamination of dairy-produce.
- (9.) Pasteurisation at factories.
- (10.) Water-supply and its pollution.
- (10A.) Preventing pollution of streams or rivers by dairy factories.
- (11.) Preventing manufacture, sale, and consumption of dairy-produce infected, or made from infected sources.
- (12.) Control of preservatives.
- (13.) Assigning and regulating fees payable.
- (14.) Form of licenses.
- (15.) Imposition of penalties up to £50 for breach of regulations.

Regulations dealing with the above have been gazetted. They contain very full details, and should be in the hands of every settler wishing to acquire more detailed information than is here supplied.

#### *Penalties.*

	Not exceeding
Resisting or obstructing officers .. ..	£50
Refusing them information .. ..	£50
Giving them false information .. ..	£50
Breach of the export provisions .. ..	£50
Falsehood in statements required by the Act .. ..	£50
All other breaches of the Act for which no penalty is prescribed .. ..	£50

NOTE.—In addition to these penalties there is, in certain cases, cancellation of license, as set out under that heading.

#### *Government Loans.*

A dairy company, if permitted by its regulations to borrow money, may borrow from the Government on account of land, buildings, plant, and machinery.

The Government, which at present is empowered to lend up to £30,000 a year in this way until\* 1908, have, before lending, to be satisfied that the financial position of applicant companies is good; their capacity of production and their prospects of milk-supply what they ought to be; and that at least one-fourth of the nominal capital has been called up and expended in either land, buildings, plant, or machinery. And there must be a "valuer's" report, specifying separately the value of the land, buildings, machinery, plant, and uncalled capital. The Government has the fullest discretion.

The amount to each company is limited to £2,000, and must not exceed in any case three-fourths of the uncalled capital at date of application.

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\* The Act of 1903 extended the time from 1904 to 1908.

The work must be done under the supervision of an Inspector appointed by the Government.

Repayment with 5 per cent. must be by half-yearly instalments, in fifteen years, or as may be agreed on. The calculation of the instalments is according to the scale used in the Government Advances to Settlers Act (*q.v.*).

The companies execute the usual mortgage to the Government, which, in case of default, is empowered to sell or lease or manage the property as it pleases. After the appointment of a Government representative in such case, the powers of the company's directors cease.

The Government is empowered, for the purposes of the Act, to borrow on debentures from any one or any institution it pleases.

#### DOG REGISTRATION, 1880 (INJURIES BY DOGS, ETC.).

##### INDEX.

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Dangerous dogs at large unmuzzled ..	70	Owner's identity .. ..	70
Dogs at large .. ..	70	Penalties .. ..	70

##### SUMMARY.

*Dangerous Dogs.*—On complaint that a dog is dangerous, or not kept under proper control, any Court of summary jurisdiction may order the owner of the animal to keep it under proper control or destroy it.

It is unlawful to permit a dangerous dog (known to be dangerous or to have bitten or injured persons, or cattle, or other property) to be at large unmuzzled. Such may be seized and killed at once by any constable.

*Dogs at Large.*—Any dog running at large among cattle or sheep may be destroyed by the owner of the sheep or his servants without liability to damages.

*Dogs in Mischief.*—(1.) Any one who sees a dog at large biting or attacking persons or cattle (including horses and sheep), or who is himself bitten or attacked by such, may destroy it.

(2.) Dogs rushing at persons, horses, cattle, &c., thereby causing danger to human life or limb, or to property, may be immediately killed.

(3.) In case of damage in this or any other way by dogs, the owners are liable for it, over and above the penalties as below. In case of such damage the aggrieved parties do not need to prove mischievous propensity on the part of the dogs or neglect on the part of their owners.

*Owner of a Dog* is "the occupier of any house or premises where any dog is ordinarily kept or permitted to live or remain, and includes the keeper of a dog, or the person in whose care such dog may temporarily be, whether loosed or confined, or who may harbour any dog." This definition applies in questions of registration as well as of injury done.

##### Penalties.

	Not exceeding
Failing to comply with order of Court to destroy or keep under control .. ..	£1 a day
Allowing dangerous dog to go about unmuzzled .. ..	£2
For "rushing" dogs .. ..	£5*

\* Plus any damages sustained.

## DOG REGISTRATION ACTS (1880, 1882, 1890). (REGISTRATION.)

## INDEX.

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## SUMMARY.

*Registration.*—All dogs above six months old must be registered within fourteen days after the age-limit, under penalty not exceeding £5.

No dog can be registered till the fee is paid.

Payment of fee after the above grace period, if voluntary—i.e., without a summons—frees from the liability to penalty.

Onus of proof of a dog's age, or of possession for less than fourteen days, lies on the owner.

*The Registration Period* is the calendar year, and all registrations effected during the year extend only to the 31st December following. First registrations after the 1st July are at half the fee.

*Registration Fee.*—The fee fixed is 10s., and it may be reduced by the local authority to anything between that sum and 2s. 6d.

For sheep and cattle dogs (to the limit of three) belonging to shepherds or drovers who live in the country, and farmers, the fee may be reduced to anything between 2s. 6d. and 1s., and also for dogs kept for rabbit purposes.

All reductions require a statutory declaration.

Registration in any district covers the whole colony.

*Mode of Registration.*—The description of a dog having been given at a registry office, the animal is registered, also the name and residence of the owner, who is entitled to a corresponding label, together with a collar; but he may attach the label to any other collar.

Change of ownership in dogs is noted in the registration-book free of charge, and the label becomes the property of the new owner.

*Consequence of Non-registration.*—Dogs without collar and label are regarded as unregistered, and such found wandering on land may be destroyed by the owner or his agent; or seized and kept by the police or duly appointed person for seven days, at the end of which time, if the expenses are not paid by the owners, they may be sold, the balance of the money going to the District Fund.

*Penalties.*

	Not exceeding
False description for registration .. ..	£5
False declarations for reduction of fee .. ..	£20*
Counterfeit label (manufacture or use of) .. ..	£20
Obsolete label (for a dog wearing last year's label) ..	£5
Wrong label (for a dog wearing another dog's label) ..	£10
Wilfully and maliciously removing label .. ..	£10†

\* In default, not exceeding one month's imprisonment.

† Plus the full value (to the owner) of any dog destroyed or sold in consequence.

*Owner's Identity.*—*Vide* Dog Registration Act (Injuries by Dogs).

## EDUCATION ACT (1904).

## GENERAL.

Ample provision is made for the education of the people. The system established costs between £600,000 and £700,000 a year, and there are numerous endowments. These are,—

	Acres.	£
For primary education ..	759,590	1,442,345
For secondary education ..	43,024	154,832
For secondary education ..	62,064	25,800
	864,678	1,622,977

The system is divided into four sections—(1) The primary schools ; (2) the secondary schools ; (3) the technical classes ; and (4) the university colleges, affiliated to the University of New Zealand.

Of these, the first division is free, and the rest all involve the payment of fees, which are avoidable by the holding of scholarships and the winning of free places by passing a certain standard of examination. In the case of the technical-instruction classes, scholarships are also provided, and grants, and thus is the way opened to the highest and the most practical education, from the primary school to the university.

The system has been lately enlarged in these respects, with results best described in the annual report (for 1905) of the Minister of Education—viz., “ The number of endowed secondary schools giving free tuition to all qualified pupils at the end of 1904 was twenty, and the number of pupils holding free places was 1,595. There were besides about 387 holders of scholarships and exhibitions given by these schools, or by Boards of Education, or by the four endowed schools not coming under the conditions. Further, there were 2,291 qualified pupils receiving secondary education in the secondary classes of the district high schools, which numbered fifty-two. On the whole, therefore, the effect of recent legislation and the regulations thereunder has been to afford free secondary education for some 4,273 children from the primary schools, whereas at the end of the year 1901 the number was about 963.”

The value of these privileges is alluded to in the report of the Inspector-General of Schools for the same year. He says, “ Five years ago, in 1900, the scholarship grants to Education Boards, which amounted to £8,424, represented practically the total expenditure out of the consolidated revenue upon secondary education, though, perhaps, we may add thereto £272 expended by the Victoria College Council out of its statutory grant upon Queen’s Scholarships. In the present financial year, although the amount of the scholarship grants to Education Boards was not increased, yet the capitation paid to the governing bodies of secondary schools on account of free pupils will reach, at least, £16,000 ; the special grants paid to Education Boards for free pupils in the secondary departments of district high schools will probably exceed £16,000 ; the total cost of Junior National Scholarships (exclusive of examination expenses) will be about £1,200 ; so that the total annual expenditure on these items will be not less than, say, £42,000 during the current year.”

Nor was this all. The Inspector-General continues : “ In addition, Victoria College now spends upon Junior Queen’s Scholarships about

£760 a year; classes for manual instruction in secondary schools and district high schools receive capitation grants; special grants are given for additional buildings rendered necessary by the large influx of free pupils, and for science laboratories and school workshops."

In addition, there is provision for technical education, under which various classes are set on foot, some of which are partly maintained by municipal authorities, schools of art, schools of mines, agricultural associations, industrial associations, &c. The system is growing into greater importance from year to year.

#### THE ACT.

The Act is divided into six parts, as follows:—

Part I. Department of Education.

Part II. Education Boards.

Part III. School Districts: School Committees and their duties.

Part IV. Public schools and management thereof.

Part V. Manual and technical instruction.

Part VI. Public-school Teachers Incorporation and Court of Appeal.

#### *Part I.—Department of Education.*

This part establishes the Department of Education under the Minister of Education, with Secretary, Inspector-General of Schools, and other necessary officers, and provides that the expenses of the educational administration shall be appropriated by the General Assembly.

The Department pays its own salaries and expenses, and also the salaries of all the teachers and pupil-teachers throughout the country. It pays, in addition, to the Education Board of each education district £250 a year, together with a sum of 11s. 3d. for each child in average daily attendance. It finds the money in addition for the establishment and maintenance of normal or training schools, and also for the erection of schoolhouses, and for any other purpose that may be appropriated.

The Department is more than the paymaster of the educational system; it is the administrator of the education system. In the latter capacity it draws up the syllabus of the primary and district high schools, prescribes the work of all departments of manual and technical instruction, receives the annual reports of all Boards and educational authorities and institutions, and sees to the carrying-out of all the statutory provisions in the matter of education.

#### *Part II.—Education Boards.*

This part divides the country into thirteen education districts, and sets a Board of Education over each, arranging all details of election, of meetings, of business, of powers, duties, and the rest. The districts are Auckland, Taranaki, Hawke's Bay, Wanganui, Wellington, Marlborough, Nelson, Grey, Westland, North Canterbury, South Canterbury, Otago, and Southland.

The Boards (of nine members each) are elected once a year by the School Committees, which are themselves elected by the householders of the districts.



“Householder” is thus defined by the Act :—

“(a.) Every adult male or female person who has for the period of three months next before the day of election resided in any dwellinghouse within the school district as owner or tenant thereof; and

“(b.) If not qualified under the previous subsection, includes the father, wherever resident, or, if he be dead or absent from the colony, the guardian or other person, wherever resident, who has the actual custody of any child attending any State school situated within such district; and

“(c.) In school districts situated within a proclaimed mining district, means and includes every holder of a miner’s right having for the period of three months next before the day of election resided in the district, and not being an alien.”

The voting is by ballot, with the usual protections of its independence.

The Boards own the property (with certain exceptions regarding secondary schools) held in the districts for educational purposes, and have to meet at least once a month, and appoint their Secretaries, School Inspectors, and other officers. It is their duty to establish and maintain public schools in their districts; establish and regulate school districts within their education districts; to appoint and remove teachers and other officers; to establish scholarships, school libraries, and district high schools; to administer the moneys granted by the Education Department, and raise others when necessary; and to generally exercise all duties and functions imposed by the Act.

Teachers must have certificates of competency from the Minister; and before they are appointed or dismissed the School Committees must be consulted.

The Boards may, in addition, receive lands or moneys for the foundation of scholarships.

Besides these Board and private scholarships, the Act establishes Junior and Senior Scholarships to be called “National Scholarships,” “for the purpose of bringing higher education within the reach of deserving scholars.”

Junior National Scholarships are given yearly in the proportion of one for each five thousand or part of five thousand children in average yearly attendance in each education district. They are awarded on the results of an examination in the subjects prescribed for the Fifth Standard of the public-school syllabus; and candidates must be not over fourteen years of age, must have been under regular instruction at a public school for three years immediately preceding, and for six months under instruction in the subjects of the Fifth or a higher standard.

After award, the holders of these scholarships are required to prosecute for three years\* their studies diligently to the satisfaction of the Inspector-General of Schools at some secondary school or its equivalent approved of by the Board and the Minister. They shall receive during the time, besides the amount of any tuition fees there may be, the sum of £10 a year, payable quarterly. In case of having to live away from home, £30 a year additional is allowed.

These scholarships are limited to children of parents of an income of £250 a year and under.

\* The Board may, with the Minister’s approval, extend the term another year.

The Senior Scholarships awarded are in number four every year for each university district, or sixteen in all. The districts are Otago (including Southland), Canterbury (both North and South), Auckland, and the Middle District. The last named comprises Taranaki, Hawke's Bay, Wanganui, Wellington, Marlborough, Nelson, Grey, and Westland Education Districts.

They are awarded on the result of the Junior Scholarship examination of the University. Candidates must be under nineteen, and must have held Junior Scholarships or Education Board Scholarships. The term is three years, the college prescribed is a university college, and the annual emolument is £20,\* in addition to any tuition there may be.

One of the conditions of the holding is the obligation to pass at the end of the second year after matriculation (another condition) in one section of the examination for the degree of Bachelor of Arts or Bachelor of Laws, or for the ordinary degree of Bachelor of Science.

A Senior Scholarship is forfeited by the failure of the holder to pass each year in at least two subjects of the annual examination of his college. Of course, this disaster is avoidable for unavoidable reasons, of which the Chancellor of the University is the judge.

For the last two conditions holders may substitute (with the Chancellor's permission) a course of study in medicine, engineering, mining, agriculture, or veterinary science. This involves the production of sufficient proof of advancement, and the passing of all regular examinations.

Senior Scholarships cannot be held by holders of Junior Scholarships of the University, nor can they be held with any other scholarship the value of which added to the amount of the Senior Scholarship exceeds £80 a year.

#### *District High Schools.*

The Board may, on the application of the School Committee and with the permission of the Minister, convert any public school into a district high school, the Department to make the necessary additions to the staff and finding the money for the cost.

All grammar schools under Education Boards or School Committees at the date of the Act (1904) are district high schools also.

The course of instruction may embrace "all the branches of a liberal education, comprising Latin and Greek classics, French and other modern languages, mathematics, and such other branches of science as the advancement of the colony and the increase of the population may from time to time require"; and "for such higher education fees shall be paid according to regulations." At the same time, instruction is to be given in every district high school in the ordinary branches as prescribed for the public schools.

#### *Secondary Schools.*

Under the Act the term includes—

High schools established by the Minister on the application of the Education Boards under certain circumstances.

Endowed secondary schools, which are as follows:—

Auckland Grammar School.

Auckland Girls' High School.

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\* With an additional £30 a year if living away from home.

Whangarei High School.  
 Thames High School.  
 Gisborne High School.  
 Napier High Schools.  
 New Plymouth High School.  
 Wanganui Girls' College.  
 Wellington College.  
 Wellington Girls' High School.  
 Marlborough High School.  
 Nelson College.  
 Greymouth High School.  
 Hokitika High School.  
 Christchurch Boys' High School.  
 Christchurch Girls' High School.  
 Rangiora High School.  
 Akaroa High School.  
 Ashburton High School.  
 Timaru High Schools.  
 Waimate High School.  
 Waitaki High Schools.  
 Otago Boys' and Girls' High Schools.  
 Southland Boys' and Girls' High Schools.

*The Standard of Secondary Education.*—The standard of the higher education is maintained in these secondary schools by the provision that "No pupil shall, after the passing of this Act, be admitted to a secondary school until he has obtained a certificate of competency in the subjects of Standard V, or a higher standard of the public-school syllabus."

Parents wishing to send unqualified children may have them accommodated at a lower department of such school, and must pay the whole of the cost of their instruction, so that the endowments may not be diverted from their proper object, which is higher education.

*Free Places.*—To every secondary school providing free places in accordance with regulations, annual grants are payable according to a certain fixed scale.

Every endowed school (as above) must either provide free places or offer scholarships of a total annual value equal to one-fifth of the annual income derived from its endowments.

The regulations of 1905 provide the conditions for junior and senior free places.

For junior free places, those are qualified who (a) hold certain scholarships; or (b) who, being not over fourteen, have qualified for such scholarships or passed the special examination required for free places; or (c) being over fourteen, have passed the above special examination; or (d) being above fourteen, have obtained a certificate of proficiency.

For senior free places, those are qualified who (a) are holders of certain scholarships; or (b) who, being not over sixteen, have passed the Civil Service Junior examination, or the special examination for Senior Scholarships, or qualified for a Board scholarship; or (c) who, whether over or under sixteen, have passed Civil Service Junior examination with credit, or matriculated.

Secondary schools and district high schools are open at all times to inspection by the Inspector-General, or such substitute as the Minister of Education may direct; and the inspection includes examination in the subjects taught.

In case of voluntary contributions, the State gives 10s. for every £1 of bequest, and £1 for every £1 of contribution.

All regulations in these matters are made by Order in Council.

### *Part III.—School Committees.*

There is a Committee for every school district, and the Board of Education may, on the petition of not less than ten householders, or on the report of an Inspector, or on their own initiative, make new districts.

The annual election is in April—fourth Monday—and the number of each Committee (from five to nine) is proportionate to the average attendance of its school.

The householders meet for the purpose in public meeting, the outgoing Committee makes its report of its proceedings during its year of office, and the new Committee is chosen by ballot.

The Committees have the management, subject to the general supervision and control of the Boards of Education and the inspection by the Boards' Inspectors, of educational matters in the school districts; they may, with the consent of the Boards, establish schools, erect, maintain, enlarge, and repair school buildings, acquire sites, appoint teachers of sewing, and establish children's savings-banks.

The funds are grants from the Boards, and donations, subscriptions, and other moneys granted, and they constitute the "School Fund."

### *Part IV.—Public Schools and their Management.*

The school age is between five and fifteen.

Every public school shall be conducted in accordance with the following regulations (a copy of which regulations shall be conspicuously put up in every school), namely:—

(a.) The subjects of instruction shall be as follows:—

Reading,  
Writing,  
Arithmetic,  
English grammar and composition,  
Geography,  
History,  
Elementary science and drawing,  
Object-lessons,  
Vocal music,

And (in the case of girls) sewing and needlework, and the principles of domestic economy.

But no child shall be compelled to be present at the teaching of history whose parents or guardians object thereto.

(b.) The school shall be kept open five days in each week for at least four hours, two of which in the forenoon and two in the afternoon shall be consecutive, and the teaching shall be entirely of a secular character.

- (c.) The school buildings may be used on days and at hours other than those used for public-school purposes, upon such terms as the Committee may from time to time prescribe.
- (d.) The class-books used in the school shall be such only as shall be approved by the Governor in Council.
- (e.) The school shall be open at all times to the visits of an Inspector.
- (f.) No fee shall be payable, except in the case of district high schools, as hereinbefore provided.

Physical drill must be taught to all children over eight years.

Evening classes may be opened by teachers for pupils above thirteen years, with a fee subject to the approval of the Committee.

Itinerant teachers may be appointed for sparsely populated districts.

Attendance at school is compulsory between the ages of seven and fourteen. Certificates of exemption may be granted on any of the following grounds :—

- (a.) That the total distance that the child would be required to walk from his place of residence to the school, or from his place of residence to the railway or other public conveyance and from the railway or other public conveyance to the school, is more than two miles in the case of a child under ten years of age, or three miles in any other case, the distance being estimated by the nearest road.
- (b.) That the child is under efficient and regular instruction elsewhere.
- (c.) That the child is unable to attend school by reason of sickness, danger of infection, temporary or permanent infirmity, or other sufficient cause.
- (d.) That the road by which the child has to travel to school is not sufficiently passable.
- (e.) That the child holds a certificate, as prescribed by regulations, that he has reached a standard of education prescribed by such regulations as the standard of exemption.

Certificates of exemption may be had from the School Committee, or from two of the members, one of them the Chairman, or the head teacher of any public school.

In case of refusal of a certificate, parents have an appeal to the Board of Education, whose decision is final.

In case of non-attendance, notice must be sent by the Committee or Truant Officer to the parent in writing, calling upon such parent to send the child to school. At the same time full particulars must be given of the right of exemption by certificate. Penalty for non-compliance is not exceeding 10s. and not less than 2s. for every week's absence.

Boards of Education may, with the sanction of the Minister, establish truant schools, and in lieu of the penalties above mentioned parents may be ordered to send their children there.

All public schools must be inspected by the Board's Inspectors at least twice a year, and private schools may be inspected by them at the request of their managers.

The Governor may at any time order the inspection by an Inspector of the Department of any educational institution maintained wholly or in part by grants from the public revenue, or endowments from the public lands.

*Part V.—Manual and Technical Instruction.*

The Minister may recognise as classes under this Act,—

- (a.) "School classes," meaning thereby classes for manual or technical instruction established by any Education Board in connection with any public school, or by the Board of Governors of any secondary school in connection with such secondary school, the syllabus of such instruction being in accordance with regulations under this Act ;
- (b.) "Special classes," meaning thereby classes for manual or technical instruction, or continuation classes, established by an Education Board or the Board of Governors of a secondary school, apart from the ordinary course of primary or secondary school instruction, as the case may be ;
- (c.) "Associated classes," meaning thereby classes for manual or technical instruction, or continuation classes, established jointly by an Education Board, or a School Committee (where no classes are established by the Education Board of the district), or the governing body of a university college, and a school of art, a school of mines, an agricultural college, an industrial association, an industrial union, an agricultural and pastoral association, or any similar public association formed in connection with any branch of trade, industry, or commerce, or any City Council, Borough Council, County Council, or other local authority : Provided that where a School Committee joins with a public association or a local authority to establish associated classes the Board of Education shall be the controlling authority ; and
- (d.) "College classes," meaning thereby classes established by any university college for technical instruction, or for instruction in such branches of higher commercial education as are prescribed by regulations under this Act.

Where school classes or special classes are not established by a Board of Education, the School Committee may establish such classes, and in every such case the Board of Education shall be the controlling power.

The capitation from the Colonial Treasury is as follows :—

For every attendance at a class for manual instruction .. .. .	3d.
For every attendance at a class for technical instruction .. .. .	3d.
For every attendance at a continuation class ..	1½d.

An addition of one-half to the rate of payment hereinbefore specified may, with the approval of the Minister, be made in the case of any class held in any place distant more than five miles from the office of an Education Board.

An "attendance," for the purposes of this part of this Act, means the attendance of one pupil for one hour at any class for which payment can be claimed under this Act.

All work of the classes requires the preliminary approval of the Minister of Education.

Local authorities may contribute funds, and the subsidies from the Consolidated Fund are 10s. for every £1 of bequest and £1 for

every other £1 of contribution. Moreover, the Minister may grant scholarships and grants in aid of buildings, fittings, workshops, &c.

The regulations of 1904 prescribe the subjects of instruction.

*Part VI.—Public-school Teachers Incorporation and Court of Appeal.*

The Registrar under the Act is the Inspector-General of Schools.

Any society of not less than ten teachers may be, with the Minister's permission, registered, and become a body corporate.

Appeals against suspension or dismissal are heard by the Court of Appeal, which consists of three persons, viz. :—

Such Stipendiary Magistrate in the district wherein the appellant teacher was employed at the time of his dismissal or suspension as the Minister appoints ;

One person of either sex, to be nominated in the prescribed manner by a corporation situate in such district ; and

One such person to be similarly appointed by the respondent Board which dismissed or suspended such teacher.

The Stipendiary Magistrate shall be Chairman of the Court, and shall have an original and, in the event of an equality of voting, a casting-vote.

Teachers (under other portions of this Act, and under other Acts) are uniformly graded by certificates issued by the Department, paid according to a graduated scale uniform for the colony, and entitled, after sixty-five in the case of men and sixty in the case of women, to superannuation allowances (virtually pensions), according to scale.

## ELECTORAL ACT (1905).

### SUMMARY.

This Act consolidated the whole of the Electoral law from sections 40 and 48 of "The Constitution Act, 1852," to "The City Single Electorates Act, 1903."

It provides for the triennial duration of the House of Representatives, with an automatic non-political adjustment of its representation to a settled basis of population ; prescribes the election of its Speakers ; defines the franchise of its electors and the qualifications of its members, European and Maori ; regulates the exercise of that franchise in all things from the first claim for enrolment to the final declaration of the poll ; fixes the procedure in all cases of petition against elections ; and deals with all illegal and corrupt practices affecting the results of elections and involving the punishment of offenders.

### *The House.*

There are seventy-six European and four Maori electoral districts, each represented by one member, and the eighty members elected by the districts are the House of Representatives. The maximum period of their office is three years, with liability at any time in due course of politics to a dissolution. Their first duty in their first session is the election of their Speaker.

### *Adjustment of Representation.*

*The Commissions.*—There are two Representation Commissions, one for each Island, each consisting of five members—three official and two unofficial. The unofficial members are appointed by the House, while the official are statutory officers. The official members for the North Island are the Surveyor-General and the Commissioners of Crown Lands for the Taranaki and Auckland Land Districts; and for the South Island, the Commissioners of Crown Lands for the Districts of Westland, Canterbury, and Otago.

*Their Duties.*—The Commissions are set in motion by the Registrar-General's report of the results of each quinquennial enumeration of the people under the Census Act, which report must be sent to the Commissions as early as possible. Taking these figures, they divide the country into districts of population as nearly equal as possible under the conditions prescribed by the law.

*The Quota.*—Sitting together, the two Commissions add to the total population 20 per cent. of the rural population, and divide the product by the number of the European electorates—seventy-six—and the quotient thus obtained is the "quota" of the population for each one of those electorates. This is the compromise arrived at after much discussion in the House, and one of the severest "stonewalls" of our parliamentary history. The "quota" enables the Commissions sitting together to calculate the number of districts for each Island. When they have settled that point, the two Commissions separate for the delimitation of the districts of their respective Islands.

*The Districts.*—In delimiting the districts the Commissions take the "quota" for their guide, and they apply the same with an adjustment allowance. This for the rural districts works between the addition to the "quota" and the subtraction from it of the number 520; but in purely urban populations the allowance is limited to 100. The allowance is provided in order that the Commissions may consider certain things: these are the proportion of the adult population, the locality, and the accessibility; and they must so manage as to reduce, whenever reduction is necessary, rural areas rather than suburban constituencies.

*Final Report.*—Before reporting, the Commissions must give notice in the *Gazette* of their boundary proposals, and before deciding finally upon these boundaries they must consider all objections that may be made. After final determination they report the names and boundaries of the new districts to the Governor, who gazettes them at once for effect at the end of the current Parliament.

### *Qualification of Electors.*

Every adult British subject who has resided in the colony twelve months and has been three months in any district is entitled to be enrolled as an elector for that district, and once enrolled is entitled to vote.

Absence from the colony for twelve months involves removal from the roll. After absence on private business for three years the returned colonist can only qualify again for the franchise by a residence of one year. Absence of any length on public business does not involve any period of residence after return as a qualification.



### *Qualification of Members.*

Every male elector duly enrolled is qualified for membership of the House. The causes of disqualification are unsoundness of mind, undischarged bankruptcy, public default, felony during period of purgation or while unpardoned, exclusion by finding of Election Petition Court, membership of the Legislative Council or the Civil Service, and participation in a State contract above the value of £50 in any one year on the part of persons not members of joint-stock companies.

### *Enrolment.*

*Registration Department.*—The district registration officers, of whom there is one for each district, are under the control of the Chief Electoral Officer, who has under him a Deputy Electoral Officer. These form the Department of Registration. It is the duty of this Department to see that every one who is entitled to be on a roll is enrolled or registered, and that no one not entitled is on any roll. They, in fact, have to keep the rolls reliable.

*Applications.*—At the same time, the public is expected to look after its own interests too, and for that end the rolls are all open to inspection.

Every applicant for registration must apply in writing, signing his claim before the Registrar of the district, or a Justice of the Peace, or an elector of the district.

The Registrar investigates the claim and decides according to the evidence before him, after inquiry. If favourable, he registers the name of the applicant, and sends him notice to that effect. If unfavourable, he sends him reasons within five days.

If the claimant fails to satisfy the Registrar of the validity of his claim, and does not withdraw it within twenty-one days, the Registrar applies to a Magistrate, whose decision after hearing the facts is final.

*Transfers.*—All registered names can be transferred from roll to roll according to change of domicile of the owner.

All claims for transfer must be notified to the Registrar of the original district of registration, who after removing the name from his roll files the notice for reference.

*Time of Registration.*—Registration may be applied for and obtained at any time except during an election after the issue of the writ; but in cases of erroneous removal, or removal by reason of information that turns out to be false, names may be restored by the Registrar until ten days before the polling-day. Names may also be placed on the roll after the issue of the writ when ordered to be placed there by a Magistrate who has been applied to in the ordinary way for judgment by the Registrar; but in such cases the hearing must be not later than four days after the issue of the writ.

*Deaths and Marriages.*—Registrars are enjoined to furnish monthly to the electoral Registrars lists of all adult deaths, and must do so before the 5th of the month. Also a list of all marriages of adult women. The Registrar must in the one case remove from the roll the names of the dead, and in the other substitute the married for the other names.

*Keeping the Roll full.*—It is the duty of the Registrar to see that every qualified person is enrolled. Members of the Police Force must at his request help him by collecting information. Postmasters, Clerks of Court, and Registrars of Pensions must also assist the Registrar by every means in their power whenever asked for their services.

Before an election the Registration Department makes a house-to-house canvass in search of qualified persons who are not enrolled.

#### *Objections.*

If the Registrar or any elector objects to any person's name remaining on the roll, the objection must be specified according to a form provided and forwarded to the person concerned when the Registrar regards the objection as reasonable.

If the objections allege conviction of crime, the Registrar communicates with the Court authorities, and decides according to their information. In other cases, if the elector fails within fifteen days either to clear himself or to have his name taken off the roll, he is summoned before a Magistrate, who, after hearing, decides.

During this inquiry none but the objections originally specified can be heard.

#### *New Districts.*

*Adjustment of Rolls.*—On the formation of new districts, the Registrar must remove from the roll all names registered for the portion of the district cut off by the Commissioners. He must at the same time send particulars to the Registrars of the districts to which the said portions have been attached, and send notice to the electors concerned of their removal from the old roll.

*Publication.*—Lists of all names removed from rolls must be exhibited on a board publicly outside the office of the Registrar for at least one month.

#### *The Electoral Roll.*

*General and Supplementary Rolls.*—There is for each district a general roll and a supplementary roll. The first of these is closed for printing on the 15th April in each year, the latter taking the new names, both being together the electoral roll of the district until the next closing-day—15th April—when they are printed together, another supplementary roll being started to maintain the continuity of the registration.

There is another supplementary roll, which is started for the reception of any names that may have to be added after the issue of the writs. This is also part of the electoral roll, and is treated accordingly in due course.

There is still another supplementary roll. This is opened before every election, to enable the general roll to be printed without hindering the addition of fresh electors to the record.

*Inspection.*—Printed copies of the roll are kept at the office of the Registrar, and at other places advertised by the Registrar, for inspection by the public. Inspection is free of charge.

Copies of the printed roll are obtainable at 1s. apiece, and the cost of copies of the unprinted is at the rate of 6d. per folio of seventy-two words.

All claims to register are open to public inspection.

*New Rolls.*—After the adjustment of the representation by the Commissions, the Registrars set about the work of making the new rolls as soon as ordered by the Governor.

#### *Outside Voting.*

Electors may vote outside their own districts. There are two methods—by elector's right and by voter's permit.

*The Elector's Right (Seamen only).*—Seamen serving on ships owned or registered in New Zealand may, when properly qualified, be enrolled at any port at which their ship usually calls. After enrolment they are entitled to an elector's right, which they may get from any Registrar direct or through a Collector of Customs. This right, which has a currency of twelve months, enables them to vote during currency at any time between the issue of the writs and the close of the poll.

Registrars are supplied with blank ballot-papers, which they fill in on the application of seamen who want to vote through their electoral rights with the names of the candidates standing for the district for which the men want to vote. These filled-in papers are used in the ordinary way by the seamen in question and forwarded to the Registrars of their districts, after notification, together with the electoral rights on account of which they were issued.

*The Voting-permit.*—Any registered elector may, up to the date of the issue of the writ, obtain from the Registrar a voting-permit. This he may present on election day at any booth outside of his district, receive in exchange a ballot-paper filled up with the names of the candidates of his district, and mark in the ordinary way, after which the procedure is the same as in the case of votes given in accordance with elector's right.

The permit is returned by Returning Officer or his deputy to the office of origin.

#### *The Ballot.*

Voting is by ballot. All general elections are on the same day, and voting is single—one elector, one vote.

#### *Elections.*

*The Writs.*—Writs are issued for every election by the Clerk of the Writs, who is instructed by the Governor's Warrant in case of a general election, by the Speaker's in all others. They name the polling-day, and are returnable within twenty-one days by the Returning Officers to whom they are addressed. These officers at once give at least ten days' public notice of the election.

*The Next Step.*—The candidates are nominated, with their consent, by two electors, and deposit £10 sterling. The money is returnable in case of withdrawal from contest before polling-day, or after if the candidate has secured not less than one-fourth of the votes polled. If there is only one nomination the Returning Officer declares the nominated candidate duly elected; if there are more, he makes arrangements for taking the poll.

### *Polling-day.*

Polling-day is a half-holiday, valid for the Shops and Offices Act, and licensed houses are closed for the afternoon from noon till 7 o'clock.

Polling-places are appointed by the Governor.

The hours of polling are from 9 till 6 in forty-two districts, and from 9 to 7 in thirty-four, these comprising mostly the town populations, together with Motueka, Thames, and Waitaki.

### *The Polling.*

*Preliminary Questions.*—The voter enters the booth, and, after claiming his right, must answer two questions if put by the Registrar or his deputy. The questions are (1) as to whether the claimant is the person on the roll he claims to be; (2) if he has voted already during the election.

*Mode of Voting.*—The Returning Officer takes a ballot-paper, marks the back left-hand corner of the same with his initials and the elector's number on the roll, secures the corner with gum or otherwise, stamps on it an official mark, hands the paper to the voter, and then runs his pencil through the voter's name on the roll.

He also hands the voter a local-option ballot-paper, marked in the same way, when the triennial licensing poll happens to be taken on the same day as the electoral poll.

The voter retires to a compartment in the booth provided for the purpose; strikes his pencil in the case of the electoral paper through the names of those candidates for whom he does not wish to vote, leaving untouched the name of the candidate of his choice; and in the case of the local-option paper through the conditions to which he is adverse. He folds up the papers and puts them into their respective ballot-boxes, and leaves the booth as soon as possible.

*Informal Papers.*—Papers are informal that do not bear the official mark, or that exhibit unauthorised marks by which the voter may be identified, or that do not indicate clearly the choice of the elector.

### *The Polling-booth.*

*Scrutineers, Officials, &c.*—Each candidate is entitled on the day of polling to employ and pay a scrutineer for each polling-booth. The scrutineers, if on the roll, may not vote. They are the only persons allowed in the booth permanently with the officer in charge, his clerks and interpreter, and the constables, whose duty it is to maintain order and support the officer in charge whenever necessary.

Each candidate may also employ one scrutineer for the proceedings subsequent to the preliminary count of votes, as below.

*Voters in the Booth.*—Not more than six voters at a time are allowed in the booth, except at the closing-hour, when the officer in charge may increase the number at his discretion. That officer alone may address the voters in the booth, and then only with the two questions prescribed as to identity and voting. But he may give general directions when he sees that voters require them.

### *Result of Poll.*

*Preliminary Count.*—As soon as possible after the close of the poll the officer in charge of each booth counts the votes in the presence of

the scrutineers who have been present till then, and the poll clerks, and announces the result at his booth. In making the count he must take care not to see the writing on the backs of the ballot-papers, and see that no one else does so.

He then forwards all the ballot-papers, used, unused, and informal, to the Returning Officer for his district, together with all books used during the election, all copies of the roll used, and the account of the ballot-papers issued to him.

*Scrutiny of the Rolls.*—The next proceeding is for the Returning Officer to hold a scrutiny of the roll in the presence of the scrutineers—one to each candidate—and his own assistants and clerks. The scrutiny is done by comparing all the certificated copies of the roll that have been used one with the other. If the scrutiny reveals voting at more than one booth by voters, the Returning Officer takes the papers so used out of the general parcel, taking care that neither he himself nor any one else can see the faces, seals up the balance of the parcel, and makes a separate parcel under seal of the papers subtracted.

*Official Declaration of the Poll.*—After the scrutiny the Returning Officer opens the sealed parcel of ballot-papers in the presence of the scrutineers and a Justice of the Peace, and counts them with the aid of whatever persons he thinks necessary, rejects all the informal papers, and publicly declares the result of the poll. If there is a tie, he gives his casting-vote.

*Recount.*—Candidates not satisfied with the official count may, within three days, apply to a Magistrate for a recount, depositing £20. The Magistrate has a recount made as soon as possible, giving not less than two days' notice of time and place. The recount must be in the presence of the Magistrate, or of some person appointed by him for the purpose, and as nearly under the same conditions as those of the official count, with the same care for the secrecy of the ballot.

The result of the recount is given effect to by the order of the Magistrate, the candidate with the largest number of votes being declared duly elected.

The costs are decreed by the Magistrate, who may make deduction from the deposit of £20 as aforesaid.

The writs are indorsed and forwarded as soon as possible to the Clerk of the House, who sends with all due diligence a list to the Speaker of all members returned.

*Double Return.*—In such cases the candidate must decide which seat he will sit for, within seven days of the day on which the absence of any objection to his holding the seat of his desire becomes certain; in the case of a hostile petition, within seven days of the final disposal of the same.

#### *Purging the Roll.*

Before sealing the certified copies of rolls, the Returning Officer transfers to a fair copy of the electoral roll all records of the voting, and in the case of the candidates and employed electors of the reason for not voting. The Registrar must, on receipt of same, inquire as to the electors unaccounted for whether they have the right to be on the roll, and if he finds they have not, he strikes their names off the roll, and sends them notice, if necessary, by registered letter of the fact.

*Used Ballot-papers, Rolls, &c.*—These are sent under seal to the Clerk of the House of Representatives, and kept by that officer twelve months unopened save by order of the House, or of some competent Court, and then they are burned in his presence.

*Candidate's Expenses.*

The maximum is £200. Accounts must be rendered within thirty days after the member's return, and must be paid within sixty days, after which period they can only be recovered by judgment of a Court. They must be supported by vouchers, and be sent by the candidate to the Returning Officer within seventy days of the return, and be kept by that officer for twelve months open to public inspection.

Receipts and expenditure must be shown in detail, and all disputed claims there may be.

The penalty of non-compliance with this provision is £20, and in the case of a member the liability is for every day the default continues.

*Maori Representation.*

There are four Maori members—one for each of the four districts into which the colony is divided. The franchise of the electors and the qualifications of the members are the same as those for the European members of the House. The elections are regulated much on the same pattern as the others, and the election day is always fixed for a short time after the general election day of the Europeans.

*Penalties.*

*Members.*

Sitting and voting in House if member of Council or Civil Service or contractor.

Fine for every day up to £50.

Ex-member becoming Civil servant within twelve months of expiry of membership. Fine up to £50 per day.

Candidate failing to furnish account of expenses to Returning Officer. Fine up to £20. If member, same fine daily for every day of delay.

*Registrar.*

Failure without valid reason to enrol applicant for registration. Fine up to £10.

Wrongful alteration of roll after issue of writ. Fine up to £20.

*General.*

False statement or declaration. Fine up to £20, or imprisonment to three months.

Wilful misleading of Registrar as to names; falsification of signature; signing other name without consent, or signing false or fictitious name in any claim, statement, or objection; false attestation of signature (i.e., attesting signature on any document without seeing the same written or hearing it acknowledged); failure to deliver claim for enrolment to registration officer, and consequent failure of claimant to get his name on the roll. Fine up to £20, or imprisonment to three months.

Candidate failing to poll one-fourth the number of the top of the poll forfeits his deposit (£10).

Failure of candidate to furnish list of employees and landlords of rented premises, together with, if electors, their numbers on the roll. Fine up to £50.

Neglect of factory employer to allow his people reasonable time to vote. Fine up to £5.

Addressing voter in booth. Prompt removal from booth, and fine up to £20.

*In re* questions at the booth—(a) Refusal to answer; (b) giving answer disclosing offence; (c) giving false answer. Fine up to £50. (a) and (b) also involve the loss of right to vote during the election.

Improperly marking and securing ballot-paper before handing same to voter. Returning Officer liable to a fine of £10.

- Failure of Returning Officer to maintain safe custody of ballot-papers.** Fine up to £100, or imprisonment to twelve months.
- Authorised printer of ballot-paper allowing papers to get into possession of unauthorised persons; unauthorised possession of ballot-paper.** Fine up to £100.
- Offences of election day—**(a) Interfering with voter in booth or on the way there with intent to influence or advise; (b) printing or distributing mock ballot-papers; (c) demonstrating during poll-hours. Fine up to £20.
- Publishing between issue of writ and close of poll matter untrue and calculated to influence votes.** Fine up to £50, or imprisonment up to three months.
- Tampering with ballot-paper by erasing marks from or adding marks to the same.** Fine up to £50.
- More serious offences in respect of ballot-papers:** (a) Forging, counterfeiting, fraudulently destroying paper or official mark; (b) unauthorised supply of paper; (c) fraudulent placing of unauthorised paper in ballot-box; (d) fraudulent withdrawal of ballot-paper from ballot-box; (e) unauthorised destruction of or taking or interfering with ballot box or papers. If by an official, imprisonment with or without hard labour up to two years; unofficial person, up to six months.
- All persons reasonably suspected of committing or attempting to commit any of the above offences at a polling-place are liable to prompt arrest by order of the officer in charge.**
- Infringing the secrecy of the ballot:** (1.) Employed persons abusing the privilege of admission to booth. (2.) Persons interfering or attempting to interfere with voter when voting, or obtaining in the polling-booth, or imparting there, information about candidates or the object of the voter's vote, or about the voter's number on the ballot-paper. (3.) Infringing the secrecy of the ballot by anything connected with the counting of the votes. (4.) Directly or indirectly inducing voters to display marked voting-papers. These offences are liable to imprisonment with or without hard labour for six months on summary conviction before two Justices.
- Personation:** Aiding and abetting, procuring, and counselling the same. For penalty, see "Corrupt Practice," which personation is declared to be; also, it is punishable by imprisonment up to two years, with or without hard labour. There is liability to arrest in the booth on suspicion by order of the officer in charge by the constables present in the booth.
- Wilful delay in returning or failure to return candidate who sustains his claim before the Election Petition Court lays the Returning Officer open to recovery by action in the Supreme Court of double the damage sustained, such action to be begun within twelve months of the cause of action or within six of the trial of the election petition.**
- Wilful wrongful delivering of telegraphic copies of documents required or authorised by law to be telegraphed—such as warrants, notices, writs, &c.** Imprisonment with or without hard labour for two years.
- Unauthorised or inexcusable signature of such telegrams.** Imprisonment with or without hard labour up to two years.
- Wilfully false indorsement on original that a true copy has been sent; and wilfully false announcement of indorsement of certificate.** Fine up to £100, recoverable for his sole use by any informer.
- Signing false certificate for indorsement on original document.** Imprisonment up to fourteen years.
- Candidate breaking the rule which prescribes the limits of time for the payment of expenses commits an illegal practice. (Q.v.)**
- Failure of candidate to furnish account of expenses within the prescribed time.** Fine up to £20. In the case of a member the fine is £20 per day.
- Rendering an account materially false is a corrupt practice. (Q.v.)**
- Exceeding the £200 limit of expense authorised by law is a corrupt practice.**
- Employer not giving Maori employees reasonable time to vote.** Fine up to £20.
- Vote or attempt to vote by person disqualified.** Fine up to £100.

#### *Corrupt Practice.*

- Bribery, treating, unduly influencing, personation,\* exceeding statutory limit of expenses, and rendering account materially false are all corrupt practices.**

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\* "Personation" is application for voting-paper in the name of some other person (living or dead) or of a fictitious person, or application for paper by electors who have already voted.

The penalties are as follows : A fine on conviction before the Supreme Court up to £400 ; disqualification up to three years according to limit fixed by the Election Petition Court.

Disqualification involves—(1.) Loss of all electoral rights, parliamentary and of local government. (2.) Loss of all offices public and judicial. (3.) Loss of the right of candidature for seat in the House of Representatives ; in the case of a member, loss of seat.

#### *Illegal Practice.*

Exceeding the statutory limit of hire—viz., one scrutineer per booth, one clerk and one messenger for each committee-room used in connection with a booth. These are illegal practices for employer and employed.

Obtaining free use of schoolroom by false pretences is an illegal practice in all concerned.

Payment or contract for payment for certain services is an illegal practice on both sides. The services are :—

(a.) Conveyance of electors to poll.

(b.) Use of bands, banners, flags, torches, cockades, ribbons, or other marks of distinction.

(c.) Bills, addresses, notices, or the use of buildings or hoardings for the same.

(d.) Everything except—(1) Personal expenses of candidate ; (2) printing and advertising in newspapers ; (3) stationery, postage, and telegrams ; (4) expenses of public meetings ; (5) expenses of committee-rooms at the rate of one for each booth ; (6) miscellaneous expenses, limited to £25, excluding, of course, all things forbidden by the Act.

Candidate using committee-room on licensed premises. Licensee letting him the same.

Providing or undertaking to provide money for an illegal practice, viz. :—(a.) In the ordinary acceptance of the term. (b.) In getting persons to vote who are by law disqualified. (c.) Betting in any form on the result of an election.

Providing money for candidate's expenses by way of "gift, loan, advance, or deposit." Small expenses legally incurred and not repaid are permitted.

All other matters declared by the Act to be illegal practices.

The penalty for illegal practice is a fine not exceeding £100, and disqualification, with disabilities as in the case of a corrupt practice.

Witnesses in election-petition cases have the right to ask for indemnity. Having obtained that, they are protected, if reported guilty of corrupt or illegal practice, from all the penal consequences, but not from the incidental incapacity.

Professional men may be dealt with by the professional authorities as in case of any other misconduct.

### "FAMILY HOMES PROTECTION ACT, 1893."

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#### SUMMARY.

*Family Settlement.*—Any landowner, freehold or leasehold, may settle his home as a "family home," on the following conditions :—

- (1.) The property must not be more than £1,500 in value with all improvements.
- (2.) It must be unencumbered, and if there are any debts the rest of the owner's property must be sufficient for them.
- (3.) The period of settlement may be for the settlor's lifetime, or till his children come of age, or till they die before coming of age, whichever event shall last happen.

*Procedure.*—The settlor applies to the Registrar, who notifies the fact publicly for twelve months. If at the end of the period there



are no objections, the Registrar issues a family home certificate. If there are objections, they are heard and determined by the Supreme Court. When the certificate is issued it is registered, and at the end of the period may be renewed. If the certificate is not renewed the property is distributed.

*Powers.*—The settlor has the control in his lifetime as to the occupation and the disposition among the family as to the shares, but not power to give a share to any one else. In case of intestacy all the family share alike.

If there is no family of those mentioned in the settlement, the inheritance is according to the ordinary course.

*Effect.*—The effect of registration is to make the home safe against all contingencies, such as bankruptcies, assignments, judgments, to which end there can be neither alienation nor dealing: Provided that if bankruptcy overtakes the settlor within the first year of the settlement the home is liable, as it is also if he dies within the same period without leaving enough other property to pay his debts.

#### FENCING ACTS, 1895 (PRINCIPAL ACT), 1896, 1898, 1904.

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##### SUMMARY.

###### *General.*

The Act deals with the nature of boundary-fences, the cost thereof and its apportionment, and the obligations, rights, and duties of settlers in connection therewith.

###### *Principle.*

The leading principle of the Act is that the occupiers of adjoining lands are jointly liable in equal proportions for the cost and annual upkeep of sufficient fences between their respective properties. The law defines what a sufficient fence is, and provides that the conversion of an ordinary fence into a rabbit-proof one is equivalent to the erection of a new fence.

The principle applies to all lands except,—

- (1.) Native lands held by Natives under their customs and usages, and not leased for their benefit ;
- (2.) Unalienated Crown lands ;
- (3.) Public reserves not vested in any local authority, trustees, or persons.

*Procedure.*

A person wanting his neighbour to contribute to the cost of a boundary-fence between them must send a notice of his intention to fence, with a description of the kind of fence he intends to erect. If the fence is put up without notice the neighbour is relieved from any share in the first cost, but not of his liability for the annual up-keep.

If the neighbour objects to the fence mentioned in the notice, he has to serve within twenty-one days a cross-notice on the proposer, notifying his objection, and specifying the kind of fence he prefers. Failure of cross-notice within the time implies acceptance of the proposals. If within twenty-one days of the last notice the parties fail to agree, the matter is decided by the Stipendiary Magistrate. In case of the failure of either party to complete the work, the other can do it within three months and recover the cost at any time. Any succeeding occupiers succeed to the proportionate liability for the cost of the fences.

A Crown tenant, if one of the parties to a fencing transaction, may elect to pay interest at 10 per cent. on the amount of his share of the cost, but his liability for half the cost of repair remains.

*Crown Tenant.*

“Crown tenant” means an occupier of Crown lands, or public reserves, or Native lands held under the original Native title and leased. The term includes Wardens of Hundreds, Trustees, Managers, &c., of commonages or mining reserves.

*Not Crown Tenant.*

The term does not include any person holding Crown lands on—

- Deferred payment.
- Agricultural lease.
- License with right of purchase.
- Perpetual lease.
- Lease in perpetuity.
- Small grazing-run lease.
- Mining district occupation lease.

*Owner.*

Owner includes a registered proprietor of any land, a tenant in fee-simple, a tenant in tail, a tenant for life, and a term for any term of not less than ten years, and a trustee of any owner as herein defined ; but does not include a mortgagee not in possession.

*Sufficient Fence.*

The fences specified as “sufficient” are contained in Schedule A of “The Fencing Act, 1895,” as follows :—

## SCHEDULE A.

(1.) *Sufficient Non-Rabbit-proof Fence.*

(1.) Post and rail, at least 3 ft. 9 in. high, of substantial material, firmly erected, with not less than four rails, the space between the two bottom rails and the bottom rail and the ground not to exceed 5 in., and the posts not more than 9 ft. asunder.

(2.) Batten and wire fence, at least 3 ft. 9 in. high, of substantial material, firmly erected, with one or more wires, not lighter than No. 8 in steel, or black or galvanised iron; battens either driven securely into the ground and securely stapled, or intertwined in wires in an upright position, and not more than 3 in. apart.

(3.) Any paling fence, at least 3 ft. 9 in. high, with posts and two rails, and having split or sawn timber placed perpendicularly, and well nailed to both rails, there being not more than 4 in. of opening between each perpendicular piece of timber.

(4.) A substantial wire fence, having not less than seven wires tightly stretched, or six wires with a top rail or barbed wire, with or without battens or lacing affixed to the wires between such posts; posts of durable wood or iron, well and substantially erected, the posts or standards not more than 9 ft. apart, top wire not to be less than 3 ft. 9 in. from the ground; and the wires not lighter than No. 8 steel, or black or galvanised iron. The space between each of the three bottom wires, or the bottom wire and the ground, not to exceed 3 in.

(5.) A substantial wire fence, having not less than seven wires tightly stretched, or six wires with a top rail or barbed wire, with battens not more than 6 ft. apart, the wires stapled or let through such battens, which shall be of durable wood or iron, well and substantially erected. The posts or standards to be not less in number than three to the chain; the top wire to be not less than 3 ft. 9 in. from the surface of the ground, and the wires not lighter than No. 8 steel, or black or galvanised iron. The space between each of the three bottom wires, or the bottom wire and the ground, not to exceed 5 in.

(6.) A stone wall, well and substantially built, not less than 4 ft. high, nor less than 2 ft. 6 in. wide at base.

(7.) A close and sufficient live fence.

(8.) A combination of the above kind of fences, at least 3 ft. 9 in. in height.

(9.) Any other description of fence (including in the expression "fence" any natural or artificial watercourse) mutually agreed upon in writing by the persons interested.

(10.) In Westland County alone, a substantial post-and-wire or standard and wire fence, having not less than three barbed wires tightly stretched and securely fixed to the posts and standards, the latter being not more than 12 ft. apart.

(2.) *Sufficient Rabbit-proof Fence.*

(1.) A substantial fence, carrying split or sawn timber perpendicularly to a height of at least 3 ft. from the ground, and sunk not less than 6 in., and well fixed, with not more than 1 in. of opening between each perpendicular.

(2.) A substantial fence, not less than 3 ft. 9 in. high, posts or iron standards not more than 9 ft. apart, and with at least two galvanised-iron or steel wires not lighter than No. 8, and one barbed wire on top, to which is attached galvanised-wire netting firmly affixed to the wires, and securely fastened to the ground, or sunken therein not less than 6 in., such netting to be not less than a total of 42 in. wide, 16 gauge, and not larger than 1½ in. mesh:

Provided that, in the case of existing fences on which the above netting cannot be stretched, netting of a less width may be affixed.

The last description (No. 9) of Part I of the schedule becomes a sufficient fence under the Act in case of mutual agreement, or of failure on the part of the notified man to object, or by decision of the Magistrate in the last resort.

*Unscheduled Fences*

If any one wants to put up a fence not in the schedule, he may do so if his neighbour (whom he must notify) agrees, or does not object. If the neighbour objects (within twenty-one days) the question has to be settled by a Magistrate.

*Working Details.*

*Fences and Improvements.*—The Land Board may declare a rabbit-proof fence to be a “substantial improvement” under the Land Act.

*Non-continuous and Incomplete Fences.*—An occupier cannot be compelled to pay for a fence which is not, so far as practicable, continuous throughout its length; but if the fence does not occupy the whole boundary-line, the liability of the parties nevertheless remains.

*Exemptions and Liabilities.*—In the case of lands exempt, as above, which become subject to the Act after the contiguous occupiers have fenced the boundaries, their occupiers become liable for their proportion of the then value of the fence, and must pay within a month of written demand to that effect. They become liable for their share of the annual repairs as well.

All disputes are determined by the Stipendiary Magistrate, and occupiers whose holding has a less currency than five years, so far as the principal cost is concerned, are liable only for the interest on their portion.

*Native Lands and Fencing Judgments.*—In the case of Native owners, fencing judgments become, but only if registered, a charge against the land, which cannot be in any way disposed of until the charge is paid.

*Bush along Fencing-line.*—The person erecting a fence has the right to, if necessary, fell bush on each side of the line for 66 ft., subject to appeal to the Stipendiary Magistrate. The cost is added to the cost of the fencing. The erector is liable for all damage done, and is not empowered to fell ornamental plantations or bush preserved for shelter, and not more than 5 chains wide.

*Natural Boundaries.*—In the case of a natural boundary—river, creek, ditch, artificial watercourse, or rocky or impracticable land—neighbours may agree upon a line of fence other than their boundary. If they differ, the Stipendiary Magistrate decides: (1) Whether a fence is necessary; (2) the line of the fence; and (3) the compensation, annual or otherwise, to be paid for loss of occupation. In this case it is especially provided that the occupation is not hostile occupation, and is of no effect against the title of the lands in question, but only available for the purpose of the Act.

The Magistrate may employ people to examine and report.

*Exact Position of Fence-line.*—Ditch and bank dividing-fences may be half on adjoining land, but they must not disturb or injure a live fence or hedge without the owner's consent.

In all cases posts, when used, must be on the boundary-line, or as near to it as practicable.

*Roads and Fences.*—If, of two proprietors facing each other across a road, one fences his boundary on his side of the road, and the other avails himself of the fence, he must pay him so long as he does so 10 per cent. interest on half its value, and he is besides during the whole time liable for half the cost of the upkeep.

*Gorse and Timber.*—Neither gorse nor trees can be planted for a live fence on a boundary-line without the written consent of the contiguous private occupiers, or of the proper authority, as the case may be.

The sowing along boundary-lines of sweetbriar, bramble, or blackberry is absolutely prohibited. The penalty under this head is a fine up to £20 and the liability for the cost of extermination of the plants by the adjoining occupiers or local authorities.

*Protection of Live Fences.*—For the protection of live fences during their earlier growth, fences may be constructed alongside on a road-line, with the consent of the local authority and on the terms imposed by the same, on condition (1) that the fence is not more than 5 ft. from the boundary-line; (2) that it does not reduce the width of the road available for traffic for less than 24 ft.; (3) that it be removed when, in the opinion of the local authority, the traffic requires its removal or the live fence needs no more protection.

*Swing Gates.*—Swing gates or rabbit-proof gates can be put up across roads and bridges with the consent of the local authority; they can remain only during that authority's pleasure. They must be properly hung, and provided with an efficient fastening capable of being opened by a person on horseback.

Any one who damages or leaves a gate open is liable to a penalty up to £5 and for any damage caused.

In case of fences upon Crown lands, gates must be made if the Commissioner of Crown Lands requires it, and as many as he requires, and where he requires, under a penalty up to £20. The Commissioner, in the event of failure to comply, can have the gates made at the expense of the fence-owner.

*Damage to a Rabbit-proof Fence* entails a fine up to £100 or imprisonment up to six months.

*Stipendiary Magistrate.*—The Stipendiary Magistrate has authority in all questions and disputes arising under the Act. Proceedings are by summons, and in every respect as in the case of summary proceedings under "The Justices of the Peace Act, 1882."

In all proceedings parties may be joined, struck out, or substituted, as under "The Magistrates' Courts Act, 1893."

The Magistrate's jurisdiction is not affected by either the amount involved or by the raising of any question of title.

*The Magistrate's Jurisdiction.*—Matters within the Magistrate's jurisdiction (section 35) are,—

- (1.) The erection and repair of fences.
- (2.) The kind of fence to be erected. (The growing or planting of a live fence or trees, either at time of erection of fence, or at any time thereafter, and the question of shelter, to be a consideration in deciding this class of fence.)
- (3.) The width of the bush to be felled and cleared.
- (4.) The persons by whom any boundary-fence is to be erected.
- (5.) Conversion of a non-rabbit-proof fence into a rabbit-proof one.
- (6.) The line of fence to be adopted, and the amount of compensation (if any) to be paid for loss of occupation of land.
- (7.) The date on which, the time within which, and the manner in which any fence is to be erected or repaired.
- (8.) The removal of fences not erected on the proper boundary.
- (9.) The entry on contiguous land for erecting or repairing of fence.
- (10.) The reasonable and proper cost of erecting, converting, or repairing any fence, and the persons by whom and the proportions in which such cost is to be borne.

(11.) Any question or dispute which by this Act is to be determined by the Magistrate.

(12.) The costs of the proceedings, and the parties by whom and to whom such costs are to be paid.

*Limit of Half Cost.*—The half cost payable for fencing shall in no case exceed the actual half, including interest on outlay, and reasonable remuneration for the superintendence and outlay of the occupier.

A Crown tenant need not pay cost of half-fencing; he can pay interest instead.

*The Limit of Price.*—The maximum limit of price is—

(a.) For fences in the No. 3 category of Schedule A (paling fence), erected in a borough, £1 15s. per chain.

(b.) For any other rabbit-non-proof fence, £1 per chain, besides half the reasonable and proper cost of clearing and felling bush.

(c.) For a rabbit-proof fence, according to agreement between the parties, or the judgment of the Magistrate.

*Access to Fencing-lines.*—Access through adjoining land to the line of fencing for any one erecting or repairing a fence must be authorised by a Magistrate's order, obtained on summons. The right thus obtained has to be exercised with as little damage as possible. Obstruction of such entry by the occupier of the land sought to be entered upon renders him liable for the whole cost of the repair or erection.

The said right of entry does not extend to crops, gardens, orchards, plantations, shrubberies, or pleasure-grounds, entry to which must be by the owner's permission. Moreover, no tree or shrub can be cut or lopped without the same.

For all damage during entry and erection the compensation is recoverable in the ordinary way.

*Freedom of Contract.*—Agreements by adjoining owners as to cost of erecting or repairing fences are not affected by anything in this Act. They run with the land whether assigns are named or not.\*

*Repairs.*—Their cost is borne by contiguous occupiers in equal proportions. An occupier desiring repairs serves notice on his neighbour opposite to assist in repairing, and, in the event of refusal or neglect to co-operate, does the work and recovers half the cost.

In case of sudden damage, involving immediate repair, any contiguous owner may do the work without notice, and recover half the cost.

Damage to a fence through the neglect or fault of any occupier brings upon that occupier the whole cost of restoration.

The right to sue for and recover for damages done to fences from the reckless use of fire remains unaffected.

*Barbed Wire* may be prohibited in towns and town districts.

*Notices* are served—

(1.) Personally, or left at a person's last known residence, or addressed to them in a registered letter.

(2.) In case of absence of principal, they are served on the agent.

---

\* Under the Land Transfer Act the agreement must be registered to bind assigns.

- (3.) If no agent, it is enough to publish them in a newspaper circulating in the district, and to affix a copy either on a conspicuous part of the land or on an adjoining public road.

*Landlord and Tenant.*—A landlord, to protect himself against future liability, may come in and defend any proceedings against his tenant, and set up the same defence as that set up by the person originally proceeded against.

<i>Penalties.</i>		Not exceeding
Planting and sowing, on or along boundary-lines—		
Gorse or timber without consent of neighbour, Commissioner of Crown Lands, or authorities over railways and public reserves..	..	£20
Noxious weeds—viz., sweetbriar, bramble, blackberry ..	..	£20*
Injury to rabbit-proof fence ..	..	£100†
Gates—		
Leaving gate open on a road or bridge or in rabbit-proof fence ..	..	£5‡
Default of one month in erecting gates on fences on Crown lands at the order of the Crown Lands Commissioner..	..	£20§
Leaving open such gates ..	..	£5
Damage to fence—		
By fault or neglect of occupier ..	..	{ The whole cost of repairs.
By reckless use of fire ..	..	
Obstructing holder of Magistrate's order of entry for purposes of fence-construction ..		{ Compensation besides.
		{ Whole cost of fence, and damages.

\* And cost of eradication.

† Or imprisonment not exceeding six months.

‡ And damages to erector of gate.

§ And cost of the erection of the gates by the tenant.

## FERTILISERS (1904).

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The object of the measure is to protect the buyer of fertilisers from the danger of adulteration, arising from either the fraud, or the ignorance, or the carelessness of the makers.

### *Of Fertilisers and Registration.*

Firstly, fertilisers are defined,—

*Fertiliser* is any substance containing either phosphates, nitrogen, or potash in a state fit for immediate application; is not lime, stable-manure, or any crude refuse not fit for immediate application.

*Registration.*—All vendors have to register with the Secretary for Agriculture themselves and their fertilisers; the former once-

every year, the latter so as to keep the whole of their stocks covered. The registered statement must have a fac-simile of the brand and show the ingredients of the fertiliser:—

Nitrogen soluble;

Nitrogen insoluble;

Phosphoric anhydride soluble, and its equivalent in tricalcic phosphate made soluble by acid;

Phosphoric anhydride insoluble, and equivalent in potash.

The Secretary may refuse to register the brand if the fertiliser differs materially from one registered previously under the same brand, or one so much alike as to be likely to deceive.

*Storage.*—Every fertiliser must be put up and kept in branded packages.

*Description and Certificate.*—On the sale of any quantity not less than 5 cwt., an invoice certificate containing a copy of the description registered must be given to the buyer, and the package must bear the registered brand. Those which are simply the result of the making up of orders specified by the buyers are to be marked “Special mixture.”

*Warranty.*—In every sale there is an implied warranty of the truth of the particulars in the invoice certificate.

*Importation.*—Imported fertilisers (bones, &c.) must carry, in addition to the registered brand, the word “Imported.”

#### *Analysis.*

*Entry and Sampling.*—Inspectors may enter premises and take samples of fertilisers there stored. The limits of the sampling are three packages for the first ton, and another for every ton additional, up to ten packages. The method of sampling is to take an equal quantity from each package and mix them all together, the mixture being legally a “fair sample.” No one but an Inspector can move in this matter, there being no taking of samples by unofficial persons.

*Treatment of Samples.*—They are divided into three—one for the vendor, another for the Analyst, a third for the Inspector. The Analyst’s portion is forwarded to him, together with a copy of the registered statement of the ingredients of the fertiliser, but without the brand or any clue of the vendor.

*Procedure of Analyst.*—After analysis the Analyst shall give a certificate stating the ingredients, whether they differ from those in the registered statement, and, if so, whether the difference is material.

*Procedure of Inspector.*—He it is who makes up the sample, divides it into three, sends their portions to the vendor and the Analyst, and on receipt of the certificate of analysis sends a copy to the vendor.

*Right of Publication.*—The Secretary may publish the Analyst’s certificate without incurring any liability of any kind.

*Right of Buyer.*—The buyer may, within ten days after delivery of the fertiliser, notify the Inspector that he requires an analysis, which the Inspector must obtain in the usual way, and if the result shows the goods to be according to registered statement, the buyer pays the costs of the whole proceeding.

*Right of Vendor.*—He has the right of due notice at all times, the right to be present at taking of sample, the right of being furnished



with a copy of analyst's certificate, the right of questioning Analyst before any Court.

*Independent Analysis.*—The Court in any proceedings may order an independent analysis to be made, ordering that the third part of the sample originally retained by the Inspector be divided equally between independent analysts for report.

<i>Penalties.</i>		Not exceeding
Falsely branding .. .. .	.. .. .	£20*
Filling package with fertiliser materially different from registered brand of the same .. .. .	.. .. .	
Giving false invoice certificate to the prejudice of purchaser .. .. .	.. .. .	
Obstructing an Inspector .. .. .	.. .. .	£5
Tampering with fertiliser so as to destroy fairness of sample taken .. .. .	.. .. .	£50
Tampering with sample or improperly breaking the seal .. .. .	.. .. .	£50
Offences not specially specified—		
First time .. .. .	.. .. .	£10
Subsequent offences .. .. .	.. .. .	£50
Breach of regulations .. .. .	.. .. .	£10

#### GOVERNMENT ADVANCES TO SETTLERS ACTS (1894, 1895, 1896, 1898, AND 1899).

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##### SUMMARY.

###### *Loans.*

*Class.*—The Government lends money to settlers at 5 per cent., either by—

- (1.) Fixed loan for periods up to ten years ; or
- (2.) A system of deferred repayment, known as “ the instalment system.” Under this system the whole liability is extinguished by seventy-three half-yearly payments. All payments can be made through the post-office, free of charge.

*Rebate.*—Under both systems promptitude of interest payments is encouraged by a rebate of 10 per cent. on all payments made within fourteen days of due date.

*Repayment Privilege.*—In all cases the loan, or any part of it not less than £5, can be paid off without notice : under the instalment system at any time ; under the fixed-loan system on any half-yearly due date of interest payment.

These repayments can be made through the post-office, free of cost.

\* In addition to all possible civil remedies.



SELECTION AFTER FIVE YEARS' OCCUPATION.

THE UNIVERSITY OF MICHIGAN





### *Securities.*

Money is advanced on first mortgage of the following securities :—

- (1.) Freehold land held in fee-simple under "The Land Transfer Act, 1885," or freehold land held in fee-simple, the title to which is registered under "The Deeds Registration Act, 1868."
- (2.) Crown land held on perpetual lease under "The Land Act, 1885."
- (3.) Crown land held under Parts III and IV of "The Land Act, 1892."
- (4.) Crown land held on lease as a small grazing-run under "The Land Act, 1885," or under "The Land Act, 1892."
- (5.) Crown land held on agricultural lease under "The Mining Act, 1891."
- (6.) Crown land held on lease (not being for mining purposes) under "The Westland and Nelson Coalfields Administration Act, 1877."
- (7.) Native land held on lease under "The West Coast Settlement Reserves Act, 1881," or under the Act of 1892.
- (8.) Land held on lease under "The Westland and Nelson Native Reserves Act, 1887."
- (9.) Land held under "The Thermal-Springs Districts Act, 1881."
- (10.) Educational and other reserves which are subject to the provisions of "The Land Act 1877 Amendment Act, 1882," by virtue of Proclamation made under section 50 thereof, or under "The Land Act, 1885," by virtue of Proclamation made under section 237 thereof, or "The Land Act, 1892," by virtue of Proclamation made under section 243 thereof, and are held on perpetual lease or lease in perpetuity, or on deferred-payment or small grazing-run systems.
- (11.) Crown land held by license on the deferred-payment system under Part III of "The Land Act, 1885."
- (12.) Land held under lease from a leasing authority, as defined by "The Public Bodies' Powers Act, 1887," and providing for the payment by the incoming tenant for improvement made upon the land, whether by the lessee named in such lease or any former lessee, as tenant.

With regard to classes 10 and 12, a lease is not eligible if it provides for absolute forfeiture (without compensation) for breach of conditions, or if on the determination of the lease compensation is to be allowed for certain improvements only.

### *Margins of Security.*

Mortgages are granted either on the instalment or the fixed-loan system (fully described hereafter); and the margins of security required by the Act are as follows :—

- (1.) On freeholds (other than urban or suburban), three-fifths of the value may be advanced either on the instalment or fixed-loan system : Provided that in the case of first-class agricultural freeholds instalment loans may be advanced up to two-thirds of the value.
- (2.) On leaseholds (other than urban or suburban), three-fifths of the value of the lessee's interest in the lease may be advanced on the instalment system. No loans are granted on leaseholds on the fixed-loan system.
- (3.) On urban and suburban freeholds, loans are granted on the instalment system only, and the amounts of loan are limited as follows :—
  - (a.) On urban freehold on which buildings exist, three-fifths of the value of the land, plus one-half the value of the buildings, may be advanced ;
  - (b.) On suburban freehold on which buildings exist, one-half the value of the land, plus one-half the value of the buildings, may be advanced ;
  - (c.) On urban or suburban freehold on which no buildings exist, one-half the value of the land may be advanced, but on such security no loan shall be granted except for the erection of buildings on the land : the loan to be advanced by instalments at the discretion of the Board, as the erection of the buildings proceeds.

"Urban land" means land which is situate in a borough having a population of at least two thousand inhabitants and is not used for farming, dairying, or market-gardening purposes.

"Suburban land" means land which is situate in a borough having a population of less than two thousand inhabitants, or in any town, or in the vicinity of any town or borough, and is not used for farming, dairying, or market-gardening purposes.

The right of determining what land may be considered "urban" or "suburban," or "first-class agricultural," is imposed by the Act on the General Lending Board.

### *The Procedure.*

**Board (General).**—The business of lending is transacted by the Government Advances to Settlers Office, presided over by a chief administrator known as the Superintendent, who is the head of the "General Board." The Board meets weekly in Wellington, and deals with all applications by resolution, which the Superintendent is bound to recognise.

**Applications** for loans must be made on the prescribed forms, which may be obtained from the Department, or any Postmaster, together with an envelope to take it free of postage.

**Notice to Crown Lands Commissioner.**—In case of offer as security of any tenure issued from the Lands Department, notice must be given to the Commissioner, and it also is entitled to free postage.

**Valuations.**—All securities are valued for the Board by valuers appointed under the Government Valuation of Lands Act, and are considered by the Board together with the Crown Lands Commissioner's reports.

**Valuation Fees.**—All applications must be accompanied by a valuation fee according to the following scale:—

	£	s.	d.
On an application for a loan not exceeding £100	..	0	10 6
Exceeding £100 but not exceeding £250	..	1	1 0
Exceeding £250 but not exceeding £500	..	1	11 6
Exceeding £500 but not exceeding £3,000	..	2	2 0

The fee is returned if the security is rejected without valuation.

**Limit of Loans.**—The minimum is £25; the maximum £2,000 for urban and suburban lands, and £3,000 for rural.

### *Cost of Mortgages.*

The cost is limited by the Act, as under:—

#### *Mortgages under "The Land Transfer Act, 1885."*

Law-costs of preparing, or perusing, and of completing mortgage (to be deducted from the advance),—				£	s.	d.
If advance be not exceeding £500	..	..	..	0	10	6
Exceeding £500, but not exceeding £1,000	..	..	..	1	1	0
Exceeding £1,000, but not exceeding £3,000	..	..	..	1	11	6
With cash disbursements, which are the same in every case—namely,—						
Mortgage form	..	2s.	) With an additional 2s. for every certificate of title after the first.			
Search fee	..	2s.				
Registration	..	10s.)				
Fee for discharge of mortgage,....						
Release fee	..	..	..	..	5s.	

#### *Mortgages under "The Deeds Registration Act, 1868."*

Costs of preparing, or perusing, and of registering mortgage, including disbursements (to be deducted from the advance),—				£	s.	d.
If advance be not exceeding £500	..	..	..	2	10	0
For every additional £500	..	..	..	0	15	0
Costs of discharge, including registration fees	..	..	..	1	1	0

In addition, in case of necessity, solicitors are entitled to charge moderately for any services mortgagors may require over and above those for which the above scale fixes the costs—such services, for example, as clearing encumbered titles, obtaining and registering titles, &c.

*Table of Payments.*

The following is the table of prescribed half-yearly payments under the instalment system for every £100 of loan :—

Half-year.	Prescribed Half-yearly Instalments.	Apportioned thus :			Balance of Principal owing.
		On Account of Interest at 5 per Cent.		On Account of Principal.	
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
1st .. .. .	3 0 0	2 10 0	0 10 0	99 10 0	
2nd .. .. .	3 0 0	2 9 9	0 10 3	98 19 9	
3rd .. .. .	3 0 0	2 9 6	0 10 6	98 9 3	
4th .. .. .	3 0 0	2 9 3	0 10 9	97 18 6	
5th .. .. .	3 0 0	2 9 0	0 11 0	97 7 6	
6th .. .. .	3 0 0	2 8 8	0 11 4	96 16 2	
7th .. .. .	3 0 0	2 8 5	0 11 7	96 4 7	
8th .. .. .	3 0 0	2 8 1	0 11 11	95 12 8	
9th .. .. .	3 0 0	2 7 10	0 12 2	95 0 6	
10th .. .. .	3 0 0	2 7 6	0 12 6	94 8 0	
11th .. .. .	3 0 0	2 7 2	0 12 10	93 15 2	
12th .. .. .	3 0 0	2 6 11	0 13 1	93 2 1	
13th .. .. .	3 0 0	2 6 7	0 13 5	92 8 8	
14th .. .. .	3 0 0	2 6 3	0 13 9	91 14 11	
15th .. .. .	3 0 0	2 5 10	0 14 2	91 0 9	
16th .. .. .	3 0 0	2 5 6	0 14 6	90 6 3	
17th .. .. .	3 0 0	2 5 2	0 14 10	89 11 5	
18th .. .. .	3 0 0	2 4 9	0 15 3	88 16 2	
19th .. .. .	3 0 0	2 4 5	0 15 7	88 0 7	
20th .. .. .	3 0 0	2 4 0	0 16 0	87 4 7	
21st .. .. .	3 0 0	2 3 7	0 16 5	86 8 2	
22nd .. .. .	3 0 0	2 3 2	0 16 10	85 11 4	
23rd .. .. .	3 0 0	2 2 9	0 17 3	84 14 1	
24th .. .. .	3 0 0	2 2 4	0 17 8	83 16 5	
25th .. .. .	3 0 0	2 1 11	0 18 1	82 18 4	
26th .. .. .	3 0 0	2 1 6	0 18 6	81 19 10	
27th .. .. .	3 0 0	2 1 0	0 19 0	81 0 10	
28th .. .. .	3 0 0	2 0 6	0 19 6	80 1 4	
29th .. .. .	3 0 0	2 0 0	1 0 0	79 1 4	
30th .. .. .	3 0 0	1 19 6	1 0 6	78 0 10	
31st .. .. .	3 0 0	1 19 0	1 1 0	76 19 10	
32nd .. .. .	3 0 0	1 18 6	1 1 6	75 18 4	
33rd .. .. .	3 0 0	1 18 0	1 2 0	74 16 4	
34th .. .. .	3 0 0	1 17 5	1 2 7	73 13 9	
35th .. .. .	3 0 0	1 16 10	1 3 2	72 10 7	
36th .. .. .	3 0 0	1 16 3	1 3 9	71 6 10	
37th .. .. .	3 0 0	1 15 8	1 4 4	70 2 6	
38th .. .. .	3 0 0	1 15 1	1 4 11	68 17 7	
39th .. .. .	3 0 0	1 14 5	1 5 7	67 12 0	
40th .. .. .	3 0 0	1 13 10	1 6 2	66 5 10	
41st .. .. .	3 0 0	1 13 2	1 6 10	64 19 0	
42nd .. .. .	3 0 0	1 12 6	1 7 6	63 11 6	
43rd .. .. .	3 0 0	1 11 9	1 8 3	62 3 3	
44th .. .. .	3 0 0	1 11 1	1 8 11	60 14 4	
45th .. .. .	3 0 0	1 10 4	1 9 8	59 4 8	
46th .. .. .	3 0 0	1 9 7	1 10 5	57 14 3	
47th .. .. .	3 0 0	1 8 10	1 11 2	56 3 1	
48th .. .. .	3 0 0	1 8 1	1 11 11	54 11 2	
49th .. .. .	3 0 0	1 7 3	1 12 9	52 18 5	
50th .. .. .	3 0 0	1 6 6	1 13 6	51 4 11	
51st .. .. .	3 0 0	1 5 8	1 14 4	49 10 7	
52nd .. .. .	3 0 0	1 4 9	1 15 3	47 15 4	
53rd .. .. .	3 0 0	1 3 11	1 16 1	45 19 3	

Table of Payments—continued.

Half-year.	Prescribed Half-yearly Instalments.	Apportioned thus :		Balance of Principal owing.
		On Account of Interest at 5 per Cent.	On Account of Principal.	
54th .. .. .	£ s. d. 3 0 0	£ s. d. 1 3 0	£ s. d. 1 17 0	£ s. d. 44 2 3
55th .. .. .	3 0 0	1 2 1	1 17 11	42 4 4
56th .. .. .	3 0 0	1 1 1	1 18 11	40 5 5
57th .. .. .	3 0 0	1 0 2	1 19 10	38 5 7
58th .. .. .	3 0 0	0 19 2	2 0 10	36 4 9
59th .. .. .	3 0 0	0 18 1	2 1 11	34 2 10
60th .. .. .	3 0 0	0 17 1	2 2 11	31 19 11
61st .. .. .	3 0 0	0 16 0	2 4 0	29 15 11
62nd .. .. .	3 0 0	0 14 11	2 5 1	27 10 10
63rd .. .. .	3 0 0	0 13 9	2 6 3	25 4 7
64th .. .. .	3 0 0	0 12 7	2 7 5	22 17 2
65th .. .. .	3 0 0	0 11 5	2 8 7	20 8 7
66th .. .. .	3 0 0	0 10 3	2 9 9	17 18 10
67th .. .. .	3 0 0	0 9 0	2 11 0	15 7 10
68th .. .. .	3 0 0	0 7 8	2 12 4	12 15 6
69th .. .. .	3 0 0	0 6 5	1 13 7	10 1 11
70th .. .. .	3 0 0	0 5 1	2 14 11	7 7 0
71st .. .. .	3 0 0	0 3 8	2 16 4	4 10 8
72nd .. .. .	3 0 0	0 2 4	2 17 8	1 13 0
73rd .. .. .	1 13 10	0 0 10	1 13 0	..

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## SUMMARY.

*Object.*—The object of this Act is to insure a uniform standard of valuation for taxation, rating, and loan purposes.

*Valuer-General.*—At the head of the Valuation Department is the Valuer-General.

*District Valuers.*—The Valuation Districts are the districts under the Rating Act.

The valuation is made by district valuers appointed by the Government, and they are under the control of the Valuer-General.

*District Valuation-rolls.*—For each district there is a valuation-roll, and a copy of any entry therein may be obtained from the Valuer-General on payment of the prescribed fee.

The valuations may be revised at any time the Governor may by Order in Council direct.

**Objections.**—Owners may object to the valuations of their properties, and all objections are heard and determined by the Assessment Courts. These consist of the Stipendiary Magistrate of the district (who presides) and two other members appointed by the Governor.

**Appeal.**—An appeal on points of law lies to the Supreme Court and must be made within seven days ; security to be given, &c.

**Compulsory Sale or Purchase.**—Either party, Valuer-General or owner, if dissatisfied with the verdict of the Assessment Court, may require the other to accept his valuation, or purchase or sell, as the case may be.

Within fourteen days of the decision of that Court, the Valuer-General may notify the owner of the value he places on the property, and the Governor may call upon him to accept that value or sell. The owner may proceed in like manner, and the parties may either complete the transaction or agree upon a fresh value altogether.

When the Governor in Council refuses the Valuer-General's recommendation, the latter accepts the valuation.

**Local Bodies.**—Valuation-rolls are supplied to all local authorities rating on the capital value or on unimproved value. Such valuation-rolls are subject to the same liability to correction as the district valuation-rolls.

**General Use of the District Rolls.**—The valuations on the district rolls are used for the assessment of land-tax, stamp duties, and duties on deceased persons' estates ; for local rates, except in places where these are levied on the annual value ; also, for the purposes of advances and investments on mortgage of land by the Post Office, Government Insurance Department, Public Trust Office, the Government Advances to Settlers Office, and the Commissioners of the Public Debts Sinking Funds. The valuation is also used for the guidance of the Government in transactions under "The Land for Settlements Act, 1894," and "The Public Works Act, 1894."

**Value.**—The terms so long in dispute, "capital value," "unimproved value," and "value of improvements," are defined for New Zealand by the Act of 1900 as follows :—

" 'Capital value' of land means the sum which the owner's estate or interest therein, if unencumbered by any mortgage or charge thereon, might be expected to realise at the time of valuation if offered for sale on such reasonable terms and conditions as a *bona fide* seller might be expected to require :

" 'Unimproved value' of any piece of land means the sum which the owner's estate or interest therein, if unencumbered by any mortgage or other charge thereon, and if no improvements existed on that particular piece of land, might be expected to realise at the time of valuation if offered for sale on such reasonable terms and conditions as a *bona fide* seller might be expected to require :

" 'Value of improvements' means the sum by which the improvements upon an owner's land increase its value :

" Provided that the value of improvements shall in no case be deemed to be more than the cost of such improvements estimated at the time of valuation, exclusive of the cost of repairs and maintenance."



*Penalty.*—For obstructing the valuers, who have the right of entry, and for refusing to answer their proper questions as to value, or giving them false answers, there is a penalty not exceeding £10.

"*The Stamp Act, 1882,*" "*The Deceased Persons' Estates Duties Act, 1881.*"—The Valuer-General may, on request of the Secretary for Stamps, have a new valuation made if he thinks it necessary. The expense to be paid by the owner or his representative.

#### " HOMING-PIGEON PROTECTION ACT, 1898.

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##### SUMMARY.

*Registration.*—The Act is intended to protect the carrier pigeon for the service of the State. To that end owners are invited to register their homing-pigeons with the Chief Postmaster of their postal districts.

The specified object is "to place the pigeons at the disposal of the Government of the colony, and of every officer thereof, in carrying messages when the exigencies of the public service may require the same."

*Penalty for Injury to Homing-pigeons.*—(1.) Shooting a homing-pigeon (registered), intentionally or negligently, killing, wounding, disabling, ensnaring, or otherwise injuring, entails a penalty not exceeding £10.

(2.) To injure a homing-pigeon when being conveyed to the point of departure for a message entails twice the penalty, or up to £20.

There is, in addition, the liability for damages.

#### IMPOUNDING ACT, 1884, 1898 (ALSO FENCING ACTS, 1893, SECTION 3, AND 1896, SECTION 6).

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##### SUMMARY.

*Impounding and Damages for Trespass.*—Occupiers of all lands whatsoever may impound cattle trespassing thereon. "Cattle," of course, includes horses, sheep, pigs, goats, and all four-footed farm stock.

In the case of unfenced land, no claim can be made for damages. In the case of fenced land, the occupier impounding chooses between the trespass rates fixed by the Act, for which he can detain the cattle, and an action for damages, in which he cannot detain them.

In both cases poundage, driving, feeding, and notice fees (as prescribed by the Act) are chargeable, and the impounded cattle can be detained till they are paid.

In the Provincial Districts of Nelson, Marlborough, and Otago the impounding law is different. In the first two named, unfenced land is on the same footing as fenced. The Counties of Buller, Inangahua, and Grey are, however, now excepted from this variation, and in them the impounding law is as it is in the bulk of the rest of the colony.

In Otago, cattle trespassing upon unfenced land may not be impounded, but compensation for any damage they do may be recovered in the law-courts.

These variations may be annulled by Governor's Proclamation, at the request of the majority (of at least two-thirds) of the members of any County Council or equivalent body, or borough or town district. That Proclamation may in its turn be revoked at the same request by the Governor, or by resolution of either House of the General Assembly. In such case the question can never be reopened.

*Modes of Impounding.*—The ordinary rule is that cattle trespassing must be impounded in the nearest pound, and a written statement supplied to the poundkeeper of their numbers, brands, and owners.

An occupier, if he knows the owner, may impound the cattle on his own land, giving the owner notice within sixteen hours. After waiting forty-eight hours he may, if nothing is done, send the cattle to the pound, charging the driving-rates and fees for trespass, sustenance, &c.

Cattle may be driven to their owner's place, and the fees and charges, if refused, may be recovered.

*Release from Pound.*—Cattle are detained by the poundkeeper till payment of all charges.

*Sales.*—If the charges are not paid, cattle may be sold after fourteen days, if neat cattle, horses, asses, or mules; and after seven days in all other cases. After deduction of expenses the balance goes to the owner. If there is not enough to cover the expenses they can be recovered from the owner.

If cattle are not valuable enough to cover charges, the sale may be made earlier, on permission of a Justice, and after due notice to owner.

Diseased, injured, and disabled cattle may be destroyed by order of a Justice.

*At the Pound.*—No cattle can be delivered at night, and none received, unless they have come over five miles on the day of impounding.

Pounds must be kept clean; room and sufficient food must be found for the cattle, and diseased cattle must be kept separate.

A pound-book is kept, and is open to the public for inspection for 1s., and to Justices, Registrars of Brands, Inspectors of Sheep and Slaughterhouses, and to Crown Lands Rangers.

Tables of fees must be displayed legibly painted on a board ; also notices of the cattle in pound.

Notice of all impoundings (except of sheep, goats, calves, and pigs, when not more than two) must be forthwith sent to the owners or persons in whose names the brands are registered, and published in one or more newspapers circulating in the district.

*Protection of Owners of Impounded Cattle.*—Owners may complain to a Justice if they feel themselves in any way aggrieved. In such case they must notify the poundkeeper of their intention ; but to get their cattle out of pound they must pay the poundkeeper all the charges, including the trespass rates, whether they object to them or not, the poundkeeper being bound to keep these trespass rates subject to the order of the Court. The owner's notice to the poundkeeper must be in writing.

The complaint must be made within ten days of the notice to the poundkeeper. It is heard by two Justices, whose jurisdiction is complete as to all matters in the complaint, and final. On their order the poundkeeper may return the trespass fees or pay them to the persons concerned, as the case may be. If the verdict is that the impounding was illegal, the complainant can recover the other charges paid, and damages, if any, from the persons who impounded the cattle.

*Cattle Trespass on Roads.*—Cattle trespassing without permission of the proper authority on roads unfenced, whether at large or tethered, may be impounded by constables, or persons authorised by the local body, or by proprietors of adjoining lands. They may under such circumstances be detained at night, at special rates, in addition to the other fees and charges prescribed by the Act.

This does not apply to a runholder's stock on roads through the run, or to stock belonging to the owner of land through which there are unfenced roads.

*Goats and Pigs : Special Provision.*—Occupiers of any land, whether fenced or unfenced, anywhere, may recover trespass rates from the owner of stray goats and pigs.

Renewal of the trespass within three months involves double the schedule rate of trespass rates for each trespass.

When pigs or goats trespass on fenced lands in grass, or under cultivation, they may be destroyed forthwith. Notice of such destruction must be sent to the owner of the animals destroyed, under a penalty for omission of not less than £10, or, if the owner cannot be found, to the nearest policeman. In the case of wild pigs no notice is, of course, necessary.

*Poultry.*—Poultry may be destroyed under the same conditions.

*Angora Goats.*—Branded Angora goats are excepted from the category of goats destroyable as above.

*Wild Cattle.*—(1.) All unbranded cattle above (or apparently above) six months old belong to the Crown. They may be sold by the Commissioner of Crown Lands, or their killing authorised.

(2.) When trespassing cattle are too wild for impounding they may be sold by the poundkeeper after two weeks' notice to the owner to remove them, plus three weeks after expiry of notice. If the buyer does not remove them at once the occupier may destroy.

(3.) Buyers of wild cattle of either of the above classes may destroy the cattle, and have power of immediate entry for purposes

of mustering, &c. (in fact, such cattle are sold for removal "forth-with"), subject throughout to liability for any damages they may do. Their authority is a written order from the Commissioner or poundkeeper, as the case may be.

*Notice for Stray Cattle.*—No such stray cattle can be taken from anywhere without at least twenty-four hours' notice to the owner of the land on which they are running.

<i>Penalties.</i>		Not exceeding
<b>Poundkeepers—</b>		
Illegal impounding or inciting purchase at pound sale ..	}	£50
Demanding or taking unauthorised charges ..		
Failure to pay moneys due for sales, fees, &c. ..		
<b>Others—</b>		
Rescuing or attempting to rescue cattle impounded ..	}	£50
Injury to pound .. .. .		
Illegally impounding .. .. .		
Removal of cattle from safety to a place where they may be impounded .. .. .		
<b>Poundkeepers—</b>		
Ill-treatment of cattle in pound .. .. .	}	£10
Omission to keep pound-book, or keeping it badly ..		
Offences without special penalty .. .. .		
<b>Others—</b>		
Refusing name and address of owner (or agent) of travelling cattle, either to constable or to owner of land or his representative .. .. .	}	£10
Driving cattle from land without proper authority, or without twenty-four hours' notice to the owner ..		
Shifting cattle about on other people's land, or from such land on to a public road .. .. .		
Leaving open gates, or slip panels, or otherwise causing or trying to cause trespass .. .. .		
<b>All—</b>		
Working or using impounded cattle without consent of owner .. .. .		£20*
Permitting entire animals to stray on lands or roads ..		£20
Additional special trespass rate for such straying ..		£10
Stray cattle on roads without permission, for each head		£2
Failure to notify in writing to owner or constable destruction of trespassing pigs, goats, or poultry within twenty-four hours .. .. .		£10
Failure to bury carcases of such if not removed by owner within forty-eight hours .. .. .		£10

#### I.—TRESPASS RATES.†

Cattle.	Unfenced Land.	Paddocks.	
		Grass or Stubble.	Crop: Growing or unremoved, or Cemetery.
	s. d.	s. d.	s. d.
Big cattle .. .. .	.. .. .	1 0	2 6
Sheep .. .. .	.. .. .	0 3	0 6
Goats and pigs .. .. .	1 0	3 0	5 0

Repairs to fences up to £2 may be charged at trespass rates.

A special rate may be charged for any entire animal up to £10.

Young stock of six months with their mothers do not count.

\* Plus compensation and costs.

† These rates are doubled for every trespass within three months of the first.

## II.—TAKING TO POUND (DRIVING FEES).

Up to twenty-five head .. ..	1s. per mile or part.
Over twenty-five head .. ..	2s. „

## III.—NOTICE OF DETENTION.

For every mile or part (over one furlong) between residences, 1s. per mile, with a maximum limit of £2.

## IV.—POUND RATES.

	Pound Fee.	Feed.
	s. d.	s. d.
Entire horses (over nine months) per head	2 6	2 6
Horses, mares, &c. .. ..	1 0	2 6
Mules and asses .. ..	1 0	1 6
Bull (over nine months) .. ..	2 6	1 6
Oxen, cows, &c.—		
First ten .. ..	0 6	1 6
Second ten .. ..	0 4	
Next twenty .. ..	0 3	
Above fifty .. ..	0 2	
Rams (over four months) .. ..	0 6	
Wethers, ewes, &c.—		
First twenty .. ..	0 2	0 2
Next thirty .. ..	0 1½	
Next fifty .. ..	0 1	
Over one hundred .. ..	0 0½	
Goats .. ..	1 0	0 2
Pigs .. ..	1 0	0 6

*Additional.*—For the expenses of detaining cattle found on road at night, and detained till daylight for impounding, an extra 1s. per head is chargeable for the first twenty head, with 6d. for every head over that number.

## “LAND AND INCOME ASSESSMENT ACT, 1900” (CONSOLIDATION), (1903).

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## SUMMARY.

*Land-tax.*

*Ordinary Tax and Rate.*—All unimproved lands with a certain exemption are liable to annual taxation. This Act formulates the liability; an annual special Act orders the taxation.

The present rate of taxation is 1d. in the pound on unimproved value (as defined in the Government Valuation of Land Act: *q.v.*) up to £5,000, with additions after that on a graduated scale.

Native lands occupied by Europeans are liable to half the amount of the ordinary land-tax. Native lands are not liable to the graduated tax.

*Exemptions.*—There is an exemption of £500, limited to properties of the unencumbered value of £1,500 and under.

For properties of £2,500 unencumbered value (and over) there is no exemption.

Between the £1,500 and £2,500 the exemption falls at the rate of £1 for every increase of £2 in the value.

Special exemptions may be granted by the Commissioner of Taxes at his discretion, in cases in which the income from land or mortgages is under £200 plus income from all other sources, and cannot, owing to incapacity of the owner from age or infirmity, be supplemented. This has been found to diminish hardship to widows and orphans.

The following are exempt from land-tax :—

A place of worship for any religious society, or a place of residence for any of the clergy or ministers of such society.

A charitable or educational institution (other than a public charitable or educational institution hereinbefore exempt) not carried on exclusively for pecuniary profit: provided that this exemption shall not extend to more than 15 acres in the case of any one such institution.

A public library, athenæum, mechanics' institute, public museum, school of mines, or masonic lodge.

A showground or place of meeting of any agricultural society.

A public cemetery or public burial-ground.

A public garden, public domain, public recreation-ground, or other public reserve.

A public road or public street.

A public railway, to the extent of the land actually used for permanent-way, and for yards, sheds, and buildings for the purposes of traffic only, but not further nor otherwise.

*Incidence.*—Out of 115,713 landholders of all sorts not more than 22,778 pay land-tax.

*Adjustments.*—Mortgages are deducted from the assessed value by the owners, and are assessed at the face-value unless cause can be shown otherwise.

In the case of mixed mortgages the part secured on land is liable to land-tax, the balance to income-tax.

Mortgagees have right of objection; they pay the land-tax, and their mortgage income is exempt from income-tax.

*Graduated Tax.*—When the unimproved value reaches £5,000,  $\frac{1}{16}$ d. in the pound is added to the tax. At £210,000 and over the added tax is 3d. in the pound.

From £7,000 the rate increases with the value of the property by further steps of  $\frac{1}{16}$ d., until the above maximum of 3d. is reached.

In the graduated assessment there is no deduction for mortgages.

*Absentees.*—Owners resident out of the colony for not less than one year preceding the date of the passing of the annual taxing Act have to pay an addition of 50 per cent. to their graduated land-tax.

#### *Income-tax.*

*Rate.*—All incomes, with certain exemptions, pay annually a tax which at present is fixed at from 6d. to 1s. in the pound of income.

*Exemptions.*—All incomes from land and mortgages over land are exempt. Individual incomes of other kinds are exempt to the extent of £300, provided the earner has lived in the colony some part of the year; and also for the life assurances paid, up to £50.

*Individual Assessment.*—The rate is: on the first taxable £1,000, 6d. in the pound; on everything taxable over that, 1s. in the pound.

*Company Assessment.*—Companies have to pay 1s. in the pound on their profits, without exemption of any kind.

The dividends of their shareholders are not returnable as for taxation.

#### *General.*

*General Exemptions.*—Besides the above, land and income are exempted which are the property of—

The King;

The local bodies, public statutory bodies, friendly societies, and building societies;

Charitable and educational institutions, if not carried on for pecuniary profit;

Savings-banks, and the commissioners of any sinking fund;

Religious societies whose funds are employed for the support of aged and infirm ministers;

Churches;

Libraries, athenæums, &c.; show-grounds, cemeteries, public gardens, and domains;

Public roads, public railways, to extent of the land used;

Native lands, unleased or unoccupied by Europeans;

All landed interests the incomes from which are already charged with income-tax;

The Governor's salary and allowances;

Pensions received in the colony from elsewhere when they are subject to income-tax;

Public societies not working for profit;

The income of dairy factory companies from the manufacture of dairy-produce from the milk supplied by their shareholders or members, where the articles provide for the distribution of the exemption among the shareholders or members according to the quantity of milk supplied by them.

*The Land and Income Tax Department.*—This consists of assessors, valuers, clerks, receivers, and other officers appointed by the Governor. It is presided over by the Commissioner of Taxes, who is assisted by a Deputy Commissioner, both being appointed by the Governor.

All officers are sworn to secrecy, and bound under heavy penalties.

Its *Functions* are to collect returns of the ownership of lands and of incomes, to assess the same, and to collect the taxation.

*Returns.*—Every landholder and earner of income (not including local governing bodies, local authorities, or statutory public bodies) must send returns to the Commissioner at the time and in the forms prescribed by him. Those for land are for biennial periods, those for income for the annual period of the Government financial year preceding the year in which return is made.

*Valuations.*—The Department may make valuations as often as it pleases.

**Assessment Rolls.**—From these, and the returns received, the assessment rolls are made, and these are the basis of the land taxation. These are, in fact, the same rolls as under the Government Valuation of Lands Act (*q.v.*).

In case at any time these should not be used for the purpose of assessment under the Land- and Income-tax Act, that Act contains all necessary provision for compilation of other rolls, for hearing and determining objections, &c., exactly as provided by the Valuation Act.

**Objections.**—For land the procedure is as under the Government Valuation of Land Act.

For income, objections are heard and determined by the Magistrate of the district, who must hear all such cases *in camera*.

**The Payment of Tax.**—The Commissioner is required to give not less than fourteen days' notice of the due date of both taxes; and if the money is not paid within fourteen days of that date, an addition of 10 per cent. is made to the tax.

**Evasion.**—Contracts for the evasion of the tax are void.

**Enforcement.**—Taxes in arrear are collected by judgment in the Courts. Notice of hearing must be given to the defaulter of thirty days; and if a defence is not filed within eight days of hearing, judgment must go by default.

#### Penalties.

- |   |   |
|---|---|
| (1.) Neglect to attend and give evidence or information at the request of the Department .. | } Penalty up to £100, and in case of any offence under the fourth heading an additional penalty of three times the amount of the evasion or attempted evasion.* |
| (2.) Failure or neglect to furnish return ..  |   |
| (3.) Making false return or giving false answer in matters affecting taxation ..            |   |
| (4.) Every kind of evasion or attempt at evasion of taxation ..                             |   |
| Aiding and abetting in any offence as above ..  | £5 to £50.  |

The tax is not remitted on account of any penalties.

**Appeal.**—Under No. 4 heading there must be two separate convictions—one for the tax and the ordinary penalty, the other for the special penalty or treble the evasion. In the case of the latter, there is right of appeal to the Magistrate's Court, which must be exercised within fourteen days.

Obstruction of officers and breaches of the Act for which there is no special penalty entail a penalty up to £50.

### LAND DRAINAGE ACTS (1898-1904).

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\* This addition may be recovered from the representatives of deceased persons who have during life evaded taxation.



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## SUMMARY.

*Object.*

To facilitate drainage and irrigation by giving power to local bodies, and by enabling districts whose natural conditions are beyond the reach of local government, and individuals who require special arrangements for protection against water, or for facilities of water, to combine through the law to secure their purpose.

*Drainage Districts.*

Under these Acts drainage districts may be constituted by the Governor, after receipt of petitions from a majority of the ratepayers affected. These may be large enough to embrace several counties, or they may be too small to cover a road district; no part of a borough may be included.

*Board of Trustees.*—The governing body of each drainage district is a Board of Trustees (of from five to seven members), elected every third year, on the first Monday in November.

*The Ratepayers' List.*—They are elected by the ratepayers of the districts, whose names are on a special roll known as "the ratepayers' list," which is compiled every year, on or before the 31st August, from the valuation rolls made under the Government Valuation of Land Act. There is the usual machinery for objections, appeals, &c.

*The Franchise* is the same as that under the Counties Act.

*Qualification of Members.*—These are also as under the Counties Act.

*Vacancies* are filled by election, except when caused by the failure of the ratepayers to elect, in which case the Governor nominates.

*Powers and Status of Boards.*—They are incorporated bodies, and three are a quorum. Within their areas they exercise for purposes of drainage all the powers and authorities of County Councils.

They are invested with very full powers, enabling them to make drainage-works of all kinds, complete existing drainage systems, or anything, in short, which may be required in their districts to protect them against floods, to drain their lower levels, or supply them with water.

Irrigation and water-supply are in the category of powers in cases in which the Water-supply Acts do not apply. The procedure is by Order in Council after petition of a majority of the ratepayers.

*Compensation* must be given for land and water taken or damage done. Claim must be made within twelve months. In case of dispute, the settlement is by the compensation machinery of "The Public Works Act, 1894," for damage done by necessary investigations on land, and for compensation for taking necessary materials.

*Right of Entry* is always with the Board at its discretion.

*Construction.*—The Board must give one month's notice of intention to construct works through private lands. Owner may object within that period. Disagreeing, the two may appoint an engineer to decide, and abide by his verdict; failing to agree in this, the matter is settled by a Magistrate, with two assessors appointed by the parties, and the decision is final.

Until compensation paid, works may be stopped by injunction of Supreme Court.

*Maintenance* is the Board's duty, with liability to consequent damages.

*In common* two or more Boards may act together.

*Rates, Ordinary and Special.*—Ordinary rates are limited to 1½d. in the pound. Loans for works are limited to one-fourth the total rate valuation.

To secure these, special rates may be struck after the consent of not less than one-half the ratepayers, representing at least three-fifths of the rateable value.

*Rating, Uniform and Differential.*—The rating may be uniform or differential according to the benefit received, the ratepayers being divided into four classes: (1) Holders whose properties receive immediate and direct benefit; (2) those receiving less direct benefit; (3) the receivers of indirect benefit; (4) the receivers of no benefit at all. Of these the first pay the highest rates and the last are free.

*Appeals against Rates and Classification.*—Appeals against rates and classification (which must be duly notified) lie to the Magistrate and two assessors.

*Accounts and Inspection.*—Accounts must be kept, and are open to inspection of ratepayers at all reasonable times.

*Overdrafts.*—Boards have the right to borrow by overdraft up to the amount of one year's "ordinary income in anticipation of current revenue."

*Loans* are limited to one-fourth of the aggregate value of the fee-simple of all the land in the district, as given in the current valuation roll.

*Default.*—In case of default there are the usual stringent provisions for the appointment of a Receiver to supersede the Board in the management of its finances until the debt is extinguished or compromised, as per "The Local Bodies' Loans Act, 1901."

*Tender of Amends.*—No action can be brought against a Board if tender of sufficient amends is made, and no action can in face of such tender continue.

*Limit of Board's Responsibility.*—Boards are not liable for breakdown on their works, unless they have neglected written notice of their inadequacy and dangerous character.

#### *Individual Action.*

*Private Drains on Neighbouring Land.*—Private individuals who, for the protection of their property against floods, or for their better drainage, or for their protection against the outfall of a stream, think it necessary to take new drains through the properties of other people, or to cleanse or improve existing drains thereon, may arrange with

their neighbours for permission to make and keep in order the necessary works.

*Procedure.*—In such case the application is served on the neighbour adjoining, stating all particulars of works proposed, with map showing localities, &c.

The assent is by deed, which is filed with the Land Registrar for the district.

*Dissent.*—In case of failure of neighbour to assent within one month to the application, or of failure on his part within that period to require the matter to go to arbitration, the case is heard by a Magistrate and two assessors, and decided as to whether injury will be done to neighbours and others by the proposed works or benefit.

If the decision is against injury, the proposed works can proceed.

If the other way, the Court apportions the injury among all claimants there may be, and when the aggregate is paid the proposed works can proceed.

If the Court finds that the proposed works will benefit persons, the amount is, in the case of compensation not having been awarded, recoverable from those persons; and if compensation has been awarded, it is deducted from the same.

When this compensation is paid, the works may begin.

*Approval by Magistrate* (which is a necessary condition of all awards) of the scheme of drainage, either as originally proposed or as modified by him, is followed by the preparation of a map of the scheme, which is filed with the Land Registrar as a record of the proceedings between the parties.

*Compensation.*—In the case of damage to any one but the adjoining owner, compensation is payable under the procedure (in case of dispute) prescribed by "The Public Works Act, 1894," provided claim be made within twelve months of the completion of the works.

*Diversion of Watercourse.*—The first step is notice—three advertisements of same in newspapers for three weeks—after which the procedure is the same as for other works.

*Upkeep of Private Works.*—On payment of compensation the works can begin. When finished they must be kept up by the proposer. If not, the neighbours can do the work, and recover the cost from him. A neighbour can alter any of these works, and substitute fresh ones equally efficient, subject to appeal to the Magistrate and assessors.

### *Penalties.*

The penalty for obstruction and damage in the ordinary way is up to £50, and is recoverable in a summary manner.

Malicious cutting, breaking dam, destruction or damage of any bank, dam, sewer, mill, engine, building, sluice, or any of the works made for the purposes of the Act, is felony, and punishable by fine up to £500, or imprisonment up to three years.

	Not exceeding
Obstructing Board or its appointees .. .. .	£50
Obstructing or injuring drains .. .. .	£50*
Breach of by-law .. .. .	£10
Refusal of custodian of books to allow inspection and copy ..	£5
Unauthorised linking of drains with Board's system, or damming Board's drains .. .. .	£30*

\* And costs of repair.

*Miscellaneous.*

*Costs.*—Costs reasonably incurred by adjourning cases in consequence of applications are paid by the applicant. All others at the discretion of the Court, which can punish unreasonable conduct by awarding double costs.

*Assessors.*—Their fees are charged at the Court's discretion.

*By-laws.*—Boards have the power of making by-laws to regulate all matters within their functions.

*Governing Bodies outside of Drainage Districts.*

Outside drainage districts and river districts, all the powers of the above Boards in regard to cleaning, repairing, or otherwise maintaining watercourses and drains are in the hands of the local bodies.

*Their Orders.*—These may order the owner or occupier of land on the banks of watercourses or drains to clear them of weeds and refuse, under a penalty for disobedience up to £1 a day; and if the local authority does the work itself, the occupiers or owners have to pay that as well as the penalties.

Appeal against these orders lies to the Magistrate, and must be made within twelve days, and until they are disposed of orders appealed against are suspended.

*The Ratepayers' Initiative.*—Ratepayers have the right to request local bodies to use these powers, and, in case of neglect to comply, or of refusal, to summon them before the Stipendiary Magistrate, whose decision is final. In the case of orders issued on such compulsion, owners and occupiers have the same right of appeal as in the others.

*Governor's Powers.*—The Governor has power to place any drainage-work at any time under any local authority he chooses, whether the authority that made it and has control or any other, and to apportion all costs and duties that may have to be divided in consequence among various local bodies.

*County Councils in certain Cases.*—Where there are no River Boards or Drainage Boards, and the Governor has not exercised the above powers, the County Councils have to keep the watercourses clean.

*Irrigation and Water-supply Districts.*—Wherever the Water-supply Acts cannot conveniently be applied, the Governor may, on petition of majority of ratepayers, declare the area in question a drainage district. The above provisions of the Act immediately come into force.

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LAND TRANSFER (1902).\*

SUMMARY.

*Object.*

To simplify the relations between mortgagor and mortgagee, to make clear the position, rights, and obligations of each, and to cheapen the procedure in their relations.

---

\* Amending the Act of 1885.

### *Simplification of Mortgage Deed.*

The parties may adopt the following form of mortgage, setting forth,—

- (a.) The mortgagor (full name).
- (b.) The estate.
- (c.) The land (area and particulars).
- (d.) The reference to title in register (folio of register).
- (e.) The mortgagee (full name).
- (f.) The principal sum.
- (g.) The date of advance.
- (h.) The rate of interest.
- (i.) How payable.
- (j.) How and when principal sum to be repaid.
- (k.) The special conditions.

As witness my hand [or our hands], this                      day of                      , 19   .  
(Signature of Mortgagor.)

Signed by the said \_\_\_\_\_ in the presence of \_\_\_\_\_  
 \_\_\_\_\_  
 (Signature of witness.)  
 \_\_\_\_\_  
 (Occupation and address.)

### *Covenants implied in Mortgage.*

In all mortgages the following covenants shall be implied :—

- (1.) For payment of the principal and interest.
- (2.) For insurances to be kept up by the mortgagor.
- (3.) For keeping premises in good repair, with right of entry to mortgagee for inspection purposes.
- (4.) For power to mortgagee to do insurance, in case of neglect, at the expense of the mortgagor.
- (5.) For right of mortgagee to sell in case of default for two months to pay principal and interest, or of any of the other covenants.
- (6.) Also his right to call up the whole liability, even though the time has not expired.
- (7.) For insurance of workmen by mortgagor, with liability in case of default to have it done by mortgagee at his expense.

### *Indorsements on Mortgages.*

**The principal secured may be altered ;**

The term may be renewed or extended ;

The interest may be transferred by a simple memorandum indorsed on the mortgage. This memorandum is signed by each of the principals in presence of a witness, who signs also.

**"MARGARINE ACT, 1895."**

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## SUMMARY.

*Object.*—The Act places the margarine industry on a separate basis, imposing heavy penalties for all attempts to confound it with any other.

The makers of margarine have to take out an annual license, the fee for which is £1 sterling.

*Margarine, &c., to be kept separate.*—It is unlawful to mix margarine with butter-fat or milk, or with anything which makes it look like butter, or to manufacture, sell, or offer for sale margarine as butter, or any other substance which contains animal fats or animal or mineral or vegetable oils.

*Export of, Brands, &c.*—Margarine, when exported, must be invoiced, branded, and shipped as such, the word "Margarine" being printed on two sides of each package, in capital letters  $1\frac{1}{2}$  in. square. This brand must be on the tops and sides of the packages before they leave the premises.

*Penalty.*—The penalty for breach of the law under the above head is anything up to £50, with forfeiture of license, and, in case of illegal shipment, forfeiture of the shipment.

*Sale, Marking, &c.*—When margarine is sold in any package other than a box or keg the package must be marked "Margarine" in printed capital letters of at least  $\frac{1}{4}$  in. square.

Penalty for neglect, £1.

*Inspection.*—The Act is administered by Inspectors, who with the public are guided by regulations made under the Act.

#### MOTOR-CAR REGULATION (1902).

##### INDEX.

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##### SUMMARY.

*Object.*—The object of the Act is to safeguard life and property on the public streets and roads, by placing the necessary controlling-power in the hands of the authorities, local and general.

*Definition and Status.*—A motor-car is a "vehicle" under every law relating to vehicles.

A motor-car is a vehicle propelled by mechanical power, which does not exceed 3 tons in weight, emits no smoke, and is used either alone or for propelling one other vehicle whose weight with that of the propelling vehicle does not unladen exceed the empty weight of 4 tons.

Motor-cars are exempt from the provisions of "The Police Offences Act, 1890," regulating traction-engines; they are subject to the Inspection of Machinery Acts.

*By-laws.*—For controlling and regulating the use of motor-cars all authorities possessing the power of regulating vehicular traffic of any kind may make by-laws for—

- (1.) Preventing or restricting the use of motor-cars on bridges or anywhere else they may think fit :

- (2.) Regulating the storage of fuels used by motor-cars, independent of all laws relating to explosive or inflammable liquids.

Such by-laws must have the approval of the Colonial Secretary.

*Lights.*—At night every motor-car must carry a lamp attached, showing a light strong enough for signalling purposes, white to the front, red to the rear, unimpeded entirely.

*Warning.*—Every car must carry some instrument or bell able to make a noise loud enough to give timely warning to the traffic.

*Rate of Speed.*—No car may travel at a greater rate of speed than is reasonable.

*Responsibility.*—For default in the last three particulars the "person in charge" is responsible.

*Inspection.*—All motor-cars between the minimum empty weight of 100 lb. and the maximum of 3 tons must be inspected once a year. They are all subject to the provisions of the Inspection of Machinery Acts of 1902 and 1903.

*Certificates.*—Cars not used for hire (for carrying either goods or passengers, or for haulage) need not have certificated drivers. The rest cannot ply without them.

Certificates of competency are granted by a special Board.

Those granted elsewhere may be recognised.

Certificates of service may be granted on production of the needful evidence.

Certificates of inspection are granted by the Inspectors under the Inspection of Machinery Acts; they are obligatory as above stated, and may be withdrawn at any time should the Inspector think fit. They must be conspicuously displayed.

*Duty under Inspection Acts.*—The owner of a motor-car must notify the Inspector within a month of his ownership and intentions as to locality of use, pay inspection fees, and notify all accidents to the machinery attended with serious consequences.

#### *Penalties.*

	Not exceeding
For breaches of the Motor-car Regulation Act, or of by-laws under same .. .. .	£10
Under the Inspection of Machinery Acts: driving without certificate when not under legal exemption. Per day ..	£5
Attempt to get certificate improperly .. .. .	£25
Use of certificate improperly obtained .. .. .	£20

#### NATIVE LAND RATING (1904).

The main fact that concerns the European settler with respect to this is that Native lands are liable to full rating which—

- (a.) Are occupied by Europeans;
- (b.) Are situated in boroughs or town districts, or within ten miles of the same;
- (c.) Are within five miles of any Government or county road;
- (d.) Have been acquired for valuable consideration;
- (e.) Have always been liable for full rates; and
- (f.) Are incorporated under Part II of Division II of "The Native Land Court Act, 1894."

All other lands of ascertained title are liable to half rates, and those of unascertained title are free.

"NOXIOUS WEEDS ACT, 1900."

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SUMMARY.

*Scope.*

The Act prohibits both the sale and the sowing of noxious seeds ; enforces the cleaning of threshing and other machinery ; prescribes the method of clearing noxious weeds, and of trimming and cutting various hedges.

*Administration.*

The Act is administered by the local authorities, namely : City or Borough Councils, Town Boards, Road Boards, County Councils (outside of town and road districts) ; and when the Counties Act is not in force the Minister of Lands is the local authority.

There are Inspectors for the various districts, and they are appointed by the Governor.

*Power of Inspection.*—They have the right of entry to every property to see whether the provisions of the Act have been complied with.

In case of default in any of the requirements of the Act, the Inspector's duty is to send notice to the occupier, naming the default and requiring compliance by a certain date. If the notice is neglected the Inspector can have the work done, and recover the cost in any Court of competent jurisdiction.

*Noxious Seeds.*

The list forms the Third Schedule of the Act. It may be added to at any time by the Governor by Order in Council, on the recommendation of the Joint Stock Committee of both Houses of Parliament :—

Bathurst Burr	Fat-hen
Broom	Gorse
Blackberry	Oxeye daisy
Burdock	Sweetbriar
Burr clovers	Thistle
Clover dodder	Wild turnip
Dock	Ragwort or ragweed.

*Prohibition.*—Noxious seeds and uncleaned seeds cannot be sown, with the exception of gorse, which may be sown for fodder by permission of the local authority in writing.

Noxious seeds cannot be sold at all. Uncleaned seeds may be sold only to buyers who are aware of their condition.

*Cleaning Seed-machinery.*—Threshing-machines, clover-dressers, chaff-cutters must be cleaned immediately after using and before



removal wholly or in part from one farm to another. The detail of the cleaning is thus described: "The machine to be thoroughly swept down, the second-dressing riddles removed and cleaned, the screen opened, the slide below the grain-elevator taken out and the grain and rubbish removed, and the machine run until empty."

#### *Noxious Weeds.*

##### *Actual—*

Blackberry	Sweetbriar.
Californian or Canadian thistle	

These are specified by the First Schedule of the Act as noxious weeds.

##### *Possible—*

Bathurst Burr	Gorse
Broom	Hakea
Giant burdock	Ragwort or ragweed.

This is the Second Schedule of the Act. It may be added to by Order in Council.

Any of the weeds mentioned in it become noxious weeds in any district when so declared by the local authority: by *Gazette* notice in the case of the Minister, by special order in the case of any other authority.

#### *Duties of Occupiers.*

*Hedges.*—Hakea, broom, gorse. These must be cut and trimmed once a year in any season. Where they touch a watercourse the cuttings must be removed and destroyed. Sweetbriar, blackberry, which are noxious weeds of the First Schedule, must be cut and trimmed once a year at the proper season. The rubbish in these cases must be removed and destroyed all along the line.

*Noxious Weeds.*—Sweetbriar, blackberry, and, when declared, broom, gorse, hakea, &c., as above.

These, when in large quantities and not in fences, must be cleared at the proper season at the annual rate of a quarter of a chain on each side of all fences, water-races, and watercourses. This width of clearing may be reduced (on cause shown) one-half by the Inspector; more by the Minister.

All other noxious weeds (and the above varieties when present in small patches) must be cleared every year at the proper season.

But gorse may be grown over a given area for fodder by permission of the Inspector.

*Cost of Clearing.*—Subject to the conditions of his lease, the occupier may recover the cost of clearing from the owner, to the extent of one-fourth if the lease has more than four years to run; if less, then, failing agreement between the parties, the matter goes for settlement to the Stipendiary Magistrate.

*Unoccupied Lands.*—The duty of clearing unoccupied Crown lands, unvested reserves, &c., lies with the Minister; that of clearing all lands under their control devolves on the local authorities.

#### *Native Lands.*

In the case of Native lands under tribal title, the work of clearing where the owners neglect it, can be arranged for by the Minister, and the cost recovered from the Native Department. Such cost,

when a memorandum specifying the amount has been registered in the Native Land Court, becomes a charge against the land, which must be satisfied before the land can be alienated.

In the case of blocks of which the Native owners exceed ten, the Minister may direct the owners to appoint a committee in any manner he may choose to indicate. If the owners fail or neglect compliance for a month he may appoint the committee himself. If the committee fails to clear the land, the Minister may do it on the terms stated.

If the Minister prefers to have the land leased in order to be cleared, the Governor in Council may order a lease to be executed by any owner he directs on his behalf, on any terms he chooses to appoint, and the lease so executed is a valid and effectual lease. This procedure may be applied to any Native land at the request of the Native owners, no matter what their tenure, title, or number.

#### *Penalty.*

The penalty for infringing the Act lies between 10s. and £20, recoverable upon the information of the Inspector or any other authorised person on the decision of the Stipendiary Magistrate alone. The payment of any penalty does not bar any action which the Inspector may bring against the party for ill-usage.

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#### "ORCHARDS AND GARDEN PESTS ACT, 1904."

*Disease.*—There are two schedules, viz. :—

- (1.) Mediterranean or West Australian fruit-fly (*Halterophora capitata*), San José scale (*Aspidiosus perniciosus*), Queensland fruit-fly (*Tephrytes tryoni*), phylloxera, or vine-louse (*Phylloxera vastatrix*), Early blight (*Alternaria solani*), Irish potato-blight (*Phloptora infestans*).
- (2.) American blight (*Schizoneura solani*), apple-scab (*Fusicladium dentriticum*), codlin-moth (*Carpocapsa pomonella*), mussel or oyster scale (*Mytilaspis pomorum*), red mite (*Bryobia pratensis*).

Of these schedules the first, which may be added to at any time by Order in Council, is of diseases within the meaning of the Act, and the second may be brought at any time wholly or partially within that meaning by Order in Council of the Governor.

The second schedule may be suspended by special County Council order, or restored, and boroughs for the purpose of the Act are included in counties.

The Governor has the power of preventing the introduction of any plant, fruit, fungus, parasite, insect, or any other thing he may consider likely to introduce disease; of appointing quarantine-grounds, special ports of entry; of adding to the schedule of diseases, of having fruit fumigated and treated in any way that may be necessary, of making regulations for the safety of the fruit industry.

*Duties of Occupiers.*—They must do all in their power to eradicate proclaimed disease, and once a year they must give an efficient dressing to all their fruit-trees at the proper season, autumn or winter, for the purpose of eradicating or checking the spread of apple-scab and codlin-moth.

*Administration.*—The Act is administered in the districts by Inspectors appointed by the Government. It is their duty to see that the owners do everything necessary for the eradication of disease, and that they obey the Act. They have the fullest right of entry upon land, premises, and ships, and of inspection. They may give notice to eradicate diseases, and in case of neglect they can do the work themselves, or get it done at the owner's expense. Such failure is an offence under the Act, as is failure to give the fruit-trees the annual dressing prescribed by the law. The Inspector, in this latter connection, may vary the season.

*Notification by Inspector.*—In the case of phylloxera and proclaimed diseases, the Inspector's notification of its presence within three months in any orchard is followed by a *Gazette* notification that the place is an infected area, from which nothing can be removed without permission of the Inspector.

*Notification by Occupier.*—Within forty-eight hours of the discovery of disease owners are bound to give written notice to the Minister in Wellington.

The offences under the Act are—

- (a.) Selling, or offering, or distributing diseased plants and fruit.
- (b.) Disposing of any fruit or package illegally imported.
- (c.) All other breaches of the Act or of Orders in Council made under it.

In Auckland fruit affected by codlin-moth to the extent of not more than 5 per cent. may be sold, nevertheless.

#### POISONS IMPORTATION AND CARRIAGE (1895, 1902).

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##### SUMMARY.

*Object.*—The Act is designed to safeguard life against the danger of poison imperfectly stored or carried or imported under improper conditions.

*Poison.*—Arsenic and cyanide of potassium.

*Marking.*—Every package must be branded with the word "Poison" on the outside, in easily legible letters, not less than 1 in. long, together with the true name and description of the contents.

*Packing.*—These poisons must be packed in iron water-tight drums; and cyanide may be packed in hermetically sealed iron cases protected by wood.

*Sheep-dip* if in powder and containing not more than 10 per cent. of arsenic may be packed securely in wood.

*Separation.*—These poisons must be stored and carried separate from all food products. If not so carried on shipboard and there is damage the goods may be confiscated, in which case the carrier has to pay the value to the owner.

*Penalty.*—Any breach of the law is subject to a fine up to £100.

## "PUBLIC WORKS ACTS, 1901."

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## SUMMARY.

*The Taking of Land.*

Land may be taken for defence or any public work.

*Conditions.*—The Minister has full power of entry to survey, erect works, &c., and his powers are protected by penalties against obstruction, &c.

In the case of railways, defence, and works under special Acts, these powers are subject to no restrictions. In all others due notice must be given, and the occupiers have the right to get from a Magistrate a decision as to whether the works are necessary. These conditions may be set aside by mutual agreement.

Stone quarries, buildings, orchards, yards, gardens, vineyards, ornamental parks cannot be entered and used without the consent of the Governor in Council and the owner.

Fences are not to be removed before others are up.

Severed lands may be surrendered at the option of the owner.

Before any land is taken, full descriptions and maps must be placed in convenient places, the intention to take must be gazetted, and notice must be served on the owner.

*Compensation.*

*Why and when.*—When lands are compulsorily taken by Government, or by local bodies, for public works, or are injuriously affected thereby, or when in subdividing town sections the owners have to dedicate enough of their land to widen the street to the 66 ft. minimum, the owners are entitled to compensation.

The claim in Government cases is good for five years; in the case of local bodies, for twelve months.

*Compensation Court.*—If the parties fail to agree, the matter is decided by a Compensation Court. This consists of a President and two assessors; the President being either a Judge of the Supreme Court or a Magistrate,\* according as the amount in dispute is under or over £250.

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\* These are the judicial officers of the districts in which the claim originates.

In cases up to £100, the Judge may appoint a District Court Judge or a Magistrate to act for him. In cases over £1,000, he can, with the consent of the parties, appoint a District Court Judge.

The assessors cannot be appointed without their consent, and neither they nor the President can act if they are interested, beyond the liability to payment of rates.

If the parties prefer a Court of one individual, and agree to appoint one, that individual becomes the Compensation Court.

The interests of absentees are protected in this way: The Minister (or local authority) has to satisfy the Court that they are entitled to the compensation, and to pay into Court the amount he is prepared to pay. If the Court is satisfied, the case goes before the Compensation Court, and the Public Trustee acts for the absentee.

In all cases the owner is "the claimant," and the Minister or local body "the respondent."

These Courts can, with the consent of the parties, hear any other claims than those they were established to hear.

*Procedure.*—The claimant makes his claim in writing in prescribed form (here appended), showing all necessary particulars in detail. There are two forms (A and B),—

Form A. For compensation for lands taken.

Form B. For damages to lands injuriously affected.

#### FORM A.

##### FORM OF CLAIM TO COMPENSATION UNDER "THE PUBLIC WORKS ACT, 1905." *For Cases where Lands are taken.*

To the Minister for Public Works [or the local authority, as the case may be].  
WHEREAS by a Proclamation by His Excellency the Governor, dated the day of , 19 , the lands mentioned in Table A hereunder, in which I have an interest, as described in Table B hereunder, have been taken and vested in His Majesty for the purposes of [Here mention the name of the public work mentioned in the Proclamation].

And whereas the lands mentioned in Table C below, adjacent to the lands so taken, in which I have an interest, as described in Table D below, will be injuriously affected by the said work by reason that [Here state items of claim, with a reference number to each, and give in each case full particulars of the nature and extent of claim].

This is to give notice that I claim the sum of £ as compensation for all loss arising out of the taking of the aforesaid lands, and the construction of the aforesaid public work, which sum is made up as follows:—

acres	roods	perches of land taken, at	£	s.	d.
per acre	..	..	..	..	..
Land injuriously affected as follows: [Here state reference number and short heading of each item of claim previously detailed, and the amount claimed in respect of each item separately]					
Total claim	..	..	..	£	..

Given under my hand this day of , 19 .  
Claimant: [Christian name and surname in full.]  
Address: [In full.]

#### TABLE A.

##### Description of Lands taken.

[Here describe the area and situation of lands taken, giving name of survey district, and number of block and section, as in Proclamation.]

TABLE B.

*Nature of Interest in Lands taken.*

[Here state in full the nature of the interest, as owner in fee-simple, mortgagee, lessee, or occupier; and if the lands are leased or encumbered, or subject to any easement, give particulars of such lease or encumbrance, &c.]

TABLE C.

*Description of Lands injuriously affected.*

[Here describe the area and situation of the lands injuriously affected, giving name of survey district, and number of block and section, or other means of identification.]

TABLE D.

*Nature of Interest in Lands injuriously affected.*

[Here state in full the nature of the interest, as owner in fee-simple, &c., &c., and the text as per Table B.]

## FORM B.

## FORM OF CLAIM TO COMPENSATION UNDER "THE PUBLIC WORKS ACT, 1905."

*For Cases where Lands are injuriously affected.*

To [Here insert Minister or local authority].

WHEREAS the public works mentioned in Table A hereunder have been [or are about to be] executed by your authority, by which the lands described in Table B hereunder, in which I have an interest, as described in Table C hereunder, have been [or will be] injuriously affected by the said works by reason that [Here state items of claim, with a reference number to each, and give in each case full particulars of the nature and extent of each such item].

This is to give notice that I claim the sum of £ as compensation for all loss arising out of the construction of the said public work, which sum is made up as follows:—

	£	s.	d.
[Here state reference number, and short heading, of each item of claim previously detailed, and the amount claimed in respect of each such item separately] .. .. .			
Total claim .. .. .	£		

Given under my hand this      day of      , 19      .  
 Claimant: [Christian name and surname in full.]  
 Address: [in full.]

TABLE A.

*Nature of the Works.*

[Here describe the works constructed or proposed which have caused the claim.]

TABLE B.

*Description of the Lands affected.*

[Here describe the area and situation of the lands affected, giving name of survey district, and number of block or section, or other means of identification.]

TABLE C.

*Nature of Interest in the Lands injuriously affected.*

[Here state in full the nature of the interest, as owner in fee-simple, &c., &c., as in Table B under Form A.]

*Procedure.*—The respondent has sixty days to reply in. If he agrees, the parties arrange. If he does not reply, the claimant at once files a copy of his claim in the nearest Supreme Court or Magistrate's Court, according to the amount of his claim under or over £250.

The respondent disagreeing has ninety days in which to make an offer and file particulars in the same Court.

If no offer is made, or if the offer is declined, the claimant files his claim, and notifies that he claims a hearing by a Compensation Court, giving the name and address of his assessor whom he has appointed, sending a copy to the respondent.

The respondent has twenty-one days to appoint his assessor, and notify the Court in which the claim has been filed. If he fails, the Court appoints one for him.

If the claimant within thirty days after filing does nothing, the respondent can demand a hearing of the Compensation Court in the same manner.

*Notice of Hearing.*—The Court being set up, its President fixes time and place of hearing, and not less than twenty-one days' notice is given to the assessor and the parties.

*Practice of Court.*—The proceedings are under the ordinary Court rules; evidence not strictly legal is admissible; all the determinations must be by majority; if majority cannot agree, the Court breaks up and proceedings begin again with the presentation of a fresh claim.

*Vexatious Obstruction.*—If a claimant is proved to have deliberately increased the cost of the work, and it should be above the award, he has to pay the excess, and is deprived of his costs.

*Excessive Costs.*—When the costs are to be deducted from the award, and are greater than the award, the claimant has to pay the difference.

*Excessive Claim.*—No one who does not recover more than one-half the amount of his claim can recover costs.

*Variation of Award.*—Within a month of filing in Supreme Court, award may be varied to rectify error.

*Enforcement of Award.*—If the award is not within sixty days of filing satisfied by the payment of the money into the Public Trustee's hands, it has the effect of a Supreme Court judgment and may be enforced accordingly.

*Distribution of Award.*—Disputes about the division of awards are settled by the Supreme Court; and in limited interests distribution is ordered by the Court or the Public Trustee.

*Mortgages and Rents.*—Compensation for mortgaged lands goes towards reduction of the mortgage debt, and that for rented lands towards the reduction of annual rent. Lands and easements may be given by agreement by way of compensation.

### *Roads.*

*The King's Highway.*—All roads are vested in the Crown. The Governor can make or repair roads anywhere, which do not become Government roads in consequence.

*Classification of Roads.*—There are three kinds of roads: (a) Government, (b) county, (c) district.

(a.) They are declared by the Government, and may be reclassified at any time. When the Counties Act is only partially in force, the roads are originally Government roads.

(b.) They may be declared by either Government or County Council, and may be reclassified at any time. All roads in counties under the full Act are originally county roads. The Councils appoint the road authorities, with their consent.

(c.) They may be declared by the same authorities, and are subject to reclassification.

No road or street in any subdivision of land may be less than 66 ft., and every section must front upon a road.

*Road Authorities.*—They are according to the qualification.

*Their Rights.*—They have all necessary powers and rights from survey to maintenance, including the right of entry into lands (no gardens, shrubberies, plantations, &c.), of taking material, and of cutting and maintaining drains, paying a fair price for materials, damages, or disturbance, as the case may be.

*Access to Lands.*—Persons purchasing from the Crown land to which there is no access are entitled to a road through adjoining lands. The Minister is bound to get them, on their application, the necessary road, even if he has to pay compensation to the occupiers, in which case his liability is limited to one-fifth of the purchase-money paid by the applicant for his land. Anything over that the applicant has to pay.

*Gates across Roads.*—In sparsely populated districts the local authority may permit swing-gates to be put up, which, however, only remain up during that authority's pleasure.

In the case of roads taken through private lands, the owner is entitled to a swing-gate at each external boundary of the land, with a tenure of twenty years, and the local authority may by agreement subscribe to its upkeep.

No gate can be put up across a road until notice has appeared, at least twice in a fortnight, in a paper circulating in the district.

When a gate has been put up across a public road, a board inscribed "public road" (in not less than 3 in. letters) must be put up on each side of it.

Persons damaging gates are liable for damages to the owners.

The Minister and the local authorities have power to make by-laws to prevent gates from being injured or left open.

Gates may be removed by order of a Road Board, on receipt of petition of five or more ratepayers. The Board may be forced by a Magistrate to obey. Gates under Rabbit Acts exempt. Disobedience of order entails a fine of £1 a day.

*Nuisances on and Injuries to Roads.*—Encroachments, timber or other material left, tampering with the soil or scarping of roads, interfering with drains and ditches, allowing evil things to get into land, dragging timber or heavy material on a road, are offences punishable by fine up to £10 for every day of occurrence, with costs of removal.

Removal of gorse, trimming hedges, cutting down or grubbing up anything impeding drainage or flow of water-races, irrigation, or road traffic, in all these matters the local bodies have powers which must be obeyed.

Appeal may be made to a Magistrate for his decision.

Authorised persons have the power of detaining vehicles to ascertain width of tires and weight of loads.



Roads may be stopped—

- (a.) By County Council or Magistrate (where Counties Act in suspense), after vote of public meeting of ratepayers, and only with the approval of the Minister in case of district and county roads.
- (b.) By Governor, in the case of Government roads.

*Offences on Roads liable to Penalty up to £5 :—*

- (1.) Furious riding or driving.
- (2.) Trespassing on footpath.
- (3.) Tethering animals.
- (4.) Driving entires or dangerous animals loose.
- (5.) Playing games to annoyance of passengers.
- (6.) Pitching tent, booth, or stall.
- (7.) Making fire without permission of local authority.
- (8.) Discharging fireworks and arms on the road, or within 50 ft. of same.
- (9.) Obstructing persons.
- (10.) Driving without reins.
- (11.) Sleeping when in charge of vehicle.
- (12.) Leaving vehicle out of control.
- (13.) Passing on wrong side, and not leaving reasonable space to pass.
- (14.) Impeding traffic and endangering safety by awkward loads.
- (15.) Letting cattle stray on road.
- (16.) Drunk in charge of vehicle or cattle. In this case there is a Justice's discretion of fourteen days' imprisonment.

*Tolls.*—Road Boards may set up toll-gates, and make charges.

The Government or the County Council can shut them up, or declare the charges excessive.

### *Railways.*

*Temporary Use of Land for Railways.*—In case of accidents and emergencies, land can be occupied by the Engineer after twenty days' notice (when possible), subject to right of occupier to get a decision from a Magistrate as to the necessity. In such cases the Magistrate may fix the conditions of the occupation, and the owner may, if he chooses, compel the Minister to make the occupation permanent, on the usual terms.

*Injuries to Railways liable to a Penalty of £10,—*

- (1.) Encroaching by building, planting, ditching, &c., without authority.
- (2.) Interfering with the soil of the line.
- (3.) Interfering with the drainage of the line.
- (4.) Felling or removing trees and shrubs or timber growing on the line.

*Railway-crossings.*—Driving or attempting to drive a vehicle or animal across a level crossing within half a mile of an approaching engine or train entails a penalty up to £50, besides all other consequences.

### *Drainage.*

*The Authorities.*—There are in the colony six classes of governing authorities in the matter of drainage and water-supply, all in their respective functions independent of each other. They are:—

- (1.) The Government.
- (2.) The County Councils.
- (3.) The authorities under the Land Drainage Act.
- (4.) The River Boards.
- (5.) The authorities under the Water-supply Act.
- (6.) The Christchurch District Drainage Board.

By the Public Works Act everything in the matter of drainage which is not under any of the last four named is placed under the County Councils and the Government.

*The Government* has power to make any drains anywhere, subject to the above rights, and they, with all railway drains, are styled in the Act "Ministerial drains"; over these the Government has the same power as the County Councils.

*The County Council*, however, is the great general drainage authority. Everything but a navigable river is constituted a public drain, and every public drain not under any other authority is under the County Council.

The Council has the fullest power necessary for all things in connection with drains, from the first survey to the maintenance of the made drain; and its duties in the matter of clearing and repairing are very comprehensive.

County Councils may delegate power to Road Boards.

Drains that run through two counties are Government drains.

*Penalty for Wilful Damage* of public drains is up to £500, or may be, at the discretion of the Court, imprisonment with or without hard labour up to two years.

*Water-races for Mining.*—Full power is given to the Government to take land and water for water-races, and to construct them. These are protected by penalties up to £50 against damage, or abstraction of the water.

They can be handed over to the County Councils.

### *Width of Roads and Streets.*

*Streets.*—No land in town or country may be subdivided without streets or roads at least a chain wide through them, and every section fronting on a road.

In the subdivision of land, every allotment must front on a road or street 66 ft. wide; land must, if necessary, be set apart for the same; and in a country district, the junction of such roads with existing public roads is according to agreement with the local authority.

If enough land has not been set aside, the Governor can compel addition up to the necessary width of roads and streets.

THE RABBIT NUISANCE ACTS (1882, 1886, 1890, 1891, 1901), ALSO  
"ANIMALS PROTECTION ACT, 1903."

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## SUMMARY.

These Acts are administered both by the Crown and by Boards of Trustees.

*Administration by the Crown.*

*Inspectors.*—The Crown appoints Inspectors, who have the right of entry everywhere. They can take any measure they please for the destruction of rabbits on Crown lands at the cost of the Crown.

*Responsibility of Occupiers.*—The Inspectors may order occupiers by notice to simultaneously attack the rabbit nuisance on their land; and the occupiers must obey by doing the work to the Inspector's satisfaction.

*Penalty for not clearing Rabbits.*—Failure, of which the Magistrate is the judge, after a reasonable time after notice, or neglect to take reasonable or diligent steps to promote the destruction of the rabbits, entails penalties of,—

On areas less than 500 acres, not exceeding ..	£5
„ between 500 and 2,000 acres, not exceeding	£10
„ over 2,000 acres, not exceeding ..	£20

If rabbits still exist after a month from the date of the conviction, and if the owners or occupiers are found by the Magistrate not to have done their duty, they may be fined anything between £5 and £100, and the liability to a repetition of the same monthly, so long as there are, in the opinion of the Magistrate, rabbits on the land.

In actions for the recovery of these penalties the onus of proof lies on the occupier, who on his side is entitled to produce evidence.

The Justices can make the penalty proportionate to the area.

There is an appeal for £10 and over.

In case of continued failure to destroy the pest, the Inspector may do the work himself; and, failing payment of the cost within three months, he must sue for it.

If the judgment of the Court is unsatisfied for three months the land may be sold by the Public Trustee, the amount of the judgment being the first charge against the property; the debts come next; and the balance, if any, goes to the persons entitled to the same.

*Penalty for not clearing Wild Pigs.*—The process and the penalties are the same as in the case of rabbits, as above, in districts where wild pigs are continually breaking down rabbit-proof fences.

*Penalty for having or loosing Rabbits.*—Any one found with a live rabbit in his possession, and any one letting rabbits loose, is liable on summary conviction to a penalty up to £50, or to twelve months' imprisonment.

*Protection of the Natural Enemy.*—The Crown has the power of declaring any animals to be natural enemies of the rabbit. When these are so declared by Proclamation in the *Gazette* the penalty for killing, capturing, or selling one of them is anything between £5 and £20.

*Destruction of Natural Enemy.*—When the natural enemy proves destructive to game and poultry the Government may, on the petition of a local authority or an acclimatisation society, remove such protection by Order in Council duly gazetted.

*Resistance to Inspector.*—Obstruction and hindrance entail penalties up to £20.

*Personation of Inspector* is punishable by twelve months' imprisonment.

*Trespassing* for the destruction of rabbits involves a fine up to £10.

#### *Administration by Boards.*

*Boards of Trustees.*—The Governor may form districts governed by Boards of trustees under the supervision of the Inspectors, who are *ex officio* members, but cannot be chairmen.

*Petition.*—This may be done—

- (1.) On petition of stockowners (i.e., owners or managers of more than 500 sheep or 100 head of cattle); or
- (2.) On petition of ratepayers. (In this case the districts must be not less than 200,000 acres.)

*Election.*—In the first the Board is elected by the stockowners; in the second by the ratepayers; but the two classes of Boards cannot occupy the same part of the same district.

The stockowners vote according to their stock: one vote for more than 500 and less than 5,000 sheep; two, from 5,000 to less than 10,000; three, from 10,000 to less than 20,000; four, from 20,000 to less than 30,000; and five for 30,000 and over, five being the maximum.

The ratepayers vote according to the Rating Act.

The qualifications, disqualifications, and voting rules in force at County Council elections apply to the elections of trustees.

*Rating Limit.*—The amount is in the one case limited to 1<sup>s</sup> 8<sup>d</sup>. in the pound of rateable value. In the other the rate shall not exceed 1d. per sheep, and 5d. per head of cattle.

Ten days' notice is sufficient to make the levy binding.

*Subsidies.*—In this case there is provision for a £1 for £1 subsidy, limited in the aggregate to £10,000 in any one year in the case of stockowners' Boards; to £5,000 in the other.

*Powers and Status of Boards.*—The Boards of both classes are incorporated, and their term of office is three years. They have full powers to enforce rabbit destruction, and they may, if necessary, do the work themselves. They can erect rabbit-proof fences.

*Procedure in Fencing.*—The Board is bound to give seven days' notice of its intention to fence as above. After such notice it may, without compensation, take all the necessary land up to 6 ft. on either side the fence-line; and it has the right to clear all the bush for double that width on either side.

*Closure of Board.*—If a Board throws up its work the administration reverts to the Inspector.

A stockowners' Board can be abolished by the Governor on the Inspector's report of its inefficiency.

*Boroughs and Town Districts.*—In these there can be no Boards.

#### *Rabbit-proof Fencing.*

*Rabbit Fences.*—In respect of rabbit fencing, the different legal rabbit-proof fences are :—

- (a.) A substantial upright paling fence, 3 ft. high, the palings sunk in the ground not less than 6 in., and not more than 1 in. apart.
- (b.) A post and two-rail fence with split or sawn uprights, 3 ft. high, and 6 in. in the ground, well nailed to both rails and not more than 1 in. apart.
- (c.) A substantial post-and-rail fence, 3 ft. high, or a substantial wire fence of similar height with five wires, or three wires and top rail, with posts of iron or durable wood not more than 9 ft. apart, with galvanised wire netting not less than 3½ ft. wide, No. 16 gauge, not more than 1½ in. mesh, firmly affixed, and pegged to or sunk 6 in. in the ground. At the Inspector's recommendation the Governor may reduce the netting to 3 ft.

*Combination of Converted Fences.*—Any fence included in Nos. 1, 2, 3, and 4, mentioned in Schedule A of "The Fencing Act, 1881,"\* with wire netting as above; and, subject to the Inspector's recommendation, the Governor may reduce the netting to a less width.

*Sufficiency under the Fencing Act.*—All rabbit fences may be declared sufficient under the Fencing Act, by an Order in Council, after petition received from—

- (1.) The majority of stockowners in an owner's district;
- (2.) The majority of ratepayers in a ratepayer's district;
- (3.) The majority of either in an outside district.

In the last case the recommendation of the Stock Inspector is sufficient.

These orders may be varied at any time on the same conditions.

*Penalty.*—The penalty for damaging† rabbit-proof fences is imprisonment up to twelve months, on conviction before a Magistrate or two Justices.

\* *Vide Fencing Act.*

† Wilful injury, damage, removal, &c.

"RABBIT-PROOF WIRE-NETTING FENCES ACT, 1898."

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SUMMARY.

*Object.*—This Act is designed to meet the wants of settlers who require to make better provision for fencing protection than is possible in the larger districts.

*Districts and Board.*—It enables rabbit-proof fencing districts to be set up by the Governor (as small as 1,000 acres in area, with as few ratepayers as three) on petition of a majority of the ratepayers.

*Subject to Rabbit Nuisance Acts.*—In these districts, which are subdivisions of the rabbit districts already in existence, the Rabbit Nuisance Acts remain in force.

*Rates and Special Rates.*—The limit of rating is  $\frac{1}{4}$ d. in the pound. In addition a special rate may be levied to secure loans for the main purposes of the Act—viz., building rabbit-proof fences. This rate is differentiated according to the fencing protection already existing, so that those individuals who have put up the most fencing will pay the lowest rates.

*Borrowing Conditions.*—The loans may be either under the Loans to Local Bodies Act or the Government Loans to Local Bodies Act. Before they can be obtained, they must have the sanction of the majority of the ratepayers obtained at a public poll; except where the ratepayers do not exceed forty in number, in which case the sanction can be conveyed to the Board in writing by the majority.

The plans of the work must be submitted to the Government, which may refuse or order any alterations.

RATING ACT (1894, 1895, 1896).

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SUMMARY.

*Rateable Value* is either the annual or the capital value—i.e., either—

Rent at which a property is lettable up to 5 per cent. on the fee-simple value, 20 per cent. being reducible for buildings and 10 per cent. for lands and hereditaments; or

The sum at which the fee-simple of any rateable property, if held in possession free from encumbrance, is assessed; or

In case of pastoral land held under Crown, such sum, interest on which at 6 per cent. would be equal to the rent paid to the Crown.

*District Rateable Values* vary in different localities between annual and capital.

*Balance of Rateable Values.*—Rates of 1s. in the pound on the annual value are equal to  $\frac{1}{4}$ d. in the pound on the capital value.

For adjustment of voting-power of ratepayers, every £5 of annual value is deemed equal to £100 of capital value.

*Lands Rateable.*—All private lands are rateable by the various authorities, and Native lands when occupied by Europeans; and in some cases rated when occupied by Natives, up to one-half of the rateable amount.\*

*Valuation Rolls.*—They are the basis of all rating. The authorities making them are the Government (under the Government Valuation of Land Act), the Borough Councils, the County Councils, and, where the Counties Act is suspended, the Town Districts and Road Boards.

The intention of the Legislature is that the Government should be the only valuer; but at present the local bodies have option in the matter, and many have not asked for the Government valuation.

*Procedure.*—The local bodies above referred to (such of them as have not taken advantage of the Government valuation) appoint valuers, who send in their valuation lists on or before the 15th February every year (in triennial valuations every third year). The lists are kept for public inspection till the 15th March, at reasonable hours, at the offices of the local bodies or other appointed place.

Objections are sent to the governing body, and heard by the Assessment Court, presided over by the Magistrate of the district, whose decision is final.

*Conditions.*—Fourteen days' notice of striking must be given.

*Objections.*—Rates may be objected to for errors of various kinds, and corrected by the local authority; and in the case of special rates there is an appeal to the Supreme Court.

Rates are inscribed in a rate-book, and have a year's currency, except in the case of separate rates, which are for the currency of the loans they secure; they are recoverable by process of Court fourteen days after due date.

After six months' default interest at 10 per cent. must be paid; when overdue for two years they are not recoverable; and when properties are sold, notice must be given within a month to the local authority; and until such notice is given the sellers are liable for rates.

Rates may be remitted on account of poverty and misfortune.

*Penalties.*—Valuers have the right of entry at all reasonable day-hours for purposes of valuation, and obstruction involves a penalty up to £10.

After six months' neglect of any judgment as to rates in any Court, the ratepayer's property may be sold or let by the Registrar of the Supreme Court.

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\* See Native Land Rating Act herewith.

## ROAD BOARDS ACTS (1882, 1883, 1884, 1886, 1888).

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## SUMMARY.

*Road Districts.*—They are divisions of a county, grouped for county purposes into ridings. They may be altered, and new ones may be made by the Governor on petition of the ratepayers, confirmed by the County Council.

*Road Boards.*—These districts are governed by Road Boards, elected once a year by the ratepayers. All ratepayers are eligible for membership, except uncertificated bankrupts, persons attainted of treason, or convicted of felony, perjury, or grievous crime who have not been pardoned, and who have not served their sentences. Participation in contracts with the Board (except by members of incorporated companies) is also a disqualification.

Disqualified persons becoming or remaining members of Road Boards are liable to a penalty of £100.

*Their Functions and Powers.*—They embrace everything pertaining to the construction and management of district roads, bridges, ferries, and tolls, including, of course, the control of gates across district roads. They may contract to do public works for the Government; they have contingent powers under the Drainage and Water-supply Acts (which should be consulted), and they make by-laws inflicting penalties up to £10.

They may surrender their powers to County Councils, or they may get power from them.

*Waterworks.*—In counties where the Act is suspended, Road Boards preferring to work alone rather than under the system prescribed by the Water-supply Acts of joining with other Road Boards, may, on application to the Governor, obtain an Order in Council giving them the same powers and duties in the matter of water-supply as municipal authorities.

They must put up all business above £20 to public tender.

Their bank overdrafts are limited to one year's revenue.

Their rating limit is  $\frac{3}{4}$ d. in the pound capital value, or its equivalent, as defined in "The Rating Act, 1895"—viz., 1s. of the annual value.

The  $\frac{3}{4}$ d. rate may be split up into separate rates with the leave of the ratepayers, and these may be differential.

Special rates for special works, after permission of the ratepayers, may be raised up to  $\frac{3}{4}$ d. The voting-power for property is the same as under the Counties Act (*q.v.*).

*Penalties.*—The by-laws may contain penalties up to £10, and obstruction to the officers of the Board involves a penalty of £10.



## "SLAUGHTERING AND INSPECTION ACT, 1900."

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## SUMMARY.

*Limit of Effect.*—This is a bulky measure, only a few clauses of which affect the ordinary settler.

*Slaughter for Family Use.*—Of these, one provides that any one can without a license slaughter stock for family use (but not for sale) provided he keep a record and allow the Inspector access.

*Small Trade permitted.*—Another permits farmers who raise stock on the farm to slaughter for sale or barter without a license, provided the weekly output does not exceed one head of cattle and five of other stock, unless with the special written permission of the Minister.

*Restrictions.*—Another makes it unlawful to slaughter for human consumption any diseased stock; compels the burning of all diseased stock so slaughtered; withholds the privilege of sale from farmers within boroughs and town districts, and within three miles of their boundaries; prohibits the sale of their meat to butchers, neighbours, and to any one in boroughs or town districts, or within three miles of their boundaries; and exacts the keeping of a faithful record of the slaughtered stock, and the buyers, with access at all times for the Inspector.

*General.*—All slaughtering-places may be entered and inspected by the Inspectors (who are veterinary surgeons), together with the books kept; stock, carcasses, skins, &c. They must be kept clean, without pollution of streams, a Magistrate deciding cases of dispute.

The skins and brands of slaughtered stock must not be destroyed.

*Penalty.*—All offences against the Act involve a penalty not exceeding £50.

## STOCK ACTS (1893, 1895, 1898).

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*Prohibited Places* (Sale-yards, &c.).—Diseased stock may not be taken to sale-yards, and they may not be left undestroyed on other people's land. }

*Diseased carcasses* must be destroyed

*Pollution of Water and Air*.—No carcass can be thrown into any water, and none can be left within half a mile of a highway; neither can any meat or offal

*Compensation*.—The market value is paid for stock destroyed compulsorily, the market value per head being arrived at before slaughtering (if necessary) or by arbitration. The maximum fixed by the law is, for—

Horses	..	..	..	..	..	£20
Cattle	..	..	..	..	..	£8
Swine	..	..	..	..	..	£2
Sheep	..	..	..	..	..	£1

Cattle after slaughter found sound are paid for at the full market value; diseased at one-half.

No compensation shall be paid—

For imported stock dying within six months of arrival in the colony;

For horses of less than one year or more than twelve years;

For cattle of less than one year or more than eight years;

For sheep and swine of less than three months or more than four years.

*Lice and Ticks*.—In the case of sheep affected with lice or ticks, the Inspector can order an immediate dipping; and neglect to dip, or to dip to the Inspector's satisfaction, entails a penalty up to £50 for each conviction. The travelling of such sheep entails a penalty of between £1 and £5; and their presence in pounds or sale-yards involves a penalty of £1 up to £10 from the owner

The Inspectors have the power to extend the time before dipping up to fourteen days in the case of sheep intended for slaughter, and in the case of lambing ewes at their discretion.

*Annual Dipping*.—The dipping of long-woolled and crossbred sheep is made compulsory once a year, between the 1st January and the 31st March in the North Island, and between the 1st February and the 30th April in the Middle Island.

The penalty for neglect is between 3d. and 2s. per head of sheep undipped, and the Inspector may grant extensions of time.

*Musters*.—All musters of stock, for ear-marking, or shearing, or removal, must be notified to the occupiers of all the adjoining lands. Stockowners who think that their stock has strayed on to any land have the right to demand in writing a notice of muster at least twenty-four hours before the yarding, and neglect to comply with the demand to that effect entails a penalty not exceeding £20.

*Strayed Stock*.—In the case of strayed stock the Inspector can require the occupier of the land where they are, or are reasonably supposed to be, to muster his stock for their recovery. If the occupier has no stock, then the requirement is to allow the strayed stock to be mustered.

The owner of the stray stock is liable for all the expenses and damages, if any; and refusal to muster entails a fine of between £1

and £20, and the Inspector may vary the period of notice at his discretion.

*Travelling Stock.*—When stock are travelling, notice must be given to occupiers on the road not less than twenty-four hours before arrival on their land, and not more than three days. They must be driven not less than five miles a day; and all gates on the line of road must be securely closed.

The penalties for transgression lie between £2 and £100.

*Night Travelling prohibited.*—Stock can only be driven in the day-time, which is between 6 a.m. and 6 p.m. from the 31st March to the 1st September, and for the rest of the year between 4 a.m. and 8 p.m., under a penalty of between £5 and £50. The exceptions are,—

- (1.) Of persons driving on their own land;
- (2.) Of persons travelling to get into boroughs within the hour appointed by their by-laws;
- (3.) Of persons driving stock to or from sale-yards within six miles of their homestead.

The stock to be driven on public roads only, except by permission of the occupier of private land.

Horses in saddle or harness and cattle in harness are not travelling stock within the meaning of the Act.

*Removal.*—No stock, except the wild cattle sold for removal under the Impounding Act, may be removed from any land without the permission of the occupier, the penalty being imprisonment (up to twelve months) or fine (up to £100).

*Brands and Branding.*—All brands must be registered, and the use of unregistered brands, or of registered brands by others than the registered owner, entails a fine of from 6d. to 10s. per head of the stock branded.

All sheep must be branded immediately after shearing, and all lambs before the 30th April, under penalty up to 10s. for every head unbranded.

Districts may be exempted from wool-branding by the Governor on petition of the majority of the sheep-farmers.

Stray sheep shorn on any property must be branded on the head with the occupier's registered brand, or, in the absence of a registered brand, with a distinguishing mark or paint of tar.

*Exception.*—Pigs need not be branded, and horses and cattle when in securely fenced lands are also exempt.

*The Branding Clause.*—Section 56 of the Act of 1893, as amended to date, prescribes the branding of stock, as follows:—

“Brand” means and includes a distinct and plain mark made as follows:—

In the case of horses and cattle: Burnt with a branding-iron into the skin, of not less than 2 in. in length, to which may be added an ear-mark made by cutting, splitting, or punching the ear, but so that in no case shall more than one-fourth of the whole ear be removed; or a tattoo mark imprinted on any part of the skin, or a metal clip affixed to the ear.

In the case of sheep: A wool-mark made with pitch, tar, paint, raddle, or lamp-black, mixed with oil or tallow, in plain and distinct letters, figures, or otherwise, not less than 3 in. in length, on the sides, back, shoulder, hips, or rump, in conjunction with any of the following marks:

- (a.) An ear-mark plainly and distinctly made by cutting, splitting, or punching the ear, but so that in no case shall more than one-fourth of the ear be removed; or
- (b.) A metal clip affixed to the ear; or

(c.) A tattoo-mark plainly and distinctly imprinted on any part of the skin ;  
or

(d.) A fire-mark made on the horn or face :

Provided that the aforesaid wool-mark shall not form part of the brand in any district which is for the time being exempt from wool-marking.

*Defacing Brands.*—Defacement of brands on stock is punishable by a fine of between £5 and £50 for every head of stock with the defaced brand, or by imprisonment with hard labour up to two years.

*Ear-marking.*—In ear-marking, the removal of more than one-fourth of the ear, whether by owner or otherwise, entails a penalty of between 2s. and £10 for every head.

*Annual Sheep-rate* is 2s. per 100 sheep, and if not paid before the 1st September of the following year 10 per cent. is added.

*Returns (Sheep).*—Of Slaughters : Once a year, on or before the 14th May, every one who has slaughtered sheep sends in a return\* to the Chief Inspector, or the Inspector in his district. The penalty for neglect is up to £20.

Of all Stock : Also, once a year every owner of sheep shall send in to the same authority, on or before the same date, the 14th May, a return in the prescribed form of the number of his sheep on the 30th of April, together with all particulars as prescribed.

The forms are obtainable from the Inspectors. Same penalty as above.

#### *Penalties.*

	Sum not ex- ceeding	Imprisonment not exceeding
Failure to make return of slaughtered sheep ..	£20	
Failing to make annual return of sheep ..	£1 to £20	
Refusal of evidence to Inspector in case of sus- pected stock .. .. .	£20	
False evidence in such cases .. .. .	£100	or Six months.
Obstruction of Inspector on duty .. .. .	£2 to £50	
Hindrance to Inspector on duty .. .. .		
Disobedience of his lawful direction .. .. .		
Introducing virus of disease .. .. .	..	Two years.
Failure to give notice to Inspector of detention of suspected stock .. .. .	£2 to £100	
Diseased Stock—		
Left in sale-yards (at per head) .. .. .	£20	
Left on other people's land, undestroyed (per head) .. .. .	£50	
Failure to destroy carcase of .. .. .	£5 to £50	
Pollution of water with carcase of stock ..	£1 to £50	
Leaving carcase, &c., within half a mile of road- way .. .. .	£1 to £50	
Dipping—		
Neglect of annual, per head .. .. .	3d. to 2s.	
Failure or refusal to obey Inspector's orders to dip .. .. .	£50	
Further convictions of same, each .. .. .	£50	
Driving stock through or on to infected areas ..	£50*	
Diseased stock, straying—		
Driven to other people's land, per day .. ..	£2 to £50	
Depastured on highway, per day .. .. .	£2 to £50	
Infected areas — Unauthorised admission or departure .. .. .	£5 to £50	
Stock with lice—		
Above three offences .. .. .	£1 to £5	
In sale-yards .. .. .	£10	
Failure of Inspector's orders to dip before sale (this penalty in addition) .. .. .	£20	

\* With forfeiture of stock and destruction, with compensation.

	Sum not ex- ceeding	Imprisonment not exceeding
Failure to pay annual rate after 1st September ..	10 per cent.	
<b>Musters—</b>		
Neglect to give notice of musters when notice required by owner of stray stock ..	£20	
Refusal to muster or allow stray stock to be mustered, at the request of the Inspector made for owner of stray stock ..	£1 to £20	
<b>Travelling—</b>		
Neglect to give notice, with particulars of numbers, description, place of start, line of route, destination, &c. ..	£2 to £100	
Less than five miles in twenty-four hours ..		
Not closing all gates securely ..		
Unauthoris'd travelling at night ..	£2 to £50	
Removing stock from land without owner's leave*	£100	or Twelve months.
<b>Branding—†</b>		
Neglect to brand sheep after shearing, and lambs before 1st April, per head ..	10s.	
Using wrong brand ..	£5 to £50	or Two years.
Defacing brand ..	£5 to £50	or Two years.
Ear-cropping cattle or sheep: Removing whole ear ..	2s. to £10	
Ear-marking: Removing more than one-quarter of ear ..	2s. to £10	
Defacing brands ..	£5 to £50	
Using unregistered brand, per head ..	6d. to 10s.	

**WATER-SUPPLY ACTS, 1891-95, 1897, 1898 (SUPPLEMENTARY TO COUNTIES  
ACT).**

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**SUMMARY.**

*Object.*—The object of the Act is to make the County Councils the chief authorities in matters of irrigation and water-supply.

Wherever the Counties Act is suspended, the Act provides for

\* Subject to provisions of the Impounding Act (*q.v.*).  
exemption from wool-branding.

† Except when there is

the establishment of "Boards of Water-supply," invested with the same powers over irrigation and water-supply as the County Councils. They also have the same powers as Road Boards, and continue to exercise them if the latter disappear.

*Water-supply Districts.*—The County Council may divide the county into one or more districts; and it can declare town districts and merged boroughs to be water districts, after petition of ratepayers representing at least half the roll-number and not less than three-fifths of the value.

When the Counties Act is suspended, the Governor, when requested by two or more Road Boards of the county, may proclaim the required water-supply district, and determine: (1) the number of members of the Water-supply Board; (2) the number (one to three) to be elected by each road district.

Road Boards preferring to do the work themselves may do so. (See Road Boards Acts.)

#### *Procedure.*

(1.) *County Councils.*—Water-supply districts are made, divided, or altered by special order; and the same order may divide as well as set up.

The first step is to deposit plans of the proposed district in the Council office, and in the offices of the Road Boards throughout the county, for public information, and to notify that they are open for inspection for fourteen days. After this period the Council may pass a resolution that the proposed district be set up, or the proposed subdivision or alteration be made; and after another fourteen days may confirm the same. After such confirmation the Council issues the declaratory special order.

Objections against the inclusion of lands in these districts must be lodged at the Council office within ten days after the issue of the special order, and if no agreement is come to in fourteen days the case is settled by arbitration under the Arbitration Act of 1890.

(2.) *Boards of Water-supply.*—Their districts having been proclaimed by the Governor as above, the Boards are elected. Their number is from five to nine; the ratepayers return the number fixed by the Governor for each road district, and the proceedings are under "The Regulations of Local Elections Act, 1876."

The Boards have, from their election, the powers mentioned below; and they may pay travelling-expenses annually up to £15 for members and £20 for the Chairman.

#### *Powers of Governing Authorities.*

They have all the powers necessary for the acquisition of land, the erection, repairing, and maintenance of works, the diversion of water, the management of water-races; for borrowing moneys, rating and classifying lands for the same, according to benefit received from works; for making by-laws regulating the charges for water, for the protection of water-races and works, for the suppression of nuisances, the prevention of water-pollution, and many other matters pertaining to the work of irrigation and water-supply.

For general purposes, maintenance of existing water-races, &c.,

the County Councils have, in addition to the powers conferred by the Act, all the powers conferred by the Counties Act.

Boards of Water-supply, which have no powers under the Counties Act, have under this Act all the rating-powers of Road Boards.

#### *Water-races.*

*Procedure.*—(1.) The plan must be on view for fourteen days at the Council office and the Magistrate's Court, and must be notified as such publicly.

(2.) Seven days after this notification, notice of the Council's intention to make the race must be given.

*Objections* must be lodged within the above fourteen days. They are heard by the Council, after seven days' notice, and determined, subject to appeal to the District Court, or (if there be none in the district) to the Supreme Court or Magistrate's Court, at the option of the appellant.

*Water-diversion.*—For getting water into the races the same process has to be gone through as for the races. This includes intake works, dams, reservoirs, tunnels, weirs, &c.

*Watercourses.*—Watercourses may be declared water-races (by the Council or Supply Board) with the consent of all the adjacent occupiers.

*Right of Entry.*—The Council has all the rights of entry for necessary work. In every case reasonable notice must be given; and in all cases, except for purposes of survey and access, the permission of the occupier is necessary. In emergencies, however, when haste is necessary to avoid, by repairs, further damage, the only obligation is to notify entry at the earliest possible moment.

There is the usual protection to fences, plantations, ornamental grounds, and the usual liability for damage done and for materials taken.

*Compensation.*—All lands taken and all damage to lands and property must be paid for. If negotiation fails, the amount is settled by a Compensation Court as provided by the Public Works Act.

*Protection of Low-lying Lands.*—In case of probable injury from proposed or authorised races to their property, the owners are entitled to an injunction from the Supreme Court.

*Operations outside of Districts.*—One month's notice must be given of the intention to interfere with any road or public work in any other district to the local authority, and in case of objection the decision lies with the Minister for Public Works.

*Government Works.*—Interference with Government works and Government railways requires the sanction of the Minister for Public Works, or Minister for Railways, as the case may be.

*Deposit of Plans.*—The plans of all water-races are deposited for public inspection and kept in the Council office, and all races are vested in the Council.

*Management Board.*—At the request of the ratepayers a Management Committee may be appointed by the Council, of from five to seven ratepayers.

*Co-operation with outside Bodies.*—Several Councils may unite for the prosecution of works in common.



*Disused Races* may be sold, the original owner being entitled to first offer.

*Proposed Works not made.*—If the works are not made in two years the ground reverts to the former owner.

#### *Loans and Rates (Special).*

*Conditions of Special Loans.*—In all counties special loans may be raised for specified purposes, and special rates levied. The loans must have the consent of the Crown; they may not exceed one-half the value of the rateable property, but for water purposes the districts are entitled to the full limit, even if the general limit imposed by the Counties Act would be exceeded by taking advantage of it; and the procedure for getting the ratepayers' consent is the same as prescribed in the Counties Act, with the variation that the poll may be taken three weeks after the meeting, after one week's notice.

The permission granted, the imposition of the rate follows. Voting may be by attorney.

*Classification of Land.*—The rate may be uniform, or graduated according to benefit received by the land, which may be classified by the Council for the purpose. Lands getting no benefit from water-works are exempt from rating.

The classification is fourfold—

- (1.) Lands immediately and directly benefited;
- (2.) Lands less directly benefited;
- (3.) Lands receiving only indirect benefit;
- (4.) All other lands:

and the proportion of rates in the first three is decided by the Council.

The classification is notified as open to inspection for twenty-one days.

*Objection to Classification.*—The appeal must be made not later than seven days after the expiry of the inspection period; it must be to the Magistrate's Court, and the decision is final.

*Partial raising of Loans.*—Loans may be raised in part only for the purpose of defraying the preliminary expenses of proposed works. The debentures may be hypothecated.

*Special Loans for Extraordinary Damage.*—These require no reference to the ratepayers.

#### *Charges and Rates.*

These are fixed by by-law, prescribing the terms and conditions of the use of water. They must be paid by every occupier on the line of a race whose land is not supplied with water from other sources, and who has not requested to be exempt. Occupiers bordering races on road-lines are in the same position.

Rates fourteen days in arrear may be immediately recovered, and no one is liable for rates more than two years in arrear.

Grantors of land may be supplied *gratis* up to 10 per cent. of the water-supply.

Surplus water may be sold to outsiders.

All water charges may be spent in the district of origin.

The Council may cut off water from defaulters of rates and of charges.

*Penalties.*

	Not exceeding
Damage to water-race or anything belonging to water system, a misdemeanour .. .. .	£500*†
Polluting water-race with refuse from any kind of works, butchery, &c. .. .. .	£100
Continuance of same, per day .. .. .	£10
Diverting water from race .. .. .	£20
Continuance of same, till restoration, and if restored by authority culprit pays the cost, per day .. .. .	£10
Miscellaneous offences (Class 1)—	
(1.) Permitting water race or pipe on premises to get out of repair after agreement to maintain .. .. .	£20*
(2.) Altering meter .. .. .	
(3.) Taking water without authority .. .. .	
(4.) Supplying others with water without authority .. .. .	
(5.) Polluting water, directly or indirectly .. .. .	
(6.) Obstruction of any person acting with the authority of the Council in any way .. .. .	
Miscellaneous (Class 2)—	
(1.) Bathing in water-race .. .. .	£5*
(2.) Permitting goats, pigs, or geese to get into water or damage race-banks .. .. .	
(3.) Washing, scouring, &c., any animal or thing .. .. .	
(4.) Throwing, pouring, or placing, or causing or permitting to be thrown, poured, or placed, into any water-race any substance whatever .. .. .	
(5.) Crossing machinery over races elsewhere than at the appointed crossings .. .. .	
(6.) Obstructing the flow of a race with plants or otherwise, by growth from hedges or otherwise .. .. .	
(7.) Interference with works and races without authority .. .. .	
(8.) Committing a nuisance in or near a race .. .. .	
(9.) Obstructing a field-crossing over a race .. .. .	
(10.) Destroying, removing, or injuring anything whatever connected with the premises, or that is likely to obstruct the water .. .. .	

N.B.—All these things are provided for by by-laws. Every settler ought to have a copy.

## WORKERS' COMPENSATION FOR ACCIDENTS (1900, 1902, 1903, 1904, 1905).

*INDEX.*

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*SUMMARY.*

*Object.*—The object of the Act is to compensate workmen for injuries sustained through no fault of their own in the course of their calling in the service of a master.

*Scope of the Act.*—The provision for compensation is applied specifically to all workers in industrial, commercial, engineering, and

\* Or by imprisonment not exceeding three years.

† Plus the cost of repairing damages.

manufacturing trades ; in mining, quarrying, engineering, building ; and since 1902, agriculture.

*Government Employees.*—It applies to all workers in the service of the Crown except those in military and naval departments, who are otherwise provided for.

*Forfeiture of Privilege.*—Serious and wilful misconduct on the part of the injured worker is a bar against all claim for compensation for injury.

*First Two Weeks.*—For disability of not more than two weeks there is no compensation.

#### *Amount of Compensation.*

##### *In Case of Death.*

After his death by accident in the service the worker's dependants are entitled to a sum equal to three years' wages, either as actually earned in three years, or computed according to the average weekly wage earned during the lesser time actually served ; these take the whole.

Those partially dependent (in case of their being none dependent entirely) receive such sum under the limit of the three years' aggregate as may be agreed on.

If there are no dependants of any kind the employer's liability is limited to reasonable medical and burial expenses, not exceeding £30.

##### *In Case of Total or Partial Incapacity.*

*Weekly Wage.*—The liability is of not more than half the average weekly wage for the twelve months previous to the accident, payable during the incapacity, and the aggregate is limited to £300.

The minimum is £1 weekly when the wages were not less than £1 10s.

*Lump Sum.*—On agreement the above may be commuted for a lump sum payable at once. Such may be awarded by the Arbitration Court on the application of both or of one of the parties ; the Court being bound, before deciding, to consider the ability of the employer to pay a lump sum instead of the weekly compensation.

#### *Miscellaneous.*

*Negligence or Default of Employer.*—(1.) The employer's liability under the civil law is not altered in any way under the Act.

(2.) The injured worker in such cases as are covered by the Act may choose whether he will proceed under the ordinary law or under the Act ; but he cannot proceed both ways, and there can only be one compensation.

*Final Authority.*—Disputes regarding compensation, being industrial disputes, are settled by the Arbitration Court.

*Stipendiary Magistrate.*—Claims not exceeding £200 may be heard by the Stipendiary Magistrate, and there is an appeal to the Arbitration Court. In cases involving under £50, the appeal is dependent on the Stipendiary Magistrate's permission.

*Notice, &c.*—Accidents must be notified as soon as practicable.

Claims must be sent in within three months in case of injury, and six months in case of death.

Errors in notices do not affect the claim, provided they do not injure the defence.

*Contractors.*—When they are simply piece-workers they rank as workers.

When they employ workers they become employers. The principal (owner in the first instance) and contractor are jointly and severally liable in the matter of the worker's compensation, but the principal is entitled to be indemnified by the contractor. This joint liability only arises in matters connected with the principal's work, not in those arising out of any other work in which the contractor's men may be engaged.

*Contracting out* can only be done in favour of some other system of compensation; but this must be certified by the Conciliation Board as equal to the system under the Act. Compulsory junction by workers of such other system is forbidden. The duration of the substituted system is fixed by the Board, and is determinable under certain contingencies. Throughout the duration the Board is the judge of all disputes between the parties, and its decisions are subject to the review of the Arbitration Court.

*Damage by Strangers.*—In case of damage by strangers in no way connected with the work on which the worker is injured by such strangers, the worker has the option of going against the stranger or the employer. The employer is entitled to indemnity from the stranger.

*Bankruptcy.*—All sums in the insurance fund, if any, are secure in case of bankruptcy of the employer to the claims against them, in so far as that these claims are the first charge. Moreover, liabilities for accidents are made, from the moment the accidents occur, the first charge against the employer's estate, "mine, factory, building, or vessel."

*Power of the Governor.*—The Governor may make regulations under the Act, and no policy of accident insurance can issue without his approval of the terms.

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## PART IV.

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### THE PUBLIC LANDS.

#### ADMINISTRATION.

THE lands of the colony are administered by the Department of Lands and Survey, presided over by the Minister of Lands; the permanent head of the Department is the Under-Secretary for Lands, who is also Under-Secretary for Immigration. For administrative purposes the colony is divided into ten Land Districts, the affairs of each being managed by the Commissioner of Crown Lands of the District, who has associated with him a Land Board appointed by the Governor. In each district there are the principal land office and various local land offices, where all information in every kind of detail

may be obtained by the public, and where applications for land must be lodged. The ten districts are :—

Auckland.	Nelson.
Taranaki.	Westland.
Hawke's Bay.	Canterbury.
Wellington.	Otago.
Marlborough.	Southland.

Naturally this is a country of the primary industries. Rome was not built in a day : neither was England's commercial supremacy. The manufacturing interest has made important progress in New Zealand, but beyond the primary industries it has not yet reached the possibility of comparison with that of nations measured by the standard of historic progress. With the primary industries and the products of agriculture it is different. So rapid has their progress been in this prolific country, that they seem almost to have grown up in a single day : for what is sixty years in the life of a nation ? Of last year's export of fifteen millions, the pastoral and agricultural industries contributed four-fifths. Manufactures play a large part within the colony—in 1901 the census stated, after deduction of frozen meat and dairy-produce, an output of fourteen millions sterling—but in the outside commerce they have as yet scarcely appeared. A vast future awaits them, for the great electric energy lurking in the abounding water-powers of the country is a guarantee of manufacturing predominance over all the countries of the Pacific. For the present, however, the outside relations of the land have precedence.

The pastoral and the agricultural interests started separate, and progressed for a time side by side in antagonism. Now their functions are for the most part merged, and they are wholly interdependent. Over a great part of the country the two are inseparable ; and, at the same time, the purely pastoral element has a special local habitation and separate name.

Agricultural New Zealand is divided into three parts, of which one is represented by the farmers, whose habit is tilth, and whose method is rotation of crops ; another by the dairymen, whose main object it is to produce butter and cheese for the market ; and the third by the stock farmers, whose chief business is the breeding and fattening of stock. This makes some divergence in agricultural life, which is increased by the fact that there are two kinds of farmers—those who are breaking in new country, and those who dwell in long-settled districts.

There is an old pessimistic saying that the pioneer sows only for some one else to reap. It had a percentage of truth once, when the colony was younger and there was much ignorance among the men who undertook the hard work of breaking in the new country. Nowadays, however, the lot of the pioneer is cast in easier places. He is within easy distance of civilisation and market, whereas his forbears were not nearer to it than twelve thousand miles, and there were no steamers. The pioneer of to-day has the advantage of the well-furnished country which the others built up out of the wilderness.

#### LAND AVAILABLE.\*

The Crown lands ready for selection and occupation (April, 1905) amount to 2,423,129 acres. These, as undermentioned, are now avail-

\* Out of the lands fit for settlement not yet taken up, which are estimated at between 9,000,000 and 10,000,000 acres.

able for selection upon application in the following manner: In terms of "The Land Act, 1892," 848,538 acres of rural land, open on the optional system—viz., for purchase for cash, for occupation with right of purchase, or for lease in perpetuity; 84,221 acres for lease as small grazing-runs; 1,423,393 acres for lease as pastoral runs; and 1,388 acres of township and other lands for lease; also, in terms of the Land for Settlements Acts, 27,986 acres for lease in perpetuity, and 37,603 acres for lease as small grazing-runs.

Intending applicants should apply to the Commissioner of Crown Lands for the district in which the land is situated, from whom full particulars, including plans, application forms, &c., may be obtained.

## PRICES.

Rural surveyed land	.. ..	5s. to £5 per acre.
Rural unsurveyed land	.. ..	5s. to £1 5s. per acre.
Small grazing-runs (annual rentals)	.. ..	£3 8s. 10d. to £104 9s. 6d. per run.
Pastoral runs (annual rentals)	.. ..	£1 10s. to £88 15s. per run.

## AUCKLAND LAND DISTRICT.—(843,479 acres.)

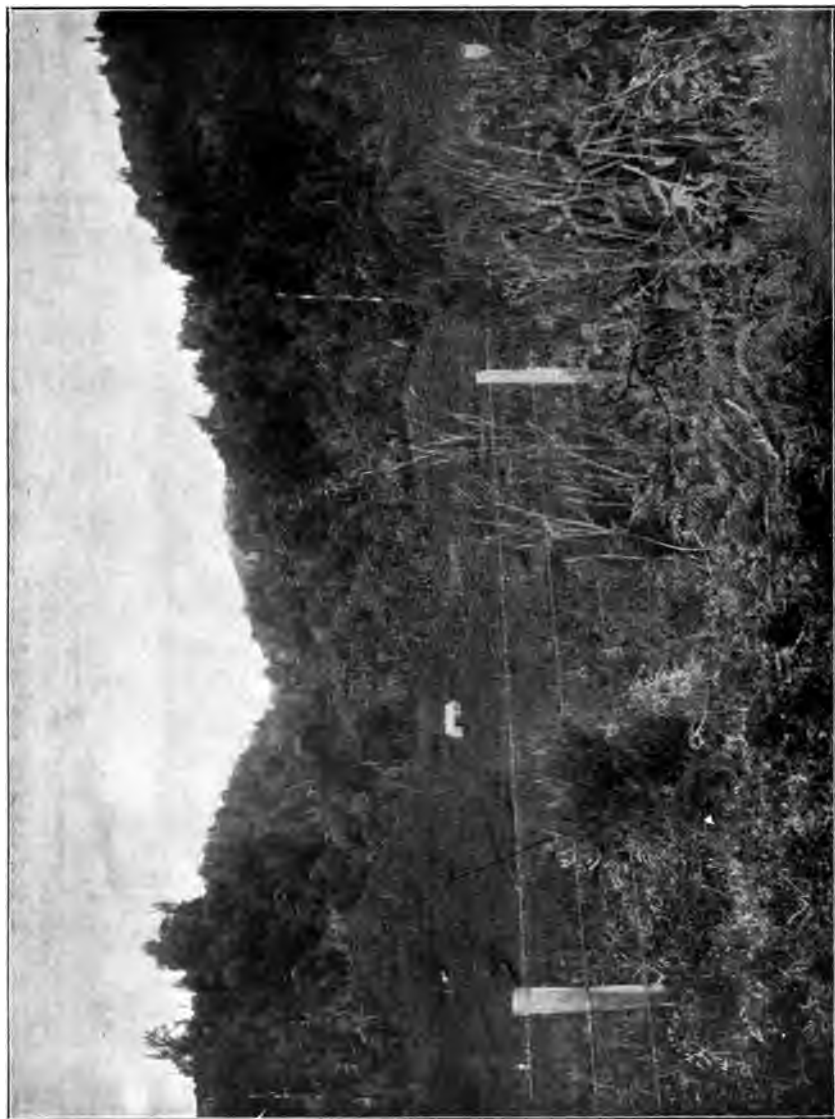
	Acres.
Surveyed rural land .. ..	16,989, in 54 sections.
Surveyed rural land under "The Bush and Swamp Crown Lands Settlement Act, 1903" .. ..	86,494, in 507 sections.
Unsurveyed rural land .. ..	65,488.
Unsurveyed rural land under "The Bush and Swamp Crown Lands Settlement Act, 1903" .. ..	61,093.
Lease in perpetuity under Land for Settlements Acts .. ..	6,181, in 387 sections.
Pastoral runs .. ..	255,034, in 10 runs.
Small grazing-runs .. ..	65,880, in 12 runs.
Small grazing-runs under Land for Settlements Acts .. ..	37,603, in 9 runs.
Hauraki pastoral leases .. ..	248,717.
	Acres.
Awakino County (15 sections) .. ..	7,767
Bay of Islands County (62 sections, including 990 acres unsurveyed land) .. ..	10,723
Coromandel County (5 sections, including 6,561 acres unsurveyed land) .. ..	7,479
Coromandel County (Hauraki pastoral leases) .. ..	70,423
East Taupo County (unsurveyed land) .. ..	5,940
.. (7 pastoral runs) .. ..	203,886
.. (2 small grazing-runs) .. ..	19,288
Hobson County (6 sections, including 1,100 acres unsurveyed land) .. ..	1,257
Hokianga County (75 sections, including 3,172 acres unsurveyed land) .. ..	16,650
Kawhia County (unsurveyed land) .. ..	1,490
Manukau County (6 sections, including 3,443 acres unsurveyed land) .. ..	4,543

AUCKLAND LAND DISTRICT—*continued.*

Mangonui County (56 sections, including 9,739 acres unsurveyed land)	Acres.
Ohinemuri County (21 sections)	20,356
„ (Hauraki pastoral leases)	7,343
Opotiki County (24 sections, including 4,246 acres unsurveyed land)	65,144
Otamatea County (9 sections)	5,079
Piako County (47 sections, including 2,249 acres unsurveyed land)	168
Raglan County (4 sections)	5,672
Rodney County (24 sections, including 230 acres unsurveyed land)	1,030
Rotorua County (11 sections, including 11,020 acres unsurveyed land)	2,093
Rotorua County (1 pastoral run)	20,563
Tauranga County (22 sections, including 5,867 acres unsurveyed land)	19,460
Thames County (7 sections, including 1,970 acres unsurveyed land)	8,617
Thames County (Hauraki pastoral leases)	4,838
Whangarei County (54 sections, including 2,346 acres unsurveyed land)	113,150
Waikato County (23 sections, including 13,606 acres unsurveyed land)	6,200
Waikato County (1 small grazing-run)	15,560
Waipa County (1 section)	4,374
Waitemata County (49 sections, including 400 acres unsurveyed land)	15
Whangaroa County (13 sections, including 940 acres unsurveyed land)	4,118
Whakatane County (11 sections, including 1,276 acres unsurveyed land)	2,128
Whakatane County (1 pastoral run)	10,564
„ (4 small grazing-runs)	17,413
West Taupo County (6 sections, including 48,737 acres unsurveyed land)	13,423
West Taupo County (1 pastoral run)	57,673
„ (5 small grazing-runs)	14,275
No county (10 sections, including 1,351 acres unsurveyed land)	28,795
	2,198
Total	799,695

*Under Land for Settlements Acts.*

Eden County (19 sections, workmen's homes)	Acres.
Otamatea County (14 sections, rural)	39
Piako County (105 sections, town and suburban)	4,301
„ (3 sections, rural)	53
„ (9 small grazing-runs)	1,165
„ (135 village lots)	37,603
Waitemata County 106 sections, workmen's homes)	122
	434

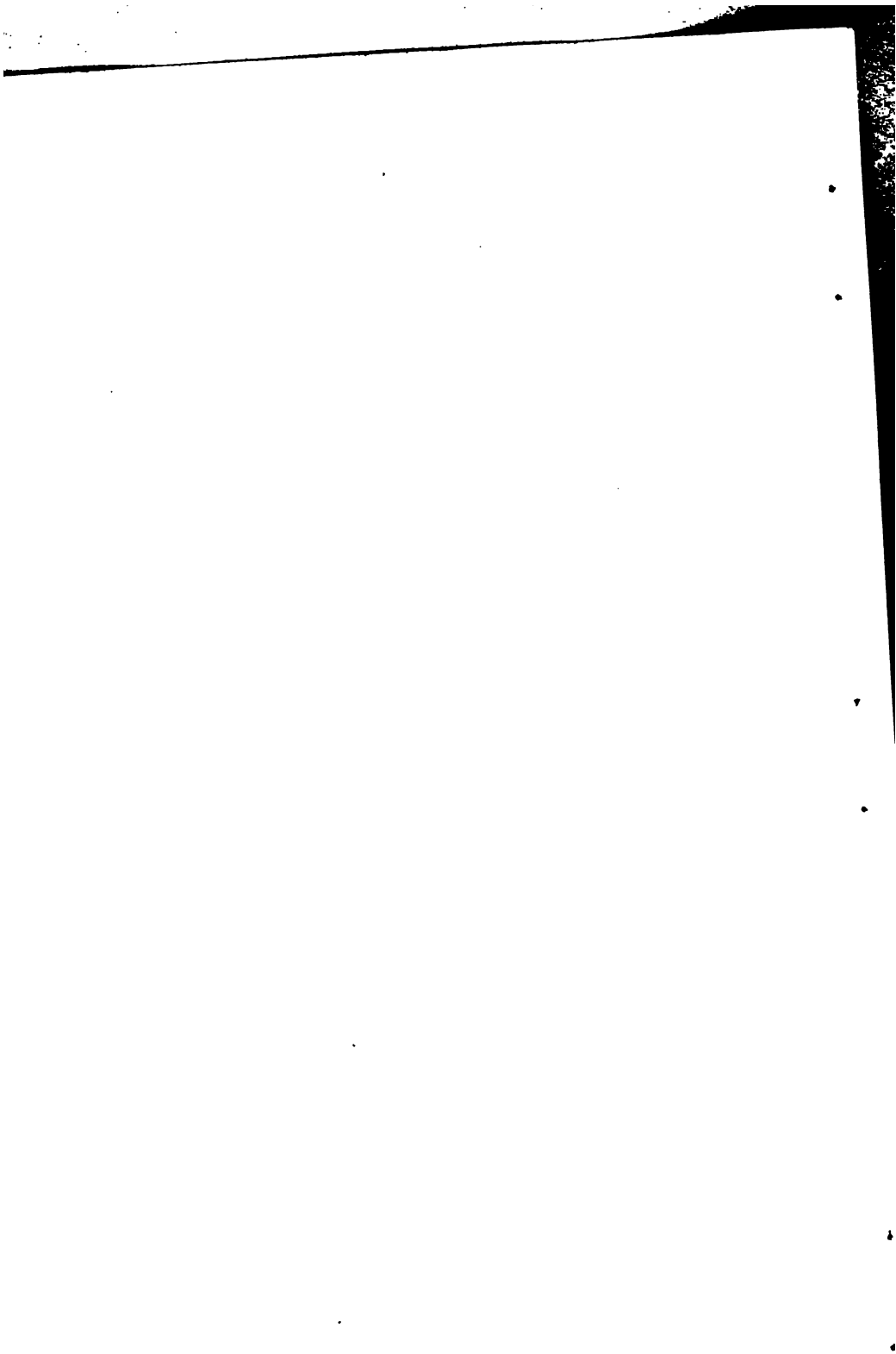


SELECTION NEAR MAIN ROAD, OTANAKE.

*Immigrants' Guide.*







AUCKLAND LAND DISTRICT— <i>continued</i> .						Acres.
Waikato County (1 section, rural)	..	..	..	..	..	64
Whakatane County (3 sections, village lots)	..	..	..	..	..	3
Total	..	..	..	..	..	43,784
Grand total	..	..	..	..	..	843,479

## HAWKE'S BAY LAND DISTRICT.

(25,194 acres.)

Lease in perpetuity under Land for Settlements Acts						Acres.
..	..	..	..	..	..	18, in 3 sections.
Pastoral runs	..	..	..	..	..	24,826, in 2 runs.
Village settlements	..	..	..	..	..	164.
Town lands	..	..	..	..	..	104.
Native township lands	..	..	..	..	..	82, in 70 sections.
						Acres.
Wairoa County (1 pastoral run)	..	..	..	..	..	5,326
Hawke's Bay County (1 pastoral run)	..	..	..	..	..	19,500
Waiapu County (70 Native township sections)	..	..	..	..	..	82
Town lands	..	..	..	..	..	104
Village settlements	..	..	..	..	..	164
Total	..	..	..	..	..	25,176

*Under Land for Settlements Acts.*

						Acres.
Hawke's Bay County (1 section)	..	..	..	..	..	17½
Patangata County (2 sections, village)	..	..	..	..	..	½
Total	..	..	..	..	..	18
Grand total	..	..	..	..	..	25,194

## TARANAKI LAND DISTRICT.

(118,344 acres.)

Surveyed rural land						Acres.
..	..	..	..	..	..	5,882, in 6 sections.
Surveyed rural land under "The Bush and Swamp Crown Lands Settlement Act, 1903"	..	..	..	..	..	106,437, in 114 sections.
Lease in perpetuity under Land for Settlements Acts	..	..	..	..	..	190, in 17 sections.
Small grazing-runs under "The Bush and Swamp Crown Lands Settlement Act, 1903"	..	..	..	..	..	5,713, in 2 runs.
Township lands, &c.	..	..	..	..	..	122, in 321 sections.
						Acres.
Clifton County (52 sections)	..	..	..	..	..	52,406
" (1 small grazing-run)	..	..	..	..	..	2,113
Hawera County (14 sections)	..	..	..	..	..	17,894
Patea County (34 sections)	..	..	..	..	..	29,376
" (1 small grazing-run)	..	..	..	..	..	3,600

TARANAKI LAND DISTRICT— <i>continued</i> .					Acres.
Stratford County (20 sections)	..	..	..	..	12,643
321 sections, township lands, &c.	..	..	..	..	122
Total	..	..	..	..	118,154
<i>Under Land for Settlements Acts.</i>					Acres.
Taranaki County (17 sections)	..	..	..	..	190
Grand total	..	..	..	..	118,344

WELLINGTON LAND DISTRICT.  
(45,019 acres.)

Surveyed rural land	..	..	..	Acres.	2,296, in 10 sections.
Surveyed rural land under "The Bush and Swamp Crown Lands Settlement Act, 1903"	..	..	..	40, in 1 section.	
Unsurveyed rural land under "The Bush and Swamp Crown Lands Settlement Act, 1903"	..	..	..	29,608.	
Small grazing-runs	..	..	..	11,443, in 5 runs.	
Village lands	..	..	..	36, in 14 sections.	
Native township lands	..	..	..	89, in 135 sections.	
Lease in perpetuity under Land for Settlements Acts	..	..	..	1,470, in 20 sections.	
Reserves for lease	..	..	..	37, in 38 sections.	
					Acres.
Hutt County (1 section)	..	..	..	..	40
Horowhenua County (2 sections)	..	..	..	..	815
Mauriceville County (2 sections)	..	..	..	..	500
Pahiatua County (1 section)	..	..	..	..	200
Patea County (2 sections)	..	..	..	..	526
Rangitikei County (1 section)	..	..	..	..	23
Wairarapa South County (2 sections)	..	..	..	..	232
Wanganui County (4 small grazing-runs)	..	..	..	..	9,733
Waitotara County (1 small grazing-run)	..	..	..	..	1,710
" (unsurveyed land)	..	..	..	..	29,608
14 sections, village lands	..	..	..	..	36
135 sections, Native towns	..	..	..	..	89
38 sections, reserves for lease	..	..	..	..	37
Total	..	..	..	..	43,549
<i>Under Land for Settlements Acts.</i>					Acres.
Hutt County (19 sections)	..	..	..	..	1,320
Oroua County (1 section)	..	..	..	..	150
Total	..	..	..	..	1,470
Grand total	..	..	..	..	45,019

## NELSON LAND DISTRICT.

(303,842 acres.)

Surveyed rural land under "The Bush and Swamp Crown Lands Settlement Act, 1903"	Acres.
21,241, in 139 sections.	
Unsurveyed rural land under "The Bush and Swamp Crown Lands Settlement Act, 1903"	279,731.
Unsurveyed rural land	2,870.
Buller County (12 sections, including 99,646 acres unsurveyed land)	Acres. 103,109
Collingwood County (24 sections, including 28,465 acres unsurveyed land)	29,575
Inangahua County, 10 sections, including 6,005 acres unsurveyed land)	13,222
Takaka County (6 sections, including 49,926 acres unsurveyed land)	50,016
Waimea County (87 sections, including 98,559 acres unsurveyed land)	107,920
Total	303,842

## MARLBOROUGH LAND DISTRICT.

(135 acres.)

Surveyed rural land under "The Bush and Swamp Crown Lands Settlement Act, 1903"	Acres.
22, in 2 sections.	
Surveyed rural land	108, in 1 section.
Lease in perpetuity under Land for Settlements Acts	5, in 17 sections.
Kaikoura County (1 section)	Acres. 10
Marlborough County (2 sections)	120
Total	130

*Under Land for Settlements Acts.*

Marlborough County (17 sections)	Acres. 5
Grand total	135

## WESTLAND LAND DISTRICT.

(878,303 acres.)

Surveyed rural land under "The Bush and Swamp Crown Lands Settlement Act, 1903"	Acres.
7,747, in 39 sections.	
Unsurveyed rural land under "The Bush and Swamp Crown Lands Settlement Act, 1903"	83,625
Pastoral runs	786,810, in 57 runs.
Lease in perpetuity—town and village lands	121, in 334 sections.

WESTLAND LAND DISTRICT—*continued.*

	Acres.
Abbey Rocks District (unsurveyed land) .. ..	1,168
Arawata District (unsurveyed land) .. ..	26,100
Arnett District (unsurveyed land) .. ..	1,600
Barn Bay District (unsurveyed land) .. ..	400
Bruce Bay, &c., District (3 sections, including 800 acres unsurveyed land) .. ..	1,146
Cascade District (unsurveyed land) .. ..	2,500
Clarke District (unsurveyed land) .. ..	680
Gillespie's District (unsurveyed land) .. ..	2,030
Haast Pass District (unsurveyed land) .. ..	320
Hohonu District (unsurveyed land) .. ..	1,640
Kanieri District (7 sections, including 3,610 acres unsurveyed land) .. ..	4,797
Karangarua District (4 sections) .. ..	842
Kokatahi Village (3 sections) .. ..	2
Macfarlane District (unsurveyed land) .. ..	400
Mahinapua District (unsurveyed land) .. ..	1,320
Matakitaki District (unsurveyed land) .. ..	930
Okuru District (12 sections, including 4,707 acres unsurveyed land) .. ..	7,549
Otira, &c., District (unsurveyed land) .. ..	1,210
Paringa, &c., District (unsurveyed land) .. ..	4,575
Poerua District (6 sections) .. ..	1,220
Runanga Town and Village (254 sections) .. ..	80
Toaroha Town and Village (unsurveyed land) .. ..	3,370
Turiwhate Town and Village (1 section, including 1,150 acres unsurveyed land) .. ..	1,475
Waiho, &c., Town and Village (3 sections, including 8,555 acres unsurveyed land) .. ..	8,945
Waitaha, &c., Town and Village (unsurveyed land) .. ..	6,580
Waitaha Village (77 sections) .. ..	39
Wataroa Town and Village (3 sections, including 9,580 acres unsurveyed land) .. ..	10,175
Waitangataona Town and Village (unsurveyed land) .. ..	400
57 pastoral runs .. ..	786,810
Total .. ..	878,303

## CANTERBURY LAND DISTRICT.

	(58,533 acres.)	Acres.
Surveyed rural land .. ..	..	344, in 23 sections.
Unsurveyed rural land .. ..	..	421, in 5 sections.
Pastoral run .. ..	..	45,000, in 1 run.
Lease in perpetuity under Land for Settlements Acts .. ..	..	12,768, in 91 sections.
Amuri County (1 pastoral run) .. ..	..	45,000
„ (2 sections) .. ..	..	1
Ashburton County (16 sections) .. ..	..	330
Ashley County (1 section) .. ..	..	15
Geraldine County (4 sections) .. ..	..	142

CANTERBURY LAND DISTRICT— <i>continued.</i>					Acres.
Selwyn County (4 sections)	..	..	..	..	269
Waimate County (1 section)	..	..	..	..	8
<b>Total</b>	..	..	..	..	<b>45,765</b>

<i>Under Land for Settlements Acts.</i>					Acres.
Akaroa County (29 sections)	..	..	..	..	11,866
" (5 sections)	..	..	..	..	3
Ashburton County (5 sections)	..	..	..	..	5
Levels County (6 sections)	..	..	..	..	5
Selwyn County (4 sections)	..	..	..	..	2
Waimate County (42 sections)	..	..	..	..	887
<b>Total</b>	..	..	..	..	<b>12,768</b>
<b>Grand total</b>	..	..	..	..	<b>58,533</b>

OTAGO LAND DISTRICT.					Acres.
(85,670 acres.)					
Surveyed rural land	..	..	..	..	28,705, in 346 sections.
Surveyed rural land under "The Bush and Swamp Crown Lands Settlement Act, 1903"	..	..	..	..	2,369, in 20 sections.
Lease in perpetuity under Land for Settlements Acts	..	..	..	..	2,061, in 17 sections.
Small grazing-runs	..	..	..	..	1,185, in 2 runs.
Pastoral runs	..	..	..	..	51,350, in 6 runs.
<b>Bruce County (21 sections)</b>	..	..	..	..	<b>1,841</b>
<b>Clutha County (85 sections)</b>	..	..	..	..	<b>12,697</b>
<b>Lake County (90 sections)</b>	..	..	..	..	<b>5,910</b>
" (3 pastoral runs)	..	..	..	..	<b>20,740</b>
<b>Maniototo County (4 sections)</b>	..	..	..	..	<b>49</b>
<b>Taieri County (16 sections)</b>	..	..	..	..	<b>1,971</b>
<b>Tuapeka County (42 sections)</b>	..	..	..	..	<b>3,752</b>
" (2 small grazing-runs)	..	..	..	..	<b>1,185</b>
" (2 pastoral runs)	..	..	..	..	<b>29,610</b>
<b>Vincent County (106 sections)</b>	..	..	..	..	<b>4,824</b>
" (1 pastoral run)	..	..	..	..	<b>1,000</b>
<b>Waihemo County (1 section)</b>	..	..	..	..	<b>3</b>
<b>Waitaki County (1 section)</b>	..	..	..	..	<b>27</b>
<b>Total</b>	..	..	..	..	<b>83,609</b>

<i>Under Land for Settlements Acts.</i>					Acres.
Bruce County (7 sections)	..	..	..	..	19
Clutha County (7 sections)	..	..	..	..	2,039
Waitaki County (3 sections)	..	..	..	..	3
<b>Total</b>	..	..	..	..	<b>2,061</b>
<b>Grand total</b>	..	..	..	..	<b>85,670</b>

## SOUTHLAND LAND DISTRICT.

	(64,610 acres.)	Acres.
Surveyed rural land .. .. .		3,583, in 45 sections.
Surveyed rural land under "The Bush and Swamp Crown Lands Settlement Act, 1903" .. .. .		43,445, in 340 sections.
Lease in perpetuity under Land for Settlements Acts .. .. .		5,293, in 19 sections.
Pastoral runs .. .. .		11,656, in 3 runs.
Township lands .. .. .		633, in 670 sections.

	Acres.
Southland County (342 sections) .. .. .	45,026
"          (2 pastoral runs) .. .. .	1,856
Stewart Island County (16 sections) .. .. .	489
Wallace County (27 sections) .. .. .	1,513
"          (1 pastoral run) .. .. .	9,800
670 township sections .. .. .	633
<b>Total .. .. .</b>	<b>59,317</b>

*Under Land for Settlements Acts.*

	Acres.
Southland County (13 sections) .. .. .	3,313
Wallace County (6 sections) .. .. .	1,980

**Total .. .. . 5,293**

**Grand total .. .. . 64,610**

## LAND DISTRICTS.

## AUCKLAND LAND DISTRICT.

*Counties.*

The district comprises the Counties of Mongonui, Whangaroa, Hokianga, Bay of Islands, Hobson, Whangarei, Otamatea, Rodney, Waitemata, Eden, Manukau, Coromandel, Thames, Ohinemuri, Piako, Waikato, Waipa, Raglan, Kawhia, Waitomo, Awakino, Taupo West, Taupo East, Rotorua, Tauranga, Whakatane, Opotiki.

*General Description.*

North of the City of Auckland the country is a land puzzling to the southern farmer, so different is it from anything to which he has been accustomed. The soil is varied enough to tempt one to regard it as the epitome of all soils. The belts of each succeed each other with remarkable suddenness, the finest red volcanic succeeded by the stiffest pipeclay, which in its turn gives place to ironstone and sandstone, these being followed by others which end by the side of the richest alluvial, and there is much limestone. The climate is warm, the altitude nowhere above 2,600 ft., and a very large portion of the country is arable. Three things all the parts of this country have in common—kauri, kauri-gum, and the capacity for fruit-growing, which embraces apples, pears, peaches, plums, figs, grapes, oranges, and

lemons, and in the most northealy parts the banana. There is land that will, when grassed, carry two sheep to the acre, easily, and land that will not carry a sheep to all its acres on any pretence whatever, but will produce fruit rapidly and of the best sorts. There are lands which grow maize, and lands on which wheat has done exceedingly well, and lands which grow the potato in perfection and profusion. Plantations of oranges and lemons are in places extensive and frequent, and in every district there is good grass, on which dairy cattle are much at home. But he with whom it is a question of investing in this country must see for himself everything he is asked to buy. He will find nothing like a desert—a word often used by the stranger who finds himself studying a worked-out kauri-gum field—but the fact will, on the contrary, strike him that there is not a spot, apart, of course, from the rocks, in the whole country which is not green. It is a green of forest, or of fern, or of manuka. Where the land is poor the fern is small and the manuka dwarfed, and when the land is rich the fern is high enough to hide an army—as indeed it has often done in these parts—and the manuka stands up tall and commanding, with the fine growth of its sturdy timber. But whatever is under the surface, the land is green. What perhaps strikes one most in travelling over this part of New Zealand is that whoever wants to use these lands profitably must be prepared with skill and knowledge as well as capital, else will he lose his labour. He must also be content to bide his time. It is not a country making farms and orchards by leaps and bounds, but it is a country in which agriculture must be specialised. At the same time, there is in the timber and gum a fine pair of resources. The forest employs the funds of capital; the gumfield rewards the industry of labour. There are men in this north country who substantially supplement the profits of farm-work by taking a few days on a gumfield, and there are men who have found in the wages of the forest and the takings of the gumfield the wherewithal to start them on the road to independence on the land. The timber is slowly arriving at extinction point; but there are gumfields which show no signs of giving out, after thirty years of working. There is no need why any one in the north country should ever want for food, clothing, or shelter. There is that in the ground which for the digging will give him the price of all three. On the whole, it is a most interesting country this country of the north.

Overland from Auckland City the tour of investigation begins in the gumfields beyond the bright Takapuna country. Heavily rolling ridges, carrying in many places bush and scrub in and about which cattle thrive, as their condition invariably attests. The rest is green dwarf manuka, looking barren where the clay has been turned over, with the air of depression deepened wherever a wretched camp of gumdiggers saddens the landscape.

At Wade, you come to rich river-bottoms, and orchards of magnificent fruit. It is not, however, the first fruit met with since leaving the Takapuna, for in the midst of the worst of the dwarf manuka grapes have astonished the eye, and you have heard of a "vintage." Neither is this the only product of planting, for here and there the pine and the blue-gum have waved well-grown branches of assurance that the soil has something to recommend it.

Further on there is bush, and one sees the kauri for the first time,



and is pleased to note how luxuriantly the young trees are growing, for there is a legend in the south to the effect that they will not grow at all. Moreover, it is clear that where all this bush is, and where the ground is not too steep—and it is only here and there you come across steepness—grasses must flourish. The proof greets you while nearing Waiwera by the sea.

At Warkworth, in the neighbourhood of which one meets the first of the mangrove swamps of the north, there are great deposits of lime, and consequently lime-burning and cement-works—things adding to your conception of the variety of the resources of the north. Inland towards Waby there is much forest on heavily undulating country, most of which will be arable when the timber is gone. It is being tackled with great patience, in small divisions, and the struggle with the wilderness appears very long.

At Waby vineyards, a very palatable wine from a port grape accentuates the hopeful character which the sight of the sullen agricultural conflict in the forest is apt to dim somewhat. Forest land, neither too high nor too rough, with stretches of gum land and land more tractable after bush, fills the country between the Kaipara waters and the ocean.

Maungaturoto, further on, close to the Otamatea waters, standing in the midst of a limestone country, is a splendid diversion. Here there are many vines, which just now for many reasons happen to be languishing. But as not one of the reasons is valid, in the sense of being unpreventable, the vine ought to flourish in this region, as well as the stock, which certainly do well.

From this fine country the road passes through the gorge of the Waipu—a most picturesque forest road—to Waipu by the sea, where there is a settlement of Nova Scotians. These have for thirty years lived a pleasant independent life, among fields well tilled, meadows well grassed, feeding cattle and growing crops with success.

Round about them is the gumfield, stretching northwards under dwarf manuka, holding its own with everything till the sea sand cuts it off with summary line of demarcation. North of that, volcanic soil follows with cultivation, and the exceedingly pleasant Whangarei country is about you. It is a country of stock, of dairy farms, of orange and lemon plantations, and vines, with gumfields mixed among the cultivation. The surroundings of the Town of Whangarei are very handsome, with much cultivation. Inland the line towards Kawakawa goes through the district of Hikurangi, where there are immense outcrops of limestone, and past the hot and cold soda springs of Kamo. From Whangarei the roads westward lie among increasing cultivation and decreasing forest.

To the north of these lands is the Bay of Islands country, with much magnificent volcanic soil and some cultivation to match, and good alluvial soil in many river-bottoms, with many fine volcanic uplands, such as those about historic Waimate. As in the rest of this north country, the best lands are still in the hands of the Maori owners, and they are conspicuous by their neglected condition: the high fern and fine manuka telling eloquently the promise of the fertile soil. In this part of the country the land is undulating, none of it high, and most of it will some day be arable. When this Native ownership is dealt with the development of this country will be astonish-

ing. At present it grows all the fruits of the north, raises stock and dairy-produce, and cultivates with a view to grass. All the roads westward towards Hokianga go through good country, reaching river-valleys of great fertility.

North of this district is the picturesque country behind Whangaroa and Mangonui Harbours. Creeks penetrate the land from these, by which launches convey supplies to the settlers and take away produce. There is a good deal of forest, some precipitous country, much that is undulating, and more that is level. There are the usual changes in the aspect of the fern and manuka, and there is a great deal of fine forest.

The extreme north is very open, fairly flat, and largely sandy. Coming next is the Mangonui County: good valleys on the coast range, fine river-flats on the other side, in a setting of gum hills. There is a fine stretch of arable land from Oruru to Kaitaia, and good corn land carrying grass and cattle. Between the last named place and the Hokianga County there are also some fine breadths of arable land, black soil in the southern portion about Whangape and the feet of the northern hills of the Hokianga Estuary. Here is good stock-farming and the inevitable gum-lands.

Hokianga has good forest hills round the great inlet, and where the timber has gone there is good grass and good stock, and there are patches of good vineyard very profitably worked.

The Wairoa country is remarkable for the fine river-valleys, chief of which is the valley of the Wairoa. Outside of these the hills run up to 2,600 ft., but the bulk of the high country is much lower. About Dargaville the soil is rich, intermixed with gum-land, while up the Kaihu Valley it is mostly rich, and farming is prosperous. Between Dargaville and the coast there is some richly grassed land as fine as anything in New Zealand, showing what sort of country the river lands at present in course of being opened up will grow into. The population talks more at present about timber and sawmilling, but the agricultural interest is growing.

On the Otamatea side of the Wairoa waterway are the famous Tokatoka swamp lands, reclaimed and settled by very prosperous settlers. The same kind of land occurs throughout the Otamatea County. Here is situated Bickerstaffe Settlement.

Between Helensville and Auckland a fine stretch of cultivated grass country is very noticeable for a few miles either side of the railway, equal to the best in the colony. The rest of the country to Auckland is fertile, and much of it open.

South of Auckland City the land district stretches east to the Napier boundary, which is the great range running under various names—Raukumara, Huia Rau, Ahimanawa, Kaweka, Ruahine, Tararua, Rimutaka—to Cook Strait.

East of the Raukumara is the Bay of Plenty country, extending to the Coromandel Peninsula. In this there is a large percentage of agricultural land, beginning in the valleys, chiefly, of the Rivers Opotiki and Whakatane, in which heavy crops of maize are regularly grown. Above these are the Raukumara lands, northern spurs of the range, which take grass well when cleared of timber. At present they are mostly covered with forest. About Whakatane the country is level and undulating, with large swamps. The Tauranga lands,

coming next, make a strip of fair to light land along the coast, closely settled, running at the northern end into fern and manuka, producing excellent fruit. Here is the well-known Katikati Settlement.

Between Tauranga and Lake Taupo is the Rotorua region, volcanic for the most part—a land of geysers and solfataras. It grows fine potatoes, as the Maoris have reason to know, and is a splendid timber-grower, as the nurseries of the Forest Department attest. The Kaingaroa Plains are east and south, roamed over by a few wild horses. All this country of Rotorua interests the tourist and the invalid more than it does the farmer or the grazier.

To the north-west of Rotorua is the plain of the Waihou (Thames) and the valley of the Waikato and the Waipa and the Puniu. A range of mountains separates the Thames Valley from the Bay of Plenty country, and runs on northwards into the Colville Peninsula. West of the Waikato-Waipā-Puniu Valleys is the Rangitoto Range, separating them from the western watersheds of North Taranaki and Kawhia. This range is the northern prolongation as far as Pirongia, of the volcanic range which stands south of Lake Taupo. The main peaks of the latter are Ruapehu and Tongariro, the first named rising to a height of over 8,000 ft. above the sea. A proportion of this hill country is pastoral. The open, undulating, and largely arable land of the Waipa basin sweeps up to the Rangitoto Range, and there is much dairying, and roots are grown to advantage, and fruit does well.

The Waikato country, coming next, is also low, open, and undulating, a plain with occasional patches of hill rising up in ridges and sharp peaks. There are in this district several large swamps, some of which have been drained with great success, as is proved by the condition of some of the finest estates in the whole Waikato Valley. Cereals do fairly, especially with the aid of fertilisers; grass grows as well as anywhere in New Zealand, and stock of all kinds do exceedingly well.

To the eastward the Waihou country is much the same, with some fine estates resumed by the Crown. The Piako County comes next, in which there is a good deal of swamp waiting for well-directed capital to set about the work of draining, which certain well-known estates are daily more and more proving a profitable operation. All this Waikato-Piako-Waipā region used in Maori and early colonisation times to be very productive. Right up to the eastern range the land is flat and light, growing grass and roots excellently in a light soil easily tilled, and requiring fertilisers from the first. The northern portion of this district is occupied by some extensive swamps, some of which have been reclaimed with results that speak for the district a rich future. To the east the Ohinemuri County rises into the hilly mineral forest-covered region which constitutes the Cape Colville Peninsula. It is country for the miner exclusively.

West of the Waikato are the Kawhia and Raglan districts. The former consists largely of hilly, broken, forest country, of which a good proportion consists of important areas of limestone and papa, much sought after by settlers anxious to make homes for themselves. This country is quick to take grass and maintain it for long periods of time. Settlement is progressing apace inland of the Harbour of Kawhia behind the axes of the pioneers.



VIEW OF CHEESE-FACTORY.

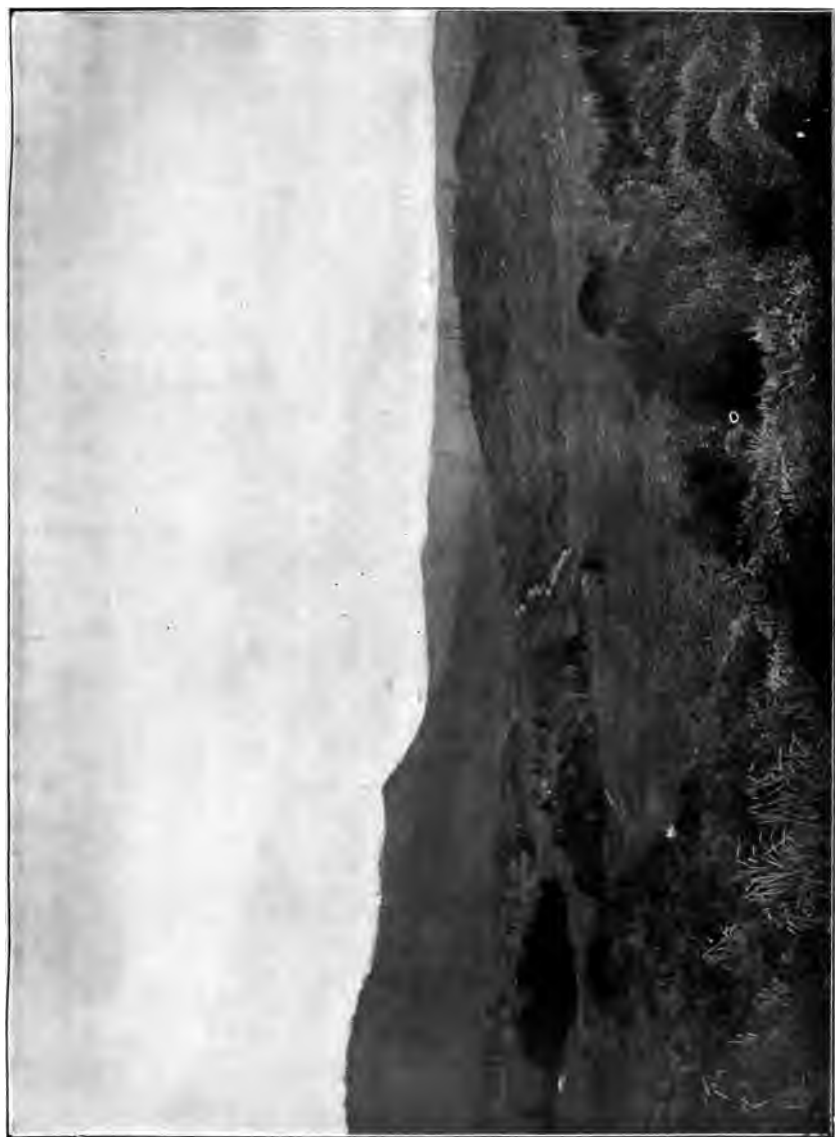
*Immigrants' Guide.*



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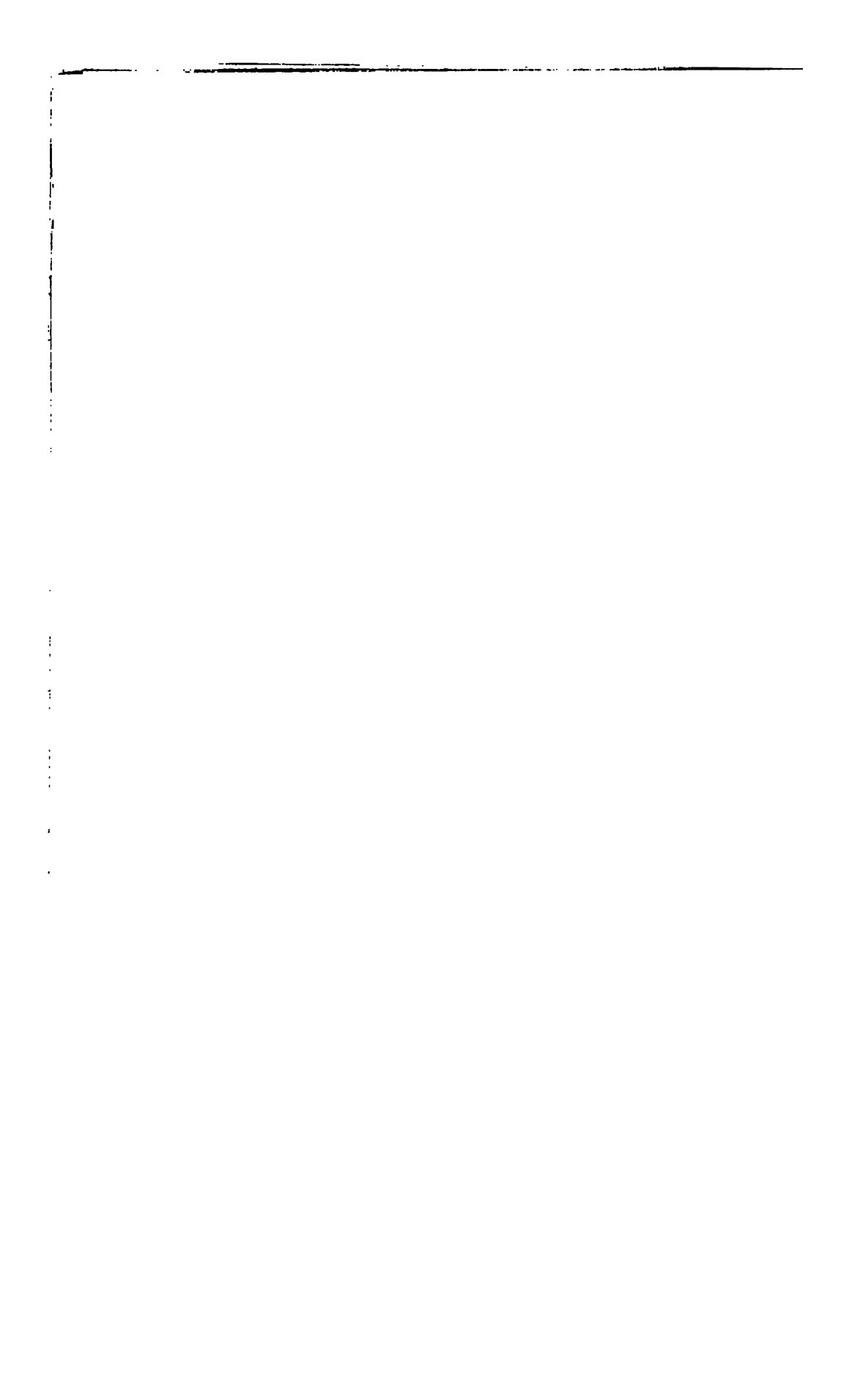
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AWAKINO VALLEY, LOOKING SOUTH.

*Immigrants' Guide.*





The Raglan County up to the Waikato mouth is much the same in character, being also hilly and broken, with occasional areas of limestone and papa. It is classed by the settlers as first-class pastoral country.

North of the Waikato the land rises quickly to the summit of the Wairoa Range (1,300 ft.). There is much timber in these hills, and a good proportion of them will be arable—indeed, much is already so. From here the land falls gradually to the shores of the Hauraki, the Manukau Estuary, and the Tasman Sea. Near the hills it rolls somewhat roughly; to the north it flattens into smooth plain. This plain is carefully tilled, the red soil showing all the signs of husbandry; also are there plantations, reserved patches of native bush, comfortable homesteads dotting the landscape, and hedges here and there cutting it up. There is some manuka and fern, and a limited area of kauri-gum land. The rest of this low country is from fairly arable to rich swamp. The hill country carries excellent grass. Cereals of all sorts are cultivated, root-crops give excellent results, dairying is carried on extensively, and stock of all kinds thrive in the comfortable, homely looking country.

The Auckland Land District covers about four and a half degrees of latitude, extending from 34° 30' to 39° S., its greatest length being about 365 miles, from the North Cape to the 39th parallel, south of Lake Taupo, while its greatest width is about 180 miles. In the peninsula north of Auckland, indented as it is on either side by harbours and arms of the sea, and with a mean width between the Pacific Ocean and Tasman Sea of little over forty miles, the range of temperature is remarkably small. The thermometer seldom registers above 80° in the shade in the middle of summer, whilst the heat is always tempered by a cool breeze, bringing the mean summer temperature to under 70° in the shade. The frosts are hardly worth mentioning, as the minimum register is seldom below 40°. But south of Auckland sharp white frosts are frequent, more especially beyond 38° of latitude, and the highest mountains are white all winter.

*Physical Features.*—This land district may be said to have no real mountains, as the most prominent peaks of the several scattered ranges or hills seldom exceed 3,000 ft. in height above the sea-level, an altitude just enough—south of 38°—to clothe the last 1,000 ft. with snow in the depth of winter. North of Hokianga and the Bay of Islands there is one well-defined range of hills rising to a height of 2,463 ft.; whilst south of these places, and extending to the Wairoa River on one side and the Whangarei Harbour upon the other, the country is all more or less broken into ranges from 1,000 ft. to 2,000 ft. in height, with valleys between. The next really well developed main range begins in the Coromandel and Thames Peninsula. With a length of over 100 miles it has an average height of over 2,800 ft., commencing with Moehau, or Cape Colville, 2,935 ft.; next, Te Aroha, a peak of 3,176 ft.; and ending at Weraiti with a height of 2,527 ft. There are two other well-defined ranges—namely, Tawairoa and Hauturu—lying between the West Coast and the Waipa basin, with their highest peak at Pirongia, which rises to 3,156 ft., and is often snow-capped. There are other ranges forming the watershed between the basins of the Waikato and Waipa Rivers, and dividing both from the streams running into the western side of Lake Taupo. Their



highest peak is Pureora, rising to 3,793 ft. The eastern side of the land district is occupied by a very broken, forest-clad country, known as the Urewera country, the average height of which is about 2,500 ft. This has been reserved for the Natives. To the east of Lake Taupo lie the Kaimanawa Ranges, of about 4,500 ft., and generally open on the ridges, with valleys clothed in beech forests.

A great portion of the Auckland Land District is indented on both coasts with harbours and arms of the sea, forming a cheap and easy means of access. Of rivers, properly so called, there are only two of any great length—namely, the Wairoa and Waikato. The first empties itself into the Kaipara Harbour, a large arm, or rather succession of arms, of the sea, giving hundreds of miles of inland water-carriage to all parts of the Counties of Hobson, Otamatea, Rodney, and Waitemata. This river is navigable from its mouth to its junction with its tributaries Wairua and Mangakahia, a distance of ninety-one miles from the sea, and for forty miles it is navigable for ships of large burden. The River Waikato has a course of two hundred miles, measured from its source in the Ruapehu Mountain through Lake Taupo to the sea on the west coast. It is navigable for river-steamers for seventy-five miles from its mouth, and its tributary, the Waipa, for twenty-five miles from its confluence with the Waikato at Nga-ruawahia. Another river—the Thames, or Waihou—though of no great length, affords a valuable means of inland water-carriage, and is navigable for small steamers for twenty-five miles. Generally speaking, every part of the district has an abundant water-supply, now and then lessened for a short time at the end of a very dry summer.

Of lakes, which add so much to the scenery of a country, this district possesses a fair share, there being eight principal lakes, with some twenty or more smaller ones. To the north of Auckland, in the Bay of Islands district, there is only one lake of any size, called Omapere, three miles by two miles, an old crater. In the Waikato are Lakes Waikare and Whangape, the first six miles and a half long by three miles across, and the second five miles by one mile. These lakes are generally covered with numerous wild swans and ducks, and, being both connected with the Waikato River by navigable creeks, form a convenient waterway for transport of goods to settlers living around their shores. All the remaining lakes of large size are within the watershed of the Thermal-springs District, and are mostly from seven to eight miles long, and from three to six miles wide, except Taupo Moana, the queen of the North Island lakes, which is twenty-five miles long and eighteen miles broad, with a depth of 500 ft. The scenery round its western shore is of the most romantic description.

The hot springs form a remarkable feature of the North Island. They are found over a large area, extending from Tongariro, south of Lake Taupo, to Ohacawai, in the extreme north—a distance of some three hundred miles; but the principal seat of hydrothermal action is in the neighbourhood of Lake Rotorua, about forty miles north-north-east from Lake Taupo. By the destruction of the famed Pink and White Terraces, and of Lake Rotomahana, during the eruption of Mount Tarawera on the 10th June, 1886, the neighbourhood has been deprived of attractions of unrivalled beauty; but the natural features of the country—the numerous lakes, geysers, and hot springs, some of which possess remarkable curative properties in certain complaints

—are still very attractive to tourists and invalids. The world-wide importance of conserving this region as a sanatorium for all time has been recognised by the Government, and it is now dedicated by Act of Parliament to that purpose.

*Forests.*—The greater part of the Auckland Land District has been covered in the past with dense forests, which are now fast disappearing under the axe of the settler, and being transformed into fruit-growing and pasture land. Much of the best Crown lands fit for settlement in the North are covered with forest, and must be cleared and sown before any returns can follow. The area of forest land in the Auckland District at the present time is about 100,000 acres north of Auckland, and 2,820,000 south of it. These forests contain a mixture of trees of all kinds, from the giant kauri to the dwarf manuka, but all the bush is useful for building, fencing, and household purposes.

*Soils.*—With respect to the soils of New Zealand, nowhere in New Zealand within such short distances is there such a diversity in the quality—a distance of half a mile often makes all the difference between rich alluvial and barren pipeclay. To the north of the Bay of Islands and Hokianga the lands are chiefly clay and sandstone, with here and there a volcanic area intervening. In the Hokianga County, and in and about the valley of the Mangonuiowae River, there is some of the richest alluvial soil in the district. There are large areas which will carry good grass and feed one or two sheep to the acre, after clearing and laying down in grass, and also land highly suitable for fruit-growing. South of Hokianga, and between that place and the Wairoa River, the soil is, generally speaking, very good, being both volcanic and alluvial. Immediately south of the Bay of Islands, and extending from there to Whangarei, the soil is, generally speaking, clay lying upon sandstone or marl, with alluvial flats in the bottoms of the valleys; but these are, as a rule, very narrow. Within the Puhipuhi State Forest there is an area, say, of 16,000 acres, more or less volcanic soil, over a large portion of which a fire has run; having been surface-sown with grass, it is now carrying most luxuriant pasture. Approaching Whangarei, at Hikurangi, the limestone crops out, overlying coal-deposits, and around Whangarei itself the soil becomes a rich volcanic, in a high state of cultivation. South of Whangarei Harbour, and from there to Auckland, the Crown lands generally are of a broken character, with soil varying from alluvial swamps—as in the case of the Tokatoka Swamp of 16,000 acres—to the limestone areas round Maungaturoto, the sandstone and clay lands of Rodney County, and the poorer clay lands immediately north of the City of Auckland, which have, however, proved eminently suitable for fruit-growing.

For about two hundred miles south of Auckland the land (with the exception of the Cape Colville Ranges) is, generally speaking, far less broken, and gradually opens out into large tracts of level country in the Waikato and Waipa basins. Immediately south of Auckland the land is rich volcanic, until it is gradually superseded by the prevailing clays; the greater portion of Manukau County, for thirty miles south of Auckland, may be classed as pastoral, and under cultivation as such. The Crown areas available for settlement—say, 4,500 acres—are chiefly in the Otatau Parish, varying

from volcanic clay to ordinary clay land, forest clad, and well adapted for pastoral purposes. In the Counties of Waikato, Raglan, Piako, Waipa, West Taupo, Kawhia, Waitomo, and Awakino, we have a still greater diversity of soils, whilst in the Raglan County there are large areas of rich limestone country, broken, but with rich black soil, and carrying most luxuriant grass. The lower Waikato County consists of clay soil and extensive swamps almost undrainable; but at a distance of eighty miles from Auckland is reached the flat and undulating country, lying chiefly within the Waikato and Waipa basins, and within the valleys of the Piako and Waihou Rivers, formed mainly of alluvial deposits of rhyolite sands brought down from volcanic districts. In the Kawhia, Waitomo, and Awakino Counties there are large areas of excellent limestone land, a portion of which is heavily timbered, with numerous warm valleys. Most of this land has been acquired by the Government from the Native owners, and has been taken up by a good class of settlers. Beyond this there is a large stretch of country, consisting alternately of open valleys and forest-clad hills, a fair proportion of which is good land, both pastoral and agricultural. The County of Coromandel, with portions of Thames and Ohinemuri Counties, is chiefly devoted to mining. The soil is nearly all clay, the land very broken, but will be suitable for pasture when cleared of the dense forest that now covers it. The western portion, however, of the Thames and Ohinemuri Counties contains large areas of alluvial swamp lands in the hands of the Crown, but through want of drainage not yet available for settlement.

In the County of Tauranga, the clay lands extend from Te Aroha Mountain to Katikati Entrance, changing, near Tauranga, to sandstone and black pumice soil of rich character, which improves towards Te Puke and Maketu, where the land is all good and more or less volcanic. In Whakatane County there are very extensive swamps, a good deal of which is drainable, and back from the coast seven miles or so are large areas of Crown lands, broken and forest-covered, open for settlement. The soil is chiefly clay or light loam, with alluvial flats in the valleys, and all well watered. This description of country extends to the boundary of the land district. The coastal lands are nearly all alluvial flats, and in a high state of cultivation, and the settlers well-to-do for the most part.

*Review of Soils: Uses and Returns.*—North of Auckland there is plenty of opportunity almost everywhere for the gum-digger. For the rest it will suffice to say that north of the Bay of Islands and Hokianga the land is suitable for the small farmer. The earnings of the gum-digger average 5s. to 10s. a day, and the man can go anywhere practically. As for the farmer, in and around Hokianga, with its two hundred and fifty miles of water frontage, almost anything can be grown, from the tropical banana to the prosaic potato, whilst oranges and lemons flourish side by side with all kinds of apples, pears, and plums. The soil is adapted for the growth of grapes, and an excellent wine is made at Kohukohu. Wheat does fairly well, and maize gives a return of 50 to 60 bushels an acre. Sheep also thrive, and most of the lands when properly grassed with English and other grasses will carry two or three sheep to the acre, but on ordinary rough grass lands the capacity is only a sheep and a half. The Messrs. Williams, at Pakaraka, are feeding four sheep to the acre upon land sown with furze.

The clearing of forest lands, ring-fencing and grassing them, will cost about £3 to £3 10s. per acre. The same remarks apply to the Bay of Islands and Whangarei, and to the country as far south as Auckland. Round about Whangarei district, and under similar conditions of culture, the average return for good agricultural or pastoral lands would be fully 12s. an acre per annum. South of Auckland, throughout the Waikato, Piako, Waipa, and Raglan Counties, and thence south to the district boundaries, the land is both agricultural and pastoral. All the cereals do well, wheat averaging 27 to 30 and up to 40 bushels per acre, and oats 26 bushels per acre. Potatoes average from 5 to 7 tons per acre. Dairy-farming is carried on, yielding, upon well-cultivated farms, a net profit of 15s. to £1 an acre per annum; whilst sheep-farming yields a profit of from 5s. to 7s. 6d. a sheep per annum on very large estates; allowing for greater losses from disease, &c., the average return would still be 4s. per sheep. The cost of clearing fern and scrub is generally from 7s. to 10s. an acre, and laying down fern land by surface-sowing and harrowing, about 17s. an acre.

The seaward Counties of Tauranga and Whakatane are both agricultural and pastoral, growing wheat and maize alike to great perfection. In fact, the County of Whakatane, upon its alluvial shores and uplands, grows the greater portion of the maize produced in the district, and from the Ports of Whakatane and Opotiki in one year some 34,000 sacks have been exported. In these counties the average yield of wheat is from 22 to 25 bushels per acre, oats about 29 bushels per acre, and maize 45 to 60 bushels per acre. It is quite possible within this district to select land early in the winter, fell and burn off by the ensuing summer, sow in grass in the autumn, and put on stock within twelve months from selection.

*Rainfall.*—The rainfall during the year averages about 39 in., the greater portion of which, as a rule, falls between the 1st May and the 1st November, or during the winter and spring months. Owing to the constant changes of wind, induced by the configuration of the coast-line, the narrow distance between the two coasts, and the influence, greater or less, of the trade-winds on the coast, it is quite common for some neighbourhoods to have double the rainfall of others, even though separated only by a distance of twenty miles. Droughts of more than a couple of months are practically unknown, and grass is always abundant.

*Winds.*—One of the chief means whereby the great healthiness of the climate is maintained is the constant presence of fine breezes, blowing both summer and winter, the prevailing winds being north-east and south-west, and very seldom passing into really heavy gales. In the middle of summer the sea-breeze during the day and the land-breeze at night are almost unvarying.

*Dairying.*—Distributed over the Auckland District are 130 factories and creameries, which afford employment for a large number of people. Periodically, State-appointed experts impart instruction regarding the most improved methods of manufacturing butter and cheese, and the industry is yearly increasing in importance. Some idea of the flourishing condition of the dairy industry in the North may be arrived at from the fact that 54,134½ cwt. of butter, valued at £292,326, and 3,032 cwt. of cheese, valued at £9,400, were shipped from the Port of Auckland to the United Kingdom in the season 1905-6.

*Fruit.*—The climate of the Auckland District is well adapted for the growth of the orange, lemon, vine, and olive, as also for the fruits of England, America, and Japan. The subtropical kinds flourish about Hokianga, in the north; those of the temperate regions, in the Waikato and neighbourhood. Now that the problem of how to land fruit in good condition in the London market has been solved, orchard planting is rapidly progressing, and it has been found that the culture of the hard varieties of the apple will repay export to England. Of late years a demand has set in for the poor clay land that used to contain gum, as it is admirably suited for fruit-growing. Orchards are now planted in neighbourhoods where the soil has lain idle for years, for it has been proved that apples grown on this poor soil keep longer than those grown on richer land. What can be done by cultivation and care on poor lands is evidenced at the Waerenga Government Experimental Plantation in the Waikato, where the two orchards of fruit-trees and vines show most luxuriant growth. Fruit-growers are also recognising the importance of the canning industry, and under the supervision of State-appointed experts are being encouraged to cultivate fruits specially adapted for the purpose. There is a good demand for locally canned fruits, which are equal in every respect to those imported from California.

*Flax.*—Throughout this district numerous flax-mills are in operation. These employ a large number of people, whilst in the City of Auckland some forty-one hands are engaged in making rope, twine, and cordage. The manufactured articles are of a quality which bear favourable comparison with those imported into the colony. Last year the quantity of flax exported was 7,002 tons, valued at £185,182, showing an increase of 2,085 tons and £56,902 when compared with the figures for 1903.

*Fishing.*—The sea and harbours abound in fish. At least eighteen different varieties suitable for the table are caught with little labour, and settlers living near the sea-coast, or any one of the many harbours and tidal rivers, can always obtain enough for all necessities. At present the canning industry is confined to mullet, of which there is a large amount exported, and an equal quantity used for home consumption. The rock-oyster is found over a large area on these coasts, and large quantities are sent both to the southern ports of the colony and also to Australia.

*Minerals.*—Gold is found in the Coromandel Peninsula, and has been mined from quartz successfully for many years, in the Counties of Thames, Coromandel, Ohinemuri, and Piako. Coal is mined at Hikurangi, Kamo, Taupiri, and Huntly. There is a mining school at Thames, which is much patronised.

*General.*—Auckland, on account of its remarkably fine harbour and first-class shipping facilities, possesses many local industries, all of which are in a most flourishing condition.

Perhaps first in importance is the Colonial Sugar Company's refinery at Chelsea, where some two hundred and fifty hands are constantly employed. The extensive machinery for the treatment of the raw material which is brought from Fiji is capable of turning out 1,000 tons of refined sugar weekly. Most of the output is consumed in the colony, but a proportion is shipped to the New Zealand dependencies and elsewhere. Last year the total output of the refinery was 41,000 tons, the quantity exported being valued at £5,214.

Amongst the more recently established industries are the paper-mills at Riverhead, on the upper reaches of the Waitemata. These mills employ some thirty-one hands, whilst the quality of the paper manufactured is entirely satisfactory.

The brick and pottery business affords occupation for about two hundred and twenty people, and there is every prospect of this number being increased shortly, as, in consequence of the extension of the electric tramways to various parts of the suburbs, a much larger demand exists for building material.

In the north and on the shores of one of the best harbours in the colony (Whangarei) an immense deposit of kaolin has been found. Various tests have proved the quality to be exceptionally good, and in every way suitable for the manufacture of china, crockery, vitrified drain-pipes, tiles, &c.

Within easy distance of Auckland large hydraulic lime and Portland cement works are in full operation, the annual output being from 25,000 to 30,000 tons. These works employ about one hundred and twenty hands. The quality of the cement is such that it is extensively used in connection with important public works. Over 9,000 tons have been used in the construction of the Napier breakwater, whilst at New Plymouth and in other parts of the colony large quantities have been used with the best results.

The Onehunga Woollen-mills employ ninety hands in the manufacture of blankets, tweeds, and other woollen goods. These compare favourably with anything of the kind imported.

Besides the industries mentioned, many others equally successful are in operation, including meat-preserving works, flour-mills, oil, soap and candle works, boot and shoe factories, tanneries, ironworks, shipbuilding yards, large printing and lithographic works, stationery and book manufacturing establishments, &c.

The Electric Tramway Company employ some three hundred and sixty hands, and maintain a huge plant. In 1904 the power was increased from 1,500 to 2,500 horse power. During the year no less than 18,500,000 tickets were issued to passengers, the largely increased traffic necessitating the construction of additional cars. Those built locally have proved in every way highly satisfactory. Since the inauguration of the electric-car service the congestion of population has been greatly relieved, large numbers of people having removed to the suburbs, where building is proceeding at an unprecedentedly rapid rate. Auckland may now claim to be one of the most progressive cities in the colonies.

The exports of colonial produce from this port last year were valued at £2,442,128.

## TARANAKI LAND DISTRICT.

### *Counties.*

The counties of this district are Taranaki, Stratford, Patea, Hawera, Clifton, and Egmont.

### *General.*

The centre of the Taranaki Land District is Mount Egmont, looking down upon sixty years of settlement and the finest dairy country in New Zealand, which it waters abundantly from its sides.

The settlement, hewn out of the forest in the beginning, has now advanced the cleared land east of the line drawn south behind the mountain from Waitara to Hawera. This is the fine volcanic country of Taranaki, the ideal dairy country, where the grass is ever green and the soil ever in heart. It is full of prosperous townships, dairy farms, and comfortable homesteads, a combination giving the land rolling up to the mountain reserves a special character all its own.

Hawera and Patea are in the southern part, in the midst of a fine agricultural country, with all the signs of the home comfort to be expected from that class of country under cultivation. In this part roots and fruits do well, and the sheep thrive exceedingly. Some of the best "freezers" are fattened hereabouts.

Eastwards the tide of settlement is following the axes of the bushmen. It has got well on past Whangamomona, and Ohura will see it swirling past in all its strength before long. It has met and mixed with the settlement flowing inland from Patea and the Waitotara country, and all along the *débris* of the departing forest the grass is springing up, and the sheep are feeding along the hillsides. Most of it is papa country, which is famous for the manner in which it carries and nourishes grass. Inside the rolling hills the valleys are warmer than much of the volcanic dairy lands, and the settlers have discovered that their country is good for the early fattening of lambs. It is also a good dairying country. To the northward the settlement is making good progress among the rough forest hills in the valleys of the Waitara, the Mokau, and the Awakino.

Settlement is stretching from Stratford towards the line of the Northern Trunk Railway, and will not be long before it reaches Taumarunui and Ohura. It has passed Whangamomona, is coming down the valley of the Tangarakau to the south, meeting the settlement up the Waitotara, and in the east is giving good account of itself in the warmer lower country of the Ohura Road. In there the settlers declare is the country that will best grow lambs for the early markets—the most profitable side of the sheep-farmer's trade. Many settlers have taken substantial means out of the old-settled districts, and, having settled among these forests, have made homes which leave them no room for regret at the change. These interior lands from the north of Stratford to Raetihi are the great papa belt of the north, so well spoken of by the experienced settler from all the valleys and hillsides from Northern Taranaki to the head-waters of the Rangitikei.

*Suitability.*—The Taranaki Land District is situated on the western side of the North Island of New Zealand, at about its widest part, and may be said to be the most compact and fertile district of the North Island, for, with the exception of the upper half of Mount Egmont, and of the ranges adjoining, which absorb about 36,000 acres, the whole of the area—minus what is taken up by the rivers, streams, and lakes—is suitable for agricultural and pastoral settlement. The gross area of the district is 2,430,000 acres.

*Bush.*—The whole of the district, with the exception of a fringe of open country along the coast from Pukearuhe to Patea, averaging three miles in width, and containing about 250,000 acres, and some valleys at the north-eastern corner of the district, about 150,000 acres in extent, was originally covered with heavy forest. But this is rapidly disappearing under the progress of settlement. Estimating

the area already cleared for settlement at 240,000 acres, it will be seen that there still remain about 1,754,000 acres under bush.

The larger timber is chiefly rata, rimu, matai, tawa, kahikatea, kohekohe, pukatea, rewarewa, hinau, with a few totara scattered here and there. Among the smaller trees may be mentioned the kotukutuku or fuchsia, karaka, and mahoe.

As regards the timber industry, there are altogether thirty-eight sawmills, and the total quantity cut during the year ended the 31st March, 1905, was about 18,700,300 ft., chiefly rimu, kahikatea, totara, and matai. Most of these mills work together under association rules and prices, their output for the year being 8,796,360 superficial feet; of the others, which work independently, the output of Messrs. Burnard and Ellis, of Otorohanga, amounted to 7,400,000 ft. for the same period.

*Mountains.*—Of mountains, the principal one is the beautiful volcanic cone from which the district takes its name, Taranaki, otherwise called Mount Egmont, which has an altitude of 8,260 ft. This mountain is the centre of distribution for a radius of twenty miles of the volcanic formation known as the "drift," which covers the volcanic rocks below an altitude of 3,000 ft. Hummocks composed of trachyte boulders and cemented shells and reefs crop up here and there, and make excellent metal-quarries.

Eastward of the base of Mount Egmont there are few, if any, mountains worthy of the name, although there are many ranges varying in height from 1,000 ft. to 1,500 ft. above the sea-level, and, in a few instances—such as the Matamateonga and Waiaria Ranges—run up to 2,500 ft.

*Reserves.*—An area of 72,000 acres, included within a radius of six miles from the summit of Mount Egmont, was originally set apart as a forest reserve. To this has now been added 1,040 acres on the lower slopes of Pouakai Range, with an additional 5,500 acres on the Patua Range, making a total of about 78,500 acres, which has now by Act of Parliament been set apart as the Egmont National Park. At about three miles within the reserve the forest begins to get stunted, and at four miles and a half gives place to low wiry scrub, which ceases at five miles, or an elevation of about 4,000 ft. At 5,000 ft. the moss ends; beyond this point to the summit the mountain is composed of scoria and lava.

In addition to the above, there are other forest and scenery reserves distributed over the land district of an area of 114,800 acres.

*Soils.*—Beyond the volcanic formation—that is, from about Urenui on the north and Hawera on the south—the country is generally broken, and the formation is known as papa—a calcareous blue clay, capped in many places by shelly limestone.

The northern portion, between the Tongaporutu and the Mokau Rivers, contains also limestone, greensands, and coal-outcrops. At Panirau, a small tributary of the Mokau, about thirty miles from the sea, there is an isolated patch of volcanic agglomerate and tufas, and a similar formation is found at the north-eastern corner of the district.

The volcanic soil, the boundaries of which have been already described, varies a good deal in quality. The best is believed to be on the south side of the mountain—between Stratford, Hawera, and



Opunake, but not less than two or three miles from the forest reserve boundary. It is believed that the country now being opened to the north and east of the volcanic deposit—that is, the papa and limestone formation—will, from the presence of lime, be much richer and more lasting as pasture land than that around the mountain. The carrying-capacity of the land is, on an average, three sheep to the acre.

*Climate.*—The climate of Taranaki is remarkably healthy, without any extremes of temperature. Below is given a table of mean, maximum, and minimum temperatures in shade for each month of the year ending December, 1904 :—

	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Mean temperature	65·5	65·6	63·7	59·5	55·5	53·6	50·3	51·3	53·6	54·7	56·8	65·2
Extreme maximum temperature ..	83	82	81	71	68	68	67	67	68	68	69	68
Extreme minimum temperature ..	46	49	43	45	40	39	33	32	39	37	41	44
Number of days on which rain fell ..	11	16	92	19	19	26	18	24	27	24	25	23
Total rainfall per month in inches and decimals ..	5·145	5·00	12·615	5·190	9·075	9·205	6·67	5·73	7·91	5·745	4·15	6·52
Mean barometric reading for the month ..	29·977	29·96	30·034	30·13	30·103	29·687	30·17	30·015	29·83	29·794	29·896	29·884

The mean barometric reading was 29·956 in. for the year. Total rainfall, 82·955 in. on 251 days. The rainfall varied considerably, as, for instance, at Norfolk Road, three miles south of Inglewood, the rainfall for the year 1904 was 128·26 in. on 201 days, the maximum fall being 5·51 in., 25th May. The average rainfall at New Plymouth during the past ten years was 64·581 in., and at Norfolk Road for same period 102·890 in.

*Dairying.*—Taranaki is essentially a grazing and dairying district, its chief products being butter and cheese. There are ninety-one dairy factories and eighty-one skimming-stations scattered over the district. Of these factories, seventy-nine produce butter only, six butter and cheese combined, while six produce cheese only. Forty factories are owned by proprietary companies, while fifty-one are run on co-operative principles. There are also in this district sixteen registered packing-houses for milled butter, 221 registered private dairies for butter-making, and two for cheese only, besides many small plants run on individual farms of which no record is obtainable.

*Meat, Bacon, &c.*—Bacon-factories have been established in several places, and there are meat-freezing works at Waitara, Moturoa (near New Plymouth Breakwater), and Patea.

*Mining.*—The only mining going on at present is at the Mokau Coal-mines, which are situated on the Mokau River, about twenty-three miles from the sea, the river being navigable right up to the mines for vessels of 7 ft. 6 in. draught. The coal is the best class of pitch-brown, and is excellent for household and steam purposes.

Ironsand is found in great abundance on the seashore from Mokau to Patea, a distance of 130 miles. It produces, when smelted, from 50 to 60 per cent. of iron of the finest quality. The first attempt to smelt this sand was made in 1848, and several trials have been made since, but the heavy cost of production and the absence of capital and modern appliances have, so far, retarded the industry. Strong efforts are now being made to remedy this by the introduction of outside capital, and it is hoped these will shortly be successful, and work in full swing.

*Petroleum.*—Another attempt at boring near the Breakwater, which has long been in progress (the company now conducting operations having decided to try until 2,000 ft. is reached), has been successful. Oil is now flowing.

*Agriculture.*—Agriculture has not hitherto been carried on to any great extent in this district. The total area under corn-crops during season 1904-5 was 7,941 acres; grass-crops cut for hay, chaff, or ensilage, 11,706 acres; sown grasses and clovers for feeding down, 860,207 acres; sown grasses for seed, 1,629 acres; potatoes, 1,113 acres; turnips, 11,947 acres; mangolds, 779 acres; rape, 2,220 acres; carrots, 653 acres; other crops, 176 acres: total area under crops of all kinds, including gardens, orchards, vineyards, 900,089 acres. Plantations, 1,029 acres; fallow, 216 acres; tussock, native grass, and unimproved land, 318,216 acres.

The average yield of different grain-crops in bushels per acre for season of 1904-5 was: Wheat, 32; oats, 43; barley, 43.

### HAWKE'S BAY LAND DISTRICT.

#### *Counties.*

The counties in the land district are Waiapu, Cook, Wairoa, Hawke's Bay, Waipawa, Woodville, and Patangata.

#### *General.*

This land district may be divided into two parts, the Gisborne division and the Hawke's Bay division, the two being connected by the Wairoa County.

The centre of the first of these is Gisborne, situated at the edge of a plain of about 50,000 acres, well peopled and well tilled. Here maize is a good crop, roots do very well, grass grows all the year round, and there is no better fruit country in New Zealand. The rest of the land consists of the spurs coming down from the Raukumara Range seawards, and the valleys between them. The land is now for the most part, both hillside and valley-bottom, covered largely with forest, and where the forest has been cleared a proportion of the country is found to be of the arable order; the rest is first-rate pastoral and dairy country. Of late years settlement has spread with great rapidity—a fact recorded in the increased output of meat and dairy-produce. A large quantity of the land is owned by the Natives.

The Wairoa County is very fine pastoral country. The climate is like that of the Gisborne division, hot in summer and mild in winter. Grass grows to perfection on the limestone hills. The whole of that part of the land district—in fact, from the East Cape to the southern boundary of the Wairoa County—carries lime, the formation being a papa marl, with limestone rock outcropping at intervals. The most famous part of this district is the Mohaka Valley, which ranks among the best pastoral country in New Zealand, with arable patches. Clyde, on the Wairoa, is the starting-place for the Waikaremoana trip. The lake, lying in a fold of the Huiairau Mountains, is one of the most picturesque in the colony. The wooded hills and the valleys of the many tributary streams are full of game; there is abundance of trout in the streams, and a fair share of good arable land adds to the attractions of a fine district.

The Napier country lies to the east of the Ruahines, between that range and the Pacific. In these ranges it is pastoral, and by the sea it is pastoral, the latter low hills originally of fern and sometimes of timber easily "broken in." A great proportion has been put in grass, which it carries in great luxuriance. These ranges make ideal country for the "freezer" and the fat lamb, and what they are for wool goes without saying. Among them there are many valleys, river-flats, and broad-topped spurs, arable and fertile—lands good for corn, green crops, roots, and fruit.

Between the central ranges of the Ruahine—which are, where free from forest, good sheep country, taking grass readily—and the Kaweka—a rough abrupt range—and the coast pastoral country, the district is a mixture of plains, downs, undulations, and hills. About Hastings, between Napier and Te Aute, you are in the centre of the Heretaunga Plain. It is rich, alluvial, fit for every cereal, more particularly barley; growing root and green crops, as well as grass, in great abundance; and fruit—the peach, the lime, and the grape doing particularly well.

A continuation southward of the Heretaunga Plain is the Ruataniwha Plain, somewhat larger, extending to and beyond Takapau. This has great stretches of alluvium. It rises in parts into undulating rolling country, and low hills are scattered about. The whole is freehold, embracing some of the finest and most extensive properties in New Zealand, with the largest and handsomest homesteads, surrounded by gardens, orchards, and plantations.

This description applies also to the Heretaunga country, whose only drawback is that between its northern rivers—Ngauroro and Tutaikui—between Hastings and Clive, in fact—it is at times troubled with inundation; but this will diminish as protective works are established. The settlements of Hatuma, Forest Gate, and others—properties resumed by the Government for closer settlement—are in this locality.

From the southern boundary of the Napier district the country, which is emerging from the old Seventy-mile Bush into settlement, is hilly and undulating, falling to the Ruataniwha in gradation of rough hill and smooth down, held for the most part in large areas—a rapidly progressive country. At the same time, there is a good deal of small settlement and much prosperity.

*Crown Lands.*—The land held by tenants of the Crown, of whom there are 1,199 in the district, under the various systems of tenure, amounts to 766,988 acres, and there remain about 224,836 acres not yet dealt with in any manner.

The latter is, for the most part, suitable for pastoral purposes only, any fit for agriculture lying in small, isolated spots, widely scattered, and such as could not be selected independently of the surrounding inferior land. Nearly the whole is broken forest country, fitted more for sheep than cattle, and having an average carrying-capacity, when cleared, of about one sheep to the acre, though the best of it might possibly carry from two to three. The land is chiefly in the Hangaroa, Koranga, Mangatoro, Norsewood, and Motu districts.

There are in all 173,000 acres available for future settlement, much of which, however, is broken forest country, difficult to road

Of this area 43,501 acres are at present open for selection, comprising for the greater part unsurveyed land under the optional system and pastoral runs. Suitable land with reasonable access is eagerly sought after and quickly disposed of.

*Native Lands.*—Of the Native lands in this district a considerable portion has been leased to Europeans, but there still remains in the hands of the Maoris a valuable estate, comprising both agricultural and pastoral country, including some 800,000 acres of excellent land. This land lies for the most part in the Waiapu County, towards the East Cape.

*Pastoral Industries.*—The value of the wool exported from the district during the twelve months ending the 30th June, 1904, was £775,537. In April of 1905 there were in the district 4,408,170 sheep, 220,116 head of cattle, and 32,676 horses. The extent of land in sown grasses is no less than 2,500,000 acres, while 2,000,000 acres more are in tussock or native grass. The continued increases year by year evidence the effect of increased settlement and the steady progress of the district.

*Agriculture.*—Agriculture is chiefly confined to the Heretaunga Plains, and the flat lands near Gisborne. The soil is favourable to root crops; potatoes range from 12 to 15 tons to the acre, and in some instances exceed this amount. Only a moderate quantity of grain is grown; barley, for which the soil seems well adapted, returning from 20 to 60 bushels of good sample to the acre.

*Fruit.*—The fruit-growing, preserving, packing, and export industries are assuming large proportions in this district, and are responsible for the profitable employment of a large number of persons of both sexes. Grape-growing and wine-making are also thriving, and quantities of locally made wine are appreciated by an increasing *clientele* of connoisseurs. The best known are the vineyards of Greenmeadows, planted by the late Mr. Tiffen; the Steinmetz Vineyard, the property of the well-known vigneron of that name; that of Meanee, kept by the fathers of the Marist Mission; Mr. Chambers's Te Mata Vineyard; and Mr. Williams's vineyard, of Frimley. These are all in the Hastings district, within easy reach of the town of the same name. In this district there is also the Government experimental farm of Wataki, where stocks of many varieties of grape are grown for table and for wine, and may be had by settlers at cheap rates. The American resistant stocks planted here have been found to grow better under ordinary climatic conditions than those grown in Australia with the help of irrigation.

*Meat Export.*—Freezing-works are established at Tomoana, Port Ahuriri, and Gisborne, and the export of frozen meat for the year ended 30th June, 1904, was as follows: Beef, 912 tons, valued at £22,800; 359,485 carcasses of mutton, valued at £271,656; 106,227 carcasses of lamb, valued at £69,047; preserved meats, 91 tons, valued at £4,550. The total of the exports shows an increase over previous year's figures—namely, £92,416—and instances the effect of increased settlement.

*Dairying.*—The development of the dairying industry has materially benefited the farming-class. Settlers have devoted their attention largely to dairying, with most profitable results, and lately factories have been established in the bush districts of Norsewood, Ormondville,

Maharahara, Woodville, &c., while several others are being built. At the last-mentioned town a cheese-factory has been in existence for some years, and turns out an excellent article, much sought after in other parts of the colony.

*Physical Features.*—The Ruahine Range extends northwards for about sixty miles from the Manawatu Gorge as far as the valley of the Ngaruroro River. Its altitude varies from 3,000 ft. to 6,000 ft., and for a considerable distance its summit is snow-clad during the winter months. The Kaweka, a lesser range, divided from the Ruahine by the Ngaruroro River, attains an altitude of 5,650 ft., is very rugged and steep, and a prominent feature in the landscape in winter, covered as it then is with snow. From these two ranges, which fall very abruptly on the Hawke's Bay side, the land slopes gradually to the sea, forming in some parts fine rolling hills—the essence of a sheep-country—in others extensive plains, with comparatively little poor soil. Northwards from the Kaweka there is a series of forest-clad ranges of varying height, stretching away in the direction of the East Cape. Hikurangi, the highest point, is a bold peak, with an elevation of 5,606 ft., rising so abruptly on all sides that the ascent can be made only at one point, and that with difficulty.

The only lake in the district of any extent is Waikaremoana, so justly famous for the magnificent scenery surrounding it. It lies about thirty-five miles inland of Wairoa (Clyde), and is eleven miles in length, with a breadth at the widest part of about eight miles. Nestled among precipitous mountain-ranges, forest-clad to the water's edge, with numerous bays and inlets, it has a natural beauty hardly to be surpassed.

#### WELLINGTON LAND DISTRICT.

##### *Counties.*

The counties of this district are Waitotara (part), Taupo West (part), Taupo East (part), Wanganui, Waimarino, Hawke's Bay (part), Featherston, Rangitikei, Kiwitea, Pohangina, Oroua, Kairanga, Horowhenua, Wairarapa South, Pahiatua, Eketahuna, Masterton, Akitio, Castle Point, and Mauriceville.

##### *General.*

Wellington is a progressive city, rapidly growing towards high rank of architectural beauty, situated on the shores of Port Nicholson—a really magnificent harbour. It is furnished with up-to-date shipping facilities, superior probably to anything in the rest of Australasia.

To all appearance this lack of flat ground in the capital of the colony is typical of the district of which it is the chief town. Wherever the eye turns from any of the commanding eminences that add the charm of prospect to the pleasures of life here, it fails to rest on anything but mountains. Nevertheless, though the mountains are evidently there, the appearance is, to some extent, deceptive.

For example, the Hutt River, which enters the harbour in the north-east corner of Port Nicholson, runs through a fine agricultural valley of some thirty miles, containing about 20,000 acres of arable land, and there are several tributaries, the chief of which are the two Akatarawas and the Whakitiikei, with flat ground in their valleys.

An appreciable proportion, moreover, of the low hills between the Hutt Valley and the Porirua country of the west coast is arable, as is the continuation Wellingtonwards of the same hills to Karori. About Porirua Harbour, and the hills around and further on, there is arable land, the greater part of the country, however, being used for grazing. These hills, like the tussock country of the Middle Island, were once covered with forest, and since the disappearance of the forest have demonstrated a wonderful capacity for carrying grass. They make a fine dairy country around Wellington.

Parallel with the Hutt Valley there is the Valley of the Wainuiomata, to the east, among the Orongorongo Spurs of the Rimutaka; and further on is the valley of the Orongorongo River, close to the watershed. The Tararuas carry this watershed north-east to the Manawatu Gorge. On the east the southernmost country is the Wairarapa Plains, some 200,000 acres in extent, a very large proportion of which is good alluvial soil, which grows cereals, roots, rape, clover, and turnips well, and carries stock admirably; sheep and dairy-cattle flourish equally well. The southern portion of the country is in possession of pastoralists, and in the northern the small farmer holds some of the land and is doing well with dairying. Eastward the coast country is pastoral right up to the Napier boundary; low hills of good English grasses, with large blocks of forest and scrub. The wild country in the south-east part of the district is the home of the red deer, so celebrated throughout the country.

West of the plain is the high Tararua country, with good sheep-country extending, with the aid of the sawmiller, into the rapidly "passing" forests. North to Woodville is the country of Eketahuna, Pahiatua, Ballance, and Newman, in which grass is growing among the *débris* of the disappearing forests. Stock, fruit, and grass will be its chief products until the last of the logs and stumps are got rid of; then the plough will run over an appreciable portion of the country. The Manawatu River drains this region, with the help of a large number of tributary streams, with picturesque and fairly open valleys. The towns in the heart of this country are in the transition stage and reveal the prosperity of the settlers. They are well laid out, and there are many fine buildings, denoting a high standard of comfort. The farms in the district are well placed and equipped. Make inquiries, and you will find people here of all professions doing well. There is, for instance, a settler here who was a college man and gave up a lucrative professorship to go farming, and finds that he is making a success of it.

On the west of the Tararua Mountains and north of the Wellington Peninsula the western plain begins at Paekakariki and ends at Wanganui, attaining its greatest width at the Manawatu Gorge, where the Ruahine Ranges carry the watershed northwards from the Tararuas towards the East Cape. The plain sweeps thence round to Wanganui, receiving on the way the valleys of the Manawatu, Pohangina, Kiwitea, Rangitikei, Turakina, and Wangaehu. The land is rich; it was once covered with forest, and now carries grass in splendid profusion. It grows stock in perfection, green crops flourish greatly, and there are breadths fit for cereal cultivation. There is no more fertile country in New Zealand. It is held in fairly small holdings, with a large proportion of more extensive properties. The homesteads of these, with

their plantations, give the country a resemblance to the best parts of the Canterbury Plain. Getting up the valleys of the rivers towards the interior the settlement gets newer and newer, up to the axemen who are hewing their way into the forests. From the comfort of the coast one passes in a few hours to the higher and colder country inland, but this country is much the same as the west coast. It takes grass rapidly after the felled forest is burnt, and fattens stock quickly. Holdings being necessarily large, the cottages of the pioneers are far apart, but they make a brave show for the most part among the ruins of the woods. The stranger travelling the roads and seeing endless profusion of blackened logs, paddocks wire-enclosed, and paddocks in rougher fencing, is apt to feel depressed until he reaches the comfort in the wayside towns, and sees the country people coming in and out, and the sturdy rosy children in the schools. This new settlement has reached the Murimotu Plains, and is making headway towards the Waimarino Forest on one side and the back country of Napier in the Kaimanawa Range country on the other.

Beyond Wanganui is another fine stretch of country as far as Hawera—low, fertile, arable for a certain breadth along the coast, with great scope inland up the valleys of the Waitotara and the Patea Rivers. The coast lands, especially the great Brunswick plateau, are very fertile, and dotted over with the best signs of settlement. The land grows turnips and potatoes and the finest grass, with cereal average of 32 for wheat and 45 for oats. Inland the hills are in process of being broken in, with excellent results, by hardy settlers, who have found out the secret of the forests which give way so readily to grass and profitable stock farming. This settlement is progressing north to meet the pioneer settlement fighting its way from the Taranaki side westwards.

*Boundaries.*—The Wellington Land District is bounded on the north by the District of Auckland, on the west by that of Taranaki, on the east by the Hawke's Bay District to the sea, and on the south and south-west by Cook Strait. The area contained within these limits is about 6,810,958 acres. It lies between the parallels of 39° and 41° 30' south latitude; its greatest length north and south is about 180 miles, and its mean width east and west about sixty miles. (See map.)

*General Physical Features.*—The district is divided into two well-defined parts by a mountain range, which forms part of the backbone of the North Island. At its northern end this range—there known by the name of Ruahine, and averaging a height of about 4,000 ft.—divides Wellington from Hawke's Bay; but after passing the point where it is intersected by the Manawatu River, the range takes the name of Tararua for many miles, until, at about forty miles from the termination on the shores of Cook Strait, it divides into two main ranges, known respectively under the general names of Rimutaka and Tararua, both ranges averaging from 2,500 ft. to 3,500 ft. in height, the highest point being 5,154 ft. Parallel to the main range, and divided from it by the Wairarapa Plain and the undulating country to the north, is a series of ranges at a few miles inland from the east coast, known as the Puketoi, Taipo, Maungaraki, and Hau-rangi Ranges. Lying on the northern border of the district are the Kaimanawa Ranges, for the most part open and grass-covered, rising

to a mean height of about 4,500 ft. Westward from the latter mountains, and divided from them by a deep, broad valley, in which flow the Waikato and Wangaehu Rivers, is the volcanic chain of mountains containing Ruapehu, 9,008 ft., and Ngauruhoe, an active volcano, 7,515 ft. high. The long sweeping curve of Cook Strait, forming the south-western limit of the district, is bordered, from the Patea River to within thirty miles of Wellington, by a comparatively level and undulating country, now nearly all under cultivation, having an average width of about fifteen miles. This is one of the finest parts of the colony, and is celebrated for its stock-raising capabilities. It was originally in a great measure open, though the southern part, where the plain is narrowed in between the sea and the Tararua Range, has a good deal of forest on it, now fast disappearing under the axe of the settler.

Inland of this coastal plain, at varying distances from the sea, the country gradually rises to a mean height of about 1,500 ft. to 1,800 ft., and becomes a good deal broken in character. It was originally forest-clad almost throughout. It is much cut up by rivers and streams flowing from the interior to the sea, of which the principal, commencing from the north, are these: The Waitotara, the Wanganui, the Wangachū, the Rangitikei, the Oroua, the Pohangina, and the Manawatu, which last, after leaving the gorge in the Ruahine Ranges, runs through level land to its mouth in Cook Strait. This broken country, being everywhere composed of papa, or marly formation, which takes grass excellently, promises in the near future to be a large sheep-carrying district.

At about fifteen miles south of the volcanic peaks of Ruapehu Mountain the papa country terminates in a fairly well-marked escarpment, giving place to a more level and undulating country formed of volcanic matter, the greater portion of which is forest-clad, though on the south-east, east, and west sides of that mountain there are open grassy plains, of no great fertility, but yet suited to pastoral pursuits.

To the eastward of the main range formed by the Rimutaka and Tararua Ranges is the great depression known at its southern end as the Wairarapa Plain, which gradually rises northwards from the lake of that name into wooded, somewhat broken country, of no great height, at a distance of some forty-five miles from the sea. From here the country falls again slightly to the Upper Manawatu River, the depression in this part being marked by the extensive flats in the neighbourhood of Pahiatua, and by the shallow valleys of the Mangahao, Mangatainoko, and Tiraumea Rivers and their branches. For thirty miles from the sea this great valley is mostly open, with patches of forest here and there, but becomes more plentifully wooded at the base of the Rimutaka and Tararua Ranges. The quality of the soil varies from light and stony on the Wairarapa Plains proper to rich papa country as the northern end is approached. The southern end of this country is watered by the Ruamahanga River and its tributaries. Generally the district is a pastoral one, though agriculture is also pursued successfully. The neighbourhood of the Puketoi Ranges is in many places composed of limestone, and promises in the future to become a very rich pastoral district, such as will support a considerable population. In the forks formed by the Tararua and



Rimutaka Ranges the Hutt River takes its rise, and runs in a southerly direction through an undulating or level country, finally falling into Port Nicholson. The valley contains some very fine land, generally held in small holdings.

*Plains.*—The two most important of these have already been mentioned. On the eastern side of the main range the Wairarapa extends northward from the lake of that name for about forty-seven miles, with an average width of about nine miles. In some parts, especially on the flats along the Ruamahanga River, the soil is alluvial and rich; in others, though stony and unfit for cultivation, it is nevertheless grassed, and carries stock well in the winter and rainy seasons. The plain is watered by the Waikihine, Waingawa, and Ruamahanga Rivers, and contains altogether about 200,000 acres, much of which is good agricultural land. On the other side of the district, west of the Tararua and Ruahine Ranges, there is a large block of land so nearly level that it may be called a plain, extending from Paekakariki (twenty-seven miles from Wellington) to Marton (a few miles north of the Rangitikei River), and contains about half a million acres. Starting as a narrow strip between the hills and the sea, the plain widens out by degrees until at Feilding it is at least twenty miles in breadth. Along the beach runs a fringe of sandhills, but behind this is to be found some of the best farming and grazing land in the colony. There are two plains inland—Murimotu and Waimarino—both lying some 2,200 ft. above sea-level, in the neighbourhood of Mount Ruapehu, the former to the south and the latter to the north-west of the mountain. The soil is covered with a coarse native tussock, and, though capable of carrying stock, is of a light porous nature, and cannot be classed as agricultural land.

*Rivers.*—First among these is the Wanganui, with a length of 136 miles from its source, near Mount Tongariro, to its outlet. The Manawatu is next in importance. Rising in the Ruahine Range, it flows through the picturesque Manawatu Gorge, joining the sea at the Port of Foxton. The Rangitikei, the third in size, rises in the Ruahine Mountains, and flows through the Awarua country, where it is joined by the Hautapu and other large tributaries. After a course of over a hundred miles it reaches the sea some little distance below the Township of Bull's, on the west coast. Lesser rivers on the west coast are the Waitotara (north of Wanganui), the Wangaeahu (which takes its rise in Mount Ruapehu, and from its source to its mouth is so strongly impregnated with sulphur that fish cannot live in it), the Turakina, and the Otaki. The only other rivers of any size are the Hutt (Heretaunga), emptying itself into the Wellington Harbour; the Ruamahanga, flowing through the Wairarapa Valley and lakes into Palliser Bay; and on the east coast the Pahaoa, Aohanga, and Akitio.

*Lakes.*—The only lake of any size in the Wellington District is the Wairarapa, lying between the Rimutaka and Haurangi Ranges, towards the southern end of the Wairarapa Valley. It is about twelve miles long and four broad, and is connected by the Ruamahanga River with Onoke, a small lake separated from Palliser Bay by a narrow shingle spit only. A passage through the spit is opened from time to time when the lake rises above its natural level and overflows the low-lying flats along its margin. Water-fowl of every kind—

among them numbers of black swans—are to be found round about these lakes.

*Scenery.*—The views obtained from the railway-line in the ascent and descent of the Rimutaka Range are among the best in the neighbourhood of Wellington, and the road through the Forty-mile Bush was long considered one of the most beautiful drives in the North Island; but its beauty has been diminished by the felling of the bush consequent on the increase of settlement. The same may be said of the Manawatu Gorge, famed in the old coaching-days for its lovely scenery, but now sadly marred by the construction of the railway-line. The most beautiful drive now left is through the Awarua Bush, from Ohangaiti to Moawhango. From this road, as it winds round the spurs, most charming glimpses are obtained of the Rangitikei River and the blue hills beyond, and at other points the traveller looks up deep ravines where the graceful fern-tree stands out in bright relief against the dark green of the native bush. Another road from Pipiriki, on the Wanganui River, to the Murimotu Plain traverses one of the most magnificent forests in the North Island. Here the bushman's axe has felled only the timber standing on the road-line, and the track runs beneath the shade of the largest and stateliest maire and rimu known. Beautiful as these drives are, the scenery on the Wanganui River is still more lovely. A few miles below Taumarunui the river enters a series of gorges, shut in by high, precipitous cliffs. Sometimes the canoe glides gently through quiet reaches, sometimes shoots rapids which make the traveller hold his breath till they are passed, and then again traverses places where the water is ever in turmoil, boiling and eddying in whirlpools, taxing the energies of the most skilful Native steersman, and testing the nerve of the most courageous tourist. These experiences, with the views obtained of the banks, densely wooded even where the papa rock rises almost straight from the water's edge, make the eighty miles journey from Taumarunui to Pipiriki an event not easily effaced from the memory. Between Pipiriki and Wanganui excellent steamers are now running, so that the beauties of the lower part of the river may be seen by all without trouble or discomfort. In summer-time a launch goes as far as Taumarunui.

*Forests.*—The Wellington District is essentially a forest country, for out of the 6,810,958 acres contained within its borders about 3,000,000 are still under bush. By far the largest forest is the Waimarino, having an area of at least three-quarter million acres, a large portion of it being nearly level land, containing timber, principally totara, maire, matai, rimu, and other pines. This forest is as yet hardly touched, though timber is being cut at Raetihi for the settlers now making their homes in the neighbourhood. The distance from the settled districts to any port will render the timber in this part useless as a marketable commodity until the country is opened up by the Auckland Main Trunk Railway now in course of construction.

There is a large extent of bush land, drained by the Turakina, Mangamahu, and Wangaehu Rivers, extending up to the Wanganui River, and containing about 300,000 acres. Very little of this, from its inaccessibility, will be utilised for sawmilling purposes, but a great deal of it, together with a further block of 230,000 acres on the west

side of the Wanganui River, will be cleared by the settlers and sown down with grass. A further block of about 100,000 acres of forest land lies in the Pohangina Valley and on the slopes of the Ruahine Range. A large portion of this has been taken up and is now being settled.

The forest land on the west coast extends from Pukerua to the Manawatu Gorge, on the west side of the Tararua Range, and contains an area of about 300,000 acres, the bulk of it being fit only for turning into pasture. The most available part of it, alongside the Wellington-Manawatu Railway, is being extensively cut into by sawmillers at Levin and other places on the line.

After this in size is the forest on the eastern slopes of the Tararua Ranges, extending from Featherston to the Manawatu Gorge, which includes what remains of the well-known Forty-mile Bush, containing probably about 175,000 acres. Portion of this area is being quickly denuded of timber by the sawmills established at Pahiatua, Newman, Hukarua, Eketahuna, and by settlers. A tract of about 50,000 acres lying to the east of the Puketoi Range cannot be utilised for milling purposes, as it is not tapped by any branch railway-line, and its distance from the main line would probably render the business unprofitable, except for local purposes. Nor are there any suitable ports along the coast where timber could be shipped.

The other forests are, one near Lake Taupo, and the Haurangi Forest on the east side of the Wairarapa Lake. These consist for the most part of birch-covered hills, and cannot be considered as valuable for milling purposes.

*Soil.*—It may be said that the Wellington Land District contains within its borders a greater quantity of good land than any other in the North Island, very little, except the mountain-tops, being unfitted for use, while some of it is of very superior quality, suited for the growth of the productions of every temperate climate. As much of it is still forest-clad, settlers must look forward to having to make their farms by felling and burning the bush before grass can be sown, and, as it takes from ten to fifteen years before the plough can be used in bush land, grazing, for which the climate and soil is admirably adapted, will be the principal industry for some time to come. It is generally calculated that the cost of felling and burning ordinary bush varies from £1 5s. to £1 15s. an acre. To this must be added about £1 for seed and fencing. It is no uncommon thing for a return to be received at from twelve to eighteen months after felling. The usual practice is to put sheep on to the new lands soon after the grass has obtained a good hold. The process of improving the lands by the gradual "logging-up" and burning of the fallen tree-trunks is a long one, but it pays in the end, for in this way fine pasture-lands are obtained on the hills, and agricultural lands on the flats.

*Climate.*—The climate of Wellington District is healthy and mild, the mean annual temperature (in the city) being 55·4, whilst the mean rainfall is 48·49 in. per annum. The rainfall differs, however, according to locality. Inland and near the ranges it is much greater. The top of Ruapehu Mountain is covered with perpetual snow, which lies also on the tops of Kaimanawa, Ruahine, and Tararua in the winter. Frosts are heavy in the interior.

*Harbours and Ports.*—The coasts of Wellington are not so well

supplied in this respect as are some other parts of the colony; but what is lost in number is made up in a great measure by the excellence of the chief haven—Port Nicholson—which, from the position it occupies, at the meeting-point, as it were, of the coastal traffic of both Islands, and from its sheltered position and depth of water, may be considered one of the most convenient harbours in the world. The Wanganui River, which has been considerably improved by artificial means, is the second port in the district, and has a considerable trade carried on by coastal steamers. The Patea and Manawatu Rivers are also used by coastal steamers, whilst several other inlets along the shore afford shelter and stopping-places, according to the direction of the wind. The extension of railways along both coasts has, in a large measure, done away with the inconveniences arising from want of harbours.

*Pastoral and Agricultural Industries.*—The pastoral ~~and~~ <sup>is</sup> by far the more important, the total area in grass in 1905 being 1,495,012 acres, as compared with 98,111 acres under crop, garden, or orchard. Of the area in crop, 7,371 acres were in wheat, 18,518 in oats, and 45,832 acres in turnips or rape, the rest being in potatoes or other crops.

The following figures will show the average return per acre of grain for the year 1905: Wheat, 31·38 bushels; oats, 35·51 bushels; barley, 39·92 bushels.

The area in sown grass now exceeds that in any other district in the colony, though the area under crop is very small as compared with either the Otago or Canterbury Districts. In April, 1904, there were 3,682,888 sheep; and in October, 1904, the cattle numbered 386,481, and horses 52,430. The total area in gardens is given as 2,251 acres; in orchards, 3,651 acres; and in plantations, 4,544 acres.

*Dairy Industry.*—Both soil and climate are well adapted for the production of butter and cheese, and hence we find creameries and butter-factories increasing in number very considerably each year, and the export constantly augmenting.

Forty-six butter and cheese factories were returned in September, 1904, as at work in the Wellington Provincial District.

*Phormium Tenax.*—The principal flax-mills working are at Featherston, Carterton, and Martinborough, in the Wairarapa, and at Waikanae, Shannon, and Foxton on the west coast. This industry fluctuates greatly, in accordance with the price ruling for the dressed article. In 1901 twenty-five mills were at work, employing 580 men and 25 boys; the machines driven by water-wheel or engine working up to 365-horse power.

*Timber Industry.*—Sawmills are to be found in different parts of the district where the means of communication are sufficient, the timbers cut being principally totara and red-pine (rimu), both of which are largely used in house-construction and other works. Others of the native woods are very beautiful, but are utilised only to a small extent. The principal mills are at Pahiatua, Eketahuna, Masterton, and Carterton, in the Forty-mile Bush and Wairarapa districts, and at Otaki, Waikanae, Shannon, and Levin on the west coast, besides which there are several mills in Wellington for dressing the rough material. In the whole district there were in 1901 sixty-six mills, of an aggregate of 1,114-horse power, engaged in this industry, employing 1,114 hands, the output of sawn timber being 41,375,471 ft., and the total value,

including posts and rails, resawn timber, doors, sashes, &c., £210,589, which, next to Auckland, is the highest for any provincial district in the colony.

<sup>14</sup> *Miscellaneous Industries.*—The numbers of the other principal industries in this provincial district, as given in census, 1901, were as follow: Meat freezing and preserving works, 5; ham and bacon curing establishments, 3; fish-curing works, 4; grain-mills, 8; sugar-boiling and confectionery works, 4; breweries, 10; aerated-water factories, 24; sauce and pickle factories, 5; soap and candle works, 4; cooperages, 4; woodware-factories, 5; gasworks, 6; brick, tile, and pottery works, 18; tinware-factories, 13; iron and brass foundries, 13; printing-offices, 40; basket and perambulator factories, 6; coachbuilding and painting works, 44; cycle-factories, 10; saddlery and harness factories, 29; tanning, fellmongering, &c., establishments, 14; sail and oilskin factories, 4; furniture and cabinetmaking, 36; tailoring establishments, 67; dressmaking and millinery, 78; shirt-making, 7; boot and shoe factories, 24.

#### MARLBOROUGH LAND DISTRICT.

##### *Counties.*

The counties of this district are: Sounds, Marlborough, and Kaikoura.

##### *General.*

The features of the district are many. They are, first, from the scenic point of view, the Sounds, and the mountain systems of St. Arnaud and Kaikoura. Besides these there are the interesting Kaikoura Peninsula; the coast country, with the valleys of the Clarence and the Awatere opening out into it; and the Wairau Plain. The latter is very rich, and well settled round about Blenheim. To the southward it sweeps into the fertile country of downs and terraces and flats and small river-bottoms, which extend to Cape Campbell and Flaxbourne, by the Seddon, Starborough, and Blind River country.

The Sounds—Queen Charlotte and Pelorus—are picturesque, with five hundred miles of inland coast-line. Their shores are not like the shores in the more famous south-western Sounds, exclusively those of the fiord, precipitous and sheer. On the contrary, they are often hills of gentle slope, of which the highest example is Mount Stokes, 3,951 ft., descending into many saddles not far above sea-level. These hills were once thickly forested, and at present they still maintain some sawmills; but the forest is greatly reduced, and the hills have, by reason of their capacity of carrying grass, their warmth of shelter, and the geniality of their climate, long since demonstrated their valuable pastoral character.

<sup>15</sup> Picton, in Queen Charlotte Sound, is the port of export for the district, with depth for all possible requirements of ocean service. Havelock is the central township of the Pelorus. Several pleasant valleys, of which the valley of the Pelorus River and its tributary the Rai are the largest, lead into Pelorus Sound, with fine proportion of arable land.

The St. Arnaud Range, which forms the western boundary of the district and descends to the Sounds, losing itself in their hilly eccentrici-

ties, is the northern continuation of the Southern Alps. Its offshoots form the northern boundary of the big Wairau Plain, which is separated from the valley of the Awatere by the Mount Olympus and other ranges, offshoots of the Inland Kaikouras. The Wairau Plain is a fine piece of agricultural country, surrounded, except on the south-east corner, by a fine sheep country, not too high, the tussock hills descending into the plain. These hills have been divided since the earliest days of colonisation into pastoral runs. The plain is fertile, and grows cereals remarkably well, especially barley, the barley of Marlborough holding easily pride of place in New Zealand. Roots give high yields; there is no better country for sheep-fattening; dairy-farming is very successful, and fruit does very well. The homesteads of the sheep-farmer—house, garden, woolshed, huts, clumps of timber—are to be seen on the Wairau and in the valleys of its tributaries. Further down, where the plain broadens, are all the signs of close farm-settlement—homesteads, barns, cultivated fields, clumps of timber, live hedges: these reach up to the Town of Blenheim.

Further south the two big ranges of the Inland and Seaward Kaikouras, the former rising to over 9,000 ft., are purely pastoral, the best of the runs being in the lower hills, descending into the Awatere and the Clarence Rivers.

The Clarence and the Awatere Valleys, opening out from the mountain system, show promising glimpses of arable land further on. Flaxbourne Settlement has produced good yields on some of its pleasant flats and downs. These make an ideal pastoral country, with arable uplands and valleys—a country lying well to the sun, and sheltered from the prevailing winds of the region. This country lies about midway between the Clarence and the Awatere.

Between Flaxbourne and the Town of Seddon is a cluster of excellent settlements comprising good flats, cultivated fertile slopes, with homesteads, &c. Here are the Settlements of Starborough, Blind River, and half a dozen others, guaranteeing this fine district future prosperity.

North of Seddon lies the rich agricultural country, the culmination of the Wairau Plain. Some miles south lies the Kaikoura Peninsula, with its mild, equable climate, under the shelter of the hills; its 20,000 acres of most fertile soil; its forests, fast disappearing; and its 300,000 acres of open pastoral hills and warm valleys—amongst the best of sheep country—which bring the spurs of the Spenser Range past the Wairau down to the sea. All this country is old-established pastorally and agriculturally.

*Physical Features.*—The district throughout is generally mountainous, but none even of the highest peaks are covered with perpetual snow, although Tapuaenuku, the highest of the Inland Kaikouras, attains an altitude of 9,462 ft. Of the Seaward Kaikouras, or Looker-on Mountains, the highest points are Kaitarau and Whakari, which are 8,700 ft. and 8,500 ft. respectively. There are several lesser peaks, from 4,000 ft. upwards.

The view from Kahautara Bluff, south of Kaikoura Settlement, looking northwards, when the Looker-on Mountains are snow-capped, is said to be one of the finest in New Zealand.

Geologically, the district may be briefly described as follows: North of the Wairau River the rocks belong chiefly to the Upper

and Lower Devonian series, with a belt of Silurian between them, embracing the country along the west of Queen Charlotte Sound to Cook Strait. Within these series auriferous deposits are found, and at present worked at Mahakipawa, Wakamarina, and Wairau Valley. In Endeavour Inlet an antimony-mine was worked for some time; but operations have been discontinued and the machinery removed. The country south of the Wairau River may be said to belong chiefly to the Carboniferous Age, with patches, along the coast and up the Clarence Valley, of Cretaceo-Tertiary and Lower Greensand formations; while along and between the Awatere and Clarence Rivers volcanic formation and numerous intrusive dykes occur. The Red Hills, also, at the head of the Wairau Valley, are of volcanic origin.

Coal has been discovered in the neighbourhood of Picton, and in the Clarence Valley, but none has been as yet successfully worked within the district. A narrow belt of Tertiary limestone, suitable for building purposes, extends, with small interruptions, from Cape Campbell to the boundary of the Canterbury Provincial District.

The Marlborough land may be divided into three classes: Open land, generally covered with associated grasses; forest land; and intermediate, or land partly forest, partly covered with scrub, fern, or other rank vegetation. This original condition of the soil naturally gave rise to a localisation of industries, and a very unequal distribution of settlement. Thus the open country was taken up for pastoral purposes; in the forest country the timber industry was developed, and the intermediate land passed into the hands of farmers. Though agriculture is now extending into the pastoral and forest country, and considerable areas of forest land have been cleared and laid down in grass, the portions of the district characterized by these respective industries are still well defined.

In the northern part of the district, bounded by Cook Strait, numerous deep fiords and bays run far into the land. The principal of these are Pelorus and Queen Charlotte Sounds, Tory Channel, Port Underwood, and Port Gore. These Sounds are very picturesque, but the hills surrounding them are not so rugged and precipitous as are those of the thirteen celebrated Sounds on the west coast of Otago and Southland.

Though generally steep, the land is not too rough to be used for pastoral purposes, and nearly all the land in the Sounds is occupied by thriving settlers.

Pelorus Sound, the most extensive and picturesque, is thirty-four miles long following the course of the main channel, with the Town of Havelock at its head. There are many bays and inlets branching off in all directions; the largest of these is Kenepuru Sound, fourteen miles long. Pelorus Sound, including its branches, has a shore-line of over three hundred miles in length, not counting islands.

Queen Charlotte Sound is the next in length, being thirty miles from its entrance to its head; it also has many bays and inlets, one of which is Picton Harbour, twenty-five miles from the entrance.

Tory Channel is ten miles long, and forms the most direct line of communication between Picton and Wellington. The distance from Wellington Wharf to the entrance of Tory Channel is about forty miles, and about twenty more to Picton.

The shore-line of Queen Charlotte Sound and Tory Channel is over

two hundred miles in length. The entrance of Queen Charlotte Sound is about twenty miles distant from that of Pelorus Sound, and this latter is about twelve miles from the French Pass. Generally there is deep water in all the Sounds and bays, and good anchorage can be found near the shore. The country is hilly everywhere in the neighbourhood of the Sounds, the highest point being Mount Stokes, 3,951 ft. above sea-level.

*Rivers.*—Four considerable rivers—the Wairau, Awatere, Clarence, and Conway—rise towards the western boundary of the district; the two former, running north-east, fall into Cook Strait; the two latter, taking a southerly and easterly course, discharge into the sea on the eastern side of the Island. These rivers water large and fertile valleys; but none can be entered by vessels except the Wairau, which is navigable for small steamers for about twelve miles from its mouth.

*Plains.*—The Wairau Plain, containing about 65,000 acres, on which stands Blenheim, the capital of Marlborough, is the principal block of agricultural land within the district. The soil, generally good, is, on the lower or seaward side of the plain, extremely fertile, especially in the neighbourhood of Tuamarina, Spring Creek, and near Blenheim, which is surrounded by numerous gardens, with rich deep mould, and well sheltered with trees. The average yield of wheat for the plain is about 25 bushels per acre; of oats and barley, 35; of peas, 30; and of potatoes, 10 tons per acre. Hops have been successfully grown for many years in the neighbourhood of the town, but, owing to the high price of labour, their cultivation has not extended. The plain, traversed in all directions by good metalled roads, and dotted over with numerous comfortable homesteads, standing in clumps of trees amidst well-cultivated fields, has already an Old-World appearance. Besides the Wairau plain there are several thousand acres of terrace flats and valleys along the larger rivers, notably at Starborough, on the Lower Awatere.

*Lakes.*—There are not any lakes worthy the name. The largest is Kapara te Hau, more familiarly known as Grassmere, situate on the coast between the Awatere River and Cape Campbell. It is about three miles in diameter, and very shallow, being, indeed, no more than a lagoon, as during a dry season there is little or no water in it. There are two other lakes of small size—viz., Lake Elterwater, four miles south of Lake Grassmere; and Lake McRae, situate in the open country between the Awatere and the Clarence Rivers.

*Forests.*—The portion of Marlborough north-west of the Wairau River, extending to the boundary of Nelson Land District, and including the County of Sounds, in all about 280,000 acres, was originally covered with dense forest. In the valleys, and on the lower hill-slopes, rimu, kahikatea, matai, totara, miro, and tawa were the principal forest-trees. The higher portions of the hills and steep spurs are clothed with the various species and variety of birch (beech), to which along the shores of the Sounds were added pukatea and kohekohe, the latter locally called cedar.

Since 1860 sawmills have been at work in various parts of the district. Thirty-two mills have been erected, and have worked for longer or shorter periods. Havelock, on the Pelorus Sound, is at present the headquarters of the timber trade.

The hills along the shores of the Sound will for many years fur-



nish birch sleepers. There are other timbers left in places, but hardly sufficient to justify the erection of mills, unless pukatea wood, hitherto neglected, could be utilised. It is a light, tough timber, well adapted for boat-building and for packing-cases. The quantity of pine timber remaining in the Kaituna and Onamalutu Valleys is small, but there is a good supply of birch and other wood, suitable for fencing and firewood. On these valleys the Wairau Plain is mainly dependent for timber.

The Pelorus Valley, with its tributaries the Wakamarina, Rai, Ronga, and Opouri Valleys, still contains about 300,000,000 ft. of convertible timbers, exclusive of the birch, of which there is a large amount of the best quality on the hills and terraces. The Wairau, Blenheim, and other districts extending southwards must depend for the future on this source for all their building-material.

In the neighbourhood of Kaikoura, along the base of Mount Fyffe, and in the Hapuku Valley, there is another small block of forest land, in which three small sawmills have been erected. The quantity of timber suitable for sawmill purposes in this block is very limited, but it will furnish the neighbouring country with firewood and fencing for many years.

*Soils and their Uses.*—The Wairau Plain, which is the principal block of agricultural land, has been already dealt with. The second agricultural centre is in the neighbourhood of Kaikoura. The land extending along the base of Mount Fyffe, between the Kohai and Hapuku Rivers, about 13,000 acres in extent, is held in small or moderate-sized farms; the soil is good, the block known as “the Swamp,” between Mount Fyffe and the Peninsula, being particularly rich. In the Pelorus, Kaituna, and Onamalutu Valleys, and in the Sounds, settlers following in the wake of the sawmills have already converted much of the land worked over into grazing-farms. The land is of three descriptions—alluvial flats, terraces, and hill-sides. On the flats in the larger valleys the soil is rich, producing heavy crops of oats, peas, beans, and potatoes, wherever it has been brought into cultivation. The terrace-land varies much in quality, but generally grows good grass, as do also the hills on which tawa formerly grew; the birch country being very barren. On the small bush farms cattle-grazing is the chief pursuit. Out of 17,900 head kept in Marlborough, 4,300 belong to the forest country.

*Grazing.*—About 1,680,000 acres of the Marlborough Land District are at present devoted to keeping sheep. The leaseholds in the northern parts of the district contain a large extent of scrub and fern-covered country, now producing little or no food for sheep, but capable of improvement. The total number of sheep depastured is 811,828, distributed as follows amongst the counties into which the land district is divided: Marlborough County, 480,777; Sounds County, 159,183; Kaikoura County, 171,868. On the natural pasture of the open country merino sheep are kept almost exclusively, the land carrying from half to one sheep per acre. In the forest country, on sown grass, the land keeps from two to four crossbred sheep per acre. Along the shores of the Sounds large areas of hill land have been taken up on lease, and are now being cleared and laid down in grass expressly for keeping sheep; but generally throughout the forest country the holdings are small.

*Industries.*—Gold-mining once flourished at many places in this district, chiefly Mahakipawa, Wakamarina, and Wairau Valley. At present the industry languishes somewhat.

Seventeen sawmills are at work within the district: two at Kaikoura, and the others in the Pelorus, Kaituna, Onamalutu, and Wakamarina Valleys, and in the Pelorus and Queen Charlotte Sounds, the total output being about 9,500,000 ft. The principal one is Messrs. Brownlee and Co.'s, in the Pelorus Valley, their tramway being some fifteen miles long, the output last year being about 3,252,000 ft. Messrs. Brownlee and Co. have sixty men employed, and keep two vessels running between Havelock and Lyttelton.

During the year the Phormium industry employed eleven mills, and the quantity of fibre shipped was 4,400 bales and 2,500 bales tow.

There is a dairy factory at Spring Creek, which contains all the latest improvements in machinery; 18 tons of butter were produced in 1904.

There is a first-class cheese-factory at Tuamarina. Last season 65 tons were turned out. There are also cheese-factories at Kaikoura and Havelock. The latter had an output of 52 tons, and that at Kaikoura 106 tons.

There are three flour-mills in the district.

*Climate.*—Marlborough possesses one of the finest climates in the world; and at Blenheim it is fine weather nearly all the year round. There is almost a total absence of boisterous winds.

The original distribution of the open and forest lands was entirely due to climatic causes. At Cape Campbell, one of the barest places in the district, the annual rainfall is only 23·25 in.; in the Pelorus Valley, the centre of the forest country, it is over 65 in. This difference between the climates of the north-western and south-eastern portions of the district explains why the artificial pasture land, when compared with the natural pasture, supports such a large amount of stock. Winter and spring are the wettest seasons, hence the dry climate is not unfavourable for agriculture. Wherever the soil is suitable, crops sown in winter and harvested in early summer can be successfully grown. Everywhere near the coast the range of temperature, considering the latitude, is very small. The thermometer seldom falls below 30°, or rises above 78°. Along the shores of the Sounds the mildness of the winter, owing to the curious distribution of land and water, allows lemons, oranges, passion-fruit, figs, and other sub-tropical fruits to be grown in favourable situations. On the lower hills and terraces of the forest country the chestnut (*Castanea vulgaris*) grows rapidly, and commences to bear fruit in five or six years. A few trees planted in the Pelorus Valley some twenty years ago are now yielding annually about 2 cwt. of nuts a tree. In all parts of the low country the common English fruit-trees—apple, plum, pear, cherry, &c.—yield abundantly, the fruit, owing to the clearness of the atmosphere, being of excellent quality. In the high country, where snow falls occasionally during winter, red, white, and black currants can be produced in such quantities that with little labour they might be made an article of export to the warmer parts of Australia.

Taking the climate by counties, it can be said generally that in the Sounds County the climate is mild, the range of temperature being moderate, seldom exceeding 70° in summer or falling below 31° in winter. Rainfall is copious, well distributed throughout the year.

For Marlborough County the records show it to be clear, dry, and extremely healthy in the centre and southern parts of the county, the thermometer ranging from 30° to 80° Fahr. Rainy winds are south-east and south-west. The northern portion (north of the Wairau River) has a greater rainfall, the hills drawing the moisture-laden winds which blow up from the Tasman Sea and South Pacific Ocean through Cook Strait.

For Kaikoura County the summary is: Moist and mild. Mean maximum temperature for summer (1st October to 31st March for last year) = 67°; mean minimum temperature for winter (1st April to 30th September for last year) = 37°; maximum summer, 90°; minimum winter, 21°; mean range, 33°. Rainfall: Total for 1899 = 38 in. Maximum for one day was 1·90 in. Rained 131 days.

#### NELSON LAND DISTRICT.

##### *Counties.*

The counties of the district are Waimea, Takaka, Collingwood, Buller, and Inangahua.

*General.*—Nelson has a limited extent of exceptionally rich agricultural country, a great extent of hill pastures, and a very large diversity of mineral resources. There is much forest on its mountain-sides.

The backbone of the Middle Island, the Southern Alps—here known as the Spenser and the St. Arnaud Mountains—divide the district from Canterbury and Marlborough. From Tophouse, in the St. Arnaud Range, a range forks away to the Lyall Range, which reaches the Tasman Sea between Waimangaroa and Ngakawau. This forms the northern boundary of the Buller Valley. The southern is furnished by the ranges thrown off seawards in apparently tumultuous fashion from the Spenser Range. In these is the source of the Grey River, and also many others.

From Mount Owen the Mount Arthur Range forks towards Cape Farewell, dividing the eastern and western watersheds of the northern part of the district. Under the shelter of this range the country lies warm and pleasant on the shores of two bays. It is divided into sections by several ranges running to the sea, dividing the valleys of the Motueka, Anatoki, Takaka, and other rivers. There is, in the Waimea County and in the valleys of the Motueka and other streams, some magnificent agricultural soil, and the same may be said of the valleys further north of the Takaka, the Anatoki, and the Aorere. This agricultural country grows cereals, roots, and fruits in perfection; the hop flourishes, and the vine, and other fruits of southern Europe. On the western watershed, north of the Buller River, the best agricultural areas are on the West Wanganui Inlet, and the valleys of the Heaphy and the Karamea. The great Buller Valley has some good agricultural flats, and there is flat land—narrow and elongated plateaux—on the coast southwards.

Sawmilling is a flourishing industry throughout the district, and everywhere the big hills take grass well after clearing. Gold from this district has added millions to the output of the colony, and is

adding its proportion still. The Westport coal is mined in the district; copper is systematically worked; and there is abundance of iron, especially in the north, at Para Para, in the neighbourhood of the coal-measures of the Aorere.

*Features.*—From Separation Point, on the western side of Blind Bay, a range of mountains from 3,000 ft. to 4,000 ft. in height extends southwards to Mount Murchison. It consists of a granitic formation, with slate, limestone, and sandstone belts. From Pelorus Sound, on the east, commences another range—a portion of which is serpentine, forming a mineral belt immediately south of Nelson City. It reaches an elevation of 6,000 ft., and runs in a south-westerly direction to the St. Arnaud Range, terminating in the Spenser Mountains, a large central mass attaining a height of 8,000 ft. above the sea-level. To the westward of the Spenser Range and those on the further side of Blind Bay are the Brunner, Lyell, Marine, and Tasman Mountains, from 5,000 ft. to 6,500 ft. in height. Still further westward along the coast are the Paparoa, Buckland Peaks, and Papahaua Mountains, about 4,500 ft. at their highest point, and the Whakamarama Range, extending from Rocks Point to Cape Farewell. There are also a number of isolated mountain-masses here and there through the district.

The inland Spenser Mountains are the source of the principal rivers of the district south of the Buller River, and are thus described by Sir Julius von Haast: "On the southern slopes of this wild alpine stack we find the principal sources of the Grey; on its north-east side the sources of the Wairau; on its eastern side those of the Acheron and Clarence; and in the deep recesses of these snow-clad giants those of the Waiau-ua, or Dillon: so we may say that, with the exception of the Takaka and Aorere, which fall into Massacre Bay, the Wangapeka and Motueka, which run into Blind Bay, the Karamea and smaller streams, which reach the sea on the west coast to the north of the Buller River, all the rivers of any size in the northern part of this Island take their rise in this magnificent chain."

*Forest.*—The area of the district is estimated at 4,686,000 acres, of which the open land under 2,000 ft. in altitude is, approximately, 915,000 acres; the area of forest land under 2,000 ft., about 1,382,000 acres; and the open land above that altitude, about 581,000 acres, inclusive of bare mountain-summits. The wooded country is estimated at 3,200,000 acres: of this area probably about 900,000 acres is scrub and stunted bush; and of the remainder, not 700,000 acres at the outside would be available for clearing. The timber on the western side consists of red and white pine, matai (or black-pine), totara, kawaka (or cedar), rata, and occasional silver-pine, besides black and red birch (*Fagus fusca*). These varieties are also found, but in smaller areas, on the eastern side; birch preponderating. A large amount of timber is used in the mining industry for props and planking, and throughout the districts generally for shingles, fencing, firewood, sleepers, &c. There are fifty-eight sawmills at work, with an output of about 13,000,000 superficial feet per annum, chiefly red, black, and silver pine.

*Agricultural.*—Wheat, maize, rye, and root-crops of most varieties are grown, and fruit is plentiful. On the Waimea Plains is grown excellent barley, a small quantity of which is exported. Oats and

chaff are sent in large amounts to the West Coast and elsewhere. Hops also form one of the chief exports.

*Pastoral.*—The total area of pastoral lands held under the Crown by fifty-four tenants on the 31st March, 1905, amounted to 231,409 acres. As the agricultural land is limited, settlers are turning their attention to the timbered mountain-slopes for grazing purposes. These, when the timber is felled and burnt, and the ground sown with suitable grass, will, after three or four years, carry about two sheep to an acre on fair soil, and more on the limestone country. The cost of felling and burning green timber is from 15s. to £1 per acre; cost of mixed grass-seeds and sowing, about 15s. per acre; and a good paling fence on ordinary bush land with double No. 8 wires top and bottom, with  $\frac{1}{2}$  in. palings, and 7 in. posts sunk 2 ft. in the ground, can be erected at about 12s. per chain.

*Rivers.*—The Buller River (Kawatiri) has its source at a point about sixty miles south-west from Nelson, where it flows out of the beautiful alpine lake Rotoiti, lying 1,800 ft. above sea-level at the foot of the lofty St. Arnaud Range. This river breaks through the massive mountain chains of the interior in a transverse or westerly direction, forming, where it receives no tributaries, a succession of magnificent rocky gorges, and, after a course of about one hundred miles, finally discharges its waters into the ocean on the west coast. The Gowan River, a tributary, has its source in another exquisite lake, Rotoroa, 1,623 ft. above sea-level. Other tributaries of the Buller are: the Matakitaiki, Maruia, Owen, Matiri, and Inangahua, all of which take their rise in the snowy ranges.

*Lakes.*—The lakes of the district are alpine in character, surrounded by grand mountain and bush scenery. The principal are: Rotoiti, lying east, and Rotoroa south-east, of Mount Murchison; Matiri, to the west of Owen Range, 980 ft. above the sea.

*Plains.*—The Waimea Plains, near Nelson, with the Lower Motueka, Riwaka, and Takaka Valley lands, formed part of the original settlement of the New Zealand Company, and are occupied mostly by small settlers. Inland are the Tiraumea Plains, 1,100 ft. above sea-level, and the Maruia, 1,300 ft. These are, together, about 30,000 acres in extent. They are surrounded by high mountains heavily timbered, and the land is of only second-rate quality. On the West Coast the level lands are Ikamatua Plain and Mawhera-iti and Inangahua Valleys, lying on the eastern flanks of the Paparoa coastal range. There are also open *pakihi* at Addison's Flat, on the south side of the Buller, and low swampy lands on the north side; northward is the heavily timbered country of the special settlement at the mouth of the Karamea.

*Mining.*—The western side of the Nelson District was a *terra incognita* till about the year 1863, when gold was first discovered in large quantities. Miners flocked in at first from the other gold-fields in New Zealand, then from Australia, California, and other parts of the world, until in 1865 the whole coast-line was peopled from Broken River in the north to Jackson's Bay in the south. Mining, at first altogether alluvial, developed into quartz-reefing, and hydraulic-sluicing of large areas. The agricultural lands about the Grey and Inangahua were taken up and cultivated; and as mining became a more settled industry, the miners occupied and tilled the non-auriferous

alluvial flats in the many valleys : hence at the present time a number of homesteads are scattered throughout the district.

Reefton and its neighbourhood forms one of the chief quartz-mining districts in New Zealand ; and the West Coast, including Westland, has produced about 41 per cent. of the total gold raised in the colony. The oldest alluvial field is at Collingwood. Among other minerals found in the district are : silver, copper, chrome, antimony, manganese, and hæmatite. Extensive deposits of coal are found on the West Coast, within the areas of the Grey and Buller Coalfields Reserves. Coal is also found in Collingwood, in Blind Bay, and in West Wanganui Inlet ; and there are numerous smaller areas of coal-bearing strata here and there throughout the district. The output from the mines at work within the district during the year ending 31st December, 1904, was 582,307 tons.

The properties formerly held by the Champion and the United Copper-mining Companies some twenty-three years ago are now being developed by the Mineral Belt Copper-mining Company (Limited), which has its headquarters at Christchurch. The area held comprises some thousand acres on the mineral belt, and lies about four miles in a direct line from the City of Nelson, but twenty-six miles by rail and road. The mineral country is a serpentinous belt, from half a mile to a mile wide, stretching from D'Urville Island in the north-east to Tophouse in the south-west, over a length of about eighty miles, and probably with breaks to the southern end of the Island. It is along the western edge of this belt on the company's ground that the most important ore-deposits are found, and these cover a distance of about four miles on a straight line, with possibly some slight breaks in continuity. The deposits are practically contact lodes between the Maitai slates and the serpentines, and have a dip of 75° westerly, coincident with that of the slates at the point in question. The company have been opening old levels and driving new ones, and otherwise steadily prospecting the ground for the last sixteen months. Its prospects will be more definitely ascertained when No. 7 level, now in progress at the United section of the mine is driven.

Between No. 2 and No. 5, 168 ft., good ore has been obtained, and No. 7, 150 ft. lower, should practically prove its continuity downwards. The ores are massive sulphides assaying up to 26 per cent. in the "United," 5 per cent. with good gold contents at "Mount Claud," 44 per cent. black ore on the surface, untouched at "Mount Claud" West, 3 per cent. with good gold at the "Monster," grey ore and native copper at the "Champion." The chief drawback is at present bad roads, but this is being rapidly remedied by the Government. The company is proceeding very cautiously, and as soon as it is satisfied that the ore-supplies fully justify it, they will probably increase their capital and erect reduction-works.

Silver-ore has been worked in the Collingwood district ; and at Parapara, in Blind Bay, there are widespread deposits of hæmatite iron-ore, combined with limestone and coal, waiting only for capital to develop them. It will be readily gathered from the above brief description that mining is the chief industry of the Nelson District. A great many river and beach dredging claims have been taken up, and in many instances a large amount has been expended in the purchase and erection of dredges, and, although this industry has not proved

quite so successful as anticipated, yet a large number of dredges are working with fair results.

*Sawmilling, &c.*—The timber industry in this district has now become an important trade. There are now fifty-eight sawmills working, and during the past year over 13,000,000 ft. of various kinds of wood, principally red and black pine, have been cut in this district for export, and silver-pine has been largely in demand for railway-sleepers for home consumption.

A small industry in Phormium fibre is also carried on.

*Climate.*—The climate round Nelson and the head of the bay is mild and rather dry; on the west side of the bay, at Motueka and surrounding districts, the climate is similar to Nelson, but more bracing; extending to the south and west it becomes gradually colder, more bracing, and the rainfall greater. The same may be said of the Collingwood district. On the west the rainfall is considerable, and there are high winds; and further south the climate is generally mild, with heavy rains, and in winter—June and July—the thermometer sometimes in the low country falls below freezing-point.

#### WESTLAND LAND DISTRICT.

##### *Counties.*

The counties of this district are Westland and Grey,

##### *General.*

In the north-western part of the district, lying between the central Grey Valley and the sea-coast, is the Paparoa Range—high, flat-topped mountains of granite, with gneiss intermingled and metamorphic rocks. In this part there are numerous rivers and very little flat land; the surface, except the top of the ranges, is covered with forest, and here are the famous coal-measures of the Grey, the Brunner, the Blackball, Point Elizabeth, and others. From the eastern boundary the spurs (the big ribs of the “divide”) come steeply down into the Grey, Ahaura, Brunner, and Taramakau Valleys, the summits carrying snow-grass, the lower spurs forest, and the numerous river valleys furnishing, some of them, like the Kopra country, fairly good cattle-pasture. There is a network of lakes and rivers in the mountain country: Lakes Christabel, Kanieri, Mahinapua, Ianthe, Rotokino, Whahapo, Mapourika, Paringa, Moeraki, Ellery, Brunner, Hochstetter, Ahaura, Haupiri, Poerua; and the rivers are the Grey, Ahaura, Nelson Creek, Waiheke, Trent, Haupiri, Waiketi, Big River, Arnold, Taramakau, and others. Towards Lakes Poerua and Brunner these river-valleys open into short stretches of undulating country, carrying good forest; and near the Grey they open into big flats, mostly fairly grassed. The Grey Valley, which receives all those that do not fall into the Taramakau, forms the centre of the county, with a flat of some thirty miles long by four broad. The remainder of the country between the Arnold, Lake Brunner, and the sea consists of low hills and rolling forest-covered country.

Limestone is found in the Grey Gorge and in the Paparoa Ranges. There is some farming on the big flats, and fruit is known to do well. Gold and coal mining are, of course, the prominent industries. Sawmilling is very prosperous, and has a great future before it.

South of the Taramakau the big spurs from the higher Alps come down precipitously into the narrow coastal plain. These hills, bare at the tops, have their sides covered with luxuriant forest, which is a continuation of the forests of the Nelson country. The rimu, the kahikatea, the silver-pine, the rata, and the totara are here in great variety, stately and splendid. They grow up among vines, flowering shrubs, and tree ferns; and vines, mosses, ferns, orchids, and lichens give them a special character. They clothe hillside and plain with green, making fine contrast to the blue waters of the rivers and their white shingle-beds. They extend unbroken past Cascade and the Karangarua to the southern boundary. About Okarito two glaciers—the Franz Josef and the Fox—come down almost to sea-level in the forest. Mount Cook and the main peaks of the Alps tower above them. At every turn there are glimpses of glacier and snowfield; the valleys hidden in the folds of the mountains are intensely picturesque.

Westland is intensely interesting to the geologist, the botanist, the naturalist, the artist, the mountaineer; is already a fine field for the miner and sawmiller, and will become the home of settlers when the areas of excellent land suitable for farming are selected.

The country has a splendid mining past, and a variety of mineral resources which are a guarantee of an even more splendid future.

There is a broad patch of agricultural land in the Grey Valley, and there are farmers there and in other valleys who grow root-crops and green crops, and rear cattle, and turn out cheese and butter of the best. They are by their industry diminishing the dependence of their district upon the importer of farm-produce and stock, and they hope one day to make the district self-supporting so far as these products are concerned. The whole area of arable land comprises about a quarter of a million acres, and the climate and soil are all that could be desired by the agriculturist. Some resumed freeholds, such as the Kokotahi property, are doing well, and the pastoral runs among the mountain country in the south are good sheep-country.

*Physical Features: Mountains.*—The main range (Southern Alps), which is the dividing elevation or backbone of the South Island, constitutes the eastern boundary of Westland for its entire length. This mountain system is snow-covered almost from end to end, and its ice-clad lofty peaks uplift from the snowfields which cap the less abrupt elevations, and which fill the immense intervening hollows (*névés*). Subsidiary ranges, varying in height, radiate chiefly from "knots" in this great central chain, and are snow-coated most of the year. From these again, ridges covered with dense alpine forests descend steeply into the valleys or fall abruptly to the level of the inland plateaux of the littoral country. The westward faces of these spurs at one time formed the sea-wall. From the sheets of *névé*-snow alluded to above, numerous glaciers, with feeders from the lateral ranges, extend down the upper main valleys, presenting every aspect of ice-action, and from these the principal rivers take their rise. Parallel with the central mountain mass, and linked to it by low, narrow saddles in the northern districts, are isolated mountains, varying in extent and height, which are the remnants of an ancient continuous granite range that extended along the old coast-line. The bold, flat-topped Paparoa Range, lying between the central Grey Valley and the sea-coast, is another island mountain. With the exception of this Papa-



roa Range and a few outrunners of the central chain, the whole of the above-mentioned areas may, from a settlement point of view, and apart from minerals, be considered barren mountain wastes.

*Forests.*—Generally speaking, the whole of the district is covered with dense forest, from the sea-beach to the grass-grown tops of the high ranges, even the gaunt, broken mountain-faces being wrapped with foliage. The varieties of trees differ considerably according to soil and altitude. Kamahi and rata are the chief timbers, very useful for firewood, and, spread over the whole country, constitute an almost inexhaustible supply. Rimu is the chief milling timber, and this also is widely distributed from the sea-board to the interior uplands. Valuable stretches of white-pine belt the low-lying depression of the coastal lands, and the same may be remarked concerning the imperishable silver-pine. Clumps of black-pine of good quality are met with, also rarer patches of marketable totara; while serviceable cedars are scattered along the flanks of the inland ranges and all over the lower hills and plateaux. The approximate area of forest equals 2,394,951 acres, of which a fair proportion carries timber fit for the sawmill. Upwards of fifty sawmills are at work in these forests.

*Soils.*—The high pastoral uplands have a coating of rich moulds, and this continues fairly good down to the heavy timber lands. The alpine forest is readily cleared, burns clean, and imported grasses grow luxuriantly, cocksfoot being the best, as it withstands fire and frosts. The lower flanks of the mountains hold a thinner soil, which at present hardly repays the heavy labour of felling; while the lower heights are somewhat abrupt and unfitted for cultivation. A margin, varying in width, of fertile slopes and fans fringes the bases of the hills, and, having a natural drainage, constitutes an area of excellent agricultural land.

The upland soils of the coastal undulations and terraces are light loams of moderate fertility, which rest upon transported gravels, the drifted accumulations of eroded hills. On these plateaux are numerous *pakihi*s, or natural clearings, which are mostly extensive tracts of swampy lands, with a peaty soil resting on thin layers of impervious clay and non-porous gravels, or, in a few cases, on impacted glacial moraines: these formations all overlying loose drifts. The reclamation of these areas is only a matter of time, as the bulk of them are quite drainable.

Stretches of good alluvium border the rivers, streams, and sea-coast, and form the favourite location for settlers.

*Climate.*—The climate is equable and temperate, remarkably free from storms and fogs; and immediately after bad weather the clouds roll inland, and there is a prevailing clearness of sky. The rain-bearing winds are mostly from the north-west and north-east. The southerly winter gales usually coat the great ranges with snow, which, however, rarely falls below 2,000 ft. The average rainfall is 112 in., and the mean average temperature is—summer, 59°; winter, 45·5°.

*Pastoral Lands.*—The total area of pastoral land now available amounts to 1,850,000 acres, 104,000 of which constitute scattered high mountain grass districts; the balance, 1,746,000 acres, being the ordinary bush-clad country, much of which is quite inaccessible to stock. All over the coastal lands, along the slopes of the lower

hills and in the bottoms of the inland valleys, large numbers of cattle are bred and fattened on the dense undergrowth of the forest. The tussock herbage of the high lands above the timber-line is at present lying waste. In the past one or two attempts that have been made to utilise this country have failed, because the sheep were left there to brave the winter snow-storms, the owners having become careless owing to having successfully wintered their stock in previous mild seasons. Sheep may be safely pastured on these high lands for eight months in the year, but feed must be provided for them in the low country for the remaining four. There are one or two farmers who are successfully following this method, and there is ample scope for settlers to copy their example. Hitherto sufficient attention has not been paid to the breed of sheep most suitable for these mountain pastures.

Some of the richest soil in Westland is on the middle mountain-slopes, and eventually, when these have been cleared of the scrubby, stunted timber and grassed, stock may run quite safely throughout the year.

*Agricultural Lands.*—The agricultural lands comprise some 220,000 acres of forest and 12,000 acres of open surface, such as swamps, grass-grown river-beds and fringes, &c. The bulk of these lands, when clear of bush, grow abundance of root-crops, especially turnips, which are much used for fattening purposes. The even and moist temperature encourages the almost uninterrupted growth of grass and clover, which are very luxuriant, and favour stock-raising. Oats are also grown abundantly for local consumption, and for the most part are cut into chaff. Year by year the imports of potatoes, fruits, butter, and fat stock are decreasing, owing to increased local production.

*Markets.*—The chief markets for stock are at Hokitika and Greymouth, where the highest prices in the colony are obtained; but the numerous sawmills and flax-mills, the gold-mines and coal-mines, and other allied industries, all form valuable local markets all over the district for farm-produce.

*Rivers.*—A few of these lead from the foothills, and are of small volume; the others are snow-fed streams descending from the central range, at first in narrow gorges amongst the mountains, but spreading widely on reaching the seaboard country. They are shallow shingly streams in winter, but swift and deep in summer. In the northern district all the larger rivers are bridged; and southward, ferries are placed on all the main streams, which from the melting of the snow are practically unfordable from September to January.

*Minerals and Mining.*—The whole of the District of Westland is a proclaimed goldfield and contains the greatest area of alluvial auriferous ground on the West Coast.

All the Westland rivers carry down more or less gold, but the three great gold-yielding rivers are the Grey, Arahura, and Waiho, the bars and beaches of which appear to be replenished with fresh deposits of the metal after each flood. Every stream in the Grey Valley is auriferous, and the gold-bearing nature of the adjoining gravels is evidenced by the old and new workings which are scattered all over the watershed. Again, if one stands on the summit of Mount Turiwhate, the ancient beds of the Arahura can be easily traced northward to the Kumara and southward to the Rimu diggings. Similarly,

the Waiho has in olden times flowed both northward down the present valley of the Okarito River, and southward to the Omoeroa River, the lateral terraces in both directions being well defined and gold-bearing.

There are three main gold-bearing deposits in Westland. The first, which may be called riverine leads, run generally westward. These are ancient river-beds, often lying at a considerable elevation, of which the bulk has been washed away, leaving detached portions, as Kumara and Rimu. The second are beach leads, both those along the present coast-line and others running parallel thereto at distances varying from one-quarter to four miles inland, and at levels from a few feet below to a couple of hundred feet above sea-level. The third are extensive masses of gravel, &c., occurring in large isolated patches, as at Bell Hill, Big Dam Hill, Humphrey's Gully, and Bald Hill, north of the Haast. These drifts have all one noticeable peculiarity—namely, that they invariably coat the seaward faces of the hills, and neither gold nor drift is to be found on the inland slopes. Gold-bearing fans from Mount Greenland have been found at different levels on Ross Flat, having probably been deposited in deep water by successive landslides.

Hydraulic mining on a large scale is successfully carried on in various portions of the northern districts, and is being extended to many other localities. Kanieri Lake is being again utilised, and an abundant quantity of water is now available for the sluicers in the Kanieri Valley. The extension now surveyed of the Humphrey's Gully water-race to Rimu and Back Creek will develop a very large field. The tapping of the Arahura River will enable the miners at Blue Spur to obtain an unfailing supply of water, and command a large area of auriferous country at present unworkable from want of water at a sufficient altitude. A large acreage of alluvial drift has been pegged out as dredging claims. Some companies are at work with more or less profit. Experts are assured that a large extent of auriferous gravels exists all over the low-lying country, which will yield remunerative returns by this new treatment. Undoubtedly great areas of swampy, undrainable, and hitherto unavailable lands will be prospected, and it is expected that valuable finds will be made in such districts. Numerous and costly experiments have been made with dredges of different types in the endeavour to work economically the gold-bearing sands which lie along the sea-beaches for a distance of a hundred and forty miles, but very few have proved a success. A considerable number of miners ("blacksanders") work on some of the beaches, and seem to make a fair living, many of them having been so employed in one neighbourhood for over twenty years.

Gold-bearing quartz has been found throughout the district, the most promising finds being at Paparoa, Mount Alexander, Taipo Range, Browning's Pass, and Cedar Creek. Silver-ores, associated with gold, have been found, notably at Rangitoto.

The reefs at Garden Gully, on the Paparoa Range, are now undergoing a thorough test by a well-equipped battery, with satisfactory results.

At Browning's Pass deposits of auriferous quartz, known as the "Westland Reefs," have been traced for considerable distances, and are at present being prospected by several parties of experienced miners.

The amount of gold exported during the past year amounted to 109,966 oz., valued at £439,841.

Specimens of nearly all the known minerals have been discovered in various localities. The Paparoa Range, north of Greymouth, contains many varieties, and will eventually hold a large mining population.

Copper also occurs in the Taipo, Arahura, Tearoha, Whitcombe, Wanganui, and Jackson Valleys, the finest lodes discovered being on the western faces of the Matakitaki Range, near the Haast River, with good seams and beds of coal and limestone adjacent.

Petroleum has been found in the Arnold Valley, and borings are now being made to test and develop what is hoped may be a good oil-bearing basin.

First-class slate, suitable for any purpose, exists in the upper Wanganui Valley and on the Paparoa Range. Fine pottery-clays and fireclays are also in bulk on this range, and building-stone of all kinds, granite freestone, &c., is to be found all over the Coast. Limestone also occurs in different localities, comprising qualities suitable for making lime and cement, and also for lithographic purposes. Greenstone (*pounamu*), is now largely exported for fine lapidary and jewellers' work, and commands a ready sale. Iron-ores occur in quantity in various localities.

*Coal-mining.*—As noted before, great quantities of coal are obtained from the mines at Brunnerton, and also from the fine seams at Blackball, higher up the Grey Valley. Extensive seams are now being developed at the State coal-mine in the Seven-mile Creek basin, and further along the coast. On the higher slopes of the Paparoa Range areas have been surveyed and leased, and large outcrops are being prospected. It would appear that the greater portion of the seaward country hereabouts contains very extensive coalfields: it undoubtedly contains the greatest area of coal-bearing strata yet discovered; but, nevertheless, all the way down the coast to Jackson's Bay, wherever the coal-measures have been protected from the scour of the ice-streams of the great glacial period, isolated areas of coal exist, and possibly borings would prove the lower coal-beds to be intact under the overlying drifts. The four large coal-mines now at work—viz., the Brunner, Tyneside, Blackball, and State coal-mines—are all finely equipped with the latest machinery, are directly linked to the main railway by branch lines, and produce great quantities of coal, varying in character and suited for different economic purposes. Last year some 250,000 tons were raised and railed to various towns, but principally into Greymouth, whence it was shipped to places in and beyond the colony.

*Dairying.*—Owing to the humid climate and light frosts, this district is especially suited for dairying purposes, and creameries and dairy factories are being established in many localities most profitably.

Surveyors are busily cutting up the remaining farming lands, and these are taken up readily. Under the provisions of the Bush and Swamp Crown Lands Settlement Act special facilities are afforded in Westland to selectors, with the most limited capital, to obtain a holding, which, when laid down in grass, is a moderate but sufficient independency.

## CANTERBURY LAND DISTRICT.

*Counties.*

The counties in this district are Amuri, Cheviot, Ashley, Selwyn, Mount Herbert, Akaroa, Ashburton, Geraldine, Levels, Mackenzie, and Waimate.

*General.*

Canterbury is the most extensive agricultural district of New Zealand by far, for nowhere else is there anything like the Canterbury Plain, with its two and a half million acres of arable land. The district is also pastoral, for millions of sheep roam the hills which buttress the Alps from the Amuri to the Otago boundary. The pastoral country was the first to make a name for itself. It was taken up before the discovery of the goldfields, and some of the men who threw in their lot with it came to better fortune than anything done for any man by any goldfield in these Islands. The first of these pastoral hills come next to the Marlborough country. Near the Alps they are rough, with some lakes here and there feeding the big rivers. The front country, with Highfield, Parnassus, Ben Lomond, Leslie Hills, Monte Rosa, Horsley Downs, and many another name famous in the palmy days of wool, gladdens the heart of the "judge of country" even more than it delights the eye of the tourist in search of the picturesque. The homesteads of these runs are historic, extensive, hospitable. They stand among plantations and cultivated paddocks—fine pictures of country life. Up the Waimakariri to the big range you find them, and they are in the wild valleys of the Esk, in the folds of the great hills; Grassmere and Lake Coleridge further on to the south, Mount Somers, Mount Hutt, the country of Lake Heron, and the runs about the head-waters of the Rakaia. All these hills come steadily down into the Canterbury Plain, with their roaming flocks. Over the Rangitata it is the same. Mount Arrowsmith and Mount Tyndall look down on the pastoral properties. Mount Peel, Four Peaks, and twenty other famous summits are among them, as are also the heads of all the South Canterbury rivers. An apron of hills turns parallel to the sea at the end of the Two Thumbs Range, dividing the Canterbury Plain and the Mackenzie Plain, with the whole of the alpine peaks in line ahead looking down on the runs. The hills run round by Ben More into the Ahuriri, coming with those that come down the Hakataramea to the Waitaki, and as they line the course of that big river the downs run up at Elephant Hill from the plain to meet them. Such is the expanse of the Canterbury run country. Of late years it has been exceedingly profitable, recalling in its prices for wool and mutton the palmy days of old.

Agricultural Canterbury begins across the Waitaki. It is a stretch of arable land extending 180 miles to the Waipara, between the Pacific Ocean and the pastoral yellow mountains which buttress the eastern ribs of the alpine backbone of the Island. Of the three and a half million acres thus comprised, two and a half are absolutely flat land: they are the Canterbury Plain proper. The other million are downs and low hills at either end of the plain, rolling up gradually into hills to meet the pastoral mountains. The coast-line is about 220 miles, of which some fifty miles are occupied by a group of volcanic hills

known as Banks Peninsula, jutting out some thirty miles into the Pacific, with an area of 250,000 acres.

The plain, tilted like a great table towards the sea, and crossed by the several rivers draining the alpine system, is destined to be one day a most successful irrigation area. Already a water-supply of 260,000,000 gallons—delivered daily through seven thousand miles of water-races, supplying stock over an area of 1,250,000 acres—has been established at an initial cost of £177,000 without appreciably diminishing the flow of the larger rivers. This plain will in the future assuredly rival the famous plain of Lombardy for varied fertility and certainty of harvests. This plain has many varieties of soil, from richest alluvial to patches of stony ground; but the average is of good quality. The downs at either end are chiefly limestone, and very productive.

The Waitaki Downs are the south-western fringe of the Canterbury Plain. Crossing the Waitaki—the boundary between the Land Districts of Otago and Canterbury—you enter the plain at once; you are in the Waikakahi country, among the sections of one of the most successful, as it is the largest, of the settlements established on areas resumed by the Crown. The farms are growing white crops, green food, roots, sheep and cattle stock, and, with their fresh houses and various improvements, give an attraction of progress to the landscape unknown in the days of the solitary shepherd who kept melancholy occasional watch where now are townships and schoolhouses, homesteads and teeming rural life. The prosperity of these settlers is as evident as are their possessions in the landscape. The downs roll over towards Waimate, where there is a rich plain covered with farms. The plains sweep on past the garden country of the Junction, Pareora, and the Levels. Inland it runs towards the mountains into the big downs and uplands of the Albury and Fairlie country, right up to the foot of the pastoral hills, the Grampians and their offshoots. The arable land is splendid, both on valley-bottom and rolling down. Some of the best estates resumed for close settlement are in this locality—Levels, Roeswill, Studholme, Albury, Pareora, and others—the settlers giving excellent account of their fortunes in the limestone soil.

Further down the plain stretches on to Timaru—a town surrounded by farms well tilled, in a country dotted with homesteads long established, and plantations well grown. From here the plain stretches like a garden past Pleasant Point, Orari, Geraldine, Mayfield, and Westerfield, all of which are coigns of vantage for viewing the prolific plain stretching to the sea.

After the Orari, the Rangitata, and the Hinds (their broad beds intersecting the plain with interruptions of shingle) you reach Ashburton, a pleasant country town, surrounded by fine properties and farms in the midst of bushy plantations, well-tilled fields, and radiating hedgerows. Eastwards, lying by the sea, is the splendid estate of Longbeach, which affords an object-lesson in the successful reclamation of swamp lands.

Northwards lie the Ellesmere, Lincoln, Southbridge lands—rich, well cultivated, well stocked—extending to the hills of Banks Peninsula. The latter is the best grass-producing hill country in New Zealand—warm, well watered, with fine valley lands, not extensive, but exceed-

ingly rich. A magnificent country, sheep and cattle pasture, of a quarter of a million acres, with most of the forest of the old days gone, the land producing the finest cocksfoot imaginable. The fattening and dairying capacity of the Peninsula is proverbial, and its homesteads among the best in New Zealand.

On the inland side the plain stretches across to the lands about Methven, skirting the bases of the great hills of the pastoral tussock, and extending northwards through country well tilled, until the farms, flocks and herds, plantations, &c., indicative of closer settlement, proclaim the approach to the Cathedral City.

Westwards the plain widens out to Springfield, at the foot of the hills, attaining its greatest width in fifty miles.

After passing Christchurch, Kaiapoi, Rangiora, in the order mentioned, the plain stretches past all three in splendour of fertility—farmsteadings, islands of timber arising out of waving crops and pasture lands, with flocks and herds in evidence.

Past the Ashley the plain narrows, and the downs begin to roll upwards to meet the sentinel peaks of the pastoral country—Mount Thomas, Mount Grey, Mount Brown. They extend to Waipara, meeting the downs which bring the pastoral country down from Lake Sumner into the plain. Near here is the Weka Pass, with the famous rock paintings, and the splendid flats of Glenmark in the vicinity. Seaward are the low hills of Motunau and Pendle—ideal sheep country—which in due course reach the Hurunui. Across the river are the Cheviot Downs.

Inland across the river is the Lowry Peaks Range, the range sloping gently down towards the sea and the above downs, and the upland slopes and terraces further on of the Cheviot Settlement. Here there are pasture and corn, and sheep and cattle and horses, and fruit and substantial homesteads, evidences of the prosperity of the settlement.

The Amuri Plain, on the landward side of Lowry Peaks, is framed by the big pastoral hills of North Canterbury. It is much of it stony and wholly yellow with tussock. In the northern quarter is the settlement of Rotherham, with its new steadings; and over the Waiau and hard by the township of that name are two prosperous settlements in the upland country, the settlements of Highfield and Lyndon.

Over the Waiau to the north of Culverden is the Hammer Plain, in a fold of the big hills that come down from the dividing range. Like the Amuri Plain it is stony and light. The much-frequented Hammer Sanatorium is situated on this plain, at an altitude of 1,200 ft. above sea-level.

*Boundaries—Physical Features.*—The Land District of Canterbury comprises the central portion of the Middle Island, and lies between the Conway River, Barefell Pass, and Mount Franklin on the northward; the Spenser Mountains, Travers Peak, Mount Barron, the Amuri, Hope, and Hurunui Passes, the summit of the Southern Alps, and the western watershed of the River Hopkins and Lake Ohau on the westward; the Rivers Ohau and Waitaki on the southward; and the South Pacific Ocean on the eastward. The length of the district north-east and south-west is about 220 miles; the breadth west-north-west and east-south-east, from the summit of the Alps to the sea, averages 70 miles. The sea-board has a length of about three hundred miles, consisting generally of low-lying beaches, broken



PART OF A NEW ZEALAND SHORTHORN MILKING HERD.

*Immigrants' Guide.*





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by the projection eastward of Banks Peninsula, which contains the only large natural harbours. That portion of the district which fronts the ocean between the Ashley and Opihi Rivers is flat land, about 2,500,000 acres in extent; north and south of those limits the plain is interspersed with undulating and hilly country. This great plain stretches westwards, rising and merging into downs and hills, which again extend westward and merge into the Southern Alps and the offshoots therefrom. Banks Peninsula, which has an area of about 250,000 acres, is wholly composed of ridges and hills, deeply intersected by basins and gullies, the result of volcanic action.

The Southern Alps, which form the backbone of the Island, are a continuous chain of mountains, with a succession of magnificent peaks, attaining their culminating point in Mount Cook, or Aorangi, 12,349 ft. above sea-level; there are, besides, numerous peaks ranging in altitude between 7,000 ft. and 10,000 ft. Offshoots, extending to great distances eastward and south-eastward from the main range, attain elevations of 6,000 ft. to 9,000 ft. On these mountain-ranges are numerous and extensive glaciers, from which emanates the river-system of the district, comprising the Waiau-ua, about one hundred miles in length; Hurunui, eighty-five miles; Waimakariri, ninety miles; Rakaia, eighty-five miles; Ashburton, sixty-four miles; Rangitata, seventy-four miles; the Waitaki and its main feeders, 140 miles. These rivers rush down from the mountain-gorges, through the intervening ranges and hills, and traverse the plains to the sea. The channels on the plains are shallow, and extend in some instances over a mile in width. These rivers serve as outlets for a portion of the lake system of the Middle Island, Lake Sumner being connected with the Hurunui, Lakes Coleridge and Heron with the Rakaia, and the Mackenzie country lakes—Tekapo, Pukaki, and Ohau—with the Waitaki. Another important lake is that known as Lake Ellesmere, west of Banks Peninsula; it is separated from the ocean by a narrow shingle-spit only 5 chains across at one point, through which, at certain seasons, the flood waters force a channel to the sea. Lake Tennyson is situated on the eastern flank of the Spenser Mountains, 3,614 ft. above sea-level.

*Climate.*—The climate of Canterbury is well suited to Europeans. It resembles that of Great Britain, but on the plains is far more equable, the mean daily range of temperature being  $17^{\circ}$ – $10^{\circ}$  Fahr. Observations taken at Lincoln (fourteen miles from Christchurch) for a period of twenty-one years, ending December, 1903, give the following results: Barometer, reduced to  $32^{\circ}$  Fahr. and sea-level, 29.968 in.; mean maximum daily temperature,  $61.8^{\circ}$ ; mean minimum daily temperature,  $43.1^{\circ}$ ; mean average temperature,  $52.4^{\circ}$ . The extremes of temperature were  $98.4^{\circ}$  and  $19.9^{\circ}$  Fahr. The rainfall for the same period averaged 24.674 in. per annum, the extremes being 35.287 in. in 1886 and 14.480 in. in 1897. The average annual number of days on which rain fell was 123, the extremes being 154 in 1902 and ninety-eight in 1891. Snowfalls are very light on the plains, but in the high uplands the climate is much colder and more severe. The changes of weather and temperature are sudden, calms and gales, rain and sunshine, heat and cold alternating. The prevailing winds are north-east, south-west, and north-west—the last a hot wind. The climate, as a whole, is splendidly healthy, bracing, and most enjoyable.

*Soils.*—The Southern Alps and mountains adjoining are, owing to their great altitude, subject to disintegration, and form for the most part rocky barren wastes. The lower ranges and hills, the high tablelands, and the light stony portions of the plain form the pastoral areas. In the northern and southern districts and in the great central plain are the agricultural areas. This latter class of land comprises rich alluvial tracts about Cheviot, Rangiora, Kaiapoi, Lincoln, Ellesmere, Longbeach, Temuka, and Waimate, and the splendid plain and down lands which extend from Cheviot to the Waitaki. Banks Peninsula, where the soil is of a rich volcanic nature, though exceedingly hilly, has alluvial areas in the valleys and about the bays.

*Pasturage and Crops.*—Below a certain level, the mountainous and hilly regions, and the high upland country in the western and northern part, are covered by native grasses, with an admixture of English forage-plants where the character of the soil and other circumstances are favourable.

The pasturage, which is very suitable for sheep-farming, is taken full advantage of by the pastoral tenants of the Crown, and is used to some extent by freeholders. The light stony portions of the plain also contain native grass lands, well adapted to merino sheep.

The lower hills, downs, and better kinds of plain-country have been widely cultivated, and have proved well fitted for the production both of cereals and of grasses.

The chief crops grown in Canterbury District are wheat, oats, barley, turnips, rape, clover, and grass-seed; while amongst other crops produced are rye, peas, beans, mangolds, beet, carrots, and potatoes.

Of the cereals, wheat is the most largely grown, and was for many years a large item of export. In the season 1904-5 the area under crop for threshing was 187,104 acres, being nearly three-fourths of the total wheat-area of the colony. The total yield was 6,559,135 bushels, being an average of 35.05 bushels per acre.

Oats also are very successfully grown, the figures for the period 1904-5 being 137,782 acres, or about two-fifths of the total area of this crop in the colony. The total yield was 6,234,367 bushels, being an average of 45.24 bushels per acre.

Barley of superior quality is also produced, the figures being 9,253 acres, equal to nearly one-third of the total area of barley-crop in the colony. The total yield was 387,523 bushels, being an average of 41.88 bushels per acre.

Grass-seeds are abundantly grown, cocksfoot mainly on the splendid Banks Peninsula country, and ryegrass throughout the land district.

Potatoes, which yield crops of excellent quality, were grown in 1904-5 on 7,135 acres; turnips and rape were grown on 222,180 acres, and the combined area of other crops grown, including rye, peas, beans, mangolds, beet, carrots, and onions, was 18,658 acres. The area ploughed and laid down in English grasses was 1,591,453 acres. Surface-sown lands comprised 524,135 acres. The total area under crop was 649,597 acres, and the area broken up but not in crop, 14,478 acres. Plantations, exclusive of private gardens, occupied an

area of 24,072 acres. The aggregate area of private and market gardens, orchards, and vineyards over a quarter of an acre in extent was 8,173 acres.

**Water-races.**—The following table shows the extent, cost, and other particulars regarding the water-race system in the several counties in 1905 :—

County.	Area watered.	Miles of Races.	Total Cost.	Cost per Acre watered.	Amount of Water distributed every Twenty-four Hours.	Annual Charge for Use of Water.
	Acres.		£	s. d.	Gal.	
Amuri ..	24,162	54	4,800	3 11½	..	Races are maintained by an annual charge in proportion to area watered.
Ashley ..	122,000	500	25,000	4 1	27,000,000	From ½d. to 6d. per acre, in addition to special rates for interest on loans.
Selwyn ..	326,888	1,132	79,307	4 10	90,940,960	8s. 4d. to £1 6s. 6d. per 100 acres.
Ashburton	586,000	1,400	43,780	1 5½	<del>84,000,000</del>	From £2 to £3 per mile of race.
Geraldine	71,212	260	9,010	2 6½	29,520,000	About 7d. per acre, including a rate for payment of principal and interest on loans, and a rate for maintenance.
Levels ..	19,000	71	5,500	5 9½	6,480,000	1½d. per acre, and on part of area an interest-rate of ½d. in the pound on capital value.
Mackenzie	9,400	35	1,935	4 1½	7,516,800	2½d. per acre on part of district, and ½d. in the pound on capital value in remainder of district.
Waimate	35,700	157	8,125	4 7	8,500,000	Races are maintained by an annual charge on the value of lands watered.

The character of all the light stony plains has changed very much and improved during the last ten years through the extension of and the beneficial effects of the water-race system, in conjunction with the extensive plantations; these two factors counteracting the parching-up by the north-west winds, which formerly kept these plains when without water or trees always so hard that grass could not thrive. All this class of land is now some of the most profitable sheep-country in the district, as both feed and stock come away early.

**Stock.**—The pastoral and agricultural lands provide grazing and fodder for a large number of sheep, cattle, horses, and other stock. Of late years the value of the plains has been much enhanced and the carrying-capacity thereof greatly increased by the water-race system, which supplies water throughout the length and breadth of the dry areas, and enables the country to be occupied in smaller holdings than would otherwise be possible.

The sheep in the District of Canterbury, in April, 1904, numbered 4,606,744. In October, 1904, there were 58,238 horses, mules, and asses, 135,892 cattle, and 55,208 pigs.

The district has a well-deserved reputation for the classes and splendid quality of its sheep. On the mountains and higher lands the merino still predominates; but on the richer low-lying ranges, hills, and plains the prevailing types are crosses between the merino and Leicester, Lincoln, Romney Marsh, and other breeds. In proof of the superior character of the flocks, pasturage, and climatic conditions in the Middle Island, the following percentages of lambing returns are quoted—these are “fair average returns, but much higher might have been exhibited”: Mountain native pasture—pure merino, 75·36; pure merino and Border Leicester, 88·94; English-grass pasture—cross-bred and Border Leicester, 80·8; half-bred Border Leicester, 82·79; Border Leicester, 90·77; Lincoln, 88·08; Romney Marsh, 111·46; English Leicester, 93·34; Shropshire, 97·41; Southdowns, 96·87. It must be borne in mind that the flocks and herds are supported by the natural and artificial pastures without housing.

Owing to the development of the frozen-meat trade a great impetus has been given to sheep-breeding. The bulk of the prime meat exported from the colony is supplied by this district, with Marlborough, and commands the highest price in the London markets. In the year ended 31st December, 1904, the number of carcasses frozen was 1,575,962, valued at £1,067,995. There were also produced 9,278 cases of preserved meats, 2,518 tons of tallow, 7,823 tons of manure, besides neatsfoot oil, oleo, &c.

*Meat-export.*—The frozen meat exported from Canterbury during the year ended 31st March, 1905, was valued at £1,022,819. At Belfast, Fairfield (near Ashburton), Islington, Timaru, and Pareora freezing-works are established, each containing a complete plant for carrying on the industry, as well as departments for curing, preserving, boiling-down, tallow-rendering, fellmongering, and the manufacture of manures. The Canterbury Frozen Meat and Dairy Produce Export Company (Limited) owns the Belfast Freezing-works, with storage for 90,000 carcasses, and a daily capacity of 5,500 carcasses; the Fairfield works (near Ashburton), with storage for 65,000 carcasses, and a daily capacity of 4,500 carcasses; and the Pareora works (near Timaru), which have storage for 100,000 carcasses, and can deal with 5,000 in a day. The works have engines representing 950-horse power, and employ 719 men when in full work. The Islington and Timaru works, which are owned by the Christchurch Meat Company, employ in all about 750 men, and have engines representing 403-horse power. The former can put through 8,000 carcasses per diem, and have storage for 140,000 carcasses. The latter can deal with 6,000 carcasses in a day, and have storage for 120,000 carcasses. At Hornby there has been established by Messrs. Nelson Brothers (Limited) a well-equipped factory for freezing only, with engines of 300-horse power, and a capacity of dealing with 1,000 sheep per diem. The factory has storage-room for 50,000 sheep, but is not now in operation.

*Wool.*—During the year ended 31st March, 1905, there were shipped at Lyttelton and Timaru 33,631,274 lb. wool, valued at £1,324,834; and to this must be added the amount (about 1,200,000 lb.) bought for manufacture by the woollen-mills in the district. The Kaiapoi Woollen Manufacturing Company (Limited) owns large woollen-mills at Kaiapoi, and clothing-factories at Christchurch. These are fitted with modern machinery and appliances, and the company's products

have obtained a considerable reputation. The company employs about nine hundred hands, and uses about 40,000 pounds' worth of wool and 6,100 pounds' worth of other colonial products in a year. The staple of the New Zealand wool, especially the long-wool and cross-bred, is remarkable for its freedom from breaks and other imperfections. The average clips are approximately as follows: Merino, 4 lb. to 7 lb.; quarter-breds,  $6\frac{1}{2}$  lb.; half-breds,  $7\frac{1}{2}$  lb.; three-quarters,  $8\frac{1}{2}$  lb.; Leicesters,  $10\frac{1}{2}$  lb.; Lincoln, 11 lb. From special flocks clips up to 25 lb. and 30 lb. are obtained.

*Butter and Cheese.*—Banks Peninsula and the rich tracts of country previously mentioned are excellently suited for dairy-farming. The pasturage and climatic conditions are favourable, and a great increase in the production of butter and cheese may be looked for, more especially as housing and hand-feeding are in some districts unnecessary. A central co-operative dairy factory has been established at Addington, served by twelve creameries, situate at Marshlands, Oxford, Halswell, Springston, Doyleston, Little River, Ladbroke, Lakeside, Kaiapoi, Green Park, Brookside, and Ashburton, each capable of dealing with the milk of 1,000 cows. There are also very complete dairy factories at Taitapu, Sefton, Cheviot, Timaru, Temuka, Southbrook, Belfast, Tinwald, and Le Bon's Bay, as well as cheese-factories at Flemington and German Bay. The number of cheese and butter factories in the district in 1904 was seventeen, and of creameries forty; the output of butter and cheese amounted to 3,933,440 lb.

In the South Canterbury district there are two factories, one at Timaru and Temuka; these are served by thirteen creameries situate at Redcliff Road, McCulloch's Bridge, Morven, Studholme, Waituna, Hunter's, Hook, St. Andrew's, Fairlie, Albury, Pleasant Point, Seadown, and Clandeboyne.

The general character of the whole of the South Canterbury district is now found to be a first-class dairying country, the output and quality of the Timaru butter-factory being equal to any in the colony.

*Fruit.*—The district is eminently adapted for the growth of a large variety of fruits, especially all that grow in Great Britain. Attention has recently been directed to landing supplies of fruit in London. The attempts so far have proved satisfactory, and point to the possibility of a large trade being established.

*Coal.*—Brown coal is found at the Malvern Hills, Homebush, Whitecliffs, Springfield, Mount Somers, Albury, and various other places. Lignite is also commonly distributed. For the year 1904 the output from fifteen collieries, employing about seventy hands, was 25,120 tons, bringing the total amount raised from twenty-six collieries up to the 31st December, 1904, to 478,233 tons. The seams worked vary from 16 ft. to 2 ft. 3 in., the average width being 8 ft. At Acheron, near Lake Coleridge, a true anthracite is found, the other pits in the district being of brown coal or lignite.

*Building-stones.*—The building-stones of Canterbury comprise some excellent varieties. The Halswell quarries produce an exceedingly hard and close-grained stone of a dull leaden-grey colour. Granular trachytes are obtained from Governor's Bay, Lyttelton; porphyrites at Malvern Hills; good limestone at Malvern Hills, Waikari, Mount Somers, and various other places; bluestone rock is found

at Timaru suitable for millstones. There is abundance of limestone in North Canterbury, Mount Somers, Castle Hill, and various other parts, which is well adapted for making lime.

*Timber.*—The sawmilling industry finds its development chiefly in the Oxford, Little River, Mount Somers, and Waimate districts. The number of mills in Canterbury in 1901 was eighteen, employing 260 hands, the horse-power being 317. The output in 1900 was 4,714,959 ft., valued at £22,277. The number is, however, diminishing, owing to the working-out of the available timber. The timber comprises birch, totara, red and white pine. The first named is used chiefly for sleepers and fencing, the totara and pine for building purposes. Including the work done by the planing and moulding mills, the value of all the manufactures under this head was £45,866.

#### OTAGO LAND DISTRICT.

##### *Counties.*

The counties of this district are Bruce, Clutha, Lake, Maniototo, Peninsula, Taieri, Tuapeka, Vincent, Waihemo, Waikouaiti, and Waitaki.

##### *General.*

Great tracts of mountainous country in Otago are roamed by millions of sheep. These are the ranges that run down from the Alps towards the sea. The first of these starts in a tangle of mountains between Lakes Ohau and Hawea. The Grand View Range takes it down to the Waitaki Valley, the Hawkdun and Mount Ida take it further down, and the Kakanui Hills take it out of the Waitaki Valley to the sea at Kakanui mouth, south of Oamaru. The mountains succeed each other, range after range, the whole length of the district, from Mount Aurum, the Richardson Mountains, the Remarkables, and the Hector Mountains, that envelope Lake Wakatipu, to the last peak of the Crown Range, which lies between that lake and Wanaka. The ranges south of these are Mount Pisa, the Carriks, the Garvies, the Umbrella, and the Obelisk (otherwise the Old Man Range), filling the country between the Clutha and the Mataura Rivers; and the Dunstan Mountains, the Raggedies, Knobbies, Lammerlaws, and the Rock and Pillar, that bring the mountain system of the interior into touch with the low coastal spurs.

All these hills are yellow with tussock, their tops green with snow-grass, and the highest altitude is not over 6,500 ft. Comfortable homesteads, each with its patch of buildings—huts large and small, woolshed, stables, and the rest—its paddocks—cultivation paddock, horse paddock, shearing paddock—its patch of trees, its garden, and sheep-yards, tell the tale of pleasant pastoral life; and wire fences abound on all the hill-sides for the better control of the sheep roaming the hill-sides in the days of the mustering, and for their safety in the time of the snow. The first falls of snow are expected in April, the hill-tops have their heavy winter mantle generally before the end of May, and it is October before the thaws set in, which by November send all but a few patches of snow to the sea. In the average winter, the flockowner is quit for the vigilance and energy necessary for keeping his flock out of the first falls, and the snow does

the rest, retiring from the tops in October or November, leaving green summer pasture for the flocks released from the low country. Throughout the winter, snow, of course, falls, covering the lower spurs and the valleys, but it seldom lies any time on either. The exceptional winters are the flockowner's trouble. The losses they have caused him have startled him into comprehension of his duty to grow food-stuff on the low lands to be fed out to the starving stock during those exceptional periods. All this is now so well understood, that in the subdivision of runs provision is always made for a mixture of suitable country—summer tops, lower winter spurs, with flat land enough, where possible, for the growing of stock food against evil days.

The revenues of these runs are derived from wool and mutton. The prices of merino wool rule high at present; merino mutton is in good demand in the country; and as the crossbred has taken kindly to the hills in many places, there are always on these plenty of stores for the farmers of the low country on the look-out for supplying the export trade. The sale of lambs is also a profitable thing for some runholders.

The tendency of the day is to subdivide the runs so as to bring their profits within the reach of the largest number of tenants. In this connection there is a tenure under the Land Act known as the "small grazing-run tenure," which has been largely and profitably availed of by small settlers.

The best way to see the pastoral country is to make a trip by the Otago Central Railway to its inland terminus near Clyde, and ride or drive round by Cromwell, the valley of the Upper Clutha, to the Wanaka Lake; thence by the Cardrona Valley, and over the Crown Terraces to Arrowtown and Queenstown, on Lake Wakatipu. From there, the journey will be by steamer to Kingston, and by train to Gore, by way of the Waimea Plain. From there to enter into agricultural Otago is but a step.

After crossing the Mataura the railway runs at once into the valley of the Pomahaka, and leaves it not far from the Town of Balclutha. This is the largest of the tributary valleys of the Clutha, with a course of something like fifty miles from the source of the Pomahaka on the slopes of Spylaw to the mouth at the junction with the Clutha. After a course of twenty miles the river valley opens out into the Tapanui Plain, and the plain merges into the Pomahaka Downs and a great tract of down country. Glenkenich, Waipahi, and Popotunoa (Clinton) are the towns of this region, and the centres of the Tapanui Plain are Heriot, Kelso, and Tapanui. In the plain the soil is a fine loam, and cereals flourish, as also root crops, rape, and all the leguminous plants of the Temperate Zone. Handsome houses proclaim substantial holdings, solid farmhouses are in plenty, dairy herds are everywhere, the country is dotted with clumps of timber, and all its roads are feeders of the railway, and good at all seasons. At Tapanui the Forest Department has a fine nursery.

Further down, the valley is broad to its merge with the Clutha. It is a country of downs rolling broad and high; in places stiff with clay and poor, in others rich; and every acre of the downs is ploughable. From commanding positions in the fringing ranges—Waipahi, Kuriwao. Wairuna—the view is very fine and characteristic: the Pomahaka Valley spreading its great downs in front, like a rolling sea of brown



and green and yellow heaving right up to the Tapanui Ranges opposite ; westward the Plain of Tapanui coming down in soft curves, with the big hills of the pastoral region behind it. The best of the country is the fertile tract of loamy down running up from Balclutha in the direction of Clydevale and Clifton.

At Ba'clutha the beautiful district of Inch-Clutha begins, spreading rich and fertile seawards, while up the river lies a splendid agricultural and pastoral country as far as Lawrence. It is a country of low hills, rich valleys of good corn land, and fine pastures. Here are the Greenfield and the Hillend Estates, lately resumed by the Government and in process of close settlement.

North and east is the open Stirling and Kaitangata country—country of fine agricultural possibilities, leading to the rich Tokomairiro Plain. This plain, in the midst of which stands the country town of Milton, is well farmed and prosperous. On the sea side it is flanked by a low range of good hills, for the most part pastoral, with a few valley-bottoms of good soil, carrying cattle better than anything else. On the other side the plain rises to the spurs of the Lammerlaw Range and its offshoots, coming down from the pastoral interior.

Further on towards Dunedin is the famous Taieri Plain. You may come upon it from Waipori by way of Berwick, perched in the south-western corner, or from the narrow strip of arable land by the side of Lake Waiholā. It is the richest land in Otago certainly, and amongst the richest in New Zealand, an alluvium that bears the heaviest crops of wheat and oats, of rape, pulse, beans, and turnips. Its black soil, numerous tree-clumps, fine paddocks, and substantial, comfortable homesteads, outbuildings, live fences, and fine tilth, and well-bred, good-conditioned stock proclaim the prosperity of the sturdy race of settlers who long ago made this swampy country their own. The southern trunk line crosses it, and so does the Otago Central on its way to thread the gorge leading to Strath Taieri and the Maniototo Plain. The towns on this plain—Berwick, Mosgiel (site of the well-known wool-factory), Outram, and Allenton.

Between the Taieri plain and the sea lies the range of Saddle Hill. A few miles of low green hills, with pleasant farming country interspersed, and you reach Dunedin, among the big hills connecting with the great system of pastoral country which fills the interior as described in the previous pages.

On the land side the Taieri Plain is flanked by the spurs of Maungatua, well grassed, descending from the heights of the Rock and Pillar and the Lammerlaws. These are largely arable, and some day will, no doubt, be put to that use.

The next agricultural country is in the Taieri Valley, where it opens out at Middlemarch with a few thousand acres of rich soil ; and the next is the Plain of Maniototo—a light soil amenable to irrigation, carrying stock well and growing timber with excellent results. The settlements of Waipiata and Ranfurly attest the good possibilities of close settlement in this region. The elevation is somewhat high, and the frosts in winter are therefore rather sharp ; but the snow rarely lies long. This district carries a large mining population. This plain curves round into the Ida Valley to the westward, between the Rough and the Ragged Ridges and into the Upper Taieri Valley, where there is good land between the Rock and Pillar and the Rough Ridge.

Then, on the other side of the boundary hills—Raggedy Ridge and its continuation in the pleasant low Galloway Hills—comes the valley of the Manuheikia, separated from the upper Clutha Valley by the Dunstan Range. This valley is about five-and-twenty miles long by some eight miles in breadth, and curves round by Alexandra and Clyde. Opposite is the large Earnscleugh Flat, across the Clutha. The whole of this area is amenable to irrigation, and is a splendid fruit-growing country besides. The peach, the apple, the plum, and the grape flourish; the latter in small quantities, but sufficient to show the possibilities of the future when adequate arrangements shall have been made for utilising the water running to waste in the main river of the region. At present all the available water is taken up by the miners, but when capital is forthcoming for the venture—a mere matter of time and faith in the resources of this fine country—there will be enough and to spare for every interest. Some examples of irrigation are here a fine object-lesson. The valley has, in fact, demonstrated its capacity for agricultural development of a high order. Already the fruit industry has begun to reap rewards which the coming years will augment. It is a country of light friable soil, with high terraces of river formation, and some fine undulating breadths. The climate is dry and the seasons well marked.

Down the Clutha there is some good fruit land at Coal Creek, Roxburgh, and the Teviot, and below them the fine country of Teviot and Moa Flat, the valley opening out into good river terraces between good pastoral hills.

The next breadth of arable land is the valley of the Upper Clutha, lightly soiled, answering, like all this interior country, the stimulus of irrigation well. On one side it sweeps round by the Lindis and the Tarras streams, forming by their valleys the low country of the Morven Hills Run, to the rich Hawea Flat lying between the lake of that name and the Grand View Range. There is some very successful settlement upon that flat, and a few farms attest the value of the country further down the river.

On the other side, the valley has a length of low plain land of some thirty miles by an average breadth of some two miles, and here and there farms attest its possibilities. Water is the great want, and water (unmonopolised by miners) is near at hand, with no engineering difficulty to prevent its abundance from duly fertilising the soil in that dry climate.

Westward the valley turns into the valley of the Cardrona, for the most part shingly, carrying a few settlers, who are beginning to take up the ground abandoned by the diggers, the mining industry having dwindled in these parts to attenuated proportions. This valley is necessary for the most part to the working of the high pastoral country of the boundary hills. It grows timber well, as do the lower spurs of the boundary hills.

Beyond the sources of the river, and on the other side of the Crown Range, is the Crown Terrace, a very fine stretch of corn land. Thence, the eye looking towards Queenstown sees fine breadths of the same sort of corn land, in the Arrow Valley round about Lake Hayes, in the Frankton Flats, and on the terraces between Arrowtown and the Shotover River; in all, perhaps, some 20,000 acres smiling with cultivation among the great rough hills of the Shotover-Kawarau-

Wakatipu region. This is an ideal fruit country; the grape ripens well; barley and wheat are the cereals for which the soil is best adapted, and they are not surpassed in quality by anything grown in these Islands. Like the rest of the interior Otago country, this land grows timber in great perfection, and answers to irrigation amazingly well.

Lastly, there is the northern country, from about Waikouaiti to the Waitaki River. The valley of that river begins to expand at Otekaieke, and for thirty miles to the river mouth is known as the Waitaki Plains—a fine stretch of alluvial soil. This plain, with very fine limestone downs, reaches round to Oamaru with a series of grand homesteads and plantations, and cultivations and hedges. Behind Oamaru there is an opening left by the Kakanui Hills taking the high pastoral country diagonally across from the Waitaki, in the direction of Moeraki to the southward. This is filled with broad limestone downs and the valleys of small streams. From Duntroon these stretch across by Ngapara, Windsor, Elderslie, Livingstone, Tokarahi, Awamoa, and other well-known places, to the Totara country and the sea, joining the magnificent limestone lands of the coast country. These hold as far as Palmerston, alongside the pastoral country, coming gently down from the Horse Range and the other hills. The district is sometimes described as the Normandy of New Zealand. From Duntroon you can see Otekaieke, Corriedale, and extensive estates stretching away towards Dansie's Pass, that gives access between this country and the Maniototo Plain. Here is the very best wheat-growing land in all New Zealand. Root crops do splendidly also, especially the potato; turnips and rape are everywhere, and the scent of clover. The older properties have the best plantations in the country—the finest gardens, the best live hedges, the most ornate, up-to-date homesteads—some of them more like "country houses" than farmsteadings. There are also many resumed estates, which show results that have greatly astonished the settlers and all concerned. The properties were bought by the Government from the owners at prices regarded by many judges as extreme. Viewed as rent, however, these prices represented a mere fraction of what used quite commonly to be paid for a season's cropping in the good old days of the shepherd kings. Seeing that the cheaper rent had the additional advantage of being part of a system of secure permanent tenure, as good as freehold in its indefeasibility, while it left the tenant free to put the whole of his capital into the business of stocking his farm, it is not wonderful that there was an enormous demand for these sections. That demand has been amply justified by the results. The houses of these recent settlers are new, and their places, being for the most part fenced with wire, have a look of bareness in contrast to the older farms of the district. But their tilth is the tilth of experience, and their crops, dairy-produce, and stock are worthy of the best traditions of the farmer all the world over. It is worth remembering that these farms have not been resumed seven years—a fact that speaks volumes for the results.

There are still several large proprietors in this country side, and the farms of the pre-resumption days are many. The homesteads and gardens and big plantations of the former punctuate the landscape with the outbuildings, woolsheds, huts, stables, and barns incidental to the best form of country life. The farm steadings are also comfortably disposed among plantations rising up out of green pasture

or yellow cornfield. This country of corn and crops and plantations, flocks and herds, hedgerows and fences, sweeps round Oamaru into the fine sea-coast country before mentioned. Everywhere the tilth strikes the stranger as perfect, with its weedless soil, fine worked as a garden.

At Palmerston the cultivation turns up the valley of the Shag River, advancing some twenty miles into the heart of the rough hills of the pastoral interior up to Waihemo.

Hawkesbury (the Waikouaiti of the coaching days, the name being now devoted to the Maori township) a few miles to the south, is also a centre of agriculture and splendid pasture, of plantations growing quick in rich alluvium, of fattening stock, and growing crops, green and cereal. There are here some of the oldest and most celebrated properties in Otago—Cherry Farm, Goodwood, Tumai, Corner Bush, Mount Royal, Bushy Park, and the rest—truly a smiling, rich country. This is the last on our list of agricultural Otago. The hills sweep down pastorally to the south of Hawkesbury, and, with the exception of the valley of the Waitati, and a flat or two here and there, and a stray swamp that has escaped the reclaiming effects of prosperous agriculture, the land to Dunedin is pastoral, most of it carrying English grasses in great luxuriance. These hills were once densely wooded, and even now there are substantial breadths of forest; but the forest has for the most part “passed,” and grass, drawing cattle in its green train, is making raids of conquest on the lingering remnants.

*Dimensions.*—The district measures about 160 miles from Stripe Point on the west coast to Waikouaiti Bay on the east coast, and the same distance from north to south. Its area is 8,882,800 acres.

*Plains.*—There are some considerable areas of tolerably level land in the interior, the largest being the Maniototo Plains, the Idaburn, Manuherikia, and Upper Clutha Valleys. Their dimensions are approximately as follows: Maniototo Plains, length twenty-eight miles, average breadth ten miles; Idaburn Valley, twenty-five miles by four miles; Manuherikia Valley, thirty-five miles by four miles; Upper Clutha Valley, thirty-three miles by five miles.

The Taieri Plain, nearer the coast, is about the same size as the Idaburn Valley, and is very fertile. Other plains are the Waitaki in the north, the Tokomairiro, the Strath Taieri, the Tapanui, and the fertile Inch-Clutha, lying between the two arms of the Clutha River, and consisting entirely of alluvial deposit. There is also a good deal of low country, chiefly rolling downs, on the south-west side of the Clutha near the sea.

*Physical Description.*—The country generally is mountainous, the highest land being to the north-west, and culminating in Mount Aspiring, 9,960 ft. above the level of the sea.

The west coast mountains are remarkably rugged and grand. The thirteen sounds that pierce this coast are on the west coast of the Southland District. Milford Sound, though only eight miles in length, contains some of the grandest scenery in the world; and fourteen miles inland from its head is the great Sutherland Waterfall, 1,904 ft. high, possibly the highest waterfall known. Bligh Sound is smaller than Milford, and not nearly so interesting; but George Sound is larger, and very picturesque.

A tourist track has been opened from the head of Te Anau Lake to Milford Sound. The Government Tourist Department has now assumed complete control of this track, and has established a comfortable accommodation-house at the head of Te Anau, where guides can be procured if required from the 1st October to the 30th April. There are six huts on the track, supplied with blankets, provisions, &c., and a man in charge of each hut. During the season there is a weekly mail between Te Anau and Milford. The track runs through the Clinton Valley, passes the Sutherland Falls and Lake Ada, and opens out some of the finest scenery in the colony. A practicable route has been discovered, and a track formed, from the north-west arm of the middle fiord of Te Anau Lake to the head of George Sound.

For nearly one hundred miles inland from the west coast the country is very mountainous, but at a distance of sixty or seventy miles from the south-east coast-line it begins to get gradually lower, taking the form of rolling hills and downs along the sea-shore.

*Rivers and Lakes.*—The largest rivers are the Clutha, Taieri, and Waitaki: the first named drains Lakes Wakatipu, Wanaka, and Hawea; the last, Lakes Ohau, Pukaki, and Tekapo, in the Canterbury District. Te Anau, the largest lake in the Middle Island, lies partly in the Otago and partly in the Southland District. The dimensions of these lakes are as follows:—

Lakes.	Length in Miles.	General Breadth in Miles.	Area in Square Miles.	Height above Sea-level in Feet.
Te Anau, in Southland	42	1 to 6	132	694
Manapouri, „	14	4	50	597
Wakatipu, in Otago ..	50	1 to 3½	114	1,069
Wanaka .. ..	29	1 to 3	75	928
Hawea .. ..	19	3	48	1,062
Ohau .. ..	11	1 to 3	23	1,720
Pukaki .. ..	11	2½ to 5	31	1,588
Tekapo .. ..	15	1 to 3½	32½	2,325

These lakes are situated in mountainous country; they are of glacial origin, and all very deep.

The steamer service on Lake Wakatipu is now owned by the Government, and is under the control of the Railway Department. During the summer months the steamers run between Kingston and Queenstown daily, and to the head of the lake from Queenstown three times a week. During the winter months the daily service to Kingston is maintained, but the communication with the head of the lake is only bi-weekly.

On Lakes Wanaka, Manapouri, and Te Anau smaller steamers are in use.

The Clutha River is the largest in New Zealand, and is estimated to discharge over 1,000,000 cubic feet per minute. It has a rapid current, but is navigable for small steamers for a distance of forty miles from its mouth.

*Forests.*—The forest land lies mostly along the sea-coast, the largest area of bush being Tautuku Forest, about forty miles in length and fifteen miles in breadth. The western part of this forest is in the Southland District. The other principal forest areas are in the following localities—viz., North of Dunedin, east of the Tapanui Mountains, in the upper valley of the Waikaia River, and towards the north-west coast.

The forests of Otago contain a large variety of useful timber, both hard and soft wood ; some being suitable for building purposes, while other varieties are highly ornamental, and much prized for cabinet-work.

*Limestone for Burning.*—Limestone is found in the following places : Oamaru, Otekaieke, Otepopo, Waihemo, Maniototo Plain, Waikouaiti, Lower Harbour, Peninsula, Waiholo, Millburn, and Wakatipu.

The Millburn Lime and Cement Company burn large quantities of lime at their Millburn works, from whence it is sent to all parts of Otago for building purposes, gasworks, &c. It is also largely used in farming, and the productiveness of the Tokomairiro Plain has been greatly increased of late years by its application to the soil. Large cement-works belonging to the same company have been open for some years on the reclaimed land in Otago Harbour, near Dunedin. The cement manufactured at these works is considered equal to the best imported, and is largely used in building and other constructive works.

*Climate.*—The climate of Otago is on the whole fairly equable. Central Otago suffers a little from the intensity of the cold in the winter and the excess of heat in summer ; but places on the sea-coast have a fairly even temperature all the year round. There is a somewhat large area of practically rainless territory, which includes the Maniototo Plains, the Idaburn and Manukerikia Valleys, and extends to Lakes Wakatipu, Wanaka, Hawea, and Ohau on the west and north, and to the northern portion of Waitaki County on the north-east. From Oamaru the direction would be across country to Mount Bengier and to the southern end of Lake Wakatipu. This part of the country is well adapted for sheep of all kinds, especially merinos, some of the runs being capable of carrying 80,000 sheep. Wonderful results have been worked with irrigation on parts of the hitherto dry and barren portions of Central Otago.

*West Coast.*—In marked contrast to Central Otago is the west coast district, which may be described as having a wet climate. Not that the number of wet days in the year is very great, but it is subject to very heavy rains from the north-west, the fall generally exceeding 100 in. per annum. But, although wet, the climate is mild, and the vegetation is consequently luxuriant. There are few settlers in this part of the country. Mr. and Mrs. Sutherland keep a house of accommodation for tourists at the head of Milford Sound, and there are a few settlers at Martin's Bay. There are very few visitors to the Sounds during winter, but in summer the tourist traffic is considerable. Towards the south-east and south coasts of the district the climate is moist, being somewhat similar to that of Dunedin, where the average rainfall is 35 in., distributed over 163 days in the year.

*Cultivation and Yield.*—Cereals of all kinds do very well over nearly the whole of the provincial district, including Southland. The

following are the agricultural statistics for the year ending the 31st March, 1905 :—

Total area in occupation in the provincial district, including sown grasses and fallow land, 10,373,910 acres. Corn-crops sown for threshing, chaffing, and feeding-off, comprising wheat, oats, barley, rye, maize, peas, beans, linseed, hops, vetches, and other similar crops, 295,682 acres; green and root crops, including grasses sown for feed and hay, 250,901 acres; land broken up and grassed, 1,487,066 acres; in clover, 4,659 acres; surface-sown with grass without the land being first broken up, 298,226 acres; plantations, &c., including private gardens, market gardens, orchards, and vineyards of a quarter of an acre and upwards, 11,827 acres; land ploughed but not planted, 31,036 acres; area in tussock or native grass, 7,994,513 acres.

	Acres.	Estimated Yield per Acre. Bushels.	Total. Bushels.
Wheat for threshing ..	53,653	37·94	2,035,861
Oats ..	167,025	41·21	6,883,583
Barley ..	3,814	35·81	136,582

Total number of sheep on 30th April, 1904 ..	3,360,743
Horses .. ..	61,470
Cattle .. ..	321,654
Swine .. ..	33,404

The dairy industry continues to flourish and expand in Otago, and new lands are continually being brought under cultivation.

The export of rabbit-skins from Dunedin during the financial year ended 31st March, 1905, amounted to 5,278,977 skins, valued at £33,524.

*Fruit.*—There are some fine fruit-growing districts in the valley of the Clutha, from below Roxburgh right up to Lake Wanaka. The summers are dry and warm, and the soil suitable. Apricots, peaches, &c., come to maturity fully a month before they do at Dunedin, and grapes ripen in the open air. There is a great future for this neighbourhood in the growing of those varieties of fruit which agree with and thrive in a dry climate. The grape might be cultivated either for wine-making or for the table, and some varieties could be made into good raisins. The dryness of the atmosphere is favourable for preserving all kinds of fruit, while the Otago Central Railway will bring the neighbourhood into direct communication with a market.

*Dairy Factories.*—Dairying is steadily increasing in Otago. The export of butter from Otago in 1905–6 was 27,966 cwt., value £151,000, and of cheese 11,936 cwt., value £37,000. Prices have ruled high, and dairymen have been much encouraged, and next year several new cheese-factories will be in operation. Most of the dairy factories—indeed, nearly all—are co-operative, the whole proceeds, less expenses, being divided among the milk-suppliers. The Taieri and Peninsula Milk-supply Company is a most admirable example of well-managed and therefore highly successful co-operation.

*Coal and Lignite.*—In the southern portion of Otago and in part of Southland thin seams of coal of a bituminous character exist. Probably the coal produced from the pits at Kaitangata and Nightcaps is the best in quality. First-class brown coals are worked in several parts of Otago and Southland, the principal seats of the industry being Shag Point, Gore, Mataura, Coal Creek Flat, and Green Island.

Beds of lignite are also found in numerous localities, chiefly around the margins of the old lake-basins and along the courses of the older river-valleys, and are worked on a sufficient scale to supply local requirements.

The output of coal and lignite in Otago and Southland for 1904 was 433,251 tons, an increase of 27,412 tons on the previous year.

*Building-stones.*—Building-stones of good quality are found in various places throughout Otago. The Port Chalmers quarries afford an inexhaustible supply of bluestone, a basaltic stone of great hardness and durability; and the neighbourhood of Hinton furnishes a bluestone of superior quality. In Otago Central a hard, close sandstone is obtained near Kokonga. A hard freestone of excellent quality is found at Waikawa, where there is a large hill of it close to the water's edge. Blocks of very great size can be obtained. There is also a freestone of superior quality on the property lately owned by the late Hon. W. J. M. Larnach at the Peninsula. A dense dark granite is obtainable on Ruapuke Island; specimens, both tooled and polished, may be seen in the base and pilasters of the new Government Life Insurance Buildings at Dunedin. A soft white building-stone—the well-known Oamaru limestone—is found in large quantities along the railway-line near Oamaru, from whence a good deal is exported to other parts of New Zealand and to the Australian States. A similar kind of stone is found at Otekaieke, about two miles from the railway-station, and it may be interesting to note that during the years 1891–93 about 3,000 tons of stone were sent from the Otekaieke quarries to form the facings of the Melbourne Fish-market.

*Freezing Establishments.*—There are three freezing and preserving works in Otago. The establishments are at Oamaru, Burnside, and Port Chalmers. At Oamaru there is a 60-ton Hercules refrigerator, capable of freezing 1,200 sheep a day, and there is storage-room for 30,000 carcasses. The Port Chalmers freezing-works, erected in 1896 by the Otago Dock Trust, are largely used for the storage of butter prior to shipment, and for the freezing of rabbits during the season when these are available for export. The refrigerating machinery originally consisted of a 12-ton Hercules, but lately the buildings were enlarged, and a 35-ton Hercules was added. At Burnside there is a 75-ton Hercules machine, capable of freezing 2,000 sheep per day, and there is storage-room for 50,000 carcasses. In addition to the usual export in mutton and lamb, much export business is done at these works in rabbit-freezing.

*Gold-production.*—Otago produces about one-third of the gold-output for New Zealand.

Gold is found very generally distributed throughout Otago, except in the southern portion of the district. The principal localities are: Clutha Valley, Tuapeka, Shotover, Cardrona, Tinker's, St. Bathans, Mount Ida, Nevis, Bannockburn, and Maerewhenua.

Last financial year 156,655 oz. of gold were exported from Dunedin, having a value of £629,672.

*Manufactories and Works.*—Under this head the returns to 31st March, 1905, give within the Otago Provincial District—12 aerated-water and cordial factories; 5 agricultural-implement factories; 6 bacon-curing establishments; 4 basket-making factories; 7 biscuit-factories; 10 blacksmithing establishments; 10 brewing establish-



ments; 105 bakers; 16 brick, tile, and pottery works; 2 brush-factories; 63 boot-factories; 49 butter and cheese factories; 3 card-board-box factories; 34 carpentering-works; 2 cigarette-factories; 3 confectionery-factories; 6 coffee and spice factories; 2 coopering-factories; 34 coach building and painting factories; 15 clothing-factories; 21 cycle-fitting establishments; 8 dental establishments; 132 dress-making establishments; 35 engineering-works; 2 electrical works; 2 engraving-works; 1 explosive-factory; 39 flax-mills; 11 fish-curing works; 2 flockmaking establishments; 3 fruit-preserving works; 15 fellmongeries, tanning, currying, and wool-scouring establishments; 45 furniture-factories; 4 gasworks; 21 grain-mills; 4 gunsmithing-shops; 3 hatmaking establishments; 9 hoisery-factories; 1 ink-factory; 4 iron and brass works; 2 jam-factories; 2 lime and cement works; 39 laundries; 5 lapidary-works; 2 manure-works; 3 mat and rug factories; 4 monumental-masonry works; 1 match-factory; 4 meat-preserving works; 2 paper-mills; 11 patent-medicine establishments; 5 piano-repairing factories; 16 photographers; 39 printing establishments; 5 rabbit-packing establishments; 2 rope and twine works; 28 saddlery and harness factories; 26 sawmills and sash and door factories; 2 sauce and pickle factories; 8 sail, tent, and oilskin factories; 9 shirt-making factories; 3 ship and boat building yards; 5 soap-factories; 95 tailoring-factories; 9 tea-packing establishments; 40 tinsmithing and plumbing factories; 3 umbrella-factories; 2 venetian-blind factories; 26 watchmaking-factories; 2 waterproof-factories; 3 wire-working establishments.

*Woollen-mills.*—There are four woollen-mills at work in the Provincial District of Otago, employing about twelve hundred hands. The woollen industry in Otago is of greater magnitude than in any other district of New Zealand; and as an exemplification of the excellent quality of the material turned out, it may be mentioned that the Mosgiel Woollen Factory took the Grand Prix at St. Louis Exposition for rugs, blankets, and wool.

Besides supplying local needs, the Otago Provincial District exported during the year ended 31st March, 1905, 9,606,183 lb. of wool, valued at £367,799.

The number of hands employed is 7,588 males and 3,661 females; total number of works of the above description, 1,243.

*Chief Towns.*—The following are the chief towns of Otago, with their population at last census, including all having one thousand inhabitants and upwards: Dunedin and suburbs, 52,390; Oamaru, 4,836; Port Chalmers, 2,056; Mosgiel, 1,463; Milton, 1,241; Kaitangata, 1,463; Lawrence, 1,159; Balclutha, 1,017.

## SOUTHLAND LAND DISTRICT.

### *Counties.*

The counties in this district are: Lake (portion), Stewart Island, Fiord, Wallace, and Southland.

### *General.*

The pastoral hills of Southland begin with the southern ridges of the Umbrella and Garvie Ranges, the mountains between Lakes Te Anau and Wakatipu, and the Dome Ranges south of the latter lake:

all good sheep country, but somewhat rough. Fiord County has a value solely scenic. The Takitimos, the principal landmark of north-western Southland; the Longwood Ranges, nearer the coast; and the Hokonuis are the hill pastoral country that runs across the district north of the great Southland Plain, and it is as good tussock country as any in New Zealand. Among these hills there are some fine homesteads, attesting the age and prosperity of the pastoral industry. On the southern coast the Slopedown and Fortification Ranges make a pastoral belt from the Maitai mouth to the Otago border, in the Tauparua Forest.

The first agricultural centre you reach on coming to southern New Zealand is Invercargill. Turn east, west, or north, as you will, you will travel among farms well tilled—oats, pulse, turnips, rape, grass, clover—all things growing and ripening as under the system of North Britain, with cattle great and small in the pastures. Westward lies the Riverton country, outlet seawards of the fertile lands of the Aparima Valley. Beyond this, a narrow strip of rich land given up to small settlement stretches between the Longwood Range and the sea to the valley of the Waiau. The plateau of the latter, looking down upon the river-bed proper, is rich for the most part, and extends many miles up the river.

The cultivation is most attractive in the neighbourhood of Invercargill: substantial it is, as becomes long-settled farmers—with homesteads, barns, stables, cowsheds, broad paddocks, and live hedges well trimmed, and many a timber-clump showing prudent care for the future and due respect for the duty of ornamentation. About Riverton the character is of the same order, perhaps a shade less extensive as to scale. Up the Waiau Valley the properties are larger—more stock than cultivation—though the latter is by no means deficient, and shows signs of steady improvement and great care. Fine patches of bush have been preserved and added to by artificial plantations; and there are good orchards, and gardens brighten the homesteads. About twenty miles up the river is Clifden, and something of the same distance eastwards is Otautau, on the rim of the plain of Southland. To see the country, drive from Otautau to Winton by the Township of Drummond, and take train to Invercargill later. The road will show you a country of substantial farms, sometimes running into the dimensions of large estates, many homesteads in sight among great tree plantations well grown, and substantial buildings. The implements are all up to date, and the cultivation what might be expected. It is a country essentially in good heart, as the farmers are fond of saying, a condition it owes, according to a large local testimony, to the use of the drain-plough, which some years ago proved the strength of the soil under proper treatment. The good land sweeps in great downs up to the feet of the ranges—the Takitimos, the Eyre, and Dome Mountains—the properties growing larger nearer the hills and less cultivated. At Drummond, lower down in the plain, the cultivation is close and the crops are always heavy. Winton, further on, presents all the appearances of a farming district that has grown old and prosperous without forgetting the days of the old pioneers. On the way to Invercargill from the latter place the signs of the best settlement increase and multiply on all hands. The rim of the plain—the Takitimos, the Domes, and the bold outline of the Hokonuis—is a delight always.

Eastwards from Invercargill, towards the Town of Wyndham, is another rich part of the plain, well settled, within easy reach of anything required by the hard-working farmer. About Wyndham is a country of dairy-farms and close cultivation, the undulating country rising up gradually to the coast range, on the sides of which are some fine estates, with green pastures in handsome setting of bush, with comfortable homesteads, and patches of cultivation telling of the mixed farming the separator and the refrigerator have made possible. Out of these rise the hills of the pastoral range of Slopedown, which, after a short course northwards, ends in the Tautuku Forest.

From Wyndham a few miles by rail bring you to the Edendale Settlement, resumed but the other day by the Crown, where the dairy industry is already the sheet-anchor of the settler. On the sea side of the same town is the Glenham Settlement. To the north of Edendale the Southland Plain is sprinkled with the homesteads of farmers as far as Maitara and Gore to the old district border, with results attested by the prosperity of these two very rising townships.

*Scope.*—For administrative purposes the Snare, Auckland, Enderby, Campbell, Antipodes, Bounty, and all other islands within the limits of the colony south of the 47th parallel of latitude are included in this land district.

*Area and Nature of Lands.*—The total area of the district, including Stewart Island, but exclusive of Solander, Ruapuke, and the other small islands enumerated above, is 7,566,592 acres, of which 500,000 are covered with bush. A considerable area in the Fiord County consists of immense alpine country, with scrubby bush reaching to the snow-line. This little-known country extends to the western sea, and there presents the remarkable indentations of the coast-line known as the West Coast Sounds. The whole region is a paradise for the artist, and, indeed, for all enthusiastic lovers of nature, but has little attraction for the agriculturist or pastoralist. The bush land suitable for timber lies in the neighbourhood of Forest Hill, Hokonui, Waikawa, and on Stewart Island. The timbers of commercial value are totara, rimu, miro, matai, kahikatea, rata, and kamahi, in mixed bushes; but *Fagus fusca* and other beeches predominate on the high lands.

The open land in Southland and Wallace Counties, in its natural state, carries tussock and snow-grass, fern, flax, manuka, &c., and there is a considerable area of marshy land, interspersed here and there with peat bogs.

Perhaps the most striking feature, if we exclude the Fiord country, is the number of well-defined rivers and valleys of the district, the latter often widening out to such an extent as to form very extensive plains. Commencing with the eastern side, the Maitara, Oreti (or New River), Aparima (or Jacob's River), and Waiau are the most prominent illustrations of this; but these rivers by no means exhaust the list, as they all have numerous tributaries, which exhibit the same features on a smaller scale.

Speaking generally, the watersheds of these rivers do not attain any great height until followed far inland, and near the great lakes. From what has been said above, it follows that the extensive plains and valleys referred to are of alluvial formation, in many places of very rich and fertile quality, and capable of raising crops of every known product, subject, of course, to climatic limitations. Generally

these plains and valleys rise from the river-levels in a very gradual slope, sometimes into a series of terraces from 10 ft. to 50 ft. in height, and sometimes into undulating hills, intersected at frequent intervals by lateral gullies, affording natural drainage and an abundant supply of water.

These hills are covered with an indigenous growth, consisting of tussock and other grasses, fern, flax, &c., and even in their native state afford excellent grazing for sheep.

Near the large lakes, such as Wakatipu, Te Anau, Manapouri, Hauroto, and others, and between these and the west coast, the country becomes very high, often reaching 5,000 ft. and 6,000 ft. above sea-level, with very steep and rugged spurs and ravines, these in most cases being covered with a dense growth of timber, principally of the birch or beech tribe, for two-thirds of their height; the tops, however, often carry tussock and other herbage, affording admirable pasture for sheep in summer; but stock have to be removed from April to October, during which period this country is generally covered with snow.

Southland does not contain so much forest as most of the North Island districts, nevertheless there is a very considerable quantity in the eastern, southern, and western parts, and a large export trade is done in the different kinds of pine and other timbers used for building, engineering, furniture-making, &c.

From what has been said of the river systems it will be evident that the country is well supplied with water, although none of the rivers can be used for purposes of internal communication; but the plains are traversed by railways for considerable distances from the principal towns, and where the railways end communication is continued by good roads, so that there is probably no part of the colony better off for means of transit; and with the Bluff Harbour the Southland District would seem to possess every facility.

*Agriculture.*—Having already touched on the character of the soil, it only remains to say that the plains, terraces, and lower hills are well adapted for raising wheat, oats, and other cereals, turnips, mangolds, beets, and the various other crops common to temperate climates. Wheat is not so widely grown as it might be, for the reason, probably, that the pastoral branches of farming receive more attention than the agricultural, and wheat is not required for these, whereas oats are largely grown for export and to feed sheep in the form of chaff; turnips also are much cultivated for winter food. Where wheat is grown the yields are very satisfactory, ranging from 40 to 60 bushels per acre, while oats frequently give 70 to 80 bushels.

Linseed is now receiving some attention from farmers, as they find ready sale for it to the manufacturing chemists at remunerative prices, a fair crop yielding over £5 per acre.

*Dairy-farming, &c.*—Dairy-farming now forms a very important industry in this district, a number of factories having been established, the total number now in the district being eleven creameries, eight cheese-factories, and fourteen dairy factories, one being a large condensed-milk factory and one making first-class Stilton cheese. In this connection the Customs Department returns (1905-6) for this district, under "Exports," give the following interesting figures: Butter, 1,550 cwt., value £8,730; cheese, 38,727 cwt., value £154,800

*Sheep-farming.*—By far the most important industries are those connected with the raising and export of mutton and wool. Some years ago sheep-farming was much hindered by the inroads of rabbits; but owing to the repressive measures adopted there has been a marked abatement of the pest. The hill-country, although it does not carry a large proportion of stock to area, is eminently healthy. The average carrying-capacity over the whole district would probably be slightly over one sheep to the acre. Until within the last few years most of the runs were stocked with merinos, but owing to the decline in price of merino wool, and to the carcass being unacceptable to the European market, these sheep have, generally speaking, been replaced by Leicesters, Lincolns, Romney Marsh, Cheviot, and crossbreds of various kinds, better suited to the existing demands. The total number of sheep on the books of the local Stock Department reaches 1,102,803. This number is distributed over Southland District. During the later portion of the past year many of these were acquired by settlers from the northern districts of the colony, but the successful lambing season intervening has more than neutralised the depletion. A number of large establishments for slaughtering and freezing sheep and tinning meat are at work. Two large establishments are situated at the Bluff, and another at Maitara (on the Main Trunk railway-line). Beef, mutton, and rabbit tinning works have been established for some years at the Gap Road, near Winton, while another is in operation at Woodlands. The exports from these factories (frozen meats) as returned for the year 1904 is as follows: Frozen mutton—80,767 carcasses, value £52,650; lamb—120,251 carcasses, value, £58,292; rabbit-skins—774,295, value £6,650.

*Industrial (Coal, Gold, &c.).*—Extensive seams of coal and lignite are distributed over the district, and a large deposit of brown coal is being developed by the Nightcaps Coal Company. This coal is used throughout the district, and its utility has been recognised by the Railway Department of the colony, some 42,000 to 45,000 tons having been used on the Southland section of New Zealand railways during the year 1904. Coal of quality similar to that at the Nightcaps has been opened up at Hokonui, and some 52,000 tons have been taken out therefrom. The comparatively small demands of the district, however, led to the mine being closed down a few years since. A deposit of shale covering a fair area exists at Orepuki. Peat is also found in some up-country neighbourhoods—notably, at Maitara—and is used for fuel where wood and coal are scarce. Gold is found all over the district, and is being obtained either by sluicing or dredging. A considerable amount of capital has been invested in river and beach dredges worked by steam. The dredging operations of the past years have for the most part been confined to the streams lying east of the Maitara River. Twenty-six steam-power dredges are on the Waikaka, twelve at Wakaia, ten on the Waimumu and Charlton Streams, one at Maitara, and one at Chatton. These dredges have been working for some years, and the yields of gold, although of an intermittent character, have on the whole been satisfactory. Payable gold-bearing reefs exist in Preservation Inlet and at Stewart Island. Among the lesser industries the preparation of the fibre of the native flax-plant (*Phormium tenax*) is worthy of notice. The plant is found all over this district, and seventy-four mills have been set up.





HAYLOCK'S LANDING, MARAKOPA RIVER.

*Immigrants' Guide.*

The more remunerative and regular prices obtained during the past year will, if upheld, make this a steady industry throughout the district.

*Timber.*—Last, but of considerable value in results, the timber industry of the district merits attention. For many years the active efforts of the sawmiller have proved a source of considerable wealth. No less than fifty-six sawmills are now at work off and on within the greatly reduced timber-areas of Southland, and it is feared that this district will be worked out; at any rate, the industry will be very considerably reduced in the near future.

*Fish.*—Salt-water fish abound in great numbers in the waters surrounding Stewart Island, and oysters are found on banks between that island and the Bluff. Fish are largely exported to Melbourne, as also the oysters during the open season. All the large rivers, and many of the tributaries, are well stocked with trout, while for heavy trout-fishing the Waiau River may be mentioned as one of the finest in New Zealand. One river—the Aparima—had salmon-spawn put into it some years ago, and, it is now believed, with success.

*Fruit.*—The small English fruits, such as gooseberries, currants, raspberries, strawberries, &c., grow in great profusion, as do also apples. Stone-fruits are not so common, although peaches, nectarines, apricots, &c., do well when trained against nursery-walls in favourable aspects.

*Climate.*—The climate is bracing in winter, and warm and genial in spring and summer. The old residents state that there has been a marked decrease in the rainfall within the last decade. No regular observations have been recorded for the last few years, but it is believed that the average is about 30 in. a year. It may, however, be observed that more rain falls near the coast than inland, and also that the rainfall is more evenly distributed throughout the year than is the case in the northern part of the colony. The temperature varies from 40° in winter to 70° in summer.

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## PART V.

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### THE PUBLIC ROUTES, TOWNS, ETC.

#### GENERAL.

TRAVELLING in New Zealand in the early days of colonisation was almost impossible; by sea there were no boats, and by land no bridges. Roads were few, impenetrable forests many, vehicles none. Therefore, the few settlements scattered over the country had little knowledge of each other. Now the land is dotted with cities, towns, hamlets, farmsteadings, and overrun with a network of railway, road, and telegraph lines. Comfortable accommodation can be had everywhere, and bridges abound, as do steamboats, railway-trains (express and otherwise), coach services, and pack-horse equipment.



At the fringes of settlement, where the pioneers are hewing their homes out of the wilderness, the history of road-making is as follows : First comes the bridle-track, that gradually grows into the dray-road ; and then comes the metal, with bridges, culverts, water-tables, and all the other paraphernalia of civilised construction. Here are stages of colonisation which intending pioneers should thoughtfully realise before starting out.

Every town and hamlet has its post-office, with money-order and savings - bank department attached, and in many instances its local newspaper

By sea the Union Company keeps up a regular and efficient service round both Islands and to Australia ; the Northern Steamship Company supplies the northern coasts, and small steamers ply regularly up and down various portions of the coasts.

The Government railways are over 2,375 miles. In the Middle Island a trunk line connects the Bluff in the south with Culverden, a station a few miles north of the Hurunui, in the Amuri County, just across the northern border of the Canterbury District, connecting all the important towns from Invercargill to Christchurch. From the capital of Southland a line runs out west to Orepuki and the Night-caps, and another north to Kingston, at the foot of Lake Wakatipu, which is met not far from the latter place (at Lumsden, in fact) by a line branching from the southern trunk at Gore. There is a branch line from the main line to Wyndham and Glenham, and a line from Invercargill to Fortrose, near the mouth of the Mataura. There is a branch between Waipahi and Edievale, south of the Clutha Valley ; another between Milton, on the trunk line further north, and Lawrence, in the mining country ; and several in the neighbourhood of Oamaru.

The Otago Central line branches from the Main Southern Trunk in the Taieri Plain, and, passing through Strath Taieri, reaches Omapau in the Manuherikia Valley.

Further north a branch connects Timaru with Fairlie, and by road with Burke's Pass and Mount Cook ; another brings Ashburton and Mount Somers together, far up the Canterbury Plain ; another connects Rakaia with Methven ; another takes people from Christchurch to Lake Ellesmere and Little River, in Banks Peninsula, connecting with the coach-road to Akaroa ; while yet another connects Rangiora and Oxford with the main line. Lastly, the western line running out of Christchurch reaches the foothills of the Alps, after throwing a branch out to White Cliffs by the way.

On the trunk line of the south, the ports are connected with the three chief centres of Christchurch, Dunedin, and Invercargill.

Further north, Blenheim and Picton (eighteen miles) are connected by rail, as are also Blenheim and Seddon (sixteen miles), and Nelson has thirty-one miles of line as far as Motupiko. The gap of 114 miles between this place and Reefton is crossed by a coach-road

Reefton, Greymouth, and Hokitika are linked together by the western railway system, and so are Brunnerton and Otira, on the Teremakau River, and a line is in progress to connect Hokitika and Ross.

In the North Island there are two separate main systems of railway, destined in a few years to be joined together by the completion

of the Northern Main Trunk Railroad. That line is now constructed between Auckland and Taumarunui to the south, a distance of 175 miles. At the southern end forty miles are complete between Marton and Taihape, higher up the valley of the Rangitikei.

The gap between, of ninety-one miles, is to be completed in about two years. Then the rail communication between Auckland and Wellington, 427 miles 70 chains, will be complete.

The Northern Trunk line is connected by branches with Rotorua, Cambridge, Te Aroha, and the Thames.

Another trunk line connects Auckland with Helensville, on the Kaipara River, thirty-eight miles to the north, and Woodstock, twenty miles further—a total of fifty-eight miles; and in the north country there are two short lines of railway—on the west the Kaihu Valley Railway, a completed line of sixteen miles, joining Dargaville, on the Wairoa River, with Kaihu to the north; and on the east an unfinished line between Whangarei and Opua in the Bay of Islands, of which two lengths, Kawakawa to Opua (eight miles) and Whangarei to Hukerenui (twenty-three miles), are complete, leaving a gap of twenty miles between Hukerenui and Kawakawa, joined by a coach-road. Construction is proceeding from both ends.

By the southern railway system of the North Island, New Plymouth, Wanganui, Marton, Foxton, Palmerston, Napier, Woodville, Masterton, the Hutt, and Wellington, together with all centres of note, are connected together, and Palmerston is connected with Wellington by the west-coast line of the Wellington-Manawatu Railway Company.

A line from Stratford extends some twenty miles towards Ohura, and will ultimately join the Northern Main Trunk.

In both Islands coaches run everywhere. The three main lines in the Middle Island are—(1.) Fairlie Creek to the Hermitage, Mount Cook, *via* Burke's Pass and Lakes Tekapo and Pukaki. (2.) The line between Springfield, on the Canterbury side of the big divide, and Otira (on the Taramakau) on the other: this road runs over Arthur's Pass, some 3,000 ft., joins the end of the western railway system at Otira, and goes on to Hokitika by way of Kumara. (3.) The line between Reefton and Motupiko, bridging the gap of 114 miles between the railways of Nelson and Westland.

The main coach-lines of the North Island are the line between Napier and Taupo, and the lines connecting Taupo, Waiouru, Taihape, at railhead, the present northern terminus of the southern section of the Northern Grand Trunk line.

There is a branch from Waiouru to Pipiriki, on the Wanganui River.

A coach-road connects Napier by Kuripapanga with the Taihape Road *via* Moawhango.

Everywhere else the name of coach is "Cobb," and throughout both Islands there are numerous roads and bridle-tracks.

Such is the general system of travel throughout New Zealand. The particulars useful to those in search of land will be found in the detailed descriptions according to the ten survey districts which follow.

## AUCKLAND LAND DISTRICT.

*City of Auckland.*

A well-known writer has said that "few cities can boast of scenery as picturesque as that surrounding Auckland. It lies on a narrow isthmus separating the seas that wash the east and west shores of the Island, the landscape dotted over with volcanic cones (Hochstetter counted sixty-three points of eruption within ten miles radius of the city). The best view is perhaps to be obtained from the lip of the crater of Mount Eden, an extinct volcano overhanging the city at a distance of about a mile." All these cones are also points of historic interest, as they were the strongholds of the Maori occupiers in ancient times, who appreciated the strategic advantages of the site, and made the most of them. Facing the town are the green hills and white houses of the North Shore, and the remarkable island peak of Rangitoto; beyond lie the many islands of the Hauraki Gulf, with the blue hills of Coromandel and the Great Barrier in the far distance. Clustered near the foot of the hill, and scattered for many miles to the southward, are charming villa-like houses, with tasteful gardens and shrubberies, while to the north-west the view is closed by high wooded ranges.

The city has an excellent commercial position; it has communication by sea with both sides of the Island, while the Kaipara and Waeroa Rivers leading far into the northern peninsula, and to the south the Waikato and Thames Rivers leading into the heart of the Island, give it natural facilities for inland communication.

There is depth for the largest steamers afloat close to the shore, and any vessel can at dead low water enter, anchor in the harbour, or approach the wharves. There are two entrances from seaward—by the Rangitoto and High Channels, the former, which is more used, being some two miles wide. They are both well lighted. The city is distant from Sydney 1,315 miles; there is regular communication, as well, with every part of the New Zealand coast; steamers ply regularly to Fiji, Tonga, Tahiti, and Rarotonga, and Auckland is the port of call for the Californian mail service. There are two harbours—the Waitemata, the large deep harbour above described, and the Manukau, on the west side of the isthmus, shallower, but giving communication with the west-coast ports and the rest of the colony, greatly shortening the distances of sea-travel. There are two graving-docks, of which that at Point Calliope is the larger—600 ft. long, with a depth of 33 ft. on the sill at high tide. The Admiralty subsidises this dock, which is fitted with all the appliances required for the repair of men-of-war of large size.

In 1906 the population of the city and suburbs, using the term in its widest sense, amounted to 89,000\* persons. It is the largest city of the colony, is well built, and fully equipped with all things that make the best setting for civic life. The streets are all either flagged or asphalted, and lighted with incandescent lights. There is a splendid water-system, equal to considerably more than the average daily consumption, which at present is 4,000,000 gallons. The water is brought from the Western Springs and the Waitakeri Ranges, and stored in the Khyber Pass and Ponsonby reservoirs, and there is a

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\* Including Orakei, Tamaki West, Mount Wellington, Avondale, Onehunga, Northcote, and Takapuna.

large reservoir on Mount Eden to supply the higher levels of the city and suburbs.

Manufactures are numerous enough to entitle Auckland to the appellation of a manufacturing centre. The chief industries are ship-building, sugar-refining, timber-converting, sash and door making, rope and twine, pottery, brick and tile, and varnish works, and the printing business is also extensively carried on. There is a large woollen manufactory at Onehunga, on the Manukau Estuary, and a paper-factory at Riverhead, the head of the Waitemata Harbour.

The port is the centre of a large trade, which recorded for the year 1905 its imports at £3,156,470, and its exports at £2,643,495.

From the education point of view the city is well supplied. At the top of the educational edifice stands the Auckland University College, which is affiliated to the New Zealand University. There is a Grammar School, the Church of England Grammar School, the Prince Alfred College, and St. John's College. The primary system keeps up a large number of schools, roomy, well built, and handsome additions to the city architecture, accommodating many thousands of pupils. In addition, there is much provision for technical education. On the whole, Auckland is well forward in the educational competition, and a centre in every way fit to draw scholars from all parts of the large district of which the city is the capital.

Among the principal buildings may be noted Government House, indicating that once Auckland was the seat of Government, the meeting-place of Parliament, and the capital of the colony. There are handsome Government offices, a post and telegraph office, a railway-station, a Supreme Court, and other buildings in which the many functions of administration are carried on. Municipally the city is well housed, as is also the Harbour Board, and there is a fine Exchange. There are several fine arcades, a splendid choral hall, two roomy up-to-date theatres, and a host of halls, such as the City Hall, the Federal, St. James's, St. Benedict's, the Foresters' Hall, the Temperance Hall, and the Hall of the Auckland Institute.

The hospital of Auckland is a handsome building in a commanding situation, furnished in the best manner, as are all the hospitals of the colony. There is a large mental hospital, commodious and roomy, and well furnished with requisites of the most modern order. Several "homes" for orphans and the aged poor add to the list. There is the Victoria School for Maori Girls, and the Veterans' Home, which has gathered together in comfort many of the men who fought in the wars of the last and the present reigns.

Auckland has a free public library of over 20,000 volumes, municipally managed and maintained, with which is the magnificent library presented by the late Sir George Grey to the city, with a collection of rare and valuable manuscripts. This is the Auckland Free Library, which cost something between £20,000 and £30,000. The funds were provided mainly from the bequest of the late Mr. Costley. There is an art gallery—the best in the colony—the bequest of the late Mr. MacKellvie, who was a collector in his time of great taste and judgment; and a fine museum.

The churches are, as in all parts of New Zealand, a feature of the city, every denomination having erected noble edifices for the most part in commanding situations.

Banking-houses, insurance offices, newspaper offices, hotels, club-houses, large warehouses, emporiums, and shops add greatly to the street architecture.

There are several parks and a magnificent domain; and the Cornwall Park, presented by Sir Logan Campbell to the city during the Royal visit in the year 1901—a splendid park of 240 acres—is a worthy addition to an extensive system of open spaces and recreation-grounds. There are in the immediate neighbourhood of the city several large racecourses, furnished and equipped in a way that leaves nothing to be desired.

Auckland has a fine system of electric trams, convenient to every part of the city and suburbs; and a ferry system of steamboats connects all the northern suburbs with the city.

On the whole, Auckland, with its natural advantages of scenery and climate, and up-to-date civic life, is a very pleasant city to live in.

#### *Road, Rail, and Town.*

Warkworth, on the east coast, forty miles from Auckland, with communication by coach and steamer nearly every day. It is a thriving township, with post and telegraph office, public halls, hotels, &c. It is also the site of important hydraulic lime and cement works. A good deal of agricultural and pastoral farming is carried on in its neighbourhood.

On the west coast an important centre is Helensville, on the Kaipara Harbour, distant thirty-eight miles from Auckland, with which it is connected by rail. It has all the conveniences required by travellers in the shape of good hotels, stores, &c., and is the starting-point of the river-steamers running to all places in the Otamatea and Hobson Counties. It is also one of the main centres for the export of balm timber.

Dargaville, 102 miles north of Auckland, on the Wairoa River, is a town of about 600 inhabitants, with all conveniences for travellers. It may be reached by rail and steamer from Auckland three times a week. Dargaville is the starting-point of the Kaihu Valley Railway, which is open for traffic for twenty miles from the town, and from the terminus of the railway all the Crown lands in the neighbourhood are reached, even as far north as Hokianga. The town is also the centre of a very large timber export. There are only two townships on the west of any importance north of Dargaville—Port Rawene, or Hokianga (in the Hokianga Estuary), the centre of a very large timber export; and Kohukohu, about four miles further up. Both have post and telegraph stations and comfortable hotels, with fortnightly steam communication from Auckland. A coach runs once a week from railhead at Kaihu to Taheke in the Hokianga County, whence launches convey passengers to Rawene or Kohukohu.

Whangarei, on the east coast, is distant ninety-five miles from Auckland, with which it has steam communication almost daily. The town is a thriving and important place, having a population of 2,116 (1906), and is the centre of a large agricultural and pastoral country. In the neighbourhood is also a large coal-bearing and gum-producing district, while the export of oranges and lemons, which thrive magnificently on the rich volcanic soil, is on the increase. From here, by carriage or horse, all lands could be visited within a

radius of thirty to forty miles. To-day there is a daily train to Hukerenui, twenty-three miles from Whangarei (Opau, the port), and twenty miles from Kawakawa. Coaches cover the gap weekly. In this district there is a large area of Crown lands.

Kawakawa, at the head of the tidal portion of the river of the same name, is connected by a railway-line of eight miles with Opua (Bay of Islands), the calling-place of steamers from Auckland. Kawakawa possesses good inns. From it coaches run weekly to Hokianga and Hukerenui. It is the centre of a coal and gum industry, and a port of lading for those products. The old Town of Russell is situated further down the bay, and has a good hotel, besides having a post and telegraph office. To Whangaroa and Mangonui the Northern Company's steamers run every week. Whangaroa is famed for its exquisite scenery, and is the centre of a large timber and gum export trade. Mangonui is the starting-point and centre from which to visit, by carriage or horse, all the Crown lands in the Mangonui County, and from it steamers run to Awanui and ports beyond, in connection with the steamers from Auckland.

South of Auckland, along the Waikato Railway, there are numerous townships of more or less importance, but no starting-point for Crown lands until Mercer is reached, at a distance of forty-three miles. It is situated at the borders of what is known as the Waikato country, upon the Waikato River, which is tidal up to this point, and the township has a post and telegraph office and other conveniences. At sixty-five miles from Auckland by rail is Huntly, also on the Waikato River, a flourishing township, with a very large output of valuable coal. It has also pottery, brick, and tile works. On the opposite side of the Waikato River large areas of Crown lands are being brought into use, and are carrying large quantities of sheep and cattle. The next town is Ngaruawahia, or Newcastle, seventy-four miles from Auckland, situated at the junction of the Waikato and Waipa Rivers, with hotels, bank, post and telegraph office, and a flourishing creamery. It is a centre from which portions of Crown lands in Raglan County are reached, and also from it river-steamers run north and south to the various settlements. At eighty-five miles from Auckland the train reaches Frankton Junction, where a line branches off to Hamilton, Te Aroha, Paeroa, Thames, and Rotorua, the main line going through Te Awamutu, 100 miles from Auckland, to Taumarunui, 175 miles. About two miles beyond Taumarunui the Wanganui River is crossed on a substantial steel bridge, which is available for both road and railway traffic. The rails are laid for a few miles beyond this bridge to a point known as Piriaka, but only material and goods trains are run at present, the passenger-trains making Taumarunui their terminus. The formation-work on the railway is being actively proceeded with towards Waimarino, the advance works now reaching to a distance of 199 miles from Auckland.

Waimarino (206 miles from Auckland) is the summit of the line, the height above sea-level here being 2,600 ft.

Te Awamutu is a thriving town, and is especially English-looking with its nicely cultivated fields and well-kept hedges. Taumarunui is not only the temporary railway terminus, but is also the point where the Wanganui River traffic connects with the northern railway system, and is becoming in consequence of this a regular tourist resort. As

the train reaches the town in the evening, and leaves for Auckland early on the following morning, travellers stay the night, and a very good accommodation-house exists for their convenience. Taumarunui is also an important Native centre.

Hamilton is a busy, flourishing town, situated on both sides of the Waikato River, with a population of 2,146 (census 1906), and is the centre of an agricultural and pastoral district. It possesses a creamery, flax-mill, brewery, and two soap-factories, besides other local industries. Cambridge, about thirteen miles by road and fifteen miles by rail from Hamilton, has a population of 1,246 (1906), and is the headquarters of the Farmers' Club. It is a busy, thriving township, surrounded by good farming country. Between Hamilton and Cambridge, and in the country round, there are numerous creameries, and cheese and butter factories. Wine and cider making are also successfully pursued, and there are several apiaries, from which large quantities of honey are produced. There are three flour-mills in the district, one at Cambridge, one at Hamilton, and the third at the terminus of one of the before-mentioned branch lines.

One hundred and fifteen miles from Auckland by rail is Te Aroha, a quiet township, celebrated for its thermal springs and medicinal mineral waters, with good hotels. Another thirteen miles brings the traveller to Paeroa, a centre of mining industry, whence a branch line 12½ miles long has just been completed to Waihi, a gold-mining town, and in another twenty miles the Thames Borough is reached.

The settlements at the Thames and Coromandel are essentially mining townships. The first is situated forty-two miles by steamer from Auckland, on the Firth of Thames, and at the mouth of the Waihou River. It has a population of 3,750 (census 1906). There is daily rail and steam communication with Auckland, the railway also connecting it with Paeroa and Te Aroha. Coromandel is about thirty-five miles from Auckland, with which it has constant communication by steamer; it is another mining centre, situated at the head of a picturesque harbour.

The Town of Waihi, near the famous gold-mine of that name, contains a population of 6,086 (1906), and may be reached by either steamer to the Thames, thence by rail to Paeroa, thence by rail to destination, or by direct railway communication from Auckland.

Tauranga, with a population of 1,057 (1906), is situated on the harbour of that name in the Bay of Plenty. Coaches run thither from the Thames, and from Rotorua; it has also constant communication by steamer with Auckland, and with Matata, Whakatane, and Opotiki. From the fact of the harbour being the only one on the east coast between Coromandel Peninsula and Gisborne capable of receiving large vessels, the town is bound to be of importance in the future.

The Township of Rotorua is situated on the shores of Rotorua Lake, at a distance of 171 miles by rail from Auckland. Travellers can reach Rotorua in one day from Auckland. It is the chief township in the hot-lakes district, and has also a large area of fairly good Crown land near, adapted for pastoral purposes. Considerable quantities of sulphur are obtained from the neighbourhood.

The road from Tuakau to Raglan (thirty-five miles diagonally through Raglan County and almost parallel with the main line of rail, from which it is distant ten to twelve miles) has been extended

but is not yet opened for wheeled traffic right through. A bridge over the Waikato River near Tuakau is now built—a very important work, for it opens a large and improving district, and allows of communication with markets.

Further south, the Kuiti-Awakino Road runs fifty-three miles to the mouth of the Awakino River (from Kuiti on the main railway-line), across the ends of Waitomo and Awakino Counties by a course about parallel to the Mokau River, and from four to eight miles to the north of the same, so that vehicles can, in summer-time, be taken from the railway-station at Te Kuiti right through to New Plymouth, ninety miles distant. There are two large bridges, besides some smaller ones, to build before the road is ready for ordinary traffic; and to make it available in winter some metalling has to be done in the worst places. This is a very important line in the interests of settlement.

The Ohura Road stretches for some 120 miles between Stratford and Ongarue, on the Northern Trunk Railway, alongside the authorised Taranaki Northern Trunk. The latter has been completed between Stratford and Oruru, twelve miles. The main townships are Toko, Strathmore, and Whangamomona.

Opotiki is the second town of importance in the Bay of Plenty. It is situated at the confluence of the Waioeka and Otara Rivers, where they empty into the Opotiki Harbour, about sixty-five miles by steamer or road from Tauranga. It has also weekly steam communication with Auckland, and is connected with Gisborne by a bridle-track, road, and railway; the former is being gradually converted into a dray and coach road. A proposed diversion of this road up the valleys of the Otara and Pakahi Rivers will shorten the total distance by many miles. On the rich alluvial land in the vicinity large quantities of maize are produced and shipped to Auckland, and dairy-farming has also lately added largely to the profits of the farmers. During the next two years it is anticipated that 50,000 acres of good bush country in the district specially adapted for pastoral purposes will be opened for settlement. Opotiki is also connected with Rotorua by the Rotorua-Gisborne Road, which is now made and bridged as far as Te Teko, forty miles from Rotorua, on the Rangitaiki River. This river and the Whakatane, as also the estuary of the Ohiwa, have all at present to be ferried, but as soon as the bridges are built over the first two, and a steam ferry is established across the Ohiwa, together with considerable improvements of the intermediate portions of the road, travelling between Rotorua and Opotiki will be effected with rapidity and ease, and it should, in conjunction with the Rotorua Railway, become popular as the main mail and passenger route to and from Auckland, as well as the principal means for transit of goods and stock for the already largely settled districts in the eastern portion of the Bay of Plenty, and large areas of Crown and Native lands still unproductive. At present there is no regular service, though vehicles are frequently driven through from Opotiki to Rotorua, the journey usually occupying two days. The most rapid and convenient means of transport is by steamer, leaving Auckland weekly: single fare, £1 12s. 6d.; return, £2 10s.

Another important main road in the Bay of Plenty district runs up the valley of the Whakatane River from the Township of Whakatane, near its mouth. This township has weekly steam communication



with Auckland, and is the distributing centre for goods and the shipment of produce from the settlements in the Whakatane and Waimana Valleys, &c., including the prosperous Government settlement of Opouriao. This road is metalled to the new township of Taneatua, in the Opouriao Settlement, and is being slowly formed up the Waimana River, later on to pass from the Waimana to the Nukuhau Valley, and thence down this latter valley and the Waitahi to junction with the Rotorua-Gisborne Road. In the summer vehicles can now be taken right through, but there are many fords on the Waimana River to pass. This road must eventually also open up large areas of Native and other lands.

From a point about six miles from Te Teko, on the Rotorua-Gisborne Road, a branch leads to Matata, a small township on the coast, on the present line of mail road from Tauranga and Rotorua to Opotiki.

#### TARANAKI LAND DISTRICT.

##### *Road and Rail.*

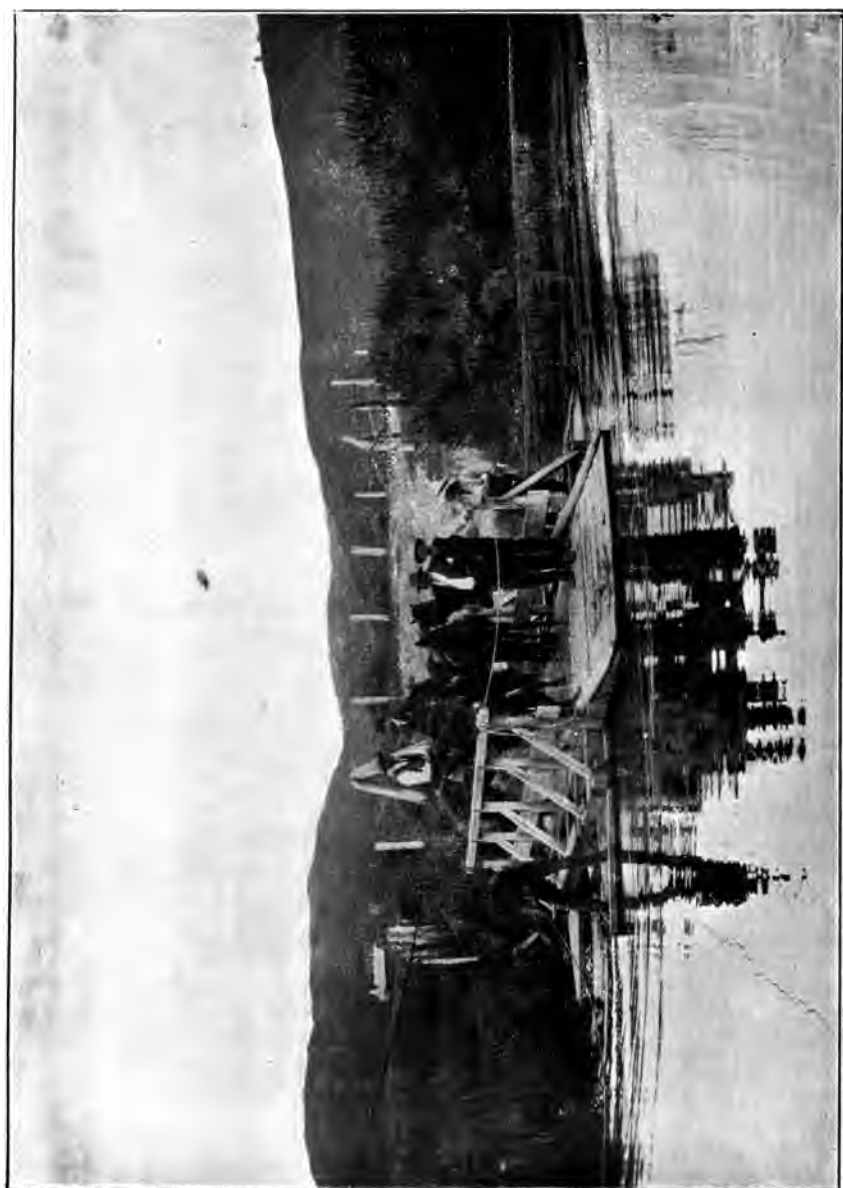
The chief means of communication is the railway from Wellington, which traverses the district between Patea and New Plymouth—a distance of sixty-six miles. Through trains run every day, except Sunday, between New Plymouth and Wellington, and *vice versa*, a distance of 251 miles. As already stated, a railway from Stratford to Ongarue, on the North Island Main Trunk Railway, is under construction, and is open to Oruru, eleven miles from Stratford.

The Main North Road runs from New Plymouth, passing through the Towns of Waitara and Urenui; and is formed as a cart-road to Mokau, the northern boundary of the district. All the streams are bridged with the exception of the Mokau River, on which is a good ferry. From Mokau there is a dray-road right through to Te Kuiti, on the Auckland railway system. About midway between New Plymouth and Waitara the Mountain Road diverges and runs almost due south, chiefly along the railway, for a distance of forty miles, connecting with the Main South Road at the Town of Hawera. This is at present the principal road in the district, tapping, as it does, large numbers of district roads, and passing through the Towns of Inglewood, Midhurst, Stratford, Eltham, Normanby, and Hawera.

The Ohura Road branches from the Mountain Road at Stratford. It is formed and open for traffic as a dray-road for 56½ miles from Stratford, and for horse-traffic to 64½ miles. A coach runs in summertime every Monday and Thursday (returning on following days) between Stratford and Whangamomona Village, a distance of forty-one miles, and the road is now being extended into the interior so as eventually to connect with Auckland, and will open up a large area of fertile country.

The Main South Road from New Plymouth follows the trend of the coast to the south, and was at one time the coach-road to Wellington. It passes through the Villages of Omata, Oakura, Okato, Rahotu, Otakeho, Manutahi South, and Kakaramea, and the Towns of Opunake, Manaia, Hawera, and Patea.

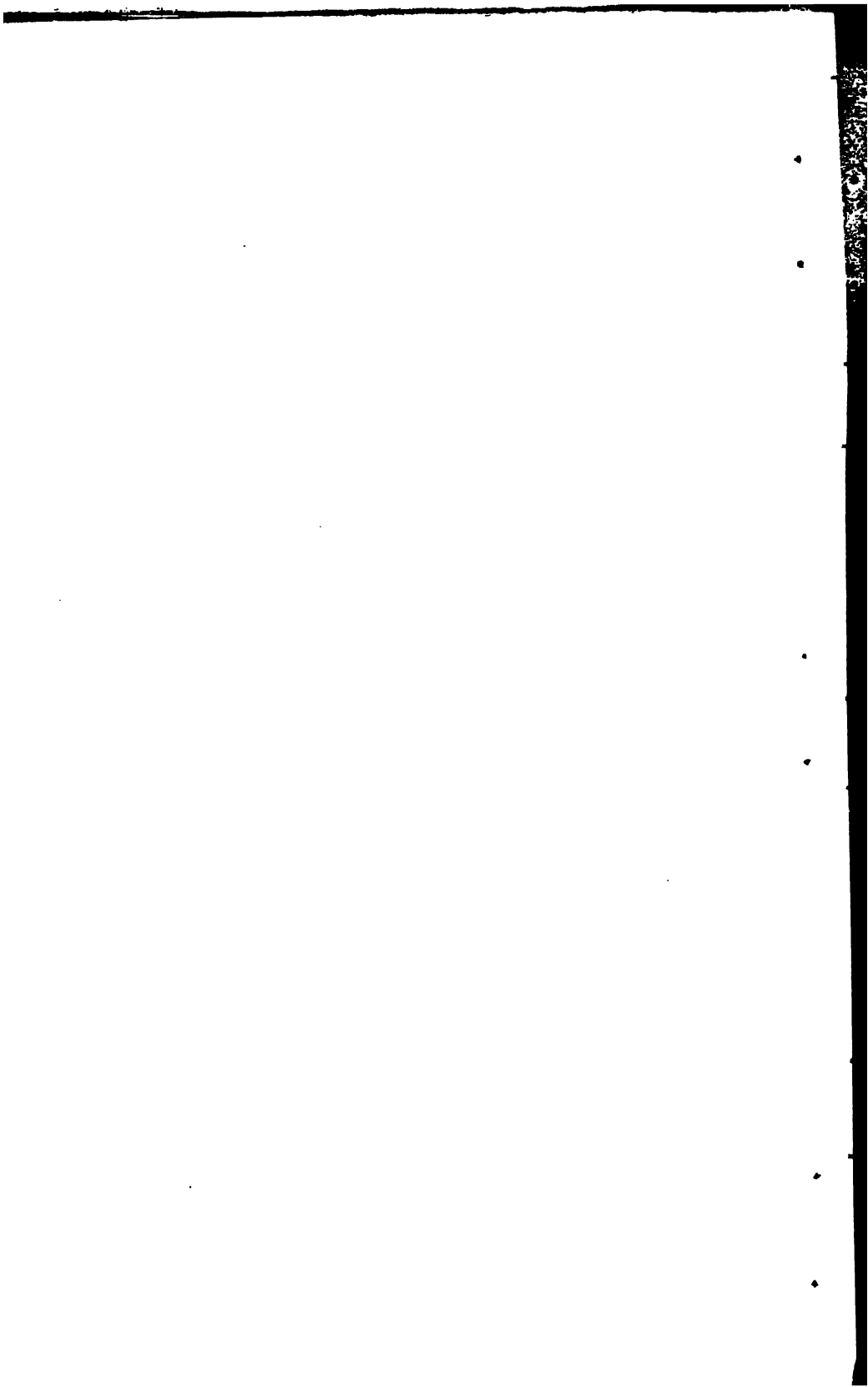
The Junction Road runs south-east from New Plymouth, and crosses the Mountain Road and railway at Inglewood, thirteen miles



PUNT ON MOKAU RIVER.

*Immigrants' Guide.*





out ; it is metalled for  $36\frac{1}{2}$  miles, formed as a dray-road to  $45\frac{1}{2}$  miles, where it connects with the Ohura Road at a distance of thirty miles from Stratford. This road crosses a number of district roads ; hence its name.

The Opunake Road runs from Stratford to Opunake, twenty-six miles, skirting the southern base of Mount Egmont. It is formed and metalled for twelve miles from Stratford ; the remainder is open for horse traffic only. Vehicular traffic turns down the Manaia Road to Kaponga, thence along the Eltham-Opunake Road to the latter place. This route is metalled throughout.

The Eltham Road runs from Eltham to Opunake, twenty-five miles, connecting with the Opunake Road at Punehu, seven miles from Opunake. This is formed and metalled throughout.

The other main roads in course of construction are the Rawhitiroa Road, leaving the Mountain Road near Eltham ; the Otaraoa, Moki, and Okoke Roads.

#### *Rivers.*

The principal river is the Wanganui, which bounds the district on the east between Taumarunui and Pipiriki, a distance of about ninety miles. Its average width varies from 2 to 3 chains. For nearly the whole distance it is shut in by high precipitous hills, and in many cases by perpendicular walls of rock. The scenery is very grand and beautiful. There are numerous rapids, but few of them are dangerous to skilful canoeists. New Zealand's great scenic river-trip may now be done in a number of ways. From Wanganui, in the winter, the steamers run tri-weekly to Pipiriki, and in the summer months, from December to April, daily, and a daily excursion is made from that point to the beautiful upper reaches beyond, returning to Pipiriki House in the evening. The traveller can then return to Wanganui, taking train either north or south, or he can take coach round Ruapehu, Tongariro, and Ngauruhoe to the Hot Lakes, or may go on up stream to Messrs. Hatrick and Co.'s houseboat, sixty miles beyond Pipiriki, returning to the latter point the next day, or proceed right on to Taumarunui, the junctioning point at the head of the river with the new Central Railway, taking train from there to Auckland or Rotorua. Coming down stream the traveller may take the train from either Auckland or Rotorua to Taumarunui, staying there overnight ; take the steam-launch down stream the following day to Pipiriki, staying there for the night, and going on to Wanganui the next day. From Taumarunui to Pipiriki is about ninety miles, and from Pipiriki to Wanganui sixty miles. Good accommodation can be procured at the houseboat and Pipiriki. Messrs. Hatrick and Co. have a fleet of twelve steamers and launches, the route being now one of the most largely frequented in the colony. The fares on the river are : Taumarunui to Pipiriki, £2 single ; Pipiriki to Wanganui, 15s. single ; Wanganui to Pipiriki, £1 return ; Taumarunui to Pipiriki, £3 return, or *vice versa*. Accommodation at Pipiriki and the houseboat can be obtained at the rate of 2s. 6d. for each meal and bed. The caves near Pipiriki are very extensive, and rich in stalactites, the entrance being hung with a mass of ferns and lichens. There are some magnificent views near Atene. A mile or two below Pipiriki the banks of the river rise to a great height, and are very imposing. From

the caves, for some sixty miles to the houseboat, the river flows between perpendicular walls of rock, all festooned with ferns and lichens, with a background of luxuriant bush. Over these cliffs fall numerous streams, making a succession of waterfalls. At Manganui-a-te-ao an immense cliff rises like a mighty pillar on the right, and the rivers meet like two lanes, walled in by massive piles of masonry.

The next river in size is the Mokau, bounding the district on the north. It is navigable for handy steamers drawing from 7 ft. to 8 ft. of water as far as the coal-mines, about twenty miles from its mouth, and for canoes as far as Totoro, twenty-six miles further up. Several outcrops of coal are to be found on its banks, and, as limestone is also present, the river is likely to become an important waterway of the district. The scenery on either side, although not on quite so grand a scale as may be seen on the Wanganui, is very beautiful.

The other large rivers are the Waitara and Patea. The former has its source about midway between the coast and the Wanganui River, in an easterly direction from Pukearuhe, between New Plymouth and the Mokau. It is about a hundred miles in length, and runs out at the Town of Waitara, some ten miles north-east from New Plymouth. There is a bar at the mouth, but steamers of 300 tons can enter safely in calm weather, and, although there are numerous rapids on its course, it is navigable for canoes for about ninety miles.

The Patea River rises in Mount Egmont, and, after traversing a tortuous course of about 110 miles, runs out at the extreme southern end of the provincial district. It has a bar harbour, with a depth of 13 ft. to 14 ft. at spring tides. Steamers of from 40 to 50 tons trade regularly to the Town of Patea, which is situated a mile or so north of the mouth. The Patea is navigable for canoes for fifty miles.

Besides these rivers there are many smaller ones, and streams innumerable—in fact, no district in the world could be better watered and at the same time be so secure from disastrous floods. It is estimated that between the Mokau and the Patea there are no fewer than eighty-five named streams emptying themselves into the Tasman Sea, fully sixty of which flow from Mount Egmont.

Excepting the Ngaire Swamp, a block of open land near Eltham, 3,700 acres in extent, now partially drained and recently disposed of for settlement purposes, there are no plains, properly so called, in the district, although the stretch of very fertile country lying between the Waingongoro and Otakeho Rivers, comprising an area of about 25,000 acres, is known as the Waimate Plains. Of this area 13,500 acres have been disposed of, and the remainder, 11,500 acres, has been handed back to the Natives as a reserve.

There are no lakes worthy of the name. The largest sheet of water is Rotokare, situate about twelve miles from Eltham; it is about half a mile in length, with an average width of 6 chains. There are also a few small lakes inland from Waverley, at the southern end of the district.

#### *Chief Towns.*

The principal town of the district is New Plymouth (population about 5,000), situate on the seashore, about two miles from and to the north-east of the picturesque rocky islets known as the Sugar-

loaves. The general appearance of the town is very attractive, and it abounds in neatly kept gardens. The Recreation Grounds, from which a good view of Mount Egmont is obtained, form a favourite resort.

New Plymouth is 251 miles by rail from Wellington, the railway running in a northerly direction through the district from Patea to Sentry Hill, where it turns at right angles westward for eight miles to New Plymouth. From Sentry Hill there is a branch line to Waitara, four miles distant.

The Port of New Plymouth is situate at the Sugar-loaves, two miles from the town. Protection for shipping is afforded by a concrete mole or breakwater running in a north-east direction for a distance of 1,900 ft. Under the lee of this there is wharf accommodation provided for the coastal trade. Steamers of 1,000 tons can be berthed here in almost all weathers. The wharf is connected with New Plymouth by both rail and road. The breakwater was built at a cost of £200,000, borrowed under security of one-fourth of the land revenue of the Provincial District of Taranaki, and the right to levy a rate over certain lands. The present rate levied is  $\frac{1}{4}$ d. in the pound on the capital value. The principal oversea exports from breakwater for the year 1904 (exclusive of coastal trade) were: Bacon and hams, 85 cwt., value £307; butter, 83,439 cwt., value £355,519; cheese, 12,012 cwt., value £25,093; fungus, 1,044 cwt., value £2,164; wool, 47,442 lb., value, £1,439; total value, £390,046. Imports (oversea): value, £90,213. Imports (1906), £86,343; exports (1906), £363,570.

Manufactures in New Plymouth are represented by two sash and door, a boot, butter-keg, and three coach factories, a brewery, a cordial-factory, a flour-mill, tannery, fellmongery, bone-mill, and iron-foundry, with freezing-works and bacon-factory in the suburbs. The town has both water and gas laid on.

Hawera, the next largest town, is situate on the eastern edge of the Waimate Plains. The population is 2,153 (1906). The town is lit with electric light and gas. The Wellington-New Plymouth Railway runs close to it, the distance by rail from New Plymouth being about forty-eight miles. Hawera is surrounded by a first-class dairying and grazing country, capable of carrying a very large population. On the 1st December, 1898, an up-to-date bacon-factory, costing some £1,200, commenced the work of killing and curing in Hawera.

The Town of Patea is situated on the coast, at the extreme southern end of the district, and has a population of 869. There is a splendid grazing district inland, with a large area of land yet to be opened up. There is a dairy factory, which has two branch creameries in the country. A refrigerating company for dairy and other produce has also been established, and is proving a great success. Exports for 1904 were: Wool, 3,836 bales; fungus, 959 bags; tallow, 586 casks; pelts, 110 casks; loose hides, 5,040; grass-seed, 409 sacks; butter, 123,225 cases; flax, 25 bales; meat, 6,032 cases; sheep, 1,560; sundries, 582 packages; cheese, 14,129 boxes; empties, 1,257; cattle, 334; bonedust, 260 sacks; potatoes, 290 sacks; carcasses of frozen meat, 2,474; bricks, 12,000. Imports: Ordinary, 8,874 tons; coals, 2,839 tons. Wharfages amounted to £1,572, dumping dues £253, tonnage dues £516. The number of steamers in and out were 204. The Harbour Board has an up-to-date wool-dumping press and

hydraulic pumps. The width between the east and west pier-heads is 260 ft.; width of channel about 180 ft., gradually narrowing to 100 ft. as the beacons are approached. The pilot reports the depth of water at not less than 12 ft. at high-water springs, and 9 ft. at high-water neaps, with a straight channel. Steamers trade regularly to Westport, Greymouth, Lyttelton, Wellington, and other ports. The Board is now engaged in erecting a west breakwater, of concrete, to be carried out to a distance of 600 ft., and this should prove a great protection to steamers, and prevent the encroachment of sand common to bar harbours. Oversea (1906) imports, £20,966; exports, £286,737.

Stratford, a comparatively young town, lies about midway between Patea and New Plymouth. It has already a population of over 2,100, and is growing fast. The height above sea-level is 1,000 ft., and the climate is bracing though somewhat moist. The main road to Auckland—known as the Stratford-Ongarue (now Ohura) Road—starts here. It has been formed as a cart-road for 56½ miles, and as a bridle-road to 64½ miles. There are some miles of bridle-track and sixteen miles of dray-road to be formed before through communication with Ohura is established, but, still, the trip right through on horseback is possible, the unformed track not being very difficult. A commencement has been made with the construction of the railway-line between Stratford and Auckland *via* Ongarue, the line being completed and open for traffic as far as Oruru, a distance of eleven miles. A short branch is also in course of construction from Waipuku to Mangonui, on the slopes of Mount Egmont. This line is for the purpose of opening up the extensive stone-deposits that exist in the Mangonui Gorge, of great value for road-metalling and railway-ballasting purposes. A bacon-factory has been started at Stratford under very favourable circumstances, and is likely to prove a public benefit, and also a financial success to the proprietary company.

Waitara, a seaport town of about 950 inhabitants, is situated on the river of the same name, a mile up from the sea, and about ten miles north-east from New Plymouth. The Mount Egmont Freezing-works have passed into the hands of a company styled the "Waitara Freezing and Cool Storage Company (Limited)," who have rebuilt and greatly enlarged the works, the storage capacity now being for 25,000 carcasses of mutton.

Inglewood, situated on the railway-line, sixteen miles south-east of New Plymouth, is a flourishing little town of 1,152 inhabitants (1906), rapidly coming to the front. The bacon-factory in the year 1904 put through 2,999 pigs, costing £5,885 13s. 8d. The factory is worked by a 24 in. turbine, the water being conveyed in a race 10 chains long. It is provided with a 4-horse power tubular boiler, a Lard jacket, and Californian pump. There is also a size D ammonia refrigerating-machine. The electric light has now been installed in the town.

Eltham, a rising borough of 1,329 inhabitants, is making very rapid progress. The bacon-factory during nine months of the year put through 365 pigs, valued at £565. The works were destroyed by fire and were closed down during the greater part of the year.

Opunake, a seaport town of 600 inhabitants, was visited during the year by forty-seven steamers. Imports, 1,040 tons; exports,

116 tons; but more than half the trade of the district does not come or go through the port; in fact, the goods carried by road are on the increase. If the railway from Eltham is made this town should make rapid strides, as it is intended to improve the harbour.

The only other townships that need be mentioned are Manaia, population 450, and Normanby, population 400.

#### HAWKE'S BAY LAND DISTRICT.

##### *Road and Rail.*

The chief outlets from Napier are three in number. First the Napier-Wellington Railway, which traverses the centre of the southern half of the district for its whole length of 100 miles, and may be called the main artery of communication. Nearly parallel to it throughout runs an excellent gravelled road, which was made before the construction of the railway. On either side there are numerous branch roads, which act as feeders, making a very complete system of internal transit. Another main road runs in a westerly direction to Kuripapanga, distant forty-five miles, a favourite resort in summer-time, removed as it is from the heat of the country near the coast. A coach runs thither twice a week, and on thence to Inland Patea, where the Napier Road meets the roads to Hunterville, Tokaanu, and the Wanganui River.

The part of the district served by these two main lines—viz., that between Napier and Woodville—contains the greater portion of the population, and from the extent of arable land within it is likely in the future to be very thickly peopled. Notwithstanding that so much of the Native land in this part is unoccupied and in its natural state, there are nearly a million of acres of land in sown grasses.

The main road northwards from Napier is the coach route to Taupo, which, soon after leaving the fertile Petane Valley, begins to traverse poor country, and twenty-five miles out enters the light pumice soil.

The Napier-Wairoa Road has been completed, with the exception of bridges at Waikare and Matahouroa Streams, and there is a weekly mail-coach service between the two towns. The coach is stopped occasionally by the floods at the streams mentioned, and until the bridges are completed the heavy traffic between the two places will be done by a small steamer.

From Wairoa there is a formed road (twenty-five miles) to Lake Waikaremoana (Onepoto), and twenty-five miles round it, as far as the Oporuahine River.

From Wairoa a main road runs northward, through the Village of Tiniroto and on to Gisborne, a distance of seventy-five miles. For a considerable distance it runs through hilly country, and, as it has not been gravelled, wheeled traffic is suspended during the winter months; but a coach runs weekly for nine or ten months out of the year. The road from Wairoa to Gisborne *via* Nuhaka Hot Springs is complete and open for wheeled traffic.

Between Gisborne and Opotiki, in the Bay of Plenty, communication is not good. The road, which is 120 miles in length, has been formed to the Motu Township, a distance of sixty miles. In the neigh-



bourhood of the forest a large area of Crown lands has been taken up and settled. The rest of the journey must be done on horseback. A railway is being constructed from Gisborne in the direction of Motu. The portion from Gisborne to Te Karaka, a distance of eighteen miles, is open for traffic. The continuation of this line will greatly assist the progress of the district.

The country to the north of Gisborne is being rapidly opened up, the coastal road being open for traffic as far as Port Awanui, while several of the arterial roads are being extended.

Small steamers trade regularly along the coast, calling in at Tolago and Tokomaru Bays, Waipiro, Tuparoa, Awanui, Kawakawa, and other small bays.

#### *Towns.*

Napier is pleasantly situated on the peninsula known as Scinde Island, which is joined to the mainland by a narrow shingle-bank several miles in length. It is a busy town, with a population of 9,489 (1906). The business part is on the flat land at the foot of the group of hills that take up the greater part of the peninsula. These hills, formerly barren and waste, are now occupied by numerous private residences, and the very general tree-planting has given the upper town a distinctive and pleasing character. There is a good water-supply, derived wholly from artesian wells of large size, and pumped by machinery to reservoirs on the tops of the hills. The shipping trade, as the large exports show, is especially active during the wool and frozen-meat season. It is still carried on at Port Ahuriri, about a mile from the town; but has recently, in a large measure, been transferred to the fine breakwater which is now partially completed. During the year 1904 the imports amounted in value to £249,433, and the exports to £1,145,845. For 1906 the figures were £275,750, £1,038,361.

Gisborne, the trade centre and port of what is known as the Poverty Bay District, is a prosperous town (1906) of 5,682 inhabitants,\* exclusive of Maoris, rapidly increasing in size and importance, as the large quantity of unimproved land in the Cook County is fast becoming settled and made productive. There are 1,330,490 sheep in Cook and Waiapu Counties, and Gisborne's exports amounted to £651,362 in value for the year 1904. For 1906 they were £600,452.

Clyde, the county town and port of the Wairoa County, is picturesquely situated on the Wairoa River, about three miles from the mouth. The river is navigable for small craft as far as the village of Frasertown, twelve miles further up.

With a few exceptions, the towns and villages to the south of Napier are all situated on the line of railway running from that city to Wellington. The principal are: Hastings (a rising town of about 4,600 inhabitants), Waipawa, Waipukurau, Dannevirke (3,570), and finally Woodville (1,110), about three miles from the Manawatu Gorge, and distant ninety-five miles from Napier. It is at this end of the district that the Crown has, in the last few years, successfully planted settlement, and, in place of the continuous forest known as the Seventy-mile Bush of earlier days, there are now prosperous townships, with various thriving industries established.

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\* The return at census of 1901 was 2,737.

## WELLINGTON LAND DISTRICT.

*Road and Rail.*

Wellington is served by two railway systems. The Government railway connects the city with the Wairarapa and the Woodville-Napier country, and the Manawatu Company's line connects it with Palmerston North, from which town the Government main line connects with Wanganui and New Plymouth. There is a railway (branch) between Palmerston North and Foxton on the coast, and a tramway to the north. Public opinion in the district hopes to see a loop-line made on the coast side, shortening considerably the run to Wanganui.

Feeding these railway systems there is a great number of coach-routes. These branch from Featherston, from Carterton, Masterton, Eketahuna, and Pahiatua, serving the population for communication between those centres and the sea-coast at most points, as well as all the inland country. In good weather there is no difficulty; in bad; there is much to be desired in the roads of the back country. The pressure of this state of things is most felt in the neighbourhood of the Northern Trunk Railway. Even there, however, the roads being made by the Public Works Department to facilitate construction of the Northern Trunk line are diminishing the evil and promising to supply a felt want to a large extent.

*The City of Wellington.*

The geographical position of the city is such as to facilitate the realisation of the city motto, "*Suprema a situ.*" These advantages the Harbour Board, which controls the shipping interests, has done its best to second. There is a system of wharves second to none in the colony and surpassed by nothing in Australasia. The depth of water in the land-locked harbour, which is completely sheltered, is such that at all tides the largest ships can approach the great jetties, which are furnished with sheds, cranes, and hydraulic appliances complete in detail and of a power equal to all possible requirements of a first-class port. There is daily communication with all important ports of either coast-line, a graving dock equal to the largest steamers is in course of erection, and there is regular communication with London and Australian ports.

Here, too, are the headquarters of the Tourist Department, which is doing so much to further the tourist traffic by organization and systematic care.

The city authorities have not been backward in their duty. They have established a splendid water system; they have inaugurated a drainage scheme which has made Wellington one of the healthiest cities in the colony; they light the streets by electricity; and they have established a rapid, convenient, and far-reaching system of electric tramways, which, being well within the means of the average citizen, is extensively and profitably patronised. They have, moreover, two fine libraries, free, and well furnished, one of which is utilised for the giving of regular lectures at certain times of the year.

In this matter the General Assembly does its duty too, for it throws open its fine library of 100,000 volumes to the public, which has to comply with certain formalities, such as debar no one who is in earnest from the opportunities for free study afforded by that excellent collection.

Education is not by any means neglected. At the head of the system stands the Victoria University College, affiliated to the New Zealand University. Wellington College, St. Patrick's College, the Wellington Girls' High School, and a number of district high schools supply the needs of secondary education, and the numerous primary schools attest the care of the people and the Government for the work of equipping the youth of the city for the battle of life. In addition, there is ample provision for technical education.

These establishments are distinguished, many of them, by their fine buildings; and in this respect other departments of civic and colonial life are not behindhand. At the head of the fine buildings of the city is the grand pile of the Railway Offices, the foundation-stone of which was laid by the Duke of York, on his visit to the colony in 1901. There are, in addition, the various buildings of the Government Departments, and Parliament House, in which is housed the above-mentioned library. The banks have some very fine houses; some of the insurance buildings are equal to the best anywhere in Australasia; there is a noble collection of warehouses, growing every day with the growing trade of the place; and there are many manufacturing establishments, extensive and up to date. Fine hotels adorn the streets; there are large emporiums and handsome shops; the Missions to Seamen has the finest building devoted to its noble purpose in the whole of Australasia, the gift—both site and building—of Mrs. Williams, the widow of a well-known shipowner of the port. There are some fine churches, and all the friendly societies are well represented.

There is a fine hospital, with a Nurses' Home, two mental hospitals, two homes for the old, two for the incurably afflicted; and there are the headquarters of the Labour Department, which sees to the dispersion of labour to every part of the country where there is need of workers.

Wellington is progressing fast, extending in every direction, and rapidly crowning the hills which surround the city. In short, everything is being done with systematic enterprise to second the natural advantages. The railway systems keep touch with a great back country, the sea does the rest; and between the two is a modern city, comfortable and up to date.

#### *Towns and Roads.*

The capital of the colony—Wellington—is situated in the southwest angle of Port Nicholson, on Lambton Harbour. The wharfage accommodation here is second to none in the colony, and the wharves present always a busy scene of life, with the numerous steamers and sailing-vessels continually loading or discharging. As many as six ocean-going steamers are frequently seen alongside, loading with wool, frozen meat, and other products, for conveyance to Europe. The port possesses a patent slip at Evan's Bay, within a short distance of the city. Founded in 1840 by the New Zealand Company, the city occupies the flats skirting the original shore-line, long since obliterated by the reclamation of the foreshore, which is now mostly covered with fine buildings. Rising close behind the old shore-line is a range of hills, the lower parts of which are all built over. The population of the city at the present time (1906) is 64,149,\* including the suburbs of Melrose, Onslow, Karori, Miramar, and Eastbourne. Being the seat

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\* With Hutt and Petone the population is 73,361.

of Government, the city contains the residence of the Governor and the headquarters of the Government Departments, which are placed in what is said to be the largest wooden building in the Southern Hemisphere. There are several noticeable public buildings, amongst which must be mentioned the Parliamentary Buildings (containing a valuable library), General Post Office, Government Life Insurance Offices, Government Printing Office, Government Railway Offices, Custom-house, Public Library, School of Art, Town Hall, and Harbour Board Offices. The Colonial Museum and the Botanical Gardens are also worthy of notice. The city is lighted by electricity, and its principal streets are paved with wooden blocks, whilst an excellent supply of water is obtained from the Wainui-o-mata River, on the other side of the harbour. A system of electric trams for the city and Island Bay has been installed; is being extended to Brooklyn and Kilbirnie, and will before long be carried to the Boroughs of Onslow and Karori. The principal industries are represented by iron and brass foundries, sawmills, soap and candle works, boot-factories, aerated-water factories, meat-freezing works, coachbuilding, rope and twine works, furniture and sash and door factories, brick, tile, and pottery works, printing and publishing offices, besides match and box factories, and other smaller works of various kinds. The city is increasing with rapid strides; its excellent position, together with the fine back country, places it in the front rank of New Zealand towns. Its principal suburbs are Onslow and Karori, containing 2,098 and 2,194 inhabitants respectively. The railway-line to the Hutt Valley is now being straightened to afford greater facilities of transit, which are necessary in consequence of the rapid development of population. Imports (1905), £3,837,729; exports, £3,035,803. Both figures are the highest in the colony.

Petone is situated near the mouth of the Hutt River, seven miles from Wellington, on the railway-line. It has a population of 5,807, and is a rising township, containing the Government Railway Workshops, a woollen-factory, and a meat freezing and preserving establishment. The Lower Hutt, almost immediately adjoining, has a population of 3,404, and some well-built residences with beautiful gardens. The Upper Hutt, situated at the head of the valley, has many small farms, owned by some of the very early settlers. The railway here begins the ascent of the Rimutaka Range.

Featherston, situated at the foot of the Wairarapa Valley, forty-six miles by rail from Wellington, is a small township, with butter and cheese factories in the neighbourhood. Roads lead from it to Martinborough and the east coast, and also down the Wairarapa Valley to Palliser Bay.

Greytown is situated three miles off the main line of railway, and near the middle of the Wairarapa Valley, fifty-four miles from Wellington by rail. The chief industries are sawmilling and coachbuilding. The population (1906) is 1,118.

A few miles further north is Carterton, where are to be found timber-mills, cheese-factories, &c., and a population of about 1,300 persons. There is some splendid farming land in this locality on the banks of the Ruamahanga River.

Masterton is situated at the head of the Wairarapa Valley, on the Wellington-Napier Railway, sixty-seven miles from the capital. It is the centre of an agricultural and pastoral country, and has a popu-

lation (1906) of 5,021. It is lit with gas, drained on the septic-tank principle, and has several industries, such as fellmongery, rope-making, flax-mills, coach-factory, &c., and, in addition, has some excellent fish-breeding ponds, from which many of the rivers in the colony have been supplied with trout. An important coach-road leads from here through a fine pastoral district to Te Nui, and on to Castlepoint on the east coast, where a large quantity of wool is annually shipped to Wellington for export.

North of Masterton is the Opaki Plain, and beyond is the entrance of the once famous Forty-mile Bush, which is now a thriving pastoral agricultural, and dairying district. Butter-factories have been established at numerous centres.

Eketahuna is, by rail and road, eighty-nine miles from Wellington. From there a main road leads to Alfredton, and up the Tiraumea Valley, through the East Puketoi country, to Weber and Dannevirke, the latter on the Napier Railway line.

Pahiatua, a township eighteen miles beyond Eketahuna, has a resident population (1906) of 1,371. It is the county and market town of a large and improving district, and will probably also become the centre of a large dairying industry. Several branch roads run from Pahiatua into the adjoining country, the principal one leading to Makuri through a beautifully wooded gorge. From there another branch road passes over the Makuri Saddle into the East Puketoi country. Excellent fishing is obtainable in the neighbourhood.

On the west coast, Pahautanui (or, more correctly, Paea-taha-nui), at the head of the Porirua Harbour, is the centre of a small agricultural community of early settlers, the old coach-road to the west coast running through it; and there is a branch road leading over to Hayward's, in the Hutt Valley. Near Plimmerton, on the sandhills and about a mile south, lies a large boulder known to Native tradition as "Te Ponga o Matahourua"—the anchor of "Matahourua," one of the canoes bringing the original Maori inhabitants to the Island. Paekakariki, twenty-seven miles from Wellington, may be considered the commencing-point of the west coast settlements, which are springing up in every available valley along the coast. At Otaki, forty-seven miles from Wellington, by rail and road, there is a township and a large Native settlement. At Manakau, Levin, and Shannon, thriving townships have arisen since the Manawatu Railway Company opened up the land round about, much of it being rich farming and grazing country. Between Shannon and the Manawatu River there is a large raupo or flax swamp, named Makurerua, containing at least 15,000 acres of fine alluvial soil, which is being gradually drained, and will probably at some future period become grazing-land.

Foxton, a township at the mouth of the Manawatu River, is a small shipping port, containing 1,331 inhabitants (1906). It is connected with Palmerston North by a branch railway, and is the outlet for a large area of good agricultural land, with a considerable flax-milling industry.

Palmerston North is an inland town at the junction of the Wellington-New Plymouth and the Palmerston-Napier Railways, situated on a fine plain in the midst of a most excellent farming district at a point eighty-seven miles from Wellington, and 112 miles from Napier. Its population is (census 1906) 10,243. It is lit with gas, and has a

good water-supply. A fine bridge across the Manawatu River connects it with the Fitzherbert Block, a tract of rich agricultural land. Nine miles from Palmerston is the Township of Ashhurst, at the mouth of the Pohangina Valley, up which settlement has now extended for a distance of twenty-two miles. Several large farm-homestead association blocks have been selected up this valley.

Feilding, ninety-nine miles from Wellington by rail, with a population (1906) of 2,972, is becoming one of the most important towns on the west coast, as it is the centre of a very fine locality, and the outlet for a large tract of inland country, the forest on which is fast being felled. A coach-road connects it with Birmingham (Kimbolton) and Pemberton, about thirty-two miles distant. On the seaward side for a distance of twenty miles there is also much good agricultural land, extending on the north-west to the Rangitikei River, and including the Township of Halcombe. There are several dairy factories established in the neighbourhood.

Marton, 116 miles from Wellington by rail, with a population of 1,268, one of the earliest of the west coast settlements, is also the centre of an agricultural country. The Township of Bull's, on the north side of the Rangitikei River, lies between Marton and the coast. From Marton Junction the southern part of the North Island Main Trunk Railway extends up the Rangitikei Valley to Hunterville, a good-sized township in the centre of a grazing district, and by way of the Makohine Viaduct to Taihape, forty-five miles from Marton, passing through Mangaweka. A short distance beyond Mangaweka is the viaduct of this name, 964 ft. long. The construction of the line is proceeding between Taihape and Waiouru. The distance from Marton Junction to the summit of Waimarino is about 104 miles. The coach-road has been made to Waiouru, and from thence to Tokaanu, on Lake Taupo, in the Auckland District.

Wanganui, situated near the mouth of the river of that name, is the oldest town after Wellington, from which it is 150 miles by rail—the distance by sea being only 120 miles. It is the centre of an excellent farming district, and has a considerable trade, and several manufactories. Near the mouth of the Wanganui River are freezing-works, the meat from which is conveyed by lighters to the large English steamers which lie off the mouth of the river. The town is lit with gas, and has a good water-supply. Not far from it are some extensive railway workshops. Altogether it is a thriving place, with a population (1906) of 8,216. The Wanganui River is navigable for a light-draught steamer up to Pipiriki, a distance of sixty miles, and a launch goes a further distance of eighty-four miles to Taumarunui. (See description of Wanganui River on page 231.) A branch road extends from Pipiriki through the Waimarino Forest to Ohakune, and on to Karioi on the Murimotu Plains, thence by way of Turangarere and Moawhango to Napier. Trade (1906): Imports, £176,387; exports, £403,570.

#### MARLBOROUGH LAND DISTRICT.

##### *Road and Rail.*

Railway communication exists between Picton and Blenheim—distance about 18½ miles. Trains leave the former place early in the morning, about mid-day, and again in the evening, returning soon

after arrival at Blenheim. Trains also run at convenient hours between Blenheim and Seddon, a further distance of  $16\frac{1}{2}$  miles. Seddon is a small township in the Awatere Valley, and is the distributing centre for the recently established Crown settlements of Starborough, Richmond Brook, Blind River, and Flaxbourne, and it is here that periodical stock sales are held for the convenience of the pastoralists of the district. The substantial bridge here (traffic and railway) is a great boon to the district.

The Main South Road runs from here through portions of the Starborough, Blind River, and Flaxbourne Settlements, and strikes the sea-coast at the mouth of the River Ure; then follows the coast, past Kekerangu and Clarence Rivers, to Kaikoura, a distance of about seventy miles. The scenery along this route is exceedingly picturesque in many parts—the ocean-beach on the one hand and forest-clad slopes on the other, with luxuriant foliage of ngaio, akeake, and other native shrubs.

From Kaikoura there are two roads running south—one known as the Coast Road, which follows the sea-shore as far as the Oaro River (about thirteen miles), along which the scenery is even more striking than the stretch already described. From the last named river the road turns inland through the Hundalee Settlement, past the Conway River, Hawkswood, and Parnassus Stations to Mackenzie (Cheviot), a distance of some twenty-eight miles, or a total distance of about forty-one miles from Kaikoura; the other route (known as the Coach Road) soon after leaving Kaikoura strikes inland up the Kowhai River, thence *via* Greenhills to Waiau, distance about forty-eight miles. There is a bi-weekly coach service between Kaikoura and Waiau, and from the latter place there is a line of coaches connecting with Culverden, the present northern terminus of the railway from Christchurch.

The Main North Road to Nelson, distant seventy-eight miles, is a good metalled road nearly the whole way. It runs up the Wairau Valley from Blenheim for about six miles, crosses the Wairau River into the Kaituna Valley, which it follows as far as Havelock—about twenty-eight miles. It then runs up the Pelorus and Rai Valleys, and ascends by easy gradients to the Brown Saddle, where it crosses the boundary into Nelson. An excellent coach service—probably the best in the colony—has been established for some years, the coach running to and from Nelson on alternate days, covering the distance in eleven hours, and another coach service twice a week has been established between Blenheim and Havelock.

A good road has been formed up the Wairau Valley, passing through the Bankhouse, Erina, Lansdowne, Hillersden, and Birch Hill properties, and connecting with Tophouse, just outside the boundary, distant fifty-six miles from Blenheim. At Tophouse there are a hotel and a telegraph-station, and thence a good road leads to Belgrove, on the Nelson Railway line.

A coach runs twice a week between Blenheim and Wairau Valley twenty-five miles—where there are a hotel, a post and telegraph office, and one or two stores.

There is also a good cart-road running up the Awatere River—which it crosses and recrosses several times—as far as Molesworth Station, about seventy miles from Blenheim. Between these points

there is a weekly coach and mail service. From Molesworth the road goes over Saxton's and Jollie's Passes to Hanmer and Culverden. There are other minor roads and bridle-tracks throughout the district too numerous to specify.

#### *Towns.*

The chief town, Blenheim, is situated on the Wairau Plain, at the junction of the Opawa and Omaka Rivers—a third river, the Taylor, would join at about the same point were it not that when not in flood it disappears beneath the surface, about three miles south of the town. Blenheim has been termed a miniature Christchurch, doubtless from its extreme flatness. Considering this, its streets are not so straight and wide as they should be. The Government buildings, which comprise the Post and Telegraph Offices, Lands and Survey Offices, Courts of Justice, &c., form a handsome edifice in the centre of the town, which is well planted with deciduous and evergreen trees. It is about 18½ miles from Picton by rail, and about twelve miles from the sea by the Opawa River, which is navigable for small steamers. Blenheim is lit by gas, and is supplied with water principally by artesian wells. The population (1906) is 3,552.

The next town in importance is Picton; the principal port, only fifty-three miles by sea from Wellington. This little town, both in position and appearance, may be said to be the antithesis of Blenheim, being most picturesquely situated at the head of Queen Charlotte Sound, and nestling among hills, some of the higher ones still densely covered with birch and other forest. There is frequent communication with Wellington and Nelson by steamers averaging 500 tons, and vessels of large size can lie at the wharf at low water. The direct exportation of frozen meat from Picton commenced in 1892, when 16,433 carcasses were shipped. The Christchurch Meat Company exported from Picton for the year ended 31st March, 1905—mutton, 46,303 carcasses; and lambs, 67,444 carcasses. Picton possesses a malting establishment also, producing for export, as the excellent quality of the barley grown on the Wairau Plain insures a ready market. A small quantity of oysters, mostly procured in Queen Charlotte Sound, is annually exported from Picton. With culture the supply might be almost indefinitely increased, many of the sheltered bays in both Sounds being well adapted for the purpose. What is now being done along the Marlborough coast is a mere trifle compared with what might be accomplished if capital and knowledge were brought to bear on the fishing industry. Around the whole coast, from the mouth of the Conway to near the French Pass, the sea abounds in fish. Within the Sounds and amongst the islands of Cook Strait, hapuku, snapper, moki, barracouta, raturi, kahawai, and rock-cod are extremely plentiful. Immense shoals of the southern herring (*Clupea sagax*) and of anchovies (*Engraulis encrasicolus*) frequent the inlets at certain seasons of the year, and quantities of fresh fish are exported thence to various places within the colony. As steamers arrive at and leave Picton almost daily, shipments can be made without delay to all parts. Picton possesses a good gravitation water-supply. Its population (census 1906) is 995. There are cement and lime works, a most extensive and up-to-date plant having been erected at Elevation, the first station on the Picton-Blenheim line, and only three miles distant from the former, thus affording every



facility for transport of material. From Picton communication by small steamers and oil-launches can be obtained to all parts of the beautiful bays and inlets in both Queen Charlotte and Pelorus Sounds, also Tory Channel. Imports (1906), £28,743; exports, £218,093.

Havelock is very prettily situated at the head of the Pelorus Sound, and is on the main coach-road between Blenheim and Nelson (distant twenty-eight miles from the former town); from here there is also a coach service to the Grove, from whence a steamer plies regularly to Picton. Near here is Blackball, where Messrs. Brownlee and Co.'s extensive sawmills stand. This firm exports large supplies of timber direct to Wellington, Lyttelton, and other places, in their own vessels; they have also about eighteen miles of tramway extending to their timber areas in the Rai Valley. There are several other firms of sawmillers in the Pelorus, Wakamarina, and Rai Valleys, from whence Blenheim and Nelson draw their chief supplies. The population is about 300. There is a mail service twice a week with Blenheim.

Seddon is the centre which serves the new settlements, and as such has a fine future before it. The railway is in course of construction, and will in due time connect with the Southern Trunk system.

Kaikoura (400), situated on the peninsula of the same name, is a most picturesque town, and resembles very closely some of the English watering-places. There is a small harbour, from which steamers run regularly to Lyttelton and Wellington. Behind the town is a thriving farming district extending up to the foot-hills of the magnificent Seaward Kaikouras, which, as viewed from the peninsula, is considered one of the finest pieces of mountain scenery in the colony. There are several sawmills near the town, which supply the local market; and a fish-freezing establishment is about to be started here. Excellent hotel accommodation can be obtained for tourists and others, and the climate is all that can be desired, while sea-bathing can be obtained in the vicinity. Coaches run from Kaikoura to Blenheim and to Waiiau twice a week. There is direct communication with Wellington and Lyttelton by steamer.

#### NELSON LAND DISTRICT.

##### *Towns and Roads.*

The chief town is Nelson, situated at the head of Blind Bay, in 41° 16' S., and surrounded on all sides, except the north, by mountains reaching an elevation of 3,500 ft. With a mean temperature of 54·8° Fahr. it possesses a climate almost unequalled for its beneficial effects on invalids suffering from pulmonary diseases. There are many picturesque spots in the suburbs, and the city itself, with its cleanly looking buildings and well-kept gardens, is one of the most charming spots in New Zealand. There is an old-established Boys' College, a Girls' College, and a School of Music, besides Government and other schools. The Boys' College was destroyed by fire during 1904, but is being rebuilt fast. The Anglican Pro-Cathedral, built on the summit of a central hill, memorable as being the site of fortifications erected in the early days of the settlement for defence against an expected attack of the Natives, is a striking feature. The Roman Catholic Church, convent, and school-buildings cover a large extent of ground. There is also at Stoke, a small village three miles from Nelson, a central Catholic orphanage, surrounded by grounds of considerable area. There is a good supply of excellent

water, from a reservoir in the hills at the back of the town, and the streets are well lighted with gas. The several Government Departments are housed in one roomy building, containing a large hall used for Supreme Court sittings and other public purposes. The principal industries are represented by iron-foundries, fruit preserving and canning works, breweries, biscuit-factory, coachbuilding, sawmills, and sash and door factories, boot-factories, and many other small works. Nelson has a good inner harbour, enclosed by a natural boulder-bank running from its entrance to the base of Mackay's Bluff, a distance of about eight miles. The average rise and fall of the tide is 12 ft. 6 in., and at present is capable of admitting vessels up to 1,200 tons with a draught of 17 ft. 6 in. There is also good safe anchorage in the roadstead, which is calm for about ten months in the year.

With a view to admitting trading steamers of the "Mapourika" class at all states of the tide, and Home steamers at high tide, a new entrance is now in course of construction, which, when complete, will give 15 ft. depth at low water, ordinary spring tides, and over 27 ft. at high water. The work is making rapid and satisfactory progress, and it is expected that the new entrance will be cut through to a sufficient width for the passage of shipping by the end of 1905.

Nelson is a port of call for the Union Steamship Company's coastal steamers, and has a small local fleet plying between the West Coast, Blind Bay, Picton, and Wellington. The town is reached from the eastward by a good main road from Marlborough. A railway-line has been constructed up country to the southward for thirty-one miles to Motupiko, passing through the farming villages of Stoke, Richmond (651), Brightwater, Wakefield, Foxhill, and Belgrove, and is being extended for a further distance of ten miles, crossing the Motueka River by means of a combined railway and traffic bridge, and proceeding up the Tadmor Valley as far as Tadmor Settlement. Leaving for the West Coast by a good main road, the traveller starts from the Motupiko Station on one of Cobb and Co.'s coaches, and, proceeding up the valleys of the Motupiko and Clarke, crosses the Hope Saddle, and thence down the Hope Valley to its junction with the Buller, about sixty-seven miles from town. He then enjoys a succession of views of mountain-gorge scenery, and, after traversing a gorge of seventeen miles in length, arrives at the Lyell, 107 miles from his starting-point. This is an alpine township, in a small quartz-mining neighbourhood. Here is a fine lattice-girder bridge, spanning a rocky gorge of the Buller, and springing boldly from a bluff on the northern side. It is about 347 ft. long, two of the spans being 108 ft. and 168 ft. respectively. The roadway is 100 ft. above the river-bed. At 116 miles the junction of the Inangahua with the Buller is reached, the main road continuing to Reefton, with a branch road twenty-eight miles to Westport, which for twelve miles passes through some of the grandest river-gorge scenery in New Zealand. Population, 8,193 (1906).

Westport, the town next in importance to Nelson, is situated at the mouth of the Buller River. The harbour is sheltered from southerly gales by Cape Foulwind and its outlying rocks, and is accessible in nearly all weathers. A large sum has been spent on a system of harbour-works, designed by the late Sir John Cooze. Westport is the place of shipment for the coal-mines lying northward as far as the Mokihinui River. The character of this coal for steam purposes

stands unrivalled. The long line of coal-staiths and wharves on the northern bank of the river, with a fleet of steam colliers loading alongside, does not fail at once to impress a visitor with a sense of the importance of the trade. Though much has already been done, yet the industry, from the extent of the coal-bearing strata, is capable of much larger expansion when the necessary capital can be found. The Westport-Mokihinui Railway connects with the mines and conveys the coal to the port. At the foot of the Mount Rochfort Plateau, nine miles from Westport, is Waimangaroa, and on the plateau itself is Denniston — both coal-mining villages. The latter, built at an elevation of 1,960 ft., is said to be the highest township in New Zealand. On a clear day it is well worth a visit, for the sake of enjoying the magnificent panoramic view of the Southern Alps, which reach their highest point in Mount Cook, 12,349 ft. high, about 100 miles south. South of Westport are the alluvial gold-mining centres of Addison's Flat, Nine-mile Beach, and Charleston. Population, 3,645 (1906).

Motueka is a thriving town situate near the mouth of the Motueka River. It is the centre of a considerable agricultural and fruit-growing district. It has two bacon-factories, fruit pulping and canning works, and dairy factory. Population, 1,068 (1906).

From the Inangahua Junction the main road continues southward through the Inangahua Valley, passing through cultivated lands, which are being gradually won from the heavy bush, and at a distance of 136 miles from Nelson reaches the Township of Reefton. Here, as at Westport, are good hotels, and, as in every one of the larger coast towns, a hospital receiving a Government grant-in-aid. This town was the first in New Zealand to be lighted by electricity. Through the Midland Railway extension of the Grey-Brunner line, Reefton is connected by rail with Greymouth, from whence it is for the most part supplied. The continuation of the line down the Inangahua Valley is being carried on at present. About two miles inland from Reefton is Black's Point mining township, with several batteries at work in and about the place, a visit to which is generally paid by tourists wishing to see something of the gold-mining industry. Other small mining townships are Boatman's, Caplestone, and Antonio's.

Leaving Reefton by rail, and passing into the Grey Valley through a short tunnel, and by a bridge over the Grey River, Totara Flat is reached, nineteen miles distant. Here there is a considerable area under cultivation. Seven miles further on is the decayed mining township of Ahaura. Small townships are springing up along the railway-line, and several large sawmills are working.

At the Grey River Gorge, eight miles from Greymouth, we enter the Borough of Brunner. This place is the oldest centre of coal-mining in the district. Owing to the effect of the coal-smoke from the coke-ovens on the surrounding cliffs and bush, and the appearance of the numerous miners' cottages nestling on the mountain-slopes, it has the look of a veritable "Black Country," such as may be seen in some coal districts in England. Population, 1,133 (1906).

Several large sawmills are at work between this place and Greymouth, which we reach at a distance of 180 miles from Nelson. The Midland Railway line, to connect with Canterbury by way of Arthur's Pass in the Otira Gorge, has been constructed on the Westland side of the Arnold River to Lake Brunner, the eastern shores of which it skirts for some distance, and from thence to the Teremakan River and the Otira Gorge.

The Town of Greymouth is situated on the south bank of the Grey River, in the Westland District, and is the shipping-port for the products of the coal-basin included within the area of the Grey Coal-fields Reserve, the larger portion of which lies on the north bank of the river in the Nelson District.

The small Town of Cobden is situated opposite the Town of Greymouth, and is connected with it by a substantial bridge.

#### *Roads, Tracks, &c.*

Situate on the coast, fifty miles north of Westport, is the Karamea Special Settlement, principally settled from the Nelson and Motueka Valley districts. This part of the district contains some excellent but heavily timbered land, and is reached from Westport by a good bridle-road, connecting with the Westport-Ngakawau Railway at the Mokihinui River. A bridle-track also connects with Collingwood and Golden Bay. This track passes along the coast northwards, thence up the Heaphy Valley to the Golden Downs, and down the Aorere Valley to Golden Bay. Here again is another coal-basin, which, though of inferior value to the older deposits on the western side, is likely to become of importance, having at the present time one mine in full work. Another coal-basin exists at West Wanganui and Pakawau.

In the Aorere Valley, of which Collingwood is the port, alluvial mining is still found to be payable, and the country contains some valuable timber in the upper part not yet utilised. Nineteen miles south, in Blind Bay, lies the small port of Waitapu, from which a considerable amount of sawn timber used to be exported, drawn from the Takaka Valley, and brought down by a steam tramway from the upper mills. From the head of this valley the main road is carried over a pass in the Pikikirunga Range, 3,476 ft. high, through the Villages of East and West Takaka, Riwaka, Motueka, and Moutere to the Town of Richmond, eight miles from Nelson. Inland are also the Villages of Ngatimoti, Dovedale, Tadmor, and Sherry, each the centre of a number of small farms, and all connected by fairly good dray-roads.

An inland road, partly bridle-track and partly dray-road, has been made from Nelson to Canterbury, by way of Tophouse, Wairau Gorge, Tarndale, Clarence Valley, Jollie's Pass, and the Waiau Plains. On the Hanmer, a tributary of the Waiau-ua, is a Government Sanatorium, at an elevation of 1,000 ft. above sea-level, and among hills 6,000 ft. high. Here there are hot mineral springs, much visited by persons suffering from rheumatism and skin-diseases. It is reached by coach and rail from Christchurch in ten hours. The Main Trunk Railway line is constructed to Culverden, twelve miles north of the Hurunui, the southern boundary of the district. From Culverden a good coach-road passes through Rotherham and Waiau-ua to the east coast at Kaikoura, connecting with Blenheim and Nelson.

#### WESTLAND LAND DISTRICT.

##### *Road and Rail.*

*Steamer Access.*—Hokitika and Greymouth are the principal shipping centres, and steamers of various lines trade daily between the latter port and the other ports of the colony. A subsidised steamer runs between Hokitika, Okarito, and the southern ports as far as Jackson's Bay, plying every two or three months, thus enabling miners

and settlers to obtain supplies and the latter to ship their cattle and produce to market. The Government steamer also calls at Big, Jackson's, and Bruce Bays on her quarterly trips from Dunedin and Bluff. Cargo-craft of various tonnage, with and without auxiliary steam-power, likewise make periodical calls at Hokitika and Greymouth.

*Railways.*—As yet only a portion of the northern district has been railed.

*Hokitika to Greymouth* (twenty-four miles).—This line, with the exception of a loop midway to connect with Kumara, runs parallel to and only a short distance from the ocean-beach. Many interesting phases of old and modern gold-workings are passed through along the base of the wooded terrace which, at no far-distant date, formed the shore-line. Sundry small farms and wayside holdings are on either hand, and lumbering and gold-mining takes place on the plateaux and in the gullies for miles inland all the way through, numerous flag-stations affording termini for this side traffic. And hereabouts, as elsewhere in Westland, there are clusters of miners, farmers, and wood-cutters, whose workings and clearings lie scattered far back on the terraces and amongst the hollows of the surrounding forest, of whom the passing traveller is unaware.

*Greymouth to Runanga* (five miles).—This short line connects with the State coal-mine in the vicinity of the newly established Township of Runanga, which lies to the north-east of the Port of Greymouth.

*Greymouth to Reefton* (forty-six miles).—This railway taps the central and lower valley of the Grey River, *via* Brunnerton, Stillwater, Ngahere, and Ahaura, as well as six minor stations all within the Westland District. A great tonnage of coal from the Brunner, Tyne-side, and Blackball mines, large quantities of timber from the numerous sawmills, gold-mining material, green flax, farming produce, stock, and goods, besides a large number of passengers, are railed along this line. A further section (Reefton to Inangahua Junction) is in course of construction.

*Greymouth to Otira.*—This line branches from the Reefton line at Stillwater and proceeds up the Arnold Valley, *via* Lake Brunner and Taramakau Valley, to Otira (forty-two miles from Stillwater and fifty-one from Greymouth). Large quantities of timber are brought down this section from the numerous sawmills that are established alongside of the line. Stock and produce also swell the amount of traffic, and there is also a considerable and increasing number of passengers travelling to and from Christchurch by the overland coach, which connects the present termini of the railways at Otira and Springfield.

The railways in course of construction in connection with the Westland system include the extension of the Greymouth-Reefton section down the valley of the Inangahua River (twenty miles) to the Buller Valley, a very convenient and promising line. There is also the link (forty-three miles) between the Otira terminus and the works now progressing up the Waimakariri Valley to complete communication between the east and west coast. This includes the contemplated tunnel through the main range between the Otira and Bealey Valleys. The extension of the Greymouth-Hokitika line to Ross (sixteen miles) is likewise in progress, and its completion will render an immense area of milling-timber available, will revive the mining industry by the

economical carriage of material and coal, and enable large numbers of fat stock to be railed to the northern markets.

*Roads.*—An arterial road extends throughout Westland from the Upper Grey Valley, *via* Ahaura, Greymouth, Kumara, Hokitika, Ross, and Okarito, down to the Haast River, and thence partly by sea-beach and rough tracks almost to Big Bay, on the confines of Otago. This thoroughfare is fit for vehicle traffic down to the Waiho, but southward of that river it is merely a horse-track. The rivers in the northern district, as far as the Waitaha, are all bridged; below that point ferries are placed on all the large streams, so that access is safe and uninterrupted right through, *via* Haast Pass, to Otago.

Three roads only have been made across the Island leading out of Westland. One, a coach-road, runs from Hokitika *via* Kumara to Christchurch. The others are bridle-roads, one of which, at present out of repair and impassable, leads up the Ahaura Valley *via* the Amuri Pass into North Canterbury, and the other, in good order, proceeds from the sea-coast up the Haast Valley *via* the Makarora River to Pembroke, in Otago.

Numerous short dray-roads and horse-tracks branch from these trunk lines to the various mining and settlement centres, while the sea-beach and open shingle river-beds likewise give access to the adjacent country. Sundry dips and *cols*, varying from 1,800 ft. to over 7,000 ft. in height, leading across the Southern Alps have been explored and mapped, and during the summer months are repeatedly crossed by experienced mountaineers. Of these depressions the only subalpine saddle is Haast Pass, all the others being liable to blocks by winter snow.

Four rough foot-tracks, blazed through the bush and partly benched, go across into Canterbury, as follows: (1) *Via* Arahura and Browning's Rivers over Browning's Pass into the Wilberforce Valley; (2) *via* Hokitika River over Mathias Pass into Mathias Valley; (3) *via* Whitcombe River, over Whitcombe's Pass into Rakaia Valley; and (4) *via* Copland River, over the main divide to the Hermitage in the Tasman Valley. This last is known as Fitzgerald's Pass.

As a whole the roads are smooth and level, and, passing through rocky and gravelly districts, are free from mud and dust.

Tracks have been constructed giving easy access to the Franz Josef and Fox Glaciers—from Okarito and Okarito Forks for the former, and from Gillespie's for the latter. The two are also now connected by the inland South Road, which crosses the Karangarua River at Scott's, the starting-place for Fitzgerald's Pass. This is the pass which gives access to the Hermitage from the West Coast.

*Coach Traffic.*—Coaches three times a week connect with Canterbury *via* Arthur's Pass, and also ply daily between Ross, Hokitika, Kumara, Greymouth, and the neighbouring towns. Once a week a mail is despatched by coach to Okarito and thence conveyed on horse-back southward to Paringa, and once a fortnight to Jackson's Bay.

*Telegraph-lines.*—These extend along all the trunk road-lines in the north, with numerous telephonic connections with side districts, and south as far as Okarito.

#### *Towns.*

*Greymouth.*—This borough, the largest town in Westland, containing a population of 4,569 (1906), has progressed remarkably during the last few years. It is situated on the south bank of the Grey River close to

its mouth, and is the main shipping-port for northern Westland. The rising Township of Cobden, which is placed on the north bank of the Grey River immediately abreast of Greymouth, to which it is linked by a fine bridge, may be considered a suburb of the borough. It contains a population of about 500, and is principally occupied by the residences of Greymouth merchants and tradesmen.

Four railway-lines radiate from Greymouth—to the State coal-mines at Runanga, to Reefton, to Otira, and to Hokitika. Extensions of the three last-mentioned lines are in course of construction. The town possesses several very fine buildings, notably the handsome new Town Hall, the Anglican and Roman Catholic churches, the State school buildings, convent structure and school, Harbour Board buildings, hospital, and many other substantial edifices. The principal street facing the port has been almost wholly rebuilt during late years, and presents a fine appearance, while the numbers of comfortable up-to-date residences give a most pleasing aspect to this prosperous place. A monument in honour of those who fell in the African war is erected in a central position. The town has a telephone exchange, a good public library, first-class sewer system, an abundant high-pressure water-supply, and is well paved and lighted, the water-works and gasworks belonging to the Corporation. One of the Government railway workshops is located here, and amongst other local industries are a foundry and engineering establishment, breweries, sawmills, dairy factory, sash and door factories, furniture-manufactories, meat-preserving works, lime and cement works, coach-factories, &c. Recreation-grounds have been laid out, one in the southern suburb and the other, containing a pretty racing track and stand, lies almost alongside the main town. About one mile out is the racecourse, which in equipment and surroundings is esteemed one of the best in the colony.

A description of the Port of Greymouth will be found *post*.

*Hokitika*.—This town is situated at the north mouth of the Hokitika River, bordering the sea-beach. It contains a population of 2,227 (1906), and is mainly dependent on the adjacent sawmills, flax-mills, farming settlements, and gold-mines. A considerable trade is also done by sea with the miners and settlers in south Westland, for which district it is the shipping-port. It possesses convenient structures, such as a drill-shed, theatre, four churches, convent, and school, as well as a commodious Town Hall, containing the Corporation offices, library, public reading-room, and museum; is lit with gas, and has a telephone exchange. A fine clock-tower, with chimes, has been erected in the centre of the town in memory of the Westland troopers who fell in the Boer war. A very handsome building encloses the high and State schools. On a high terrace immediately north of the borough are situated the Hospital, Gaol, and Lunatic Asylum, all of which, with their many detached buildings, gardens, and grounds, are beautifully kept. There is a fine central park—the recreation-ground of the place. As the suburban dwellings are surrounded by gardens, the town has a most pleasing aspect. It enjoys grand views of Mount Cook and other dominant peaks, and from the terrace on the Town Belt the panorama of snow-capped mountains is one of the finest in the world. Excursions by road and water can be made to the adjacent beauty-spots and Lakes Kanieri and Mahinapua, which are unrivalled in their different scenic aspects. On the eastern boundary of the borough is the racecourse, which is well equipped and pleasantly situated. The

local industries comprise sawmills, flax-mills, sash, door, and furniture factories, foundry and engineering shops, fish-cannery, coachbuilding, bone-mill, breweries, and coffee and spice works. Hokitika is connected with Greymouth and the north by railway, which will ere long be open southward to Ross. In connection with this latter extension, a fine combined railway and traffic bridge has been erected across the Hokitika River, and proves a great convenience to the townspeople and suburban residents.

*Brunner.*—Picturesquely situated on the banks of the Grey River, seven miles above Greymouth, it includes the Villages of Dobson, Taylorville, and Wallsend, and contains about 1,100 people. This town is wholly dependent on the adjacent Brunner and Tyneside coal-mines and their allied industries of coke-burning and brick and tile making. The output of these mines and the manufactories is sent by rail to Greymouth, where the bulk of it is shipped. The mineral traffic causes this short branch to be the best paying railway-line in the colony. Two fine suspension bridges across the Grey River link the townships together, one being a railway and the other a foot bridge.

*Kumara.*—This compact little town, with its suburbs of Dillmantown and Larrikins, of 919 inhabitants, is placed on the skirts of the largest alluvial goldfield in New Zealand. Main roads to Hokitika, Greymouth, and Christchurch radiate from this place, and a fine road of four miles connects it with the railway. The town is finely situated on a high table-land, and enjoys interesting views of mountains, and bush-clad plateaux, river, valley, and ocean. Hydraulic gold-mining is carried on here on an extensive scale, the greater portion of the water-supply coming many miles from the inland mountains. Large sludge-channels have been made to carry away the tailings. This industry gives employment to a large number of men, and also provides lucrative work for sawmillers and mechanical engineers. Kumara has finely equipped and well-built schools and a hospital.

*Ross.*—Population, 572. A very picturesque township, situated at the foot of the northern slopes of Mount Greenland, 150 ft. above and one mile distant from the sea. It is essentially a mining centre. Right under the town area are various layers of auriferous drifts, partly worked, but at present water-logged; these deep levels will be worked again in course of time. The district has got a name for fruit and flowers.

*Blackball.*—A coal-mining township in the Grey Valley, with a population of about 800. There is a combined railway and traffic bridge over the Grey, and a branch line (two miles and a half) will shortly connect the town with the Main Trunk Railway.

*Miscellaneous.*—There are besides many small centres of mining and sawmilling, such as Ahaura, Notown, Hatters, Stillwater, Kokiri, Nelson Creek, Moana, Noble's, Orwell Creek, Twelve-mile, Stafford, Kanieri, &c. The Town of Runanga has been established in connection with the State coal-mines, near Greymouth, which are connected by rail with that town.

#### *Harbours and Ports.*

The harbours and ports of Westland are the following:—

*Greymouth.*—Twenty-four miles north-east of Hokitika. Extensive harbour-works have been carried out. A breakwater or sea-wall extends some 3,542 ft. seaward from the mouth of the river on the



south side, and on the north side 1,400 ft., with internal half-tide training-walls, the result being an average depth of water on the bar of 20 ft. at high water, and of from 8 ft. to 16 ft. at low water. Vessels of 1,500 tons can now come alongside the wharf. There is a berthage accommodation of 2,355 ft., with a minimum depth of 12 ft. to 16 ft. at low water. The principal exports are gold, coal, coke, and timber.

*Jackson's Bay.*—153 miles south-west of Hokitika. Good shelter and anchorage, open only to north-east, with 12 ft. of water within a few chains of shore. Jackson's Head runs out about one mile and a half in a north-easterly direction from the southern end of the bay. This is the only ocean harbour on the coast of Westland, and could be converted into a first-class port at comparatively small cost. Possibly Jackson's Bay may eventually form a great coal port, as indications of coal are found from the bay to Tauperikaka, a distance of thirty miles.

*Hokitika* has a bar-harbour of 9 ft. to 15 ft., and is safe for about ten months of the year for vessels drawing 8 ft. to 10 ft. of water.

The other harbours are Okarito, Bruce Bay, Paringa River, Haast, Okuru, Awarua (or Big) Bay. Steamers have also entered the Taramakau, Waitata, Wataroa, Wanganui, Waitoto, and Arawata. The Cascade River is navigable, and there are roadsteads at Saltwater, Gillespie's Beach, and Abbey Rocks.

#### CANTERBURY LAND DISTRICT.

##### *Road and Rail.*

In no part of New Zealand are the means of communication better than in Canterbury. The natural facilities of the country have been abundantly supplemented by railways and roads. Lyttelton, the chief port, is connected by rail with Christchurch, the heart and centre of the whole district. From Christchurch the main line extends northwards to Culverden, a distance of sixty-nine miles, with a branch from Waipara to Scargill (about fifteen miles) open for traffic. A further portion, Scargill to Hurunui (about twenty-three miles), is almost completed, and work is actively in progress beyond this point towards Westlands (about twenty-seven miles). It is proposed to extend this branch to Mackenzie, in the Cheviot district. An extension of the main line from Culverden to Hanmer Springs is also in contemplation. Southward the Main Trunk line runs through Waitaki (139 miles) to Dunedin. These lines tap and serve the whole coastal district and the lands adjoining on the western side. In addition, eight branch lines have been constructed westward, and two lines south-eastward; the former, in most instances, extending to the foot of the hills.

Combined with the railway system is a complete network of main, district, and subsidiary roads, extending into all parts of Canterbury. The total length of railways is about 470 miles, and the roads probably exceed 10,000 miles in the aggregate. The completion of this splendid system is due, partly to the foresight of the original settlers, partly to the exertions of the Provincial Government, and partly to the railway and public-works policy of the late Sir Julius Vogel.

##### *The City of Christchurch.*

Christchurch, the capital city of the Canterbury District, is situated on the plains. It is practically level, the original portion of the city

being laid out in rectangular form, two miles by one mile and a quarter, and intersected diagonally by a street. All the principal streets are 66 ft. in width. There are numerous open spaces, including the Cathedral Square in the centre, and Cranmer and Latimer Squares. The Avon, a pretty stream, overhung by willows, runs through the town, presenting from all points charming vistas. The city is surprisingly English in its appearance, architecture, and surroundings. The central portion, where stands the Cathedral, Government offices, and other substantial structures, has a handsome, well-built look. Other parts contain fine public buildings, such as the Museum, Canterbury College, High Schools, &c. The whole is admirably set off by Hagley Park (400 acres in extent), the Domain and Botanical Gardens (79 acres), Lancaster Park, the Town Belts, and other public and private gardens and plantations. The suburbs can show many handsome houses and beautifully kept grounds. There is an extensive system of electric tramways, the water-supply (artesian) is copious and pure, and the city drainage scheme is comprehensive and up to date. Christchurch is the centre of trade and commerce for the North Canterbury agricultural and pastoral country, and the headquarters of many manufacturing industries, including carriage, boot, and clothing factories, flour-mills, breweries, meat preserving and freezing, biscuit, planing and moulding, bicycle, and other works.

*Population* (census 1906).—Greater Christchurch (the city, Sydenham, St. Albans, Linwood, and Richmond) recorded 49,908. The metropolitan area includes, in addition, the whole and portions of certain contiguous road districts—Spreydon, Halswell, Riccarton, Avon, and Heathcote—with a population of 17,900. These bring the metropolitan area to 67,700. With the addition of New Brighton (1,132), Sumner (1,182), Woolston (2,891), and Lyttelton (3,942)—the last added for purposes of comparison—the metropolitan population rises to 76,800.

*Miscellaneous*.—There are large and well-equipped show-grounds at Addington.

The Canterbury Agricultural and Pastoral Association and the Industrial Association, operating through a public company, have erected a fine block of buildings in brick and stone, comprising a large hall capable of seating 3,000 persons (and known as the Canterbury Hall), together with smaller halls and suites of offices. It is proposed to establish an industrial and agricultural museum of a permanent character in the building, which should form a most useful reference to the productions and capabilities of the district. The opening of the building was inaugurated by the holding of the Canterbury Jubilee Industrial Exhibition, 1900, commemorating the establishment of the province fifty years before, and forming an excellent index to the progress of the district since that time. The exhibition was confined to colonial products, but the bulk of the exhibits were produced in the district. It remained open for three months—from the 1st November, 1900, to the 31st January, 1901—was visited during that time by about 250,000 persons, and yielded a profit to the industrial association (as promoters) of about £3,000.

Recreation and amusement are provided for by the Canterbury Hall (already referred to), Theatre Royal, Opera House, and various public halls, the famous Riccarton racecourse, the numerous cricket

and football grounds, &c., while, boating-men have the River Avon and the Heathcote Estuary

Christchurch is connected with the outside world by Port Lyttelton, seven miles distant. The railway-tunnel of one mile and five-eighths in length, through the Port Hills, is on this line. Christchurch is not only the centre of the splendid Canterbury Plains, but is also one of the chief railway centres of the colony. Addington railway-workshops are extensive and fully equipped.

*Manufactories.\**—Excluding mines and quarries, the total number of manufactories in Canterbury, most of which are in Christchurch and the neighbourhood, at the date of the census in 1901 was 648, employing 7,050 males and 2,754 females. Included in the above were 35 printing, 10 agricultural-implement, 26 coach building and painting, 29 fellmongering, tanning, currying, and wool-scouring establishments, 5 sail and oilskin factories, 27 boot and shoe factories, 7 rope and twine works, 8 flax-mills, 4 boiling-down, meat-preserving, and freezing works, 10 bacon-curing works, 17 cheese and butter factories, 23 grain-mills, 34 chaff-cutting and grass-seed-dressing works, 16 breweries, 10 malt-houses, 27 aerated-water and cordial works, 4 sauce and pickle making factories, 6 soap and candle works, 18 sawmills and sash and door factories, 4 gasworks, 20 brick, tile, and pottery manufactories, 14 iron and brass foundries, 25 cycle-works, 20 furniture-factories, and 8 engineering-works.

The census returns also showed that in 1901 the value of land, machinery, and buildings used for factory purposes was £1,489,096, and the total value of manufactories, £4,701,304.

*Educational Institutions.*—Primary Schools: The district is divided into two parts, termed North and South Canterbury, each presided over by an Educational Board. Under the control of the Boards schools have been established throughout the whole country wherever population warrants their erection.

There is a Normal School at Christchurch for the training of teachers.

Secondary Education: For the further education of children ample provision has been made by the establishment of secondary schools. The principal schools of this class are the Boys' and Girls' High Schools at Christchurch, Rangiora, Ashburton, and Timaru. For more advanced students Canterbury College, Christchurch, is available. This institution was founded and endowed by the Provincial Government in 1873. It is presided over by a Board of Governors. The teaching-staff comprises twelve professors and lecturers, and the number of students attending lectures is 277. The School of Engineering, Electricity, and Technical Science, recently established as a special branch of the college, is well equipped, and is attended by a large number of students. The School of Art is also a special branch of the college work, and the popularity of both these branches has been met by the recent erection of considerable additions to the building-accommodation.

It should be recorded here that the Provincial Government of Canterbury was fully alive to its duties as regards higher education. It made reserves for the purpose of endowment for the following ob-

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\* Figures of census 1906 not available at time of writing.

jects : (1) College, 101,640 acres, reserved June, 1873 ; (2) technical science, 103,000 acres, reserved July, 1873 ; (3) School of Agriculture, 100,950 acres, reserved June, 1873 ; (4) Boys' High School, 9,220 acres, reserved at various dates ; (5) Classical School, 8,953 acres, reserved at various dates. To these were subsequently added the following : (6) Girls' High School, 2,578 acres, reserved January, 1878 ; (7) Medical School, 5,000 acres, reserved December, 1877.

In April, 1903, there was established in Christchurch a technical school, administered by a local board of management, and embracing continuation, commercial, and technical classes. The school commenced with 8 classes and 66 students, and at the end of twelve months had developed to include 31 classes, with 924 students and 20 instructors. The fees vary from 3s. 6d. per term for continuation classes to 15s. per term for commercial and practical classes, and the revenue of the school is supplemented by contributions from various public and local bodies, assisted by Government subsidy and capitation.

**Private Schools :** There are numerous private schools, independent of the State, the chief amongst them being Christ's College, Christchurch, connected with the Church of England. The Roman Catholics support schools of their own in Christchurch, Pleasant Point, Lyttelton, Timaru, Addington, Papanui, Ashburton, Akaroa, Rangiora, Sheffield, Temuka, Leeston, and Waimate, as they do in all other parts of the colony. There are besides, in Christchurch, some excellent private boarding and day schools for both boys and girls.

*Other Institutions.*—Canterbury has the advantage of possessing many flourishing public institutions. The School of Art, Christchurch, was established by the College Governors in 1882 ; the Art Gallery owes its origin to the Art Society, the site being the gift of the Government. The Canterbury Agricultural College, Lincoln, also founded by the College Governors, is surrounded by 660 acres of land. The commodious buildings, which cost over £20,000, provide accommodation for the Director and teaching-staff, and for forty-five students. The fees are on a low scale. The farm buildings are complete, and include a well-equipped dairy. Instruction is given in agriculture, chemistry, botany, mechanics, physics, surveying, &c.

The Public Library, Christchurch, under the control of the College Governors, contains reading-rooms, a circulating library of 23,429 books, and a reference library of 15,547 volumes. One hundred and thirty-three magazines and newspapers are provided. The number of subscribers is 1,900, and the average daily attendance 1,300. A spacious free reading-room, 60 ft. by 36 ft., has been erected, and is supplied with 151 English, American, and colonial newspapers and periodicals.

The Museum, Christchurch, is a handsome pile of stone buildings ; the collections are large and varied. They are separated into two groups : (1) Those from New Zealand ; (2) those from foreign countries. In the New Zealand department the skeletons of whales and moas, as well as the collections of shells (tertiary and fossils) and rocks, are specially good ; and the Maori collection, exhibited in a Maori house, is also of considerable interest. In the foreign department, the geological, mineralogical, and ethnological collections are the most extensive, but there is also a good illustrative series of Egyptian

and Roman antiquities, as well as of the remains of prehistoric man in Europe and America. This institution owes its origin and success to the foresight, skill, and energy of the late Sir Julius von Haast, and to the munificence of the Provincial Government.

The philanthropic institutions embrace the Christchurch, Akaroa, Ashburton, Timaru, and Waimate Hospitals; the Sunnyside Asylum for the Insane; the Rhodes Convalescent Home; the Memorial Home for the Aged, at Woolston; the City Mission and Destitute Men's Home, Christchurch; the Deaf-and-Dumb Asylum, at Sumner; the Orphanage, Lyttelton; the Industrial School, at Burnham; and the Mount Magdala Asylum, Samaritan Home, and St. Mary's Home, in the vicinity of Christchurch.

#### *Towns.*

Lyttelton, the chief port of the district, is situated on the northern shores of the inlet of that name, sometimes called Port Cooper. The surrounding country consists of high precipitous hills, which separate the harbour from Christchurch and the plains; but by the construction of the railway and tunnel the natural difficulties have been overcome, with the result that the whole of the imports and exports of northern and central Canterbury pass through Lyttelton. The origination and accomplishment of this great engineering work is due to the late William Sefton Moorhouse, at that time Superintendent of the province. The natural advantages of the port have been enhanced by reclamation and harbour works, which include two breakwaters, 2,010 ft. and 1,400 ft. in length respectively, extending from Officer and Naval Points, enclosing about 107 acres; long lengths of wharf accommodation, 10,041 ft.; a patent slip for ships up to 400 tons; and a splendid graving-dock, 450 ft. long, width on top and bottom 82 ft. and 46 ft. respectively, the entrance being 62 ft. wide, well equipped with machinery and all requisites for repairs. Ships drawing up to 25 ft. can berth alongside the spacious wharves and sheds. The railway, electric light, machinery, and appliances are available throughout, which renders loading and unloading practicable both by day and by night. As an indication of the volume of trade dealt with at the port, it may be noted that for the year ended the 31st December, 1905, the imports were valued at £2,095,617 and the exports at £2,459,034. The town nestles on the side of the range, the streets being generally steep, flanked by solid stone buildings; and a background of green spurs and bold rocky faces gives to the whole a charming and picturesque appearance. The water-supply is obtained from artesian wells on the Christchurch side of the hills. To Christchurch there is a bridle-track over the range, and a carriage-road *via* Sumner. The harbour is well defended by fortifications and batteries on Ripa Island and the mainland. The population is 3,942 (census 1906).

Timaru, the third town of importance, is situated on the coast and railway-line between Christchurch (100 miles) and Dunedin (131 miles). The boundaries of this borough were extended in 1898, the estimated area, including Town Belt, being now 1,100 acres. It has a well-constructed artificial harbour, the port of shipment for the agricultural and pastoral districts of Geraldine, Timaru, and Waimate. The harbour is enclosed by a breakwater built of blocks of concrete; a

rubble wall—the North Mole—starts from the shore a quarter of a mile away to the north, and extends easterly to a point 350 ft. from the breakwater. The enclosed space is 50 acres. The town is picturesquely situated on rolling downs overlooking the sea. The streets are irregular, but the public and commercial buildings, churches, and private houses are generally well and handsomely built of stone. The chief industries are meat-freezing, saw-milling, flour-milling, &c. The town has a good high-pressure water-supply, a complete sewage system, and is connected by well-made roads with the surrounding districts, and by rail with Fairlie, the route to the Mackenzie country and Mount Cook. The population (census 1906) is 7,608. In 1905 the imports were £227,224 and the exports £1,042,463.

Rangiora, population 1,724, twenty miles from Christchurch by northern line of railway, is situated in the centre of a fine farming country, and possesses manufactories, including seven flax-mills, flour-mill, and brewery. The town and neighbourhood are much benefited by plantations.

Kaiapoi, on the Waimakariri, population 1,804, about fourteen miles from Christchurch by the northern railway-line, lies in a rich farming country, rendered pleasing and attractive by the extent and variety of plantations and gardens. There are factories and various industries, including ham and bacon curing, sawmills, brewery, and agricultural-implement works. Here also is the famed Kaiapoi Woollen-mill, which employs six hundred hands when trade is brisk. The Waimakariri is navigable for small vessels to the centre of the town.

Ashburton, the newest of the towns, has a population of 2,563, and is fifty-three miles from Christchurch on the southern trunk line. It is a well-built town, with extensive and beautiful recreation-grounds and gardens. It owes its existence to the settlement of the plains, the surrounding country being well adapted for farming. There are two breweries, a cordial-factory, three flour-mills, gasworks, iron-works, woollen-mill, brickworks, &c.

Geraldine, population 942, is situated on the Waihi River, four miles from Orari Railway-station, about eighty-six miles south-west from Christchurch. It is a neat and pretty town, in a first-class farming district, and has a beautiful park of native forest-trees.

Temuka, eighty-eight miles from Christchurch, on the southern railway-line, is a well-built town, with good agricultural land all round. It possesses three flour-mills, a butter and cheese factory, brewery, foundry, fellmongery, and paper-mill. There is a beautiful park and domain. The population, with that of Arowhenua, is now 1,661 persons.

Waimate, population 1,637, is situated on the Waihao Forks Railway, about four miles from Studholme Junction, some 111 miles from both Christchurch and Dunedin. This town is the centre for an extensive back country and a splendid agricultural area. It owes its origin to the sawmill industry of the Waimate bush. Industries: saw-milling, flour-milling, &c.

Akaroa, population 557, situated on the noble harbour of that name, was founded in 1840, in the first instance by the French. It is a quiet, picturesque little place, much patronised as a summer resort. It was here that Captain Stanley hoisted the British flag on 11th

August, 1840, when he took possession of the Middle Island on behalf of the Crown, forestalling the French by a few hours only. A suitable obelisk commemorating this event has been erected on the spot.

#### OTAGO LAND DISTRICT.

##### *City of Dunedin.*

Dunedin, the capital city and commercial centre of Otago, is situated at the head of Otago Harbour, and is distant nine miles—about half an hour's journey by rail—from its seaport, Port Chalmers. Otago Harbour has been greatly deepened by dredging during the past decade, and ocean liners are now berthed alongside the Dunedin wharves. The trade returns for 1905 are: Imports, £2,016,340; exports, £1,533,812.

The city proper is about two miles and a half long by a mile broad, and is dotted here and there with handsome public buildings and large warehouses, which compare favourably both in size and architecture with those in other centres of New Zealand. Among buildings of note may be mentioned the new Supreme Court, Knox Church, St. Joseph's Cathedral, Boys' High School, First Church, Town Hall, and Otago University. The city has been much beautified of late years with numerous parks and reserves artistically laid out by the Dunedin and Suburban Reserves Conservation Society, who have taken in hand with praiseworthy energy the task of planting with trees and flowers hitherto neglected areas of waste land. The Octagon, Jubilee Park, and Victoria Gardens (formerly known as the Triangle) are standing monuments to the society's work.

The private residences of Dunedin are largely situated on the hills sloping upwards from the harbour, and cable tramways connect the city proper with the hill suburbs. A reserve of native bush fringes the hills round about, and is traversed by a fine carriage road, named "The Queen's Drive," from which views of the harbour and city can be obtained. This reserve—known as the Town Belt—was set apart in the early days of Otago settlement.

The city has now an electric-tram service, which is being rapidly extended to the favourite seaside resorts of Ocean Beach and St. Clair, each within three miles of the Chief Post-office. At the northern end of the city—about two miles from the Chief Post-office—the electric cars run down to the Botanical Gardens, which are tastefully and artistically laid out with many beautiful flowers and shrubs. A band rotunda has been erected here, and on Sunday afternoons sacred concerts are given throughout the summer months.

The Woodhaugh Valley, the reservoir, and the Leith Valley with its waterfalls, are also within easy distance of the town, and from a scenic point of view possess many features of interest.

Dunedin is well supplied with elementary schools, there being in 1903 six large schools in the city proper, with an attendance of 3,470 pupils, and twelve more in the suburbs, with 4,065 pupils.

There is also in Dunedin a training-college for teachers. The students in training number sixty-two.

The School of Art and Design is in the same building as the Normal School, and has a staff of six teachers and a pupil-teacher. In 1904 there were 388 students in attendance.

The Otago Boys' High School stands on a commanding plateau

300 ft. above the business part of the city and the harbour. The school was opened on the 3rd August, 1863, in the building in Dowling Street now occupied as the Girls' High School. The new buildings in Arthur Street were opened by the late Sir William Jervois, Governor, in February, 1885. The teaching-staff, including the Rector, numbers twelve; the attendance is about 306.

The Otago Girls' High School was opened on the 6th February, 1871, with a roll of seventy-eight pupils. The present attendance is 185, with a teaching-staff of eleven, exclusive of visiting teachers. Otago holds the proud distinction of having established the first girls' high school in Australasia. Among the earnest band of workers who laboured to establish this first high school for girls the name of Miss Dalrymple stands pre-eminent, and will ever be held in grateful remembrance by the people of Otago.

At the commencement of the year 1903 the Board of Governors accepted the Government's offer in connection with providing free secondary education by admitting sixty-three boys and fifty-one girls who passed the Sixth Standard in the primary schools and were under fourteen years of age on 31st December, 1902, on payment by the Government at the rate of £6 per annum per head.

There are now 222 boys and 153 girls in attendance at the schools under the new Government regulations.

The University of Otago was founded in 1869, and opened in 1871. It is well housed in a pile of handsome buildings after the domestic Gothic style. There are four separate faculties in the University—viz., arts and science, medicine, mining, and law. The teaching-staff comprises twenty-six professors and lecturers. The School of Medicine provides the full course for a medical degree of the University of New Zealand. There is a medical museum in the University buildings containing anatomical, pathological, and other preparations and models. The School of Mines occupies a separate (temporary) building. It possesses a metallurgical testing-plant, well-equipped mining, geological, and metallurgical laboratories. The curriculum provides for the course prescribed for the B.Sc. degrees in mining and metallurgy of the University of New Zealand, geology, and for the Associate diplomas in mining and metallurgy of the University of Otago. The undergraduates keeping terms (present year, 1904) are 239 men and ninety-four women. The University library contains over five thousand specially selected volumes, and is open to the public under certain conditions for purposes of reference. The chemical and physical laboratories are well fitted up, and furnished with all necessary instruments and appliances. There are six scholarships tenable at the University, ranging in value from £15 to £30 per annum.

The public Museum is under the control of the University Council. It is situated in Great King Street, about five minutes' walk from the University. It includes a public art gallery, in which there are some good works of art, and a well-equipped biological laboratory. Up to the present time only the central portion of the original design for the Museum building has been erected.

The Dunedin Athenæum and Mechanics' Institute is centrally situated in the Octagon, and possesses a well-maintained library of over 20,000 volumes, and a membership of about 1,400 subscribers. The building has lately been enlarged, and in addition to the circulat-



ing library contains a reference library, a large reading-room with an excellent supply of magazines and newspapers from all parts of the world, a chess-players' room, and a smoking-room.

The Cargill Monument, which was erected to the memory of the late Captain Cargill, the founder of the Otago settlement, stands in the triangle between the Customhouse and the Bank of New Zealand. It is an ornate specimen of early decorated Gothic.

*Manufactories and Works.*—Under this head the returns to 31st March, 1905, give within the Otago Provincial District—12 aerated-water and cordial factories; 5 agricultural-implement factories; 6 bacon-curing establishments; 4 basket-making factories; 7 biscuit-factories; 100 blacksmithing establishments; 10 brewing establishments; 105 bakers; 16 brick, tile, and pottery works; 2 brush-factories; 63 boot-factories; 49 butter and cheese factories; 3 cardboard-box factories; 34 carpentering-works; 2 cigarette-factories; 3 confectionery-factories; 6 coffee and spice factories; 2 coopering-factories; 34 coach building and painting factories; 15 clothing-factories; 21 cycle-fitting establishments; 8 dental establishments; 132 dressmaking establishments; 35 engineering-works; 2 electrical works; 2 engraving-works; 1 explosive-factory; 39 flax-mills; 11 fish-curing works; 2 flockmaking establishments; 3 fruit-preserving works; 15 fellmongeries, tanning, currying, and wool-scouring establishments; 45 furniture-factories; 4 gasworks; 21 grain-mills; 4 gunsmithing shops; 3 hatmaking establishments; 9 hosiery-factories; 1 ink-factory; 4 iron and brass works; 2 jam-factories; 2 lime and cement works; 39 laundries; 5 lapidary-works; 2 manure-works; 3 mat and rug factories; 4 monumental-masonry works; 1 match-factory; 4 meat-preserving works; 2 paper-mills; 11 patent-medicine establishments; 5 piano-repairing factories; 16 photographers; 39 printing establishments; 5 rabbit-packing establishments; 2 rope and twine works; 28 saddlery and harness factories; 26 sawmills and sash and door factories; 2 sauce and pickle factories; 8 sail, tent, and oilskin factories; 9 shirt-making factories; 3 ship and boat building yards; 5 soap-factories; 95 tailoring-factories; 9 tea-packing establishments; 40 tinsmithing and plumbing factories; 3 umbrella-factories; 2 venetian-blind factories; 26 watchmaking-factories; 2 waterproof-factories; 3 wire-working establishments. Most of these works are in Dunedin.

*Woollen-mills.*—There are four woollen-mills at work in the Provincial District of Otago, employing about 1,200 hands. As an exemplification of the excellent quality of the material turned out, it may be mentioned that the Mosgiel Woollen-factory took the Grand Prix at St. Louis Exposition for rugs, blankets, and wool.

*Population* (census 1906).—The Metropolitan area works out at 57,915. This is made up as follows: City—including Caversham and South Dunedin—36,068; Maori Hill, 1,887; Mornington, 4,148; North-east Valley, 4,379; Roslyn, 5,439; St. Kilda, 2,580; West Harbour, 1,514; Anderson's Bay Road and Town District, 1,400; Peninsula County (part), 500. With Port Chalmers (2,120)—added for purposes of comparison—the aggregate is 60,035.

#### *Town, Road, and Rail.*

Port Chalmers (eight miles from Dunedin), situate on Otago Harbour, midway between the Heads and Dunedin, has a population of over

2,000. It is the chief port of Otago, and possesses every accommodation for Home vessels, including dry dock, 80-ton shear-legs, steam-hammer, and other appliances, besides several private foundries, cool-storage chamber, &c.

Leaving Dunedin by the northern railway, winding in and out through the hills which surround the town, and skirting the precipitous cliffs of the coast-line, the first station of importance reached is Waitati, a favourite seaside resort in Blueskin Bay; distance, seventeen miles. Fifteen miles beyond is Waikouaiti—population, 690—pleasantly situated on the Hawksbury Lagoon, the centre of a flourishing farming country. The next place of note is Palmerston, forty-one miles from Dunedin, with 800 inhabitants. A branch-line leaves Palmerston and runs nine miles up Shag Valley to Dunback. Six miles further on the main line there is a branch to Shag Point, a coalfield with two pits being actively worked.

Oamaru (seventy-eight miles) is the second town in Otago, having a population of about 5,071. It is the centre of a large farming district, and has a good harbour, formed by a concrete breakwater, for the reception of ocean-going ships. The chief exports are wool and grain. A branch-line runs from the junction near Oamaru up the Waiaireka Valley to Ngapara, seventeen miles, and Tokarahi, twenty-five miles from Oamaru, and another seven miles by road leads to Livingstone.

Starting from Oamaru, and proceeding to Central Otago, *via* the valley of the Waitaki River, the first part of the journey is accomplished by rail across the fertile Papakaio Plains to Awamoko (ninety-six miles), and thence following up the Waitaki River past Duntroon to Kurow (120 miles from Dunedin). At Kurow the traveller leaves the railway and follows the course of the Waitaki through pastoral country to Rugged Ridges Station (133 miles); a little beyond Rugged Ridges the road leaves the Waitaki River, and, crossing the Ahuriri Pass (141 miles), strikes the Ahuriri River, which it follows up past Omarama Station (158 miles) to the junction of Longslip Creek; it then ascends this creek until Lindis Pass saddle is reached (172 miles), at a height of 3,185 ft. Here begins the descent to the Clutha Valley *via* Morven Hills Station (181 miles) and Tarras Station (200 miles). From Tarras Station the road runs through settled farming country up the Clutha River, which is crossed by means of a punt at Newcastle (219 miles), and four miles more brings the traveller to Pembroke, on the southern shore of Lake Wanaka.

From Dunedin the Main Trunk Railway runs southward to Invercargill, a distance of 139 miles. Passing through the Caversham Ward and Tunnel the traveller reaches Burnside (four miles) and Abbotsford (five miles), industrial centres, with coal-mining, tanning, iron-smelting, and other works. Four miles farther on is Wingatui, the junction of the Otago Central Railway; and ten miles from Dunedin is Mosgiel, a rising township with 1,500 inhabitants, noted for its woollen-mills. The railway-line now skirts the Taieri Plain, an alluvial flat eighteen miles long by five miles broad—the most fertile portion of Otago. A branch-line nine miles long from Mosgiel junction runs to Outram, on the farther side of the Taieri Plain. The main line continues on from Mosgiel, passing the smaller Townships of Allanton (Greytown) and Henley, and Lakes Waihola and Waipori, and strikes Milton (thirty-six miles). Milton, in the middle of the Toko-

mairiro Plain, is a town of 1,300 inhabitants, with flour-mill, dairy factories, flax-mill, pottery-works, and tannery. The next place of importance is Balclutha (fifty-three miles), on the banks of the Clutha River, with flax-mills, dairy factories, and chicory-works; population, 1,160. Kaitangata, situated lower down the Clutha River, and connected by a branch-line four miles long, has extensive coal-fields, and a population of 1,682 (1906). Leaving Balclutha, the main line runs through the Clutha downs, passing the small centres of Waitepeka, Warepa, Kaihiku, and Waiwera, and reaches Clinton (seventy-four miles), on the Waiwera Stream, a favourite resort of anglers. The next station of note beyond Clinton is Waipahi Junction (eighty-four miles), on the Waipahi River, likewise a favourite fishing-ground. Further on is Gore (100 miles), on the Mataura River, in the Southland District. Gore is a fast-rising township of 3,033 inhabitants, with paper-mill, flour-mill, freezing-works, dairy factory, coal-mines, &c.

A branch-line from Waipahi follows up and crosses the Pomahaka River and connects Tapanui (107 miles), Kelso (110 miles), Heriot (114 miles), and Edievale (120 miles).

The Otago Central Railway starts from Wingatui, crosses the Taieri Plain, and then winds round to the Taieri River, which it follows up to Waipiata, eighty-one miles from Dunedin, thence proceeds across the Maniototo Plain to the watersheds of the Taieri and Manuherikia Rivers and through the Ida Valley to Omakau Station (Ophir), the present terminus, and is under construction towards Alexandra and Clyde. In its course along the river it runs for some distance through a rocky gorge, but after crossing the Sutton Stream enters Strath-Taieri—a comparatively flat, open country. Near Hindon Station (twenty-five miles from Dunedin), in the Taieri Gorge, and Barewood (thirty-seven miles), there are quartz-reefs being worked. In traversing the Strath-Taieri the line passes the Blair-Taieri Village Settlement (forty-four miles), Middlemarch, a rising township (forty-eight miles), and reaches Hyde (sixty-four miles). The line passes through the Poolburn Gorge across the Manuherikia River to a point immediately opposite the Township of Ophir. The Townships of Alexandra and Clyde are thus brought within seventeen and eighteen miles respectively of the railway. The extension of the line to Clyde presents no engineering difficulties. Central Otago has a great future before it, as in the opinion of experts it is naturally adapted for producing fruit of different kinds to perfection.

Another means of access to Central Otago is by the Clutha Valley.

Two miles beyond Milton the Lawrence branch leaves Clarkesville Junction, runs up the Tokomairiro River and the gorge of Manuka Creek, and down to Waitahuna (fifty-three miles from Dunedin) and Lawrence (sixty miles), gold-mining centres, with an aggregate population of about 1,100. Gold was first discovered here in 1861, and the mines are still yielding freely. From Lawrence a coach runs to Beaumont (twelve miles further and seventy-two from Dunedin), on the Clutha River. Crossing the Beaumont Bridge the road follows the west bank of the Clutha, passing numerous dredging-claims. At eighty-nine miles from Dunedin is Ettrick, and seven miles further on is Roxburgh—the Teviot—(ninety-six miles), a town of 500 inhabitants. Recrossing the Clutha River by the Roxburgh Bridge, and

proceeding up the east bank, the traveller reaches Alexandra South (124 miles), at the junction of the Manuherikia River with the Clutha, and Clyde—the Dunstan—(130 miles from Dunedin), the chief town of Vincent County. The next place of importance is Cromwell (143 miles), at the junction of the Kawarau River with the Clutha. Cromwell is a small town of 670 inhabitants, and has a good bridge over the Clutha River. If the traveller wishes to pursue his journey farther he can either follow the road up the Clutha to Newcastle and Pembroke, on Lake Wanaka, or take the Kawarau Gorge road by way of the Crown Terrace to Queenstown, on Lake Wakatipu.

Queenstown, a picturesque township situated on the shores of Lake Wakatipu, has a population of 660, and is the centre of a large gold-mining district. The chief feature of Queenstown is the grand mountain and lake scenery in the neighbourhood, which attracts large numbers of tourists every year. There are two ways of reaching Queenstown—the one by the Clutha Valley and Kawarau Gorge, as above described, and the other by rail to Kingston, at the foot of Lake Wakatipu, and thence by steamer, which runs to suit the trains.

The Tautuku Bush, in the south of Otago, has only lately been opened up, but a large number of settlers are making their homes there. Starting from Balclutha the Catlin's River branch line runs southwards to Romahapa (sixty miles), on the crossing of the main road to Port Molyneux, thence to Glenomaru (sixty-five miles) and Owaka (seventy-two miles from Dunedin), and the present termination at Catlin's, four miles further on. The Catlin's-Waikawa Main Road is formed the whole way through, as are also numerous district roads.

The principal railway-lines are as follows: (1.) The Main Trunk line from Dunedin to Christchurch (230 miles), with branches from Oamaru to Hakataramea (forty-three miles), and Oamaru to Ngapara and Tokarahi (twenty-five miles), also Palmerston to Dunback (nine miles). (2.) The Main Trunk line, Dunedin to Invercargill (139 miles), with branches, Mosgiel to Outram (nine miles), Milton to Lawrence (twenty-four miles), Stirling to Kaitangata (five miles), Balclutha to Catlin's (twenty-three miles), and Waipahi to Edievale (twenty-seven miles). (3.) The Otago Central, from Wingatui to Omakau (120 miles).

#### SOUTHLAND LAND DISTRICT.

##### *Towns.*

Invercargill, the chief town, was from the first well laid out with wide streets and liberal reserves in the Town Belts for recreation purposes. The town has become conspicuous by the architectural beauty presented to the visitor in the many fine buildings. Among these—all in brick, concrete, or limestone—the branches of the leading banks doing business in this colony are prominent, also hotels and many wholesale and retail mercantile houses. The Government buildings are on a scale not often seen in a town of the same size, and a clock and chimes of New Zealand make have been placed in the central tower. The Corporation provides water and gas, also disposes of sewage, &c., for the citizens. The streets are well lighted, paved,

and maintained. Artesian water is pumped to the top of a handsome brick tower—which, by the way, is a very conspicuous landmark—and stored there in a tank, from which most of the houses within the town boundaries are supplied. The population, including suburbs, is 12,508 (1906).<sup>\*</sup> Five railways concentrate here—one from the famed cold lakes, another from Dunedin and Christchurch, a third line communicates with the agricultural and pastoral country lying east of the Mataura River, known as the Seaward Bush line, a fourth line opens communication with the extended area westward covered by the Wallace County and known as the Western District, while the short line to the Port of Bluff carries a heavy traffic—the main produce of the district—for export. Rope and twine, carriage and implement factories, flour-mills, sawmills, fellmongeries, a boot-factory, three bacon-factories, brick and pottery works, iron-foundries, and various other industries are in active operation. There are three first-class hotels. In the summer season Invercargill, by the arrival of inter-colonial steamers and express trains, may be said to be thronged with visitors and tourists desiring to view the beauties of Stewart Island or the more distant high alpine scenery and deep waters of the Cold Lakes District (Te Anau, Wakatipu, Manapouri, and the further lakes), for, doubtless, the combinations of scenery there presented in mountain, glacier, and lake are unexcelled in either hemisphere. It should also be mentioned that Stewart Island is now connected by means of a submarine cable used for telephonic communication, which is of the greatest service to business men and pleasure-seekers. Although the Bluff is the principal port, Invercargill is provided with a lesser harbour in the New River Estuary, forming its western margin, where there is a jetty with appliances for the use of small steamers and craft trading with Stewart Island and along the coast, the goods being handled within the town boundaries.

Campbelltown, situate at the foot of the hill known as the "Bluff," has become a place of some importance in the district, being identified with the Bluff Harbour. The town presents some good buildings—frozen-meat works, hotels, grain-stores, and shipping offices, all in brick. Perhaps the most conspicuous building is seen in the Government, Post, Telegraph, and Customs building, with its clock-tower and chimes; while the railway offices, with hardly less proportions, and conveniences lately added to facilitate the easy handling of goods, assert the prosperity of the place. Connected by rail with Invercargill (eighteen miles—six trains daily), a very large shipping business is effected here in the imports and exports of the agricultural counties of Southland, Wallace, Lake, and Stewart Island, principally consisting in exports of wool, grain, frozen mutton, rabbits, fish, cheese, butter, timber, flax, and oysters; and in imports of general merchandise, guano, coal, and hardwood timber. In 1901, 75,000 tons of grain, chiefly oats, were exported, being about 4,200,000 bushels. The increasing trade of the port has been steadily met by the harbour authorities in increase of wharfage accommodation in the direction of widening and strengthening, and there is now a fine wharf, 1,760 ft. long, with four lines of rails, having 3,300 ft. of berthage, all well lit, as also the town, with electric light. As a further indication of the importance of the port, it may be stated that steamers having a combined net tonnage of 469,042 tons entered inwards during 1904, and

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<sup>\*</sup> Campbelltown (1,472) included for purposes of comparison = 13,980.

comprised the largest frozen-meat carriers in the trade. Imports (1906), £338,976; exports, £893,730. The port is a natural one, possessing good shelter and anchorage, with deep water. On account of the depth of water, the port is frequently selected as the final port of departure for fully laden vessels, and in April, 1903, the s.s. "Ayrshire" left the port for London drawing 27 ft. 10 in., and with a cargo estimated to be 15,000 tons; but in view of the increasing size of steamers, and the possibility of the great ocean passenger lines extending their terminals to New Zealand, the Board has recently imported an up-to-date bucket and suction dredge built by Simon's, of Renfrew, and capable of dredging to a depth of 40 ft. By this means it is intended to make the harbour one of the most accessible and commodious in the colony. The Bluff is also known as the first and last port of call for steamers trading with Tasmania and Australia.

Next in size to Invercargill is the inland Town of Gore, situated on the Mataura River, and at the junction of the Main Trunk Railway with the Waimea Plains Branch. Owing to this fact, and to the fertility of the land in the neighbourhood, Gore is rapidly growing in size and importance.

Riverton is a pretty little town, about twenty-five miles from Invercargill, with which it is connected by rail, which runs through to Orepuki and Waihoaka; it is situated on the estuary of Aparima, or Jacob's River. Riverton is the oldest settlement in Southland, and was a great resort for whalers in former years. The harbour is available for and used by coasting vessels, but the principal carrying-trade is done by rail. There are several sawmills in the neighbourhood, this industry being largely carried on near the many timbered localities in the district. Population, 914.

Otautau, on the banks of the stream bearing the same name, is the county town of Wallace. It is the distributing centre of all that large area of agricultural and pastoral country lying between the Longwood Range and the Waiau River, and northwards to the Mararoa River. It has direct communication by rail with Invercargill, Nightcaps, and Orepuki. In Otautau large grain-stores are seen, flour-mills, and a dairy factory, while in the vicinity timber and flax mills are met with. The most direct inland communication with Lakes Manapouri and Te Anau is by road passing through the town and onwards. This route is well suited for vehicular traffic, but the favourite or more easy line of communication is by rail from Invercargill to Lumsden and onward by coach.

The Village of Nightcaps is reached by a short line of railway from Thornbury, on the Invercargill-Riverton line. A large colliery exists here.

The Town of Winton (456) is on the Invercargill-Kingston Railway, about twenty miles distant from Invercargill, and is the centre of a good farming, sawmilling, and coal-mining district. A short line of railway has been opened from here to Hedgehope, an extensive agricultural locality lying some fifteen miles in a westerly direction.

Lumsden is the junction of the Kingston (Lake Wakatipu), Invercargill, and Waimea Plains Railway lines. Coaches starting from here take passengers and mails to Lakes Manapouri and Te Anau and the surrounding country.

East of Invercargill are Edendale and Wyndham, both with railway

connection, and surrounded by rich agricultural country reaching to Fortrose, with good roads. Fortrose is easily reached from Invercargill by the Seaward Bush Railway, which connects with the Wyndham Road at Waimahaka, distant about four miles north of Fortrose. It is surrounded by exceedingly fertile country, and the harbour (estuary of the Mataura River) can be entered by coasting steamers.

Eastward of Fortrose and about midway between that place and Catlin's River is Waikawa, a newly settled township with a harbour for coasters, and a large area of surveyed Crown land around, with good timber, available for settlement. Steamers trading with Dunedin and Invercargill call here and at Fortrose at regular intervals. A good export of timber occurs at Waikawa.

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## SPORT IN NEW ZEALAND.

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New Zealand is a fine country for the sportsman. The angler can cast his fly on to almost every stream from the North Cape to the Bluff, with the certainty of a good basket of trout, and pleasant surroundings. The native sea-fish on their side offer various kinds of sport not to be despised. The lover of the gun has a large choice: imported game, pheasants, plover, hares, and Californian quail—these he can come across in plenty in the proper places. Native game (grey duck, teal, widgeon, paradise duck, pukaki, pigeon, black swan, dottrell) abound almost everywhere, and can be had in the proper season without difficulty. To the deer-stalker New Zealand offers the grandest sport with the red and fallow deer, which now number thousands in both Islands. Both these varieties have, like everything else imported, greatly improved on their original form, the weight of the stags and the superiority of their antlers in spread, girth, and points being very marked. The presence of these herds of deer is becoming more widely known from year to year, and the number of "guns" arriving in the shooting season from abroad is increasing in proportion. In some of the counties there are packs of hounds and good hunting: horses that face wire as boldly as they do brush, men who ride straight, and respect the traditions of a noble sport.

### *Red-deer.*

They are found in the Wairarapa district of the North Island, south of a line drawn from the gorge of the Manawatu River to the east coast. Their haunt is an area of some fifty square miles in the Maungaraki Ranges—an ideal deer-forest. The mountain-tops are rough and rocky, the glens deep, and the spurs covered with dense forest. The shelter is perfect; the food, now supplemented by large quantities of English grasses sown over wide areas, is abundant and nutritious, and the country is watered by numbers of clear streams always running. In these fastnesses the deer find all the conditions favourable to multiplication and growth.

In the Middle Island they are in two districts. In Nelson good stalking is to be had in the wooded ranges running down into Blind Bay from the alpine chain.

Further south the deer are numerous in the country between Longslip Creek and the southern head-waters of the Waitaki, and they abound in the country between that region and the ranges east of Lake Hawea; the watershed of the Dingle, one of the principal feeders of the lake, being a favourite resort of theirs.

In Nelson and Otago the deer are chiefly on Crown lands, but in the Wairarapa they roam over private property, and there the permission of the owner must be obtained by the stalker who wishes to avoid trespass. In this there is no difficulty at the proper season. Deer are, however, spreading to Crown lands in this district, and have afforded some of the very best sport.

Particulars as to season, license, and shooting limit will be found in Part III of this work ("Obligations, &c., of Settlers").

#### *Fallow-deer.*

Fallow-deer are to be found in several parts of the colony. In the Waikato district, not far from Auckland, they are in many parts regarded as a nuisance, and no restrictions are placed on the shooting of them; that is to say, they may be shot at any time and in any number, and the does are not protected as are the hinds of the red-deer. In this part of the country the sportsman can have a day's sport when he chooses. On the Island of Motutapu, at the mouth of Auckland Harbour, known as the Waitemata Estuary, there is a large herd, the property of Mr. Reid, who owns the island.

The fallow-deer are also in Southern Otago (in the Tapanui district), and these are only shot in season and under restrictions. In all these localities, with the exception of Motutapu, the deer are on Crown lands. They, like the red-deer, have greatly benefited by acclimatisation in the colony, under the superior conditions of good climate and shelter.

#### *Other Deer.*

Other varieties have been imported—Sambur, Axis, Wapiti, and Tahir—and have become established. They are too few to be entered in the region of sport, but there is good reason to hope that they will one day add largely to the attractiveness of sport in New Zealand.

#### *Wild Pig.*

The wild boar is to be found everywhere from the North Cape to the Bluff, wherever the conditions of shelter are favourable. He likes dense forest and thick fern. When sheep are in his neighbourhood he likes a change of diet in the lambing season, for which reason the whole pastoral industry regards him as a sort of combination of shark, hawk, and cormorant, to be suppressed at any price. Consequently, gangs of men in various localities are making money steadily all the year round by "killing pigs" as hard as they can. The boar gives noble sport, and his tusks are grand trophies. The sportsman is sure of an exciting time with rifle or spear.

As he has invariably to hunt in country unfit for cavalry, he cannot expect any of the wild runs so dearly enjoyed by the "pig-sticker" of India. But if his dogs are good, his eye keen, his nerve firm at close quarters, and his skill with any weapon respectable, the boar of New Zealand will give him as grand sport as any of his congeners



can furnish to the sportsman in any part of the world. The wild pig in this country is descended from the stock liberated by Captain Cook during his second voyage.

#### *Wild Cattle, &c.*

For the present the wild bush cattle tempt the hunter with very attractive sport, not without some danger. Station-owners enjoy many a day in the valleys of the back country with rifle and horse.

The domestic goat, like the domestic pig, has also gone wild in the wilder country of both Islands. He, too, gives good sport, his nimble foot and exceeding wariness testing the hunter's mettle to the keenest extent.

#### *Trout.*

Thirty-five years ago there was not a trout in New Zealand, from one end to the other. To-day the majority of the rivers in the North and Middle Islands are regularly fished by an aggregate of anglers numbering some two thousand five hundred. Each of these streams is known in every detail. There are hotels which depend largely on the fisherman; camping-places abound in the midst of romantic scenery; railways and coaches make every river accessible, and the fisherman can buy everything required for the gentle art. There is, taking in all the trout streams, an enormous range for the angler, the greater part of which is free, the foreshore of the rivers having been for the most part reserved from sale; of the balance, there is little that is not accessible, as a matter of course, for the asking. In every centre it is easy to get information of all kinds required by the fisherman: of the fish and their habits; of the comparison between the fish of different rivers; of the natural and artificial flies and bait to be used, and the season for the same; of the state of the rivers, whether good or bad for fishing; and of every other thing it is desirable for the fisherman to know.

There is a distinction between the big rivers (the snow rivers of the colony) and the small rivers (the rain rivers). In the former the fish are large, and their taking requires strong tackle and a spinning bait; whereas in the other the fish are smaller, and take readily to any fly at all resembling the flies in their habitat. The snow rivers of the eastern coast of the Middle Island are the Clarence, northern Waiau, Hurunui, Waimakariri, Rakaia, Ashburton, Rangitata, Waitaki, Clutha, Mataura, Oreti, and the southern Waiau. The most exciting sport is found in the estuaries of the snow rivers, when the big fish (6 lb. to 12 lb.), ranging near the surf of the ocean, dash freely at the spinning-minnow and kindred lures. The sport is not without its dangers, for sands are shifty, shingle-spits are treacherous, and currents amazingly swift often where the river-bottom is boulder strewn, and waves of unusual size come sweeping in at times from the ocean surf with appalling suddenness. But it has its compensation in "big baskets," and in the exhilaration of the desperate struggles with the heavy lively fish fresh run from the sea. At the Rakaia Mouth (Canterbury) baskets are recorded of eight fish, weighing 88 lb.; thirteen, 147 lb.; forty-four, 347 lb., &c. The same sport is to be had at the mouth of every snow river from the Waiau-ua of North Canterbury to its namesake, the Waiau of western Southland. The

only variation is in the size of the fish, which are smaller in the small rivers, such as the Rangitata and Maitara.

These rivers are, in the South Island, the main outlets of the great watershed, being therefore fed by numerous tributaries on their way to the sea. The northern Waiau-ua drains half the eastern watershed of the Spenser Mountains; the Rakaia and the Rangitata take the streams that drain the first eastern section of the watershed of the Southern Alps; the Waitaki takes another and much larger section—that which drains into the Lakes Tekapo, Pukaki, and Ohau, which are each in their turn drained into the Waitaki, the river receiving two main tributaries in addition—viz., the Ahuriri, from the Otago side, and the Hakataramea, from that of Canterbury, each a collector in turn of many subsidiary streams. The Clutha is an outlet of an even larger lacustrine system (Lakes Hawea, Wanaka, and Wakatipu), with numerous tributaries, of which the richest in feeders is the Pomahaka. The southern Waiau is another drainer of lakes, those of western Otago (Te Anau and Manapouri), also with many tributaries from the mountain systems around them. In the lower waters of this river in one day, six fish weighing 89 lb. (heaviest, 22½ lb.) once fell to one rod. Another landed 86 lb. in two hours. Three rods got 560 lb. in one week. The Oreti (the “New River” of Invercargill) is another snow river, and, though smaller, has in its larger estuary a grand feeding-ground for the big fish, which here and elsewhere prefer the neighbourhood of the sea, and are in consequence in the pink of condition and fighting “fitness.” Baskets of over 50 lb. weight are here common enough. The record is given of one fisherman taking four in a morning, of 12 lb., 12 lb., 10 lb., and 9 lb. each: total, 43 lb.

The tributaries of these great water systems, many of them rain rivers, are simply charming trout streams, and there are many rain rivers besides. To begin with, there is the Clarence, in the North Canterbury Acclimatisation District (partly a snow river), which in summer in its middle and upper reaches is, especially when the grasshopper is plentiful, an ideal trout stream, with its confined banks, long rapids, and deep pools. Its principal tributary, the Acheron, is nearly as good.

Further down—all through the district, in fact—Canterbury has many more good trout rain rivers. There are a host of tributaries of the Waimakariri, and of the Ashley, Kowhai, Cust, Waikuku, and a legion more besides. Of all the rain rivers in Canterbury, however, the Selwyn is the favourite of the angler, by reason of the brightness of its waters, the striking difference in the sport of its upper waters on the mountain-side and of its lower waters in the neighbourhood of Lake Ellesmere, and the nearness of the fishing to Christchurch. In the southern part of the district there is a great number of small rivers, admirable from the angler's point of view—Waihao, Orari, Opihi, and the rest. Of these, the Opihi is the best, being the trunk of a somewhat extensive network of waters, its chief southern tributaries being the Esk, the Opawa (with two branches), and the Tengawai; its northern affluents being the Opuha (two branches), Hae-Hae, Kakahu, Temuka, and Waihi. The main river flows into the sea at the large estuary of the Milford Lagoon. The sport differs

somewhat in the lower reaches from that of the upper waters. The respective average catches of one season were 2.1 lb. and 3.5 lb.

The Orari, with its tributaries (Hewson and Mackenzie), also gives good fishing.

In Otago the best rain rivers are the Kakanui, near Oamaru; Waitati, near Dunedin; Shag, near Palmerston; Pomahaka, Waiwera, Kaituku, and Waipahi, tributaries of the Clutha in the lower waters of that river; the New River and its tributaries (the river of Invercargill is the New River, and is really the estuary of the Oreti); the Aparima, at Riverton; and all the tributaries of the southern Waiau, the greatest of which is the Mararoa. There are many smaller streams besides, which are exclusively fly streams; and amongst such in the above list of rivers are the Waitati, Waiwera, and Kaihiku. The others are fly and minnow rivers. The waters of the Clutha basin, however, are unsurpassed anywhere in New Zealand for the number, quality, and spirit of their fish. In the goldfields zone, between Roxburgh and Cromwell, the quantity of mine tailings prevents the fish staying; but above the goldfields there is good fishing in the main river, in the Hawea, and in their smaller tributaries, and below the goldfields contamination there is great fishing. In the Mimiha River the record is three baskets for three rods (in one day) of 54½ lb., 40½ lb., and 30 lb. And in the Waipahi there is a record in one day with bare fly of 38 lb. 1 oz. The Waipahi Society's medal was won one year by sixteen fish, aggregating 29 lb., and thirty fish of 25 lb. Catlin's River is also good fishing ground, yielding up to 50 lb. a day per rod.

The big lakes of the alpine chain are full of trout. The varieties acclimatised are: brown trout, Loch Leven, Fontinalis, and Scotch burn trout.

Nelson has well-stocked trout-streams. The Buller is the finest example of a big snow river, and yields trout near Lake Rototoi up to 25 lb. weight. These grow to their large size in the lake, and the local anglers have done what no anglers have done at the other lakes: they have succeeded in getting sport out of the fish at the mouths of the inlet and outlet of the Buller. Live bait (fry, inanga, whitebait, bullhead) is the only thing they will take.

The Whangamoa, Wairoa, Taheke, Motueka, Maitai, and Riwaka give very good sport, the best fish being in the Wairoa, of 4 lb. or 5 lb., and more like salmon in many ways than trout. The Happy Valley River is an ideal trout stream, in perfect pastoral scenery, abounding in good camping-places, and affording a most pleasant, not to say romantic, outing.

In the North Island trout are acclimatised from the neighbourhood of Auckland to Cook Strait, the southern rivers being better stocked than the northern. The acclimatisation societies are working hard to equalise matters, and they receive, as the other societies do everywhere else, substantial help from the Government. A fairly large proportion of the fish in the North Island are rainbow trout and American brook char, both these varieties thriving better in the warmer climate. The other varieties, however, mentioned as acclimatised in the Middle Island abound and preponderate. Trout may be had in abundance in the streams in the neighbourhood of Auckland, in the tributaries of the Upper Thames and in the main stream,

and in the Waikato, Waipa, and their tributaries. The large watershed between Lakes Taupo and Waikaremoana is now stocked with the rainbow trout and the American variety, many of the streams being enthusiastically described by the experts engaged as in every respect perfect trout streams.

The anglers come back with big stories of sport, especially from the lakes in the Rotorua country. During the fishing season 1905-06, 22,140 trout (Rainbow chiefly) are known to have been caught in the Rotorua district, the aggregate weight being 87,323 lb. This quantity is three times greater than for the season two years ago, and one-third more than last season. Splendid fish were caught in Lake Tarawera towards the close of the season.

In the Hawke's Bay District the Upper Manawatu, the Ngaruroro, Waipawa, Tukituki, and other rivers are regularly fished, sometimes yielding fish from 2 lb. to 10 lb., which take the creeper and the grasshopper readily. Of these, the best beyond compare is the first-named river.

The Taranaki District, with its riverine system, more numerous than any other in New Zealand, has proved, as was expected, a true home of trout acclimatisation. The rivers, with their quick succession of pools and rapids, are very suitable, and the fish strong and bright. Their abundance is only a question of time.

In the Wellington District there are hundreds of miles of running water, with some of the finest trout-fishing in the world. In the small streams the fish rise readily to the fly, and in the larger ones the minnow and grasshopper and live bait of many kinds are effective, and at midsummer the cicada is a very successful bait.

The west coast has some fine rivers, the Rangitikei and Manawatu being the largest. The upper waters of the former and its numerous tributaries give excellent fishing. The Manawatu, however, takes the palm, not only being full of fish along its whole course, but being the outlet of a very large watershed. Of this, the network of tributaries coming through the Forty-mile Bush contains the most notable rivers, such as the Mangahao, Makaretu, Mangatainoka, Makakahi—rivers always at a fairly high level in the fishing season. Other rivers come down from the Tararua, Ruahine, and Puketoi Ranges, all good trout streams, and all accessible easily by road and rail.

The Wairarapa, further south, has its lake and its river system, of which the Ruamahanga is the chief—"an ideal river for minnow-fishing," as it is described by common consent of anglers, the fish running large, from 4 lb. to 12 lb., with the one drawback that they are uncertain feeders. Other rivers of this district are the Tauherenikau, Waiohine, Mangatera, Waingawa (in these the trout are very game and of superior quality), Waipoua, Kopuaranga, and others.

Further south still, between the Rimutaka Range and Cook Strait, are the river systems of Wainui-o-mata and the Hutt, which, main streams and tributaries alike, yield good fish under favourable conditions. These, on account of their propinquity and the road and rail conveniences, are the favourite waters of the Wellington anglers. They are well stocked with fine trout, which are in the habit of taking to the sea for a large portion of the year. They are exceedingly wary, and give, therefore, excellent sport.

On the west of the Tararua Range, from Porirua to the Manawatu,

are many small rivers, mostly shingly, with pools and rapids, rising and falling quickly, all well stocked. There are streams like the Porirua and the Horokiwi, running through private property into the Porirua Estuary; and, at short distances from each other, rivers debouch into the sea, like the Waikanae, Otaki, Waitohu, Manakau, Waikawa, Ohau, and Otauru.

For particulars as to season, license, &c., see Part III of this work ("Obligations &c., of Settlers").

The British angler will, of course, bring to the sport all his equipment of experience. Nevertheless, he will find that he has many things to learn about the habits of the local fish. For instance, the New Zealand trout feed less on the surface, and do not rise as quickly to the fly as English fish do. But upon all these points information is plentiful and readily obtainable.

As before remarked, road and rail make every trout stream accessible. It need only be added that everywhere hostelries or accommodation-houses abound, where the angler can get comfort, information, supplies, and transport.

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## PART VI.

### AGRICULTURAL AND PASTORAL.

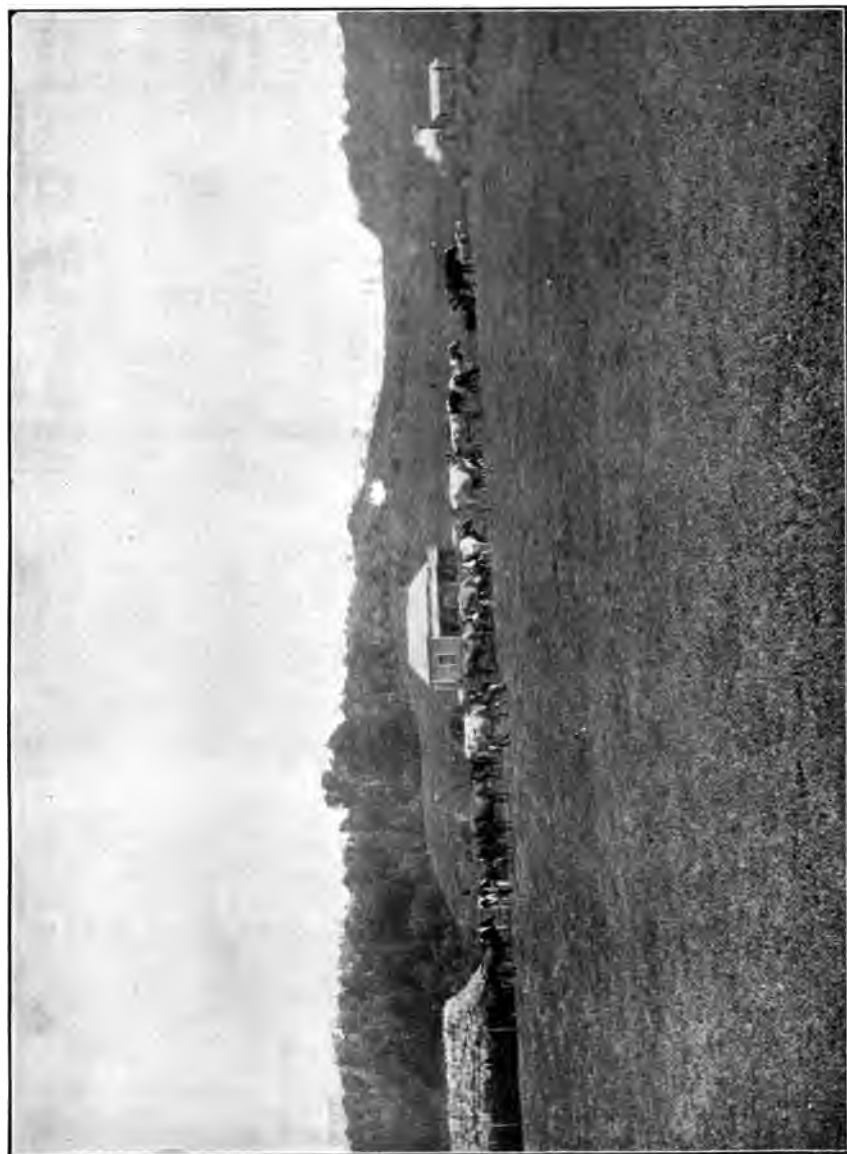
#### GENERAL CONDITIONS.

It is generally admitted that there is no part of the British dominions where agriculture, in its widest sense, can be carried on with so much certainty and with such good results as in New Zealand. The range of latitude, extending as it does from 34° to 47° S., secures for the colony a diversity of climate which renders it suitable for all the products of subtropical and temperate zones, while an insular position protects it from the continuous and parching droughts which periodically inflict such terrible losses on the agriculturist and pastoralist of other countries.

Again, the climate, although somewhat variable, never reaches the extremes of heat or cold. So genial, indeed, is it that most animals and plants, when first introduced to the colony, assume a vigour unknown to them before.

#### *North Island.*

All the best forage-plants and grasses thrive most admirably, continuing to grow throughout the year with little intermission. Stock of every sort thrive and fatten rapidly on the pastures, coming to maturity at an early age without the aid of roots or condimental foods. All cereals flourish equally well, more especially Indian corn, which produces from fifty to eighty bushels per acre.



SELECTION AFTER ELEVEN YEARS' OCCUPATION.

*Immigrants' Guide.*





So full is the soil of plant-food that several continuous crops of potatoes or cereals may be taken with little apparent exhaustion. Wheat, oats, and barley thrive where the soil is not too rich; otherwise they produce enormous crops of straw, without a corresponding yield of corn. The tobacco-plant thrives well, as do also hops and sorghum, broom-corn, peanut, hemp, together with a large variety of economic plants, the growth of which will one day afford employment for a large population. In addition to these, all the British, Chinese, and Japanese fruits, with oranges, lemons, limes, olives, and vines, flourish abundantly, requiring but ordinary care. Potatoes are largely grown, and yield heavy crops.

Most of the country along the south-west and west coast is now taken up, and the primeval forest is fast disappearing before the settler's axe. For the most part, the soil is fertile, and the growth of grass and clover is extremely rapid and vigorous when sown on the surface after the felled timber has been destroyed by fire.

To the British husbandman it will seem almost incredible that the best pasture-grasses grow and thrive as they do with no other preparation than the ashes resulting from the burnt timber—no ploughing and no previous loosening of the soil—yet, in less than a year from the date of scattering the seed, this same land will fatten stock.

So rapidly are these fertile forest lands being cleared and converted into pastures that the demand for stock (principally dairy) has greatly increased, and this demand must continue for a number of years before it is fully met.

In the North Island there are large areas yet unoccupied, a great portion of which is of good quality, and only waiting the hand of man to make it carry, with very little cost, many herds of cattle, with flocks of longwool sheep.

The west coast contains excellent cattle country—especially the Taranaki District, which is the best dairy country in Australasia—and considerable areas are also adapted to longwool sheep.

Much of the country may be described as being good sheep land, a large portion of which is quite capable of carrying two sheep to the acre, and some of it as many as three or four.

The northern districts are eminently adapted to subtropical cultivation.

#### *Middle Island.*

If the North Island has a splendid inheritance in her forests, the Middle Island can boast of her magnificent plain-lands, rolling downs, and vast mountain ranges, all of which, to a greater or less degree, have already been made to contribute to the wealth of the colony.

The central portion of the Middle Island presented to the first-comers a vast plain, covered only with waving tussock-grass, offering little or no obstruction to the plough.

Travelling south, the country assumes a different character: easy, undulating downs, well watered, here and there interspersed with fertile plains, the greater portion admirably adapted for agriculture, and all of it suitable for pastoral purposes.

The climate of the Middle Island is not so warm in summer nor so mild in winter as that experienced in the North Island. How-



ever, as has already been stated, there are no extremes of heat or cold. Much more might be said in praise of this portion of the colony. It is deemed necessary to say so much in order that readers may better comprehend the comparative ease with which every kind of farming is carried on in New Zealand as compared with other countries less favourably situated.

#### THE FARMING OUTLOOK.

Before the advent of the freezing-chamber, sheep-farming could only be carried on profitably on large areas with large flocks, for the reason that wool and tallow were the only marketable products, the sale of fat sheep and lambs being confined to supplying the demand for local consumption. The development of the meat-export trade has completely altered the condition of things from an agricultural point of view. Almost every farmer, small and large, now keeps his flock of breeding-ewes for the production of lambs for freezing, thereby necessitating the growth of root and forage crops, and so bringing about a greatly improved style of farming throughout the colony when compared with the previous system of universal corn-growing.

#### BUSH LANDS IN THE NORTH ISLAND.

For the most part the soil (more particularly along the south-west and west coast) is fertile, and the growth of clover and grass is rapid and vigorous when sown on the surface, after the felled timber has been burnt. The best pasture grasses grow and thrive with no other preparation than the ashes resulting from the burnt timber, with no ploughing and no previous loosening of the soil.

#### WHEAT.

The Canterbury Plains, the great wheat-growing district of the Middle Island, extend 150 miles north and south, running inland from the sea for forty miles, the whole forming an area of over 3,000,000 acres. A great portion of this vast plain is admirably adapted for the production of wheat, barley, and oats, and all the best cultivated grasses, the growing of which has been carried on extensively since the foundation of the colony. The land is for the most part free from stones, double- and three-furrow ploughs are in general use, and an occasional steam plough. Three horses, occasionally four, with a man or a boy, can turn over three acres per day on the plains, at a cost of 5s. or 6s. per acre. A stroke of the disc or other harrow, followed by the seed-drill and light harrows, completes the operation of sowing.

Seed-sowing commences in May, and can be continued as weather permits through the winter, and in the heavy swamp land (drained) on into September and even October. From  $1\frac{1}{2}$  to  $1\frac{1}{2}$  and 2 bushels of seed per acre are usually sown, the quantity increasing as the season advances. The value of the export of grain for 1904 was £392,346. The average yield is from 25 to 33 bushels, and on the better soils from 40 to 60 bushels. The usual varieties are Hunter's White, Pearl, Velvet Chaff, and Red and White Tuscan for spring sowing. The best wheat land in New Zealand is in North Otago—the limestone country about Oamaru—and South Canterbury

The average yields for the last fifteen years are as follows :—

Year.				Land under Wheat.	Estimated Gross Produce.	Average Yield per Acre.
				Acres.	Bushels.	Bushels.
1891	..	..	..	301,460	5,723,610	18·99
1892	..	..	..	402,273	10,257,738	25·50
1893	..	..	..	381,245	8,378,217	21·98
1894	..	..	..	242,737	4,891,695	20·15
1895	..	..	..	148,575	3,613,037	24·32
1896	..	..	..	245,441	6,843,768	27·88
1897	..	..	..	258,608	5,926,523	22·92
1898	..	..	..	315,801	5,670,017	17·95
1899	..	..	..	399,034	13,073,416	32·76
1900	..	..	..	269,749	8,581,898	31·81
1901	..	..	..	206,465	6,527,154	31·61
1902	..	..	..	163,462	4,046,589	24·76
1903	..	..	..	194,355	7,457,915	38·37
1904	..	..	..	230,346	7,891,654	34·26
1905	..	..	..	258,015	9,123,673	35·36

#### OATS AND BARLEY.

Otago and Southland Districts excel in the production of oats, which is their principal cereal crop. The total area under this cereal harvested for the season 1904-5 was 548,938 acres, of which 206,749 were cut for chaff and ensilage.

The yield of oats in Otago and Southland varies from 40 to 80 bushels per acre, the cost of production being about the same as wheat—viz., £2 per acre when grown from grass land, and £1 10s. from stubble. The colony's average for the last two years was 42·53 and 38·58.

Malting barley, of very superior quality, is grown in Nelson and Marlborough, where the soil and climate appear to be particularly adapted to its culture. Colonial average for last two years: 38·26 and 33·46.

The growing of this cereal (barley) for malting purposes requires more attention than it has yet received in this colony. It is claimed for this crop that it will show a better result than wheat, for the following reasons: (1) It is less exhaustive to the soil; (2) it gives an average yield of from 10 per cent. to 20 per cent. more than wheat; (3) the growing crop in favourable seasons can be fed off twice, or even three times, to the advantage of the subsequent yield of grain. Land of a light and calcareous nature, but unsuitable for wheat, will give a barley thin in the skin, and particularly suited for malting purposes. Barley is not a difficult crop to raise, but there are certain points that need careful attention, which, if neglected, would probably result in the production of an inferior sample, which would hardly pay for growing.

**MAIZE.**

Maize is a good crop in the North Island, chiefly the Auckland District, with a frequent average of 38 bushels to the acre.

The counties where maize is chiefly grown are Hobson, Manukau, Rodney, Whangarei, Mongonui, Hokianga, Tauranga, Whakatane, Opotiki, Cook, Wairoa.

**ROOT-CROPS.***Potatoes.*

Potatoes are largely grown throughout New Zealand. On suitable soils very heavy crops are raised, it being no uncommon thing to dig from 8 to 10 and 15 tons per acre, although the general average is much lower, for the reason that unsuitable land is frequently devoted to this crop. The area under potatoes in 1904-5 was 26,331 acres. The bulk of the crop is planted without manure, but, where used, bonedust, superphosphate, blood-manure, or animal guano (which may be procured of first quality from the local manure manufacturing), from 1 cwt. to 2 cwt. per acre, is applied with good results. The potato is, however, an expensive crop to grow, costing from £5 to £6 per acre, and it is perhaps the most precarious of all crops, being materially affected by drought, but more particularly so by early and late frosts.

Land for potatoes is usually broken out of grass, skim-ploughed in autumn, ploughed deeply in spring, and thoroughly tilled; or potatoes may be grown in drills opened and closed with a double-furrow plough. The seed—15 cwt. per acre—is then ploughed in under every third furrow, the after culture consisting of harrowing just as the crop is appearing above ground (by this means myriads of seedling weeds are destroyed); drill-grubbing, hoeing, horse-hoeing, and earthing-up being the subsequent operations. Heavy crops of wheat, oats, barley, beans, or peas can always be relied upon after potatoes.

*Turnips.*

The turnip-crop of this season has been a fair average one on the plains of Canterbury. In the southern portion of the Island the crop was very good. The area under this crop for the season 1904-5 was 447,244 acres, an increase of 38,585 acres as compared with the previous year.

On virgin soil turnips can always be relied upon as a certain crop without any manure, even with a single furrow and a couple of strokes of the harrow. But, as most of the land (at least in the Middle Island) has already been cropped, turnips cannot now be successfully grown without the aid of manure. In the nature of things, from a climatic point of view, farmyard manure cannot be procured in sufficient quantity; artificial manures are therefore largely used, from 1 cwt. to 2 cwt. per acre being applied with the best results, securing ample crops of sound roots, from 15 to 30 tons per acre. The seed is sometimes sown in drills on the flat, the manure being dropped in front of the seed by the same machine, from  $\frac{1}{2}$  lb. to 1 lb. of seed per acre being used; when sown broadcast a smaller quantity will suffice. Sometimes the manure is deposited in a liquid state by machines manufactured for the purpose, called water-drills. This system in-

variably secures a rapid and vigorous braird, forcing the young plant into the rough leaf, after which it is secure from the attack of the turnip-beetle, usually the first enemy of the young plant's growth. So soon as the turnip-plants reach the third or fourth leaf they are thinned by a scuffler, made for the purpose, which is drawn across the drills, bunching the turnips and thoroughly loosening the soil. The drill grubber and scuffler are used as required till the leaves meet. This kind of culture produces capital crops at a minimum of cost. In Otago and Southland, where Swede turnips are largely grown, the seed is sown in ridged-drills, and the young plants are thinned out with the hand-hoe. Large areas are sown broadcast, and, if found too thick, the harrows are run through them: in any case, a stroke of the harrows is a great help in promoting the growth of the plant.

The varieties used are Devonshire Grey for early and very late sowing; Purple- and Green-top Aberdeen are the most generally grown. Swede turnips, from their proneness to the attack of the turnip aphid, are not so much grown, though they produce enormous crops in Otago and Southland, where the climate is more suitable. The turnip-crop is generally fed off by sheep intended for freezing. It is estimated that an acre of good turnips, with a little hay or oat-chaff, will fatten from eight to fourteen sheep.

Turnip-sowing commences in November, and may be continued till the end of December. Stubble turnips may be sown in March, but this can only be considered as a catch-crop. It, however, often proves of great value, supplying an abundance of green food for ewes with early lambs.

Turnip land is usually sown with oats or barley, and sometimes spring wheat.

The cost of growing turnips sown broadcast and in drills may be: Broadcast—ploughing, 5s. 6d. per acre; harrowing, 3s. per acre; rolling, 1s. per acre; seed and sowing, 1s. 6d. per acre.

#### *Rape.*

Rape is largely grown as sheep-feed, and may be sown either in early spring or immediately after harvest, the stubble being skim-ploughed or broken up with the spring-tined cultivator. This crop is invaluable in the early spring, and may be fed off in time for oats or barley. Dairy cattle, however, should not be fed on rape, as doing so destroys the flavour of the milk. This fodder plant is more valuable for fattening lambs than the turnip; there were 131,588 acres under this crop, being an increase of 12,926 acres.

#### *Kale.*

This crop, says Mr. Ritchie (in his last annual report, 1905-6). "is now being largely grown for fattening lambs, and is found to answer better than rape."

#### *Mangolds and Carrots.*

These are largely grown in some districts. They cost more money per acre than turnips to produce, as they must be hand-hoed; nor are they so suitable a crop for cleaning the land. Turnip-sowing does not commence till November or December, affording ample time for the destruction of seedling weeds; this important opportunity is

largely lost in the culture of the mangold, which is usually sown in October. Mangolds are, however, an invaluable crop on a stock-farm, as they do not reach their prime condition until the turnip-supply is exhausted, usually in August. From 30 to 60 tons per acre is not an uncommon yield of these roots, often without the aid of manure, on rich swamp land. Experiments and analyses show that the orange and yellow Tankaid are more nutritious than any of the long varieties.

Carrots are also a valuable crop, especially for horses; on sandy loams the yield reaches 15 to 20 tons per acre. Carrots impart a pleasant flavour to butter, and should be largely grown for dairy stock.

#### SOWN GRASSES, SEEDS, ETC.

At the beginning of the year 1905 there were 13,310,074 acres under artificial grasses. Of these, 4,741,702 acres had been previously ploughed, presumably under grain or other crops, while 7,568,337 acres had not been ploughed. Much of the latter area was bush or forest land, sown down in grass after the timber had been wholly or partially burnt off. Ryegrass when sown for seed usually yields, under fair conditions, 25 bushels to the acre, and cocksfoot between 150 lb. and 165 lb.

The following shows the acreage in sown grasses in Australasia in 1903-4:—

	Acres.
Queensland .. .. .	15,639
New South Wales .. .. .	552,501
Victoria .. .. .	962,665
South Australia .. .. .	24,118
Western Australia .. .. .	2,952
Tasmania .. .. .	343,284
New Zealand .. .. .	11,949,171

#### PULSE.

Peas and beans are largely grown for pig-feeding and for export; they form an excellent preparation for wheat. An extensive trade in peas of a certain description is done in the manufacturing towns of Great Britain; and efforts are now being made to secure a share of this trade for the colony by producing peas suitable for splitting for human food. The business should prove a most remunerative one. Thirty bushels of peas are considered a fair crop, while 40 to 70 bushels of beans are often secured. As showing the extraordinary fertility of some of the lands in the Canterbury District, it may be mentioned that beans and wheat have been grown alternately on Kaiapoi Island for thirty years without any apparent diminution of yield, the crops of recent years being as abundant as those grown years ago; 40 to 50 bushels of wheat and 60 to 70 bushels of beans being the usual return per acre.

The average for peas for the whole colony for the season of 1900, over an area of 7,086 acres, was 34.02 bushels per acre; and for beans, over an area of 3,094 acres, 37.33 bushels.

In 1904 the average for peas (10,328 acres) was 30.15, and in 1905 it was 33.09 for 11,426 acres. The bean averages for the two last years were 29.64 and 35.34.

## CAPE BARLEY AND WINTER OATS.

The demand for early spring feed sometimes results in the growing of these plants for forage. Their extreme hardiness renders them well adapted for autumn sowing. If sown in March they are ready for feeding off in May; they may be fed off again in July, and on till the beginning of October, when, if allowed to run to seed, they will produce 40 to 60 bushels per acre; or they may be ploughed in for turnips.

## TARES.

Tares are also grown, but not so largely as they deserve to be, especially for dairy stock. Mixed with oats, barley, or rye, they are excellent milk-producers; and when grown luxuriantly they destroy all kinds of weeds, and leave the land in fine condition for a spring corn-crop.

## LUCERNE.

This permanent fodder-plant thrives admirably in most parts of New Zealand, yielding three to five cuttings in the year; and, if properly cultivated and well attended to, it will continue to yield liberal cuttings for seven or eight years. This is a most excellent crop for the small or large farmer, furnishing, as it does, an abundant supply of succulent fodder, in deeply cultivated soils, during the drier months of midsummer, as well as in the early spring. All farm animals are partial to lucerne; pigs thrive admirably upon it. No farm should be without a well-cultivated plot of this plant. In deeply cultivated land lucerne will yield several cuttings during the season, no matter how hot and dry the weather may be. It is this drought-resisting quality which renders lucerne such a valuable fodder-plant in Queensland and New South Wales, where it is extensively grown for pasture purposes, and for hay, which is largely exported for use in other parts of the continent.

## COST OF WORKING A FARM IN NEW ZEALAND.

When comparing the cost of working a farm in England with one of the same size in the colony, several points have to be taken into account, such as the climate, the soil, labour, and machinery. In the colonies wages are higher than in Britain; as a set-off against this, the colony can claim—firstly, that there are more fine working-days in the year, that the fields are much larger, that the latest improvements in machinery have been introduced, that the soil is more easily worked, and that the genial nature of the climate renders it unnecessary to house stock during the winter months, at least in the North Island, thus saving the cost of attendance; secondly, that farming operations may be carried on continuously throughout the ploughing and sowing season; and, thirdly, that the paddocks are so large, and usually so level, that the double- and treble-furrow plough may be worked by one man or youth with three horses, thus equalising the cost of labour, as we have shown that one man, or even a boy, will be quite equal to two men or boys in the Old Country, so that after all the difference in the rate of wages is not so great as might appear at first sight.

The hay-crop is simply cut one day, raked into windrows the next, and in a couple more it is ready for stacking.

Wheat is cut and tied by reaper-and-binder, the stooks requiring no capping. It is frequently threshed out of the stook in favourable seasons, thereby saving the cost of stacking and thatching; but this method is not recommended, except in hot, dry seasons. When stacked, the stacks are rarely thatched, except, perhaps, on the weather side. This is a wise precaution, the neglect of which sometimes entails serious loss.

The manure bill, which is such a heavy item of annual expenditure with the British farmer, presses as yet very lightly on the farmers of the colony. It is, however, a notable fact that the use of fertilisers is becoming more general; 1 cwt. to  $1\frac{1}{2}$  cwt. of superphosphates per acre is used with the turnip and other root crops, for the purpose of forcing the young plant into the rough leaf, when it will be out of one danger—the turnip-fly. It will nevertheless be seen that the colonial farmer has many advantages over the farmer of the Old Country.

It may also be pointed out that the application of 1 cwt. or 2 cwt. per acre of superphosphate of lime produces better results in colonial soils than double the quantity would do in England, showing clearly that the natural richness of colonial soils is not yet exhausted.

#### CLOVER.

White and alsike clover are now grown in considerable quantities. White clover yields enormously: as much as 300 lb. of alsike seed has been obtained per acre. These clovers are not so dependent on the action of the humble-bee for their fertilisation. They mature earlier, and are more easily threshed and cleaned than cow-grass or red-clover.

Saving clover for seed in favourable seasons is a lucrative industry, adding materially to the farmers' income. Clover is sown with a spring crop, usually of corn, lightly grazed in the following autumn, and then reserved for a crop of hay, which, according to the season, yields from 2 to 3 tons per acre when cut in November or early in December. Most farmers prefer feeding off with sheep in preference to mowing for hay. The after-growth is then allowed to flower and seed, which it does very freely. Thousands of humble-bees may be seen in the clover-fields during the months of January, February, and March. The seed ripens in March, and is then cut and dried, and threshed out by machines known as clover-shellers. An acre of clover may yield in hay and seed from £8 to £10. It must, however, be stated that, while a good crop of clover-seed is most lucrative, it is nevertheless a most precarious one. Owing to lateness of the season of ripening, it sometimes happens that the fertilisation is imperfect, resulting in a majority of barren heads. This gave rise to a controversy as to whether the proper bee has been introduced. The point was referred to the late Miss Ormerod, the English entomologist, with specimens, which that lady identified as *Bombus terrestris* and *subterraneus*. The former is declared by Mr. Darwin to be useless as a fertiliser for the reason that its tongue is too short. This question has again been revived, it being thought that, while some of the varieties introduced have proved very valuable as fertilisers, it is quite possible that there are others still more so.

On this question of the right bee for the red-clover, the following

discussion, which took place at the Conference of Agricultural Societies (July, 1905), is interesting :—

Mr. D. D. McFarlane said that before humble-bees were introduced the yield of red-clover was very scanty, and they believed the best results were not yet being obtained. Mr. Grigg had stated at their meeting in Canterbury that the majority of the bees were useless, and a sub-committee was appointed to make inquiries. He referred to the latest reports of Lord Avebury and the United States Department of Agriculture.

Mr. McCallum, in seconding the motion, said he thought the present bee was too slow; yet with them it was possible to grow clover very well in small patches.

Mr. Grigg said we were importing 64,000 pounds' worth of clover every year, which was quite inferior to the seed grown in the colony. *Bombus terrestris* did little good and nearly all harm. *Bombus hortorum* was no good at all. If we only had the proper bees we had everything favourable for growing large quantities of clover-seed. The long red-tailed bee and the bronze bee of the north of Ireland ought to be imported. The bees coming out late in a cold season upset everything. The two he had mentioned would come out very early in December and January in time to fertilise the clover on the quick light lands. They wanted all but the sluggards. The price paid for the last was 2s. 6d., but the mistake was made of not specifying what kinds were to be sent. The boys naturally went for those that they could find easiest and that would not sting.

Mr. Kirk thought there would not be much difficulty in getting the two bees suggested. He was already endeavouring to get them out from Home. He had left it in the hands of agents at Home to get the best they could.

#### GRASS-SEED SAVING.

All the most valuable British grasses flourish throughout New Zealand. Cocksfoot has been for many years a staple product of Banks Peninsula (Akaroa County), where the soil for the most part consists of decomposed volcanic rocks and vegetable mould. Large quantities of this seed are now raised in the North Island, and in many other parts of the colony as well. The seed is of the finest description, frequently weighing 20 lb. to the bushel, 12 lb. being a standard bushel. Cocksfoot thrives on a very wide range of soil, from the richest to the poorest, preferring, of course, the former. It may be found on the dry stony plains of the interior, green and healthy, when the surrounding herbage, introduced or indigenous, has given way to the heat of the summer sun.

Growing ryegrass for seed is also an important industry. The seed is usually gathered by stripping; sometimes the grass is cut and tied and afterwards threshed by machinery. The average yield is from 15 to 20 bushels per acre, weighing from 25 lb. to 32 lb. per bushel, 20 lb. being the standard weight. A common practice is to graze the land till midsummer; to take the stock off for a few weeks, and then to run the stripper over the ground. By this primitive method 10 bushels per acre are sometimes secured, being of the finest quality. Ryegrass-seed is usually in good demand; the price varies according to the season; the usual price, however, is from 2s. 6d. to 3s. 6d. and 4s. per bushel. Crested dogstail, sheep's fescue, and meadow fescue are also successfully grown, particularly in the North Island, for seed.

Many of the indigenous grasses of New Zealand are possessed of considerable feeding-value, but, unfortunately, few of them will stand too close feeding. The action of fire is especially injurious to most of them. Of recent years much has been said in favour of *Danthonia semiannularis* (one of the native oat-grasses) as a grass particularly



*adapted to some of the poorer soils in the North Island, where it is said to thrive admirably: it is also said to be able to resist the action of occasional grass-fires. There are many varieties of Danthonias, from the giant, coarse-growing snow-grass or oat-grass to the fine-leaved varieties found in almost all the natural pastures in the colony. They are for the most part valuable for sheep pastures.*

#### SMALL SEEDS.

New Zealand, from the nature of her soil and climate, offers a fine field for growing all kinds of farm and garden seeds. This circumstance has already attracted the attention of some of the larger seed-merchants of Great Britain, whose agents occasionally visit the colony with a view to inducing farmers and others to grow certain kinds of seeds. The industry is peculiarly adapted to small holdings, and well suited to young persons, the work being light and of an interesting character. Ready sale can be found for carefully grown and carefully cleaned garden-seeds if grown in quantity.

#### LIVE-STOCK.

##### CATTLE.

The total number of cattle in the colony on October 31, 1905, was 1,810,936, an increase of 74,086 over the previous year.

##### HORSES.

The number of horses in the colony at same date was 326,966, an increase of 11,196 over the previous year.

##### SHEEP.

The returns to April 30, 1906, show 20,030,886, an increase on 1904 of 1,750,000. It is thus clear that the 1904 shortage of 673,777 did not arise from any diminution on the producing-power of the colony, but rather to the continually increasing export of maiden ewe lambs, regardless of the requirements for the upkeep of the breeding flocks of the colony. So serious was this matter considered that legislation was contemplated with a view to curtailing the export of maiden ewes. The increasing demand for breeding ewes had the natural result of raising the price of this class of sheep, large numbers of which are now reserved for replenishing the breeding flocks of the colony. The export of frozen lambs for the year 1906 amounted to 1,932,214, and the export of frozen sheep for the same period was 1,518,722—a total of 3,982,756; besides which there were 15,000 cwt. of frozen mutton-joints exported.

The returns made up to the 30th April, 1906, show the distribution of the flocks of the colony to be as follows: In the North Island, 9,936,616; and in the South Island, 10,094,276: total, 20,030,886.

New Zealand has proved itself admirably adapted for the breeding of all classes of sheep, from the fine-combing merino to the strongest type of Lincoln. The merino occupies and thrives on the wild lands of the colony, from the snow-line to the border of the plains, as well as on the drier portions of the plains. The merino ewe furnishes the

foundation for all the cross-bred varieties. On the rich moist soils the Lincoln and Romney Marsh sheep flourish, while the finer English and Border Leicesters occupy the drier lands

### *Cross-breeding.*

Those bred from merino ewes and long-wool rams, or from cross-bred ewes with Down rams, are the most suitable for the frozen-meat trade, and are known as "freezers."

The dapper little Southdowns flourish wherever cross-breeds thrive. Their more ponderous cousins the Shropshire and Hampshire Downs have their admirers, especially the Shropshire, which are largely used for crossing with a view to producing early-maturing lambs. English Leicesters are also much sought after for this purpose, particularly in the Middle Island, where "prime Canterbury" mutton is produced.

The breeds of sheep now in New Zealand are Lincolns, English Leicesters, Border Leicesters, Romney Marsh, Shropshires, Southdown, Hampshire Downs, Merino, Cheviot, Dorset Horn, Ryeland, Roscommon, Cotswold, Suffolk.

Since the development of the frozen-meat trade sheep-farming in the colony has undergone a radical change. At one time wool was the chief consideration, the surplus stock finding its way into the boiling-down vat, the tallow and pelts being the only products of value. Things have marvellously altered since 1882, the inaugural year of the frozen-meat trade. Farming has assumed a new phase, sheep-raising for mutton and wool being the most profitable branch. Small and large flocks of pure and cross-bred sheep are now kept on all farms which are suitable for them, the object being the production of early lambs for freezing. The percentage of increase all over the colony is very high, especially in the paddocks, where 100 to 125 per cent. is not uncommon in favourable seasons; while on the hill and unimproved country it varies from 45 to 80 per cent.

The average clips for the various breeds of sheep are approximately as follow: Merino, from 4 lb. to 7 lb.; quarter-breds, about 6½ lb.; half-breds, 7½ lb.; three-quarter-breds, 8½ lb.; Leicester, 10½ lb.; Lincoln, 11 lb. Of course, very much larger clips are obtained from special flocks, as much as 25 lb. to 30 lb. per sheep; but the above figures represent general averages.

The staple of New Zealand wool, especially the long-wool and cross-bred, is remarkable for its freedom from breaks and other imperfections incidental to countries subject to long droughts and scarcity of feed.

### *The Sheep to breed.*

Three things are required—(1) Best possible wool; (2) best carcass for freezing; and (3) quick maturity. With these in combination you have the best sheep.

Mr. Murphy, one of the best agricultural authorities in New Zealand, writing on this subject in 1905, said:—

The most profitable sheep for New Zealand is that which combines the best fleece and the most suitable carcass for freezing purposes, together with early maturity. This is the class of sheep which some sheep-breeders have set themselves to produce. Whether such an animal, having fixity of type, can be evolved remains to be proved; so much depends on the feed, situation, and soil.

This pronouncement that in the search for a definite new type finality has not yet been reached is important, in view of the fact that six years previously the opinion was strongly held in the Middle Island that finality had been reached, and that a breed known as the "Corriedale" was the new and reliable type. Mr. Murphy, referring to this, wrote in 1899 guardedly thus :—

Some breeders claim that the new breed, Corriedale, is a class of sheep which embraces these desired qualities and possesses a fixity of type. The generally accepted meaning of the Corriedale is a sheep resulting from the fourth cross of half-bred Lincoln-merino and the rams Lincoln. The progeny of these is half-bred. These in turn are bred, half-breds to half-breds, for four generations, and a Corriedale is the result. It was Mr. James Little, of Allandale, Waikari, Canterbury, who gave sheep bred on these lines the distinctive name of "Corriedale," from the estate of that name in the Oamaru back country.

The other side of the question is the general agreement among Southern breeders that they have in the Corriedale found fixity of type. The history of the type is—(1) merino ewe crossed with any long-wool ram ; (2) followed by five in-crosses.

Discussion during the last dozen years or so has been fairly exhaustive. In 1892 Messrs. J. A. Johnstone and Roberts, well-known as speaking with good grasp of the subject, may be selected as the two who have handled the matter perhaps the best. Thus Mr. Johnstone :—

The difficulty in maintaining a half-bred flock is to retain the quality of the wool without losing in quantity, and to keep the flock sound and healthy. This is usually done by bringing in a proportion of first-class two-tooth ewes annually, and drafting out a number of the coarser ewes, and also by careful selection of suitable rams.

The climate and soil in New Zealand are of such varied character that in some districts it has been found that one cross does better than another. For examples the following are given : In the North Island, until lately, the Lincoln and Romney Marsh breeds have predominated ; but since the starting of the frozen-meat trade it has been found necessary, in order to produce an earlier maturing of sheep with a better quality of fleece, to put Hampshire, Shropshire, or Southdown rams to the long-wool ewes ; and the desired result has in every case been achieved.

In some districts the cross between the Leicester (especially the Border Leicester) and the merino ewe is found most suitable ; in others, again, where the climate is wetter, the Romney Marsh cross is regarded as best ; whilst on heavy rich lands some prefer the Lincoln cross, and on high cold country the Cheviot cross is regarded with much favour by others.

The result of this crossing is a sheep which, if nourished well during lambhood and afterwards kept on good pasture until after first shearing, is considered, so far as quality of mutton is concerned, equal to the best Welsh and Scotch.

The weight of these half-bred sheep at two-tooth varies, according to feeding and breeding, from 56 lb. to 65 lb. The Border Leicester cross, maturing earlier than the others, gives the best return at two-tooth, if the climatic conditions are favourable. From the wool-producing point of view, the half-bred sheep is the most profitable ; at all events, it has been so for many years. Of course, the weight per fleece is much less than in the case of long-wools, but this deficiency is more than counterbalanced by the extra value of the staple. Given two flocks of equally well-fed two-tooth sheep, on properties suitable to each breed—one, for instance, Lincoln, and the other the half-bred by Border Leicester rams from merino ewes—and the result, according to present values, would approximately be this—viz., Lincoln, two-tooth, clipping 12 lb. wool at 6d. = 6s. ; half-bred, two-tooth, clipping 9 lb. wool at 9d. = 6s. 9d.

Again, the pure-bred sheep would probably have the advantage in weight per carcase to the extent of 4 lb. or 5 lb. ; but the extra value of the half-bred mutton at Smithfield, or any other of the meat-markets—say,  $\frac{1}{4}$ d. per pound—would give the finer (or half-bred) sheep a further advantage over its coarser competitor of 10d. or 1s. per carcase, making a total of 1s. 7d. or 1s. 9d. per sheep.

The first cross, or, as it is called, the half-bred sheep, has been found so

suitable to the country that several attempts have been made to perpetuate or form a breed of pure half-breds, and with some success. One flock in New Zealand, started fourteen years ago, now numbers 4,000 ewes. These are put to half-bred rams, and will yield 8 lb. of first-class wool. The wethers, too, when under two years old, will dress from 60 lb. to 65 lb. of mutton in every way suitable for freezing and export.

Mr. Roberts's views are of equal interest and authority. They are as follows :—

The following breeds of long-woolled sheep have been chiefly used in this colony for the purposes of cross-breeding: Leicester (English and Border), Lincolns, Romneys, Cotswolds, Southdowns, Hampshire Downs, and Shropshire Downs. I do not purpose going into the question at any length as to the respective merits for freezing purposes of any of these breeds, pure or close up to the pure, but I propose to confine my remarks chiefly to the question as to which is most suited for producing a prime half-bred sheep bred from the merino ewe.

In arriving at a conclusion as to what is the best and most suitable sheep to use for the somewhat small-carcased merino ewe, we must take into consideration the question as to which of the pure breeds possesses the qualifications necessary for the successful breeding from the smaller females; these qualifications must of necessity consist in the main of small head, small bone, and a good fleece of wool. The Southdowns are perhaps the smallest in frame; the Shropshire Downs are also useful enough sheep to use for the first cross; but both of these Downs, being light-fleeced, produce in the first cross such light-clipping sheep as to make the use of these rams very inadvisable for breeding. These two classes of black-faces are very suitable for use for breeding early lambs, and they have been used with considerable success in this direction by putting them to white-faced long-woolled ewes. In breeding, however, from the merino, the fleece from these sheep is so extremely light and unprofitable as to decide the question against their use for purposes of growing mutton and wool conjointly.

The Hampshire Downs are heavier in the fleece than either of the other sheep, and they also have a somewhat less defined type of wool than the white-faced long-wools, and the advantages which they afford are not equal to those which can be secured from other breeds.

The Lincoln, Romney, and Cotswold are, in my opinion, too strong in the head and heavy in the bone to justify their use with merino ewes. Experience points to the inadvisability of using these heavy-carcased sheep for first crosses, as the difficulty of lambing is so great, and the loss arising therefrom very heavy.

Maiden merino ewes ought on no account to be put to long-woolled rams of any kind.

I now come to deal with the Leicester breed, of which there are "English" and the "Border." The English Leicester is in many respects a very excellent sheep, and one which carries a fairly heavy and useful fleece of wool, while it also possesses considerable merit in the shape of being fine in the bone. They, however, lack the perfect butcher's carcase of the Border; and, seeing that carcase is one of the first considerations in cross-breeding, I altogether lean to the Border Leicester as being the best long-woolled sheep to use for crossing with merino ewes. They possess a fine quality of head, fine bone, excellent constitution, the best of carcasses, and a fair weight of good-stapled wool. This class of sheep has been very much used in New Zealand for crossing purposes, and I think it deserves, and fully deserves, the reputation it has secured. The first-cross sheep from this breed is, when properly fed and matured, the best for the frozen-meat trade. If these sheep are well done to when hoggets they can be turned off fat, good weights and excellent mutton, at about twenty to twenty-two months; if they are not well done to when lambs, they require to be about two and a half years old before they are fit for export. With this cross excessive weights are not at all common, and they can be always reckoned on to come up to the prime standard of weights—say, 55 lb. to 70 lb. They are ready feeders, and are sheep that can be kept on their feet, not being liable to foot-rot, and they carry a fleece of wool on the average about 2 lb. heavier than the merino.

Altogether the Leicester cross is, to my mind, the finest sheep for freezing purposes, and I have no hesitation in affirming that our Australian neighbours will find the Border Leicester the most suitable sheep for crossing their merino flocks with. It is a very hardy cross, and we find that it will depasture and

thrive on native grasses at high altitudes quite as well as the merino will. They are not, of course, quite as hardy as merinoes, but if the country which they are running on is at all fairly grassed they thrive very well. On the ordinary average run of New Zealand tussock country they will do as well as merinoes. If any breed beyond the first cross is wished for, the heavier-fleeced sheep are desirable, and for breeding three-quarter-breeds no doubt can exist about the advisability of using these heavy-fleeced sheep, such as Lincoln, Romney, and Cotswold, as against the Leicester.

The views of another writer, Mr. Acton Adams, of Tarndale, Nelson, are worth considering. The article appeared in 1901 in the *Canterbury Weekly Press*, and was entitled, "Which is the most profitable sheep to grow?" This is the question that naturally engages the mind of the New Zealand sheep-farmer. Fifteen to twenty years ago the pure English breeds were not available in any number; and the merino was the basis upon which the sheep of the future had to be grafted. Most breeders seemed agreed that some kind of cross-bred must be created. It was generally admitted that whilst the English long-wools—namely, the Lincolns, Leicesters, and Romneys—were too big and heavy for the larger farms of the colony, yet the English Downs—the Southdown, Shropshire, Hampshire, and Oxford Down—would not grow sufficient wool to be profitable. Mr. Adams says,—

I mention the above breeds, and omit the Cotswold, Highland Black Face, Welsh, and other breeds that I have seen at the annual Royal Shows in England, because, for various reasons, such as bone with the Cotswolds, coarseness and lightness of fleece with the Black Face, and smallness of carcass with the Welsh, these other breeds, of which there seems to be one for every British county, are generally admitted to be not worth trying in New Zealand.

On the other hand, the merino, of which the New Zealand flocks at first almost entirely consisted, though profitable as a wool-grower on the hilly and thinly grassed lands, yet was totally unfitted to depasture on the bush lands of the North Island, or the heavy swamp lands of the South; and last, but not least, would neither mature early enough nor provide the meaty, plump carcass that was most saleable in the London market.

There was then a general consensus of opinion that some kind of cross-bred was the right thing to grow, but as to which kind there were as many opinions as there were provinces in New Zealand. Most, however, I think, would agree with me in limiting the choice of the one side of the cross to the few pure-breeds I have enumerated above, and, at any rate, in order to prevent this paper becoming too discursive, I shall confine my attention to them only.

In discussing the question as to the most profitable sheep, I would first point out that that question for each individual farmer largely depends on the position of his farm and the character of its soil, and that what is the most profitable sheep in one locality may be an unprofitable animal in another place. In some parts wool pays best, in others meat. There are the back-country runs, where the merino still reigns supreme on the uncultivated pastures, where the return for stores represents about one-third of the gross returns, the wool finding the other two-thirds. There are other estates partly cultivated, and growing half-breeds, where stores and fat sheep provide half the gross profits. And, again, there are the highly cultivated properties within easy distances of the freezing-factories, where fat lambs are grown on rape, turnips, and clover, and the returns from meat double those from wool, and return two-thirds of the gross income. These points must not be overlooked in coming to a conclusion on the question stated at the head of this paper.

Coming, then, first to the Lincoln, one of the purest and most ancient of British breeds, I will admit that for the long, moist pastures of the North Island no cross is more profitable: though the Lincoln cross-bred lamb is too slow in maturing, and too long in the shank when matured, for a first-class lamb for the London market; yet the long, lustrous fleece grown on the Lincoln cross-bred sheep is pre-eminent, and not to be excelled by any other cross, and it blends better with the merino than any other.

Wherever it pays to grow fat lambs (and nothing is so profitable on suitable land) it will pay best to grow the cross that comes next in my list—namely, the English Leicester. This breed, as all breeders know, is an improved one, created about a hundred years ago by selection, and is now more generally used in the English Midlands than any other; though in the extreme north the severity of the climate compels the use of the hardy Black Face, and on the southern downs the shortness of the herbage and the high price of superior mutton in the London market render the Down varieties more profitable. And, as Canterbury holds somewhat the same position in New Zealand as the Midlands do in Britain, I recommend the use here of a cross from the same breed.

I admit that the Lincoln cross is better in most parts of the North Island, and that the Border Leicester is suitable to the drier pastures of Otago, whilst the Romney, from its powers of resisting foot-rot and withstanding wet, suits the rank, coarse-grassed localities of the North Island, and the wet, cold districts of Southland. The wool of the English Leicester is softer and finer than that of the Lincoln, though not so lustrous and long. It blends fairly well with that of the merino, and the half and three-quarter crosses yield a fine heavy fleece, classed by experts as "fine half-bred," that sells well now, and is likely to sell better in the future, in London.

Wool-growers must bear in mind that the production of coarse Lincoln fleeces has increased enormously in South America, and with its large area of rich alluvial plains, capable when sown with lucerne of carrying four and five sheep to the acre, the production of coarse Lincoln wool will probably exceed the demand, and cause its value to sink far below the value of the fine half-bred Leicester. At present, about half of last year's clip is lying unsold in the warehouses of the River Plate, and the price of coarse Lincoln fleece has been falling in the London market, whilst at the same sales fine half-bred is rising in value. The comparative shortness of the supply of merino wool has no doubt accentuated this difference.

Then, meat-growers will recognise that a small, meaty carcase, short and plump in the leg, is most desired in the meat-market, and (excepting the South-down) the English Leicester fulfils these requirements better than any other cross. As a lamb, the English Leicester, three-quarter-bred cross, at four to five months old, will weigh about 36 lb., and cut a fleece of about 3 lb. When skinned and dressed the legs look as short and full as those of the Downs, and are practically not distinguishable. The fleece is one-fourth more valuable, and the culls will sell for a shilling apiece more—two great considerations. As a two-tooth, no sheep, not even the Down, will mature earlier or fatten on less feed, and the mutton carcase will weigh, according to age and condition, from 50 lb. to 60 lb., the very prime weight for the Home market.

Reverting briefly to the other breeds, and indicating why they are not so suitable to most farmers in Canterbury as the English Leicester cross, I would say that where meat is a consideration the long shank of the Border Leicester compares badly with the short, plump leg of the English Leicester and Down breeds; and after four-tooths the fleece gets very bare on the points and thin on the back. On the other hand, I fully recognise that the Border Leicester matures early and grows a heavier carcase than the English Leicester, whilst the fleece, though not quite as heavy, is fully as fine. The Border Leicester is a better mutton than the lamb-growing animal, but it is lamb that pays best on the best lands of Canterbury.

Coming to the Down crosses, it is difficult to find fault with the Southdown, except to say that its wool is not so valuable and does not seem to blend so well with the merino as the Lincoln and Leicester do, and that the cull lambs are not worth so much in the market as those of the white-faced breeds. But the South-down ram on a long-wool ewe will produce a splendid lamb for freezing purposes, short in the leg, and the best quality. I prefer the Southdown to the Shropshire, Hampshire, and Oxford Down crosses.

The late Mr. Brydone, of the New Zealand and Australian Land Company, was also a good authority on the "cross" for freezing purposes. In 1892 he read a paper at the Australasian Stock Conference, in which he said,—

Breeders differ widely in their opinions, and men generally favour the sheep they have been most accustomed to. A good deal depends also upon the nature of the country, as one breed of sheep would thrive well where another would

starve. Having had very considerable experience in breeding cross-bred sheep in Canterbury and Otago during the last quarter of a century, and having experimented with most of the popular breeds, the result of our experience has taught us to favour the Border Leicester cross as the most profitable all round. The Border Leicester, as now produced in New Zealand, is a very different sheep from the Home Leicester, as he has been bred with an eye to producing wool as well as mutton, whereas at Home they look principally to the carcase. We put the Border Leicester ram with the merino ewe, which produces a sheep carrying a profitable fleece, and fattening early, and afterwards we use the Leicester, excepting with ewes that may be light in their wool, and to these we put the Lincoln rams. The Canterbury farmers who breed for export mostly favour the Leicester blood, although a few still prefer Lincolns and Downs. In the North Island Lincolns and Romneys have been most in favour, and that may account for the difference in price between Canterbury and Wellington mutton.

#### *Sheep-producing Power of New Zealand.*

The capability of New Zealand for producing mutton has not yet reached its limit. When the frozen-meat trade was first seriously considered, an assertion to the effect that the colony could soon find 1,000,000 sheep per annum for freezing without impairing the breeding-flocks was treated as highly chimerical by sheep-breeders of long experience. The output of sheep and lambs for the year ending 31st March, 1905, was 3,777,638 carcasses; in 1903 the output reached 4,815,417 carcasses. There are now twenty-two freezing-works in operation in New Zealand. But, while congratulating the colony on the development of the frozen-meat trade, it must be borne in mind that Argentina and Australia also share the privilege of Great Britain with New Zealand. It must be admitted that, with a cheaper land, and a closer proximity to the markets of the world, Argentina must necessarily be a very formidable rival to Australasia. The only way to keep command of the market is to ship nothing but first quality graded mutton and lamb.

#### *New Zealand Flock-book.*

"The New Zealand Flock-book," published in 1895, is now thoroughly established, and is of great value to the owners of pure pedigree flocks. The Royal Agricultural Society of Victoria also publishes a Flock-book for British breeds of sheep. This is a step in the right direction, as flock-masters in South America demand a certificate to the effect that the cattle and sheep purchased by them are duly registered in an authorised Herd or Flock book. The value of these books is now so fully recognised that all the distinctive breeds of sheep in Britain and elsewhere have their recognised registers. Carefully kept registers of breeding must ultimately tend to improvement in the quality of the flocks of the colony.

#### *Sheep-feeding.*

Two other important points in connection with sheep-farming in New Zealand call for the special notice of the would-be colonist—namely, (1) the low cost of the production of mutton; (2) the high percentage of natural increase. Respecting the first point, it has been proved beyond all doubt that, under ordinary conditions, the very choicest of mutton can be produced so as to pay the grower handsomely when sold at 2d. per pound for the carcase at the nearest shipping-port. To the British sheep-farmer this statement, of course,

is valueless by itself; but when we add that this mutton would only cost the London butcher, delivered *ex steamer* at the dock, 3½d. per pound, he will be able to realise in some measure what a wonderful grazing-country New Zealand is, and to understand how it is that settlers of the right stamp have done so well.

In getting new country into condition for stock, especially sheep, many settlers have found that it is very profitable to sow turnips and rape, after a burn, with the grass-seed. In some districts the first year of stocking is for this reason regarded as the most profitable.

A fair broadcast crop of turnips will carry about thirty sheep per acre for a month (or fatten from fifteen to twenty sheep), while good crops of drilled turnips will carry three times as many. While being fed on turnips, sheep are, in some places, also supplied with oaten sheaves cut into fine chaff and put into large covered boxes so constructed that as the sheep eat the chaff fresh supplies fall into the troughs. Half a pound of oaten chaff per day will cost ½d. per week for each sheep, the outlay is well repaid, as sheep are much healthier and feed much more quickly when thus supplied with a proportion of dry food. A breadth of oats or Cape barley is usually sown to come in at early spring, the turnips are exhausted and before the young grass is forward enough to stock.

New Zealand may be said to be the only country in the world free from disease of a contagious nature amongst its stock. Scab is now eradicated, and foot-rot to a great extent, can be avoided by keeping the class of sheep least liable to it and best adapted to the districts in which there is a tendency to it. The blow-fly, which is such a pest to Home shepherds, is here very little trouble: and when it is stated that the average death-rate of an estate carrying 40,000 sheep, of which the number of breeding-ewes is 15,000, is only from 4 to 6 per cent., it will be readily understood that few countries can compete with this one as regards the health of the flocks.

The North Island, with its luxuriant pastures, is not so healthy as the Middle Island; but to set against this, the sheep-farmers there have so open a winter that they are not put to any expense in providing turnips and winter feed for their stock.

#### HORSE-BREEDING.

The climate of New Zealand is admirably adapted for the breeding and rearing of horses of all kinds, especially draught-horses. Indeed, it would be difficult to find better Clydesdale horses than those bred on the limestone soils of Oamaru and elsewhere. Some of the best blue-blood of this breed has from time to time been imported from Scotland, with the result that the breed is now well established in the colony.

The light-horse stock of the colony has risen into note through the production of animals which have rendered themselves famous on the colonial turf. The demand for horses suitable for remounts for the cavalry service in India is a continuous one, affording a ready market for the proper stamp of animal; shipments are periodically made to that country with varying results.

With a view to bringing the use of pure-bred sires within the reach of small selectors in the outlying blocks, the Government have im-



ported a few first-class horses of the most approved types, which cannot fail to have a beneficial effect on the stock of the country. The Canterbury Agricultural and Pastoral Association publish a Draught-horse Stud-book, which is largely used by breeders of that class of horse.

#### CATTLE.

The colony possesses all the best strains of blood, and this is evidenced by the superior class of cattle to be met with throughout the settled districts, especially in the show-yards. There are now four herd-books published in the colony—viz., the “Shorthorn”; “Other Breeds,” published by the Canterbury Agricultural and Pastoral Association; the “Hereford Herd-book,” published by the Hereford breeders; and the “Jersey Herd-book,” published in Palmerston North. The value of properly kept herd-books is now fully recognised. Purchasers of animals for export or otherwise now demand that they shall be duly registered in some authorised herd-book as a guarantee of pure breed. New Zealand is comparatively free from many of the diseases so disastrous to horned stock in other countries. With a view to maintaining this enviable position, the Government have prohibited vessels carrying live-stock from infected colonies touching at any of the ports of New Zealand except under certain conditions.

#### Pigs.

These useful adjuncts to the dairy now hold an important position on all dairy-farms in New Zealand. The last statistics (30th October, 1905) show swine numbering 249,727, a decrease of 5,593 on year before. The favourite breed in New Zealand is the improved Berkshire. The large and small breeds of White Yorkshire are also to be met with, but are not so generally approved of as the black pigs. The Tamworth pig has its admirers amongst pig-breeders, as they answer admirably for crossing with black pigs. They produce good bacon pigs, making more lean meat and longer sides than the pure Berkshires. Pigs require no better attention than a good grass paddock, with a liberal supply of roots, and a little unthreshed pea-haulm for a few weeks before killing, with plenty of water, and shelter from the sun during the warmest summer months, and in winter as well.

The breeding, rearing, and fattening of pigs is a source of wealth which is capable of considerable expansion. Several plants for the mild curing of bacon have been set up at the various freezing-factories, and by private persons and firms. The establishment of properly appointed pig-farms is a somewhat costly undertaking, as all the fences must be pig-proof. Doubtless this consideration has had a deterrent effect upon some, while others find the rearing of young stock for the dairy and the breeding of lambs a sufficiently profitable undertaking, besides causing less trouble; but there is room for an enormous extension of this industry.

#### POULTRY.

The efforts being made by the Government to foster this industry are gradually producing the hoped-for results. The distribution of a better class of poultry is showing good results already. Farmers are beginning to see that their poultry-yard should form no mean

auxiliary to the general return from the products of the farm. With such a climate as we have, there need be no difficulty in raising hundreds where dozens are now produced. The Department is doing much to foster this industry. The Government Poultry Depots are kept busily employed. The Agricultural Department intends to seek legislation to prevent the export of any poultry unless it has been graded by a Government official. This is a step in the right direction. The egg-laying competitions now being carried out at Lincoln Agricultural College and Blenheim will certainly give an impetus to fowl-raising. The competition at Lincoln College embraces thirty-eight pens of most of the pure breeds of the colony. The condition of the several lots at the end of a trial extending over twelve months will be a fairly good index to the breeds best suited for export.

#### THE FRUIT INDUSTRY.

From the North Cape to the Bluff Hill, in the extreme south of the Middle Island, the climate and soil are, for the most part, eminently adapted for the growth of a large variety of fruits. Generally speaking, pears, plums, quinces, apricots, figs, walnuts, cherries, gooseberries, currants, strawberries, and raspberries grow luxuriantly, producing abundant crops of fruit. In the Auckland District, oranges, lemons, and limes flourish; many groves are now bearing, and afford light and pleasant employment to a large number of persons. This employment will go on increasing as the plantations throughout the colony become older. The olive flourishes in the North Island, bearing heavy crops, and the manufacture of oil will assume important dimensions at no distant date.

Vine-growing is also carried on with tolerable success in many districts; tons of fruit grown under glass are sold in the Auckland markets annually. Signor Bragato, an Italian wine expert, has given it as his opinion that there are numerous localities in both Islands suited for growing vines for the manufacture of wine.

Away in the far north the banana grows and ripens its fruit, but it is not thought that it will ever enter into successful competition with those grown and imported at so cheap a rate from the Pacific Islands.

Extensive orchards of apples have existed in Auckland for many years, and are still capable of producing an abundance of fruit, if kept free from codlin-moth and other pests. Orchard-planting is progressing, and must one day be a very important industry. Central Otago will also become a large fruit-producing district, being free from violent and scorching north-west winds, so soon as that district is connected by rail with the sea-ports. The total area under orchards in the colony is 27,482 acres, including 541 acres of vineyard.

The manufacture of cider has assumed considerable dimensions, opening up a ready market for suitable surplus fruit. The colonial-made article is rapidly coming into favour with the general public.

The drying of fruit has been fostered by the authorities, who sent an expert through some of the apple-growing districts, giving practical lessons in the art of artificial fruit-drying. A great deal more might also be done in bottling fruits, and the manufacture of fruit-wine, if only for home consumption. The manufacture of jam is

successfully carried on ; there is, however, plenty of room for further developments in this direction.

#### PROSPECTS OF SMALL FARMERS.

Those who have watched the course of events in other countries, so far as they affect the agricultural interests of New Zealand, are forced to the conclusion that New Zealand will have to pay great attention to the quality of her agricultural exports. Our farmers cannot hope to compete with such countries as Australia and South America, where land is so much cheaper, and where mutton and beef of good quality can be produced ; for cheap meat these must command the markets of the world. Happily for New Zealand, our climate and pastures are such that we can not only produce mutton equal to the finest English or Scotch, but we can produce more per acre than can be done in Australia. Our dairy-produce is now second to none, which is largely due to the system of manufacture and Government grading.

Owing to her humid climate and fertile soil New Zealand is peculiarly well adapted for small holdings. Men of slender means can easily make homes for themselves and their families, always provided they know something of the work they undertake, and are, with their families, willing to work hard and live frugally for a few years. It is quite possible for a man with a few cows and pigs, together with poultry and bees, to make a good living, as markets for these products are available in England and elsewhere ; there is also a good local market if the goods are properly prepared, and a continuous demand for the supply of coastal and ocean-going steamers. The facilities now given for obtaining land and money at reasonable rates offer great inducements to persons to settle upon the land. This is amply illustrated at Cheviot and elsewhere, where fine estates have been cut up into moderate-sized farms, and let to farmers on perpetual lease at a rental representing 5 per cent. on the purchase-money. Prosperous homes have sprung up, and tree-planting is being carried on by some of the settlers, which is an earnest of the stability of the settlements.

#### ABOUT LIME.

The question of fertilisers is much discussed, and, as its interest grows, the output of the various works which turn out artificial manure of various kinds grows with it. Reference has been made in the foregoing pages to the use of fertilisers of several kinds. To complete the treatment of this great subject we subjoin a paper on the use of lime as a fertiliser, by the late Mr. T. Brydone, at the Conference of the delegates of the agricultural societies of the colony in Wellington, in June, 1900.

The paper is of such interest, by reason of its combination of wide research and close personal experience, that no apology is required for giving it *in extenso* :—

Lime is one of the oldest and most widely used of all manures. Frequent mention of it is made in the works of the writers of antiquity, more especially of Pliny, who treats of its properties and its action on the soil. And yet, in spite of the fact that it has been in use for so many centuries, and among so many nations, we are not in a position to say that we are by any means cognisant of the exact nature of its action, and can only speak of its results.

Limestone is found in abundance throughout the globe, and forms about one-sixth of the earth's crust. Mountain limestone exists in huge beds 500 ft. to 2,000 ft. thick. The soil upon the limestone is generally thin, but produces a naturally sweet herbage, and good cereals where the soil is deep enough for cultivation.

To convert carbonate of lime, or limestone, into quick-lime, it has to be exposed to a considerable heat to drive off the carbonic acid, and the lime which remains after burning is that which is used for agricultural and building purposes. There are two methods adopted for burning—(1) continuous; (2) intermittent. The former consists of charging the kiln at the top with alternate layers of limestone and fuel, and drawing the lime from the bottom, hence the name of "draw-kiln." The latter system is by loading a kiln with layers of fuel and stone, and igniting, then waiting for it to burn off and cool before drawing. It is self-evident that the "continuous" is the more economical. The quantity of fuel required to burn a ton of lime varies with the quality of both the coal and the stone. It should be remembered, in making up an estimate of the cost, that it requires 2 tons of stone to produce 1 ton of lime, there being 44 parts of carbonic acid to be expelled from each 100 hundred parts of stone (by weight).

The practice of regularly liming in this colony may be said to be confined to Otago and Southland, and it is only since 1890 that the merits of lime have been recognised to any extent. Although every farmer who has had Home experience must have been well aware of its value, yet, until the Milburn Lime and Cement Company commenced business, there was very little chance of obtaining lime except at a prohibitive price. This company has built up a large trade by fixing the price at the lowest payable rate—namely, 13s. per ton (based on a big output).

The magnitude of the trade may be judged by its requiring upwards of 25,000 tons of stone per annum to supply the demand, and eight continuous kilns, 40 ft. deep, to burn it.

There are now about five hundred and fifty farmers in Otago and Southland who regularly use lime. With the knowledge that such a trade has been developed, it will be of interest to study the cause and effect, briefly touching upon the agricultural chemists' theory and the farmers' results.

It has been proved by eminent chemists that lime is part of the direct mineral food of plants, and the quantity absorbed by the following crops is estimated to be for:—

Wheat	..	50 bushels per acre	25 lb. of lime.
Oats ..	..	50 bushels	22 lb. "
Barley	..	40 bushels	17 lb. "
Turnips	..	20 bushels	118 lb. "
Potatoes	..	8 tons	40 lb. "
Red clover	..	2 tons	77 lb. "
Ryegrass	..	2 tons	30 lb. "

Now, if this direct good were the only advantage, the use of lime might be doubted, but it fortunately possesses the following qualities:—

- (1.) It is of the greatest benefit to all soils, and is injurious to none.
- (2.) Lime is good for burning up and destroying the excess of vegetable matter when the accumulations of such are an encumbrance to the soil, as in the case of swampy land. Of course, draining must precede liming to obtain the full benefit.
- (3.) Heavy lands are made lighter, and its action is just the reverse on light soils. On soils containing much mineral and vegetable matter it has a wonderful effect, decomposing and turning the decaying matter into useful plant-food in a very short time. It has been computed that with two tons per acre on this class of land an effect is obtained in five months that would require five years in ordinary working.
- (4.) It releases from stubborn clays the potash, magnesia, and phosphates which they contain, thus rendering these ingredients available for the use of the plants.
- (5.) Lime also sweetens sour soil by neutralising the free acids which it contains. It is for this purpose the very best application which farmers can employ in seed-time after a wet winter.
- (6.) Lime in slaking imparts a great amount of heat, and rapidly warms the cold soil.

(7.) It was discovered about ten years ago by the great German agricultural chemist Hellrigel that lime is just the base which is best fitted for the growth of the nitrogen microbe: the functions of this wonderful microbe being to take the nitrogen from the atmosphere and use it for its own purposes, and then transfer it into the substance of the plants on which it grows. Such plants, however, are those of the leguminous order, which include peas, beans, vetches, lucerne, all the clovers, and, indeed, all plants which have a flower like the pea-blossom.

(8.) Messrs. Sutton and Sons, the well-known seedsmen, assert that a dusting of lime, when the leaves of young turnips are damp with rain or dew, will entirely protect them from the fly.

(9.) Sorrel, which is a sure sign of sour, impoverished land, is acted upon magically by lime.

Permanent pasture soils are very often deficient in lime. These soils may have contained a sufficiency of lime originally, but they have become deprived of it owing to the well-known tendency which lime always has to sink in the soil. On this account it is always advisable when laying down pasture to keep the lime as near the surface as possible. In arable lands the tendency of the lime to sink is, in a great measure, overcome by ploughing, which brings the lime up to the surface again; but this, of course, is not possible with permanent pasture, the result being that the pasture becomes impoverished. However, a light top-dressing, applied once in six or seven years, has the desired effect.

Perhaps its most noticeable effect is in promoting the growth of clover. No matter how poor the capacity of the soil has been previously, when once it has been limed an abundant growth of clover can be depended upon. This is in a great measure due to the fact that lime liberates the potash in the soil, potash being the principal manure required for clover.

The land company which I represent has been one of the earliest and largest consumers of agricultural lime, on the Edendale Estate, in Southland, a distance of eighty-five miles by rail from the Milburn lime-works, and it may be of some interest to say that, being reared on a farm in Perthshire, where we had limestone and burned it for our own use, I was early trained to the benefit of it, and have always been a strong advocate for lime. It is some seventeen or eighteen years now since we first experimented with lime on Edendale, and were perfectly satisfied with the result; but lime was high in price, and railway carriage so dear that we could not afford to go into liming on a large scale. Ten years ago both were reduced in cost, and we started the business in earnest, and since then have used 9,500 tons, on 4,890 acres, at a cost of £10,261, and are still going on and increasing as fast as we can. We started with liming 200 acres in 1890, and this year did 1,069 acres, and I can only say that the company never made a better investment.

The soil of Edendale is a light loam, with a sandy-clay subsoil resting on gravel. It yielded good crops of oats and turnips for a few years after being first broken up, but soon became exhausted and turned to sorrel.

Grass also was all right for a short time, and then got full of couch and fog, and would only carry a very small stock—in fact, we could not make it pay. The liming has changed all this. We get heavy crops of oats at least a fortnight earlier than before; our turnip-crops have never failed, and average about 25 tons to the acre. We can also grow from 30 to 40 bushels of wheat to the acre, which would not grow at all before; but the principal advantage is with the grass and clovers. The lime seems to kill out and keep down the weeds, and foster the grasses which we want to grow. Our manager at Edendale says, "Lime is the best couch-eradicator, with judicious labour, we have yet found." Without the lime the grass would run out in a couple of years, but so far we have not required to renew an acre of the limed land.

We have thoroughly proved in practice that turnips and clovers require lime for their growth, and that rape also thrives splendidly after lime. We had a 180-acre paddock this last summer sown with rape, turnips, and Indian ryegrass, simply as a catch-crop: 90 acres fattened 3,000 lambs after weaning, besides carrying 2,000 stores for six weeks. The other 90 acres carried 350 bullocks for six weeks, and 160 dry cows for longer. The weather was wet nearly all the time, which wasted a lot of feed. The stock eat the ryegrass first, then the rape, and finish with the turnips. The ryegrass was sown with a view to keeping the ground clean for the lambs grazing, but it afforded a lot of excellent feed, besides serving the purpose it was sown for. The first year's grass of a 240-acre paddock fattened 250 head of heifers from stores, and a second 250 a little better than stores were put on it, and finished off the bulk of them.

Before liming it would have been dear enough at 6s. an acre rent. Oats that we have had on limed land have threshed out 75 bushels, which before only gave 25 bushels. We apply the lime at the rate of 2 tons to the acre, the lime being carted direct from the railway-trucks and put in small heaps on the land, when it is ready to be drilled for turnips, or sown with rape or oats. It very soon dissolves even if there is no rain, and can then be spread evenly with long-handled shovels.

For nearly two years the Government has been carrying agricultural lime free, and farmers south of Dunedin have taken full advantage of the privilege, which has been a great boon to them. Without railage, we find the cost per acre to be £1 11s. 6d., made up by 2 tons at 13s. a ton, 4s. for cartage, and 1s. 6d. for spreading. When I was in the Old Country, two years ago, I found many farmers using lime in small quantity in place of artificial manure—say, 10 cwt. to the acre—and then they would apply another dressing in four or five years, according to their rotation of cropping. They generally used crushed lime, and spread with a machine. The same thing was tried by my company some years ago with considerable success, only the Lime Company is kept too busy now to bother with crushing.

I should mention that we apply about 1 cwt. of artificial manure to the acre for turnips, to help them to start, and the lime does the rest.

I have not met a farmer yet who has used lime but speaks highly in its favour. I could get hundreds of testimonials, but I only wrote to one man, who is a well-known sheep-breeder not far from Milton. He says: "Before liming, my land was red with sorrel; now you cannot find a blade. Before liming, I could not grow more than from 30 to 40 bushels of wheat to the acre; since liming, from 60 to 76 bushels, and I would call 50 bushels a small crop. The sample is now quite different, being well matured and no seconds. Oats, before liming, 40 to 50 bushels; now 80 to 100, and as high as 110 bushels. Turnips, before liming, were very poor—in fact, could not grow for sorrel; now I grow nothing but swedes, as they grow bigger than the ordinary sorts. I also find that the turnips grown with lime fatten stock quicker than where no lime has been used. I can now carry two sheep for one before. I consider my farm has doubled in value. If worth £12 to £15 formerly, it is now worth £24." And he adds in a postscript, "I would not take £30 an acre at present."

That is surely good enough testimony to the advantages of liming land, and, judging from my own experience, I can indorse it. I always consider that, at Edendale, if we do not get our money back the first year, we get it the second: so what better gold-mine can you have than that? Were I a farmer, and had no money to buy with, I would "beg, borrow, or steal," but lime I would have, were it within reach and my land suitable. Of course, every soil or climate is not suitable, and the farmer should experiment on a small scale before he goes to much expense, as it would be wasting money to put it on land that contained sufficient lime naturally, or in a very dry climate.

## THE DAIRY INDUSTRY.

### EXPORTS OF BUTTER AND CHEESE.

*Butter.*—1896, 60,066 cwt., valued at £241,152; 1906, 314,165½ cwt., valued at £1,696,493: decennial increase, £1,455,341—603 per cent.

*Cheese.*—1896, 71,474 cwt., valued at £132,039; 1906, 121,322 cwt., valued at £376,098: decennial increase, £244,059—182 per cent.

The Dairy Division is under the control of the Dairy Commissioner, Wellington, who will be pleased to furnish any particulars on matters relating to the industry generally.

Plans and specifications of factory buildings, &c., are also supplied free of cost. Advice on these matters is also given by him.

The dairy staff consists of a Dairy Commissioner, Assistant Dairy Commissioner, five qualified butter and cheese instructors, and ten Graders.

There are about twenty thousand milk-suppliers to the various factories throughout the colony.

The total quantities and values of butter and cheese exported for the year ending 31st March, 1906, were :—

			Quantity. Cwt.	Value. £
Butter .. ..	..	..	314,165½	1,696,493
Cheese .. ..	..	..	121,322	376,098
Total .. ..	..	..	435,487½	2,072,591

SUMMARY OF REGISTRATIONS OF CREAMERIES, ETC., FROM 1896 .  
TO 1906 (MARCH 31).

—	1896.	1897.	1898.	1899.	1900.	1901.	1902.	1903.	1904.	1905.	1906.
Creamery .. ..	91	117	136	157	172	180	206	205	217	214	229
Factory .. ..	79	82	87	83	91	90	82	77	78	84	89
Private dairy (butter) ..	..	..	..	..	326	372	457	386	448	502	556
Private dairy (cheese) ..	..	..	..	..	74	80	85	60	65	69	75
Packing-house .. ..	..	..	..	..	167	190	205	162	175	194	212
Total registrations ..	170	199	223	240	830	912	1,035	890	983	1,063	1,161

The number of skimming-stations in connection with factories and creameries on the 31st March, 1906, was 451.

GENERAL.

The Government still spends large sums of money in teaching the art of butter and cheese making, the proper method of packing, and shipping. Till recently nothing was done in the way of encouraging the breeding of better strains of cattle for the production of milk of superior quality as well as quantity. The Government, recognising the importance of this matter, have imported a few first-class sires from well-known breeders of milking-strains of cattle for the use of those dairy-farmers who are not in a position to secure the best bulls for their purpose. The service of these bulls has been fixed at a nominal scale, and is only available for selected animals. Graders are employed examining all butter and cheese for export, who brand each packet with its proper quality. Factory-owners recognise the fact that it is folly to pay freight on any but the best quality; and this remark applies to grain and meat as well. We have to compete against Canada, the United States, Denmark, Australia, the Argentine, and Siberia. New Zealand dairymen must therefore endeavour to raise dairy cattle which will yield the maximum of milk of the best quality; in fact, nothing but intense farming will pay in the future, applied to every branch. To produce milk of the best quality for the manufacture of butter or cheese during the winter and early spring months is a very difficult matter, especially when turnips are largely used, their use being sometimes unavoidable. Ensilage is strongly recommended as a substitute for turnips. A well-known Australian authority, writing in the *Pastoralists' Review*, says, "Ensilage for years past has been fully recognised as pre-eminently a food for the cow in milk, but to be of much feeding-value a great deal depends on the herbage and grasses and care used in its manufacture." This is an important point.

The complete sterilising of milk to destroy the germs of disease is a wise precaution. The operation consists of heating milk up to a certain temperature, and cooling it rapidly, a process which has been found to destroy the bacillus of tuberculosis known to be present in the milk of affected cattle. The Government veterinaries are employed examining the cattle, and a large number are annually tested with tuberculin, and when found affected they are destroyed, compensation being allowed.

#### BRIEF HISTORY.

The following was written in 1892 by Mr. Murphy, F.L.S., the well-known secretary to the Canterbury Agricultural and Pastoral Association:—

New Zealand may claim to be the Denmark of the South, without ever having to enter into competition with the Denmark of the North, for the reason that our seasons are opposite. The dairy industry is steadily growing into a very important one. In the North Island, along the west coast, factories are springing up in all directions. This will be the great dairying district of the colony, the humidity of its climate rendering it better adapted to this industry than any other. The luxuriance of the pastures has to be seen to be appreciated. Large tracts of bush lands are being thrown open for small settlements, and are eagerly taken up, for the most part by thrifty hard-working men. Land is procurable either by purchase, deferred payment, or perpetual lease, on the easiest terms. Homes are being built up in all directions, dairy-farming being the staple business of the occupants. The very nature of the industry renders it peculiarly suited to small selectors.

It is hardly necessary to point out that all butter and cheese intended for export will have to be factory-made, for the reasons that no other will command the highest price, and that so much more can be made of the milk by the use of the separator. One illustration will serve for our purpose. Experience has demonstrated to a certainty that 26½ lb. (or 2½ gallons) of fairly good milk will produce 1 lb. of butter which averages 2d. per pound more than ordinary farmers' butter, whereas it takes 33 lb. (or 3 gallons) of milk treated in the old-fashioned manner of setting in pans to produce the same quantity of butter—which means exactly 50 per cent. more returns from the milk treated on the factory system.

The factory system is now fairly well established. With judicious supervision, and the institution of regulations providing for the grading and proper handling of butter for export, the industry is sure to go on flourishing, and will secure to thousands lucrative employment.

Thirteen years have passed, and the industry has justified these predictions by an increase of its gross returns from £366,000 to over £2,000,000.

To the completeness of the fulfilment, however, there is one exception. The factory system, owing to the want of adequate means of communication, cannot penetrate everywhere; and it is computed by good authorities that the dairy-farmers are in consequence losing £100,000 a year. This should be an incentive to the politicians of New Zealand to supply the necessary roads.

#### BREEDING FOR THE DAIRY.

The breeding of first-class dairy stock offers a field for profitable investment. Milking-cattle now command a fair price, and will continue to do so. The rearing of well-bred heifer calves will repay all the time and trouble bestowed thereon. They must, however, be of exceptionally good quality, and from fine milking-strains. Separated milk, although relieved of its butter-fat, loses little of its feeding-value; the addition of a little linseed-meal will restore the fatty con-



stituents, which, however, are not the most valuable for feeding purposes. Ground oats, wheat, or barley added to the linseed mucilage will render calves fit for the butcher in a comparatively short time. An acre or so of European flax should be grown upon every farm where stock-rearing is carried on. The fattening of calves for export has not yet been attempted in the colony, although there is a very large and lucrative market for veal calves in London, ranging from £4 to £6 and £7 per head. Much has still to be done in the way of improving the dairy stock of the colony. The yield of milk from fairly good milking-cattle is approximately 500 gallons per annum, although 700 gallons per head are frequently obtained from selected herds. The average quantity of milk obtained will no doubt be increased as more attention is paid to breeding and proper feeding. The general management and feeding of dairy stock is a question demanding immediate attention. Kind treatment is essential to success; clean pastures, clear running water, and grasses of the best quality are all factors fully recognised wherever dairying is successfully carried out. [F.T.S.]

The average yield of butter from milk passed through the separator is 1 lb. for every  $2\frac{1}{2}$  gallons of milk of  $10\frac{1}{2}$  lb.; so that the average cow produces annually 200 lb. of butter, or 500 lb. of cheese, which, estimated at  $4\frac{1}{2}$ d. per pound, will be worth about as much as the butter.

#### GRADING DAIRY-PRODUCE.

The quantities and grades of creamery butter passing through the Government cool-stores for export to the United Kingdom during the year ending the 31st March, 1905, were as follows:—

Port.	Total Packages.	First Grade.	Second Grade.	Third Grade.	Per Cent., First.	Per Cent., Second.	Per Cent., Third.
Auckland ..	106,606	105,943	645	18	99.38	0.60	0.02
New Plymouth ..	151,027	148,069	2,931	27	98.04	1.94	0.02
Patea ..	121,881	120,279	1,592	10	98.69	1.31	..
Wellington ..	158,049	148,745	9,263	41	94.11	5.86	0.03
Lyttelton ..	23,372	23,078	294	..	98.74	1.26	..
Port Chalmers ..	30,114	30,054	60	..	99.81	0.19	..
Bluff ..	5,232	3,844	1,380	8	73.47	26.38	0.15
Total ..	596,281	580,012	16,165	104	97.27	2.71	0.02
Standard, 1899 ..	..	..	..	..	92.63	7.10	0.27

The comparison is the best justification of the compulsory system of grading.

On this important subject the Dairy Commissioner (Mr. Kinsella) makes some interesting and pertinent remarks in his report for 1905. He says,—

#### *Grading of Butter.*

The grading of butter continues to give every satisfaction to both buyers and sellers. The system is now recognised to be on a sound practical basis, and is looked upon, almost without exception, by those engaged in the dairy business as being of the highest value.

It has always been my aim to keep the grading of butter on the most uniform lines possible at each and every grading-port in the colony, and the efforts

put forth in this direction have been attended with a good deal of success, reflecting credit on the officers who have charge of the various grading-ports. The Graders have been called together once or twice during each season for some years back for the purpose of testing their judgment on butter of different quality, when each man was required to examine the produce placed before him and report to me on a form supplied to him in the room. No discussion was allowed amongst those who took part in the test, and each Grader was obliged to state in writing his individual opinion on every box or consignment examined. The forms filled in and signed by each Grader were then compared, and I have pleasure in stating that uniformly close work was done all through, many of the samples being awarded the same number of points under each heading by all the Graders. A general discussion followed on the merits or demerits of the various samples of butter examined, which had the effect of diffusing much valuable information amongst the officers in attendance. These consultations of officers have resulted in levelling up the work at all the grading-ports, and have also helped to increase the confidence of the factory directors and managers in the system of grading throughout the colony.

From an educational point of view the grading of butter has done and is doing a great amount of good amongst the factory-managers of New Zealand. In addition to this, it has created a healthy rivalry between them, which is productive of much good. The majority of them are constantly comparing notes with their fellows, and discussing the respective merits of the different details in manufacture adopted by each for the improvement of the flavour and make of the produce under their care. In the early stages of the industry in New Zealand it was customary for the factory-managers to carry on their work, as it were, with closed doors, many of them endeavouring to prevent what little knowledge they possessed from filtering through to others engaged in the same business; but now all that sort of thing has entirely disappeared, and it is safe to say that this has been largely due to the mutual benefits derived from the system of grading.

One noticeable feature of the season just closed has been the large increase in the number of managers who have visited the grading-stores with the object of seeing the butter and cheese made by one another, and also to compare it with their own. Many of these managers have expressed their surprise at the difference between their own manufacture when they compared it with higher-class goods. In such cases the most of them returned to their factories with a firm determination to improve the quality by every means in their power. These visits to the grading-stores should be encouraged by their employers, as they have the advantage of qualifying the managers in the judging of dairy-produce, which would enable them to more readily detect any fault in the output of the factory under their control, and would also give them an opportunity of prescribing a remedy where needed.

During the past year the Graders have frequently been called upon to examine and report on quantities of "experimental butter" sent in for storage by dairy companies and others. The owners of this butter requested that it be graded on arrival, and then regraded after having been stored for several months. It has not been customary for those making these requests to furnish the Graders with any particulars of the "experiments," and in some instances duplicate boxes of the same butter have been forwarded to several of the grading-stores without the fact being intimated by the owner. As this is apt to cause confusion I have decided not to allow this work to be done in future unless full particulars of what the tests are being made for, and a copy of the key to the experiment, are supplied to me. I have deemed this necessary in the interests of the grading, and also to prevent the work overlapping.

#### *Grading of Cheese.*

The grading of cheese has been carried out on the same lines as in previous years, and in conjunction with the work of instruction it has resulted in raising the standard of quality to a considerable extent since its adoption.

During the past season the majority of the cheese-makers in the colony have taken a very keen interest in the examination of their cheese by the Graders at the port of shipment, making special visits to the ports for the purpose of comparing their own make with that of the neighbouring factories. The result of this admirable method of gaining information as to the defects in some of the consignments has proved beneficial to the makers, and it has also been a factor in improving the quality.

### MISCELLANEOUS INFORMATION.

The following matter of interest to dairying is extracted from the report of the Dairy Commissioner (Mr. Kinsella) for 1905 :—

#### *Hints.*

In the first place, what is needed most is cheaper production. This can be brought about by educating the farmer and dairyman to the importance of better breeding, more housing, and better feeding of their dairy cattle. The all-important question of feeding in winter receives little or no thought or attention in the colony. In my opinion, this is a matter of the utmost importance, and it should be carefully studied and carried into effect by our dairy-farmers.

The testing of the herds is another matter which I have constantly kept before the notice of our dairymen. The testing of individual cows for the purpose of weeding out the unprofitable ones is, I am sure, the keynote to more successful and more profitable dairying in this colony. The time has arrived when the farmer cannot afford to harbour on his premises what Governor Hoard, of Wisconsin, in the United States of America, calls "the robber cow." The cow that does not turn over a profit after deducting the cost of feeding and labour should be dispensed with. Unfortunately, too many of this class of dairy cow are milked in New Zealand, and until the farmer wakes up to the fact that, with high-priced land and expensive labour, only first-class animals should be kept, the cost of production will not be greatly lessened: or, in other words, the profits to each individual dairyman on the turnover from his herd will not be as great as they should be.

The question of building silos, the growing of corn and other green feed for ensilage purposes, should be taken up at the experimental farms, where practical demonstrations on the making and curing of ensilage, the proper housing and feeding of dairy cattle, and the careful testing of individual cows by means of the Babcock test should be carried out.

As to this question, the period under review has afforded another practical lesson to many of the dairy-farmers of New Zealand as regards the provision of some extra feed and shelter for their cattle at a time when there is a shortage of grass and when the weather is unseasonable. For example, had dairymen taken the precaution to provide a sufficient quantity of good food in the form of hay, roots, or, better still, good ensilage (which I had previously recommended in this colony), for their dairy stock the supply of milk would certainly have been materially increased.

#### *Saltless Butter.*

A somewhat large quantity of saltless butter has been exported from the colony during the past season, and it would appear that there has been an increasing demand for this class of butter. Special orders were placed with a number of the large factories by the representatives of several London produce firms for the supply of a certain quantity to be shipped by each fortnightly steamer.

In some instances slightly higher prices were paid for "saltless" butter in order to induce the factories to enter into a contract for the supply of same.

Before entering into an agreement for the sale of butter without the addition of the usual percentage of salt, several of the dairy companies wrote to this office for advice on the matter, but it was thought inadvisable to recommend the exportation of a purely fresh or saltless butter, the reasons for so doing being clearly set out in the replies to these communications.

It is quite apparent that this butter does not find its way into the hands of the retailers or the consumers as "New Zealand produce": at all events, there is ground for believing that it is imported into England for disposal to those who are directly or indirectly connected with the blending trade. It is well known that New Zealand butter, being of a very dry nature, lends itself to the particular process of blending.

Apart from the fact that butter entirely devoid of salt can be more easily adulterated and sold under a special brand, it should be remembered that there is an element of risk in shipping it without salt, for the reason that saltless butter goes off in flavour quicker after defrosting than ordinary butter does.

Large profits are no doubt being made by those engaged in the butter-blending trade, little or none of which finds its way into the pockets of the man who milks the cow; therefore the producers of this colony have nothing to gain by encouraging the shipment of saltless butter.



DAIRY FACTORY (CAPACITY: SIX TONS OF BUTTER PER DAY).  
*Immigrants' Guide.*





### *Salting of Butter.*

\* The salting of butter is another point which requires more attention on the part of a number of makers; this applies not only to the makers of a poorer class of butter, but also to those who are making an otherwise first-class article. These butters when examined show irregularity in salting, some churnings being too lightly salted, while others contain too high a percentage of salt. This irregularity appears to be more noticeable in the butter which is salted in the churns instead of on the butter-workers, and is evidently caused in some instances by the butter-maker misjudging the quantity of salt to use, or by not allowing for the amount of loss made according to the condition of the butter as regards its moisture-content at the time of salting.

Salting the butter in the churn is undoubtedly a commendable practice if the butter is churned in the right condition—that is, when the granules are firm and comparatively dry. If the butter contains too much moisture, or if water is sprinkled over the surface, which is sometimes done with the idea of dissolving the salt quicker, then a portion of the salt is carried off in the form of brine and is lost, consequently the butter is too lightly salted. Then, again, unless particular care is exercised in mixing the salt thoroughly throughout the whole mass of butter in the churn some portions of it will contain more salt than others and result in the irregularity complained of.

When salting butter on the worker it is possible to arrive at a more correct estimate of the quantity of salt to apply, and it is easier to mix it thoroughly with the butter; but many of the makers appear to go about this work in a haphazard kind of way, neither weighing the salt nor the butter; therefore it is little wonder that cause for complaint under this heading has arisen.

To obtain uniformity in the salting of butter, either on the butter-worker or in the churn, the maker should strive as far as possible to have the butter in the same condition from day to day, using the same percentage of salt and mixing it thoroughly into the butter. While other butters have been uniformly salted, they did not contain as much salt as experience has shown could be incorporated with advantage. Butter that is too lightly salted does not retain its keeping-quality so well as that containing a higher percentage.

### *Paraffining of Butter-boxes.*

The general use of paraffin-lined butter-boxes has been advocated by this Division during the last four or five years, and although many of the dairy companies have not yet taken the matter up, still a considerable number of them have been induced to do so. Those dairy companies and owners of proprietary factories who have been paraffining their butter-boxes speak very highly of the benefits derived therefrom. They also claim that the saving in shrinkage alone more than compensates them for the extra expense incurred, to say nothing of the more important question of protecting the butter from becoming tainted with a pine-flavour from the wood.

The melted paraffin wax is, as a rule, applied to the boxes by a hand-brush after they have been heated by means of a steam-jet, which is encased in a galvanised compartment made to fit the size of box used, and this method is found to work very well, although it is somewhat slow. Some of the box-makers are, however, interesting themselves in an improved method of applying the paraffin to the wood before the box is made up, by means of steam-heated rollers. One of the rollers is allowed to take on a coating of melted wax, and this is pressed very evenly over the whole surface of the wood. This is a neater and more expeditious way of doing the work.

No doubt a large number of paraffin-lined boxes would be used if it were possible to have them coated at the box-making factory at a reasonable cost. Until this can be arranged it will pay the dairy companies interested to instal their own plant to carry out the work of paraffining their butter-boxes.

### *The Cheese Industry.*

Except in certain districts in Wellington, Otago, and Southland, the making of cheese does not give evidence of increasing in favour amongst the dairy-farming community. Why this is so it is somewhat difficult to explain. It cannot be that the industry has not proved a financial success, for in some instances cheese-factories have returned larger profits to the dairymen than butter-factories. Then, again, the relative cost of cheese-factory buildings and their equipment is much lower as compared with that of the average butter-factory. The fact

that the feeding-value of whey, especially for young calves, is not so good as skim-milk may have some influence in determining the issue when the settlers in any particular district contemplate the starting of a new dairy factory.

Of course, when it is found to be advisable to take in a large district and establish a central factory with outlying creameries or skimming-stations there is no alternative. In isolated districts where there are no frequent nor regular means of safe transit to the shipping port, or where the supply of milk does not warrant the more expensive butter-factory, it would pay the settlers very well to build and equip a small factory in which to make cheese. Cheese is not affected in quality to the same extent as butter when delayed in transit, providing it is well made; therefore these points should be considered by intending milk-suppliers when deciding which produce it is better for them to manufacture under the circumstances.

The slight increase in the quantity of cheese exported to the Home markets for the year ending the 31st March may be partly explained by the fact that, although three of the large dairy companies in the Taranaki District (which had dual plants) turned their attention to butter-making, there was an increased output in the South Island. The reason, no doubt, was the low price offering and the general pessimistic views then held of the prospect of the cheese-market, which proved later on to be erroneous.

The continual changing from the manufacture of one product to another is, to say the least of it, very unwise. It would be much more profitable for the companies to confine their operations either to cheese or to butter making. It is, of course, necessary to consider all the circumstances connected with each of these factories in deciding which product it will pay best to make, but when that point has been settled it should be strictly adhered to. It is obvious that dairy companies which manufacture cheese for one or two seasons and then turn their attention to butter, and later come back to cheese again, cannot establish a permanent reputation for their brand of produce on any particular market.

#### *Cool-curing and Cold-curing of Cheese.*

The question of the cool-curing of cheese has in some places been misunderstood, and "cool-curing" has been confused with "cold-curing."

When the system of cool-curing of cheese was first talked of in Canada and the United States it was thought by some writers and cheese-makers in this colony that it necessitated the holding of the cheese at a temperature of 40° Fahr. or below. I shall here endeavour to explain the difference between cool-curing and cold-curing. The latter would mean the holding of the cheese in the curing-rooms at a temperature of 40° Fahr. for six or eight weeks. This system, in my mind, is out of the question in New Zealand, for the following reasons—viz.: First, it would be necessary to provide for enormously large curing-rooms in order to furnish sufficient space for the cheese; second, there would be a large consumption of fuel, thereby increasing the expenses for refrigeration to such an extent that any improvement in the quality of the cheese might not compensate for the extra cost and the additional time and labour necessary; and, third, the suppliers would have to wait longer for their dividends, owing to the extra time required for cold-curing. The producers certainly could not afford to stand out of their money for such a length of time, even though the cheese were improved in quality by curing at such a low temperature.

While making the above statements, I wish it understood that excellent results have been obtained from experiments carried out by Professors Dean, Van Slyke, Russell, and Babcock by curing cheese at a temperature of 40° Fahr., and in many cases where cheese were cured at much lower temperatures a superior quality was obtained. There are, however, as above pointed out, many difficulties in the way of cold-curing being adopted in connection with our factory system.

In defining the system of cool-curing as compared with cold-curing, Professor Ruddick makes the following statements:—

"If I may be allowed to draw a line of division I would say that all cheese cured at temperatures below 50° might be called 'cold-cured' in order to distinguish them from those cured at temperatures ranging from 50° to 60°, which can be more properly described as 'cool-cured' cheese. At first sight this may appear like making a distinction without a difference, but if we examine the question carefully we shall find that there is sufficient reason for making the two classes."

Cool-curing, according to the experience gained at the Canadian Government's cool-curing stations, and also at many factories where the system of con-

trolling temperatures has been adopted, means curing at a temperature of from 55° to 60°. Cheese cured at a temperature of 55° would require about two weeks longer to cure than cheese held at temperatures ranging from 75° to 80° and curd in poorly constructed or uncontrolled curing-rooms.

During my visit to England and Scotland, where some of the finest cheese in the world is made, I found that rarely or never does the temperature of the ordinary curing-room go above 60° or 62°. I wish to point out that the object of the dairying branch of the Department of Agriculture in Canada in establishing the central experimental cool-curing stations was to convince the manufacturers of the importance of curing their cheese at a uniform temperature, or at nearly the same temperature which nature provides in nearly every district where fine cheese is made in England and Scotland.

In many parts of Scotland the cheese are cured in brick and stone buildings, which are much cooler than many of our poorly constructed wooden buildings. I have also seen cheese cured in the basements of such buildings; but there is always a danger of the growth of mould becoming a serious difficulty when cheese are cured in such places. The Scotch cheese are, however, handled differently in the process of manufacture. Their method of bandaging the cheese tends to prevent mould from attacking the surface of the cheese. The system adopted in many factories, when it is found difficult to secure a smooth, tough rind, is to plunge the cheese into a tank of clean hot water and allow it to remain there for a few seconds. This treatment tends to give a better rind, and allows the bandage to knit into the surface of the cheese, thus preventing them from cracking. Many of the Scotch makers claim that the method of applying warm water to the rind of the cheese is not sufficiently effective. All this is done at the time of bandaging. In all small cheese-factories in Scotland, which as a rule are operated by private enterprise, the cheese are bandaged with strong cotton, which is cut or torn into narrow strips about 2½ in. in width, and wrapped tightly around the cheese, beginning at one end and overlapping about ¼ in. as the cotton is bound round the side of the cheese. There is quite an art in properly bandaging cheese in this manner; one point in its favour is that it keeps the cheese in its natural shape much better than our thin loose cheese-cloth or bandage does. It also has, in my opinion, a tendency to prevent mould from attacking the rind or penetrating into the cheese.

When the cheese are ready for shipment they are covered with cheap cotton or rough canvas covers to prevent the cotton bandage from getting dirty or soiled on the way to the markets. These cheese present a neat, clean appearance when placed on the counters after the rough covering is removed. Most of the Scotch makers do not allow the cheese to leave the factory until they are cured properly, and our New Zealand factories could take a lesson from the Scotch people in this respect.

Some people in this colony are sceptical as to whether the system of controlling temperatures in our curing-rooms, which means, putting it plainly, cool-curing, would pay for the outlay necessary to improve the buildings. From what I have seen in Canada, and also from all the information which I have to hand regarding experiments carried out in the United States, I have no hesitation in saying that the saving in shrinkage and the improvement which would result in quality, flavour, body, and texture would in a couple of seasons more than pay for the outlay required to improve the curing-rooms in our factories. Our dairy companies must also take into consideration the important question of increasing the reputation of their brands, which would undoubtedly be the result if a uniformly made cheese, cured in properly controlled curing-rooms, were supplied to the same customers on the British markets each season. The proper temperature for curing cheese which are required to be shipped regularly to the British markets is from 55° to 60°, as above stated. It only requires a week longer at a temperature such as this to cure cheese to that stage which is generally termed "breaking down" than it does to cure cheese in uncontrolled curing-rooms at temperatures ranging from 80° to 85°.

Experiments have been carried out on an extensive scale by the Dominion dairying service in Canada, where various samples of cheese from the same curd, but cured at different temperatures, were submitted to various buyers and experts. The latter pronounced the cool-cured cheese to be far superior in quality to those which were cured at the ordinary temperature. The difference in value was in many cases placed as high as 1 cent, or ¼d., per pound of cheese.

*Saving in Shrinkage.*—Apart from the improvement in quality of the cheese, the question of shrinkage is one which must be reckoned with by the producer.



From all the experiments carried out in the United States and Canada it has been proved beyond a doubt that the great saving which is brought about by cool-curing would of itself soon repay the ordinary cheese-factory for the cost of improving their curing-rooms. Detailed tables of the saving in shrinkage at the four consolidated curing-rooms in Canada have been prepared by the Dairying Division of the Dominion Department of Agriculture. The tables being lengthy, space will not permit of publishing them.

*System of cooling the Rooms.*—The system of utilising the cooling-power of natural ice has been proved a success in Canada. The ice can be stored so cheaply during the winter months, and the system is so simple and effective, that the probability is most of the ordinary-sized factories will adopt this method of controlling the temperature in their curing-rooms.

In this colony, of course, it will be necessary to adopt the mechanical refrigeration system. At the Cowansville and Woodstock consolidated curing-rooms in Canada the brine-tank system was installed. This plan was adopted not only for the purpose of cooling, but also on account of the advantage of being able to store a reserve of cooling-power. After one season's experiments it was found that, owing to the sluggish circulation of the cold air, the relative humidity was so high that it was impossible to keep the cheese from contracting mould. The next season the tank system was substituted by placing expansion-coils over a brine-tank, which was insulated in a small chamber, from which the cold air was forced out by means of a fan. The cold air is now circulated through the curing-room by means of a system of ducts, and the warm air is brought back to the fan. As the brine flows over the coils, and as the air is forced through them, it is chilled, dried, and purified.

*Insulation and Concrete Floors.*—It is important and necessary to insulate the walls and ceiling of the curing-room and to arrange strong bevelled-edge insulated doors, so as to prevent the hot air from flowing in and the cold air from escaping. A concrete floor is also necessary. Concrete being a good conductor of heat, and lying as it does on the ground, its surface has a constant temperature—derived from the low degree of heat in the earth—of from 50° to 55° according to locality and the character of the soil underneath. Concrete having the qualities above mentioned, it is not difficult to maintain a temperature of from 55° to 60° if the building is thoroughly insulated and the installation properly arranged. The curing-room portion of the buildings where the cool-curing is carried out in Canada is 3 ft. below the surface of the earth, or, rather, 3 ft. below the level of the making-room. It is claimed that by this arrangement the cost of maintaining the necessary temperature is much less, both where artificial and natural ice methods are adopted.

#### *The Alkaline Test: Its Value in Cheese-making.*

The alkaline test, although not a new idea in connection with up-to-date cheese-making, may be said to be new to many of the older cheese-makers. While this means of determining the amount of acid present in whey and curd has been known and used in Canada and the United States for a number of years, its general use in the majority of factories in these countries has not yet been adopted. The above being so, it is gratifying to find that nearly all the factory-managers in this colony are now using the acidimeter, and that they are alive to the fact that the test is a great guide to them in varying the treatment of the milk and curd all through the process.

Three years ago, when I was in charge of this Division, Mr. W. M. Singleton, Cheese Instructor, introduced the test at a few factories with good results. Since my return I find that excellent work has been done during the past two seasons by Mr. Singleton amongst nearly all the cheese-factories in the south. His frequent visits and practical demonstration at factories had convinced many managers of the great value of the alkaline test.

The intelligent use of this reliable test is particularly applicable to the process of cheese-making, as the degree of acidity can be measured by it when the milk is received and at every stage of the process of manufacture. It not only assists the individual manager to manufacture a uniform product from day to day, but it is also conducive to uniformity as between the make of one factory and that of the others. Another important point in favour of this test is its value in determining the amount of acidity contained in the starters.

#### *Instruction at Factories.*

The work of practical instruction in the manufacture of butter and cheese has been vigorously carried on amongst the numerous factories during the year.

Two Butter Instructors and two Cheese Instructors were kept fully employed from the commencement of the busy season.

As far as possible, all applications sent into this office by the directors or managers for the services of the instructing staff were dealt with at once, although every effort was made to give the urgent case first attention, irrespective of priority of application. Immediately the list of applications was cleared off in this way the policy of following up the poor brands of butter and cheese with practical help from the Instructors at the factories was adopted, and as a result much good work was done. As soon as the Instructor's work at one factory was completed he was sent on to the nearest factory at which the manager required advice or assistance, unless in the case of urgent applications as above mentioned. In this way the maximum amount of work was done with the minimum amount of loss of time in travelling, at the same time avoiding unnecessary expense. The staff were instructed to spend from one to four days at each factory visited, according to the amount of time required to make the necessary changes in the methods of manufacture or to complete their investigations in a thorough manner.

Nearly every factory in the colony, besides a large number of creameries, were visited by one or other of the Instructors during the year, and many of them were visited a number of times. By keeping in close touch with the grading through the medium of weekly reports from the Graders, or by personal visits to inspect the butter and cheese at the grading-stores, it was possible to notify the instructing staff which factories were turning out inferior goods, so that they could proceed to these factories at the earliest opportunity with the object of helping the managers to locate the cause of defect, and at the same time effect improvement or a possible remedy.

More assistance by way of instruction was given to managers of factories in the Auckland Province this season than hitherto, and this was much appreciated by their employers and by the managers themselves. The dairy industry has made great strides in the above-mentioned province within the last few years, and shows unmistakable signs of further extensive development in the near future; therefore, in order to cope with the work of instruction, it will be necessary to station an officer in Auckland, who can devote the whole of his time to the work of instruction at factories.

As has been the custom for some time past, the services of Instructors have been available to advise the settlers in the new districts and elsewhere with regard to the building and equipping of dairy factories; in fact, so much confidence has been placed in the reliability of the advice given by the officers of this Division, that one of the first steps taken by the settlers who propose starting a factory is to write or telegraph to this Division for an expert to attend a meeting for the purpose of advising the settlers how best to proceed with the preliminary work, which is, as a rule, new business to them.

In addition to advising the settlers generally on dairying matters, this Division has assisted the directors of many of the factories already established in making suggestions and in deciding the most effective and economical way of making any necessary improvements to their buildings or additions to the plant and machinery.

The bulk of the work which the Instructors in butter-making were called upon to perform was in connection with the inspection of milk, making and preparation of starters, cream-ripening, churning, working of butter, and testing of milk and cream. The Instructors in cheese-making usually also examined all milk delivered at the factory during the first day of their visit, pointing out to the managers and suppliers the several defects, and urging on them the necessity for cleanliness and the best means of improving the quality generally. Some of the starters found in use were condemned and better ones substituted.

In many instances the Instructors took entire control of the making of the cheese, in order to demonstrate to the managers the practicability of their recommendations. Occasionally only one or two vats of milk were taken charge of by the Instructor for the purpose of making the cheese himself, the manager handling the remainder of the vats in his own way, by mutual arrangement with the Instructor. Comparisons were made all through the process, and the advantages of the system advocated by the Instructor were brought under the notice of the manager. Frequently one cheese made from each separate vat handled by the manager and Instructor respectively was held over until the Instructor's next visit, some weeks later, when they were examined and compared.

It has been the practice all through the season for the Instructors to supply

fresh lactic-acid cultures to the majority of the factories visited. These cultures were, as a rule, originally made from a commercial culture, and kept going under more or less favourable circumstances by the Instructor himself. Some were selected from a good factory and distributed in the same way. The Instructor's time was thus saved, and they were able to prepare good starters to ripen the milk or cream as required.

A great deal of valuable information has been disseminated amongst the managers and directors of factories by the Instructors. Numerous reports have been sent out at the request of the directors on these visits of inspection to factories, and these reports contained a full account of the working of the business from a practical point of view, and also suggestions for the improvement in quality of the butter and cheese.

Where time would permit the Instructors visited a number of dairy farms, more particularly those from which tainted milk was being received at the factories, and directed these suppliers how to treat the milk in order to prevent it being spoiled on the farms.

#### *Cultures and Starters.*

Commercial cultures containing lactic-acid organisms for making starters are now in general use at both butter and cheese factories, and have largely replaced what is known as the "home-prepared" cultures formerly introduced by me in connection with the dairy work in the colony over five years ago. In many respects lactic-acid cultures prepared under proper conditions by a specialist are to be preferred, although splendid results have been and are still being obtained with the "home-prepared" cultures when strict attention is paid to all the details in making them. These cultures, however, have the disadvantage of taking longer to mature and develop before the first propagation can be made, and it is sometimes necessary to make several before a first-class one can be obtained. Good commercial cultures are therefore handier and more reliable for general use.

Two distinct brands of these so-called pure cultures have been on the market during the past year, one put up in the form of a dry ferment, and the other in a liquid form, the latter being prepared under the supervision of an eminent bacteriologist in the colony. The value of a lactic-acid culture is dependable first on its purity, then its propensity for curdling milk and imparting to it a clean, acid flavour, and also what may be termed a nice nutty taste, capable of being transferred to milk and cream and eventually developed in the butter or cheese.

If there is one part of the factory-manager's duty which requires more attention than any other it is that connected with the preparation of the starter for ripening the milk or cream and producing a good flavour in the products made from them. Unfortunately, however, there are a number of men in the business who, being intrusted with the welfare of their employers' produce, do not give their close attention to starter-making, and when pure cultures are placed in their charge for propagation the benefits to be derived through them are nullified through carelessness.

Occasionally the cultures do not produce the desired flavour, and have to be discarded; but this rarely happens if proper care is taken in selecting good milk, thoroughly sterilising it, and maintaining the right temperature all through the process.

Every factory in the colony should have a properly fitted-up compartment wherein cultures and starters could be prepared and kept during development, as there is considerable risk of contamination when the work is carried on in the ordinary making-room of either a butter or cheese factory.

#### *Testing of Milk.*

The method of testing milk instituted by Dr. Babcock nearly fifteen years ago has been adopted at nearly every dairy factory in New Zealand; in fact, the New Zealand dairy companies and factory proprietors are further advanced in this respect than those of many of the older dairying countries in different parts of the world. The use of this test has spread rapidly during the last twelve years, and this goes to show that it is the most useful and accurate means of testing milk that has been suggested or tried up to the present time.

Considerable improvements have been made of late years with regard to the make of the testers. The old cog-gearing machines have now almost entirely disappeared, and have been superseded by what are called "turbine testers."

These have become very popular, and a substantial machine made of cast iron, with a heavy frame and gun-metal pockets for holding the test-bottles, is the tester now commonly used. They are solid and heavy enough to give a steady motion when whirling the bottles, and the castings as well as the bearings are made of durable material. However, the changes which have taken place in the construction of the testing-machines are purely mechanical, and have not in any way changed the methods of testing as originally described by Dr. Babcock. The glassware for testing whole milk is just the same now as it was at the beginning; the same size and design of test-bottles, acid-measures, and pipettes are used, and they have proved to be entirely satisfactory. Most of the test-bottles in use at the factories have been tested to ascertain whether the graduations on the neck of the bottles are correctly spaced or not, and this has reduced the risk of errors being made in reading off the test to a minimum.

There are still many complaints made by the milk-suppliers against factory-managers in connection with the irregularity of milk-tests. Possibly many of the complaints are made without just cause, but in other cases milk-suppliers seem to receive unfair treatment. It is recognised that our best factory-managers devote the utmost care to the testing of milk with which they are intrusted; notwithstanding this, it cannot be denied that there are others who are either careless or incompetent in this important branch of the factory-manager's duty.

Under this heading I may say that the Instructors have reported to me quite recently that a sufficient amount of attention is not always given to milk-testing by those responsible. Carelessness is sometimes displayed in keeping the composite samples by allowing the cream to form in a thick layer on the surface of the milk. Then, again, the sample-jars are occasionally left uncovered, which causes a certain amount of evaporation to take place. Both of these delinquencies render it almost impossible to take an absolutely correct sample, and is likely to result in loss either to the supplier or to the dairy company. More attention should also be paid to the temperature all through the process of testing, as the degree of heat at which the tests are maintained has a direct influence on the direct result when the reading is taken.

In some of the principal dairying districts of the colony there is a feeling existing amongst a certain section of the dairy-farmers that the testing of milk should be undertaken by the Government. To carry this into effect would mean the appointment of a somewhat large number of qualified officials, and at this juncture I do not think it would be advisable to make such a recommendation.

Perhaps it may be of interest to mention here what is being done elsewhere to place the testing of milk and cream on a better basis. In some parts of Canada and in Denmark the dairymen have formed associations at various centres composed of the patrons who supply the surrounding factories and creameries. These associations make a levy on their members, in proportion to the number of cows milked by each, towards the payment of the salary of an independent official tester. The Government is asked to appoint qualified men to carry out the work, and also to pay £25 per annum towards the salary of these men. It is found that this system gives entire satisfaction to all concerned. The men engaged in such work are appointed and controlled by the Government, and consequently this has been the means of avoiding any friction as between the supplier and the purchaser of the milk or its butter-fat content. Similar arrangements could no doubt be entered into in New Zealand amongst the dairymen, especially in those districts where trouble has arisen in regard to the testing of milk; I would therefore commend the system to those interested for their consideration.

#### *Testing the Milking-qualities of Dairy Herds.*

The testing of the milking-quality of herds is a matter which should receive more attention from the dairy-farmers of this country than it receives at present. The improvement of every herd, which should be the constant aim of the owner, depends upon regularly discarding those animals that are not reaching a certain standard. The owner should aim to keep only those cows which return the largest net profit for the year. Take, for comparison, two cows, one producing 250 lb. of butter annually, and the other 175 lb. Assuming that all butter produced above 225 lb. is a clear profit, the cow producing 175 lb., besides being cared for and fed at a loss, would eat up the profit made by the first cow. The line of 225 lb. between profit and loss is, perhaps, rather high as a basis of calculation. Many dairymen in America fix it at 200 lb., and a cow producing below this should be "weeded out" of a herd.

When a cow is giving her largest quantity of milk, shortly after calving,

the milk is usually poorer in fat, but the quality generally improves as the period of lactation advances. The variation in the tests of individual cows from day to day is much greater than many people suspect. This is influenced by a number of conditions, such as changes in feed, drink, and surroundings, rough treatment, chasing by dogs, exposure to cold, rain, or rough weather, changes of milkers, excitement or sickness, length of interval between milking, starving, or under-feeding. Such changes, not usually recognised by many owners, have a wonderful influence on the composition of the milk from day to day.

The most accurate method of testing herds, or individual cows, is to weigh and sample each milking during the whole period of lactation. This, however, entails a great deal of labour, and instead of testing every milking separately the composite test may be applied. Fairly accurate results may be obtained by making the test once a month and extending it over a period of four days. Although approximately correct results have been obtained by making only one test during the period of lactation, the testing of a single sample taken from a single day's milking is not recommended, and rarely will it give trustworthy results. In experiments carried out at the Vermont Experimental Station, in the United States of America, tests were made at intervals of seven, ten, fifteen, and thirty days, and at the end of the trial the results obtained from the seven-days tests were found to be most accurate. I would, however, recommend making the daily sampling with the weekly composite test, or the monthly test lasting over a period of four days each time.

In testing the milk of individual cows the sampling of the milk is a very important factor. A correct sample cannot be obtained by milking from the teats into a bottle or small jar, or by taking some of the first, middle, and last milk drawn from the udders. All the milk from one milking should be thoroughly mixed by pouring from one vessel to another, and a correct sample immediately taken. As the quantity given by an individual cow varies considerably at times, this sample should be in proportion to the quantity as well as representative of the quality. For taking such aliquot samples a Scovel sampling-tube made in the right proportions will give good results. This sample should then be placed in a composite jar to which some preservative, such as bichromate of potash or a small quantity of formalin, has been added. A record-book must be kept, in which each cow's number or name corresponding with her number or name on the composite sample-jar is recorded. The milk of each cow should be weighed separately and accurately at each milking, and at the end of the testing-period the aggregate weight of each cow is found and the average yield per day calculated. The average number of pounds per day multiplied by the number of days in the month will therefore give approximately the total pounds of milk produced during the month. The percentage of fat is then found by testing the composite sample, and the total fat for the month is found by multiplying the monthly total of milk by the percentage of fat divided by 100. At the close of the lactation period the aggregate monthly totals will show the estimated yield for the season. Lack of care in sampling and carrying out every detail in preserving the samples and manipulating the test will give untrustworthy results, and such carelessness might be the means of discarding the best cow of the herd.

Any farmer not knowing how to make the test will be supplied with full particulars on making application to the Division.

#### *Ensilage and Silos.*

I have already drawn attention elsewhere in this report to the importance of the better feeding of our dairy cows during the winter months. There is no individual branch of the industry which I would advocate more strongly, nor is there one which requires to be kept more constantly under the notice of our farmers, than does the preservation of a supply of properly cured winter feed for the dairy cow by the use of the silo.

Now that our farmers are steadily advancing in the direction of winter dairying—that is to say, more farmers are becoming cognisant of the benefits to be derived by milking their cows for long periods—it is important that an abundant supply of fodder of the proper sort should be provided, in order to keep up the supply of milk during the winter months and to bring out the animals in good condition in the spring.

There are many business arguments which may be used in favour of winter dairying. In countries where the business is carried on scientifically and for profit solely the farmers arrange to have a portion of their herds come into milk fresh in the autumn, instead of the whole herd coming into milk in the spring.

This method is working well in Canada and Denmark, and seems to me to be a business way of carrying on dairying. In doing this there is no discharging of the dairy hands when the winter comes on; the same hands can be kept employed, the cattle receive more attention, and when a constant supply of milk is being sold the farmer can afford to feed and house his cows much better.

Apart from these facts, there is another important question to be considered by the dairy-farmers—namely, that of aiming to supply the British people who purchase our produce with a regular and constant supply all the year round. The British retailer complains that no sooner has he established our brands of butter so that the consumer likes it and asks for more than he is compelled to supply such customer with another brand, usually one from a foreign country. I have no hesitation in saying that if our farmers do not consider this question of better winter feeding at the earliest possible date we are almost certain to be caught napping by the Argentine (which has such go-ahead people and is such a wonderful country) in the matter of being able to produce cheaply a constant or regular supply of butter for the people who now handle and consume it.

The crops that can be utilised for the making of ensilage are many. In nearly all the countries which I have visited and had experience in I found the cultivation of lucerne extending in every direction, and the immense value of this fodder is universally acknowledged by all those who grow it. Lucerne is not only a valuable food for dairy cows, but is relished by other animals such as horses, sheep, mules, &c. It is now grown in large quantities in Australia.

The problem of making ensilage from different fodder crops and the construction of silos has been carefully studied for the past ten or twelve years by the best scientific men we have on such subjects in many parts of the world. From my own experience with corn or maize ensilage, and the knowledge which has been gained by scientists during the past few years, also the conclusions arrived at by such institutions as the Wisconsin Agricultural Experimental Station, I will endeavour to lay before you a few practical facts with reference to the making and preserving of first-class ensilage. It is a fact that there is a great deal to be learned yet on this subject, but with the amount of experimental study which has been given to the subject we should now be in a position or at least possess a sufficient knowledge upon which to base the opinion that properly cured silage is the cheapest and best autumn and winter feed that can be used as a substitute for hay or other dry-cured feed.

In most countries where winter feeding is carried on extensively maize is the crop chiefly grown for making ensilage. Maize, besides yielding large quantities per acre, is a very wholesome food for cattle, and is also a good milk-producing feed, owing to the large amount of sugar and starch it contains. It follows that such a fodder, giving a large tonnage of succulent food, must be an economical feed for cattle. While it is true that in some parts of New Zealand maize is not a reliable crop, there are many of our best dairying districts where it can be grown successfully and cheaply. This applies practically to all parts of the Auckland Province, while I have found very good crops of maize in the Wellington and Manawatu districts. Maize planted on high warm land should sufficiently mature for making ensilage without being injured by frost. In Southland maize, no doubt, has practically been a failure, but it should be realised that it is successfully grown in colder countries on practically the same kind of soil and with shorter seasons. To accomplish this it is necessary to have both proper under-drainage and surface drainage and also proper methods of cultivation.

There are other ensilage crops which can be grown with success, such as lucerne, tares, rape, oats, barley, clover, sunflowers, horsebeans, soja-beans, &c., all of which make excellent ensilage.

*Cultivation of the Land.*—In preparing the land for maize it is important to carry out surface cultivation before planting, at two intervals of, say, eight days apart. The first cultivation will give the weeds a start, and the second one will destroy them just before the seed is put in. The land should receive a coat of manure, bone-dust, or artificial phosphates. When this cannot be done, good results may be obtained by ploughing thick grass sod or clover and tilling well before planting.

*Selection of Seed.*—The variety of maize to plant can best be ascertained by planting two or three kinds to start with. In this way one soon finds the variety best adapted to his particular soil. Possibly the biggest crops are grown from the large southern State varieties, Stowell's Evergreen, Horse Tooth, or Mammoth Sweet. Some of the harder varieties do better on cold soils where the seasons are short. The variety which will yield the largest crop per acre and reach the

glazing-period before the autumn frosts come on is the best one to select. The glazing-stage is just when the maize is right for boiling for table use before the kernels get hard. The seed should always be tested to ascertain its vitality before selection for planting. This can be done in a hothouse, or even large flower-pots indoors in the spring.

*The Time to Plant, and how to Plant.*—The time to plant maize is just when the ground is dry and warm, but late enough to escape the spring night frost. The importance of getting the maize in early so as to give it as long a season to grow as possible should not be overlooked. If maize is planted late and receives little or no attention or cultivation it seldom comes to maturity or amounts to much before the autumn frosts come on. Beans and sunflowers are not so liable to be injured by frost. Sunflowers should, however, be put in as early as possible so as to allow plenty of time to ripen. The maize may be planted in drills or rows about 32 in. to 36 in. apart and from 2½ in. to 3 in. deep. If planted too close the maize will be smothered and never grow large, nor mature well. With good sound seed about 25 lb. is right for an acre, although less may be used. The young maize should be harrowed with a light harrow when about 2 ft. or 3 ft. high, this being found to be necessary especially where the ground becomes baked or hard. The maize should be kept free from weeds and cultivated often.

*When to cut.*—The time to cut maize for ensilage is when the leaves lowest down begin to discolour, and when the kernels are full grown, just before they begin to harden or get ripe. At this stage the maize is at its greatest feeding-value for ensilage. It is always better to cut the maize a little on the early side than to risk injury by frost, which destroys the feeding-value to a great extent. When cut the corn should be allowed to wait a little longer before being housed, but not long enough to allow it to lose too much moisture. When the maize is allowed to wilt for, say, a day and a half the resulting ensilage will have a much nicer odour.

Many machines have been devised for cutting maize, but where labour is fairly cheap probably the most economical way is to cut by hand.

*How to store and feed.*—When carted in the maize should be passed through an ensilage-cutter and cut into lengths of ¾ in. It should be elevated by means of an elevator driven from the cutter or by a blower attachment. Care should be exercised to have the cut corn spread evenly as it is put in the silo. Neglect of this will result in the hard pieces of the stalks and ears rolling down to the sides and corners and consequently less uniform maturing. The maize should be well stamped when going in, particularly round the sides and in the corners. If the whole mass is not made compact and is thus exposed to the air it is sure to become mouldy and spoil. It is also best not to expose too great a surface when feeding ensilage during the winter. To avoid this a small portion may be cut square down with a hayknife and covered over with straw, which will minimise the loss.

Where, again, a large herd is fed from the silo each day, only uncover a portion and then replace the straw covering. When ensilage is made from such fodder crops as green grass, hay, rye, oats, barley, clover, rape, tares, kale, &c., these should, as with maize, be cut with a cutter and put in the bottom of the silo, the maize-crop being then placed on top. If this is not done it is important to weight the finer fodders very heavily by artificial pressure to prevent the entrance of air, which will cause mould to set in and so destroy the ensilage. All the crops named above should be cut on the green side to insure good results. As mentioned, when the ensilage is going in it should be well tramped. When completed the top should be levelled off and tramped evenly, after which about 2 ft. of long dry straw should be put on top to prevent the air getting in.

While the stack method of making ensilage is fairly successful in some districts, judging from my personal observation in the colony, it cannot be regarded as financially profitable, owing to the enormous loss which takes place, apart from the normal contact with the air, through improper building of the stack, insufficient weighting, &c.

To my mind, a most serious objection against curing ensilage in stack in this colony is the enormous amount of rain and inclement weather experienced in some districts during the winter months. It is, however, pretty safe to say that with the average stack the loss caused by exposure to the weather during winter would in two seasons equal the cost of building a small silo.

There are various forms of silos. Where farmers have large barns built with strong framework a splendid silo can be cheaply fitted in a portion of one of the bays. Underpinning is done with stone and mortar, and the inside lined

up with 2 in. plank or hewn timber, the corners being interlocked for strength; then one ply of felt is put on, and the inside lined with dressed tongued-and-grooved lumber.

Every square silo should have a plank fitted on end in the corners, securely nailed, and the space behind filled in with pumice or sand to prevent air getting in and to allow the silage a better chance of settling.

*The Round Silo.*—In some countries the round wooden silo is the one most in use. First a stone foundation is built, then the frame is set up, composed of 2 in. by 4 in. studding placed 12 in. apart and of the length required. Silos are usually built 25 ft. high and from 14 ft. to 16 ft. in diameter. Half-inch tongued-and-grooved lining is nailed on the outside, then one ply of building-pape., and lastly a finishing of  $\frac{1}{2}$  in. tongued-and-grooved boards. The inside is made in practically the same way as the outside, with the exception of the last finish, which should be of dressed matchboards not over 6 in. wide to prevent warping. It is important to have this shell ventilated by means of holes at the bottom and top outside. The outside of the foundation-wall should project from the structure and be bevelled outwards; the inside may be plastered with 1 in. of 2 to 1 cement.

*The Stave Silo.*—When describing briefly the foregoing styles of silos, the one which I think can be built the cheapest and will best suit the conditions in most parts of the colony is the stave silo. Nearly every farmer can secure some standing or fallen timber and have it cut to the length and size required. A stave silo to hold 100 tons of ensilage would require to be about 16 ft. in diameter and 24 ft. high. The first operation is to build a circular base or wall. This can be made of stone and mortar, and should be carried to at least 2 ft. above ground-level to secure the timber from moisture, which latter means early decay. It is necessary that the top part of the wall should be of cement, with a groove of at least 4 in. in depth on top to stand the staves in. This groove is made by placing a circular boxing in the wall when building and removing same when the cement is about set. It is best to have the timber cut all one size—6 in. to 8 in. wide and from 2 in. to 2 $\frac{1}{2}$  in. thick. The staves are the same width top and bottom, and are bevelled a little on the inside like the staves of a barrel. A better method is to have the staves tongued and grooved. The staves can also be spliced by having a tongued-and-grooved joint. In erecting the silo the staves are stood upright in the groove in the base and a few slats tacked on the inside until the hoops are put on. The hoops may be of from  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. round bar iron, and can be either passed through an upright joist on the outside or through special iron clamps. By means of heavy double nuts on the hoops or rods the whole structure can be drawn together almost as tight as a barrel.

A silo 24 ft. high should have at least six strong iron hoops, as the pressure is enormous. The inside of the stonework and the bottom of the staves should be finished smoothly with cement, the shoulder of the wall being bevelled downwards to allow rain-water to get away. A stave silo need not be a very expensive structure. All that is required is to have it strong enough to withstand the outward pressure, and fairly close so as to exclude the air from the silage. A ground or earth floor is just as good as any that could be put in and the most economical.

An important point is to use well-seasoned timber. Unless this is attended to trouble may arise from heavy shrinkage of the staves in dry seasons. This, in fact, is the chief drawback of the stave silo, although in the comparatively humid climate of New Zealand it is not so serious as in some other countries.

Rectangular silos should be made rigid so as to prevent bulging of the sides, which allows the air to get in between the walls or staves and the ensilage and causes the latter to spoil.

Brick-and-wood silos are coming into favour in some countries. Round brick-lined silos of this description are built on a solid stone-and-mortar foundation, with a strong frame of 2 in. by 4 in. studding lined with brick inside. There is also the concrete silo, which is possibly the best in the end, as small losses are unavoidable in the cheap form of stave-and-wood silo. A convenient shape for a concrete silo is the hexagonal (six sides). In constructing such a silo it is usual to place pieces of iron of the proper angle in the corners at intervals in order to strengthen the walls. Twisted strands of barbed wire are also placed in the concrete at different points of the elevation. A useful size for a concrete silo is 25 ft. in height, 14 ft. inside diameter, and walls 16 in. thick at bottom and 10 in. at top. Looking at the matter from a business point of view, and taking two farmers with silos, the one losing 15 per cent. of the ensilage, and the other saving



it all but 5 per cent., the 10 per cent. saving on a large quantity of feed by the latter would more than pay a high rate of interest on the difference in cost between a cheap and a first-rate silo. A silo that allows from 10 to 15 per cent. of the feed to spoil is a structure that no farmer should keep.

## THE EXPERIMENTAL STATIONS AND THEIR LESSONS.

### WAERENGA.

It is sometimes asked what are the aims of the Government experimental stations, and what are they doing. In the case of Waerenga, the aim is to demonstrate that these despised lands can be brought into useful occupation; what is being done is the producing of bark (wattle) for tanning, demonstrating the suitability of such land for fruit and grape-vine growing, and the formation of permanent pasturage. These are the warrants for the establishment of Waerenga; further, it may be remembered that there are hundreds of thousands of acres of similar land at present valueless for the purposes of ordinary British agriculture.

This is the introduction penned by the Superintendent of the Experimental Station, Mr. Clifton, to the report of the useful work done at the Waerenga Station, in the Waikato.

Among the lessons learned here are the following:—

#### *Wattle Plantation.*

A harvest of 205 tons was gathered last season; last year's crop (bark) was sold at £8 per ton; 150 tons are expected yearly in future. The only obstacle is the labour; Europeans not taking to the work, and the Maori labour being not always constant.

The departmental report proceeds as follows, in connection with this station:—

The most serious menace to the older portion of the plantation is the silver-wattle, *Acacia dealbata*. The seed of this was sown years ago, in error it is said, instead of the black-wattle, *A. decurrens*. The mistake was unfortunate: black-wattle bark is being sold at £8 per ton; silver cannot be disposed of at any price. The loss caused by the presence of this silver-wattle is not confined to the fact that the bark is valueless, but the greater damage is due to the encroachment of the tree on to other parts of the plantation. On this account several attempts have been made to eradicate this tree. Of these, the one means giving encouragement is cutting and burning it and sowing the land with a heavy seeding of *Danthonia*. As a fair measure of success has attended this procedure, a block of nearly 100 acres has been cut for burning and sowing in the spring.

#### *Indigenous and other Grasses.*

The land sown in *Danthonia* attracts the attention of visitors, and secures the interest of those who are engaged in working poor land. The value of this grass is now demonstrated beyond question. It is permanent where other grasses fail, and it feeds a fair quantity of stock. In the same enclosure, under the same conditions, *Danthonia semiannularis*, *pilosa*, and a third, said to be *racemosa*, *Microlaena stipoides*, Chewing's fescue, and with the latter a little ryegrass, were sown. On this land the ryegrass made but the merest appearance, and was not found after the first spring; Chewing's fescue remains, but it is bare and affords but little herbage; *Microlaena stipoides* exists. The *Danthonias* have formed a close sward and a useful pasturage. Of the various trials that have been undertaken at this station, nothing has given a more unqualified success than *Danthonia*. It is a matter for congratulation that so many see and interest themselves in this part of the Waerenga Station.

While the production of fruit for export or for canning and the development of viticulture are the chief aims at Waerenga, the establishment of some useful pasturage containing grass suitable for dairying has not been lost sight of. With this object in view, 6 acres have been prepared and sown with *Paspalum dilatatum*. This grass is in great favour at present; it has already esta-

blished itself in the northern districts, and it is growing well on lands of medium quality. On the 6 acres mentioned it is flourishing, and gives every promise of becoming well established in spring. In the north several small plots have been observed. It was noted that stock eat it freely and that it quickly recovers after being eaten down; so also do the specimen plants at Waerenga recover after severe cutting. It may now be said that on average lands there is an assured success for this grass.

#### Autumn Planting.

I would strongly urge the advantages of autumn planting in this and like stiff soils, wherever the necessary drainage has been effected, for it will invariably be found that where such early planting has been carried out the following season's growth is out of all proportion to that of trees planted in the middle of a cold winter or later. There are several reasons for this: it will generally be found that the temperature of the soil is about the same during the month of April to the middle of May as from the middle of August till the middle of September, our early spring months. This being so, and remembering the difference in temperature and the inaction of this heavy land during the winter, it must be plain that a tree planted during the former months, when the warmth still in the soil will readily effect the healing of wounds and emission of fibrous roots, stands better prepared to face a possible dry spring and summer than if put out in the depth of winter or later. In the case of late-planted stuff, particularly deciduous trees, very often by the time the land is in a fit condition to receive them after the winter rains they have already commenced growing, and their resources are severely taxed in their getting established at all. Right here I might refer to perhaps the chief cause for spring-planted fruit-trees not thriving during the first year of their growth. Many nurserymen lift all their saleable trees as early as possible in autumn, as a matter of expediency, and heel them in thickly. The trees immediately commence to make young roots, and by the end of winter these show a mass of white fibres; in the process of packing and transportation (no matter how carefully they are handled) these young roots are practically all destroyed. A fresh demand in root-production is thus made upon the tree, the result being that with so much wasted effort there is a weakened growth for the season.

The transplanting of seedling conifers, &c., from seed-beds to nursery rows was not completed till the end of November. Considering the lateness of the season, a very low percentage of losses in transplanting was recorded. This was accounted for by the careful "puddling-in" at the time of planting—i.e., immersing the roots in an earth-paste—and the free use of the hose afterwards.

The severe gales and cold weather experienced here till nearly Christmas time told heavily against the general growth of nursery stock for some time, but with few exceptions this was made up for in early autumn, when really good growth was made. A nice collection of young conifers, &c., was sown in the spring under scrim-shaded frames, and the seeds germinated satisfactorily throughout. The species raised were *Cupressus* in variety, *Pinus*, spruce, larch, *Sequoias*, *Eucalypti*, &c., and a large quantity of hedge-plants. These trees are grown solely for extension-work here and at other Government stations. The same remarks apply to the fruit-trees raised here.

#### Hedges.

Additional specimen hedges were planted in the nursery and immediately outside, and we now have a very good variety in this respect. So far the following species are represented in hedges: *Cupressus lawsoniana*, *C. macrocarpa*, *C. torulosa*, *Cryptomeria elegans*, *Pittosporum crassifolium*, *P. buchananii*, *P. eugenioides*, *Ligustrum sinensis*, *Cerasus laurocerasus* (laurel), *Rhagodia* (salt-bush), *Betula alba* (silver-birch), *Olearia traversii*, *Elæagnus*, *Hakea acicularis*, and *Cytisus proliferus* (tree-lucerne). The tree-lucerne is a wonderfully quick-growing plant for shelter-hedges, but it is a matter of doubt if its life as such is of long duration. In two years from sowing, and on the very poorest of land, it forms a dense hedge nearly 10 ft. in height, this after repeated cutting. It can be recommended as the quickest-growing plant for garden-shelter, but it is not suitable for a boundary-fence owing to the fondness of stock for it. Of the other hedges mentioned, the *Pittosporums* are perhaps the most ornamental, standing trimming well, and always beautifully green. *Cupressus macrocarpa* is another useful plant in forming a quick shelter-hedge, but being naturally of a gigantic habit it is not to be expected that the restriction of its growth

to the confines of a garden-hedge will conduce to its longevity; it does, however, make a splendid garden-hedge for a period of fifteen years or so, and its term of usefulness as a hedge may be extended if it is not allowed to become too wide at the base or cut too low. As a nurse for the slow-growing and more permanent hedge-plants I know of no better than the one under notice. The *Hakea*, being of a dense habit and rather prickly, forms an excellent sheep- and cattle-proof fence, and adapts itself well to clay soil. It is not benefited by too hard cutting-back, as this always induces patchiness. Due precautions should always be taken that the *Hakea* seedlings do not spread and become a nuisance. The remaining species all have their own particular merit as garden-hedges.

#### *Tomato-growing.*

An experimental plot of tomatoes was the most interesting feature of the kitchen-garden for some months. Some four hundred plants were put out early in November, and, being pot-grown, immediately made headway. The plants were lined out at 18 in. apart in the rows, which were 4 ft. apart; the single-stem system of training was adopted as in former seasons, and the plants were stopped, on the average, at the fifth bunch of fruit. The following varieties were tried: Burwood Prize, Early Ruby, Early Smooth Red, King Humbert, Mikado, Market Favourite, Ponderosa, Peach, Stone, Trophy, and Palmer's Selected Large Red. Of the above varieties only four set their fruit well, these being Palmer's Selected, Peach, Market Favourite, and King Humbert. I would place Palmer's first as the most profitable tomato to grow for the market: it is a most consistent cropper, fairly early, and of good quality. Peach carried a splendid crop of beautiful round fruit, and is perhaps the best table variety of all. Market Favourite is very similar to Palmer's, but not quite so heavy a cropper. King Humbert is a heavy bearer, the fruit plum-shaped, but very hollow and light.

The efficacy of spraying with Bordeaux mixture, in preventing the fungoid diseases of the tomato, was thoroughly demonstrated this season. In previous seasons a good percentage of fruit was destroyed by the tomato black-rot (*Macrosporium tomato*) and leaf-blight (*Cladosporium fulvum*), owing to pressure of work preventing spraying being done at the proper time. This season the plants were sprayed for the first time, just as they were coming into bloom, with a 3-3-50 solution of Bordeaux mixture, and the spraying was continued, at intervals of a fortnight, until the fruit commenced to ripen, the result being an entire absence of the fungoid pests of previous seasons. The caterpillar, so destructive to the tomato throughout the Auckland Province and especially noticeable in small plots to which small birds have not free access, was kept thoroughly in check for the time being by the addition of 3 oz. of Paris green to the Bordeaux mixture. This strength proved quite harmless to foliage, if applied in cloudy weather and kept thoroughly agitated in the pump in spraying. As mentioned above, spraying ceased when the fruit began to ripen. It was only after this that any fruit was destroyed by the caterpillar, and I should not hesitate another season to continue the Paris-green spray as long as the crop lasted, for there need not be the slightest danger to consumers of the fruit as a result of the spray, for as each fruit receives but an infinitesimal quantity of the poison, and that on the skin, the ordinary process of preparation for the table removes every vestige of it.

#### *Green Manuring.*

Several unoccupied plots in the nursery were sown in tares early in the autumn, and the crop dug in in the spring. As a means of enriching land deficient in humus, and where farmyard-manure is not available, this is the best method that can be adopted. Not only is the land rendered more fertile by the addition of combined nitrogen, which the legumes afford, but by the increase of humus its working-texture is entirely altered, and the conservation of moisture throughout the summer greatly aided.

#### *Tobacco-culture.*

The growing of a tobacco-crop was undertaken in connection with the general nursery-work, some four thousand plants were raised in the hothouse in early spring, and after hardening off were planted out in land recently ploughed and planted in orchard. Several weeks of terrific wind-storms, combined with a shallowness of surface soil, did not conduce to anything like the growth of previous seasons, when the plants occupied a more sheltered situation. For the

reasons mentioned the experiment cannot be counted so successful as in previous years.

In order to test the influence of shade in the production of a greater weight of leaf, some twenty-four plants of the "Connecticut" variety were planted out in the nursery at 4 ft. apart, thus occupying a square 16 ft. by 16 ft. A light framework (3 in. by 2 in. uprights and battens) 20 ft. by 20 ft. by 6 ft. was erected over the bed and covered with scrim, which was drawn tight. The resulting growth was marvellous as compared with plants grown in the open, the average height of which after topping being 2 ft. 6 in., while those under cover averaged nearly 5 ft. when topped, the leaf in some instances measuring 1 ft. 10 in. across, nearly double that of outside; it ripened well, and was of a fine texture. That good leaf can be grown in selected spots in this district we have already shown. The plants must be got out as early as possible, directly all danger of frost is over, for when we remember that it is nearly four months from the planting to the harvesting of crop, the importance of having the assistance of the late summer's warmth in drying the leaf will be appreciated. Where artificial heat is not resorted to, I have found it extremely difficult to prevent moulding in a late-harvested crop. Given suitable land, which should be deep, friable, and warm, but not so rich as to promote coarseness of growth, and proper climatic conditions, there is no reason why the small farmer, with a family to attend to the necessary details of suckering and topping, should not be well recompensed in devoting an acre or two annually to tobacco-culture.

#### RUAKURA.

The lessons learned at this experimental station (Waikato, in the Kirikiriroa district, near Hamilton) relate to,—

##### *Drainage.*

This season has shown the necessity of complete drainage, for without it all tillage operations are at the mercy of the weather.

Tile drainage costing not less than £6 an acre, some means of reducing the cost was sought for. The alternative, the mole or drain plough, is being made use of, and is now being operated over a considerable area of this property. With this implement there is every anticipation that this class of land can be drained at a very reasonable cost. The use of this mole or draining plough is by no means put forward as a novelty—it has been too long in operation in other parts of the colony for that—but its advantages are so enormous that its value should be impressed on all owners whose lands require draining. At a visit of farmers to this station their attention was directed to a piece of land in a paddock laid down in grass two years ago. The paddock generally was in fair pasturage, but this particular part was so wet that all the exotic grasses had disappeared and were replaced with sedge. This wet land had then been recently drained with this implement. These visitors were asked to note its condition and the vegetation on it. Since that visit and after experiencing heavy rains this spot remains dry; even the small vestiges of English grasses are commencing to assert themselves. It may possibly be considered that drainage and this mole plough are too much dwelt on; but drainage is a necessity there, and the mole plough promises to bring within the limits of a reasonable cost this most essential improvement to any farm.

The following information is extracted from the departmental report for 1905 :—

##### *Oats, Algerian (rust-resisting).*

The yield is an average of 45 bushels per acre. Rust was present, but not to any serious or damaging extent. The chaff is bright and fine, but the sample of grain is unattractive and coarse.

A trial of other oats was made—the Banner, Garton, Black Tartarian, and Black Swedish. The seed of this last-named oat is a perfect sample, hard and heavy. These suffered very seriously from rust, most particularly the Black Swedish—in fact, it was practically destroyed.

The main crop, as well as the other varieties, was dressed with smut-preventing preparations—the ordinary bluestone mixture, lysol 1 lb. to 40 gals. of water, formalin in the same proportion, and a proprietary preparation. Of these, formalin gave the best result. It was entirely satisfactory, it being difficult to find an affected head of grain. Lysol was as effective, but closer experiment would be required to demonstrate if the germination of the grain was affected to any serious extent. On the part dressed with bluestone a certain amount of smut could be observed. The proprietary preparation was of no effect. It may be added that none of these dressings appeared to have the slightest effect on the rust.

By the kindness of the Director of the Hawkesbury Agricultural College, New South Wales, a sample of a rust-resisting oat (the Argentina) was obtained. It is a much more attractive grain than the Algerian, of a better colour, and finer. This small sample was sown carefully; it gave a fair yield, and is being increased with much care.

#### Wheat.

From the same gentleman, and through the secretary of the Auckland Agricultural and Pastoral Association, sample packets of wheat of two varieties were received—a rust-resistant grain, Bobs, a hard, fine grain; and a strong bearded one, Candéal. Both yielded well, particularly the latter. These are being propagated, but some time must elapse before any quantity can be produced.

#### *Paspalum dilatatum.*

Two acres are sown in this grass. It was long in germinating, but now covers the ground, and in the coming spring its value can be estimated. This grass is being largely grown, but no sufficient time has elapsed to enable a proof of its value in New Zealand to have been made. By many persons it is recommended that planting is preferred to sowing the seed; but if the covering be not too deep, and a firm seed-bed assured, the germination is satisfactory.

#### Flax, or New Zealand Hemp.

A small selection of the varieties of this fibre-plant has been made. It now contains some five varieties, and is being considerably added to this year. The selection was obtained from Mr. McGregor, of Maxwelltown.

#### Grass-garden and Plant-specimen Plots.

Experimental plots of the following grasses and forage plants have been laid down:—

No. of Plot.	No. of Plot.
1. Cowgrass (perennial red clover) ( <i>Trifolium pratense perenne</i> ).	15. Sainfoin ( <i>Onobrychis sativa</i> ).
2. Red clover ( <i>Trifolium pratense</i> ).	16. Tree-lucerne ( <i>Cytisus proliferus</i> ).
3. Red clover, locally grown.	17. Turkestan lucerne ( <i>Medicago sativa Turkestanica</i> ).
4. White clover ( <i>Trifolium repens</i> ).	18. Kidney vetch or sand-clover ( <i>Anthyllis vulneraria</i> ).
5. Alsike clover ( <i>Trifolium hybridum</i> ).	19. Villous vetch or hairy vetch ( <i>Vicia villosa</i> ).
6. Crimson clover ( <i>Trifolium incarnatum</i> ).	20. Yarrow or milfoil ( <i>Achillea millefolium</i> ).
7. Strawberry clover ( <i>Trifolium fragiferum</i> ).	21. Sheep's parsley ( <i>Carum petroselinum</i> ).
8. <i>Trifolium resupinatum</i> .	22. Chicory ( <i>Cichorium intybus</i> ).
9. Bokhara clover ( <i>Melilotus leucantha</i> ).	23. Sheep's burnet ( <i>Proterium sanguisorba</i> ).
10. Egyptian clover ( <i>Trifolium alexandrinum</i> ).	24. Spurry ( <i>Spergula arvensis</i> ).
11. Japan clover ( <i>Lespedeza striata</i> ).	25. Giant spurry ( <i>Spergula maxima</i> ).
12. Trefoil or yellow clover ( <i>Medicago lupulina</i> ).	26. Siberian millet.
13. Birdsfoot trefoil ( <i>Lotus corniculatus</i> ).	27. Hungarian or awnless brome grass ( <i>Bromus inermis</i> ).
14. Greater birdsfoot trefoil ( <i>Lotus major</i> ).	28. Hungarian forage grass.

No. of Plot.	No. of Plot.
29. Golden crown grass, roots ( <i>Paspalum dilatatum</i> ).	40. Fiorin or creeping bent-grass ( <i>Agrostis stolonifera</i> ).
30. Golden crown grass ( <i>Paspalum dilatatum</i> ).	41. Crested dogstail ( <i>Cynosurus cristatus</i> ).
31. Saltbush ( <i>Atriplex vesicarium</i> ).	42. Meadow foxtail ( <i>Alopecurus pratensis</i> ).
32. Saltbush ( <i>Atriplex speciosa</i> ).	43. Golden oat grass ( <i>Avena flavescens</i> ).
33. New Zealand oat-grass ( <i>Danthonia semi-annularis</i> ).	44. Meadow fescue ( <i>Festuca pratensis</i> ).
34. False oat-grass ( <i>Arrhenatherum avenaceum</i> ).	45. Chewing's fescue ( <i>Festuca duriuscula</i> , var.).
35. Racemed oat-grass ( <i>Danthonia racemosa</i> ).	46. Red fescue ( <i>Festuca rubra</i> ).
36. Meadow rice-grass ( <i>Microlaena stipoides</i> ).	47. Hard fescue, imported ( <i>Festuca duriuscula</i> ).
37. Moor-grass ( <i>Triodia decumbens</i> ).	48. <i>Poa pratensis</i> , imported.
38. Sedge ( <i>Carex</i> ).	49. Kentucky blue-grass, America ( <i>Poa pratensis</i> ).
39. Buffalo grass, roots ( <i>Stentathrum americanum</i> ).	50. Marram ( <i>Psamma arenaria</i> ).
	51. Berseem, Egyptian clover ( <i>Trifolium alexandrinum</i> ).

These attract great interest. The collection is being added to.

Among the specimens of plants, the Siberian millet and the Bokhara clover give promise of providing useful fodder or ensilage, the luxuriant growth of each being very marked. It is the intention of some of the visitors to try the millet for ensilage.

#### Permanent Pasture and Top-dressing.

One of the most, if not the most, disappointing aspects of agriculture in this district is the absence of profitable permanent pasturage, except on lands that are of the most fertile description of volcanic soil. At Ruakura there is no old pasture of any stock-carrying capacity. There certainly are some acres in old grass, these grasses consisting chiefly of sweet vernal, fog, some trefoil, and a little cocksfoot and fiorin. One of these old pastures, in 1904, was stocked heavily, hay carted on to it and fed off, 2 cwt. of basic slag applied, the whole well harrowed, and now other grasses and white clover are appearing: it is a marked contrast to the portion left untreated. This would lead up to the idea that, in place of the usual routine here—roots, grain, grass, or *vice versa*, then, after a few years in grass, the process repeated—the grass should be laid down, with the land in the best condition; and, having sown this grass, conserve it with judicious top-dressing. This appears so important and interesting that it is proposed, with the co-operation of some of the agricultural associations, to undertake a careful trial of top-dressing.

In some of the fields laid down in grass top-dressing has been regularly applied with gratifying results. Clovers and the better grasses are flourishing, and compare favourably with those fields, or portions of fields, that remain untreated. The top-dressings applied comprise: Lime, 2 tons per acre, at £1—£2; New Zealand phosphate, 4 cwt. per acre, at 3s. 6d.—14s.; blood and bone, 2 cwt. per acre, at 5s.—10s.; basic slag, 2 and 3 cwt. per acre, at 3s. 9d.—7s. 6d. to 11s. 3d. All of these show improvements in the grasses: on the light land basic slag the more prominently, on heavier lime shows more effect.

#### The Milking-machine.

This machine continues to give satisfaction. Since the installation of this labour-saving machine at Ruakura many persons have visited the farm simply to see and examine it. Now more than eight dairymen are using the machines. They tell me that they would not be deprived of them, and that they could not go back to milking by hand.

#### Dehorning.

All the cattle on the farm are dehorned, except the Ayrshires and the imported pedigree Shorthorns. Many hundreds have been dehorned. A great number are brought by settlers. Store cattle and dairy cows have been operated upon, and among all these there has been but one loss, and that fatality arose through an abnormality of the animal. Dehorning is becoming more practised. A single observation of milking-cows in a yard is sufficient to convince the sceptic that it is merciful.

*Fat Lambs.*

As the lamb for export maintains its importance, the following crossbred lambs were bred and exported. Fifty average crossbred ewes were put to each of the following rams, with the result as shown, average:—

Ram.			Live Weight of Lamb.	Dressed Weight.	Fat.	Skin realised.
			Lb.	Lb.	Lb.	s. d.
Southdown	..	..	97	48	5	2 10.
English Leicester	..	..	102	43	3	2 10
Shropshire	..	..	96	42	2	2 8
Tunis	..	..	94	44	4	3 0

The Tunis were two weeks younger than the other lambs.

As to the ewes of the above table, it is well to bear in mind that at Ruakura the sheep are Southdowns and Leicesters, the main flock made up of the ordinary crossbred ewes of the district, with Lincoln blood predominating.

**MOMOHAKI.**

At Momohaki, near Waitotara (Mr. Gillanders), the things to note more particularly were (as quoted from the departmental report) as follows:—

*Cattle-feeding.*

Eighty-four three- to three-and-a-half-year-old bullocks were put on the turnip-crop last season, the bulk of these being purchased for that purpose. Last season I made some remarks on the carrying-capacity of a crop of turnips, and will now add the following to what has already been said. The eighty-four cattle consumed 15 acres of turnips, of an average crop of 25 tons 6 cwt. to the acre, giving an estimated total crop of 379 tons 10 cwt. Sixteen of the cattle were fed 120 days, twenty-four 74 days, twenty-four 63 days, and twenty 31 days. This would give an average daily consumption of 146 lb. per head, or a weekly consumption of 9 cwt. 14 lb. per head. The several lines of cattle would thus have consumed, approximately, 125 tons, 115 tons 15 cwt., 98 tons 11 cwt., and 40 tons 8 cwt. Apart from the above, the cattle had hay carted out and put in racks, but had no run of grass further than being turned out from the turnips on a very wet day, now and again. Taking the two seasons dealt with as a basis, it will thus be seen that the ordinary consumption of a 3½-year-old bullock is an average of 9 cwt. of turnips per week for outside feeding. Suppose the average period of fattening to be fourteen weeks, one bullock would thus consume 6 tons 6 cwt. of turnips; and a crop of from 24 to 25 tons per acre should carry at the rate of four bullocks per acre for the time mentioned.

*Fat Lamb.*

Sixty crossbred ewes were again mated to each of the following rams: Border Leicester, English Leicester, Shropshire Down, and Southdown. The percentages of lambs from the various breeds were as follows: Border Leicester, 98; English Leicester, 112; Shropshire, 113; Southdown, 97. As mentioned last year, the idea was to try and find out the best or most profitable lamb for export or producing fat lambs. The ewes were ordinary crossbred, the predominating blood being Lincoln. During the lambing-season the ewes had man-golds carted out to them in the paddocks, but otherwise had nothing outside the ordinary treatment; the ewes with single lambs being run by themselves, the ones with twin lambs having a separate run. On the 28th January the first draft of lambs was sold to the Aramoho Meat Company at 13s. 6d., and consisted of the following numbers: Border Leicester, 31; English Leicester, 22; Shropshire, 50; Southdown, 37. The remaining lambs were weaned on the above date and put on rape. On the 27th March the second draft was sold to the same company and at the same price, and consisted of the following lambs: Border Leicester, 26; English Leicester, 31; Shropshire, 16; Southdown, 19.

The subjoined tables give the original number of each line of lambs, the numbers of each line sold, the average live weight, and the average freezing-weight of each line; the average percentage of dressed meats to live weights also the range of live and dead weights from each line

It will thus be seen that the Border Leicester cross gives the largest live and dead weights, but the smallest percentage of meat to live weight; it, however, made the largest average gain per head from birth. The English Leicester gave a slightly better percentage of meat to live weight, but by far the poorest percentage of fat lambs from the original numbers. The Shropshire cross proved very prolific, fattened well, and gave a good percentage of meat to live weight. The Southdown cross, although not so prolific as the English Leicester and Shropshire, fattened well, gave the smallest live weights, but the largest freezing-weights and the largest percentage of meat to live weight.

One or two points are very noticeable in the experiment—First, that the black-faced crossbred lambs fattened much better on their mothers than the Leicester crossbred; second, that the black-faced crossbred lambs gave a much higher percentage of meat to live weight than the Leicester crossbred; third, that the Border Leicester crossbreds showed the largest average gains from birth.

The analytical tables are:—

(a.) *Analysis of Weights.*

Breeds.	Original Number of Lambs.	Number of Lambs fattened.	Average Live Weights.	Average Freezing Weights.	Average Percentage of Meat to Live Weight.	Range of Live Weights.	Range of Dead Weights.
			Lb.	Lb.		Lb.	Lb.
Border Leicester cross	58	57	86·2	40·9	47·4	70-111	33-54
English Leicester cross	68	53	81·9	39·1	47·7	65-97	30-54
Shropshire Down cross	68	66	81·3	39·09	48·08	66-101	32-48
Southdown cross	57	56	80·7	40·0	49·5	64-100	29-50

(b.) *Analysis of Daily Gain.*

Breeds.	Number of Lambs.	Average Age from Birth.	Average Gain per Head.	Average Daily Gain per Head.
<b>FIRST DRAFT.</b>				
		Days.	Lb.	Lb.
Border Leicester ..	31	160	75·8	0·473
English Leicester ..	22	160	69·0	0·431
Shropshire ..	50	160	70·1	0·438
Southdown ..	37	160	70·6	0·441
<b>SECOND DRAFT.</b>				
Border Leicester ..	26	218	77·8	0·356
English Leicester ..	31	218	74·8	0·343
Shropshire ..	16	218	77·4	0·355
Southdown ..	19	218	72·4	0·332

*Oats.*

Fourteen acres of oats was grown last season, principally the Algerian variety. Small plots of Gartens, White Danish, and Sparrowbill were grown alongside the Algerian, to enable a comparison to be made as to the rust-resisting qualities of the different varieties. Rust was not so prevalent in this quarter as last season, but enough appeared for the purpose. All the varieties of white oats tried showed rust to a considerable extent, and they all had to be cut for chaff. The Algerian variety showed a little rust, but nothing to hurt either the straw or grain, and threshed out an average of 61 bushels per acre.

Touching on the question of rust-preventatives. If we take the experience of authorities in older countries we must arrive at the conclusion that no successful rust-preventative has yet been found, and at present all that can be done is to sow varieties of grain that are immune or partly immune to its attacks. Rust is purely parasitic, and as long as wind and weather are favourable to the



growth of the grain it may ripen without showing any signs of rust. While, on the other hand, if conditions are favourable to the rust, such as damp, foggy weather, it will make its appearance, and, should the conditions keep favourable, it will soon absorb the sap that should go to form the grain, and destroy the crop.

#### *Root-crops.*

An extensive trial was again made of manures on turnips, the variety of root grown being *Crimson King swede*. As in former years, the turnips were grown in raised drills 26 in. apart, the plants when ready being hoed out to about 10 in. in the rows. The trials were made in a field after a crop of rape. The following is the history of the field: The Department got possession in 1897. The field was then in grass, and had been for several years. It was grazed continuously until September, 1901, when it was ploughed and put in oats, which were harvested in the following February. The field was again ploughed and put in oats, which were fed off during the winter. In October it was again ploughed, cleaned of couch-grass, and put in turnips in December. The turnips were fed off during the winter of 1903, and the field was sown in rape, which was in due course fed off until July, 1904, when it was again ploughed and put in turnips in December.

I may here mention that our reason for taking three crops of the Brassica order in succession was to try and clean the ground of wild turnips. This can be better done by growing green crops than by any other system I have tried. In a rape-crop the feeding-down keeps the wild turnips from getting to seed, and the cultivating and hoeing in the turnip-crop acts as a stimulant to germinate the seed of the wild turnips, and also keeps them from seeding.

The trial plots were each one-twelfth of an acre. As far as possible in conducting the experiment care was exercised to give an equal money value of manure to each plot. Although we found it difficult to sow the manures so as to do this exactly, the computations should be near enough to enable ordinary comparisons to be made.

It will be seen that Malden Island guano gave the best results,  $3\frac{1}{2}$  cwt. per acre giving a crop of 31 tons 3 cwt. per acre, at a cost of 18s. 3d.; the next highest being superphosphate,  $3\frac{1}{2}$  cwt. giving a crop of 30 tons 14 cwt., at a cost of 18s. 8d.

Of the smaller dressings 1 cwt. of root-manure gave the best results—viz., 24 tons 18 cwt., at a cost of 7s. 3d. Taking the average crop for a number of years, it will be seen that  $2\frac{1}{2}$  cwt. of steamed bonedust has given the best average results. Taking the results for a period of nine years, the average crop is 28 tons per acre. While on this subject it is only fair to say that very few of the manures on the market now were procurable nine years ago, the bulk of the manure-vendors having changed their mixture considerably during that period.

Taking the unmanured plots, the average yield for nine years is 3 tons 8 cwt., the range of crop for that period with no manure being from  $1\frac{1}{2}$  to  $3\frac{1}{2}$  tons per acre. These figures should suffice to illustrate the benefit to be derived from judicious manuring. Taking the difference between the manured and unmanured plots, we may safely say that there is a gain of 20 tons per acre on the manured plots. Taking the roots at 5s. per ton, which is a low estimate, would mean a gain of £5 per acre by using manure. We have also to take into consideration not only the decline in produce, but also the loss of phosphatic and nitrogenous ingredients to the soil, also the constituents left in the soil after consuming a large crop of turnips on the land. To insure continued fertility and obviate exhaustion, some restoration must be made to the soil.

Although I advocate judicious manuring, I also say that it is impossible to lay down any hard-and-fast rule. The climatic influence plays a greater part than the manurial, and this makes it difficult to adopt any system that can be followed year after year. [The advice given by the writer (Mr. Gillanders) is, that farmers should make experiments regularly for themselves.]

#### *Mangolds.*

About 6 acres of mangolds were grown, the bulk of the crop being what is known as Sutton's Prizewinner. These were grown in a field after a crop of oats, the field being previously in grass and having been grazed since the Department got possession. No experiments with manures were made on this crop. Owing to the field not being cropped before, it was considered suitable for the purpose. The crop, on the whole, was a very fair one, although very much behind

last season's. This was no doubt due largely to the backward season, the mangolds being sown three weeks later than usual. Like the turnips, they were grown on raised drills 2 ft. 3 in. apart, and afterwards hoed out to about a foot in the rows.

The mangold-crop is one that seems to be getting less attention every year on this coast. Why this should be, in the midst of a dairying district, is more than I can understand. Mangolds are excellent feed for any stock in the spring of the year, and have a big advantage over turnips in being so much better for storing and using in the spring months when no other feed is available. Last season we fed three hundred ewes on mangolds during the lambing-season, and found them admirably adapted for the purpose. There is no root-crop that will give such a large yield per acre. With an ordinary good season, and little attention at hoeing-time, crops of from 40 to 50 tons per acre can easily be grown. A very small piece of ground will thus provide feed for a good many stock, which will be a good stand-by when all other feeds are scarce.

Mangolds also withstand drought much better than any other root-crop except carrots. The roots go straight down, and will procure moisture in almost any drought; while, on the other hand, turnip-roots run on the surface, and in dry weather will not withstand the drought nearly so well. Ground for mangolds should be subsoiled to a depth of 7 in. or 8 in., which enables the roots to get down and procure moisture. The general run of farmers on this coast are against subsoiling, thinking that it is not necessary on loose soil. If any one cares to try potatoes or mangolds on a subsoiled and a non-subsoiled field they will see which of the two suits the crop best.

Mangolds are a very hard crop on the ground, and they should be manured with at least 3 cwt. of manure to the acre. In older countries, where the soil has been cropped for generations, a complete manure is generally recommended. In this colony, where we have still abundance of nitrogen and phosphate in the soil, good crops can be grown from superphosphate alone.

Several varieties of mangolds were again tried. The following table gives particulars and the crops per acre:—

Date sown.	No. of Plot.	Names of Varieties.	Crop per Acre.		Remarks.
			Roots.	Tops.	
1904.			T. cwt. qr. lb.	T. cwt. qr. lb.	
Nov. 23	1	Sutton's Golden Tankard	38 3 1 22	7 8 2 4	Manured with A. superphosphate, at the rate of 3 cwt. per acre, at a cost of 18s. per acre for manure.
"	2	Sutton's Golden Globe	34 10 3 24	7 13 0 5	
"	3	Sutton's Yellow Intermediate	25 8 1 17	7 16 0 7	
Nov. 25	4	Sutton's Mammoth Long Red	46 1 3 17	14 8 0 10	
Nov. 26	5	Sutton's Prize-winner	46 6 1 16	6 5 0 14	

#### *Fodder-crops.*

Six varieties of maize and sorghum were grown in plots ranging from  $\frac{1}{2}$  to  $\frac{1}{4}$  acre. The varieties of the former grown were Horse-tooth, Early Puritan, Round East Coast, and Ninety Day. Also sorghum, Imphee and Saccaratum.

All the varieties of maize did very well, and were cut for green feed during March and April, the Ninety Day giving a crop at the rate of 37 tons per acre, the fodder coming in at a very opportune time during the dry weather in autumn when no other fodder could be obtained.

None of the sorghums did very well; the seed did not germinate evenly, and the crop came very patchy.

In dairying districts it would always be a wise thing for every farmer to put in a few acres of maize. It is easy to grow enormous crops on small areas, and, besides being extremely useful as a green crop, it has the advantage of being an excellent crop for saving in the form of ensilage. It has also the further advantage that it can be handled for either purpose in any weather.

The rehandling of ensilage when it is being fed to stock is often looked on as

a serious drawback to the making of it, but as no great amount of material has to be moved at one time, the handling should be no great detriment. It is also considered a great merit in favour of maize ensilage that it will keep good in stack or silo for several years.

#### WERAROA.

At Weraroa (Mr. G. Ross) the points of the past year were as follows :—

##### *Oats.*

Some rust-resistant oats—viz., the Newmarket, the Dun, the Grey Winter, and the Black Winter—were obtained and sown in trial lots of 2 acres each. As this seed did not come to hand until rather late it was not altogether a success, the small birds destroying a large quantity. Of the four varieties, the Newmarket did by far the best. This oat has a nice clean straw, is entirely free from rust, and gives promise of a good yield.

##### *Hay.*

The hay-crop this season has been exceptionally good, one small paddock of less than 15 acres producing fully 55 tons of first-class hay. We also gathered about 45 tons from the young plantations.

##### *Potatoes.*

These are only a light crop. About 2 acres were planted; the bulk of these are still in the ground.

##### *Mangolds and Turnips.*

The mangolds and turnips are doing well, the former cropping very heavily, despite the dry weather which set in before they were well out of the ground.

##### *Maize.*

This was also a splendid crop, the growth being most luxuriant. Fed to the cattle in the green state it makes an excellent fodder, and they eat it readily. In this locality we find it expedient to make three sowings: the first about Christmas-time, the second about the beginning of January, and the third at the end of January. Thus, by the time the first sowing has arrived at the stage for cutting, and has been used up, the subsequent sowings come on in their turn. By sowing at this time and in this manner the crop is ready for feeding out to the stock at the time when the other feed is going off.

##### *Winter Food.*

As additional winter food we have some 3 acres of cabbages. These will be reserved mainly for the cows. Also a stack of ensilage, containing about 25 tons.

##### *Turpentine and Seed.*

A minor experiment with turnip-seed soaked in turpentine was conducted. This is a device employed by farmers to protect the seed from the ravages of small birds; but it has not been wholly successful, as they were afraid to leave the seed long enough in the turpentine. Some seed was placed in an enamelled iron vessel and covered with turpentine; this was covered to prevent evaporation. The seed was left to steep twenty-four hours; sufficient was then extracted to sow a small bed, and so on each succeeding twenty-four hours for eight days. Every sowing came freely in six days. The remainder of the seed—sufficient to sow two rows each about 40 yards long—was left in the vessel for eighty-five days, when all the turpentine had vanished, leaving the seed dry. This seed was sown alongside other seed not treated, and came up just as freely and simultaneously with the untreated seed.

#### VITICULTURE

The following particulars are extracted from the report of Signor Bragato, Viticulturist, for the year 1905 :—

##### *The Experimental Stations.*

The practical work of the Division at the experimental stations has been mainly in the direction of propagating American vines for resistant stocks, my aim being to establish all the vineyards in the colony upon a sound basis, and

free from the ravages of the dreaded phylloxera. This can only be done by grafting the European grape best suited to the district upon the American stock most adapted to the needs of the different varieties and localities. With this end in view nurseries have been established at the Waerenga Experimental Farm, in the Waikato, and at Arataki, in the Hawke's Bay District. The results of the experiments carried out with the different varieties at Waerenga, are set out below, and should be of great interest and practical utility to viticulturists.

*Waerenga.*

At this station a permanent vineyard of 13 acres has been planted during the last season with the principal varieties of American resistant vines. These for the present will be used as mother-plants for the supply of cuttings needed in the work of the Division and for distribution to growers. Later they will be grafted with the best European varieties of wine and table grapes. In addition to the above a nursery of 2 acres has been laid down, and a series of experiments carried out with the grafted cuttings of European stocks. The method adopted was the English whip-tongue grafting, and the results obtained are set out in the following table:—

European Scion.	American Stock.	Percentage successful.
• Black Hamburg ..	Mourvedre Rupestris .. ..	57
" ..	Solonis Robusta .. ..	27
Carbarnet Sauvignon	Mourvedre Rupestris .. ..	56
" ..	Rupestris Metallica .. ..	64
" ..	" du Lot .. ..	66
" ..	" St. George .. ..	39
" ..	" Mission .. ..	27
" ..	Riparia x Rupestris, 3306 .. ..	46
" ..	" x " 3309 .. ..	27
" ..	Riparia Grand Feuilles .. ..	61
" ..	" Grand Glabra .. ..	46
" ..	" Gloire de Montpellier .. ..	33
" ..	Berlandieri Riparia, No. 120A .. ..	44
" ..	Solonis Robusta .. ..	46
Claret Blanche ..	Rupestris du Lot .. ..	47
Hermitage ..	Mourvedre Rupestris .. ..	62
" ..	Rupestris St. George .. ..	32
" ..	" Mission .. ..	56
" ..	Riparia x Rupestris, No. 3309 .. ..	22
" ..	" x " No. 3306 .. ..	60
" ..	" x " No. 1014 .. ..	62
La Folle ..	Mourvedre Rupestris .. ..	47
" ..	Rupestris St. George .. ..	36
" ..	Solonis Robusta .. ..	36
Malbec ..	Riparia x Rupestris, No. 3306 .. ..	44
Muscat of Alexandria	Rupestris du Lot .. ..	13
Pineau Meunier ..	" St. George .. ..	51
" ..	" Mission .. ..	45
" ..	Riparia Gloire de Montpellier .. ..	42
Pineau Noir ..	Riparia x Rupestris, No. 3306 .. ..	58

By means of these experiments we were enabled to ascertain the degree of affinity between the various European scions and the American stocks, and, further, which varieties of stocks and scions were best adapted to the climatic conditions obtaining here. Altogether, these operations were carried out under great difficulties. No proper glass-house was available for the necessary callousing of the grafted cuttings, while the cuttings obtained from Australia were of poor wood, ill-nourished, and had become slightly heated in transmission. Still, in the face of these drawbacks, the percentages of successful striking obtained compare favourably with the results shown in Europe. The table of results should prove an invaluable guide to intending planters, and it is my intention to continue these experiments on an extended scale during the coming season, so that the

Division may be in a position to supply growers with vines of the finest and most profitable European varieties, suited to the different localities, and grafted upon the best American stocks.

*Cellar-work.*—The cellars at Waerenga contain at present 3,000 gallons of wine of 1902-3-4 vintages, and to this quantity must be added the vintage for the past season, the amount of which will be determined after the first racking. Most of the wine is ready for consumption, and, if placed on the market during the coming year, would realise a considerable sum of money. The amount obtained from the sale of this wine would repay practically the whole of the expenditure upon the Waerenga Vineyard and cellars since my appointment, and there would still remain to the country a valuable asset in the shape of a splendid vineyard of 18 acres, a nursery of 2 acres, and a modern cellar fitted with proper appliances and an up-to-date wine-making plant.

#### *Arutaki Experimental Station.*

Since my report upon this station last year considerable improvements and additions have been made. There is now a permanent vineyard of 10 acres planted with those varieties of wine and table grapes best adapted to the district. The land has been laid out in four divisions—(1) the permanent vineyard; (2) a large area planted with American vines for the future supply of cuttings; (3) a nursery for rooted plants; (4) beds for planting grafted cuttings in.

It is proposed to extend the nursery to 8 acres during the coming season, and in view of the importance of this work, constituting as it does our chief supply of cuttings and rooted vines for the future, I would point out the necessity of an increased water-supply for irrigation purposes. Seeing, too, the large amount of grafting which will be carried out, it will be necessary to erect here also two small houses for callousing the grafted cuttings, and this work is essential if propagation is to be economically and successfully undertaken. A large number of rooted American vines and cuttings will be available for distribution from this station during the coming season.

The station under the able care of Mr. S. F. Anderson shows good progress, and promises well for the future. It is, of course, in an embryonic condition as yet, but even as it stands is a valuable object-lesson to the settlers in the Hawke's Bay District in the proper preparation and planting of a successful vineyard. The vines are in a healthy and vigorous condition, displaying a very even growth. A large amount of preparatory work has been carried out, the land being nearly all drained; roads have been formed, shelter has been planted, the whole has been well fenced, and a manager's house will shortly be erected.

#### GRASSES AND GRASSING.

The following paper was read by Mr. J. G. Wilson at the Seventh Conference of the Agricultural Societies, held in Wellington during July, 1905:—

I do not propose to do more than give a general and discursive short address on grass and forage plants, leaving to text books, of which there are many, to give an account of the different varieties. At one time in the colony those laying down pastures generally contemplated leaving them down permanently, and the permanence of the grasses sown was of much consequence. Especially so was this in the bush districts, where it seemed incredible that they would ever be broken up. And it would seem to be the experience of most settlers who have broken up bush land that the first sowing gave as a result the best and closest sward. But the frozen-meat trade has greatly altered the system of working sheep properties, especially when the low price of wool made it imperative that breeders should supplement their income from wool by trying some more profitable system than had been in vogue. This was found in rearing and fattening lambs for export; and to get the best results it was necessary to grow rape and turnips, and to do this much bush land, which had been previously in permanent grass, was broken up. In other parts of the country, where the breeding was done in the higher country and the fattening completed in the lower country, the increase of arable land was considerable. A rough system of rotation was adopted to suit the altered conditions, and temporary pastures (or "seeds," as they are called at Home) have become more common.

1.

2.

3.

4.

5.



WAERENGA EXPERIMENTAL STATION.—THE NURSERY, WITH STABLES TO LEFT, RESIDENCE AND WINE-CELLAR IN BACKGROUND.

*Immigrants' Guide.*

It is obvious that grasses suitable for temporary pasture may not be suitable where permanency is required; and the first thing necessary is to distinguish the value of a grass from this point of view.

The second distinction is their coarseness or finer qualities, their early or late growth, and perhaps their suitability to withstand heat or cold, whether they come to profit the first or subsequent years.

A number of other differences which may have an important bearing on the value of grasses are whether there is ample growth of leaf, late seeding, whether the grass is inclined to grow a small quantity of leaf and go to seed early, whether the seed-stalk is eaten or rejected by animals.

Besides this, much depends (whether a grass is suitable or not to be sown) on the quality and condition of the soil and the humidity or dryness of the climate, the elevation at which the grass is expected to grow, the class of stock to be grazed, and, perhaps I might add, the prejudices of the sower—for farmers often allow their prejudices to stand in the way of profitable seeding—whether it is deep or shallow rooted.

Some grasses are more suitable than others for hay, and where hay is grown the quality and quantity of the aftermath is often of importance.

If we go back to the older countries for information we do not get much help. When last at Home, one of the disappointments I had was the condition of the pastures and lawns. In many instances the paddocks which had been down longest were nothing but an unsightly mass of uneaten bents of some of the agrostic tribe, and the lawns (one of which was a far-famed lawn of one of the colleges at Oxford, the rolling and the mowing of which is proverbial) were a mass of weeds.

In many parts of England and Scotland the oldest pastures, far-famed for their feeding qualities, are let year by year. There is almost no record of when or how these pastures were laid down. The tradition is that it takes one hundred years to make a permanent pasture. They are frequently limed and manured, and very little even is known of their constituent grasses. They are fed down hard by the tenants, and the grass rarely allowed to go to seed. An interesting investigation of some of these noted pastures was made by Mr. Carruthers, Botanist to the Royal Agricultural Society, and it was shown by him that the best fattening paddocks which he examined (I was told by a tenant of some of the land it would fatten a bullock to the acre) was found to consist mostly of the worthless grass—squirrel tail or wild barley grass. It is obvious, therefore, that not much information as to the qualities of the different grasses is to be gained by the experience of others under different conditions and climate. Mr. Carruthers's remarks about these old pastures are worth recording (from memory): "This is no evidence of the feeding qualities of squirrel tail, but only a confirmation of what has long been known, that the quality of the land on which the grass is sown has a great deal to do with its feeding value." The feeding qualities of this particular instance (The Vale of the Parret, in Somerset) only shows that if the grass consisted of the better varieties, the results would be more satisfactory still.

Yet the advent of one grass, ryegrass, in England marked a distinct improvement in the profits of grazing. Not so much as the introduction of turnips, but still an appreciative quantity. And the introduction of Italian ryegrass was looked upon as another era. But, save in the irrigated meadows, Italian has not made much difference.

When we know how complex this subject is, does it not make us more and more diffident in offering our opinion? And perhaps that is the reason why those farmers who are so chary of giving their experience to the world are generally those whose opinion—when you can get it—is most valued. Lord Melbourne said of Lord John Russell, "I wish I was as cocksure of anything as he is of everything." And I am afraid it is only when one is young that one is sufficiently cocksure of anything to dogmatise. We can, however, discuss the qualities which are most desirable in grasses for the various purposes.

If you take grazing first—and it is by far the most important use we have for grasses—the most desirable qualities are—(1) That they should come early; (2) that they should continue to grow through the season before it goes to seed; and (3) during its growth that it should grow a large quantity of leafage, for the leaves are what in most grasses the stock feed upon; (4) when they have seeded, that stock should eat the heads. These qualities are most obvious in the deeper-rooted large grasses, which form the bulk of our pastures. They are, however, apt to be tufty, and therefore the finer grasses are sown to fill up what would otherwise be bare. Ryegrass is grown perhaps more than any of the



larger grasses. It is the most popular, and is generally looked upon as the best grass to sow, if the land is suitable. There is, however, very little land which is entirely suitable in New Zealand. There has been much discussion as to its quality, some saying that it is a worthless weed, whilst others consider it is of great value.

Some say it is not a permanent grass, whilst others say it is. The grower's opinion, however, is guided by where the grass has been sown. In deep-bottom lands of a strong nature ryegrass seems to hold permanently, but almost anywhere else, after the first year, it seems to be ousted by other grasses. Being a very gross feeder, and with shallow roots, it soon exhausts all the available plant-food in the top soil, and after that dwindles, and often apparently disappears; but a top dressing of manure soon shows that it only requires fresh plant-food to recuperate it again. Some soils are able to give up a continuous supply of plant-food, and only these can be said to be ryegrass soils.

One very objectionable property ryegrass has. It has frequently been said that ryegrass is not permanent unless the seed is grown upon old pastures—that first year's seed is not permanent. A settler I knew, who grew different grass-seeds for sale, sowed ryegrass, and cut it for seed the first year, and had a 20-bushel crop. But the plant entirely died out. He attributed it to being annual.

I think we must look for some other explanation than this. Mr. Buchanan, in his manual of indigenous grass, supplies this in speaking of *Triticum scabrum*: "The species of *Triticum* are considered as annuals in New Zealand, but this must be accepted with a reservation, as it is doubtful if a true annual grass exists in these Islands. The cool and moist climate of many inland localities, enabling grasses to maintain a continuous growth without the amount of heat which is at all times necessary to ripen seed the first year, is probably the explanation for this idea; for there certainly exists an inherent tendency in many grasses to flower and seed at an early stage of their growth, and before stoles are thrown out from the roots. In such cases the plant is exhausted and dies, and may be considered as an annual, although the species may be continued on the same ground from shaken seed. This is undoubtedly the theory of certain supposed perennial grasses, such as *Lolium perenne*, sometimes annual, and such grasses can only be secured as a perennial by cutting or grazing down the flowering stems for one or more years, till each seedling plant has thrown out numerous stoles from the root before ripening any seed, by which time a thick, close sward has been formed. Some grasses, again, such as *Dactylis glomerata*, require no such attention, possessing, as they do, an inherent tendency to delay the process of flowering and seeding for some years, by which time each seed has formed a small tussock, and, by confluence, a close sward, thus proving a true perennial grass."

This, I think, must be the true explanation of why ryegrass is sometimes considered an annual. But where the soil is rich deep loam, and the climate moist, it must be considered perennial.

In some parts of New Zealand, however, the ryegrass dies out very rapidly, and is often replaced by native grasses. It is an early seeder if not kept closely cropped by stock, and when it goes to seed stock reject it in favour of other grasses.

Timothy is peculiarly a cattle grass, and is only successful when grown on heavy soil, with a good deal of moisture available. This grass seems to have gone out of favour, which is probably accounted for by the fact that at the base of the seed-stalk it has a bulb-like growth, and if fed down closely by sheep is apt to be killed by the sheep injuring it. Americans seem to set great store by this grass, but it is now not much grown here. It seems to grow a small quantity of leaf even when growing vigorously; and although the latest grass to go to seed, and in large quantities, and therefore cheaply grown, it can scarcely be recommended, especially for hill land, although it might be successful on the deeper lands of the colony in dairying districts. The hay made from this grass is said to be of high nutritive value.

Meadow foxtail has perhaps all the best qualities that we could look for in a grass, but it is not suitable for upland sowing. Where the soil is deep and moist, it is perhaps the most valuable grass we have. It takes quite three years to come to its best, and often the first year is almost unobserved; but when it does sward it forms a most nutritious and succulent pasture, liked by all stock, and in land that might be subject to flood can be covered by water several days without loss. It is the earliest seeder we have. I have seen seed-stalks showing up in late August and early September; but this habit is no detriment, for stock eat the head with avidity.

Now that the seed of this grass is freely grown in the colony, there is not much

difficulty in getting seed of good germinative quality. The imported seed was very disappointing in this respect.

Cocksfoot (*Dactylis glomerata*) is the most common grass in New Zealand. It seems to be like the merino sheep—can be grown in hot or cold climates with almost equal success. It grows a great deal of leaf, and is therefore very suitable for grazing; but if allowed to grow tufty, the side shoots are rather easily pulled out by grazing stock, and late frosts seem to do considerable damage to the young shoots. Many have great objection to this grass, as lambs are said not to be so easily reared on it as on less vigorous grasses. But if it is carefully stocked, and forms with other grasses a close sward, it stands stocking very heavily. In many of the bush hills of New Zealand it forms the principal grass. But its excessive growth in spring makes it very difficult to stock properly, and when it grows rank it is not easily dealt with. Stock are, however, fond of the heads, and readily eat them. On limestone land the grass seems much more palatable than when grown on clays. But with all its drawbacks, it is perhaps the most useful grass we have.

Meadow fescue does not seem to be much grown in New Zealand, and not so much now as it was a few years ago. But it is a very palatable grass, and well liked by stock. The tall fescue, which has overrun some of the richer swamp lands in New Zealand, has become such a pest that farmers have in many cases to grub it out, as it grows almost like toi toi in some of these lands. When grown on the colder clays, although it sometimes has an objectionable tufty habit, it succeeds very well, and no one need be afraid of growing it on such lands. In swamps or on rich alluvial lands it should never be grown.

These form the larger grasses, but mention should be made of Italian rye as one of the most useful grasses we have. It is at most biennial, but of stock it has great fattening qualities, and as a nurse to clover cannot be beaten.

To make a permanent pasture of all or any of these grasses would, however, be far from wise, and they should all be sown together with some of the finer grasses which are most suitable to the soil and climate. Many think for this purpose that crested dogtail is one of the best grasses, and if closely cropped by sheep it does make the sward much closer; but its inveterate habit of growing innumerable seed-stalks, which stock are unable to eat, owing to the toughness of the straw and the harshness of the seed head, cause it (especially so in clay lands) to take almost entire possession of the ground.

Of the poas we have little experience in the colony, except for the *Poa pratensis*, which is looked upon by agriculturists as little better than twitch grass. In arable land it is very objectionable. If you can get a true sample of *Poa trivialis* or *memoralis*, they do very well in bush country, and are well liked by those who have grown them.

Of the smaller fescues it is difficult to offer an opinion, but hard fescue is admirably adapted for upland sowing, as sheep are fond of it.

I have no intention of offering any suggestion as to mixtures. The only true way to find out which grasses suit the land best is to observe what one's neighbours are doing, and profit by their mistakes; yet never discard a grass until tried in the district where it is to be grown on similar land.

At a time when special attention is being directed to the regrassing of runs, I might add a few words re native grasses. On the authority of Mr. James McKerrow, who, perhaps, is better able to judge than any other man, it is said that the Crown runs in the South Island are not so well grassed as they were, and as a consequence are not carrying the same number of sheep. The Land Commission has taken some pains to ascertain if any of the runs have been re-sown, and with what success.

Where the land is suitable, cocksfoot seems to gain a hold, but for any systematic regrassing, experiments will have to be made as to which grasses are the most suitable. The late Mr. Scobie Mackenzie (Kyeburn Station) was very much interested in the subject, and just before his death I sent him a bag of seed of the *Danthonia pilosa* to try. I am told that where it was sown it took very well, and the manager said stock and rabbits were very fond of grazing on it. In a letter dated 20th May, 1899, Mr. Mackenzie said, "I had a paddock of about 20 acres at the back of the house, which was ploughed and sown with English grasses twenty years ago. In course of time every blade died out—even cocksfoot—and the paddock gradually got covered with a little wiry blue-looking grass, which Mr. George Thompson, of the High School, Dunedin, called '*Atropis pusilla*,' and I think it is allied to the *Danthonias*, or is a dwarf variety of what we call blue tussock grass of the mountain."

The other grass is a curious little bronze-coloured tufty low-growing grass. Thompson calls it *Poa mackayi*.

I have been told that cocksfoot and white clover has succeeded very well on McDonald Downs, in Canterbury, on very high country.

I was told that the sowing of the Kyeburn Station had increased the carrying capacity, and been a success. In the early days of Hawke's Bay, most sheep-farmers had large experience in fern-crushing. They burnt the fern, sowed English grasses, and kept sheep in large quantities on the land to eat the young fern out when it came up. This they did effectually, but it is needless to say that fern-crushers were not in demand after the process was finished.

When the seasons are moist and favourable the imported grasses do well; but when drought comes, and the stock eat the paddocks bare, they are easily killed, and sometimes replaced by native grasses. Especially is this the case when the country is much burnt. The *Danthonias*, which usually spread in such cases, are wonderful fire-carriers, and as a result large stretches of country are sometimes burnt, and the English grasses suffer; but it seems to suit the *Danthonias*, for they make a fresh spurt. As a consequence, in some districts in Hawke's Bay the land is not carrying the stock as well as it did. Where merino sheep are carried they do well on these native grasses, but the long-woolled sheep do not seem to thrive so well.

This fire-carrying of the *Danthonias* is taken advantage of on some runs which have scrub growing on them. The scrub is burnt and *Danthonia* sown. After, say, three years, the scrub has come up again, but the native grass has spread amongst it, and it is burnt again. This time the native grass gets a little better hold, and the process is repeated until the grass gets the better of the scrub. Some owners object to this process strongly. Their mode of dealing with such land is to fall the scrub and burn it about six weeks after falling, sow it with English grasses, and they get a good result for a few years, till the scrub again takes possession; then they consider it will pay to fall again.

Of course, there are many factors to take into consideration as to which process is best, but it is certain that, however valuable the *Danthonias* are on poor clay lands, imported grasses are much better feeders.

Still, there is a considerable area of country where to get any grass to grow is satisfactory—even the much-despised Yorkshire fog. And in such a country the native grasses, especially the *Danthonias*, are well worth a trial. It would be well for Government to take some run in the South in hand, and experiment with the different grasses as to which is best for the purpose.

The same feature is found in America, and in the United States the Department of Agriculture has published a leaflet entitled, "The Renewing of Worn-out Native Prairie Pastures." They give as a reason for the giving-out of the pastures "drought and overstocking," and on upland they recommend Kentucky blue grass, sheep's fescue, red fescue, and Canadian blue grass. "The fescues are especially valuable if the soil be sandy."

It might be worth while to try some of these. The *Poa pratensis*, although it is looked upon as a weed in our arable land, might do excellently for some of the runs. The United States Department seem to collect information as to which grasses suit the different districts best, and it seems that there, too, the growth of native grasses is recommended. And *Bromus inermis*, a grass imported from Russia, is said to give very good results.

Grasses take the whole of their nutriment from the land, so far as we yet know. Clovers, alfalfa, and leguminous crops generally are able, by the action of certain bacteria, to utilise the free nitrogen of the air.

Wherever they succeed, therefore, it must be beneficial to sow clovers. They perhaps come under the heading of forage crops.

I remember, when I first took up land in the North Island in 1873, white clover had been spread all over the country by the cattle, and such places as were clear of native growth and fern in the spring were a great sight to one who had come from Victoria, where such a growth would have been phenomenal; but the sheep with which I stocked up seemed very soon to keep the clover down. Every few years, however, yet, although I have not sown much white clover, it seems to be a clover year, and when in flower the paddocks look white with bloom if they have been spelled. I have never been able to account for some years being better than others for its growth.

Alsike and red clover, when the land is of a strong nature and drained, do very well with us, and although not so fattening as rape, they are excellent feed for lambs. Much clover-seed has been grown in New Zealand, but Californian thistle

has become so prevalent that buyers are chary of buying it. It would seem that the kind of clover generally grown is scarcely like either cow grass or red clover, and may be a cross between these two. Although I have never come across a case of clover sickness in New Zealand, yet it is unwise not to recognise that in older countries this exists from some cause or other, and clover should not be grown again by itself, or with Italian ryegrass for seed or hay, unless after a considerable interval, on the same land.

Most of the clovers grow best on the soils with plenty of lime in their constituents, and for lucerne, an ally of theirs, it is especially necessary. Lucerne-growing has never caught on in New Zealand, but in America and parts of Australia it has been of immense benefit for stock. Its extraordinary depth of root gives it great power to resist drought. I have known it to go down 20 ft. It succeeds best in a dry climate, on deep alluvial land, where it can be cut several times in succession. It is certainly weakened by grazing, unless great care is exercised.

There are many other forage plants which have been tried, but in New Zealand there are so many climates, that what succeeds in one district fails in another. For instance, *Paspalum dilatatum* is said to be completely successful in the warm north, and to be of little benefit in the colder latitudes. Many forage plants not in general use have been recommended by Mr. Elliot, of Clifton Park, for renovating old lands. When he lays a paddock down, he sows chicory, burnet, and other deep-rooted plants. These, he says, extract their nourishment from the lower soil, and bring it up to the surface much in the same way worms do. He claims to have been completely successful in renovating exhausted paddocks; and we have all seen that thistles, after they have dried off, seem to have this effect on grass.

Mr. Kirk informs me that he has at last got a really good collection of grasses sown in plots, so that careful observations can be made of how each one suits our soil and climate.

The following interesting discussion of most practical character took place upon the completion of the reading of the paper:—

Mr. Grigg said it had been established that clover sickness, so-called, was really a fungus disease, and consequently it could be dealt with. In England the rule was one clover sward in seven years; but one of the things that most surprised his father, on coming to New Zealand, was to find clover growing for seven years consecutively.

Mr. Matthews said it was necessary to be very careful what was sown in poor ground. Some years ago he sowed a mixture of grasses, and by-and-by florin sprang up, and got absolute possession of the land.

Mr. T. W. Adams believed in timothy as a late grass.

Mr. Teschemaker said he was surprised to hear Mr. Grigg stand up for *Poa pratensis*, because it would not give anything like the quality of feed that other grasses would give. As for growing grasses on the high runs, a great many people overstocked their properties in dry seasons, not giving the grasses time to recover. He had had thousands of acres of white clover and cocksfoot by planting along the rivers. He suggested the use of cowgrass, which he had known to last for eight or nine years, and still bring up good shoots.

Mr. Overton said he was woefully disappointed with the pastures in Great Britain, of which he had read so much. Up to a certain time sheep would certainly eat the heads of ryegrass, and do pretty well on them. In his experience the only two grasses worth growing were meadow fescue and Italian ryegrass, the latter his favourite grass. He had been over some of the despised Kaipara country, and, to his astonishment, found some of the barest hills covered with *Danthonia*, and he was told that by a careful system of burning the grass in the autumn they were able to carry nearly two sheep to the acre.

Mr. Coleman said the only method to find out for each district was by actual test.

Mr. Clifton, Chief Inspector of Stock at Auckland, advised farmers to keep little control plots of grass, so that they would be able to recognise the grasses in the pastures if they came up. At Ruakura he had fifty-six such control plots of grasses. He would like to see *Danthonia* used on the hills in Otago. A man in the Auckland Province, who had been endeavouring twelve years ago to eradicate *Danthonia*, had told him the other day that it was making his living. A good deal of attention had been paid in the north to *Paspalum dilatatum*, which,

curiously enough, proved its worth there on dry and poor lands. He had put in some chicory, which provided a great mass of feed of which sheep were fond, and sheep's burnet, which was growing very well, but in pasture was eaten down by the sheep at once.

Mr. Robert Reid said he had seen a very simple experiment this year. A grass paddock had been down eight or nine years, and Yorkshire fog predominated. They had a very moist season, and as a result there was not a sign of fog in the track of the superphosphates, while the clover had grown 9 in. or 10 in.

Mr. Perry (Woodville) agreed that sheep grazing year after year had a great deal to do with the eating-out of pastures. In Woodville, cocksfoot was the chief grass, most farmers never having given ryegrass a trial by itself. They sowed 4 lb. or 5 lb. of rye to the rest cocksfoot. The second year there was a crop of thistles, and the third year only cocksfoot was left. A grub went through in the third year and seemed to destroy all the vegetation. He had sown a paddock of 200 acres in cocksfoot. It recovered after the third year, and went on, and now was a splendid pasture, carrying stock better than any other paddock he had. Overstocking was the ruin of most farmers—(Hear, hear.)—One farmer he knew carried two and a half sheep to the acre, and to day his pasture was all pipiriri, and would scarcely carry one sheep.

Mr. Ritchie said he had noticed some of the runs Mr. Pattullo referred to. On a run where cocksfoot was sown on the back faces it was gradually spreading right over, and there was a good sward. In a few years it would be thickly grassed. Mr. Pattullo went in for Chewing's fescue, which was very suitable for large areas of high country. The Waikato people were not sowing sufficient of it. In Otago, two years ago, he saw a magnificent crop of crested dogtail. The snow was 2 ft. deep, and the sheep were penned in on tall patches, yet there was a magnificent sward at Christmas-time. He had been urging on the Minister for some time the necessity of grassing Crown lands, and was glad to see the Land Commission had reported in that direction. Large quantities of seed were being thrown away. He limited the grasses himself to cocksfoot, with a little crested dogtail and some clovers, using pure timothy for the bottom of the gullies. As a result, cocksfoot was the main grass, but crested dogtail was showing all over. Cocksfoot was the chief stand-by on the drier and harder ridges. If they used sufficient cocksfoot in sowing down clay lands—say, 35 lb. for virgin land—they would get a close sward, with a lot of feed on it. Continuous stocking, particularly with cattle, as on the West Coast and in Taranaki, made it impossible to renew the grasses, and the pastures could only be maintained by dint of judicious manuring. Most of the dairy-farmers would have to face this question. As for Crown lands, they would lose for some years, but it would pay eventually. He would take good care proper and pure seed was furnished to the tenants.

Mr. Teschemaker: Extend the leases, and it will be done.

Mr. Rutherford said one of the great advantages of *Danthonia* was that, if carefully attended to, it would spread over the country without sowing, and it would stand burning well—they could, by running a fire through it, get rid of it-tree. In the poor lands of Auckland it had spread very quickly during the last few years. They had only *Danthonia* on Waiheke Island, and on four different occasions the wool from there had topped the market. They had no turnips or artificial feeding. Another grass he had seen grown very successfully on poor country was *Paspalum dilatatum*, from which satisfactory results had been obtained under favourable conditions.

#### TUBERCULOSIS IN ITS RELATION TO THE STOCKOWNER.

[By J. A. GILRUTH, M.R.C.V.S., Chief Veterinarian.]

As tuberculosis, in so far as that disease affects human beings, is to day receiving the utmost attention throughout New Zealand, in common with other parts of the civilised world, and money, not only from the public purse, but from the majority of private individuals, is being freely and beneficially spent in the treatment and prevention of consumption, it becomes incumbent on the farmers of the colony to seriously consider their position, and in how far they, as stockowners, are, or may be, liable as contributors to the spread of the "white plague."

It cannot be denied that human consumption (or tuberculosis of the lungs) is by far the most prevalent form of this deadly disease, and that this is almost invariably contracted by contact with persons already suffering. As you are

aware, it is not necessary that the contact should be immediate, the contamination of rooms, &c., permitting the retention of the disease germs until a fitting fresh host be introduced. But that phase of the spread of tuberculosis it is not my function to deal with, and, in any case, if any intelligent individual in this colony is not already aware of its salient points, he must be woefully ignorant.

Since consumption was proved to be a contagious disease, much advancement has been made in its treatment, control, and prevention.

By preventive measures, which consist chiefly of fresh air, cleanliness, and hygiene, combined with the intelligent assistance of patients who are made aware of the danger of their germ-laden spit, the annual mortality from consumption has been considerably reduced. There is, therefore, a decided diminution in that form of the disease (pulmonary consumption), which is undoubtedly due to infection or contagion between one human being and another.

There is, however, quite another phase of tuberculosis—viz., abdominal consumption, which chiefly occurs in children, and in which the germs indubitably gain entrance to the tissues through the intestines, in contradistinction to the lung form of tuberculosis, in which the disease germs are inhaled in a dry state generally along with particles of dust, &c. Yet, in spite of all the endeavours of sanitarians, the improvements in sanitary conditions, and the general dissemination of knowledge, so effectual in the latter form, the disease in children under five years of age in many places remains stationary, and in not a few appears to be on the increase.

That consumption of the lungs is caused by the inhalation of dried spit containing the bacillus tuberculosis is accepted. It appears obvious, and is undoubtedly the case, that consumption of the bowels, or other organs of the abdomen, is equally due to the entrance of the microbe by the food channel. What is therefore the source of the infection, in that case, and why should not the efforts which have proved so successful in arresting the spread of the one form of the disease appear to fail in the other, as is shown by the fact that between the periods 1851 and 1895, in England and Wales, the mortality from abdominal tuberculosis in children under a year old had increased 27 per cent. ?

#### *Koch's Theory.*

Doubtless you all recollect the sensation produced four years ago by the statement of the great Professor Koch, that tuberculosis of man differed from tuberculosis of cattle, and that to all intents and purposes there was no danger to be apprehended from the flesh or milk of tuberculous animals. Koch was admittedly the greatest living authority on tuberculosis. He it was who first succeeded in cultivating the bacillus artificially outside the living body, and by experiments demonstrated it to be the true and only cause of tuberculosis. He it was who discovered tuberculin, that almost infallible diagnostic agent of the disease; although it is only fair to state that the discovery of its true value is not to his credit, he having claimed for it a curative power, which further evidence compelled him to abandon.

During the twenty years that had passed since the discovery of the tubercle bacillus by Koch, no one had seriously questioned the identity of human and animal tuberculosis (with the exception of fowl tuberculosis), and no one had doubted the possibility of contracting the disease from certain products of tuberculous cattle. You can imagine, therefore, that when the unexpected happened, and Dr. Koch jettisoned a great part of his previous cargo, it was almost impossible at the moment to contradict him. True, it had been previously observed that the bacillus from human cases was very often less virulent for cattle than the bacillus from bovine cases; but against this it was easily shown that the bovine bacillus was more virulent for all other animals than the human, and therefore, although not provable by experiment, it was reasonable to conclude, more virulent for the human being also.

Since the date of Koch's last scientific bombshell, a large number of experiments and observations have been made, and before dealing with the question of the disease amongst the herds in the colony, I trust a brief *résumé* will not prove uninteresting.

Koch stated distinctly the human disease could not be transferred to cattle, although the experiments he quoted gave, on the whole, what he and Schutz considered practically negative results, yet other investigators have not had similar results with their experiments.

*Royal Commission.*

The experiments made by Sidney Martin for the British Royal Commission on Tuberculosis, while demonstrating the comparative weakness of the human bacillus so far as cattle was concerned, did not bear out Koch's definite conclusion. Of six calves fed with tubercular sputum, two showed *post mortem* no lesions, but the others had tubercular nodules in the intestines varying in number from thirteen to sixty-three, while in one case the mesenteric glands were also affected.

*Chauveau.*

The experiments of Chauveau, conducted previous to this, were more satisfactory. Three cattle were fed with human tubercular material (being an emulsion from a diseased lung), three were fed with bovine tubercular material, and three were held as controls. These animals, when slaughtered for autopsy, after the lapse of from four to nine weeks, with the exception of the controls, which were free of disease, all showed infection in varying degree; but it was impossible to distinguish any difference between the animals fed on human and those fed on bovine material.

Cruikshank, Delepine, and others have also shown before and since that it is quite possible to transmit tuberculosis to the bovine species from the human patient; while De Jong, and Pearson, and Ravenal have shown that the bacilli increase in virulence by passing through calves. Delepine, besides, states that he has been able to obtain from man bacilli just as virulent for bovines as the bovine bacilli.

*Bang, of Copenhagen.*

Even instances in which animals have become naturally infected through the agency of tubercular attendants are not wanting. Professor Bang, of Copenhagen, cites an instance in which the cows on a farm where tuberculosis had never been seen became diseased through a phthisical attendant, who was in the habit of spitting on the fodder. He records a similar case on another farm, and also an instance of the infection of pigs, the sources being similar—viz., tubercular attendants who were in the habit of spitting on the animals' food and about the premises.

*Cozette's Case.*

Cozette's case is extremely interesting. On a dairy farm where tuberculosis had never made its appearance among the cows up till 1883, an attendant was employed who was suffering from phthisis. This man slept in the loft above the cows, and was in the habit of spitting over the edge into the manger underneath. In 1886 the two cows immediately below his "bed" fell ill, were slaughtered, and found to be extensively tubercular. Later on, gradually, one by one, all the cows in the same row showed indications of disease, were taken to a slaughterhouse, and found to be tubercular. In 1892 the herd of twenty was tested by the tuberculin method, when seven reacted, and on slaughter were found to be diseased. The curious point is that these seven were all in the same row—that is, the one in which the first two cows were found. The other twelve cows, in a different row of stalls, were healthy, none reacting to the test.

A large number of experiments made during the past few years by distinguished investigators throughout Europe and America have proved absolutely that different bacilli, isolated from different cases of human tuberculosis, are far from being possessed of the same degree of virulence for the lower animal, including cattle, and further, that bacilli can be isolated from human cases which are just as virulent for cattle as the most virulent bovine bacillus. Moreover, the indications are strong to the effect that the type of those bacilli which are most virulent for the ox are most frequently to be found in human cases, chiefly in children, where infection was evidently received by way of the digestive tract—in other words, through the food supply.

Fibiger and Jensen made a number of interesting experiments on cattle from ten cases of human tuberculosis, the ages of the people affected being ninety-two years, forty-two years, forty years, twelve years, eleven years, seven years, six years, three years and a half, nineteen months, and four months. The results proved that of the bacilli isolated from the four adults, only one, that from a man forty years old, who died of intestinal tuberculosis, was capable of causing generalised tuberculosis in cattle, the other three being of little or no virulence. On the contrary, from four of the six children bacilli were secured which exhibited great virulence for cattle, and these were all from cases of primary infection of the intestine, indicating food as the vehicle of the disease.

The German Commission appointed to inquire into the statements made by Koch reported on thirty-nine cultures isolated from various cases of human tuberculosis. Of these, nineteen showed no virulence for cattle, sixteen produced only slight lesions, and the remaining four proved very virulent for calves, the important point being that these four virulent cultures were all obtained from children.

All experimenters have conclusively proved that human tuberculosis may be transmitted to asses, sheep, goats, hogs, and especially to cattle, so that Koch's affirmation that human tuberculosis could not be transmitted to cattle has been absolutely and repeatedly disproved.

In a recent bulletin of the Bureau of Animal Industry, United States, Schweinitz, Dorset, and Schroeder, in detailed experiments, prove that of three bacilli isolated from cases of tuberculosis in children, two proved quite as virulent for pigs as bacilli isolated from cases in cattle.

Eight calves were injected intravenously by the same investigators with as many different cultures of human bacilli, three being from cases in children, and five from adults. Two of the eight cultures produced a fatal generalised tuberculosis, and both of these were derived from children, and these were quite as virulent for calves (and we have seen they were also as virulent for pigs) as cultures of virulent bovine bacilli. Even after injection subcutaneously with these same bacilli, calves were found to develop generalised tuberculosis, while the others, by intravenous inoculation, were proved to possess less virulence in varying degrees down to complete innocuity, thus again establishing the extreme variability of the tubercle bacillus from the standpoint of virulence.

Subcutaneous and intravenous inoculation alike of each of the bacilli isolated from three cases of infantile tuberculosis proved virulent for cattle, while another proved of little virulence. The bacilli isolated from five human adults all, on the contrary, showed comparatively little virulence, some none at all. The experimenters, therefore, affirm "that tubercle bacilli of various degrees of virulence for cattle may be obtained from human sources, some quite as virulent as the tubercle bacilli of bovine origin, and others less so"!

"Mohler, working in the Pathological Division, Bureau of Animal Industry, has obtained three very virulent cultures of tubercle bacilli from the human subject. A goat, inoculated subcutaneously with one of these cultures, died in thirty-seven days with miliary tuberculosis of the lungs, involving the axillary and prescapular glands. Of still greater interest is a bacillus isolated by Mohler from human sputum. A goat, inoculated subcutaneously with a culture of this germ, died in ninety-five days of generalised tuberculosis. A rabbit, similarly inoculated, died in fifty-nine days of pulmonary tuberculosis. A cat, inoculated in the same manner, died in twenty-three days of generalised tuberculosis.

"Another rabbit, inoculated with a bovine culture for comparison, lived ten days longer than the rabbit inoculated with the sputum germ. Mohler also inoculated subcutaneously a one-year-old heifer with a culture derived from the tubercular mesenteric gland of a boy four years of age. This culture was always refractory in its growth under artificial conditions, and the bacilli were short, stubby rods, corresponding in appearance with the bovine type.

"At the autopsy, held 127 days after the inoculation, the general condition was seen to be poor and unthrifty, and large hard tumours were found at the points of inoculation. On the right side, the swelling measured  $3\frac{1}{2}$  in. by 5 in., and the corresponding lymph gland was  $2\frac{1}{2}$  in. long by  $1\frac{1}{2}$  in. in diameter.

"This gland contained numerous calcareous foci; one of these, at the apex, was an inch in diameter. The lesions on the left shoulder of the animal were very similar to those found on the right side, but the dimensions of the tumour were slightly less. The lungs presented an irregular mass of tubercular nodules, and seven or eight grape-like nodules were seen on the parietal-pleura. Bronchial and mediastinal lymph glands contained numerous tubercular foci, and the pericardium, peritoneum, spleen, and liver were also affected."

#### *Clausen's Cases in Pigs.*

Clausen, an Inspector of Slaughterhouses in Germany, found that pigs fed at the hospital and poorhouse were more or less tubercular, while pigs of the same breed fed elsewhere were healthy. Investigation discovered that the refuse from the hospital (in which there were a number of cases of human consumption) was fed to the pigs daily. This was forbidden, with the result that the disease completely disappeared, although previously all efforts at stamping it out by



slaughter, isolation, disinfection, &c., had proved of no avail. Truly, a remarkable proof of the danger of tubercular-affected material.

Koch's first generalisation, that human tuberculosis differed from bovine, has therefore been absolutely disproved.

*Transmission of the Disease from Animals to Man.*

Koch's second statement, to the effect that there was practically no danger of the transmission of the disease from animals to man, "and that he did not deem it advisable to take any measures against it," was of the utmost importance to the stockowner, particularly the dairymen, for, if true, much legislation now in force would have ultimately to be allowed to lapse. Fortunately, administration of animal diseases all over the world preferred to wait for further experiments before acting upon Koch's hasty and ill-advised conclusion.

Naturally, it is impossible at present to prove or disprove Koch's contention by experiments on any human being, but I venture to assert that the evidence which has already been collected, both from observation and from experiment, can leave no doubt in the minds of any one as to the danger of infection to the human being from contaminated food supply, particularly milk.

The first class of evidence to be noted is the apparent transmission through infected milk. The case of the daughter of Dr. Gosse, of Geneva, is most interesting. There was no history of hereditary predisposition, and the source of the contagion appeared at first extremely obscure. Up till seventeen years of age, the girl was in good health. Then she became ill, and died in less than a year. Her father made a *post-mortem* examination, and found extensive tuberculosis of the whole of the abdominal viscera. The source of the infection was finally located on a small farm belonging to himself, which his daughter frequently visited, and where she was extremely fond of drinking fresh milk from the cows. Examination of the five cows on the farm showed that four were tubercular, the udders of two being affected with the disease.

Dr. Salmon, of the Bureau of Animal Industry, U.S.A., reports an interesting case. A boy, seven years of age, had been fed on a great deal of milk from one cow, which was proved to be badly tubercular when examined later. The boy became ill, and was sent to the Children's Hospital in Boston, where the case was diagnosed to be primary tubercular peritonitis with effusion. An operation was performed, and the peritoneum was found to be thickly studded with minute tubercles.

Dr. Stang, of Amorbach, mentions the case of a boy, five years old, who developed tuberculosis of the mesenteric glands and lungs, the circumstances pointing to a tubercular cow being the origin. Dr. Demme, of the Berne Children's Hospital, reports four similar cases, and states that in these cases he could with certainty eliminate any other origin. Van Kuck reports the case of a father, aged thirty-three, and his child, aged one year, who both died of tuberculosis within a short time of each other. Both father and daughter drank exclusively of the milk of a Jersey cow, which was found to be suffering from tuberculosis of the udder. Van Kuck considered the case almost conclusive.

Huls reports the case of a miller's family, in good circumstances, near Mander-schied, composed of the miller, his wife, five sons, and two daughters, all herculean in stature and boastful of strength and health. Consumption had never occurred in the families of either of the parents. The mother became affected with pulmonary catarrh, which aroused a suspicion of tuberculosis, but after a few months she was again healthy. During the following year the thirteen-year-old daughter became ill of pulmonary tuberculosis and died. The same year an eighteen-year-old son died, and the following year a twenty-three-year-old son. Two years after her first illness, the mother sickened and died; then followed the death of a sixteen-year-old daughter; then the father; and finally the third son, all of pulmonary tuberculosis. For one of the two remaining sons a tuberculous abscess of the finger was treated, which healed. These two men are still living. Huls thinks that the view of contagion from the sick members of the family cannot be held, since there was practically no contact. These cases appeared subsequently to the introduction by the miller of a herd of Simmenthal cattle on his farm. These cattle were all practically infected with tuberculosis, and it was scarcely possible to dispose of the meat on account of its infected condition. Many of the carcasses were returned on account of being tuberculous, so that later the owner was compelled to sell the cattle without a guaranty as to their condition.

Bang relates the following cases which have come under his observation in various parts of Denmark: "A merchant, whose two daughters were chlorotic, wished them to drink milk freshly drawn. He procured a fine cow and fed her abundantly, but nevertheless she became tubercular, and it was necessary to kill her. A second cow, procured in the place of this one, also became tubercular, and showed disease of the udder, which was probably tuberculosis. The two girls died at the ages of sixteen and eighteen years. The two younger children of the same family have attained the ages of twenty and twenty-four years, and are in perfect health. A healthy cow became tubercular after having been placed in the same stable in which another died of tuberculosis. A child which had been fed almost exclusively on the milk of these two cows became scrofulous, and died of tuberculosis. A peasant of Silkeborg drank freely of milk freshly drawn. He died of tuberculosis, and almost at the same time a cow succumbed to the same disease in his stable, and a little later a pig. Another peasant who drank milk died of tuberculosis, and the disease was found to be widespread among the cattle of his farm. A peasant owned a cow aged eleven years, which was profoundly diseased with tuberculosis of the lung and of the udder. According to the owner, she had coughed since she was three years of age. Another cow, three years old, placed in the same stable, also became tubercular, but in a less degree. The wife of the peasant, who had been in perfect health until this time, became tuberculous, and died at the age of forty-five years. Soon after, his daughter became sick, and died during the same year, also of tuberculosis. These two deaths both took place during the year when the tuberculous disease of the udder became evident in the cow. The mother and daughter had used the milk of the cow. The husband drank beer, and remained well. . . . A physician lost his two children by tuberculosis after having made them drink milk from his own cow, which was tubercular. Neither the father nor the mother nor the grandparents were tuberculous."

Dr. Cowie, assistant to the Medical Officer of Health, Manchester, has reported two cases of consumption which he considers were probably caused by tuberculous milk. Both patients were in the same family, and previous to the death of the first, a girl of five years, there was no family history of tuberculosis. Neither patient drank much milk, probably not more than 3 oz. a day. The milk, however, had been constantly tubercular for two years, as was proved by repeated experiments by Professor Delepine.

While the above instances, and more that could be cited, are wanting in absolute proof, the circumstantial evidence is so complete that it would be folly to ignore the connection between the milk and the human cases.

Accidental inoculation of man with bovine bacilli has been frequently recorded as having occurred in veterinarians making *post-mortems* on diseased animals, and in butchers in the ordinary course of their work. Pfeiffer records a case in a veterinarian which resulted fatally. Dr. Ravenal, of Pennsylvania, records three cases of skin inoculation, one—of his own assistant—being very interesting. Hartzell, of the Pennsylvania University, reports two cases of inoculation of the skin of the hand, following injuries received by the splinters of timber when the men were working on cattle-trucks. In both, the wounds healed at first, but later developed tubercular lesions. In one case, recovery followed operation, but in the other the disease affected the glands and became generalised, death resulting a year later. Grothan mentions a case where a little girl, suffering from a skin eruption on the leg, was treated with fresh cream, the result being that later a tubercular ulcer appeared. The cow which supplied the cream was tubercular, and the milk was found to contain tubercle bacilli. Coppez records the case of a girl milker contracting the disease through milking a tubercular cow; while Priester records a case of skin inoculation in the attempt to remove tattoo-marks by means of introducing milk with needle punctures in the same way as tattooing. Recently, "La Semaine Medicale" reported a case of a man, sixty-three years of age, who presented himself at the Utrecht Surgical Clinique on the 3rd February, 1902, suffering from an affection of the little finger. In May, 1900, while assisting at the autopsy of a cow suffering from generalised tuberculosis, the veterinarian had inadvertently wounded him on the little finger with his knife. Three days later the slight wound had healed, but remained painful. Ultimately, a swelling gradually developed. Examination showed a condition of cutaneous tuberculosis, the bacilli having evidently gained entrance when the wound was made. The corresponding cubital gland was swollen, and about the size of a pea. Professor Nerath extirpated the diseased skin and the affected gland. The patient was discharged cured. The

tuberculosis nature of the skin-lesion and of the swollen gland was demonstrated by both microscopical examination and inoculation of guinea-pigs. Other cases of inoculation of man accidentally by the bovine bacillus might be cited, but the foregoing are the most interesting.

Lessar examined 365 men who were working in abattoirs in Germany, and found seven suffering from inoculated tuberculosis, while three others were possibly affected. This showed 2 to 3 per cent. of slaughtermen, who were proverbially healthy, affected, while Lessar found only one-thirtieth of 1 per cent. amongst others not so employed.

In a recent bulletin (52) of the United States Bureau of Animal Industry, Schweinitz, Dorset, and Schroeder describe in detail, and with beautiful plates, reproduced in colour, a long series of most interesting experiments on—(1) the infectiousness of human tubercle bacilli for cattle and pigs (regarding which I have already dealt), and (2) the comparative virulence of human and bovine bacilli for animals, and particularly monkeys.

Monkeys, it may be mentioned in passing, were utilised as being the nearest in the biological scale to human beings, and it is well known that certain human diseases which are innocuous for other animals are still virulent for monkeys, not the least being, as Roux and Borrel have recently proved, syphilis, a disease which is naturally confined to the human subject, and cannot be transmitted to the lower animal, with the exception of the monkey. In the experiment seven monkeys were used, and standard cultures of human and of bovine bacilli were employed. Six of the animals were inoculated underneath the skin, four with bovine bacilli, and two with human, as controls, and the seventh was fed with tuberculous milk. Of those inoculated all succumbed, or were killed when in a dying condition in from six to seven weeks after inoculation, and, judging by the admirable plates illustrating the bulletin, one can only conclude that the bacillus of bovine origin produced the severer lesions. The monkey fed on tuberculous milk received less than 4 oz. twice daily (a comparatively small dose) for four months. About two months after the feeding with milk was stopped loss of condition was observed, breathing became more rapid than normal, and was accompanied by a wheezing sound. A fortnight later the animal acted as though affected with headache. Later, a discharge from the nostrils occurred, the appetite became impaired, sickness and drowsiness were evidenced, and finally death occurred about eight months after feeding commenced, the animal being in a very emaciated condition. *Post-mortem* examination showed tubercular lesions throughout the body, but none in the intestines, which is an important point, seeing that Koch insisted that before one could consider infection to be due to food, there must be lesions exhibited in the intestines—a statement which by other experiments has been proved wrong.

As these experimenters state: "This monkey indicates at one and the same time that tuberculosis contracted through ingestion progresses more slowly than tuberculosis induced by a subcutaneous injection; that a fairly generalised fatal tuberculosis can be produced by ingestion without specific lesions of the intestines; and, finally, that monkeys, notwithstanding their distance from cattle in the animal scale, are highly susceptible to the pathogenic properties of tubercle bacilli of bovine origin, which gain entrance to their bodies with the food they eat. The question regarding the susceptibility of man to tubercle germs of bovine origin cannot be more closely approached in an experimental way, and this experiment alone, supported by the large existing mass of circumstantial evidence of the infectiousness of tubercle bacilli of bovine origin for man, seems sufficient to warn every reasonable mind against the use of milk from tuberculous cows, and to point out with the greatest emphasis that it is desirable to take measures which will eventually eliminate all tuberculous cows from our dairy herds."

The late Professor Nocard, before his lamented death, also proved the susceptibility of monkeys to bovine bacilli by feeding experiments. Three animals had mixed in their food small quantities of cultures, and three were kept as controls. The animals fed with the bacilli all developed tuberculosis after a short time, the others remaining healthy. He found, as a result of his experiments, that small doses of bovine tuberculosis culture produced intense intestinal and mesenteric lesions in monkeys, followed by death in a few months, and characterized by lesions identical with those of abdominal tuberculosis in infants. A curious point in his experiments was that after passing the bovine bacillus through monkeys, it then proved to be much less virulent for calves than before.

*The Danger of Bovine Bacilli to Human Beings, especially Children.*

The summary of the work and observations of scientific men throughout the world which I have just given you demonstrates beyond all reasonable doubt the possibility of human beings, particularly children, becoming affected through milk contaminated with tubercle germs. I admit that no absolute proof has been afforded of that contention; but has absolute proof been afforded of the contention that the sputum of a consumptive man is dangerous for a healthy? The only absolute proof in either case would be by experiment on a human being. But because that is not possible, it would be even more criminal for an individual to permit a child to drink milk known to be contaminated with tuberculosis, than to live in a room recently occupied by a patient in the last stages of consumption unless it had been thoroughly disinfected.

You will have remarked that in many cases the human bacillus was found to be of small virulence for cattle, and it was this fact that led Koch so far astray. Professor McFadyean, in his reply to Koch, placed the facts in their true perspective. "But" he stated, "it cannot be admitted that the low virulence of human bacilli for cattle proves, or even makes it probable, that bovine bacilli have only a feeble pathogenic power for man. That might have been held to be probable if it had been shown that bovine bacilli were very virulent only for cattle; but since it is well established that these bacilli are highly dangerous for such diverse species as the rabbit, horse, dog, pig, and sheep, and, in short, for almost every quadruped on which they have been tried, it appears to be highly probable that they are also dangerous to man. At any rate, it is impossible to cite any ascertained fact relating to other bacterial diseases that makes the contrary conclusion probable. It is well known that the majority of disease-exciting bacteria are harmful to only one or two species, but all those that are common to all the domesticated animals are also pathogenic to man." Anthrax, rabies, glanders, and all diseases having a wide range in the lower animals, are at least equally dangerous for man.

It is only by admitting the possibility of the transmission of tuberculosis to children by contaminated milk that one can account for—(1) The fact that tuberculosis in adults (consumption) is on the decrease, while tuberculosis in young children, particularly infants, shows a slight increase, in all countries where reliable data have been preserved for a period of years; (2) the fact that while in this colony consumption in adults is common, infantile tuberculosis is rare, as is tubercular disease of the udder in cows, comparative to what is found in Europe and North America; and that (3) in Berlin and Paris (where the cows are under greater supervision than in Britain, and where pasteurised or sterilised milk is more commonly used), the percentage of cases of abdominal tuberculosis to phthisis &c., is far less than in Great Britain.

#### COW-TESTING.

[By J. A. KINSELLA, Dairy Commissioner.]

The following is taken from a paper read before the Seventh Conference of the Agricultural Societies of New Zealand:—

In Denmark this subject of cow-testing has been receiving marked attention for a number of years, and the results to-day are manifest. There are about 325 to 350 dairy-control societies, composed of farmers, owning nearly 300,000 cows conjointly. Qualified men are engaged by these societies to spend a couple of days on each farm belonging to the members, at intervals, in order to test the quality and quantity of the milk, to calculate the cost of it produced by each cow. By adopting this method, it is easy to see that the farmer is in a position to know which cow of his herd it pays him best to keep. Exhaustive experiments proved that some herds yielded one-third more milk than others, while the butter made from the milk of certain cows cost only 5d. per pound, as compared with that from others, which cost as much as 2s. per pound. To encourage the work of these societies, the Danish Government pays £25 per annum to each society having above 300 cows under its control. Now, this matter of testing is a matter which the New Zealand dairy-farmers should take up at the earliest possible moment. It is interesting to note what co-operative testing in this way has done for the Danish dairy-farmers in cheapening the cost of production. Then, again, co-operative testing associations were first formed in 1895. Each society is composed of farmers, limited in number from twelve to fifteen, and these agree

to have careful tests of their cows made at frequent intervals during the milking period by a competent man hired for that purpose. Records of a fairly accurate nature are thus secured, not only of the yield of milk and butter-fat, but of the amount, kind, and cost of the feeds consumed. The information thus available has proved exceedingly effective in inducing the dairy-farmers to adopt improved methods of breeding, feeding, and culling of dairy cows. At the time the first testing association was formed, as I said, in 1895, the value of the butter exported from Denmark was less than £3,000,000. Since 1901, when over three hundred of these associations had been established over the country, the value of the exports rose to nearly £8,000,000, or an increase of over 100 per cent. in the six years. This enormous increase, it was generally conceded, was for the greater part due to the work of these testing associations in weeding out the unprofitable cows; and not only was the average production of the milking cows greatly increased, but so much additional skill in feeding was acquired that the cost of feed required to produce 1 lb. of butter is now estimated to be less than two-thirds of what it was when the first co-operative association began operations. The cost of keeping the yearly records was shown by the reports of the testing societies to be from 1s. 8d. to 2s. 6d. per cow, while the increased returns per cow as a result of five years' testing was shown to be from £1 5s. to £3 per annum. This rate of increase must be deemed to be eminently satisfactory, while the extraordinary increase in the number of societies in Denmark proves how highly their work is appreciated. The tests made by the original associations were more than sufficient to convince the Danish farmers that formerly they were not dairying on businesslike principles, but were allowing a lot of robber cows to eat up the profits produced by the better-class cow, and naturally the Danes were quick to adopt better and more profitable methods. It is but a short step from the co-operative factory to the co-operative testing association, and it would seem that the methods which have proved of such marked benefit in Denmark should not much longer remain unheeded in this country. There is at least one particularly intelligent and progressive man in every dairy community who should have little difficulty in inducing twenty or thirty of his neighbours to join with him in an enterprise that has shown such good results elsewhere.

#### TURNIPS, RAPE, AND GRASS.

##### COST OF MANURING AND SOWING IN THE WAIKATO.

[By Mr. LANGLEY SHAW, of Hamilton.]

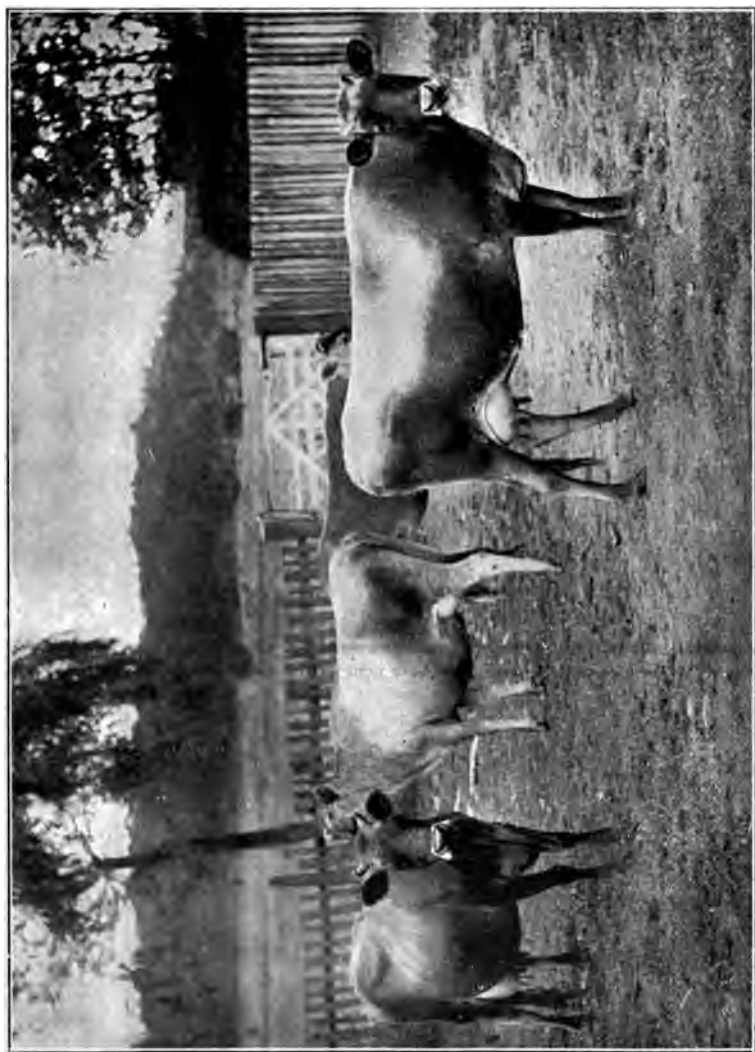
Bonedust, £6 10s. to £7 10s. f.o.b. or f.o.r., Auckland; superphosphate, £4 10s. f.o.r. or f.o.b., Auckland.

Two parts bonedust to one of superphosphate is the usual mixture, and the amount per acre varies from 1½ cwt. to 2½ cwt., according to the quality and condition of the soil, or the belief of the farmer in heavy or light manuring. The average is 2 cwt.; 2½ cwt. being the maximum quantity applied. For top dressing, basic slag and kainit are much in favour, the former costing ex ship about £3 8s. 6d. to £3 10s. per ton on rail at port, and the latter £3 17s. 6d. As in the mixture for turnips and grass, two parts of the one and one of the other are used—viz., two of slag to one of kainit. Slag furnishes phosphoric acid and kainit sulphate of potash, and the amount runs from 2 cwt. to 2½ cwt. per acre of the mixture. Many farmers use special manures, such as special grass manure, special turnip manure, and so on. Among the latter the special fertiliser which finds great favour among turnip-growers is that made by Fison, in England. Waikato farmers have found out by experience that a top dressing of basic slag has a wonderful restorative effect on worn-out pastures, especially on leguminous plants, such as the various clovers, the dormant roots of which respond readily to the slag dressing, thus saving the cost of frequent breaking-up.

The cost of ploughing the ordinary Waikato turnip land is 6s. to 7s. an acre; the average cost of manure per acre is 10s. to 12s., and the cost of laying down turnips would be approximately £1 5s. per acre. Turnip crops sell readily at from £1 10s. to £2 15s. per acre, according to quality, and are readily bought by stock-dealers at these figures. A good average crop of 50 acres of swedes will carry, for four months, 200 bullocks, or 1,250 wethers, or 1,900 hoggets.

Many farmers and others who are not acquainted with Waikato lands entertain the belief that they will only hold grass for two or three years. In some instances this was the case in the early days, but constant and intelligent cultivation has completely remedied this fault. The writer has seen land near Maunga-





A FEW NEW ZEALAND JERSEYS.

*Immigrants' Guide.*

tautari which was only surface sown, and which after the lapse of eleven years still held a splendid sole, and not 1 oz. of manure had ever been applied to it. Many paddocks are now to be seen which have not been broken up for sixteen or seventeen years, and which are still carrying good grass. Indeed, by intelligent manuring the life of the grass can be indefinitely prolonged.

People say that they want land which does not need manure. One farmer justly remarked, "It pays to manure good land." Judicious manuring has largely increased the capacity of Waikato land for carrying and breeding stock. So good are the horses bred here, that at the annual fairs many buyers from the South Island compete eagerly for the draught stock; which goes to prove that big-boned stock can be raised in a country in which there is little or no limestone. In the King-country, however, there are, south of Otorohanga, large areas of limestone country still in the hands of Native owners, but which will soon be thrown open to European settlement.

## THE IMPROVEMENT AND TESTING OF DAIRY HERDS.

[By J. A. KINSELLA, Dairy Commissioner.]

Dairying in New Zealand to-day evidences a development during the last score of years which has surprised even the most optimistic promoters. The exports are increasing in quantity with each succeeding year, and the manufacture has also improved from something crude and irregular to a uniformly high standard. Further improvement in manufacture does not open up a wide field for changes which will net larger proceeds to the milk-producers. At present the widest scope for improvement which will directly affect the largest net saving to the dairy-farmer is in bringing the farm herd to a higher average butter-fat production. This is to be accomplished by better feeding and breeding; and to do this intelligently, the farmer must study his business. In starting a new herd the farmer should have some definite and fixed idea of what he wants. He should select the females first, taking every precaution to get a good, healthy, uniform lot to start with. The bull should then be selected with a view to improving the herd. It is said that the bull is half the herd; in my opinion, he is more than half the herd, and in his selection lies the success or failure in endeavouring to build up a profitable dairy herd. Too much stress cannot be laid on this latter point. It is a pity to see the number of weak scrub bulls that are used amongst some of the good milking herds in this colony. The introduction of a greater number of well-bred and properly selected bulls into our dairy herds would mean a big boon to our dairy industry.

Now, with regard to the best breed of dairy cow. The answer to this is, that there are several breeds of dairy cow, each of which is claimed to be the best. We find good and bad milkers in all the best breeds. In my opinion, the best dairy cow is that animal which will, at the least cost, yield us the largest production. This depends in a large measure upon the individuality of the cow. If the very best milking cows we have were mated with a well-bred bull from a good milking strain, and then the Babcock test applied, for the purpose of weeding out the inferior ones, we should, in a short period, be able to build up a profitable and businesslike working dairy herd.

If you are breeding for milk, then let milk be the real object aimed at. Farmers should not let their minds become filled up with fads or notions of all sorts; neither should they let prejudice come in in the matter of breeding. From my experience amongst cattle since a boy—although not a breeder myself—I have rubbed up against a great many good breeders, and I have come to the conclusion that often too much confidence is placed in a pedigree. I have heard many farmers say, "Just look at the pedigree!" Now, I am at one with those who think that a pedigree is a fairly good guarantee of the breed, whether it be of the beef or of the milk type; yet the greatest breeders alive will tell you that you cannot draw milk from a pedigree. I have seen a good many cows which were said to have come from good milking strains, and although such animals had excellent long pedigrees, it would be found, if the Babcock test were applied, that they were not producing as much butter-fat as the well-selected, or what might be called the carefully bred, milking cow alongside them, and which had no pedigree. This is supposed to be a scientific age. While admitting this fact, I believe it is also a practical age, and that every breeder, to be successful, should be first practical, then scientific.

Better breeding, or the improvement of a dairy herd, need not necessarily imply that a farmer must start off with a pedigree herd; nor does it follow that he must adopt any special breed. The sire should ever be pure-bred, and from



a good milking strain of whatever breed he represents. The selection of the sire's-breed should depend partly on the characteristics of the herd, and also on the fancy of the dairyman. Other things being equal, the dairyman should select the breed he likes best—the one he will do most work for, and to which he will give most care and attention. Such a sire may be used on the ordinary farm herd at the start. The heifers from the best cows only should be retained for the forthcoming herd three or four years hence. In order to determine which cows of the herd will drop calves worthy of such distinction, the management must resort to the use of the scales and butter-fat test. This herd-testing should commence with the start of the season, and be continued regularly throughout the season. At the close of the season the management will have detected cows in the herd which are not nearly up to the average of the herd, and by so doing he knows exactly what cows to relegate from his herd before they have an opportunity to detract from the average production of a succeeding year. This weeding-out should continue with each year, for with each succeeding year the farmer should raise his standard production required from each cow. After the first couple of years these cows can gradually be replaced by the heifers from the better cows. These being half-breeds, and being from the superior milking cows of the herd, should in a year or so be a great asset in raising the average production. To be absolutely accurate in such cow-testing would entail an amount of work that only the ardent enthusiast would undertake and carry through. It would mean a daily testing and weighing of an aliquot sample for a composite test throughout the entire season.

#### GOVERNMENT PUBLICATIONS.

The Agricultural Department issues every year a number of publications, chiefly of reports furnished by the various Divisions of the Department, and leaflets dealing with a wide range of subjects of interest to agriculturists. Of these copies may be had on application to the head office, Wellington.

Those wishing to become conversant with the wide range and instructive character of the work of the Agricultural Department ought to procure the annual reports presented to Parliament and printed in large numbers.

## PART VII.

### THE FORESTS.

THE forests of New Zealand are under State control, as provided by the State Forests Act of 1885 and the Land Act of 1892. The reasons are :—

1. They are a valuable national property, which must be used for the benefit of the State, and conserved for the same for all time to come.

2. Their presence is a climatic advantage.

3. It is indispensable as a protection against weather and against fire.

4. The State lessees are invaluable auxiliaries to the State in these matters, as they are a class whose interest it is to conserve their property.

5. The replanting necessary for maintaining the timber-supply can be undertaken only by the State, for no one else can afford to do the work on the scale required.

6. In such matters as felling, guarding against trespass especially during the dry months of the year, protection against injury, securing of way-leaves, road, tram and railways, avoidance of waste, the State, backed as it is by the law, is the only competent authority.

Hence every forest and every tree in every forest is under the special protection of the Government. The sawyer, the splitter, the logger are all under the dominion of the Department by license or agreement of one kind or another. Trespass is forbidden both by man and beast, and there are heavy penalties against wrongdoers by fire or by careless work.

Captain Campbell Walker, the well-known expert, who served a short time here as head of the Forest Department, summed up the position remarkably well in his first report, as follows :—

It is incumbent on the Government to take early steps to secure adequate reserves for future supply and climatic considerations, reduce waste to a minimum, and secure a proper share of public revenue from the valuable wooded area remaining in its hands, a portion to be devoted to replanting hillsides and plains destitute of timber. By this means we shall virtually transfer the wealth of timber from places where it is superfluous to where it is most required, and benefit both localities, both directly and indirectly, by doing so. No forest is inexhaustible unless systematically worked on principles which insure the capital not being trenched upon, and the income alone utilised.

At present the chief feature of the forest position is the expenditure of the capital as income. A remedy—the planting of useful timbers on a large scale—has been begun, but the chief feature is, at present, as described. The capital is shown in the following table, which is the result of the first systematic attempt to take stock. The figures are approximate.

In the tables given the distribution of the forests and the relative proportion of the various useful woods of New Zealand (fit for milling) can be seen at a glance. Thus the disposition of our capital.

TABLE showing APPROXIMATE QUANTITY of MILLING TIMBER on CROWN, NATIVE, and PRIVATE LANDS on 31st March, 1905.

[The districts are shown in the order of their forest resources. The timber are placed in the order of their quantities.]

District.	Rimu.	Kahikatea.	Birches.	Matai.	Totara.	Kauri.	Miscellaneous.*	Total.
Wellington	Sup. Ft. 4,791,955,050	Sup. Ft. 1,284,528,600	Sup. Ft. ..	Sup. Ft. 2,168,618,100	Sup. Ft. 399,249,700	Sup. Ft. ..	Sup. Ft. 1,980,508,750	Sup. Ft. 10,624,860,200
Auckland	3,987,550,000	981,540,000	..	924,824,000	343,120,000	1,112,019,000	166,000,000	7,465,053,000
Nelson	1,944,466,000	231,600,000	4,408,556,000	126,880,000	42,280,000	..	190,320,000	6,944,102,000
Westland	4,806,800,000	1,018,000,000	..	147,000,000	185,000,000	..	624,500,000	6,776,300,000
Taranaki	4,586,983,200	1,166,921,300	..	21,747,750	21,747,350	..	..	5,797,399,600
Hawke's Bay	1,492,000,000	488,000,000	2,000,000	311,000,000	134,000,000	..	..	2,367,000,000
Otago ..	457,175,000	13,399,000	56,445,000	72,905,000	6,251,000	..	294,318,000	900,493,000
Southland	235,500,000	69,500,000	125,000,000	16,000,000	11,470,000	..	90,000,000	547,470,000
Marlborough	91,216,000	46,037,000	32,000,000	12,374,000	4,770,000	..	32,000,000	218,397,000
Canterbury	500,000	2,500,000	49,000,000	1,500,000	1,500,000	..	27,500,000	82,500,000
	22,834,145,250	5,247,025,900	4,673,001,000	3,802,848,850	1,149,888,050	1,112,019,000	3,405,146,750	41,724,574,800

\* Miro, maire, silver-pine, tanekaha, tawera, mangalo, hinau, kamahi, birch.

TABLE showing the MILLING TIMBER on CROWN LANDS only on 31st March, 1905.

[Districts are given in order of quantity.]

District.	rimu.	hirches.	Kahikatea.	Matai.	Kauri.	Totara.	Miscellaneous.*	Total.
Nelson ..	Sup. Ft. 1,394,660,000	Sup. Ft. 4,260,436,000	Sup. Ft. 147,000,000	Sup. Ft. ..	Sup. Ft. ..	Sup. Ft. ..	Sup. Ft. ..	Sup. Ft. 5,802,102,000
Westland ..	3,747,800,000	..	327,000,000	28,000,000	..	51,000,000	294,000,000	4,447,800,000
Wellington ..	1,860,629,700	..	479,193,300	874,381,800	..	85,186,600	993,080,000	4,291,471,400
Auckland ..	954,320,000	..	159,490,000	98,524,000	447,880,000	163,780,000	30,000,000	1,563,994,000
Taranaki ..	1,131,451,200	..	285,720,000	5,714,400	..	5,714,000	..	1,428,599,600
Hawke's Bay ..	663,000,000	2,000,000	226,000,000	144,000,000	..	62,000,000	..	1,097,000,000
Otago ..	457,175,000	56,445,000	13,399,000	72,905,000	..	6,251,000	294,318,000	900,493,000
Southland ..	179,000,000	100,000,000	31,500,000	12,000,000	..	8,970,000	90,000,000	421,470,000
Marlborough ..	91,216,000	..	40,037,000	12,374,000	..	2,270,000	..	151,897,000
Canterbury ..	500,000	49,000,000	2,500,000	1,500,000	..	1,500,000	15,500,000	70,500,000
	10,479,757,900	4,467,881,000	1,716,839,200	1,249,399,200	447,880,000	386,671,600	1,716,898,000	20,465,327,000

\* Miro tanekeha, maire, mangalo, tawera, kakawaka, hinau, silver-pine, black-pine, kamahi, birch.

Another table measures the call made on the capital last year for the satisfaction of the public requirements. It is a table of the sawmills, and is as follows:—

SUMMARY OF SAWMILLS IN 1905.

Land Districts.	Number of Mills.	Horse- power.	Hands.	Annual Capacity.	Output.
				Super. ft.	Super. ft.
Auckland ..	49	2,528	2,138	244,320,000	184,454,000
Hawke's Bay ..	61	1,632	1,032	81,888,400	49,151,354
Taranaki ..	31	612	574	39,500,000	20,323,700
Wellington ..	73	1,324	1,052	100,330,000	55,860,106
Marlborough ..	16	252	202	15,722,000	9,552,000
Nelson ..	58	675	334	55,333,200	13,191,807
Westland ..	51	913	609	88,990,000	37,249,775
Canterbury ..	9	101	86	3,363,000	2,696,000
Otago ..	10	137	77	5,984,000	2,918,000
Southland ..	56	1,323	808	69,500,000	38,893,000
	414	9,427	6,912	704,930,600	413,289,742

At the rate of output here shown the forests have a hundred years' supply. On the one hand, the rate is sure to increase (for example, in the year 1904 it was 372,000,000 ft., and in 1905 it increased by 41,000,000 ft.). On the other hand, there are sundry areas of forests unrepresented in the table of distribution (private and Native lands) in Canterbury and Otago, and the Taupo, Westland, Nelson, and inland Taranaki estimates probably all require supplementing. Then there is the danger of fire, which every year destroys appreciable quantities of bush. For all these reasons the departmental estimate of seventy years as the limit of supply seems reasonable.

Afforestation is the question pushed vigorously to the front by these facts. The rate at which the timbers of New Zealand are being used up stands revealed not surely but clearly enough to show the vital need of a remedy which will restore the forest capital of this country, consolidate it in the State forests, maintain its development in proportion to the growing requirements of the country, and at the same time supply these requirements adequately by the annual products of the State forests.

In his report for 1904-5 the Surveyor-General, Mr. J. W. A. Marchant, clenched the matter. He says,—

It will be admitted that this colony should never be allowed to drift into the position of having to look for its supplies of timber to other countries, which, at the best, are very distant, and in all probability will have, in the interests of their own inhabitants, to prohibit the extensive exportation of timber. I have therefore to recommend that the operations of the Forestry Branch of this Department in tree-planting be conducted on a scale at least equivalent to the estimated requirements.

In the same year the Chief Forester, Mr. H. J. Matthews, wrote, in his valuable little book on "Tree Culture in New Zealand," the following suggestive sentences:—

The evils resulting from deforestation, foreshadowed by such eminent authorities as the late Captain Campbell Walker and the late Professor Kirk more than twenty years ago, have in many districts been verified through climatic changes resulting inevitably from the wholesale clearing of bush lands. Almost every

spring brings floods and freshets down the watercourses, in which the streams fed by melting snow and spring rains formerly flowed gradually. Winter winds now sweep over large areas, damaging alike stock and crops. It is only by the preservation of existing forest lands and the replanting of denuded areas that it is possible to secure agricultural fertility, a lasting supply of timber, and a permanent water-supply.

In this connection the late Right Hon. the Premier in his Financial Statement for 1904 said,—

The knowledge that the timber supplies have been so largely reduced led to the reconsideration of the question of the timber regulations, and steps have been taken to safeguard the whole of the remaining milling timber, and to deal with the applications for the right to erect sawmills and cut out the same only after full inquiry, so as to insure that there shall be as little waste as possible. Every encouragement should be given to private owners of forests containing milling timber to preserve the same, so that all resources of the colony in this respect shall be used for the common good. Of the public expenditure in this respect we shall have to incur much greater expense in providing for the future requirements of the colony.

Here a few considerations naturally suggest themselves, and chiefly with regard to climate, rainfall, and the experience of the effect of forestation of countries in these. For instance,—

#### EFFECT OF FORESTATION UPON CLIMATE.

M. Clavé, the eminent French authority, writing in the *Revue des Deux Mondes* in 1875, describes the influence of forests upon climate and physical conditions as exerted by four separate actions. These are: (1.) Chemical: Through leaves decomposing carbonic acid of the air. (2.) Physical: In retaining moisture in the earth and checking the force of winds. (3.) Physiological: In transmitting to the air through the leaves a portion of the moisture which the roots draw from the earth. (4.) Mechanical: Through the action of the roots in retaining in its place the earth, especially on the sides of mountains and hills. In general, Clavé sums up that, though the influence of forests on climatic and physical conditions is but imperfectly understood, it is generally admitted that the denudation of forests is followed by climatic changes. Asia Minor, which, while there were forests, supported vast populations and was the granary of the earth, is now, after the destruction of the forests, too infertile to mature crops.

Marsh, in his work on "Man and Nature," says,—

One important conclusion on the meteorological effects of forests is certain and undisputed: the proposition that within their own limits, and near their own borders, they maintain a more uniform degree of humidity in the atmosphere than is observed on cleared ground.

He is supported by such authorities as Marshal, Vaillant, Mathieu, Hooker, Schleider and Firés, Becquevel, Boussingault, and many others.

#### RAINFALL.

Scientific opinion does not consider it proved that forests influence in any appreciable degree the rainfall of a district, but that they certainly prevent evaporation, and by their presence and action render the flow of water more regular and permanent, thus preventing disastrous floods and torrents during the winter or rainy season, and long droughts in summer. Their removal from mountain-tops and hill-sides cannot but be regarded as an evil, often followed by the most disastrous results.

## INDIAN EXPERIENCE.

The results and accumulations embodied in the records of the Forest Conservancy Department of our great Asiatic possession prove that in the case of narrow valleys with steep shingly hillsides, covered with but a thin coating of vegetable deposit, we cannot be too careful how we remove the forest: the result of any general or extensive clearing being that the little soil is soon washed away, leaving barren hillsides of no value for any purpose, and resulting in the rapid pouring-off of water from their bare and steep slopes, followed by disastrous floods and by long and often equally disastrous droughts. This is so well known on the Continent of Europe that what is called "selection felling," by which individual trees only are removed as they mature, is the system universally in force, and experience teaches that any departure from it under such circumstances is very dangerous, and should invariably be avoided if possible. The carrying-out of this system results in a positive gain in the shape of an equable climate and an ample but not excessive supply of water.

## EUROPEAN EXPERIENCE.

In the early "sixties" of the nineteenth century the evils of forest denudation on the slopes of the Alps and Pyrenees had reached their insupportable climax. For two thousand years the policy of clearing the hillsides of forest to make way for grass and intense cultivation had worked without hindrance. In face of the result—destruction of mountains, sterilisation of valleys buried under vast accumulations of detritus, and the inundations of the plains beyond with awful disaster to life and property—the nation awoke. The Government of the Emperor Napoleon determined to plant the whole of the French slopes of these two mountain-chains. The work was designed to reforest 200,000 acres, at a cost of £400,000, and was to last over a hundred and forty years. It was begun with most energy at the most threatened points, and now, after nearly forty years, the results are very marked.

Italy, Germany, and Austria have the same tale of destruction to tell, and all are engaged in the work of reparation. The proved fact of their experience is that if the shelter is stripped from steep light-soiled hillsides to make room for stock-food there will soon be neither shelter nor food on the hillsides, and much hardship elsewhere.

Here the Forest Department has reserved the timber on hilltops and certain hillsides. The felling is limited to the system of "selection felling"—i.e., the selection of individual trees by competent authority. In the course of time, by the aid of this system, vast quantities of perfectly useless bush can be replaced gradually by valuable timbers such as flourish at similar altitudes in other countries.

The remedy has been begun and is well under way, as the following remarks of the Surveyor-General clearly describe:—

To counterbalance in some measure the destruction of our indigenous forests, about 25,000,000 trees of different varieties have already been raised and planted out in the eighteen State nurseries and plantations that have been started since 1896, and now comprise an area of 4,058 acres. Last year the addition was nearly

7,000,000 trees; and if this annual increment is maintained or increased, our timber supplies will in another twenty years, or perhaps a little later, be considerably augmented by the gradual maturity of the trees raised under the direction of the Government, and so the coming loss of the present native forests may not be so keenly felt as would have been the case if steps had not been taken to meet the difficulty.

This is the work of the Forestry Branch of the Agricultural Department.

#### BRIEF HISTORY OF OFFICIAL FORESTRY IN NEW ZEALAND.

In 1876 a Forest Department was created, forest legislation passed, and many timber reserves were made. Within these the Department was supreme. It was under a Chief Conservator of Forests (Mr. T. Kirk) and a staff of conservators and rangers. In 1887, for reasons of economy, the Department was abolished, and after a time forestry became a division of the Department of Lands and Survey.

Early in the "nineties" that Department took up forestry with vigour and system, and the whole of the forests were reserved and otherwise brought under rule, local regulations (the survival of the provincial days of divergent management) being replaced by uniformity of systematic direction.

#### PLANTATIONS.

In 1875 an Act to encourage plantations was passed by the Legislature, and under it considerable areas in Canterbury and Otago were planted.

In Canterbury, Plantation Boards have also done a great deal in the way of planting, the total area afforested in that provincial district being 10,500 acres.

In 1896 nurseries were started by the Forest Division in several places in the two Islands, for the threefold purpose of ascertaining the timbers suitable to the various climates, of demonstrating the best methods of growing them, and of planting Crown lands. These nurseries, under Mr. Henry Matthews, the Chief Forester, bear but a small proportion to the bulk of supply by private nurserymen all over the colony, and by the various Domain Boards and local bodies into whose hands many reserves intended for plantation in provincial days fell. The part it plays, however, is the greatest, for the management is uniform, the cultivation instructive and on the widest range of locality, and the trees planted are of useful varieties.

The evidence that replanting of the forest trees is very feasible is on all sides abundant. The rapidity of the natural reproduction was noticed at Kinloch, at the head of Lake Wakatipu, a quarter of a century ago; and also at Taipo, on one of the tributaries of the Tere-makau, on the west coast of the Middle Island. In both localities the vigorous, healthy growth of the young red-pines and beeches was noted, and the inference was drawn that the system of natural reproduction might be encouraged and protected with the best results. During the period named the instances have multiplied greatly. Moreover, the rapidity with which imported trees grow in New Zealand, and the fine development to which they attain, leave no doubt on the subject. The only question is of the suitability of particular varieties to particular localities.



## CONCLUSION.

The situation is grave enough for the most energetic application of the farthest-reaching measures. (1.) The planting rate must be increased at least tenfold. (2.) Existing timber must be preserved with the greatest vigilance. (3.) The question of prohibiting the export will have to be faced. (4.) As the denudation will greatly diminish firewood and fencing timbers, the settlers must devote a large amount of attention to growing timber for household and fencing requirements.

## NATIVE TIMBERS.

The Chief Forester in his book refers to a frequent question, and answers it: "Why don't you plant native trees?" "Because it will not pay." Then he gives the reasons, which are, chiefly, three. They are the conditions of the native timbers for the most part—viz., expensive cultivation, early uselessness, late maturity.

*Expensive Cultivation.*

The native trees are for the most part surface-rooters, and therefore in exposed situations suffer disastrous damage from wind. They are therefore unfit for planting in the open, and must have the natural shelters of the forest, or the artificial shelter of trees grown with them for the purpose. In either case the rapid growth of the native trees in the early stages makes their protection from the encroachments of the shelter difficult and expensive.

*Early Uselessness.*

In the earlier stages of their growth these timbers are useless for anything but firewood. At 12 in. in diameter, when most of the exotics are valuable fence posts, rails, sleepers, building-material generally—the trees mentioned being the oak, the larch, the spruce, the Oregon pine, the eucalypti—native trees are still useless.

To elucidate this point Mr. Matthews has published a table from records of tree-cultivation kept by Mr. J. W. Hall, of Parawai, Thames. The details are as follows (the trees were planted out as seedlings 6 in. high):—

Tree.	Diameter.	Annual Growth of Diameter.	Girth.	Height.	Age.
	Inches.	Inches.	Ft. in.	Feet.	Years
Kauri .. ..	7	0·30	1 10	36	24
" .. ..	7	0·33	1 11	34	23
Puriri .. ..	16½	0·59	4 4	39	29
" .. ..	11	0·49	2 10½	36	24
Matai .. ..	2½	0·09	7½	14	24
Totara .. ..	10½	0·39	2 9	42	28
" .. ..	9	0·33	2 4	39	28
Miro .. ..	5½	0·17	1 1	16	25
Kahikatea .. ..	6	0·24	1 6	35	25
Rimu .. ..	7	0·21	1 10	33	28
" .. ..	7½	0·27	1 11	35	27
" .. ..	6	0·24	1 6	22	25
Cedar (kawaka) .. ..	7½	0·29	1 11	24	26
Tanekaha .. ..	6	0·25	1 7	32	25
" .. ..	6½	0·30	1 9	30	23

Puriri and totara are exceptional in the above list of slow girth development, and they are among the exceptions to the rule of early uselessness mentioned by Mr. Matthews. He also refers to the well-known fact that the rapidity of growth in the native timber is greatest in the initial stages. As the first stage is shown in the above table from twenty-three to twenty-eight years, it is probable that in fifty years all the trees in the list, with the two exceptions aforesaid, will be of less diameter considerably than 12 in., at which the colonial timbers are useless. The thinnings would therefore be useless for between fifty and seventy-five years. Mr. Matthews shows us the bearing of this fact:—

To produce marketable timber free from knots it must be planted so thickly together that the formation of side branches of a large diameter is impossible. When a too crowded state is reached thinning must be resorted to; otherwise in the struggle for existence the trees will so interfere with one another to such a degree that all will be more or less worthless through want of space for natural development.

He proceeds to explain that to secure the marketable quality of the timber crop, twelve hundred trees must be planted (in the seedling stage) on every acre; and of these eleven hundred must be destroyed (by thinning out during the crop period), in order that the crop of one hundred trees per acre may not deteriorate for want of space for natural development.

It follows, therefore, that the plantation of native trees, for the most part, involves the waste, during a very large portion of the crop period, of eleven hundred trees per acre, the only possible return being a mere nothing comparatively for firewood. Puriri, totara, Fagus, and kowhai are the exceptions. Now, exotics will give a handsome revenue long before the main crop comes to be cut.

#### *The Slow Growth of Native Timbers.*

A list, based on information in Kirk's "Forest Flora" and Blair's "Building Materials of Otago," is the only guide available for the study of this point. The age of the trees was arrived at by counting the number of annual growths on recently cut sections of timber. It is a method accepted for computing the ages of trees very generally by the authorities, but there are objectors who differ strongly. Here is the list:—

				Approximate Ages.
				Years.
Manuka	..	..	..	100-250
Rata	..	..	..	200-450
Broadleaf	..	..	..	340-700
Miro	..	..	..	150-300
Totara	..	..	..	470-800
Matai	..	..	..	270-400
Kahikatea	..	..	..	370-600
Rimu	..	..	..	400-650
Yellow-pine	..	..	..	300
Silver-birch	..	..	..	150-330
White-birch	..	..	..	80-180
Kauri	..	..	..	600-3,600
Cedar	..	..	..	150-400
Red-birch	..	..	..	130-300
Pokaka	..	..	..	200

The Chief Forester adds the information that the oak, the larch, the spruce, the Oregon pine, and the Eucalypti may all be depended upon to give from two to three crops of mature timber in the crop period required by these native timbers for their maturity; asks how the Forestry Department could be justified in giving preference to native timbers: and that clinches the argument against the native side.

Summarised the matter stands thus: The native timber requiring expensive shelters is dear to grow; their crop period is long, and during that period they earn nothing. The exotics, requiring no shelter, are cheaper to grow; their crop periods are from one-half to two-thirds shorter; during the crop period they return a handsome income.

Treating of the exceptions to the rule of native unsuitability, he says:—

Puriri, totara, Fagus, and kowhai are, however, being planted by the State in certain favourable localities, and in comparatively small numbers, thus affording an opportunity of obtaining accurate data for future guidance. The value of this timber is unequalled for certain technical purposes, and from close personal observation it is tolerably safe to predict that they will produce useful timber within a century.

This is right from the point of view of the State, for in matters of research for the public benefit the public purse ought to pay. But for the settler, who, for many reasons, finds himself forced to plant timber trees, it is different. The safest course is to plant exotics which will give him revenue early, and, if he be young, substantial timber in his lifetime.

#### DISTRIBUTION OF FORESTS.

##### *The Kauri District.*

The kauri-tree is found nowhere but in that part of the North Island north of a line drawn from Waikato Heads to Tauranga. At Aotea, to the southwards, and elsewhere kauri-trees are found, but so few that the above line has been recognised always as the kauri boundary.

In some parts only single trees are found, in others they occur in clumps or groups, sometimes forming extensive groves, or even large blocks, almost to the exclusion of all other trees. Most frequently the kauri will be found mixed with rimu, kahikatea, tane-kaha, miro, totara, totara-kiri-kotukutuku, northern rata, puriri, tawa, tarairi, matai, and many other trees, the tawa, as a rule, being most abundant. The nikau, or southern palm, is plentiful all through the district, and is everywhere accompanied by noble tree-ferns and palm-lilies. The underwood is composed of numerous shrubs, and the ground is carpeted with a rich growth of delicate filmy ferns. A large kauri forest is one of the grandest sights to be found in the entire range of the vegetable kingdom: massive columnar trunks, 4 ft. to 8 ft. in diameter, clothed with smooth grey bark, rise close together, often to the height of a hundred feet or more, their spreading arms and deep-green leaves presenting a picture of the greatest luxuriance and vigour. At the base of each tree is a large mound of humus, formed by the decay of bark through successive centuries. The surface soil as well as the humus is charged with resin that has exuded from the fallen leaves or twigs. Some of the most ancient specimens

are among the oldest trees in the world, and must have originated in a period long before the Christian era, yet they exhibit all the life and exuberance of early youth.

The great question is as to the date after which this splendid timber will be no more. According to the table of distribution, the kauri left standing on the 31st March, 1905, represented an aggregate of 1,112,000,000 superficial feet. Now, in the year 1903-4, the thirty-six mills dealing with kauri cut up 144,000,000 ft. of it. At that rate the kauri forests will not last more than eight years.

In 1900, the life of these forests was computed at thirteen years, on a consumption of 109,000,000 ft., with a supply of 1,379,766,000 ft. In the interval the consumption has gone up 33,000,000 ft.; but the supply of timber turns out to be more than was estimated. It is therefore quite possible that the life of the forests may prove somewhat longer than the eight years of the above calculation.

#### *Kahikatea (White-pine).*

In the extensive swamps by the Northern Wairoa and other rivers the kahikatea forms forests of a remarkable character. The uniformly straight naked trunks often exceed 100 ft. in height, carry very short branches at their tops, and are so close together that at the distance of a few yards the view is completely blocked, and nothing is to be seen but the column-like trunks, from 2 ft. to 5 ft. in diameter, the undergrowth being insignificant.

The rainfall at Mongonui and Auckland is 56·44 in. and 42·33 in. The average mean temperature between the two places is 59° 7', with means for summer and winter of 66° 7' and 52° 7', and an extreme difference of 16°.

#### *The Totara District.*

This extends south from the Waikato Heads to the mouth of the Mokau; thence inland diagonally southward by the slopes of Ruapehu to the start of the Ruahine Range; thence south along the eastern watershed of the Ruahine, Tararua, and Rimutaka Ranges to Cape Palliser; from Palliser along the coast to Tauranga.

The totara is everywhere in the forests of this region plentiful, especially on the eastern side, and it is, on the whole, the best to be found in New Zealand.

Large areas in which it is the prevailing tree are found in many parts south of the Lower Waikato, more especially in the southern parts of Hawke's Bay, the northern portion of the Wellington District, and the Seventy-mile Bush.

In a large portion of the area the totara is sparsely scattered, and even when most dense is usually intermixed with rimu, tawa, totara-kiri-kotukutuku, kamahi, hinau, kahikatea, and other trees. Unlike the kauri, the bark of the totara is of a deep-brown colour and much furrowed, while the short narrow leaves are of a brownish-green. Amongst the most conspicuous trees of this area there are two worthy of special mention, the northern rata and the black-maire. The former is often found with a distorted trunk of gigantic dimensions clothed with rough brown bark. The latter has a pale bark,

and yields a timber remarkable alike for its density and strength. In the totara district there is great variety of rainfall, the country north of Mokau being one of the wettest parts of the North Island, while eastern Hawke's Bay is one of the driest. The best totara is found in the Waimarino Forest, about 2,500 ft. above sea-level. The rainfall at Napier is 37·30 in. ; on the south-east coast it ranges between 45 in. and 50 in. The mean temperature is 57° 5'.

*North Island Red-pine District.*

This comprises all the country lying between the sea on the west and the western boundary of the totara district—i.e., a line south-south-west to the top of the Ruahine, and along the summits of the kindred ridges to Palliser Bay. There is totara in this district, but it is not so plentiful, nor in general so valuable, as it is in the other.

The red-pine (rimu), which is found in appreciable quantity in the other districts, is the predominant tree in this, and all other varieties abound, except the kauri, and, with the exception of a patch near New Plymouth, where the rainfall is the highest in the district, puriri and pohutukawa.

Large portions of the forest consist chiefly of tawa, rimu, and kahikatea, which are extensively converted throughout the district, the two former for building and general purposes, and kahikatea for buildings, butter-boxes, and packing-cases. Tooth-leaved beech, entire-leaved beech, and silver-beech are plentiful on the lower slopes of the mountains, but rarely descend to the sea-level, while mountain-beech forms the bulk of the forest at high levels. Rimu and kahikatea are the chief timbers of the moist forests in the valleys of the Manawatu, Rangitikei, and Wairarapa.

The wettest and driest parts in the North Island are here close together—the New Plymouth country being the wettest, and the country from Wanganui to Kapiti the driest. The rainfall at New Plymouth is 58 in., running up in the immediate vicinity of Mount Egmont to 68 in. ; at Wanganui, 37·30 in. ; and at Wellington, 50·8 in. The temperature of New Plymouth is 57°, and of Wellington 55°.

*Southern Red-pine District.*

In this is comprised the whole Middle Island between the altitude of 1,000 ft. and sea-level, and also Stewart Island. There are several treeless tracts on the eastern side of the dividing range, the largest of which are the Amuri and Canterbury Plains, and Central Otago, lying between a line drawn from the Waitaki mouth to the southernmost point of Lake Wakatipu, and thence due north to the old Canterbury border. The only trees in this region are the forests on Lake Hawea and the tributary streams to the north. There are also patches of woodless country in eastern Marlborough and southern Otago. In the rest of this district in nearly all localities the forest is of a mixed character, yet from Marlborough to Stewart Island the rimu must be considered the predominating tree, and is the most extensively converted. The kahikatea stands next in abundance, and is closely approached by the kamahi, while the miro, matai, totara, Hall's totara are generally distributed ; but the northern rata and pukatea scarcely occur south of Greymouth. The Westland silver-pine, yellow silver-

pine, and quintinia, although not peculiar to Westland, are more abundant there than in any other part of the colony; while the southern rata, which extends to Stewart Island, is especially plentiful in the Tautuku Forest, where it attains very large dimensions. Cedar, or pahautea, pokaka, and hinau are not unfrequent, while most of the beeches are plentiful, especially in the southern parts of the district. The undergrowth contains a large variety of shrubs or small trees, many of which afford timbers suitable for ornamental cabinet-work and inlaying.

Much of the rimu and kahikatea in the south-western portion of the Nelson District, and in Westland, is of great height, and very well grown, in some cases yielding 80,000 superficial feet of converted timber per acre.

The area of heavy forest on the eastern side of the South Island is small; the inland Oxford and Alford Forests consisting chiefly of entire-leaved beech.

The mean temperature varies  $4^{\circ}$  between Nelson ( $54^{\circ} 8'$ ), Southland ( $50^{\circ} 3'$ ), and Dunedin ( $50^{\circ} 7'$ ); the east and west being about equal—viz., Christchurch,  $52^{\circ} 8'$ ; and Hokitika,  $52^{\circ} 3'$ . The winter temperature of the northern part of the east is  $2^{\circ}$  colder than that of the west, and that of southern Otago and Southland  $3^{\circ}$  lower. The rainfall is highest in the west, where the forests are most luxuriant, with Hokitika at 119.66 in., and between 40 in. and 60 in. (such places as Southland, 45.18 in., and Nelson, 59.53 in.) the forests are plentiful, whereas in the dry parts there are none.

#### *Southern Upland or Beech District.*

This takes in everything in the Middle Island between 1,000 ft. and 4,500 ft., above which the beech, the predominating tree in the district, disappears, as the last survivor of the ascending forests.

The rimu and kahikatea are often found above 1,000 ft., yet they rarely occur in any great quantity, or exhibit great luxuriance; so, on the other hand, the different beeches occasionally descend even to the sea-level, although rarely forming any large portion of the forest at extremely low levels. The most valuable forest tree is the tooth-leaved beech, which attains exceptional luxuriance and large dimensions in the neighbourhood of Te Anau Lake, and many other localities. Silver-beech and entire-leaved beech are found as far south as Preservation Inlet and the Tautuku Forest, while the mountain-beech prefers higher levels, although occasionally a few specimens descend to the rimu district. None of the beeches extend to Stewart Island, which in many parts is covered with a dense growth of rimu, kamahi, and rata, the kahikatea being extremely rare.

The temperatures are as follows: Bealey (2,104 ft. level),  $46.76^{\circ}$ ; Queenstown (1,070 ft., and  $2^{\circ}$  further south),  $51^{\circ}$ . The rainfall for the Bealey is 97 in., and for Queenstown 30.7 in.

#### FORESTS (AREA AND OUTPUT).

The forest area of the colony approximates to twenty million acres, a large proportion of which will never be fit for milling. The output of timber, from a total of some 400 sawmills, is about 414 million superficial feet.

## FOREST PRODUCTS.

[From report of T. Kirk, F.L.S., Conservator of Forests (1886).]

I.—*Timbers of Great Durability.*Section 1.—*Suitable for General Building Purposes.*

Native Name.	Settlers' Name.	Family.
Kauri .. ..	Kauri .. ..	Coniferæ.
Totara .. ..	Totara .. ..	"
Matai .. ..	Black-pine .. ..	"
Kawaka .. ..	Cedar .. ..	"
" .. ..	" .. ..	"
Tanekaha .. ..	Tanekaha .. ..	"
Manoao .. ..	Manoao .. ..	"
" .. ..	" .. ..	"
" .. ..	Westland pine .. ..	"
" .. ..	Yellow silver-pine .. ..	"

Section 2.—*For Constructive Works and Special Purposes.*

Native Name.	Settlers' Name.	Family.
Puriri .. ..	New Zealand teak .. ..	Verbenacæ.
Tawhai-raunui .. ..	Tooth-leaved birch .. ..	Cupuliferæ.
Tawhai .. ..	Entire-leaved birch .. ..	"
Rata .. ..	Rata .. ..	Myrtacæ.
" .. ..	Ironwood .. ..	"
Pohutukawa .. ..	Pohutukawa .. ..	"
Maire-raunui .. ..	Black-maire .. ..	Jasminæ.
Maire .. ..	White-maire .. ..	"
" .. ..	Mountain maire .. ..	"
Kanuku .. ..	Tea-tree .. ..	Myrtacæ.
Maire-tawhake .. ..	Maire-tawhake .. ..	"
Kowhai .. ..	Kowhai .. ..	Leguminosæ.

II.—*Timbers adapted for General Purposes or Special Uses, but of less Durability than the preceding.*

Native Name.	Settlers' Name.	Family.
Rimu .. ..	Red-pine .. ..	Coniferæ.
Kahikatea .. ..	White-pine .. ..	"
Miro .. ..	Miro .. ..	"
	Mountain beech .. ..	Cupuliferæ.
	Silver-beech .. ..	"
Pukatea .. ..	Pukatea .. ..	Monimiacæ.
Hinau .. ..	Hinau .. ..	Tiliacæ.
Pokaka .. ..	Pokaka .. ..	"
Tawa .. ..	Tawa .. ..	Lauriniæ.
Taraire .. ..	Taraire .. ..	"
Titoki .. ..	Titoki .. ..	Sapindacæ.
Tawari .. ..	Tawari .. ..	Saxifragæ.
Mangeao .. ..	Mangeao .. ..	Laurinæ.
Rewarewa .. ..	Honeysuckle .. ..	Proteacæ.
Kaiwhiria .. ..	" .. ..	Monimiacæ.
Kohekohe .. ..	Cedar .. ..	Meliacæ.

III.—*Timbers, chiefly of Small Dimensions, adapted for various Purposes.*

Native Name.	Settlers' Name.	Family.
Horopito .. ..	Pepper-tree .. ..	Magnoliaceæ.
Tarata .. ..	Tarata .. ..	Pittosporæ.
Karo .. ..	Karo .. ..	"
Kowhiwhi .. ..	White-matipo .. ..	"
Mahoe .. ..	Mahoe .. ..	Violaceæ.
Houi .. ..	Ribbonwood .. ..	Malvaceæ.
" .. ..	Lace-bark .. ..	"
Wharangi .. ..	Wharangi .. ..	Rubaceæ.
Kaikomako .. ..	Kaikomako .. ..	Olacineæ.
Akeake .. ..	Akeake .. ..	Sapindaceæ.
Karaka .. ..	Karaka .. ..	Anacardiaceæ.
Putaputa-weta .. ..	" .. ..	Saxifrageæ.
Makamaka .. ..	Makamaka .. ..	"
Manuka (kahikatoa) .. ..	Manuka .. ..	Myrtaceæ.
Ramarama .. ..	Ramarama .. ..	"
Rohutu .. ..	Rohutu .. ..	"
Kohutuhutu .. ..	Fuchsia .. ..	Onagraceæ.
Horoeke .. ..	Lancewood .. ..	Araliaceæ.
" .. ..	Toothed lancewood .. ..	"
Puka .. ..	Broadleaf .. ..	Corneæ.
Kapuka .. ..	" .. ..	"
Karamu .. ..	Tree-karamu .. ..	Rubiaceæ.
Akeake .. ..	Akeake .. ..	Compositæ.
Heketara .. ..	" .. ..	"
Neinei .. ..	Neinei .. ..	Epacrideæ.
" .. ..	Grass-tree .. ..	"
Inaka .. ..	" .. ..	"
Mapau .. ..	Mapau .. ..	Myrsinææ.
Tipau .. ..	" .. ..	"
Pau .. ..	Pau .. ..	Sapoteæ.
Maire .. ..	Sandalwood .. ..	Jasmineæ.
Manawa .. ..	Mangrove .. ..	Verbenaceæ.
Ngaio .. ..	Ngaio .. ..	"
Toro .. ..	Toro .. ..	Proteaceæ.
Turepo .. ..	Milk-tree .. ..	Articeæ.
Toatoa .. ..	Toatoa .. ..	Coniferaæ.
" .. ..	Mountain toatoa .. ..	"



*Kauri-gum.**Exports.*

The following statement, taken from the Customs returns, shows the quantity exported in each year from 1891 to 1900, with the total value, and average per ton :—

Year.		Quantity.	Total Value.	Average per Ton.		
		Tons.	£	£	s.	d.
1891	..	8,388	437,056	52	2	1
1892	..	8,705	517,678	59	9	4
1893	..	8,317	510,775	61	8	3
1894	..	8,338	404,567	48	10	5
1895	..	7,425	418,766	56	8	0
1896	..	7,126	431,323	60	10	7
1897	..	6,641	398,010	59	18	8
1898	..	9,905	586,767	59	4	9
1899	..	11,116	607,919	54	13	7
1900	..	10,159	622,293	61	4	10

The total export from 1853 to 1905 (inclusive) has reached £12,920,331. Export, 1906 : 10,883 tons (at £51 12s.) = £561,444.

*Bark.*

The native barks suitable for tanning are :—

Tanekaha (*Phyllocladus trichomanoides*), Don. The bark contains 23 to 28 per cent. of tannin, which possesses special value as an organic mordant in the preparation of basils for kid gloves. It has realised from £30 to £50 per ton in London for this purpose, but is used chiefly in France. The tree is plentiful north of the Waikato. There can be little doubt that the phyllodia, if collected in the spring, would be of considerable value for tanning purposes, and in all probability the bark and phyllodia of *P. glauca* and *P. alpina* would answer the same purpose.

Tawhero (*Weinmannia silvicola*), Banks and Solander. The bark contains 10 to 13 per cent. of tannin.

Towhai (*W. racemosa*), Forster. The bark of these fine trees contains from 10 to 13 per cent. of tannin, and could be obtained in vast quantities, especially in the South Island.

Hinau (*Elæocarpus dentatus*), Vahl. This is of still higher value, as the bark contains 16 per cent. of tannin.

Pokaka (*Elæocarpus hookerianus*), Raoul. The bark contains 10 per cent. of tannin.

Maire tawhake (*Eugenia maire*), A. Cunningham. The bark yields 16·7 per cent. of tannin. The tree is almost restricted to the North Island.

Rata (*Metrosideros robusta*), A. Cunningham. The bark contains 18·5 per cent. of tannin, and can be obtained in large quantities.

Tawhai, or tawhai-raunui.

Black-birch, of Auckland, and parts of Otago and Southland.

Red-birch, of Wellington, Nelson, and parts of Otago.

Bull-birch, of southern lakes district.

Tooth-leaved beech (*Fagus fusca*), Hooker f. The bark affords 7·6 per cent. of tannin.

Rimu (*Dacrydium cupressinum*), Solander. The bark contains

4.3 per cent. of tannin, and could be obtained in vast quantities at small cost by stripping the logs before sawing.

Kohutuhutu, or kotukutuku (*Fuchsia excorticata*), Linné. The wood of this common tree contains 5.3 per cent. of tannin, but in all probability a larger yield could be extracted from the leaves and young shoots.

Tutu (*Coriaria ruscifolia*), Linné. The bark of this common shrub affords 16.8 per cent. of tannin, but is rather slim. There is, however, good reason to believe that a profitable extract could be obtained from the stout spring shoots and leaves.

In early years many of these barks were used, tanekaha, tawhero, and tooth-leaved beech being especially valuable, until Australian importation (the wattle-bark being richer in tannin), favoured by improved means of communication, drove them out of the market.

In America twenty years ago an extract from the bark of hemlock (Canadian spruce) was produced, and though the percentage of tannin is not more than 9 per cent., the industry was so remunerative as to cause 200,000 acres of this timber to be cleared every year. Extract has been made from New Zealand barks by Mr. Grayling, of New Plymouth; Mr. Kingsland, of Invercargill; Mr. Tyler, of Ngahauranga; Mr. Godsir, of Havelock; and various others.

In 1885 tannin extract was worth in London £16 to £18 per ton. Thus it is shown that by reduction of bulk and weight a mere waste product may be converted into an important article of export. It was estimated by Professor Kirk at £70,000 a year.

#### *Kauri-resin.*

"Whenever," wrote Professor Kirk in 1886, "a kauri-tree is cut down the bark and chips become more or less covered with exuded resin in a few days' time. Even the leaves, while still green, exhibit numerous rounded particles or minute tears." As the recent resin sells nearly as well as the fossil gum, the waste of the product is enormous. As in 1878 recent resin was exported to the value of £132,000, it has been computed that the waste that has taken place every year of the last two decades cannot be a penny short of two millions sterling. Professor Kirk recommended distillation, and described a rough process in use in Formosa for the extraction of camphor. Water is boiled in a wooden trough or hollow trunk, protected from the direct action of fire by a coating of clay, the trough being covered with a board bored all over with holes. Chips of camphor-wood are placed on the board, and covered with earthen pots. The steam from the boiling water passing through the board extracts the camphor and deposits it on the upper surface of the pots.

Major Lusk, in his valuable report on the timber supply (Annual Report, Lands and Survey, 1903-4), gave the financial results of long-conducted experiments at 13s. per tree. The Surveyor-General's comment was, "It yet remains to be seen whether the operation has not injuriously affected the trees."

The following year's report covered an adverse opinion by the Chief Forester, Mr. Matthews, which seems to settle the matter once for all:—

For some years past the practice of bleeding kauri-trees for the extraction of gum has been in operation in the North of Auckland, both on private as well as

on Crown lands. An application to the Auckland Land Board for a further extension of lease was referred for my opinion. Believing that this subject will be of some interest, my report and recommendation thereon, which was duly acted upon, are appended:—

I have perused the correspondence on this subject, and beg to report as follows: Ranger Lusk states that "Messrs. Dysart and Macfarlane have proved by a series of experiments that the health of the trees and the value of the timber would not be injuriously affected by the operation."

The latter portion of this statement seems to me contrary to all facts established by physiological science. Whether the timber from "bled" kauri-trees would or would not be deteriorated in commercial value cannot possibly be decided in the few years during which these experiments have been in progress. The trees would require to be converted into timber, and its lasting qualities tested against timber from "unbled" trees over a series of years, before such opinion could be accepted. The presence of tar, resin, and turpentine in all coniferous trees (such as the kauri) is absolutely necessary to prevent decay. Remove any one of the constituents, and the timber is at once deprived of its natural protection against disease or decay generally known as "dry-rot." This statement is an established fact, demonstrated by actual experiments by such famed vegetable pathologists as Professors Marchall, Ward, De Bary, Robert Hartig, and others.

The only instance of which I have personal experience in the colony is as follows: The rafters supporting the roof of First Church, Dunedin, were of Oregon pine. Some fifteen years after the building was erected these rafters exhibited signs of decay. An examination was made, and the result showed that the timber had completely perished. The architect who supervised the work was at a loss to understand why such reputed valuable timber had become worthless in such a short time. He therefore instituted inquiries, and traced the timber to the port of shipment in America, from whence he ascertained the fact that the trees from which these rafters (as well as the whole cargo) were cut had been bled for turpentine, as was usually the custom with timber for export.

Ranger Lusk states that "he has given the subject close attention, and he is of opinion that kauri-trees may be tapped without injuring them, but if the work is carried on in a rash and careless manner that the trees and the timber would undoubtedly suffer." He does not, however, say what effect judicious bleeding will have on the quality of the timber, although the Commissioner in his memorandum credits him with having said "the timber will not be damaged." There seems to be a general impression amongst the writers in the correspondence in question that it is possible to damage the trees by excessive bleeding. This is a fallacy: no amount of bleeding could possibly affect the health of the trees, the secretions being chiefly in the heart-wood, which to all intents and purposes is practically dead, and has nothing to do with the active growth of the tree, but merely acts as a support. The secretions of resin, &c., must not be confounded with the sap, which has an entirely different function—viz., to supply nourishment. The live portion of a tree-trunk does not extend beyond the sap-wood, one ring or layer of which annually becomes heart-wood after it has performed its function of returning the digested sap from the leaves to the roots.

Many trees are found perfectly hollow, with a mere shell of bark, liber, and sap-wood. The heart-wood may have entirely disappeared by disease or fire, and yet the trees are in perfect health, thus proving that any interference with the heart-wood or its juices has no possible effect on the general health of the tree.

The effect of extracting turpentine, resin, or tar—the secretions of coniferous trees—from the timber-trees of Europe and America is well known to be highly injurious to the timber, which is then only suitable for packing-cases and similar purposes where durability is not essential. Many instances could be quoted where trees have been "tapped" for a century or more, and yet no damage has resulted to the trees so far as their vitality is concerned.

It is therefore apparent that bleeding trees for resin is detrimental to the timber, and that the value of a kauri-tree known to be bled must necessarily be diminished. I am therefore of opinion that trees should not be leased for bleeding, unless they are situated in localities so difficult of access that the timber cannot be profitably marketed. If it be deemed expedient to continue this industry, the trees should be sold outright, instead of leasing them.

In consequence of the above, the practice of "bleeding" kauri in any forest is by regulation made an offence punishable by fine not exceeding £25 for every kauri-tree so bled.

*Tar.*

Many of the native trees contain tar, the richest in this product being the pines—kauri, totara, kahikatea, rimu, miro, matai, tane-kaha—also the beeches (the “birches” of the settlers), so widely spread throughout the Middle Island. A great source of danger from fire is the vast quantity of waste in sawmilling—tops, branches, crooked pieces, knots, and roots. If this were used up for tar the danger would be converted into a profit.

Tar is made in Northern Europe from the Scotch fir and the Baltic spruce, by processes described by Professor Kirk. The wood and roots are cut into short billets and burned slowly. A funnel-shaped cavity of any convenient size is excavated in the side of a sloping bank; an iron pan is fitted tightly into its bottom, and communicates with the exterior by an iron pipe passing through the side of the bank. The billets are tightly packed upright above the pan, and when the hole is full the wood is covered with turf, which is pounded by wooden stampers and mallets until it is firm enough to prevent the escape of volatile products. A small piece of the turf is taken off, the stack is set fire to, and the turf replaced. During the slow combustion the tar exudes, drops into the pan, and is conveyed by the pipe to casks waiting outside; and the casks when full are at once got ready for shipment.

In Scotland the process is more primitive: they do without pan or pipe, dig a hole in a bank, cut a drain to the bottom of it, fill up with timber, cover with sods, and fire the stack, catching the tar as it flows out of the drain.

*Pitch.*

This is obtained by boiling wood-tar until nearly one-half of its bulk has evaporated, when the remainder is allowed to cool into pitch. The process is usually effected in copper boilers, set in brickwork to diminish the risk of accident.

*Resin and Turpentine.*

Several trees, the best being rimu and kahikatea (red and white pine), yield a resin which, though not approximating in value to the kauri-gum (the best resin in the world), is quite equal to the average “rosin” of commerce, valued by importers in the colony at 5s. 7d. per hundredweight. The resin is found in a liquid state, being mixed with a volatile oil, the mixture being the sap of the tree, and known as the turpentine of commerce. The turpentine is obtained in Europe and America from the Scotch fir, Baltic spruce, larch, pinaster, silver-fir, the loblolly pine, and the Georgian pine. It varies considerably in value, some kinds being used chiefly for the manufacture of resin—as that of the pinaster, for instance; while the turpentine obtained from the silver-fir simply requires straining to free it from accidental impurities and render it fit to be used in the manufacture of clear varnishes.

Although a shake or fissure of any kind in the trunk of the rimu (red-pine) or kahikatea (white-pine) is always found to be completely filled with resin, no attempt has been made to collect it for commercial purposes. It may therefore be worth while to describe the mode of extraction practised in Southern Europe.

In the Landes of Bordeaux the pinaster has been largely planted to fix the blown sand, and the plantations thus formed not only yield a supply of useful timber and firewood, but afford support to a large portion of the population engaged in the collection of resin. In May a piece of the outer bark about 5 in. wide by 20 in. long is stripped from the trunk just above its base; a cavity sufficiently large to hold a half-pint of sap is cut in the trunk at the bottom of the place thus laid bare, or a trough attached outside. Above the trough or cavity the inner bark is removed to the width of 4 in. and the height of 6 in. The resin escapes from between the inner bark and the wood, and is conducted to the trough, from which it is removed at regular intervals. The surface of the wound is lightly chipped over once a week until the close of September, so as to expose a fresh surface; by this means its dimensions are gradually increased, but it is not allowed to increase to more than 6 in. in width and 18 in. in height. The following spring the process is repeated above the old wound, and every year after a fresh place is selected in the vertical line, until the incision is carried up to 15 ft. or so, according to the strength of the tree. After that a new incision is made at the base, parallel with the old one, not less than 2 in. away, and carried up to the same height by fresh annual incisions, all to the same height. The series is repeated until the tree has been surrounded with wounds, when the old incisions are found sufficiently healed to bear a repetition *de novo*. Of course, when it is not desired to preserve the trees, but to use them for firewood, or for the manufacture of tar, incisions are made all round the trunk at the same time, and regardless of length.

The resin which hardens on the surface of the wounds is very white, and is scraped off to be used in the manufacture of candles. It is called "barras." The liquid resin is termed "galipot." When collected it is placed in wooden vats sunk in the earth. To purify it from its impurities (fragments of bark, earth, &c.) it is placed in copper boilers, kept boiling and constantly stirred. When a spoonful on being cooled after pouring on to a smooth board crumbles freely on pressure between the fingers, the whole is considered to have been sufficiently boiled, and to be ready for filtering. This is effected by pouring the hot mass over 6 in. of straight straw or rushes into casks. It is then the "brown resin" of commerce, and is ready for use.

Yellow resin is manufactured by frequently adding cold water, a few drops at a time, causing the boiling resin to expand, when it is allowed to pass through a tube in the side of the boiler into another vessel, and ladled back again, until the resin becomes perfectly clear, when it is filtered as above into sand moulds, forming cakes from 100 lb. to 200 lb. in weight.

As it is not thought advisable to make any wound of greater length than 18 in. or 20 in. during one season, from eight or ten years will usually be required to operate upon the trunk to the height of 12 ft. or 15 ft. A short pole, with sloping notches to receive the feet, is used by the operator when the incisions are more than 6 ft. or 7 ft. from the ground. An expert operator does not require more than two or three minutes to ascend the tree, form a new surface to the wound, and descend. He is expected to attend to between two and three hundred trees a day, and to take the entire management of from fifteen hundred to two thousand trees each season. It need not be remarked

that eight hours does not constitute a working-day in the district under notice.

In some countries the resinous matter obtained from the trunk by incision is collected in baskets, which are placed over earthenware jars so as to allow the fluid portion to drain off, forming the common turpentine of commerce. The solid portion is then boiled to purify it, when it becomes ordinary resin.

The method of extracting the turpentine in Georgia, North Carolina, and Alabama—from the Georgia and loblolly pines (*Pinus australis* and *Pinus toedus*), which give the best turpentine in the market—is as follows: During winter small cavities, termed “boxes,” are cut in the trunk of the tree, about 12 in. above the ground. The boxes, which are cut with a long narrow axe like a mortising-axe, and can be made in ten minutes, slope downwards into the tree, and are large enough usually to hold two or three pints of fluid sap. From one to four boxes are made in a trunk, and trunks 15 in. through should have three boxes, each holding a quart.

The flow of sap is from the beginning of March to the end of August. The bark and sapwood above the box are cut and hacked every week during this period, the surface of the wound increasing in height each time until in the course of years it reaches 15 ft. or more. The turpentine is removed from the cavity as often as is necessary, and the resin that has dried on the boxes is scraped off and often mixed with it.

Trees carefully treated will last forty or fifty years. The first year's produce is always the most highly valued, and is called “virgin dip.” The resin scraped from the surface of the wound forms the common frankincense, or “gum thus” of the druggists, and is the chief ingredient in the incense used in the Roman Catholic churches as a substitute for the expensive *Olibanum* or true frankincense of Arabia.

Turpentine is obtained from the larch by boring auger-holes in the trunk ( $\frac{3}{4}$  in. to 1 in.), taking care not to reach the centre of the tree. The holes are slightly inclined upward, and have a tube or small gutter tightly fitted into each, with a tin canister or small bucket suspended from the end to receive the turpentine. A mature tree will yield from 7 lb. to 8 lb. of turpentine for forty or fifty years.

The turpentine is often collected in small cavities in the larch, exactly as in the New Zealand red-pine. In some cases the cavities are closed with a plug and the turpentine allowed to become pasty, when it is removed with an iron spoon.

In some pines, as in the silver-fir, in which the wood is destitute of resin-ducts, the turpentine is contained in small cavities beneath the bark. In Italy it is collected by the peasantry, who puncture the bladders in the bark and extract the turpentine.

The barbarous plan of cutting boxes in trees would not be adopted in New Zealand, at any rate when it is desired to continue the process of extraction for a lengthened period. Tin or zinc boxes could be readily fixed to the trunk, or even sunk in the ground at its base, and the turpentine conducted to them by grooves or some other simple contrivance. In this way every timber-tree might be made to yield a supply of turpentine for some years without material injury to its timber.\* Of course, when clearing is to be done incisions may be multiplied and cavities deepened without taking ulterior results into consideration.

\* As to lasting power of bled timber, see pages 358-9 (Matthews).

The amount of turpentine and resin in our native pines involves several points of direct interest to the botanist, as well as to the merchant and settler. It would be well for settlers in forest districts to ascertain the yield by actual experiment. The rate of flow should be carefully noted, and the variations caused by changes in temperature observed. And it would be advisable to try different methods of extraction with each tree, giving the preference to those which cause the least injury to the timber.

The Westland pine appears to merit particular attention: in common with the red and silver pine, it would probably afford turpentine of special value for certain purposes, although the yield of either would, in all likelihood, be comparatively small.

#### *Potash.*

This is extensively prepared from wood-ashes in the forest districts of Germany, Russia, and other European countries, also in Canada and the United States, where it enables the settler to defray a large proportion of the heavy cost of clearing the forest land. Potash-salts are found in varying proportions in all plants, and are most abundant in the young branches and leaves.

The process of extraction is simple and inexpensive. All parts of the plant, including the leaves, are burnt in dry pits dug in the earth, from 3 ft. to 5 ft. in depth, and of any convenient size. The ashes are placed in tubs or vats, each having an orifice near the bottom secured by a plug, and a false bottom covered with straw or rushes. The ashes are saturated, and after standing about twelve hours the potash liquor is drawn off and taken to the evaporating pans, usually shallow iron vessels, sometimes with corrugated bottoms. It is now kept boiling and stirred constantly, fresh liquor being added from time to time as required, until the whole becomes of a pasty consistence, when the heat is gradually reduced and the dry residuum allowed to cool. After the first potash liquor has been drawn off, water is again poured over the ash in order to remove all soluble matter, and the weak solution thus afforded is used to lixiviate a fresh supply of ashes.

In Canada the crude potash is usually sold to the nearest store-keeper; but it requires to undergo a process of calcination to free it from certain organic matter before it becomes the potash of commerce. The insoluble portion of the ash is used in the manufacture of certain kinds of glass, and is of great value as manure on account of the phosphates which it contains.

In Britain potash is employed in numerous manufactures, and the consumption increases year by year, so that no doubt can be entertained of the possibility of finding a market. Baron von Mueller estimates that a bucketful of ordinary wood-ashes contains about  $2\frac{1}{2}$  lb. of crude potash, worth 6d. per pound.

It is obvious that by collecting the ashes immediately after burning off, especially when much "logging" has been necessary, the settler has the means of defraying a considerable portion of the cost of clearing at a trifling outlay. Might not our local Boards derive a hint from this to assist them in defraying the cost of clearing the miles of furze and fern by which traffic is impeded upon some of our roads, and at the same time open a new outlet for labour?

Charcoal-burning and the making of wood-pulp for paper-manufacture are other industries which need not be described in detail.

### *The Planting of Trees.*

But of all the products of the forest, timber naturally stands at the head ; and of all the products of the soil, timber is, to the settler, indispensable. Fencing for his fields and garden ; material for his house ; shelter for his stock and his orchard, his home and his garden ; protection to his water-supply ; ornamental woodland round his homestead ; firewood : timber means all these things to the settler. It is imperative, therefore, that on every farm and estate not fortunate enough to possess timber, the planting of trees on a large scale with systematic purpose and sustained energy must be part of the system of management.

At the same time, it is a thing not to be lightly gone about, for there are difficulties at every turn. The advice of the old farmer to his son to " Aye be stickin' in a tree " is good, and his reason, because " It will be growin' when you are sleepin'," is better. But better than both is knowledge. That which is required is of many kinds—knowledge of the right kind of trees to plant—an important matter in a country a thousand miles long, with an assortment of climates as great as the variety of its soils, aspects, and altitudes ; of the treatment of seeds before planting, of the thousand vital details of transplanting, of the soils and the subsoils, of the time of year favourable to these operations—in short, of all the mysteries of the " how, when, and where " of this great subject. Without this knowledge, embracing a vast number of details, " stickin' in " of trees might be only foolishness.

But in New Zealand no one need be without this knowledge. Quite enough for the ordinary farmer's digestion and guidance is contained in " Tree Culture in New Zealand," the masterly and well-filled little book written by the Chief Forester, Mr. Matthews. It proves—firstly, as we have seen already, how unsuitable the native timbers are for the settlers' purpose ; secondly, there is a list of some four hundred trees, evergreen and deciduous, for various useful purposes, of fairly rapid growth—trees of broad glossy leaves in great masses for the rich ground and the low places, and trees with needle leaves for higher altitudes in situations where no moisture is, and trees for every conceivable situation. There are, in addition, careful descriptions in elaborate detail of all the processes from the collection of the seed to the cutting of the last thinning in the planted forest becoming ready to play its part. Studies of particular trees there are, or rather of types and classes of trees, with which there is much intermingled about sea-coast planting, street planting, the setting-out and growing of hedges, the raising of shelter plantations, of sheltering young trees in nurseries, of pruning them after they are planted out, and of many other things useful, salutary, and necessary. There are lists, in addition, of forty timbers good for fencing and sleepers, twenty-four well adapted for shelter, and forty-eight for extensive planting of hard woods. All the due information about soils and climate is present ; and there is a list of Eucalypti immune against the hardest frosts, of which it may be said with emphatic truth that had it been in existence forty years ago that wholesale slaughter of valuable well-grown gums of a few years



back which disfigure so much of the southern and central parts of the Middle Island would have been avoided. No settler's house can be considered properly equipped without a copy.

#### THE FOREST LAWS.

There are in New Zealand 20,500,000 acres of forest lands. They are divided by law into—

(1.) State forests proclaimed under the State Forests Act of 1885. These amounted on the 31st March, 1900, to 2,282,804 acres, of which 694,958 acres were reserved in the previous twelve months.

(2.) All other forest or bush standing on Crown lands undealt with. After the marketable timber is cleared off the forests, the land is either replanted or disposed of under the usual provisions of the Land Act.

Tenants of the Crown settled on treeless sections, and entitled to get timber from waste lands of the Crown for their improvements and domestic fuel, can only take it from the bush reserves by permission of the Crown Lands Commissioner of the district.

In all other respects the two classes of forest land are under the same conditions, and administered under practically identical regulations by the Lands and Survey Department.

The Minister of Lands is the Commissioner of State Forests, with whom lies the chief power over those forests under the Act of 1885; and the chief power in dealing with the other forests vests nominally in different authorities, but really in the Minister of Lands.

There was at one time a Forest Department, separate and independent, under a Chief Commissioner, assisted by Conservators of Forests and Forest Rangers. This Department is now merged with the Department of Lands and Survey, the Minister being Commissioner of State Forests, the district Commissioners of Crown Lands being the Conservators of Forests, and the Crown Lands Rangers being the Forest Rangers. In 1896 a Division of the Department, under the charge of a Chief Forester, was established, mainly with the object of afforesting the treeless and in some respects waste lands of the colony.

Nurseries for growing trees have now been established in both Islands, and the annual planting will now be about three and a half million trees.

#### *Use of Timber.*

No timber can be felled, removed, or sold without license or permit. Unauthorised possession of timber is finable up to £5, and unauthorised occupation of Crown lands, or felling, entails a fine up to £20, with the alternative of imprisonment up to one month.

Trespassing in a forest entails a penalty up to £50; and a fine up to £20 can be imposed on the owners of stock trespassing, together with the obligation of paying for any damage done, and trespassing stock may be impounded in the usual way.

#### *Fires.*

Any one who lights a fire in or near a forest and allows it to spread is liable to a penalty not exceeding £50; if any damage is done he will have to pay for it, and, in any case, is liable to prosecution under "The Criminal Code Act, 1893."

### *Destruction of Animals*

Any one carrying, without the written permission of the proper officer, "a gun, or any engine, net, or device, or using a dog for the destruction of any bird or animal," or taking eggs or young birds, is liable to a penalty up to £50, seizure of his gun or gear, and destruction of his dog.

### *Prohibited Months.*

All the forests are closed against all and sundry, whether license-holders or not, during certain months of the year, which are: In the North Island—November, December, January, February, March; in Canterbury, Nelson, and Marlborough—December, January, February.

The penalty for entering a forest in these months is up to £50. Licensees are excepted while felling and removing timber, if not forbidden by the terms of their licenses.

### *Seizure.*

Timber suspected to have been unlawfully cut may be seized, and if not claimed within fourteen days may be sold. The reputed owner must be notified if his address is known, but non-receipt of notice is no bar to the sale.

### *Disposal of Timber, &c.*

Timber and its products are disposed of by—(1) Auction, at per 100 ft.; (2) appraisement; and (3) license to fell, saw, split, strip bark, &c. In (1) and (2) the terms are at the discretion of the proper authority,\* subject to the conditions established by law.

For auction sales it is usual to have the timber classed and estimated, to fix the upset price, and publish the particulars, with the conditions of sale attached, prescribing rates and date-limits of removal, way-leaves, payments, and surrender of the cleared areas to the Department. Sometimes the proper authority\* elects to exercise its power of reserving trees required for special purposes, and these trees are branded "F.R.," and cannot be cut by licensees.

Special licenses may be granted for cutting single trees or clumps after appraisement and report by the proper officers, by auction or in any other way, on conditions fixed by the proper authority.\* The timber so sold is to be branded with a broad arrow pointed upwards, under the capital letter "F," on the bare wood near the base of each tree, and no other can be felled.

In all cases an official brand as above may be used by the proper authority, and all trees so branded must be felled above such brand. If any of the purchase-money remains unpaid seven days after the limit fixed for payment, the contract of sale may be declared at an end, and all moneys paid on its account forfeited to the Crown.

In all disputes as to correctness of valuation, or statement of timber cut, or of damage done, the decision of the proper authority† is final, and payment must be made at once, with right reserved to the licensee to appeal to any Court of competent jurisdiction for refund.

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\* Conservator of State Forests or Waste Lands Board. † Conservator of State Forests or Commissioner of Crown Lands.

## LICENSES.

### *Application.*

Application must be made, in the form prescribed (Form 1), declaring the object for which the license is required, addressed to the proper authority,\* and accompanied by a sketch of the locality, which must be described, and the survey fees.

### *Date.*

Licenses date either from date of notification of completion of survey or date of grant. All the conditions apply from the date, and the utmost rapidity of survey possible is guaranteed.

### *Forfeiture of Deposit.*

Forfeiture may be by abandonment of application, by one month's neglect to take up the license, or by non-fulfilment of any of the conditions of the license.

### *Renewal.*

Licenses may be renewed if the proper officer\* certifies to the due observance of all conditions during the currency of the lease.

### *Transfers.*

Transfers may be effected on payment of a fee of £1 1s., by leave of the proper authority,† who may refuse if any regulations have been broken or if he thinks it better for the public interest.

### *Power at Headquarters.*

There is no obligation to grant any license, renewal, or transfer.

### *Way-leaves, Roads and Tramways.*

Way-leaves are granted for roads or tramways to all licensees, on conditions fixed by the proper authority, during the currency of their leases. The Crown retains all rights-of-way over every license area, and has the power of authorising local bodies and licensed persons to use the same. No obstruction may be offered and no timber may be felled upon ways so authorised. No one can use another's way without his permission, and disuse of a way for ninety days entails forfeiture at the discretion of the proper authority.

### *Royalty.*

The schedule of royalties payable for cutting timber is at page 369. When payment is by royalty, payment may, by agreement, be wholly or partly in cash, after ascertainment of the quantity and character of the timber on the licensed area, or it may be upon the actual output of the sawmill, in which case the books of the mill must be open for inspection by the proper officers.

### *Brand.*

License-holders, on being required to do so by the proper authority,\* must brand their timber, and their brands must be registered

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\* Conservator of State Forests or Waste Lands Board. † Conservator of State Forests or Commissioner of Crown Lands.

in the District Land Board. No two brands may be the same, and the wrongful use of a brand entails a money penalty up to £50. When trees are branded with the official brand, they must be felled above the brand.

#### *Removal of Timber.*

Timber must be felled and removed from licensed areas without injury to the young growth, neglect in this particular entailing payment of the damage done and forfeiture of license at the discretion of the proper authority.\* Timber remaining without a permit on the area after the currency of a lease may be forfeited to the Crown. Before the erection of the mill plant no more timber than is necessary for the same can be removed from the licensed area. Timber may by permission be removed for utilisation elsewhere on prescribed conditions.

#### *Boundaries.*

The surveyed boundaries of licensed areas have to be kept clear at all times of fallen timber and young trees, the licensees of adjoining areas dividing the work. Neglect for fourteen days after notice by the proper officer entails forfeiture, and in all disputes the decision of the chief authority\* is final.

#### *Sawmill Licenses.*

The limit of the first area is 200 acres, and three other sections (up to 600 acres in all) may be reserved on application for the future use of the license-holder. The period for the first licensed area is three years, and during its currency the licensee cannot work the reserved areas. The period for the reserved areas is at the rate of one year for every 50 acres, with a maximum limit for the aggregate of the areas originally reserved of twenty-one years.

The shape must be, as far as possible, rectangular, in the proportion of not less than three to one, and must be, so far as is compatible with previous surveys, on one side of a watershed.

#### *Hand-sawing Licenses.*

The area is fixed between 1 and 20 acres. The period is not to exceed two years. There are no reserve areas; and the payment is usually according to the schedule of royalty rates at page 369.

#### *Wood Cutting and Splitting.*

The areas and fees to be paid vary: (a.) In forests "cut out" or not heavily timbered, the areas and corresponding fees are—200 ft. by 200 ft., £2 10s. per annum per man; 200 ft. by 100 ft., £1 10s. per annum per man; 200 ft. by 50 ft., £1 per annum per man. (b.) In lightly timbered country these dimensions may be enlarged up to areas carrying enough timber for a year's felling per man. (c.) In virgin forests, heavily timbered, the fees are—For cutting firewood, £5 per annum; for splitting, £7 10s. per annum. (d.) In exceptionally well-timbered country, the proper authority\* may increase these rates, or may license at schedule rates of royalty.

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\* Conservator of State Forests or Waste Lands Board.

*Special Licenses.*

These are granted on application—(a.) To settlers on treeless Crown sections, who are entitled by law to cut timber in forests (other than State forests) for their statutory improvements and household fuel, but not for sale: the terms and conditions are as the Land Boards choose to make them. (b.) To charcoal-burners, extractors of tar, potash, and other by-products: the fees and conditions are fixed by the chief authority.\* They are always to take proper precautions against fire, and the responsibility for damage by fire to the forest through negligence rests upon them. In the closed season (*vide* page 366) none of these works can go on. (c.) To peelers of bark: on terms and conditions to be prescribed by the proper authority.\*

*Sleeper-cutting License.*

For a twelve-months license for cutting sleepers for the New Zealand Railways the fee is 5s. The holder is entitled to cut all timber on the area covered by his application which is not included in any sawmill or appraisement license, or in land under lease or license from the Crown. There is a royalty to be paid of 3d. on every sleeper cut, whether accepted by the Railways or not.

The penalty for cutting the wrong timber, or for evading the royalty, or wasting timber cut for sleepers, or of wanton destruction in the forest, is a fine up to £20, and the forfeiture or suspension of the license at the discretion of the proper authority.

*Peeling Bark.*

Licenses may be given at the discretion of the Ministerial head of the Department, and on any terms he chooses.

*Bleeding Kauri Trees.*

This is forbidden under penalty up to £25 for each tree bled.

*Unlawful Damage to any Tree.*

Any one unlawfully injuring or destroying any timber-tree growing in any forest† is liable to a penalty up to £5 per tree, injuries from "bleeding" to trees other than kauri excepted.

*Royalty.*

Ordinary royalty shall be paid by the purchasers of timber in forests according to the following classification:—

		At per 10	
		Sup. Ft.	
Class I—		s.	d.
Totara, matai, puriri, maire-raunui, silver-pine, and pohu-			
tukawa, not less than .. .. .		2	0
Class II—			
Kauri, not less than .. .. .		1	0
Class III—			
Totara and matai less than 25 ft. in length, rata, tangeao,			
tooth- and entire-leaved beeches, manuka (tea-tree),			
manoa, tanekaha, kawaka, kaikawaka, not less than ..		1	0

\* Conservator of State Forests or Waste Lands Board. † There are two regulations, one for State forests and one for the other division of forests.

	At per 10
	Sup. Ft.
	s. d.
Class IV—	
Rewarewa, mapau, toro, hinau, taraire, miro, not less than	0 6
Class V—	
Mountain and silver beech, not less than .. ..	0 6
Class VI—	
Rimu (red-pine), kahikatea (white-pine), kamai, pukatea, tawa, not less than .. ..	0 6
Class VII—	
Puriri, totara, kauri, silver-pine, and matai posts and sleepers to be charged under Classes I to III.	Per 100.
Other posts, rails, and sleepers .. ..	8 0
Fencing-stakes .. ..	4 0
	Per Cord.
Firewood, not less than .. ..	1 0
No standing totara or black-pine, and no timber required or suitable for milling purposes, to be permitted to be cut under this class.	

The royalty to be paid under this schedule is subject to the right of the Land Board to cause any timber to be sold by appraisalment or by auction in the manner set forth in the foregoing regulations.

### Application Form.

#### Form 1.

"The New Zealand State Forests Act, 1885" (or "Land Act, 1892").

APPLICATION FOR [State nature of license required] LICENSE.

To the Commissioner of State Forests.

I, [Name in full], of [Residence and occupation], do hereby apply for a license [Give full particulars of license required] to .. over all that area described in the schedule hereto; and I also apply [If the application be for a sawmill license with reserved areas, give particulars of the extent of such areas, or, if any other privilege be required, state the nature of the same].

I deposit herewith the sum of .., as required by the Commissioner of State Forests, such sum to be counted as [Survey fee, royalty, or license fee, as the case may require]: and I agree to comply with the regulations now in force relating to State forests or forest reserves within the district, in so far as they affect the license hereby applied for.

I attach a sketch showing the area and locality.

As witness my hand, this .. day of .., 19 ..  
[Signature of applicant.]

#### Form 2.

"The Land Act, 1892" (or "State Forests Act, 1885").

#### SAWMILL LICENSE.

[Name in full], of [Address and occupation], having paid the sum of .. by way of [State what the money has been paid for—viz., as a deposit for survey fees, royalties, &c.], is hereby licensed to erect a sawmill, and to cut timber within the area\* described in the schedule hereto for the period from .. to .. 19 .., subject to the provisions of the above-mentioned Act and to the regulations attached hereto; subject also to the following express conditions: [Specify any special conditions upon which the license is to be held; and in cases where the license is for a reserved area it should state the extent to which the licensee has the right to work a sawmill or use roads and tramways over the original or previous area].

As witness my hand, this .. day of .., 19 ..  
Commissioner of Crown Lands [or Commissioner of State Forests],  
Acting for and on behalf of the Land Board  
for the District of ..  
[Schedule.]

\* The area is only to include the actual area for which the license is granted, and it is not to give any rights over the reserved areas.

### KAURI TIMBER.

In addition to the foregoing, which apply to all timber (kauri included), there are special regulations for the disposal of kauri on Crown lands.

(Form.)

#### TENDER FOR KAURI SAWMILLING TIMBER.

I, \_\_\_\_\_, hereby tender for \_\_\_\_\_ superficial feet of kauri timber.  
The position of the timber applied for is shown in red on the lithograph, tracing, or sketch-plan attached hereto.

It is intended to cut the timber at the \_\_\_\_\_ Mill, situated on \_\_\_\_\_, in the \_\_\_\_\_ District, concerning which I attach the following statement as to output, timber on hand, &c.

#### Statement.

Name of mill, \_\_\_\_\_, situated in \_\_\_\_\_ District within \_\_\_\_\_ miles of  
Township, and close to or fronting \_\_\_\_\_ River.  
Capacity, \_\_\_\_\_ million feet per annum.  
Output during last year, \_\_\_\_\_ million feet.  
Details of total quantity of timber now on hand for cutting at the above mill,—

	Feet.
Total quantity on hand .. .. .	

I, \_\_\_\_\_, hereby certify that the above is a correct statement as regards the \_\_\_\_\_ Mill, for which a tender is now being made to obtain \_\_\_\_\_ million feet of kauri timber.

Dated this \_\_\_\_\_ day of \_\_\_\_\_, 190 .

Name :

The tenders must be accompanied by a deposit of 5 per cent. of the amount of the tender ; to be returned to the tenderer or retained as part payment, according to success or otherwise of tender. They are forwarded to the head authority at Wellington, with the report of the Ranger and the remarks of the chief officer at the District Office. The highest tender need not be accepted.

The Commissioner (or Conservator, as the case may be) has the right to allot the timber in any way he thinks best, and must restrict the sale of timber to millowners, for use at their mills.

#### Licenses.

The licenses follow acceptance of tender, they provide a maximum time for the removal of timber, they contain the usual conditions against waste, and entail the furnishing of an annual statement of timber on the lands held by the licensee.

#### Transfers.

Transfers are not allowed during the first two years of license, or of timber covered by it, or of interest in either, without the approval of the proper authority.

#### Payment for Timber.

Payment for timber shall be made by the licensee either wholly in cash on acceptance of tender, or partly in cash and partly by instalments, as follows : For half to one million feet, half in cash on acceptance of tender and half in six months thereafter ; for one to three million feet, one-third in cash on acceptance of tender, one-third in eight and one-third in sixteen months thereafter ; for three to six million feet, one-fifth in cash on acceptance of tender, one-fifth in seven,

one-fifth in fourteen, one-fifth in twenty-one, and one-fifth in twenty-eight months thereafter; for six to ten million feet, one-fifth in cash on acceptance of tender, one-fifth in nine, one-fifth in eighteen, one-fifth in twenty-seven, and one-fifth in thirty-six months thereafter; and the Crown can choose to accept royalty on estimated or actual quantity of the timber.

All instalments at 5 per cent. from date of acceptance of tender.

#### *Removal of Timber.*

The time may be extended. The Crown may accept royalty either on estimated or realised quantity of timber. When payment is made by instalments,—

The property in all uncut timber shall remain in the Crown until all the instalments are paid :

The value of the timber cut shall at no time exceed the total amount actually paid :

In any case where the Conservator of State Forests is satisfied that timber has been cut in excess of the limit fixed by the last preceding paragraph, he shall appraise the quantity and value of the timber so cut in excess and demand payment from the licensee of the amount of such appraisal. The amount paid shall be in or towards satisfaction of the accruing instalments in the order in which they accrue due, and shall accordingly be credited to the same, as also to the promissory notes securing the same. In default of payment of such amount for the space of fourteen days the whole of the unpaid instalments shall be payable forthwith, and payment may be enforced accordingly.

#### *Logging.*

Persons wishing to buy timber for cutting into logs for sale to millers or for export have to send in tenders as above, stating necessary particulars as to royalty and terms of payment, trade, methods of getting timber to port or mill, property in timber, &c. These tenders are forwarded to headquarters, with the report of a Ranger and remarks by head district officer attached, after which the areas are, on the approval of the head authority, thrown open to public tender.

Timber acquired for logging may not be sold to any miller who controls more than three times the capacity of his mill.



## PART VIII.

## THE COST OF STOCKING AND WORKING A FARM.

## INTRODUCTION.

A CONSIDERABLE quantity of information has been collated and recorded in the following pages for the information of settlers. The prices are intended only as an approximation to the sums of money a settler requires to spend at the start.

## TABLE I.—THE FOREST.

## COST OF CLEARING.

NOTE.—In the Auckland District felling varies from £1 for light to £1 5s. for ordinary bush, everything to be felled under 3 ft. ; but in felling everything, such as for fence-lines or special clearings, where all is felled, from £1 10s. to as high as £1 15s. is paid.

For logging-up various prices are paid, depending on size and quantity of timber on land. The work is generally done by the owners of the land themselves, assisted where necessary by day labour. It is reckoned to cost from £1 per acre to £3 for heavily timbered land. The cost of burning is hard to determine, there being no fixed rate; generally done by owner, otherwise by day-labour. Ordinary bush burns should not cost more than 3d. per acre (full value).

*Auckland Land District.*

County.	Felling, per Acre.		Clearing, per Acre.	
	Virgin Bush.	Milled Bush.	Logging-up.	Burning.
Mangonui .. .. .	20/-25/	10/-15/	20/-60/	5/
Whangaroa .. .. .	25/	10/-20/	"	"
Hokianga .. .. .	25/-27/6	15/-20/	"	"
Bay of Islands .. .. .	25/	10/-20/	"	"
Hobson .. .. .	"	"	"	"
Whangarei .. .. .	"	15/-20/	"	"
Otamatea .. .. .	20/-25/	10/-15/	"	"
Rodney .. .. .	"	"	"	"
Waitemata .. .. .	25/	10/-20/	"	"
Manukau .. .. .	20/-25/	"	"	"
Coromandel .. .. .	"	"	"	"
Thames .. .. .	"	"	"	"
Ohinemuri .. .. .	"	"	"	"
Piako .. .. .	"	"	"	"
Waikato .. .. .	"	15/-20/	"	"
Waipa .. .. .	"	"	"	"
Raglan .. .. .	"	"	"	"
Kawhia .. .. .	"	"	"	"
Rotorua .. .. .	"	"	"	"
Tauranga .. .. .	"	"	"	"
Whakatane .. .. .	"	"	"	"
Opotiki .. .. .	"	"	"	"
Taupo West*	"	"	"	"
Taupo East*	"	"	"	"

\* In these counties there is not enough felling, &c., to supply data.

## THE FOREST—continued.

County.	Felling, per Acre.		Clearing, per Acre.	
	Virgin Bush.	Milled Bush.	Logging-up.	Burning.
<i>Taranaki Land District.</i>				
Waitotara .. .. .	23/-27/	..	..	..
Taranaki .. .. .	"	20/	20/*	5/
Egmont .. .. .	"	"	"	"
Stratford .. .. .	"	15/-20/	"	"
Patea .. .. .	"	"	"	"
Hawera .. .. .	"	"	"	"
Clifton .. .. .	"	"	"	"

\* From £1 upwards, according to circumstances.

*Hawke's Bay Land District.*

Waipatu .. .. .	15/-40/	10/-15/	2/-10/	6d.
Cook .. .. .	17/6-40/	"	"	"
Wairoa .. .. .	15/-25/*	"	"	"
Hawke's Bay .. .. .	17/6-40/	"	"	"
Waipawa .. .. .	"	"	"	"
Patangata .. .. .	"	"	"	"
Woodville .. .. .	"	"	"	"

\* Includes cutting to 2 ft.

*Wellington Land District.*

Patea .. .. .	15/-25/	..	40/-80/*	3/-4/
Waitotara .. .. .	20/-30/	..	40/-100/*	3/6-5/
Taupo East .. .. .	..	..	..	..
Taupo West .. .. .	..	..	..	..
Wanganui .. .. .	25/-40/	..	40/-100/*	3/6-5/
Hawke's Bay .. .. .	20/-30/	..	"	"
Rangitikei .. .. .	25/-35/	..	"	"
Kiwitea .. .. .	"	..	"	"
Oroua .. .. .	..	..	..	..
Manawatu .. .. .	..	..	..	..
Horowhenua .. .. .	25/-35/	..	..	3/6-4/
Pahiatua .. .. .	25/-32/6	15/-25/	2/6-5/† (25/-30/†)	5/
Eketahuna .. .. .	"	"	"	5/
Masterton .. .. .	"	"	"	5/
Akitio .. .. .	"	"	"	5/
Castlepoint .. .. .	..	..	..	..
Mauriceville .. .. .	25/-32/6	15/-25/	2/6-5/† (25/-30/†)	5/
Wairarapa South .. .. .	"	"	"	5/
Hutt .. .. .	"	"	"	5/

\* Stumping included.  
" logging-up."

† After burn.

‡ Cost of stumping.

§ Cost included in



MANGAOTAKI GORGE.

*Immigrants' Guide.*

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THE FOREST—*continued.*

County.	Felling, per Acre.		Clearing, per Acre.	
	Virgin Bush.	Milled Bush.	Logging-up.	Burning.
<i>Marlborough Land District.*</i>				
Sounds .. .. .	25/	18/	10/	3/
Marlborough .. .. .	20/-23/	20/	..	3/-4/6
Kaikoura .. .. .	20/-30/	15/	10/-20/	3/-5/

\* Cost of felling virgin bush is for clearing trees from 3 ft. up, and the cost of burning includes sowing.

*Westland Land District.*

Westland .. .. .	30	..	..	..
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*Nelson Land District.*

Waimea .. .. .	15/-20/	12/-15/	20/-40/	10/
Collingwood .. .. .	15/-35	12/-20/	..	5/-10/
Buller .. .. .	25/-40	20/	30/-80/	10/-20/
Inangahua .. .. .	20/-30/	..	20/-25 *	..

\* Includes burning.

*Canterbury Land District.*

In this land district there is very little bush. There is virgin bush in the Counties of Amuri, Ashley, Selwyn, Akaroa, and Ashburton. The cost of felling it is from £1 to £1 7s. per acre.

*Otago Land District.*

The only counties possessing bush are Clutha and Lake. The cost is : Felling virgin bush, £1 10s. to £1 15s. per acre ; felling milled bush, £1 to £1 10s. per acre ; logging-up, 15s. to £1 ; burning (including seed and sowing), 12s. 6d. to £1.

*Southland Land District.*

*Stewart Island.*—The settlement of Stewart Island is on a small scale, and livelihood is earned chiefly by fishing and keeping small vegetable-gardens. Only small patches of land are cleared in the bays opposite Bluff Harbour for supply of vegetables for local use. The clearing costs £1 10s. an acre ; logging-up, £1 ; and burning, 10s.

*Fiord County.*—Here there are no data.

*Wallace and Southland.*—In these felling costs £1 to £1 5s. per acre ; logging-up, 15s. ; and burning, 5s. to 7s. 6d.

TABLE II.—THE NEW PASTURE.

NOTE.—The following remarks apply to the Auckland District :—

*Between Forest and Pasture.*—Under ordinary circumstances from twelve to fifteen months is the period between the axe and the first grass fit for stock. Bushfelling generally commences about May and ends about November. Burning and sowing last from the end of March to the end of April. The land is ready for stocking in the following spring. There are tracts of high-range bush lands, such as Rauamoā, in Kawhia County, high-range country in Hokianga, and high forest lands in Rotorua County. Here experience has shown that good results are obtained by letting the felled bush lie for an extra season, then under-scrubbing any fresh growth, together with close lopping. These high forest lands are subject to heavy rainfalls. The bush lands have a heavy covering of decayed foliage and mossy growth; this holds the wet like a sponge, and does not dry sufficiently in one season to insure a good burn. The grass-seed when sown apparently takes well, but with the summer heat the deposit parches up, and the roots of the grass, not having reached the solid earth, die out, with the sequence that another burning and sowing is necessitated. Three different burns and sowings have been known on the one piece of land—two failures, with a splendid take and permanent pasture on last occasion.

*Carrying-capacity.*—On what is known in Auckland as virgin bush no sheep are depastured, but it will carry cattle during the winter months at an average of about 10 acres per head. On the other hand, the felled and grassed bush lands vary according to locality and quality, in some cases 2 acres to 4 acres, even as high as 6 acres, per head for cattle, and from two sheep to the acre to 2 acres per sheep.

It is, unfortunately, a fact that a great deal of these bush lands will not hold the grasses usually sown for more than three years, with the result that, owing to the stumps and top-cumbering, the ground cannot be ploughed for several years, until these either decay or the land is stumped. In the meantime (with the exception of the hardier grasses) weeds and rubbish take possession of the land, and its carrying-capacity is reduced to a minimum. This difficulty should in a great measure be met by sowing a judicious mixture of grasses when land is first laid down, and it is a matter that requires more attention than it receives.

*Auckland Land District.*

County.	Time between Forest and Grass (Months).	Grass-seed most suitable.	Carrying-capacity.	
			Cattle : Acres per Head.	Sheep : Heads per Acre.
Mangonui ..	12-15	All necessary information will be found in Appendix I, following Table XII.	..	..
Whangaroa ..	"		..	..
Hokianga ..	15-8		..	..
Bay of Islands ..	12-15		..	..
Hobson ..	"		..	..
Whangarei ..	"		..	..
Otamatea ..	"		..	..
Rodney ..	"		..	..
Waitemata ..	"		..	..
Manukau ..	"		2-4	1-3
Coromandel ..	"		1-5	1-2
Thames ..	"		2-6	"
Ohinemuri ..	"		1-5	"
Piako ..	"		2-4	1-4
Waikato ..	"		2-5	1-2
Waipa ..	15-18		3-5	"
Raglan ..	"		2-4	1-3
Kawhia ..	12-15		"	"
Taupo West ..	"		..	..
Taupo East ..	"		..	..
Rotorua ..	12-24		..	..
Tauranga ..	12-15		2-4	1-2
Whakatane ..	"		4-6	"
Opotiki ..	"		2-5	"

## THE NEW PASTURE—continued.

County.	Time between Forest and Grass (Months).	Grass-seed most suitable.	Carrying-capacity.	
			Cattle : Acres per Head.	Sheep : Heads per Acre.

*Taranaki Land District.*

Waitotara ..	..		2½	..
Taranaki Egmont	12-15*	Cocksfoot, 5 lb.; rye-grass, 10 lb.; Italian rye-grass, 3 lb.; crested dogtail, 1 lb.; meadow foxtail, 2 lb.; white clover, 1 lb.; cow-grass, 1 lb.; timo- thy, 3 lb.; rape, 2 lb.	"	2½-3
Stratford ..	"	Ditto .. .. .	"	"
Clifton ..	"	" .. .. .	"	"
Patea ..	"	Cocksfoot, 5 lb.; Poa grass (three kinds), 1½ lb.; white clover, 1 lb.; alsike, 1 lb.; cow-grass, 1 lb.; sheep fescue, ½ lb.; meadow fescue, ½ lb.; crested dogtail, 1 lb.; timothy, 1 lb.; trefoil, 1 lb.; rape, 2 lb.; mustard, ½ lb.; weight per acre, 22 lb.	2-2½	"
Hawera ..	"	Ditto .. .. .	"	"

\* Felling is usually done in winter. The burn is done generally in February. Sowing is done in March, and the pasture is ready in September.

*Hawke's Bay Land District.*

Waiapu ..	10-18*	A mixture of cocksfoot, rye-grass, clover, timothy, and native grass-seed in proportion of 25 lb. to 2 bushels to the acre	2	2
Cook ..	"	Cocksfoot, rye, clover, timothy, crested dog, 25 lb. to 2 bushels per acre (for poor land increase cocksfoot and decrease rye)	"	"
Wairoa ..	"	Chiefly cocksfoot, with a propor- tion of rye-grass and white clover; 2 bushels is a big dressing	†1-2	2†
Hawke's Bay (Woodville)	"	Usually white clover, cow-grass, rye-grass, cocksfoot, crested dog, and some of the fescues; 25 lb. to 40 lb. per acre	3	2
Waipawa ..	"	Ditto .. .. .	"	"
Patangata ..	"	" .. .. .	"	"

\* According to burn.

† Seldom, and then not advisable.

‡ For a few years.

THE NEW PASTURE—*continued.*

County.	Time between Forest and Grass (Months).	Grass-seed most suitable.	Carrying-capacity.	
			Cattle : Acres per Head.	Sheep : Heads per Acre.
Wellington Land District.				
Patea ..	15-18	Rye-grass and cocksfoot, with a mixture of fine grasses, according to ground and locality; 20 lb. to 25 lb. per acre	1½-4	1½-4
Waitotara ..	"	Ditto .. .. .	"	"
Wanganui ..	"	" .. .. .	2-5	1-3
Hawke's Bay ..	"	" .. .. .	2-4	1½-2½
Rangitikei ..	"	" .. .. .	2-3	2-3
Kiwitea ..	"	" .. .. .	"	"
Horowhenua ..	"	" .. .. .	2-4	1½-3
Taupo East ..	..	A fair mixture of white clover and other grasses	..	..
Taupo West ..	..	Ditto .. .. .	..	..
Pohangina ..	15-18	Rye-grass and cocksfoot, with fine grasses, according to soil	..	..
Oroua* ..	..	.. .. .	..	..
Manawatu* ..	..	.. .. .	..	..
Pahiatua ..	12-14	Rye-grass, 12 lb.; cocksfoot, 8 lb.; rape, 1 lb.; timothy, 1½ lb.; cow-grass, 1 lb.; crested dog, 1 lb.; foxtail, 1½ lb.; alsike, 1 lb.; white clover, 1 lb.; meadow fescue, 1 lb.; rape, 2 lb.: 31 lb. per acre	2	2½
Eketahuna ..	"	Ditto .. .. .	"	"
Masterton ..	"	" .. .. .	"	"
Akitio ..	"	" .. .. .	"	"
Mauriceville ..	"	" .. .. .	"	"
Wairarapa ..	"	" .. .. .	"	"
Castlepoint ..	"	" .. .. .	"	"
Hutt* ..	..	.. .. .	..	..

\* No felling.

*Marlborough Land District.*

Sounds ..	12	Cocksfoot, with a little rye-grass and clover; 25 lb. to 30 lb. per acre	5	1½
Marlborough ..	"	Ditto* .. .. .	3	"
Kaikoura ..	9-12	Ditto,* with the addition of timothy; 15 lb. to 45 lb. per acre†	2-5	½-3

\* For ploughed land: Marlborough—Rye-grass, 15 lb.; cocksfoot, 6 lb.; meadow fescue, 2 lb.; crested dogtail, 2 lb.; Cheving's fescue, 2 lb.; timothy, 1 lb.; white clover, 2 lb.; red clover, 2 lb.; cow-grass, 3 lb. Kaikoura—Cocksfoot or rye-grass, 1 bushel; 8 lb. clover to 6 lb. cocksfoot, or 4 lb. clover to 6 lb. rye-grass; 2 lb. timothy.

† Opinions vary widely.



THE NEW PASTURE—*continued.*

County.	Time between Forest and Grass (Months).	Grass-seed most suitable.	Carrying-capacity.	
			Cattle : Acres per Head.	Sheep : Heads per Acre.

*Nelson Land District.*

Waimea ..	15-18	Rye, cocksfoot, and clover, 1½ to 2 bushels per acre	4	½-2
Collingwood ..	12-18	Ditto, 2 bushels per acre ..	"	½-4*
Buller ..	"	" " " "	2†-4	½-2
Inangahua ..	"	Cocksfoot, rye-grass, clover, and timothy, 2 bushels	4‡	1-2

\* The first is for flat, the second for hill land. † Cleared river-flats and coast lands.  
‡ Vary greatly.

*Westland Land District.*

Westland ..	6*	Clover, cocksfoot, rye, and timothy	2	1
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\* After favourable burn.

*Canterbury Land District.*

Ashley ..	12	20 lb. to 30 lb. cocksfoot, with 5 lb. to 10 lb. rye-grass and white clover	2	2
Selwyn ..	12*	Ditto .. .. .	"	"
Akaroa ..	24	" .. .. .	1-1½	3
Ashburton ..	12*	" .. .. .	1½-2	1-2

NOTE.—In the other counties of this land district there is no bush.

\* For light stocking with cattle.

*Otago Land District.*

Clutha ..	18-24	Cocksfoot, rye-grass, clover, and cow-grass, 30 lb. per acre	..	..
Lake ..	"	Ditto .. .. .	..	..

NOTE.—In the other counties there is no bush.

*Southland Land District.*

Lake ..	..	Chiefly cocksfoot, white clover, and rye-grass, with a little crested dogtail	..	..
Wallace ..	6	Cocksfoot, 15 lb.; rye-grass, 10 lb.; crested dogtail, 1 lb.; white clover, 1 lb.; cow-grass, 3 lb.; alsike, 1 lb.	1½-2	5-7

TABLE III.—IMPROVEMENTS.\*

NOTE.—The cost of building in the Auckland District is wholly dependent upon the surroundings. If in a locality where material and labour are readily obtained, £90 to £100 would put up a fairly well-built five-roomed house, match-lined, floored, brick chimneys, &c.; where haulage of material for a distance is required, the same house might cost £120; and the same conditions apply to barns, stables, &c.

*Auckland Land District.*

County.	Buildings.					Fencing (Fences usually used).
	House, Five Rooms, lined, Brick Chimneys.	Stable (Four Stalls, 35 ft. by 22 ft., with Feed- room and Shed.	Barn, 20 ft. by 14 ft.	Yards.		
				Sheep (for 200).	Cattle, with Shed (for 25 Cows)	
	£	£	£	£	£	
Mangonui ..	150-180	80-100	60-80	10-50	30-45	8 wires, with 7 posts per chain; from 16/ per chain. 4 wires, with 7 posts per chain; from 14/
Whangaroa ..	"	"	"	"	"	
Hokianga ..	"	"	"	"	35-50	
Bay of Islands	"	"	"	"	30-45	
Hobson ..	"	"	"	"	35-50	
Whangarei ..	"	"	"	"	30-45	
Otamatea ..	"	"	"	"	"	
Rodney ..	160-200	100-120	"	"	"	
Waitemata ..	"	"	"	"	35-50	
Manukau ..	"	"	"	"	"	
Coromandel ..	120-180	"	"	"	"	8 wires, with 7 posts per chain; from 16/ per chain. 4 wires, with 7 posts per chain; from 14/
Thames ..	"	"	"	"	"	
Ohinemuri ..	180-200	"	"	"	"	
Piako ..	"	80-100	"	"	"	
Waikato ..	"	"	"	"	"	
Waipa ..	"	"	"	"	"	
Raglan ..	"	"	"	"	"	
Kawhia ..	"	"	"	"	"	
Taupo West ..	200	100-120	"	"	"	
Taupo East ..	"	"	"	"	"	
Rotorua ..	"	"	"	"	"	8 wires (one barb- ed), with posts and battens; 16/ to 18/ per chain.
Tauranga ..	150-180	80-100	"	"	"	
Whakatane ..	180-200	"	"	"	"	
Opotiki ..	"	"	"	"	"	

*Taranaki Land District.*

Waitotara ..	..	..	..	..	..	8 wires (one barb- ed), with posts and battens; 16/ to 18/ per chain.
	From					
Taranaki ..	220	150	70	70	70	
Stratford ..	200	"	"	"	"	
Patea ..	220	160	75	75	75	
Hawera ..	"	"	"	"	"	
Clifton ..	200	150	75	50	70	

\* All buildings must be considered as likely to cost 20 per cent. more than the prices in the text.

## IMPROVEMENTS—continued.

County.	Buildings.				Fencing (Fences usually used).
	House, Five Rooms, lined, Brick Chimneys.	Stable (Four Stalls), 35 ft. by 22 ft., with Feed- room and Shed.	Barn, 20 ft. by 14 ft.	Yards.	
				Sheep (for 200).	

*Hawke's Bay Land District.*

	£	£	£	£	£	
Waiapu ..	250-300	50-75	50	15-20	120-130	6 wires and 1 barb- ed; 15/-25/ per chain.
Cook ..	"	"	"	"	140	Ditto.
Wairoa ..	200	100	"	10	"	Post and wire where no timber on the land; 17/6
Hawke's Bay	"	"	"	"	"	Ditto.
Waipawa ..	"	"	"	"	"	"
Patangata ..	"	"	"	"	"	"

*Wellington Land District.*

Patea ..	200	80	35	12	30	12/-15/ per chain for the usual wire fence.
Waitotara ..	"	"	"	"	"	12/-17/ 6
Taupo East ..	"	"	"	"	"	"
Taupo West ..	"	"	"	"	"	"
Wanganui ..	200-225	10-80	35	12-15	50	16/ for usual wire fence.
Hawke's Bay	300	80	50	12	"	15/-20/ for ditto.
Rangitikei ..	200-225	70-80	30-35	12-15	30	16/-20/ "
Kiwitea ..	"	"	"	"	"	15/-17/6 "
Pohangina ..	"	"	"	"	"	"
Oroua ..	"	"	"	"	"	16/-20/ "
Kairanga ..	"	"	"	"	35	" "
Manawatu ..	250	50	"	"	30-35	" "
Horowhenua	"	25	50	"	30	15/-17/6 "
Pahiatua ..	150-250	40-60 80-100*	25-40	5-10† 15-30	30-40 65-85‡	20/§
Eketahuna ..	"	Ditto	"	Ditto	Ditto	"
Masterton ..	"	"	"	"	"	"
Akitio ..	"	"	"	"	"	"
Castlepoint ..	"	"	"	"	"	"
Mauriceville ..	"	"	"	"	"	"
Wairarapa ..	"	"	"	"	"	"
Featherston ..	"	"	"	"	"	"
Hutt ..	200	50	30	10	45	"

\* With loft.  
concrete floor.

† The first is for split timber, the second for sawn.

‡ With loft and  
§ 7 wires (galvanised), posts 9 ft. apart, with two battens between them.

IMPROVEMENTS—*continued.*

County.	Buildings.			Yards.		Fencing (Fences usually used).
	House, Five Rooms, lined, Brick Chimneys.	Stable (Four Stalls), 30 ft. by 22 ft., with Feed- room and Shed.	Barn, 20 ft. by 14 ft.	Sheep (for 200).	Cattle, with Shed (for 25 Cows).	

*Marlborough Land District.*

	£	£	£	£	£	
Sounds ..	120	80	30	20*	40†	Wire and paling, wire and standards, wire netting; ave- rage cost, 12/ per chain.
Marlborough	220‡	60	25	10	„	7 wires (galvanised No. 8), one barbed, with one post to chain; average, 13/; with rabbit- proof netting, 22/.
Kaikoura ..	200-275	30-50	20-40	5	20-30	Ditto.

\* Including dip.  
finished and painted.

† With six bails.

‡ Rooms 15 ft. by 12 ft.; sheds, 10 ft.; all

*Nelson Land District.*

Waimea ..	150-250*	40-50	25-30	8-10	50-60	Wire and palings, also 7-wire fences; 8/-12/ per chain.
Collingwood..	200†	„	20-30	„	„	‡
Buller ..	„	50	30	25	„	§
Inangahua ..	180-250	80-100	50	20	60-80	6 plain wires and 1 barbed; 15/ per chain.

\* According to vicinity of sawmills.

† Iron hip-roof and lean-to, papered and finished.

‡ Aorere Valley: 4 to 5 barbed wires, 15s. per chain; wire and paling and 1 barbed wire, 12s. Takaka Valley: Wire and paling and 1 barbed wire, 12s. per chain; 5 plain and 2 barbed wires, 15s.

§ Buller: 5 barbed wires, 2 plain, 8 posts to chain (sheep), 15s. per chain. Same without the 2 plain wires, for cattle, proportionally less.

*Westland Land District.*

Westland ..	200	75	40	20	50	Barbed wire, with silver-pine posts, 15/.
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IMPROVEMENTS—*continued.*

County.	Buildings.				Fencing (Fences usually used).
	House, Five Rooms, lined, Brick Chimneys.	Stable (Four Stalls, 35 ft. by 22 ft., with Feed- room and Shed.	Barn, 20 ft. by 14 ft.	Yards, Sheep (for 200), Cattle, with Shed (for 25 Cows).	

*Canterbury Land District.*

	£	£	£	£	£	
Amuri ..	220	110*	32	10	80	6 to 8 wires, stan- dards, and posts; 10/-15/ per chain.
Cheviot ..	"	"	"	"	"	Ditto, also white- thorn hedges; 10/-15/
Ashley ..	200	100	30	10	75	..
Selwyn ..	..	..	..	..	..	..
Ashburton ..	..	..	..	..	..	..
Akaroa ..	..	..	..	..	..	8 wires, posts 9 ft. apart; 15/
Geraldine ..	300	190	50	30	50	Wire and standards, 13/; gorse, 15/
Levels ..	"	"	"	"	"	Ditto.
Mackenzie ..	"	80	30	15	20	Wire and standards, 12/
Waimate ..	250-300	90-190	40-50	30	40	Post, standards, and wire, 14/6-20/; gorse, 12/-15/

\* 35 ft. by 32 ft.

*Otago Land District.*

						Per Chain.
Bruce ..	150-180	80-90	35-40	10-12	50-70	10/-11/
Clutha ..	140-180	75-80	"	5-12	50-60	9/-10/6
Lake ..	150-225	85-95	40-50	5-10	65-75	10/6-11/
Maniototo ..	180-240	90-95	"	5-12	"	9/-10/
Peninsula ..	140-200	80-90	"	"	"	10/-11/
Taieri ..	180-250	100-120	35-45	5-15	75-85	10/-10/6
Tuapeka ..	180-200	90-100	45-50	7-10	65-70	10/-11/6
Vincent ..	180-250	85-95	"	5-10	65-75	10/6-11/6
Waihemo ..	180-200	100-120	"	15-20	75-80	10/-11/
Waikouaiti ..	"	"	"	"	"	"
Waitaki ..	180-250	90-100	"	12-15	65-75	"

NOTE.—The fence for which the prices are given in the fencing column consists of six plain wires and one barbed wire, with six standards to the chain, and one post 3 ft. 9 in. high.

*Southland Land District.*

Lake (south portion)	260	50	25	10	35	3 wires and 1 barbed wire, iron stan- dards, straining- posts, and wire- netting, 16/6
Stewart Island	175	75	50	..	50	Ditto.
Wallace ..	"	"	"	"	"	6 wires and 1 barbed (making 7 in all), with posts, 11/
Southland ..	"	"	"	"	"	Ditto.

## IMPROVEMENTS—continued.

*Fencing Guide.*

The Land Act requires that all sections shall, as far as practicable, be of such shape that the frontage is one-half the depth. The calculations on which the figures in the table are based are for sections of that shape. In making their own calculations from the table settlers will have to bear in mind that the cost of fencing per acre lessens as the shape of the section approaches the square, and increases as the section gets further from the square. The figures are for ring fences, not for subdivisions. They also show the distribution per acre of the cost of fencing at 1s., 12s., and £1 per chain of fencing.

Acres.	Length of Fence.*		Cost of Fence per Chain and per Acre.					
	Two Sides of Fence (Long and Short).	Total Length of Fence.	Cost at 12s. per Chain.	Cost per Acre.	Cost at £1 per Chain.	Cost per Acre.	Cost at 1s. per Chain.	Cost per Acre.
	Chains.	Chains.	£	£	£	£	£	£
1	4½ x 2½	13½	8/2	162/	13/10/	£13/10/	13/6	13/6
20	20 x 10	60	36	36/	60	60/	£3	3/
50	31½ x 15½	95	57	22/11	95	38/3	£4/15/	1/11
100	44½ x 22½	134	80	16/	134	26/8	6/14/	1/4
200	63½ x 31½	190	114	1/4	190	18/16	9/10/	11½d.
320	80 x 40	240	144	9/	240	15/	£12	9d.
500	100 x 50	300	180	7/2	300	12/1	15	7½d.
640	113 x 56½	339½	203	6/4	339	10/6	17	6½d.
720	120 x 60	360	216	6/	360	10/	18	6d.
1,000	141½ x 70½	424½	254	5/	424	8/4	£21/4/	5d.
1,280	160 x 80	480	288	4/6	480	7/6	£24	4½d.
1,500	173½ x 86½	520	312	4/2	520	6/10	26	4½d.
1,620	180 x 90	540	324	4/	540	6/8	27	4d.
2,000	200 x 100	600	360	3/7	600	6/	30	3½d.

\* In hilly and rough ground these lengths are longer. In these cases the estimate of increased cost must be left to experience.

TABLE IV.—TILLAGE.

NOTE.—In the Auckland District ploughing varies greatly between light and comparatively level lands and rough or bush country. In the former, where contracts are let to plough considerable areas of land, either for turnips or grass, and where two- and even three-furrow ploughs can be used, the price per acre is as low as 5s. On the other hand, for ploughing new land in rough country the first time as high as 12s. 6d. per acre has been paid. To the north of Auckland the country as a rule is broken, with no extensive ploughing done in any one locality; this precludes the setting of a price, which varies according to circumstances.

There is no tussock-land in Auckland District fitted for agricultural purposes. In Taupo Counties alone it is found in anything like a large area, and then on pumice land; it affords a certain amount of very poor pasture, carries a few sheep to a large acreage, and is unfitted for anything except tree-planting.

With reference to sowing, it may be stated that in all the counties north of Auckland and in some five to the south very little sowing except on bush clearings, and that by hand, is done, and then by day labour. The cost may be put down at from 9d. to 1s. per acre.

## TILLAGE—continued.

County.	Ploughing, per Acre.		Harrowing, per Stroke.	Discing, per Stroke.	Rolling, per Stroke.	Sowing, per Acre.	Seed-time.
	Tussock.	Grass.					

*Auckland Land District.*

Mongonui ..	..	8/	..	..	..	1/-1/6	Mar., April.
Whangaroa ..	..	"	..	..	..	"	"
Hokianga ..	..	6/-8/	1/3	1/3	1/6	"	April, May.
Bay of Isl'ds ..	..	6/-7/	1/	"	"	"	"
Hobson ..	..	"	"	"	"	"	"
Whangarei ..	..	"	"	"	"	"	"
Otamatea ..	..	6/-8/	"	"	"	"	Mar., April.
Rodney ..	..	"	"	"	"	1/	"
Waitemata ..	..	"	"	"	"	"	"
Eden ..	..	"	"	"	"	"	"
Manukau ..	..	6/-7/	9d.	1/	1/3	1/-1/6	Mar., April.
Coromandel ..	..	"	"	"	"	"	"
Thames ..	..	7/-8/	1/3	1/6	1/6	1/-1/3	Mar., April.
Ohinemuri ..	..	"	1/	1/3	"	1/-1/6	"
Piako ..	..	5/-7/	"	1/	1/-1/3	"	"
Waikato ..	..	"	"	"	"	"	"
Waipa ..	..	"	"	"	"	"	"
Raglan ..	..	6/-7/	"	"	"	1/	"
Kawhia ..	..	"	"	"	"	"	"
Taupo West ..	..	7/	"	"	"	"	"
Taupo East ..	..	8/	1/3	"	"	"	"
Rotorua ..	..	"	"	"	"	"	"
Tauranga ..	..	6/-7/	1/	1/-1/3	1/6	1/-1/6	Autumn.
Whakatane ..	..	"	"	"	"	"	"
Opotiki ..	..	5/-7/	9d.	"	"	"	"

*Taranaki Land District.*

Taranaki ..	8/-10/	(6/-8/ ) (5/-6/*)	1/	1/6	9d.	1/6-2/	Mar., Oct.
Stratford ..	"	Ditto ..	"	"	"	"	"
Patea ..	"	" ..	"	"	"	"	"
Hawera ..	"	" ..	"	"	"	"	"
Clifton ..	"	" ..	"	"	"	"	"
Egmont ..	"	" ..	"	"	"	"	"

\* Stubbles.

*Hawke's Bay Land District.*

Waiapu ..	8/	6/	2/	2/6	2/6	9d.-1/	Autumn for flats, earlier for hills.
Cook ..	"	"	"	"	"	"	Ditto.
Wairoa ..	7/6	5/-7/6	1/3	1/3	1/	1/3	Autumn.
Hawke's Bay	8/	6/	1/	2/	"	1/	Feb., Mar., & early April.
Waipawa ..	"	"	"	"	"	"	Ditto.
Patangata ..	"	"	"	"	"	"	"

TILLAGE—*continued.*

County.	Ploughing, per Acre.		Harrowing, per Stroke.	Discing, per Stroke.	Rolling, per Stroke.	Sowing, per Acre.	Seed-time.
	Tussock.	Grass.					
Wellington Land District.							
Patea ..	..	7/	6d.-9d.	1/	1/	9d.	Spring and autumn.
Waitotara ..	..	7/-8/	..	1/-1/6	..	1/	Ditto.
Taupo East ..	..	..	..	..	..	..	..
Taupo West ..	..	..	..	..	..	..	..
Wanganui ..	..	7/-7/6	1/	1/-1/6	1/	1/	..
Hawke's Bay ..	..	..	..	..	..	..	..
Rangitikei..	..	8/-10/	1/	1/6	1/	1/-1/6	Spring and autumn.
Kiwitea ..	..	10/-12/	9d.-1/	1/3-2/	9d.-1/	1/3-1/6	Ditto.
Pohangina ..	..	..	..	..	..	..	..
Oroua ..	..	..	..	..	..	..	..
Kairanga ..	..	..	..	..	..	..	..
Manawatu ..	..	..	..	..	..	..	..
Horowhenua ..	..	8/-10/	1/	1/	6d.	1/6-2/6	..
Pahiatua ..	..	10/-30/*	1/6-2/	1/6-2/	1/6-2/	..	Sept., Oct., Mar., April, May.
Eketahuna ..	..	..	..	..	..	..	Ditto.
Masterton ..	..	..	..	..	..	..	..
Akitio ..	10/	8/	1/3	1/6	1/	2/	..
Castlepoint	15/-20/*	10/	1/-1/6	1/6-2/	1/-1/6	1/6-2/6	..
Mauriceville	30/*	..	..	..	..	..	Sept., Oct., April, May.
Wairarapa ..	..	7/-10/	..	..	..	..	Ditto.
Featherston ..	..	..	..	..	..	..	..
Hutt ..	..	12/-15/	2/-2/6	2/3-3/	1/6-2/	1/-2/	..

\* First ploughing of recently stumped land.

*Marlborough Land District.*

Sounds ..	7/-11/	5/6-7/	11d.-1/3	1/3-1/8	6d.-1/	1/-1/6	March, April, Oct., Nov.
Marlborough	7/-11/	5/6-7/	11d.-1/3	1/3-1/8	6d.-1/	1/-1/6	March, April, Oct., Nov.
Kaikoura ..	7/6-10/	6/-8/	10d.-1/* 6d.-9d.†	1/6-2/	1/-1/3	1/-1/3	Winter and spring.

\* First. † Afterwards.

*Nelson Land District.*

Waimea ..	..	8/-10/	Per Acre. 2/*	4/*	1/*	1/	Mar., April.
Collingwood ..	..	10/	..	..	..	1/6	..
Buller ..	..	15/-20/	..	4/	2/	1/	Autumn.
Inangahua	15/-20/	..	1/6	..	3/	1/	Spring and autumn.

\* These figures give the cost per acre.



## TILLAGE—continued.

County	Ploughing, per Acre.		Harrowing, per Stroke.	Discing, per Stroke.	Rolling, per Stroke.	Sowing, per Acre.	Seed-time.
	Tussock.	Grass.					

*Westland Land District.*

Westland ..	..	..	..	..	..	..	Mar., Sept.
-------------	----	----	----	----	----	----	-------------

*Canterbury Land District.*

Amuri ..	6/-8/	4/-6/	10d.	1/3-1/6	1/	1/-1/3	May, Sept. (g r a i n), Oct., Dec. (roots and rape).
Cheviot ..	"	"	"	"	"	"	Ditto.
Ashley ..	"	"	"	"	"	"	"
Selwyn* ..	6/-10/	"	"	"	"	1/6	"
Akaroa ..	"	"	"	"	"	"	"
Ashburton ..	"	"	"	"	"	"	"
Geraldine ..	7/-10/†	5/6-6/	9d.	1/3	1/-1/3	1/3-1/6	Mar., Sept.
Levels ..	5/6	5/	10d.	1/3-1/6	1/	1/	"
Mackenzie ..	"	"	"	"	"	"	"
Waimate ..	6/-7/6‡	5/6-6/	"	"	1/-1/3	1/6	"

\* Ploughing is generally more expensive near the hills than lower down on the plains.  
† On stony land. ‡ Subsoiling to 12 in. deep has been found in some places to amply repay the cost, 10s. an acre.

*Otago Land District.*

Bruce ..	6/-7/	5/-6/	9d.	1/	10d.	1/	Oct., Mar., April.
Clutha ..	6/-7/6	5/6-6/6	"	"	"	10d.-1/	April, May, Oct., Nov.
Lake ..	6/6-7/6	6/-7/	9d.-10d.	10d.-1/	10d.-1/	9d.-1/	Feb.,* Mar., Sept., Oct.
Maniototo ..	6/-6/6	5/6-6/	9d.	1/	10d.	1/	Ditto.
Peninsula ..	"	5/6-6/6	"	"	"	"	Mar., April, Oct., Nov.
Taieri ..	6/-7/	"	"	"	"	"	Ditto.
Tuapeka ..	"	"	"	"	"	"	"
Vincent ..	6/6-7/6	5/6-6/	"	"	"	1/-1/2	Mar., Oct.
Waihemo ..	6/-7/	5/-6/	"	"	"	1/	Sept., Mar.
Waikouaiti ..	"	"	"	"	"	"	Oct., Mar.
Waitaki ..	6/6-7/	5/-6/	9d.-10d.	"	9d.-10d.	1/-1/3	Oct., Nov., Mar.

\* Applies to bush lands.

*Southland Land District.*

Lake ..	8/	6/-7/	4d.	6d.	1/3	1/-1/6	Spring.
Stewart Is- land	..	..	..	..	..	..	..
Wallace ..	7/-8/	5/-5/6	9d.	1/3-1/6	1/	1/-1/9	Oct., Feb.
Southland	"	"	"	"	"	"	"

TABLE V.—SEED.

NOTE.—In the counties that are blank there is no recognised standard, the cultivation being small. For the land district the question of grass-sowing is fully dealt with in Appendix I.

County.	Wheat, per Acre.	Oats, per Acre.	Barley, per Acre.	Turnips, per Acre.	Mangolds, per Acre.	Grass-seed, per Acre.
<i>Auckland Land District.</i>						
	Bushels.	Bushels.	Bushels.	Lb.	Lb.	Bushels.
Mongonui ..	..	..	..	..	..	..
Whangaroa ..	..	..	..	..	..	..
Hokianga ..	..	..	..	..	..	..
Bay of Islands..	..	..	..	..	..	..
Hobson ..	..	..	..	..	..	..
Whangarei ..	..	..	..	..	..	..
Otamatea ..	..	..	..	..	..	..
Rodney ..	..	..	..	..	..	..
Waitemata ..	..	..	..	..	..	..
Manukau ..	1½	2½	2	1½*	6	..
Coromandel ..	..	..	..	..	..	..
Thames ..	..	..	..	..	..	..
Ohinemuri ..	1½	2½	2	1½	6	..
Piako ..	..	..	..	..	..	..
Waikato ..	..	..	..	..	..	..
Waipa ..	..	..	..	..	..	..
Raglan ..	..	..	..	..	..	..
Kawhia ..	..	..	..	..	..	..
Taupo West ..	..	..	..	..	..	..
Taupo East ..	..	..	..	..	..	..
Rotorua ..	..	..	..	..	..	..
Tauranga ..	1½	2½	2	1-2	4-5	..
Whakatane ..	..	..	..	..	..	..
Opotiki ..	..	..	2	..	..	..

\* Surface-sowing, 1 lb. to 2 lb.; drill-sowing, 2 lb. to 4 lb.

*Taranaki Land District.*

Taranaki ..	1½	2½	2	2-4*	3-5	30-40
Egmont ..	..	..	..	..	..	..
Stratford ..	..	..	..	..	..	..
Patea ..	1½-1½	1½-2	1½-2	2	3	..
Hawera ..	..	..	..	..	..	..
Clifton ..	1½	2½	2	2-4	3-5	..

\* Drills.

*Hawke's Bay Land District.*

Waiapu* ..	2½-3	3	2-3	2-4†	6-10	2
Cook* ..	2-2½	2-3	..	..	..	..
Wairoa ..	..	..	..	..	..	..
Hawke's Bay ..	2	2½	2	½-1	..	..
Waipawa ..	..	..	..	..	..	..
Patangata ..	..	..	..	..	..	..

\* The quantity of maize sown per acre is 3 bushels.

† Surface, ½ lb. to 1 lb.; drill, 2 lb. to 4 lb.

## SEED—continued.

County.	Wheat, per Acre.	Oats, per Acre.	Barley, per Acre.	Turnips, per Acre.	Mangolds, per Acre.	Grass-seed, per Acre.
<i>Wellington Land District.</i>						
	Bushels.	Bushels.	Bushels.	Lb.	Lb.	Bushels.
Patea ..	2	2½	2	2*	5-6	2
Waitotara ..	2-2½	2½-3	"	1-2	"	"
Taupo East ..	..	..	..	..	..	..
Taupo West ..	..	..	..	..	..	..
Wanganui ..	2-2½	2½	2	1-2	5-6	2
Hawke's Bay ..	..	2	..	..	..	1½-2
Rangitikei ..	2-3	2-3	..	1-2	3-4	1½-2½
Kiwitea ..	2	2-2½	2-2½	"	4-5	"
Pohangina ..	..	..	..	..	..	..
Oroua ..	2½	2½-3	2-2½	1-2	4-5	1½-2
Kairanga ..	"	"	"	"	"	"
Manawatu ..	2½-3	2-3	..	"	"	"
Horowhenua ..	"	"	..	"	"	"
Pahiatua ..	..	"	..	"	..	1-2
Eketahuna ..	..	"	..	"	1½	"
Masterton ..	2½-3	2½-3½	2½-3	12 oz.-1 lb.	1½-1½	"
Akitio ..	2	2½	2½	1½	1	1½
Castlepoint ..	..	"	..	1	1½-2	"
Mauriceville ..	..	2½-3½	..	"	"	"
Wairarapa ..	2½-3	"	2½-3	"	"	"
Featherston ..	..	"	"	"	"	"
Hutt ..	2-3	3-4	..	"	3-4	2

\* Up to 1 lb. for surface-sowing; over 1 lb. for drills.

*Marlborough Land District.*

	Bushels.	Bushels.	Bushels.	Lb.	Lb.	Bushels.
Marlborough ..	1½-1½	2-2½	1½-1½	1	3-5	1-1½
Kaikoura ..	2-2½	"	2-3	1-1½	4	1-2

NOTE.—Sounds County has no crops.

*Nelson Land District.*

Waimea ..	1½-2	2-3	2½-3	3	2*	1½-2
Collingwood ..	2	3	2	"	"	2
Buller ..	..	..	..	..	..	2
Inangahua ..	..†	..	..	..	..	..

\* Not much grown.

† Very little oats, turnips, and mangolds—practically nil.

*Westland Land District.*

Westland ..	..	3	..	4	..	2

## SEED—continued.

County.	Wheat, per Acre.	Oats, per Acre.	Barley, per Acre.	Turnips, per Acre.	Mangolds, per Acre.	Grass-seed, per Acre.
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*Canterbury Land District.*

Amuri ..	1-2	1½-2½	1½-2	½-1	2½-4	1-1½
Cheviot ..	"	"	"	"	"	"
Ashley ..	"	"	"	"	"	"
Selwyn ..	1½	"	1½-1¾	"	"	"
Akaroa ..	"	"	"	"	"	"
Ashburton ..	"	"	"	"	"	"
Geraldine ..	"	1½	2	1½-¾	5-6	2
Levels ..	1½-1¾	2	1½	¾-¾	"	"
Mackenzie ..	"	"	"	"	"	"
Waimate ..	"	"	"	"	"	"

NOTE.—In the middle and northern counties the usual time for sowing grain is May to September; and for roots and rape, October to December. All over the district grain is sown on heavy lands near the coast in winter or spring. In the three southern counties grain is oftenest sown in September and October.

North Canterbury: The following mixtures of grass-seed for ploughed land are in use:—

(1.) Ordinary pasture—Rye-grass, cocksfoot, white clover, cow-grass.

(2.) For light land—Cocksfoot, 12 lb. to 14 lb.; white clover, 2 lb.; rib-grass, 2 lb.

(3.) For lambs' feed—Italian rye-grass, 26 lb.; white clover, 2 lb.; this will last two years.

Middle and South Canterbury: Permanent pasture (in good land)—Rye-grass, 15 lb.; cocksfoot, 5 lb.; red and white clover, 5 lb.; cow-grass, 5 lb. In light land—Cocksfoot, 12 lb. to 14 lb.; red clover, 5 lb.; white clover, 2 lb.; rib-grass, ½ lb.

South Canterbury: (1.) Rye-grass, cocksfoot, fescues, timothy, clovers (mostly in Mackenzie County).

(2.) Italian rye-grass, cocksfoot, cow-grass, red and white clover, alsike, timothy (mostly in Waimate County).

*Otago Land District.*

Bruce ..	1½-1¾	2	1½-2	½	..	1½-2
Clutha ..	2	1½-2	..	"	..	"
Lake ..	1½-2	"	1½-1¾	"	..	"
Maniototo ..	2	2	2	..	..	"
Peninsula ..	1½-2	1½ 1¾	1½-1¾	1½-¾	..	1½-1¾
Taieri ..	"	"	1½-2	"	..	"
Tuapeka ..	2	"	"	"	..	"
Vincent ..	"	"	"	"	..	"
Waihemo ..	"	2	2	½	..	"
Waikouaiti ..	1½-2	"	"	"	..	"
Waitaki ..	1½-1¾	"	"	..	..	"

NOTE.—The following mixtures of grass are used for ploughed land in the various counties: Bruce—Rye-grass, cow-grass, white and red clover, and fescues (on the low lands); cocksfoot and clover (on the high). Clutha—Rye-grass, fescues (for open country); cocksfoot, cow-grass, and timothy (for bush clearings). Lake and Maniototo—Cocksfoot, rye-grass, clovers. Peninsula, Taieri, Tuapeka, Vincent, Waihemo, and Waikouaiti—Rye-grass, cocksfoot, clovers, fescues, cow-grass. Waitaki—Rye-grass, fescues, clovers (low lands); cocksfoot and clovers (high lands).

*Southland Land District.*

Lake ..	2	2½	2	1	3	1½
Wallace ..	2-3	3-4	2½	1	2-3	2
Southland ..	"	"	"	"	"	"

NOTE.—Stewart Island and Fiord Counties can furnish no information under this table.

TABLE VI.—YIELDS OF CORN AND GRASS.

County.	Wheat.		Oats.		Barley.		Rye-grass.		Cocksfoot.	
	Average.	1901.*	Average.	1901.	Average.	1901.	Average.	1901.	Average.	1901.

*Auckland Land District.*

	Bush.	Bush.	Bush.	Bush.	Bush.	Bush.	Bush.	Bush.	Bush.	Bush.
Mongonui ..	..	15	..	34	..	20	20	20	15	..
Whangaroa ..	..	"	..	"	..	"	"	"	"	..
Hokianga ..	..	"	..	"	..	"	"	"	"	..
Bay of Islands	..	"	..	"	..	"	"	"	"	..
Hobson ..	..	"	..	"	..	"	"	"	"	..
Whangarei ..	..	"	..	"	..	"	"	"	"	..
Otamatea ..	..	"	..	"	..	"	"	"	"	..
Rodney ..	..	"	..	"	..	"	"	"	"	..
Waitemata ..	..	"	..	"	..	"	"	"	"	..
Manukau ..	25	20	25-30	35	25	22-8	20-25	..	10-15	..
Coromandel ..	..	"	..	..	..	..	..	..	..	..
Thames ..	..	"	..	..	..	..	..	..	..	..
Ohinemuri ..	..	"	25-30	30	..	..	..	..	..	..
Piako ..	25	"	30	"	..	..	20	20	15-20	..
Waikato ..	"	"	30-35	"	30	20	20-25	"	"	..
Waipa ..	"	"	20	"	25-30	"	"	"	15*	..
Raglan ..	"	"	25-30	"	..	..	..	..	15-20*	..
Kawhia ..	25-30	"	30-35	"	..	..	..	..	"	..
Taupo West	..	..	..	..	..	..	..	..	"	..
Taupo East	..	..	..	..	..	..	..	..	"	..
Rotorua ..	..	..	..	..	..	..	20-30*	20	"	..
Tauranga ..	20-25	18	30-35	34	25	18	20-25	"	10-20*	..
Whakatane ..	"	"	"	"	35	"	"	"	"	..
Opotiki ..	30	"	40	"	"	"	20	"	20-25	..

\* Bush clearings.

*Taranaki Land District.*

Taranaki ..	30-40	22	35-50	31	30-35	40	30	..	40	32
Stratford ..	"	22	"	"	"	"	"	..	"	"
Patea ..	35-40	30	40-60	48	30-40	37	30-35	..	40-45	"
Hawera ..	35-45	"	"	"	32-40	"	"	..	"	"
Clifton ..	30-40	22	35-50	31	30-35	40	30	..	40	"

*Hawke's Bay Land District.*

Waipatu ..	40	30	60	..	60	..	40-50	..	25-30	..
Cook ..	"	"	25	..	"	..	"	..	"	..
Wairoa ..	"	20	25-30	..	"	..	"	..	"	..
Hawke's Bay	15-40	"	25-50	..	25	..	10-20	..	"	..
Waipawa ..	"	"	"	..	"	..	"	..	"	..
Woodville ..	"	"	"	..	"	..	"	..	"	..
Patangata ..	"	"	"	..	"	..	"	..	"	..

YIELDS OF CORN AND GRASS—*continued.*

County.	Wheat.		Oats.		Barley.		Rye-grass.		Cocksfoot.	
	Average.	1901.	Average.	1901.	Average.	1901.	Average.	1901.	Average.	1901.
<i>Wellington Land District.</i>										
Patea ..	32	..	45	..	..	..	..	..	..	..
Waitotara ..	..	31	..	41·78	..	..	..	..	..	..
Taupo East ..	..	..	..	..	..	..	..	..	..	..
Taupo West ..	..	..	..	..	..	..	..	..	..	..
Wanganui ..	35	31	45	41·78	..	35	..	..	..	..
Hawke's Bay ..	..	..	40	..	..	..	..	..	..	..
Rangitikei ..	30	..	35	..	..	..	..	..	..	..
Kiwitea ..	40	..	50	..	40	..	..	..	..	..
Pohangina ..	..	..	..	..	..	..	..	..	..	..
Oroua ..	35	..	40	..	..	..	..	..	..	..
Kairanga ..	..	..	..	..	..	..	..	..	..	..
Manawatu ..	..	..	55	..	..	..	..	..	..	..
Horowhenua ..	40	..	..	..	..	..	..	..	..	..
Pahiatua ..	..	..	27	..	..	..	17½	..	17½	..
Eketahuna ..	..	..	..	..	..	..	..	..	..	..
Masterton ..	28	..	45	..	40	..	17	..	..	..
Akitio ..	..	..	30	..	..	..	20	..	25	..
Castlepoint ..	..	..	..	..	..	..	..	..	20	..
Mauriceville ..	..	..	40	..	..	..	17½	..	17½	..
Wairarapa ..	28	..	42	..	42	..	..	..	..	..
Featherston ..	..	..	..	..	..	..	..	..	..	..
Hutt ..	55†	..	45†	..	..	..	..	..	..	..

\* Latest yield.

† Very little grown.

‡ Chiefly for chaff, yield 2 to 2½ tons per acre.

*Marlborough Land District.*

Sounds ..	..	..	..	..	..	..	12-20*	..	..
Marlborough ..	22	24	30-40	35	24	29†	20	15	..
Kaikoura ..	30-40	..	50-60	..	..	..	..	..	..

\* Bush clearings.

† Average for 4,833 acres.

*Nelson Land District.*

Waimea ..	20-30	27	30-40	30	30	21	*	..	..	..
Collingwood ..	30	..	40-50	..	40-50	..	..	..	..	..
Buller† ..	..	..	..	..	..	..	..	..	..	..
Inangahua† ..	..	..	..	..	..	..	..	..	..	..

\* For grass, only 17 acres of rye were reaped in the whole land district in 1901.

† No grain or grass harvested in these counties in 1901.

*Westland Land District.*

There is not enough cultivation to furnish standards.



TABLE VII.—YIELDS OF ROOT-CROPS.

*Auckland Land District.*

County.	Potatoes (Average).	Turnips (Average).	Carrots (Average).	Mangolds (Average).
	Tons.	Tons.	Tons.	Tons.
Mongonui .. .. .	4	..	..	..
Whangaroa .. .. .	"	..	..	..
Hokianga .. .. .	..	..	..	..
Bay of Islands .. .. .	4	..	..	..
Hobson .. .. .	..	..	..	..
Whangarei .. .. .	5-6	..	8-10	..
Otamatea .. .. .	..	..	..	..
Rodney .. .. .	4-5	..	..	..
Waitemata .. .. .	..	..	..	..
Manukau .. .. .	6-8	15-20	10-12	30-35
Coromandel .. .. .	..	..	..	..
Thames .. .. .	..	..	..	..
Ohinemuri .. .. .	4-6	15-20	6-8	..
Piako .. .. .	4-8	"	8-10	..
Waikato .. .. .	4-6	20-30	6-8	20-30
Waipa .. .. .	"	20-25	"	..
Raglan .. .. .	5-7	15-20	"	..
Kawhia .. .. .	4-5	25-30	"	..
Taupo West .. .. .	..	..	..	..
Taupo East .. .. .	4	..	..	..
Rotorua .. .. .	3-4	..	..	..
Tauranga .. .. .	4-6	15-20	6-8	25-30
Whakatane .. .. .	6-8	25-30	8-10	30-40
Opotiki .. .. .	6-10	15-20	6-8	25-30

*Taranaki Land District.*

	Tons.	Tons.	Tons.	Tons.
Taranaki .. .. .	8-10	15-20	8	10
Egmont .. .. .	"	"	"	"
Stratford .. .. .	6-10	15-20	8	10-12
Patea .. .. .	"	15-25	8-12	"
Hawera .. .. .	8-10	"	"	"
Clifton .. .. .	"	"	8	"

*Hawke's Bay Land District.*

	8-12 10-15†	* ..	9-12	15-20
Waiapu .. .. .	8-12 10-15†	4-5†	"	"
Cook .. .. .	6-8	"	"	"
Wairoa .. .. .	5-15	"	"	20-60
Hawke's Bay .. .. .	5-10	"	"	20-40
Waipawa .. .. .	"	"	"	"
Patangata .. .. .	"	"	"	"
Woodville .. .. .	"	"	"	"

\* Too few.

† Not much.

‡ Pumpkins.



YIELDS OF ROOT-CROPS—*continued.*

County.	Potatoes (Average).	Turnips (Average).	Carrots (Average).	Mangolds (Average).
<i>Wellington Land District.</i>				
Patea .. .. .	Tons. 8½	Tons. 17½*	Tons. 17½†	Tons. 30*
Waitotara .. .. .	8	"	15	"
Taupo East .. .. .	"	"	"	"
Taupo West .. .. .	"	"	"	"
Wanganui .. .. .	8	25	20	30
Hawke's Bay .. .. .	9	"	"	"
Rangitikei .. .. .	7½	15	15	30
Kiwitea .. .. .	11	20	20	"
Pohangina† .. .. .	"	"	"	"
Oroua (including Kairanga) .. .. .	8½	25	"	"
Manawatu .. .. .	"	§	"	"
Horowhenua .. .. .	"	§	"	"
Pahiatua .. .. .	8	§	9	35
Eketahuna .. .. .	"	"	"	"
Masterton .. .. .	"	"	10	"
Akitio .. .. .	"	25	"	30
Castlepoint .. .. .	"	§	9	35
Mauriceville .. .. .	"	§	"	"
Wairarapa .. .. .	"	§	"	"
Featherston .. .. .	"	§	10	35
Hutt .. .. .	5-9½	25	7	40

\* Only grown for feeding off. † Approximate; very little grown. ‡ Very little grown.  
 § Fatten 22½ sheep per acre.

*Marlborough Land District.*

Sounds .. .. .	5-10	"	12	25-35*
Marlborough .. .. .	7-10	10	"	"
Kaikoura .. .. .	8-10	8-10	†	"

\* Only on rich flats. † Fit to feed 250 to 300 sheep per month on 5 acres.

*Nelson Land District.*

Waimea .. .. .	5-6	10-12*	30*	20-30
Collingwood .. .. .	6-8†	40-50†	30*	50*
Buller† .. .. .	"	"	"	"
Inangahua† .. .. .	"	"	"	"

\* Very little grown. † Only grown on best soils. ‡ No cultivation in these counties to speak of.

*Westland Land District.*

Westland .. .. .	6½	12	Eaten off	"
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*Canterbury Land District.*

Amuri .. .. .	7	20	20	30
Cheviot .. .. .	"	"	"	"
Ashley .. .. .	"	"	"	"*
Selwyn .. .. .	6	†	15-20	"
Akaroa .. .. .	7	20	20	30*
Ashburton .. .. .	8	†	†	"
Geraldine .. .. .	7	15	6	10
Levels .. .. .	"	20	8	30
Mackenzie .. .. .	"	20	5	"
Waimate .. .. .	6-10	15	6	10

\* In rich swamp land, 30 to 60 tons. † Usually fed off. ‡ Almost entirely fed off.

YIELDS OF ROOT-CROPS—*continued.*

County.	Potatoes (Average).	Turnips (Average).	Carrots (Average).	Mangolds (Average).
<i>Otago Land District.</i>				
	Tons.	Tons.	Tons.	Tons.
Bruce .. .. .	5-8	..	..	..
Clutha .. .. .	"	..	..	..
Lake .. .. .	..	..	..	..
Maniototo .. .. .	..	..	..	..
Peninsula .. .. .	7-10	..	..	..
Taieri .. .. .	7-8	20-30	..	30-40
Tuaspeka .. .. .	5-7	..	..	..
Vincent .. .. .	"	..	..	..
Waihemo .. .. .	4-7	..	..	..
Waikouaiti .. .. .	6-10	..	..	..
Waitaki .. .. .	15	40	10	..

*Southland Land District.*

Lake .. .. .	6	*	25	25
Stewart Island .. .. .	7	..	..	..
Fiord .. .. .	..	..	..	..
Wallace .. .. .	6	{ 30† 20-25† }	6	7
Southland .. .. .	"	Ditto ..	"	"

\* Fed off always.

† Swedes.

‡ Yellow.

## TABLE VIII : COAL AND LIME.

## LOCALITIES WHERE FOUND.

*Auckland Land District.*

Locality.	Coal.	Lime.
Mangonui .. .. .	None .. .. .	None.
Whangaroa .. .. .	" .. .. .	"
Hokianga .. .. .	" .. .. .	"
Bay of Islands .. .. .	Kawakawa .. .. .	"
Hobson .. .. .	None .. .. .	"
Whangarei .. .. .	Hikurangi, Ngunguru, Kiri- paka, Kamo, Whareora	Hikurangi, near railway-line. Hydraulic lime is worked on the shores of the harbour.
Otamatea .. .. .	None .. .. .	None.
Rodney .. .. .	" .. .. .	Warkworth.
Waitemata .. .. .	" .. .. .	None.
Eden .. .. .	" .. .. .	"
Manukau .. .. .	" .. .. .	"
Coromandel .. .. .	" .. .. .	"
Thames .. .. .	" .. .. .	"
Ohinemuri .. .. .	" .. .. .	"
Piako .. .. .	" .. .. .	"
Waikato .. .. .	Huntly, Miranda .. .. .	"
Waipa .. .. .	None .. .. .	"
Raglan .. .. .	West of Waikato River, near Huntly	On Raglan Main Road, about six miles from the banks of the Waipa.*
Kawhia .. .. .	None .. .. .	Large deposits at Te Kuiti, and about 300,000 acres of good limestone land
Taupo East .. .. .	" .. .. .	None.
Taupo West .. .. .	" .. .. .	"
Rotorua .. .. .	" .. .. .	"
Tauranga .. .. .	" .. .. .	"
Whakatane .. .. .	" .. .. .	"
Opotiki .. .. .	" .. .. .	"

\* There are in addition large areas of limestone country well grassed.

COAL AND LIME—*continued.*

Locality.	Coal.	Lime.
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*Land District of Taranaki.*

Faranaki ..	None .. .. .	None.
Egmont ..	" .. .. .	"
Stratford ..	Tangarakau, Eao, Ohura Rivers	"
Patea ..	None .. .. .	"
Hawera ..	" .. .. .	"
Clifton ..	Mokau, Tongaporutu ..	Mokau.

*Hawke's Bay Land District.*

Waiaapu ..	None .. .. .	Limestone all over the county.
Cook ..	Indications in Waipaoa District	Whataupoko, Patutahi, Maungapoike No. 2, and generally all over the county. The formation is a papa marl with limestone rock outcropping at intervals.
Hawke's Bay ..	None .. .. .	Throughout the whole county.
Wairoa ..	" .. .. .	"
Waipawa ..	" .. .. .	"
Woodville ..	" .. .. .	"
Patangata ..	" .. .. .	"

*Wellington Land District.*

Patea ..	None .. .. .	A deposit of shellrock on Nukumar Beach.
Waitotara ..	" .. .. .	None.
Taupo East ..	" .. .. .	"
Taupo West ..	" .. .. .	"
Wanganui ..	" .. .. .	"
Hawke's Bay ..	" .. .. .	"
Rangitikei ..	" .. .. .	"
Kiwitea ..	" .. .. .	"
Pohangina ..	" .. .. .	"
Oroua ..	" .. .. .	"
Kairanga ..	" .. .. .	"
Manawatu ..	" .. .. .	"
Horowhenua ..	" .. .. .	"
Pahiatua ..	" .. .. .	A large area east of the Tiraumea is of limestone formation. Kiln at Makakahi.
Eketahuna ..	" .. .. .	None.
Masterton ..	Coal near Alfredton, on the Tiraumea	Maungaraki, Mania.
Akitio ..	None .. .. .	Akaroa Peak (outcrops), eastern slope of Puketoi.
Castlepoint ..	" .. .. .	None.
Mauriceville ..	Indications near Mauriceville	Large burning - works at Mauriceville.
Wairarapa ..	None .. .. .	Maungaraki Range.
Featherston ..	" .. .. .	None.
Hutt ..	" .. .. .	"

COAL AND LIME—*continued.*

Locality.	Coal.	Lime.
<i>Marlborough Land District.</i>		
Sounds ..	None .. .. .	Gland Bay, Tory Channel.
Marlborough ..	Shakespeare Bay, Mount Pleasant, Clarence Valley	On the coast south of Cape Campbell.
Kaikoura ..	Clarence Valley; small seams, unused	Scattered all over the district; probably 30,000 acres.

*Nelson Land District.*

Waimea ..	Baton, Dovedale and Stanley Brook (indications), Blue Glen, Motupiko (household)	The Wangapeka and Kaiteriteri districts.
Collingwood ..	Pakawau, Puponga, and Heaphy, true coal; Takaka and Motupipi, brown coal	Takaka Range, Takaka Valley, Clifton; almost everywhere.
Buller ..	The whole county is more or less coal-bearing, Dennistown being the chief coal centre	Cape Foulwind, Charleston, Karamaea.
Inangahua ..	Merrijigs, Murray Creek, Devil's Creek, Boatman's	Crushington, Inangahua Junction, White's Point, Mangles, Lower Matakaitaki, Matiri.

*Westland Land District.*

Westland ..	Lower Grey Valley, Koitirangi (in Hokitika Valley), Lower Paringa, Abbey Rocks, Bullock Creek, Jackson's Bay	Brunnerton, Greymouth to Teremakau, Koiterangi, Lower Paringa, Bullock Creek, Jackson's Bay.
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*Canterbury Land District.*

Amuri ..	None .. .. .	Deposits in the eastern part.
Cheviot ..	" .. .. .	North of the Jed, where there is a kiln, and near Mackenzie.
Ashley ..	" .. .. .	Large deposits at White Rock, and all over the north-eastern part of the county.
Selwyn ..	Selwyn Gorge (7 miles from White Cliffs), Brockley, Springfield, Sheffield, Guntunnel, White Cliffs ..	..
Akaroa ..	None .. .. .	..
Ashburton ..	Mount Hutt, Springbourne, Mount Somers, and along foot of hills	Mount Somers, Springbourne. Kilns both places, and busy.
Geraldine ..	None .. .. .	Lower reaches of Opuha River.
Levels ..	" .. .. .	The Cave, Totara Valley, Tycho Flat.
Mackenzie ..	Albury, Fairlie ..	Albury and Fairlie.
Waimate ..	Waiho River (poor lignite)..	Waiho, Elephant Hill, Pareora.

COAL AND LIME—*continued.*

Locality.	Coal.	Lime.
<i>O'ago Land District.</i>		
Bruce .. ..	In coastal chain (lignite) ..	Millburn and Kapiti.
Clutha .. ..	Pomahaka (lignite) ..	None.
Lake .. ..	Gibbston, Cardrona (lignite)	Twelve-mile, Lake Wakatipu, unlimited quantity, first-class quality.
Maniototo ..	St. Bathans, Rough Ridge, Idaburn, Kyeburn (lignite)	None.
Peninsula ..	None .. ..	"
Taieri .. ..	Mosgiel, Fernhill, Green Island (lignite) ..	"
Tuapeka ..	Roxburgh (lignite) ..	"
Vincent ..	All over (lignite) ..	"
Waihemo ..	Shag Point, Allandale ..	Macrae's, 17 miles Palmerston South; Round Hill, 4 miles Palmerston South.
Waikouaiti ..	None .. ..	None.
Waitaki ..	" .. ..	Totara, Oamaru, Te Aneraki, &c.
<i>Southland Land District.</i>		
Lake .. ..	Here and there (lignite) ..	None.
Stewart Island ..	.. ..	.. ..
Fiord .. ..	Coal in some of the inlets of the coast	.. ..
Wallace ..	Nightcaps, Orepuke ..	Large beds north of Clifden Bridge, Waiau; Limestone Gorge, Waiau; Fairfax, near Otautau.
Southland ..	Good, neighbourhood Waikawa and Wyndham districts, Winton; brown coal east of Winton; lignite along Winton and Forest Hill Railway line	Lime hills, east and north of Winton Township.

# APPENDICES.

## APPENDIX I.

### MIXTURES OF GRASS-SEEDS.

For the different classes of land in the Auckland Land District the following mixtures of grass-seed are used:—

For bush burns on good loamy soil, limestone formation: 10 lb. Poverty Bay rye-grass, 3 lb. Italian rye-grass, 6 lb. cocksfoot, 2 lb. timothy, 1 lb. meadow fescue, 2 lb. Chewing's fescue, 1 lb. crested dogtail,  $\frac{1}{2}$  lb. meadow foxtail,  $\frac{1}{2}$  lb. *Poa pratensis*, 2 lb. cow-grass, 2 lb. white clover, 1 lb. alsike clover,  $\frac{1}{2}$  lb. rape,  $\frac{1}{2}$  lb. turnip,  $\frac{1}{2}$  oz. yarrow,  $\frac{1}{2}$  oz. sheep's parsley: total, 32 $\frac{1}{2}$  lb.

For ploughed land, loamy soil, for permanent pasture: 12 lb. Poverty Bay rye-grass, 5 lb. Italian rye-grass, 6 lb. cocksfoot, 4 lb. timothy, 1 lb. crested dogtail, 1 lb. meadow fescue, 1 lb. sheep's fescue, 1 lb. Chewing's fescue,  $\frac{1}{2}$  lb. *Poa pratensis*,  $\frac{1}{2}$  lb. *Poa trivialis*, 2 lb. cow-grass, 1 lb. alsike clover, 1 lb. red clover, 1 oz. sheep's parsley, 1 lb. white clover: total, 38 lb. 1 oz.

Bush burns, and medium heavy land: 6 lb. rye-grass, 10 lb. cocksfoot, 4 lb. Chewing's fescue, 3 lb. red-top, 2 lb. florin, 1 lb. brown-top, 1 lb. crested dogtail, 1 lb. *Poa pratensis*, 1 lb. red clover, 2 lb. white clover, 1 lb. alsike,  $\frac{1}{2}$  lb. rape, 1 lb. trefoil,  $\frac{1}{2}$  lb. *Lotus major*,  $\frac{1}{2}$  lb. *Lotus corniculatus*, 1 lb. sheep's parsley, 1 lb. *Danthonia*: total, 37 $\frac{1}{2}$  lb.

For well-drained swamp land, for surface sowing, after burn: 10 lb. English rye-grass, 5 lb. Italian rye-grass, 5 lb. cocksfoot, 4 lb. timothy, 1 lb. meadow foxtail, 1 lb. sheep's fescue,  $\frac{1}{2}$  lb. meadow grass, 3 lb. prairie grass, 1 lb. red clover,  $\frac{1}{2}$  lb. rape, 2 lb. alsike, 1 lb. cow-grass, 1 oz. sheep's parsley: total, 34 lb. 1 oz.

For ploughed land, poor soil: 10 lb. cocksfoot, 8 lb. Poverty Bay rye-grass, 2 lb. red-top, 1 lb. *Poa pratensis*, 2 lb. Chewing's fescue, 1 lb. *Danthonia*, 2 lb. white clover, 1 lb. cow-grass, 1 lb. alsike, 1 lb. trefoil, 1 lb. *Lotus major*, 1 oz. sheep's parsley: total, 30 lb. 1 oz.

For poor swamp land: 8 lb. cocksfoot, 6 lb. Poverty Bay rye-grass, 2 lb. Italian rye-grass, 2 lb. timothy,  $\frac{1}{2}$  lb. meadow foxtail, 2 lb. meadow fescue, 3 lb. florin, 1 lb. red-top, 2 lb. alsike, 2 lb. cow-grass, 1 lb. white clover,  $\frac{1}{2}$  lb. *Lotus major*,  $\frac{1}{2}$  lb. rape, 1 oz. sheep's parsley: total, 30 lb. 9 oz.

For medium-quality land with clay subsoil: 15 lb. rye-grass (English or Poverty Bay), 4 lb. Italian rye-grass, 6 lb. cocksfoot, 1 lb. crested dogtail, 1 lb. *Poa pratensis*, 1 lb. Chewing's fescue,  $\frac{1}{2}$  lb. *Danthonia*, 1 lb. white clover, 2 lb. alsike, 2 lb. cow-grass,  $\frac{1}{2}$  lb. rape: total, 34 lb.

For sandy loam land, ploughed: 15 lb. English rye, 12 lb. cocksfoot, 1 lb. *Poa pratensis*, 1 lb. rape, 2 lb. alsike, 2 lb. cow-grass, 1 lb. white clover, 1 lb. hard fescue, 1 lb. Chewing's fescue, 1 lb. crested dogtail: total, 37 lb.

For volcanic soils: 10 lb. Poverty Bay rye-grass, 5 lb. Italian rye-grass, 6 lb. cocksfoot, 3 lb. cow-grass, 1 lb. crested dogtail, 2 lb. alsike, 1 lb. rape, 1 lb. *Poa pratensis*, 1 lb. Chewing's fescue, 1 lb. *Danthonia*, 1 lb. white clover: total, 32 lb.

For peaty swamp land: 15 lb. rye-grass (English), 5 lb. Italian rye-grass, 2 lb. prairie grass, 3 lb. cocksfoot, 2 lb. timothy, 1 lb. meadow foxtail, 1 lb. crested dogtail, 1 lb. *Poa pratensis*,  $\frac{1}{2}$  lb. rape, 2 lb. alsike, 2 lb. cowgrass, 1 lb. white clover,  $\frac{1}{2}$  oz. sheep's parsley: total, 35 lb. 8 $\frac{1}{2}$  oz.

For surface sowing, swamp land, ordinary: 15 lb. rye-grass, 10 lb. cocksfoot, 2 lb. alsike, 2 lb. cow-grass, 1 lb. red clover,  $\frac{1}{2}$  lb. white clover,  $\frac{1}{2}$  lb. rape, 1 lb. timothy, 1 lb. meadow fescue: total, 33 lb.

For surface sowing, ordinary bush, medium, and clay land: 15 lb. rye-grass, 8 lb. cocksfoot, 1 lb. crested dogtail, 1 lb. *Poa pratensis*, 2 lb. Chewing's fescue, 1 lb. *Danthonia*,  $\frac{1}{2}$  lb. *Poa trivialis*,  $\frac{1}{2}$  lb. *Lotus corniculatus*,  $\frac{1}{2}$  lb. *Danthonia*,  $\frac{1}{2}$  lb. white clover, 1 lb. trefoil, 1 lb. *Lotus major*,  $\frac{1}{2}$  lb. rib-grass,  $\frac{1}{2}$  lb. rape: total, 33 lb.

For light new land: 15 lb. rye-grass, 6 lb. cocksfoot, 2 lb. red clover, 1 lb. rape, 1 lb. *Lotus major*, 2 lb. cow-grass, 2 lb. Chewing's fescue, 2 lb. crested dogtail, 1 lb. white clover, 1 lb. *Poa pratensis*: total, 33 lb.

N.B.—Great prominence should be given to native grasses, especially for poor and hot lands.

## GRASSES FOR HAY.

A very suitable mixture for North Island (a bushel to the acre) is as follows: Rye-grass, 15 lb. perennial and 5 lb. Italian; cocksfoot, 5 lb.; timothy, 3 lb.; dogstail, 1 lb.; Chewing's fescue,  $\frac{1}{2}$  lb.; *Poa pratensis*,  $\frac{1}{2}$  lb.; red-top, 1 lb.; meadow fescue, 2 lb.; and following clovers: cow-grass, 3 lb.; alsike, 2 lb.; white clover, 1 lb.; birdsfoot trefoil, 1 lb.—i.e., 40 lb. in all to the acre.

## APPENDIX II.

## HOP-CULTURE, NELSON DISTRICT.

Average crop, 15 cwt.

Prices—January, 1902, 4d. to 4½d. per pound; average for five years ending 1900, 10d.; range during the same years, 8½d. to 1s. 3d.

Cost of cultivation (annual)—

	£	s.	d.
Hop-poles, at 2,000 per acre, lasting five years (one-fifth of £40) ..	8	0	0
Tillage—Ploughing and harrowing, £2 16s. per acre; pruning, £1 10s.; poling, £1 10s.; tying, £2 .. ..	7	16	0
Manure, per acre .. ..	3	0	0
Picking and drying, per acre—1,680 lb. (average crop), at 3½d. ..	24	10	0
Extras, per acre—Scrim for kiln, bales, &c. .. ..	2	0	0
	£45	6	0

NOTE.—The initial expenses include fencing and planting, and a garden is not fully productive before two years.

## APPENDIX III.

## PASSAGES AT REDUCED RATES FROM THE UNITED KINGDOM TO NEW ZEALAND.

THE Government has arranged with the Shaw-Savill and Albion Company, the New Zealand Shipping Company, and the Federal Steam Navigation Company to grant passages at reduced rates to persons approved by the High Commissioner in London.

The payments required from a passenger are as follows: Second class, £27; third class (two-berth cabin), £12; third class (four-berth cabin), £10. Children between three years and twelve years of age, travelling with their parents, are charged half-price. One child under three years of age in each family is taken free. A quarter-fare is charged for each additional child under three years of age. The full rates are—second class, £38; and third class, £21 or £19; a reduction to the passenger of £11 in the second class or £9 in the third class. The passage-money must be paid to the New Zealand Government Shipping Agent in the United Kingdom.

The question of suitability of any applicant for reduced passage will be decided by the High Commissioner; and, in addition, each head of a family must prove that he is possessed of £50 in cash for himself and family.

Full information and the necessary forms will be furnished upon application to the High Commissioner in London. The address of the High Commissioner for New Zealand is, Westminster Chambers, 13 Victoria Street, London, S.W.

The Department of Immigration, Wellington, New Zealand, will also furnish information on application.

## APPENDIX IV.

## DANTHONIA, PASPALUM, GORSE:

OPINIONS OF SETTLERS AND OTHERS ABOUT THESE, AS GIVEN IN EVIDENCE BEFORE THE LAND COMMISSION, MAY AND JUNE, 1905.

*Danthonia.*

WITH reference to the poor country between here and Auckland which you think might be made profitable, do you think it might be made profitable by sowing English grass upon it?—No, not the ordinary English grasses.

It is recognised that this grass, danthonia, is going to redeem the North?—It would not grow well on limestone land, but it would on poor dry land which would grow nothing else; and instead of going to the trouble of clearing these lands, the danthonia comes up better after the burning.

*R. C. Smith, Maungaturoto.*

*Danthonia, Paspalum.*

What is your estimate of the cost to make that land [poor manuka land at 5s. per acre] carry the sheep to the acre you say it will?—I should say about £2 per acre. You have to experiment to find out what grasses will take on the soils. At the present time a grass called Waipu brown-top and danthonia seem to be taking the places of the other grasses the settlers tried to grow. They used to go in for English grasses, but they proved an utter failure.

Would paspalum do on the poor land?—I believe it would. I have seen it tried on poor places, and it seemed to grow very well. I have seen it grow 5 ft. high on pipeclay land.

You say that at a cost of £2 10s., which includes the cost of the land and fencing, the land will carry a sheep to the acre; but will it go back?—No, not with danthonia. I am only speaking of what I have observed myself. Danthonia apparently kills tea-tree and fern.

*J. Hall, Valuator, Kawakawa.*

*Danthonia.*

What do you think of this danthonia?—I look upon it as a good grass for burning off the tea-tree, but as a feed I value it very little. However, it is better than nothing.

How do sheep do on danthonia?—They fatten pretty well.

Can you get fat lambs off it?—I do not know about that. I have seen four-tooth sheep killed off it going to close on 80 lb.

What breed of sheep?—Lincoln, I should say. Danthonia seems to do well on volcanic soil where I saw these sheep killed.

*W. Parsons, settler, Kawakawa.*

What is your experience of danthonia?—I cleared 300 acres of tea-tree scrub on wages, and surface-sowed it with cocksfoot and rye-grass, with the result that the grass died out in the second year and the scrub continued to grow. I cleared the ground a second time, and tried other grasses, with the same result. I find the only grass that is standing and doing any good at all is danthonia.

*H. Lane, settler, Opua.*

Do you think danthonia will carry three sheep to the acre alone on the land?—It has been a great help, more especially as it comes up again after a burn.

Will the fern come back to any extent at all after the burn?—Nothing to speak of. There is more trouble with the young tea-tree.

Is it not the case that fern will make headway even with danthonia?—We have not had danthonia long enough yet for me to be able to say that. In any place where it has taken hold with us it keeps the ground clean.

*J. Lane, Clerk, County Council, Whangaroa.*

Have you any danthonia?—I have a few hundred acres. I sowed other grasses, and danthonia has taken their place. It is very good for the hills, but does not seem to take so well on the flat land. It takes very well on poor land. In my opinion, danthonia is a good "fill-belly"; but I am not quite sure as to its nutritious qualities. I can fatten sheep on my land, but I go in more for dairying.

Do you find that your hills now under danthonia, and which were formerly under cocksfoot and clover, have the same carrying-capacity to-day as they formerly had?—I do not think so.

Do you think the sheep are doing as well?—I do not think so. There is more feed in the danthonia than in other grasses, but I do not think the danthonia is so nourishing. I may say that you can burn off everything and kill the fern, but that does not destroy the danthonia. In the spring it will grow so strong again that you cannot keep it down. Just before the rain comes is a good time to burn off, and then three or four weeks afterwards the danthonia comes up as fresh as if it had just been sown, and it covers the land and is good feed.

Will it get rid of the fern?—Yes, because you can burn it off every year. The danthonia will kill anything, I believe.

Have you ever had more than three hundred sheep on the land?—I had fourteen hundred at one time and a hundred cattle. That number of stock ran on the 1,900 acres. There is about 500 acres of danthonia. The balance has not yet got into danthonia, but it will do so.



If the place was fully stocked how many sheep to the acre would it carry?  
—I should think two sheep to the acre under danthonia.

Have you kept anything like two sheep to the acre on it?—Yes, I think so.

Would it pay you to put the 1,400 acres into danthonia or into English grasses?

—I believe there is a lot of the land that would not want sowing. If it were simply burnt the danthonia would spread itself. It spreads very quickly.

What would it cost to burn the land and sow it?—It would not cost much.

*G. Thomas, settler (3,000 acres), Peria.*

#### *Danthonia, Paspalum.*

Have you had much experience in grazing this poor land?—Yes; twenty years' experience.

What do you do?—The only thing to do is to burn off and surface-sow. Some of the land will not hold English grasses, and in such cases it nearly all goes back to danthonia.

What is your opinion of danthonia as a feeding-grass?—I am not very much in favour of it, I was in favour of it at first, but I am not now. During the dry summer season it is almost useless. It is useful in the case of land subject to tea-tree and fern, because you can burn the tea-tree and fern off and the danthonia will come up again, but I would not advise any one who has land that will hold English grasses to sow danthonia.

Have you sown danthonia?—No. It is just like a meadow in the summer, and the sheep and cattle carry it about on their wool and legs and in their droppings.

You do not consider it a good grass?—It is only good for clearing land. It is very fair feed during the winter and early spring, but it does not compare favourably with English grasses if they will hold.

*W. Garton, settler (1,700 acres), Mangonui.*

#### *Danthonia.*

Have you had any experience of danthonia?—My experience is that it is a very poor grass.

Do you find that stock will not eat danthonia?—They are not fond of it.

Sheep do not seem to take to it if they can find any other feed?—That is so. Danthonia will fill, but it will not fatten.

*J. Pearson, settler (640 acres), Mangonui.*

#### *Paspalum, Danthonia.*

Has the grassing been successful?—Yes. The best grass and the one which I consider will be the making of the north is a new grass called *Paspalum dilatatum*. That is the only grass that will stand in a dry season. I have not seen a single root die yet. All the other grasses stand well in rich, low-lying grounds only. Cattle and sheep are all fond of paspalum, and I consider it is very nutritious. I have seen sheep, cattle, and horses eating paspalum and leaving the other grasses. I have sown other grasses and got a dry summer, and the grasses have died out, and then I have resown in the autumn with paspalum over the bare ground, and in two years' time I had a close sole of good grass, and the sheep were eating it all the time. That shows the value of the grass.

Do you use danthonia at all?—I have used danthonia. I think danthonia is something the animals must get accustomed to. They will not eat it if they can get anything else. I have sown it in my mixture, and only this summer in one paddock I saw danthonia a foot high, while the other grasses were eaten short. I will never sow it again.

Do stock leave the English grasses to eat paspalum?—They will occasionally.

They do not prefer it to the English grasses?—Well, I can hardly say whether they prefer it, though I have seen them leave cocksfoot when it gets a little bit dry and go for the paspalum. For instance, cocksfoot and paspalum ripen at the same time, and after the seeds have been cut off the animals eat the paspalum right down to the roots, because the stalks remain green. But the cocksfoot remains dry and the cattle will not eat it.

Does paspalum spread from the roots?—It spreads in this way: the bunches gradually grow larger.

Would sheep be apt to kill it off as they do timothy?—They cannot kill it.

What do you estimate is the cost of sowing down hilly country to get a fairly good sward right from the start?—If there is any timber on it at all and you can get a good burn, you have some chance then if you sow the seed on it. My experience is that it does not matter when you sow the seed, whether summer or winter, it will come up within eight or nine months afterwards. The first year it makes very little show, but in the second year you will see it leave the other grasses

behind. In the summer-time when the other grasses begin to dry up, the clumps of *paspalum* in the paddock will look like little islands. It remains quite green. If you then shut up the paddock and give the plants a show the seeds will spread it.

Will it stand frost?—I cannot say. I do not get any frost.

Do you know that poor ironstone land to the north of Lake Omapere?—I have been through it.

Do you think *paspalum* will grow on that country?—I think it would grow even there if you could get the seed to take or planted it. I have tried it on the highest and worst places on my land, where the fern was very high, and I have not seen a single plant die there.

Is it your intention to cease sowing English grasses and sow only *paspalum*?—I mix the *paspalum* with the English grasses, and I intend continuing that. I have had many offers from people who wanted to buy my seed, but I refused to sell, because I wanted it all myself.

You think it is a grass that will redeem the poor lands of the north and make them profitable?—Yes, because it forms such dense root-bunches. The sheep cannot eat it close down. Their manure gets caught in amongst the roots of the *paspalum* and is not washed away, and in the course of time this ground becomes really rich on account of the grass holding the manure.

*C. Schreider (700 acres), Kohukohu.*

Have you any experience of *danthonia*?—Not a great deal, but I believe in the *paspalum* and the clovers. They do very well.

*C. Mardon (300 acres), Kohukohu.*

#### *Paspalum.*

How many years have you been experimenting with it?—I have had *paspalum* on my place only about two years, but I have seen paddocks of it in other places.

Do you think it will, when it matures, stand the cold weather better?—I do not think so. The frost does not kill the roots, and in the warm weather the grass comes up again. It has good fattening properties.

*W. Fuller (670 acres), Ohaeawai.*

#### *Gorse.*

From your experience, have you found gorse a very great evil, or do you find there is any good in it at all?—That is a very large question to go into. I can give you my experience if you like.

Does not the young growth come in very useful in the winter season?—It does. Gorse fenced off into small paddocks is a splendid thing. You can keep it under. The trouble with gorse, as a general rule, is to keep it under. I have 4 acres subdivided into acre paddocks, and alongside them another 7 acres in grass. The four gorse paddocks and the grass paddock carried thirty-two Romney rams through the winter by changing them from one paddock to another. If you have the gorse sown broadcast in large areas the sheep do not seem to thrive in the winter at all unless they are changed from block to block. One witness said something about seeing bales of wool on the gorse. That is only a question of the kind of sheep people go in for. At Kerikeri they run Southdown sheep, and the wool is short and comes off very easily. We go in for coarser-wooled sheep, and it does not come off.

*A. Close (3,500 acres), Pakarake.*

#### *Gorse, Danthonia, Paspalum.*

What is your opinion with respect to the growing of gorse on poor land for feeding sheep?—Growing gorse on poor land enriches the soil. Gorse is what they call a leguminous plant. I dare say the members of the Commission have heard a good deal lately about nitrogen and bacteria. The gorse is a leguminous plant which sends its roots down, and it throws down a certain amount of deposit and decay that enriches the soil, and, as you have observed in going round, there is a large area of poor land that I have heard witnesses say to-day is almost worthless. If you could confine the gorse to that particular class of land there is no doubt that in ten or twenty years' time that land would be really good-quality land, but the difficulty is to confine the gorse to that particular class of land. If it were possible to do so I should say plant all the land in gorse that is reckoned worthless, and in twenty years' time it would be a different class of land, but that is the difficulty. The question is whether it is advisable to do so considering the difficulty of controlling it.

As a feed-plant for sheep, what is your view?—It can be made to winter two sheep to the acre, and in the spring and summer months it will carry from six to ten sheep an acre easily.

Mr. T. C. Williams's experiment was on a large scale, and I understand that the gorse got beyond control?—Yes; he went in a little too much for it. If he had put in a limited area and had worked it in connection with danthonia on the poor land I think it would have been a success, but he went into it on too big a scale. He could not control the amount of stock, and, isolated as we are, he was not in a position to go into the market and buy the requisite number of stock to keep the gorse down in the spring months. I think a great deal might be done in working gorse and danthonia together. Danthonia is improved by burning. As the gorse gets ahead of it you can burn it off, and you can get the succulent shoots to come on again, and they are very excellent food for sheep.

Have you had any experience with respect to *paspalum* grass?—I have had no experience, but I have heard that it is very good during the summer, but not during the winter. I understand it gives good succulent feed during the summer months, especially in dry weather like we have had this year, but in the winter very little feed can be got from it at all.

We have heard a good deal about gorse. If it is nitrogen that the soil requires, it seems a rather expensive way in which to give nitrogen to the ground. Do you not think it would be cheaper to have the soil analysed, and by means of artificial manure restore the nitrogen that is chiefly wanted in the soil?—I am afraid it would be more expensive to deal with this soil in the way you suggest than in the other way. I want to safeguard my statement by saying that I do not know that it would be a wise thing to do on account of the danger of the gorse spreading to better land, but if it is possible to prevent that I should say put all the poor land into gorse—that is, the land that has been spoken of to-day as worthless.

H. Ludbrooke (970 acres), Ohacawai.

#### *Danthonia.*

Have you had any handling of the medium manuka land?—Yes.

Will it take grass?—Some of it will take grass.

I refer to the land with tea-tree on it about 6 ft. high?—I have tried a good many experiments with it, and my greatest success was through a mistake. I had the scrub cut in January, and it accidentally caught fire in March and a portion was burnt. I sowed that in danthonia and mixed grasses. The danthonia did well. None of the scrub came up, and the land is still in good grass, considering its quality.

Can this scrub be kept down?—Yes, if once you get the danthonia into it. I have also felled scrub and let it lie for twelve months with good results by sowing danthonia.

Do you consider this danthonia will be the saving of the scrub country?—I believe it will.

How would it do on the pipeclay stuff?—I do not think that is worth troubling about.

J. Kemp (500 acres), Te Ahuahu.

#### *Paspalum.*

*Paspalum*, when you can get it to grow, no doubt puts a different face on the country and improves it wonderfully. I consider *paspalum* will be the saving of the north, but the difficulty is to get it to germinate. This year I put in 40 lb. of seed, and so far I have not seen a plant, and the chances are the whole of the seed will be lost, because it will not stand the cold and wet in the winter.

W. Barker (245 acres), Marua, Whangarei.

#### *Paspalum, Danthonia, Gorse.*

I have had considerable experience with grasses. In grassing land you want to find out first the quality of the land, and then the grass most suitable to it. A great deal of the land throughout the North is well suited for rye-grass, clovers, cocksfoot, timothy, and the fescues, but they will not do on all classes of country. There is a very large area along the coast, especially the east coast, that is only fit for danthonia, which takes the place of the scrub and fern and enables the land to carry some stock in the way of sheep and cattle, when otherwise it would run nothing. These lands will not grow any of the better classes of grass. I think *Paspalum dilatatum* will grow on most of these lands also. I have had a good deal of experience with that grass. I have seen it on the gum lands—that is, the pipeclay land—as well as on the swamp lands up north, very nearly up to the North Cape. I have sown it on the sands of the west coast, and I have found it do well in every instance. Of course, when I say "well" I mean that it grows better than any other grass. I think very highly of it. It

is a very fattening grass, and very good for renewing old pastures, especially on hilly land.

What about gorse?—Gorse is also a weed in many places, but in some places I think it has done a great deal of good. I speak particularly of the Kerikeri district. There is a lot of land there that at one time carried very few sheep. I knew that Mr. Kemp at one time was running eight hundred sheep on the place, and he considered that was all he could run. He told me himself that when he had twelve hundred sheep on the place it was overstocked. He sold the property to Mr. Williams, and then managed the place for him. Mr. Williams went in for the systematic sowing of gorse. He imported the seed from England, and sowed it in drills, with grass in between. I was up there some years ago, and I recommended them to sow danthonia, which at that time had not been advertised. I had taken notice of it then. On my advice Mr. Kemp sowed down some danthonia. I pointed out a piece of ground where danthonia was growing, and he saved the seed himself. He sowed the danthonia, and he found it carried fire whenever he wanted to burn the gorse in order to renew it. They are now carrying four thousand sheep within the boundaries of that property. In that instance gorse has been a great success. In other places it has practically ruined the settlers. It is just a matter of the quality of the land. If it is allowed to grow on good land it is difficult to eradicate. On this land at Kerikeri, Mr. Kemp told me quite lately, he had not been able to get anything to grow. After a few years in gorse he stumped it and put the land in turnips and oats and grass, and he now finds the land will carry grass where it would not hold it before. The gorse opens up the land and improves it.

We saw some extensive tracts of country where apparently the gorse had got beyond the control of the grazier?—A great deal of it has. Still, that land will carry a great number of sheep, though certainly it is an eyesore to see good land in gorse. However, one is very diffident about saying anything against it, seeing there are no other means of bringing the land into grass.

You think under careful management the sowing of gorse and danthonia is not to be condemned so long as it can be controlled?—Yes.

You have spoken very highly of the *paspalum*; but complaints have been made to us of the low germinating properties of *paspalum* and the difficulty of getting a good sole of grass: what is your experience?—My experience has been quite the reverse. I have always saved my own seed. I have never bought imported seed. Some *Paspalum dilatatum* was sent to me by a friend twenty-four years ago, and I divided the contents of that very little packet with a neighbour, and we raised a good many plants, and I always collected my own seed. I find that wherever I sow the seed it grows, and that no matter in what month of the year it is sown it is never lost. Sometimes it is slow in germinating, and sometimes I have not seen the grass until twelve months after sowing.

Would there be any difficulty in settlers acquiring the seed if they went in for this grass extensively?—No. It is being imported in large quantities from Australia.

Are the germinating properties of the Australian seed as high as those of the local seed?—I do not think so.

Would you advocate the Government taking the matter up and cultivating an area for seed-sowing purposes in order to bring in these lands?—I would.

Was the area on which the eight hundred sheep were run covered with tea-tree then?—It was open land with low tea-tree here and there. It was mostly covered with fern. Before gorse was sown Mr. Kemp had laid several paddocks down in English grass, but had failed with them.

Did he plough the land several times or only once before sowing English grass?—He ploughed it several times and cropped with oats.

I suppose by occasionally burning the gorse the young gorse comes up. Do the sheep eat it?—They are very fond of it.

Though it is beneficial to the owner of the land who keeps his stock on the gorse, do you mean to say it is beneficial to the rest of the country that the gorse should be sown?—It is in the case of poor land like that north land. Mr. Williams has employed a great deal of labour. There are a number of settlers about on fairish sections, but I do not think they could have lived on them if Mr. Williams had not taken up this land and started gorse-growing. He has found constant employment for them.

But supposing you had a farm alongside Mr. Williams, and wanted to use it for some other purpose, how would you like him to grow gorse on his place?—I should object to it.

J. Shannon, Crown Lands Ranger, settler, &c.

APPENDIX V.  
ANNUAL RAINFALLS, 1864-1905.

	Mangonui.	Auckland.	Gisborne.	Napier.	Taranaki.	Wanganui.	Wellington.
1864	67·900	37·400	..	49·300	43·800	30·410	44·500
1865	40·800	40·000	..	..	56·800	..	50·700
1866	..	42·000	..	30·000	55·700	36·580	41·100
1867	55·200	53·180	..	..	60·690	38·250	41·950
1868	..	49·087	..	..	50·420	34·130	55·522
1869	48·340	52·797	..	..	55·125	42·960	56·768
1870	52·870	44·831	..	32·410	54·720	35·030	48·205
1871	57·640	47·505	..	35·890	72·120	51·090	64·057
1872	46·900	42·096	..	23·940	63·640	40·420	50·945
1873	63·720	41·237	..	42·380	53·120	39·000	54·985
1874	56·950	35·024	..	37·940	57·220	36·760	53·496
1875	52·530	51·310	..	38·260	66·960	44·340	65·827
1876	58·640	44·025	..	38·390	48·180	33·880	43·374
1877	54·470	40·375	..	33·450	52·000	33·970	51·925
1878	40·140	37·160	26·090	21·100	56·730	41·980	54·602
1879	58·920	46·130	64·330	53·140	60·180	33·650	57·441
1880	55·480	38·890	59·450	38·400	47·220	36·270	46·767
1881	..	34·237	38·480	..	..	30·270	50·132
1882	..	45·630	52·140	..	..	33·880	55·685
1883	..	52·215	56·460	..	74·870	47·290	51·994
1884	..	38·070	33·890	..	60·640	45·770	62·335
1885	..	28·140	44·410	..	..	23·580	36·813
1886	..	32·640	28·500	..	..	46·410	54·477
1887	..	37·710	54·390	..	..	38·590	56·969
1888	..	34·600	32·230	..	..	31·300	41·009
1889	..	41·970	38·340	..	..	35·410	31·356
1890	..	46·100	50·740	27·620	68·190	32·840	45·230
1891	53·570	36·040	39·850	30·360	73·100	35·470	35·125
1892	59·550	41·331	45·970	40·630	..	36·910	67·656
1893	86·370	53·810	62·390	57·730	..	42·990	53·034
1894	71·000	41·110	62·900	40·640	63·120	33·930	51·006
1895	60·740	44·150	48·470	33·970	67·880	46·490	61·473
1896	37·970	37·790	37·950	35·900	66·661	41·540	57·546
1897	..	45·361	48·110	41·280	72·530	44·060	48·495
1898	..	40·750	48·240	*30·790	49·060	31·160	41·962
1899	..	34·440	51·430	37·550	64·727	38·180	52·715
1900	..	39·150	59·950	45·690	61·261	36·910	51·000
1901	85·25	38·490	47·630	27·010	58·440	37·980	41·557
1902	*64·65	38·280	44·980	37·050	52·040	29·030	38·750
1903	45·14	45·130	32·800	33·650	69·170	36·380	53·800
1904	59·39	45·700	51·540	..	82·935	43·490	60·405
1905	37·30	39·820	55·900	49·780	64·510	37·920	51·170
Aver-	..	..	..	..	..	..	..
ages	56·59	41·80	47·06	37·29	60·72	37·72	50·80
Years	26	42	28	28	33	41	42

\* Incomplete.

APPENDIX V—*continued.*ANNUAL RAINFALLS, 1864–1905—*continued.*

	Nelson.	Canterbury.	Greymouth.	Hokitika.	Dunedin.	Queenstown.	Invercargill.
1864	63·400	22·000	..	..	24·200	..	51·700
1865	68·300	24·300	..	..	46·600	..	63·600
1866	56·000	19·400	..	127·500	29·000	..	47·200
1867	46·310	30·070	..	110·510	39·050	..	41·620
1868	79·370	30·041	..	120·210	33·893	..	46·346
1869	65·230	27·292	..	88·210	32·918	..	42·680
1870	48·430	28·364	..	116·680	39·202	..	53·950
1871	55·670	27·935	..	122·440	22·146	..	39·030
1872	78·610	19·741	..	123·210	27·393	28·880	40·110
1873	65·440	26·330	..	96·170	35·825	32·300	37·480
1874	71·550	22·790	..	104·480	28·789	30·190	44·650
1875	69·070	32·310	..	130·790	42·631	31·760	44·180
1876	60·640	23·990	..	116·325	38·260	30·930	40·590
1877	48·520	23·720	..	136·660	37·460	35·590	43·150
1878	51·900	13·540	..	154·446	45·235	60·020	54·020
1879	61·420	23·180	..	128·295	42·099	22·420	33·260
1880	37·270	17·670	..	122·840	33·063	27·690	39·140
1881	..	28·071	..	..	26·402	..	..
1882	..	25·391	..	..	41·796	..	..
1883	..	30·336	..	..	38·312	..	..
1884	..	28·451	..	..	33·881	..	..
1885	..	22·080	..	..	24·598	..	..
1886	..	35·287	..	..	52·632	..	..
1887	..	32·890	..	..	39·144	..	..
1888	..	29·155	..	..	48·356	..	..
1889	..	20·384	..	..	23·446	..	..
1890	..	14·836	..	..	27·984	44·520	..
1891	..	20·575	..	..	32·734	28·890	68·500
1892	..	27·883	118·960	..	47·552	20·870	39·090
1893	..	22·112	112·970	..	54·495	26·750	35·240
1894	45·090	29·844	106·680	115·890	39·436	23·480	35·530
1895	46·400	30·982	92·160	92·320	51·396	26·930	64·930
1896	34·340	30·228	106·920	115·880	48·538	23·990	36·600
1897	37·940	†14·480	114·050	128·830	38·110	*30·560	52·800
1898	..	†18·558	107·400	124·000	34·143	37·660	58·240
1899	..	†24·860	98·760	104·780	38·621	32·280	44·110
1900	37·300	†23·720	89·260	99·450	43·378	31·470	33·390
1901	41·780	†22·016	110·250	133·970	37·652	35·550	47·830
1902	..	†24·490	98·950	96·070	53·564	31·740	..
1903	45·690	†20·890	83·910	102·850	42·774	27·230	..
1904	41·640	†31·150	124·730	114·070	48·708	28·460	45·800
1905	43·240	28·450	95·190	93·830	53·840	28·740	36·650
Averages	53·86	25·00	90·01	115·58	38·55	31·16	45·38
Years	26	42	14	27	42	25	30

\* Incomplete. † Lincoln. ‡ Linwood.

Mean of above fourteen stations, 52·26 in.

Meteorological Office,  
Wellington, 3rd August, 1906.D. C. BATES,  
Meteorological Observer.

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\* The returns of the census of 1906—which were not available when Part I went to press—show a total population of 888,639, thus divided: North Island, 471,891; and Middle Island, 411,258.

Erratum.—Page 31, *Travelling and other Allowances*: For "each way" read "one way."

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