

1885.
NEW ZEALAND.

REPORT

ON THE

SURVEYS OF NEW ZEALAND,

FOR THE YEAR

1884-85.

Presented to both Houses of the General Assembly by Command of His Excellency.

WELLINGTON :

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1885.

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The SURVEYOR-GENERAL to the Hon. the MINISTER of LANDS.

SIR,—

General Survey Office, Wellington, 12th August, 1885.

I have the honour to present the report on the surveys of New Zealand for the twelve months ended the 30th June, 1885.

The work in the field and in the office proceeds on a well-defined system, so that the operations from year to year are very much of the same nature, any variation being more in the amount of work done than otherwise. Thus, during the twelve months under review, there is a greater return of trigonometrical and topographical survey than usual, and a less area of sectional survey. The falling-off in the returns of the latter is mainly due to the arrears in the Middle Island being nearly all worked off, and in that class of survey a nearer approach made than ever before to the condition of the department getting abreast of and keeping pace with the demands for settlement surveys.

The reports of the several branches by the officers in charge will be found in the appendices, and the out-turn of work is tabulated and mapped in the same manner as formerly.

The following statement shows in general form the amount of field-work completed during the year:—

		FIELD-WORK.		Rate per Acre.		Cost.	
		Area.	£ s. d.		£ s. d.		
Major triangulation	...	2,936,798 acres	0	0	0 $\frac{1}{4}$	3,021	8 2
Minor triangulation	...	580,209 „	0	0	1.39	3,305	15 10
Topographical and trigonometrical survey	...	1,950,939 „	0	0	0.97	7,899	2 7
Rural and suburban settlement survey	...	300,774 „	0	2	1.2	31,672	15 4
Town section survey	...	{ 1,299 „ =994 allots. }	1	1	1 $\frac{1}{2}$ per lot	2,107	11 3
Native Land Court surveys	...	316,378 acres	0	0	4.2	5,563	9 0
Native Land purchase	...	17,339 „	0	0	6.1	440	11 4
Gold-mining surveys	...	1,230 „	0	14	7	896	19 0
Road, railways, water-races	...	612.8 miles	12	10	7 $\frac{1}{2}$ per mile	7,679	4 1
Miscellaneous and detention	...	...	...	...	...	7,601	10 3
						<u>£69,188</u>	<u>6 10</u>

GEODESICAL SURVEY.

During the greater part of the year Mr. Adams was engaged in observations for latitude by means of the zenith telescope at stations principally in the North Island where there were uncertainties as to the latitudes of several stations, which have now been cleared up, and the results, so far as computed, are as follow:—

1—C. 1A.

Station.	Astronomically-observed Latitude.	Latitude calculated through the Triangulation from Mount Cook, Wellington.	Difference between Astronomical and Triangulation Latitude.	Triangulated Latitude, how obtained.
	° ' "	° ' "	"	
Mount Cook Observatory ...	41 18 0·59	...	...	...
Mount Cook Initial Station ...	...	41 17 59·3	...	...
Mangonui, 20 A ...	34 59 35·79	34 59 29·8	5·99	Via Tatarakino and Eden.
American Transit of Venus Station, 1882 ...	36 51 50·58	36 51 41·1	9·48	Ditto.
Mount Eden... ..	...	36 52 38·7	...	Via Tatarakino.
Tauranga, Domain ..	37 40 57·31	37 40 53·5	3·81	"
Maketu ... ..	...	37 45 33·4	...	"
Gisborne, Trig. Station 108 ...	38 40 38·04	38 40 40·8	1·76	Via Hawke's Bay and Tatarakino.
Trig. A, Poverty Bay ... ..	...	38 37 23·5	...	"
Napier, Station 60	39 28 43·52	39 28 45	1·48	Via Wharita.
Hawke's Bay, Station A ... ..	...	39 38 57·9	...	"
Nelson, Botanical Hill	41 16 14·82	41 16 23·2	8·38	...
Burnham, British Transit of Venus Station, 1874 and 1882	43 36 48·54	43 36 43·3	5·24	...
Ditto, by Major Palmer, R.E. ...	43 36 48·4	43 36 43·3	5·1	...

The differences between the observed and computed latitudes show, in common with results formerly reported, that there is a very considerable deflection of the plummet at various points. From Mr. Humphries's report it will be seen that in the Taranaki Provincial District the differences *per se* of stations around Mount Egmont are nearly 10", or a difference of 1,000 feet between the stations at New Plymouth and Hawera, thirty-eight miles apart, on a line bearing S. 18° E., with Mount Egmont, 8,260 feet high, nearly in the middle. The station at Midhirst, due east of the mountain-top, also shows a discrepancy of 8" from Marsland Hill, New Plymouth, the distance between the two stations being only nineteen miles. In both cases the results show that the plummet is drawn towards the intervening mountain mass. It would be interesting to observe at more stations in this district, with a view to finding out the particular locality where the greatest discrepancy exists. There are other districts also where it would be interesting to pursue this inquiry; but, as sufficient latitudes have now been observed throughout the colony for geographical purposes, it is not proposed to continue taking more observations for the present.

The triangulation of Westland having been extended *via* Haast Pass to a connection with the Canterbury and Otago triangulations has afforded data for the computation, by Mr. Mueller, of differences of latitude and longitude and convergency between the initial stations of the meridional circuits of Okarito, Jackson's Bay, Lindis Peak, and Timaru.

TRIANGULATION.

The area of 5,500 square miles has been brought under triangulation during the year, of which 3,050 square miles have also been topographically surveyed.

In the North Island Mr. L. Cussen has extended the network of major triangles referred to in last year's report over the King country to the Taranaki provincial boundary, where he closed on the stations of Mr. H. M. Skeet, who also was engaged during the season in extending a triangulation over the northern portion of the Taranaki Province. Both officers were in the field to a late period of the season, and their computations are not yet finally completed; but, so far, the closures show a discrepancy between the two surveys of two links to the mile, of only 3" in bearing, and of 1 foot in altitude—results, in every respect, very satisfactory; the bases from which the surveys were made being 200 miles apart in a direct line, and the country difficult and trying to the surveyors.

The Appendix contains reports both from Mr. Cussen and from Mr. Skeet, descriptive of the country, and a map, on which the topography of their joint labours is shown. It is at present, for the most part, a wild, bush country, tenanted by a very sparse Maori population, about one to the square mile, although, from numerous clearings and other evidences of occupation, it would seem to have been more populous even quite recently. That deduction, however, must be received with some degree of caution, for, as is well known, the Natives

migrate from place to place, cultivating at choice spots for a few years, and then remove to another, and they frequently also shift their quarters in the season of fishing, bird-catching, and so on. Still it may be assumed that there has been a decrease, for, apart from natural causes, there is no doubt that, in the pacified state of the country during the past few years, the Maori no longer seeks isolation in the back country, and the tendency has been to gravitate to the coast settlements, and share in the enjoyment of the good things to be got there.

Although the country is decidedly more suitable for pastoral than agricultural occupation, there is a large field for the energy of the European settler to bring it into shape even for that purpose. Messrs. Cussen and Skeet will carry on the triangulation as soon as the season will permit, and continue to completion next summer.

The ability and energy with which both officers have devoted themselves for several seasons to the execution of these arduous surveys is highly creditable to them.

In the Middle Island Messrs. F. S. Smith and F. A. Thompson, in the Amuri District, and Mr. G. H. Bullard, in the Maruia District, have been conducting trigonometrical and topographical surveys, and next season will resume and probably complete the network across the dividing range, define the pastoral lessees' boundaries, and furnish the details of a map of the mineral and pastoral country between Reefton and Amuri. There was a gap in the triangulation of the West Coast, extending from a little north of Westport round to Collingwood. Mr. Snodgrass has filled in the coast up to Mokihinui, and reports an area of 16,000 acres of coal-formation within his survey. It is most desirable that the triangulation and topographical survey should be extended on round the coast to Collingwood, for, although a poor rugged country from the settler's point of view, there is a good reason for supposing it to be a valuable mineral country.

In Marlborough Mr. A. D. Wilson has extended triangulation of the Wairau Valley, and closes on the Nelson triangulation with an error under one link to the mile.

In Canterbury the country between Hakateramea and the Mackenzie country has been trigged by Mr. H. C. White. It will be necessary before 1890, or rather 1889, to have all the pastoral country of Canterbury not yet trigged brought under topographical survey, so that on the re-letting of the country accurate areas and boundaries may be given. As the altitude of the country only permits of work for about half the year, a portion must be done each intervening summer.

In Westland the triangulation *via* Haast Pass by Mr. G. J. Roberts was closed on the Otago and Canterbury triangulations in the Makaroro Valley, with an error of only one-third of a link per mile.

In Otago Mr. Wilmot completed the trigonometrical and topographical survey of the high country around the Nevis and Nokomai; the former maps of that part of Otago being exceedingly vague, and the cause of great uncertainty as to run boundaries.

The cost of these operations throughout the colony does not average more than one penny per acre; and, as they furnish a map of the country, showing all the main topographical features, altitudes, and best lines for future roads, it will be seen that the result is well worth the expenditure, even if the trig. stations did not serve ever after as the standard points of all succeeding surveys.

SETTLEMENTS SURVEYS ON RURAL AND SUBURBAN LANDS.

As the sectional surveys during the past year have been nearly all in bush lands the area surveyed has been less and the cost more per acre than in some former years, when the open grassy plains of Canterbury and Otago were the principal field of operations. In bush lands everything is against rapid progress, for, apart from the great labour of cutting lines where every corner is pegged, there is necessarily much research required in a hilly bush district in finding the lowest saddles and the best possible grades and location of road-lines.

Another very great hindrance is in finding the position of old surveys in those districts where they were originally not only very imperfectly marked on the ground, but with no recorded connection to any trigonometrical or other point by which to trace them. As the boundaries described in the Crown grants prepared from many of these surveys are manifestly in error, and could not be reproduced on the ground, the question of how to locate recent Crown lands purchased in relation to them is often a matter of much difficulty.

In the Auckland and Nelson Land Districts there are still a very considerable number of settlers who were placed in possession of their land purchases on such meagre, imperfect surveys that, although many years have since elapsed, they are still without the Crown grants of their land, nor can a sufficient description of the land for purposes of title be given until

a correct recordable survey is made. This class of work is invariably more tedious and troublesome than any other, and although, as a rule, it is only taken up when other work has to be done in the same locality, yet in these two land districts the old inaccurate surveys are a serious drag on progress, and an ever-recurring cause of complaint on the part of the settlers who have not received their grants. As this class of cases occurs in many different places it will be several years at the present rate of progress before they are all overtaken, and the grants issued.

NATIVE SURVEYS.

The return for the year of surveys for the Native Land Court for investigation of title is 273 blocks, and a total area of 505,879 acres. Of this, 151 blocks and 312,678 acres have been paid in advance by Government, and a sum of £5,563 9s. registered in lien, to secure future repayment. The survey of 122 blocks and 193,201 acres has been paid for by the Natives to the surveyors. Part of these surveys were executed in former years, but, as they have only been brought recently to account, they appear for the first time in the returns for the twelve months ending the 30th June, 1885. There have been numerous applications by Natives for surveys which have never been entered on, because the Natives cannot pay the cost, and, private surveyors having no power to register a lien, they have no security for future repayment, and, as a rule, now decline to execute Native surveys. The Government can register a lien, but, as it also declines to advance the cost, the number of surveys of Native lands for investigation of title has necessarily very much diminished.

The Native land purchase surveys return four blocks, of an aggregate area of 17,339 acres. This class of surveys being now almost confined to the completion of transactions entered into in previous years, and no new purchases of any magnitude being negotiated, it also has a tendency to diminish. The purchase of the Mangatainoka Block, of 70,000 acres, which for many years had been under negotiation, was recently adjudicated on by the Native Land Court, and subdivided according to the interests of the several proprietors; about 40,000 acres of land well adapted for settlement being allotted to the Crown, and which is now under survey for definition of boundaries and section of road-lines.

LAND TRANSFER SURVEYS.

The facilities given for the conveyance of land under the Land Transfer Act, the numerous sales and subdivisions incident to the settlement of a new country, where as yet no great sentiment attaches to land—it being treated more as a commodity to be bought and sold for profit than as a family possession—together with the fact that in the rapid development of the country, and the great changes which occupation is making on its surface, where there are no ancient landmarks as in other countries to stereotype possessions, all point to the necessity of having boundaries and marches referred to a network of trigonometrical or standard points, so that the position of every piece of land brought under the Land Transfer Act may be easily ascertainable ever after, irrespective of the changes on surface referred to. An accurate recordable system of survey is therefore the basis of the success of the land transfer system. As the State gives its guarantee to the title of every piece of land brought under it, all survey plans are carefully examined before being passed for registration of title. At each of the eleven principal district survey offices the work requires the constant attention of one or more officers.

There is occasional delay in passing plans, from having to refer them back for further information to the private authorized surveyors, by whom this class of surveys is almost wholly undertaken. As a rule, however, the authorized surveyors show every desire to co-operate with the department, but considering the large number of practitioners, and the difficulties in unravelling the entanglements of some of the old surveys, it will be manifest that delays must sometimes ensue before all the requirements are met, and the plan passed on to the District Land Registrar. There is, however, the satisfaction that in the investigation of every difficult case the subsequent dealing with all the adjacent land is rendered comparatively easy, so that, by keeping steadily to system, the work of inspection and check will gradually become less tedious and difficult. A great aid to the efficient working of the land-transfer system is the entering of the boundaries of the lands dealt with on a record plan of the town, suburb, or district, as the case may be. This shows at a glance the existing state of the tenure, and is a valuable index to the ownership of the land.

In the recent preparation of rolls for the Assessors under the property-tax very great difficulty was experienced, as explained in Mr. Barron's report, in finding what portions of a

property had really been conveyed by some of the deeds under the Deeds Registration Act. In some cases it was even impossible to determine from the deeds whether the land conveyed was or was not parts originally of several adjoining properties. In the light of these facts it is worth while considering if the time has not come to make it compulsory to bring all future dealings with lands directly under the Land Transfer Act.

RECONNAISSANCE.

In the Appendix will be found an interesting account by Mr. Mueller of his explorations of the head-waters of the Arawata and Waitoto Rivers, being portions of the back country of Jackson's Bay District, and close up to the backbone of the great dividing range at Mount Aspiring.

As might be expected in that region of gorge and mountain and snowfield, there is no footing for the agricultural settler, and but little for the pastoral.

There is, however, as will be seen from a perusal of Mr. Mueller's report, abundance of valuable birch timber in the Arawata Valley, and specimens of copper, galena, and gold were found in several places. From this, and the reports which have been received from time to time from different sources regarding the country around and to the south of Jackson's Bay, it is quite evident that it is a mineral country, which a fortunate discovery may any day bring into prominence. The exploration and mapping of the country is an essential and important step to its systematic examination, either by the geologist or mining prospector.

Mr. Strauchon's excellent report of his exploration of the extensive Tautuku Bush, along the south coast of Otago, between Waikawa and Catlin's Rivers, reveals a country well adapted for a coast population, who at first would find their interest in developing its timber industry, in cattle, and in fishing.

The district, so far as reported on, comprehends the country adjacent to Waikawa and Tautuku, an area of 80,000 acres, and only wants opening out by a road to render it accessible to settlers, whose occupation of the country is only a question of time in any case, but which would be greatly accelerated by the formation of a road connecting with the Waikawa Valley.

PUBLICATION OF MAPS.

In this important branch of the department there has been a large out-turn of work for the year, as will be seen from Mr. Barron's report, and under whose excellent and skilful direction work of a high class is produced.

In respect of maps the main effort is to publish the survey districts on the one-inch scale. For local and general purposes this scale is much the most convenient, for it is large enough to show clearly every section above ten acres, roads, railways, townships, and so on, over an extensive area, without having a map of inconvenient size. The normal sheet represents a district twelve and a half miles square, or just 100,000 acres. By joining sheets larger areas can be shown, and the boundaries of rating and local industries delineated by a coloured outline, as may be required.

The extensive topographical surveys of the last few years have furnished the information for detailed and more correct geographical maps on the scales of four and eight miles to the inch. Maps of a portion of the Auckland Province and of the north end of the Middle Island are now in hand on these scales, and will shortly be published.

Some attention has been given during the year to the preparation of chromo-lithographs illustrative of the settled districts of the colony, of the agricultural and sheep farms, and of the principal buildings in its towns and cities. The main purpose of this class of work is to convey a correct notion of the industrial aspect of New Zealand. Hitherto the colony has been almost exclusively illustrated as though it were an enlarged Switzerland, its surface exclusively occupied with Alps, and lakes, and glaciers, and snow-fields.

There is always considerable pressure on the drafting and lithographic department from varied miscellaneous work, but it is hoped that, notwithstanding a diminished staff and the inconveniences of the printing office, referred to in former reports, considerable progress will be made during the ensuing year in the issue of new maps.

ROADS TO OPEN CROWN LANDS FOR SALE.

The importance of rendering Crown lands accessible before offering them for sale or settlement has been so fully referred to in former reports, and is now so universally acknowledged, that it is unnecessary to enlarge on the subject. The reports of the Chief Surveyors

in the Appendix give in detail the several works in hand; and, while these officers have a general control of all the works in their respective districts, and see to the due performance of contracts before certifying to payments, acknowledgment must also be made of the co-operation and assistance in many of the works of officers of the Public Works Department, and of the officers of the counties and Road Boards, for in carrying on this class of work the department has found it better to avail itself of whatever agency was most to hand in each locality, rather than adhere to any cast-iron rule of exclusive departmental procedure.

During the year which closed on the 30th June the following works have been accomplished:—

In Auckland there have been 44·65 miles of cart-road made, 5·05 miles of cart-road felled and cleared through forest, 45·5 miles of bridle-road made, and 1 mile felled and cleared; 5·65 miles of ditching done, 216 culverts and bridges constructed, and 49·87 miles of roads graded in anticipation of their being formed in the future: the payments on account being £19,803.

In Taranaki 22·53 miles of cart-road have been formed, and 28·5 miles have been felled and cleared; 2·93 miles of bridle-road have been made, 2·2 miles of road gravelled, and 5 bridges and culverts constructed: payments on account, £4,160.

In Hawke's Bay 27 miles of cart-road have been felled and cleared, and 1 mile formed; and 22 miles of road have been graded ready for construction: payments, £1,953.

In Wellington 8·34 miles of cart-road have been felled and cleared, and 5·1 miles formed; $\frac{1}{4}$ mile of road has been gravelled, and 32·32 miles graded ready for construction: payments, £2,909.

In Nelson 22·81 miles of cart-road have been constructed, and 3·5 miles graded: payments, £1,963, and £1,133 paid out of goldfields votes.

In Westland 75 mile of cart-road has been cleared, and 9·75 miles constructed; 12 miles of bridle-road have been felled and cleared, and 9·25 miles formed: payments, £774.

In Marlborough a sum of £379 has been expended in finishing up the Awatere Road.

In Canterbury 15·86 miles of cart-road have been made during the year, 1 mile of ditching, and 12·12 miles of water-race for irrigation purposes constructed: payments, £6,315.

In Southland 4·28 miles of cart-road have been made, $\frac{1}{4}$ mile cleared of bush, 4 miles of gravelling done, 54 mile of ditches and drains have been made, and 24 culverts and bridges have been built: payments, £4,200.

In Otago 21·97 miles of cart-road have been constructed, 14 miles have been gravelled, and 1·25 miles of drains have been made: payments, £5,890.

The totals are: 147·95 miles of cart-road formed; 69·89 miles of cart-road felled and cleared; 57·68 miles of bridle-road formed; 13 miles of bridle-road felled or cleared; 8·44 miles of drains and ditches made; 245 culverts and small bridges made; 20·45 miles of road gravelled; 107·69 miles of road graded ready for formation; and 12·12 miles of water-race for irrigation made. The total payments to account have been £48,346 from roads vote, and £1,133 from goldfields vote.

FUTURE DEPARTMENTAL OPERATIONS.

In consequence of the decrease in the number of officers by the discharge of 23 surveyors and 20 draughtsmen the working power of the department is necessarily very considerably curtailed. It is a matter for regret that the necessity arose for dispensing with so many officers able and willing to serve the department. In field-work it is proposed that this reduction shall affect the sectional settlement survey as little as possible. It will, therefore, be necessary to refrain from entering on any new extensive trigonometrical and topographical surveys, but simply confine operations on this class of work to the completion of districts already begun, and which it would be a loss to leave in an unfinished state. In the matter of taking roads through Native blocks and Crown-granted lands, before the expiry of the time allowed by law, the department will endeavour to survey the more important lines; but it will be impossible to do all that the local bodies or the public interest would require in that respect. In a previous report it was recommended that the Legislature should extend the time within which to exercise the right of taking roads.

In any forecast of work a very considerable allowance has to be made in respect of miscellaneous survey services required by the various departments of the public service. Thus, quite recently, peremptory demands were made for surveys and plans for defence, which had to be attended to in preference to other work. Again, the Property-Tax Department had

to have maps prepared up to date, showing the position of every property in the colony, This work occupied nearly all the office staff for about two months, stopping pretty well all other work.

NECROLOGY.

I cannot conclude this report without expressing great regret at the death, on the 3rd instant, after a few days' illness, of the late Mr. William Arthur. He was Chief Surveyor of Otago from the end of 1876 until his death, and for many years previous was one of the Otago surveyors, having been appointed under the late Mr. J. T. Thomson, in 1860. Mr. Arthur was a most estimable man, held in high respect, and a very excellent officer.

On the 16th October, 1884, there also passed away the late Mr. J. T. Thomson, whose name will ever be associated with New Zealand as one of its early explorers and, it may be added, founders, for the method of survey introduced by him, and now known as the New Zealand survey system, has had a very great deal to do with the successful settlement of the colony. On the abolition of provinces in 1876, he organized the Survey Department, and was Surveyor-General up to the 31st October, 1879, when he retired into private life after forty years of official service, seventeen years in India and the last twenty-three years in New Zealand. Mr. Thomson was a man of marked individuality of character, inflexible yet courteous in the discharge of duty, greatly respected and liked by those who knew him best.

In the death of Mr. Theophilus Heale, a few months ago in England, New Zealand has lost another of her very earliest colonists and surveyors. Mr. Heale was the first Chief Surveyor of Southland under the provincial system, and retired from that position about 1863, and afterwards until the end of 1876 was inspector of Native surveys in the North Island. Afterwards he became a Judge of the Native Land Court, and continued so till recently. He was a man of great acquirements, of most amiable character, and generally beloved.

The Hon. the Minister of Lands.

JAMES MCKERROW,
Surveyor-General.

TABLES.

No. 1.—ABSTRACT of the SURVEYORS employed and of the WORK ON HAND in each PROVINCIAL DISTRICT on 30th June, 1884.

Chief Surveyors.	Surveyors employed.		Work on Hand.				
	Staff.	Tempo- rary.	District.	Trig.	Settle- ment.	Native Block, &c.	Roads, Railways, &c.
S. P. Smith, A.S.G. ..	18	2	Auckland	Sq. Miles.	Acres.	Acres.	Miles.
Thomas Humphries ..	8	2	Taranaki	2,268	76,796	32,490	593
H. Baker	4	3	Hawke's Bay	625	36,000	..	30
J. W. A. Marchant ..	7	1	Wellington	612	72,426	532,265	137
J. S. Browning	10	2	Nelson	1,570	359,500	20,000	517
H. G. Clark	2	..	Marlborough	125	80,132	..	..
G. Mueller	3	..	Westland	625	4,545	..	..
J. H. Baker	5	..	Canterbury	1,796	32,673	..	248
W. Arthur	4	1	Otago .. ..	..	9,639	..	..
J. Spence	2	..	Southland .. ..	..	12,907	..	..
				..	3,234	..	..
Totals	63	11	..	7,621	687,852	584,755	1,525

No. 2.—CROWN GRANTS and other INSTRUMENTS of TITLE from the CROWN prepared.

District.	Number.	Cost.	District.	Number.	Cost.
Auckland	2,833	£ s. d. 657 16 8	Westland	170	25 11 0
Taranaki	389	175 0 0	Canterbury	1,113	655 0 0
Hawke's Bay	302	202 0 0	Otago	577	442 0 0
Wellington	175	140 6 0	Southland	349	120 0 0
Nelson	344	181 9 6	Totals	6,272	2,607 9 2
Marlborough	20	7 10 0			

No. 3.—LAND TRANSFER WORK.

District.	No. of Plans passed.	No. of Plans placed on Certificates of Title.	Cost.	District.	No. of Plans passed.	No. of Plans placed on Certificates of Title.	Cost.
			£ s. d.				£ s. d.
Auckland ..	244	1,098	1,214 1 8	Westland ..	378	303	43 0 10
Taranaki ..	34	794	140 0 0	Canterbury ..	70	2,874	731 1 8
Hawke's Bay ..	69	39	300 0 0	Otago ..	3,564	820	440 0 0
Wellington ..	48	2,004	584 0 0	Southland..	16	1,042	180 0 0
Nelson ..	160	659	252 16 0				
Marlborough ..	27	256	59 0 0	Totals ..	4,610	6,489	3,944 0 2

No. 4.—PHOTOGRAPHS.

Department.	Number of Plates taken during the Year.	Department.	Number of Plates taken during the Year.
Public Works ..	103	Lands.. ..	19
Survey ..	212		
Museum ..	27	Total ..	442
Marine.. ..	19		
Education ..	13	Silver prints—	
Railways ..	1	Survey ..	60
Post and Telegraphs ..	16	Lands ..	23
Mines ..	19	Public Works ..	12
Defence ..	9		
Printing ..	4	Total ..	95

No. 5.—LITHOGRAPHIC PRINTING executed from the 1st July, 1884, to the 30th June, 1885.

Department.	No. of Separate Printings.	Number of Impressions.		Department.	No. of Separate Printings.	Number of Impressions	
		By Machine.	By Hand.			By Machine.	By Hand.
Survey ..	727	302,840	46,881	Exhibition ..	4	7,000	..
Public Works ..	363	44,450	23,493	Printing ..	9	11,150	..
Customs ..	18	..	960	Native ..	26	4,900	1,966
Geological ..	37	57,065	2	Treasury ..	3	2,359	40
Justice ..	24	500	3,076	Property-Tax ..	13	..	5,250
Mines ..	20	8,000	36	Registrar-General ..	15	..	1,189
Royal Commission ..	4	9,200	..	Patent ..	4	200	300
Insurance ..	1	..	60	Colonial Secretary ..	22	..	632
Railway ..	26	24,850	2,800	Crown Lands ..	4	..	132
Telegraph ..	14	12,450	1,750	Library ..	4	500	52
Marine ..	36	3,900	2,743	Defence ..	23	12,500	847
Postal ..	8	..	2,350				
Education ..	50	1,580	2,738	Totals ..	1,491	506,744	96,597
Premier's Office ..	36	3,300	300				

No. 6.—ABSTRACT of LITHOGRAPHS PRINTED during the Year.

Head Office, Wellington ..	603,841
Auckland ..	7,500
Dunedin ..	12,500
Invercargill ..	1,050
Total ..	<u>624,391</u>

HEAD OFFICE.

Since the 30th June, 1884, the number of letters received and despatched has been 9,477, in addition to the usual references, searches, and notes.

The accounts passed amounted to £166,560 6s. 4d., being £118,214 10s. 1d. for the Survey Department, and £48,345 16s. 3d. for roads to open Crown lands for sale.

The number of surveyors who have done work for the department during the year, and whose accounts have been passed, has been 118.

Road-formation is partly carried on by officers of the department and partly by local authorities. The work done by the twenty local bodies who have had control of expenditure during the year has amounted to £14,982 10s., and that done by the officers of the Survey Department to £33,363 6s. 3d.

In the Head Office the chief work is still the publication of the one-mile district maps, of which twenty-three have been drawn during the year, and thirty-eight printed. I regret that this useful series has been retarded by urgent miscellaneous work.

The number of impressions printed from lithographs during the year was 603,341, of which 349,721 were for the Survey Department, 67,943 for the Public Works Department, 57,067 were for the Museum and Geological Survey, 27,650 for the Railway Department, and the balance for twenty-two other departments of the service.

The geographical map of the northern part of the Middle Island, which was in hand last year, has been completed for the press, but its publication has been deferred by other work of a pressing kind in the litho-printing office.

A map of New Zealand, on a scale of eight miles to an inch, measuring 7 feet by 10 feet, and designed to show the physical geography of the colony, is now in hand for the Colonial Exhibition, to be held in London next year, and a replica will show the tenure of the lands in the colony.

The maps which have been prepared for Assessors under the Property-Tax Act have occupied nearly two months of many of the draughtsmen in this and the district offices.

The preparation of about 2,740 maps has been a work of some labour; but ascertaining the subdivisions which have been made since the Crown disposed of the lands has been an equally arduous task. Where lands have been dealt with under the Land Transfer Act the operation is simple, if laborious; but where the properties are held by conveyance the utmost carelessness abounds in the plans and descriptions engrossed. For example, in a case which is a type of many: A piece of, say, 50 acres is sold out of a property of 2,000 acres, and, apparently without any survey to ascertain in what part of the property the piece is situated, a conveyance is drawn and a plan placed in the margin, but the situation of the portion conveyed might be in the north, south, east, west, or middle of the estate. In another case a conveyance is given of a road which has never been closed, and includes also an education reserve alongside. These possibly are good holding titles; but some one will succeed to trouble through them some day. Under the Deeds Registration Act any instrument is registered without check. Under the Land Transfer Acts titles are checked by experienced Government Survey Officers, and the Government guarantees their correctness. In the district offices the work of ascertaining and mapping subdivisions of properties was crowded into a very small space of time, and I have to express my pleasure at the cordial, untiring efforts of the Chief Draughtsmen to complete the many maps at the appointed period. Had not they and their assistants most willingly toiled—some from 9 in the morning until 10 at night—it would have been impossible, even with the large number of temporary hands employed, to have accomplished the task in anything near the time required. It would be of great value to future assessments, if they are to be made, were all subdivisions now recorded, and kept up from time to time either in the Property-Tax Office or in the Registry Offices of the districts.

My thanks are due to the officers employed in the Head Office for able and willing assistance in carrying out the instructions received. Messrs. Lakeman, Bull, Boscawen, and Danby, in the clerical and account branch, have performed laborious duties well and cheerfully. Messrs. Flanagan, Grant, Kemp, Wilson, McCardel, Taylor, Malings, Watt, Farquhar, and Graham, in the professional branch, have done very good service during the year. Many tedious calculations have been made and checked by Messrs. Grant and Farquhar. In the photographic gallery I am glad to notice considerable improvement in its arrangements. Mr. Earle and his assistant printers have turned out a large number of maps and other lithographs, many of them in a highly-finished state.

A. BARRON,
Office Surveyor.

No. 7.—RETURN of FIELD WORK executed by STAFF and SURVEYORS SURVEYORS, and of the COST of the SURVEY DEPARTMENT of New Zealand, from 30th June, 1884, to 1st July, 1885.

District.	Major Triangulation.		Minor Triangulation.		Topographical and Trigonometrical Survey.		Rural and Suburban.		Town Section Survey.		Native Land Court Survey.		Native Land Purchase Survey.		Gold-Mining Survey.			Roads, Railways, and Water-races.		Detention by Native Opposition or other Causes.		Miscellaneous.		Total Charges against the Survey Vices for Twelve Months.											
	Acres.	Cost per Acre.	Acres.	Cost per Acre.	Acres.	Cost per Acre.	Acres.	No. of Sections.	Acres.	No. of Allotments.	Cost per Allotment.	Acres.	No. of Blocks.	Cost per Acre.	Acres.	No. of Sections.	Cost per Acre.	Miles.	Cost per Mile.	Cost.	£ s. d.	£ s. d.	Cost.	£ s. d.	Field-work.	£ s. d.	£ s. d.								
		d.		d.		d.		d.																				d.	d.	d.	d.	d.	d.	d.	d.
Auckland	2,767,398	0.23	269,743	0.96	644,304	0.82	76,688	723	2/2.76	62.7	123	22.9	17,339	4	6.1	..	..	267	14	6	0	109	0	8	1,739	6	4	24,920	3	4	7,631	0	0
Hawke's Bay	40,000	1.8	39,100	2.25	130,300	1.25	19,707	130	2/4	80	68	20/	..	..	..	..	..	67	10	14	0	53	2	10	..	..	..	5,460	13	3	1,510	0	0
Taranaki	..	..	..	..	250,000	6	48,051	158	1/7.9	..	..	..	..	..	..	..	..	5.5	31	8	0	65	0	0	†290	7	6	7,538	12	11	2,256	0	0
Wellington	..	..	131,700	2	86,435	1½	7,821	20	1/4	533	268	33/1	16,539	81	2.75	..	..	83.25	11	10	0	..	..	..	2,082	1	2	8,521	3	4	2,354	0	0
Nelson	101,445	1.5	327,740	1.5	33,336	420	3/2	211	992	22/	17,739	1	5.4	324	34	16/3.4	78	10	15	0	815	6	0	11,450	6	6	1,580	0	0	
Marlborough	..	..	21,570	..	..	..	1,976	19	1/7.5	149	52	20/	..	..	..	..	..	..	..	..	..	..	..	..	24	0	0	1,820	9	4	525	0	0
Westland	129,400	0.7	118,980	1	19,742	72	1/7	50	138	21/6	406	34	17/	40.5	8	6	5	502	16	6	4,475	10	0	1,816	8	0	
Canterbury	16,651	0.67	151,700	0.85	35,478	675	2/1.75	100	265	4/11	165	10	300/	24.11	421	0	3	6,394	11	8	6,003	14	0	
Otago	241,480	0.51	35,459	238	1/9.5	114	88	16/3	3,000	5	1/3.25	385	30	8/3.87	47.75	10	0	9	36	0	0	1,153	15	6	6,670	14	8	4,312	0	0	
Southland	..	..	..	..	..	..	22,516	274	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	309	13	6	2,263	14	0	1,677	0	0
Head Office
	2,986,798	0.25	680,203	1.39	1,950,939	0.97	300,774	2,784	2/1.2	1,299	71,994	21/1½	316,378	156	4.2	1,230	108	14/7	612.8	12	10	7½	263	3	6	7,338	6	9	79,454	19	10	88,759	10	3	

* 3,700 acres of this paid for by Natives.

† Includes £1,870 lrs. 11d. for back pegging, old surveys.

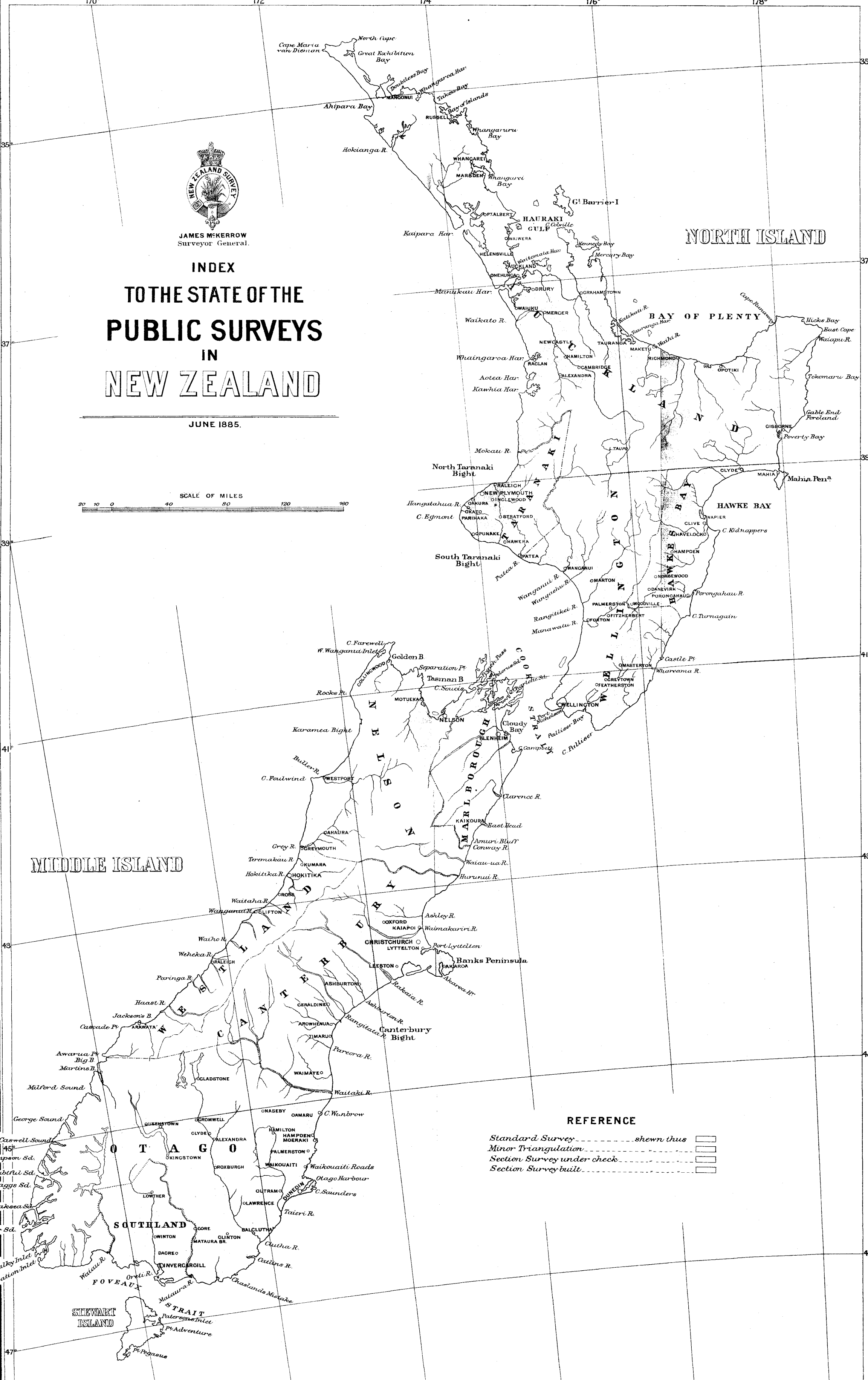
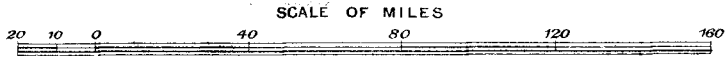
170° 172° 174° 176° 178°



JAMES MCKERROW
Surveyor General.

INDEX TO THE STATE OF THE PUBLIC SURVEYS IN NEW ZEALAND

JUNE 1885.



REFERENCE

Standard Survey	shewn thus	
Minor Triangulation		
Section Survey under check		
Section Survey built		

No. 8—continued—RETURN of FIELD-WORK executed by STAFF and CONTRACT SURVEYORS from 1st July, 1884, to 30th June, 1885.

PROVINCIAL DISTRICT OF MARLBOROUGH.

Surveyor and District.	Major Triangulation.			Minor Triangulation.			Topographical and Trigonometrical Survey.			Rural and Suburban.			Town Section Survey.			Gold-Mining Survey.			Roads, Railways, and Water-races.			Detention by Native Opposition or other Causes.	Other Work.	Total Cost of Surveyor and Party from 1st July, 1884 to 30th June, 1885.	Remarks.
	Acres.	Cost per Acre.	Total Cost.	Acres.	Cost per Acre.	Total Cost.	Acres.	Cost per Acre.	Total Cost.	Acres.	No. of Sections.	Cost per Acre.	Total Cost.	Acres.	No. of Sections.	Cost per Acre.	Total Cost.	Miles.	Cost per Mile.	Total Cost.	Cost.					Cost.	£ s. d.
A. D. Wilson (standard)	d.	£ s. d.	..	d.	£ s. d.	..	d.	£ s. d.	d.	£ s. d.	s.	£ s. d.	995 18 10	467,840 acres major and 216,960 topographical and trigonometrical survey in progress. Field work completed. Partly open, partly bush. Partly covered with scrub and small bush. 3 sections open. 5 sections heavy bush. In various bays of Pelorus Sound; 10 sections covered with heavy bush.
R. F. Goulter (staff) { Mount Fyffe Gore Cloudy Bay Onamalutu Pelorus Sound, North Bank of Wairau	21,570	..	71 14 6	..	..	..	717	8	24	71 5 0	..	..	..	..	..	..	..	..	..	..	783 4 9	
	1,259	11	13	94 8 6	..	..	..	..	..	..	..	..	..	..	..
	21,570	..	71 14 6	..	..	..	1,976	19	19½	165 13 6	149	52	20	52 0 0	..	..	..	..	..	24 0 0	1,729 3 7	
Less fees deposited for surveys																						58 6 0			
																						£ 1,670 17 7			

PROVINCIAL DISTRICT OF WESTLAND.

W. G. Murray, Totara, Waimea, Tekinga, Otira, Teremakau ..	92,360	0.7	265 7 0	..	..	..	10,720	5.7	257 5 0	200	10 2/	20 0 0	..	..	..	..	396	32 17/06	337 10 6	9	19 17 0	179 4 0	..	24 4 6	1,083 11 0	Bush country, within a goldfield. Cadet under one year's experience assisting for three months. Heavy bush, hilly, within a goldfield. Dense bush country. Assisted by cadet during eight months of the year. Mountainous country, densely timbered; no roads, tracks, or open river-beds. Country partly thick scrub and partly heavy timber, within goldfield.	
E. J. Lord, Greymouth, Arnold, Hohonu, Waimea ..	..	..	..	..	..	..	..	..	..	6,942	23	1/6.7	540 14 11	50	138	21/6	143 12 0	..	..	..	..	..	..	102 4 0	791 10 11		
J. N. Smyth, Mahinapua, Bruce Bay, Waiho, Karangarna ..	..	..	..	..	..	..	14,700	1.9	111 8 0	10,705	22	1/0.7	566 10 4	..	..	..	..	10	2 12/7	6 6 0	27.5	3 15 0	103 7 0	..	48 0 0		830 11 4
G. J. Roberts, Cascade, Barn Bay, Jackson's ..	37,040	0.6	92 12 3	..	..	..	90,000	0.1	27 5 0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	321 0 0	1,118 6 4		
R. Wither, Paringa, Abbey Rocks, Otumotu, Otira ..	..	..	..	..	..	..	3,560	3	41 10 0	1,894	17	4/8.5	446 2 10	..	..	..	..	..	..	..	4	13 12 9	54 11 0	..	12 10 0		557 13 10
Less refund cost of road survey by County Council, and mining survey fees																						405 19 0					
																						£ 3,975 4 5					

PROVINCIAL DISTRICT OF CANTERBURY.

J. S. Welsh, Akaroa .. .. .	..	..	..	..	..	..	..	..	..	2,195 45 *277 6	5/1	631 1 1	..	..	..	..	..	..	..	..	..	..	..	207 9 10	838 10 11	Sectional surveys, bush land, very scattered. Akaroa standard survey, £90 3s.; Defence surveys at cost of Defence office, £117 6s. 10d.; total, £207 9s. 10d.
James Hay, Akaroa .. .. .	..	..	..	..	..	..	..	..	..	5,341 74 *597 21	2/6	745 5 4	..	..	..	..	..	..	..	1	6 0 0	6 0 0	..	..	751 5 4		
H. Maitland, Geraldine .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	64 6 0	64 6 0	Resigned. Plans of work done previous year.
T. N. Brodrick, Ashley and Selwyn .. .. .	..	..	..	10,118	0.8	33 4 6	..	..	..	4,766 63 *754 20	2/11	802 19 5	..	..	..	..	..	..	..	16.20	3 11 7	58 4 3	..	..	894 8 2	Partly bush surveys, Oxford.				
J. E. Pickett, Selwyn .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	53 15 6	53 15 6	Plans of work done previous year. Transferred.
H. C. White, Waimate .. .. .	..	..	..	..	..	..	151,700	0.85	541 8 9	751 82 *49 2	3/8	130 1 5	..	..	..	..	..	..	..	3.21	5 16 0	18 17 0	..	..	690 7 2					
L. O. Mathias, Ashburton, Ashley, Selwyn and, Geraldine ..	..	..	..	6,533	0.5	13 12 2	..	..	..	4,612 72 *1,817 18	1/8	532 4 4	..	..	..	..	..	..	..	2	3 10 0	7 0 0	..	30 12 1	583 8 7	Survey of Education Reserve 119 at cost of Education Board.						
G. H. M. McClure, Ashburton, Geraldine, and Selwyn ..	..	..	..	..	..	..	..	..	..	2,328 97 *278 4	2/10	366 17 10	169	265 4/11	65 17 4	165	10	15	150 0 0	..	..	..	..	{157 6 10 17 10 0}	647 12 0							
F. Watkins, Ashley, Geraldine, Mackenzie, and Selwyn ..	..	..	..	..	..	..	..	..	..	5,128 47 *3,364 12	1/3	522 7 10	..	..	..	..	..	..	..	..	..	..	..	..	522 7 10	Partly pastoral deferred-payment land.
W. C. Wright, and Timaru office, Geraldine and several counties ..	..	..	..	..	..	..	..	..	..	723 37 *731 19	1/0½	75 14 7	..	..	..	..	..	..	..	..	..	..	..	..	75 14 7	
Christchurch office, including Mr. Shanks. Several counties ..	..	..	..	..	..	..	..	..	..	1,767 56	1/3	22 1 9	..	..	..	..	..	..	..	..	..	..	..	..	22 1 9	
W. A. Nalder, contract surveyor .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1.50	10 10 0	15 15 0	..	..	15 15 0	And altering sections.
Total																						16,651	0.6	46 16 8	151,700	0.85	541 8 9	35,478	6.75	2/1½	3,828 13 7	100	265 4/11	65 17 4	165	10	15	150 0 0	24.11	..	105 16 3	..	421 0 3	5,159 12 10	

* Resurveys.

† Subdivision of Education Reserve 939 at cost of Education Board

‡ Three-quarters of a mile river traverse.

No. 8—continued—RETURN of FIELD-WORK executed by STAFF and CONTRACT SURVEYORS from 1st July, 1884, to 30th June, 1885.

PROVINCIAL DISTRICT OF OTAGO.

Surveyor and District.	Exploration.			Village Settlements.			Topographical and Trigonometrical Survey.			Rural and Suburban.				Town Section Survey.				Native Land Court Survey.				Gold-Mining Survey.			Roads, Railways, and Water-races.			Detention by Native Opposition or other Causes.	Other Work.	Total Cost of Surveyor and Party from 1st July, 1884, to 30th June, 1885.	Remarks.				
	Acres.	Cost per Acre.	Total Cost.	Acres.	Cost per Acre.	Total Cost.	Acres.	Cost per Acre.	Total Cost.	Acres.	No. of Sections.	Cost per Acre.	Total Cost.	Acres.	No. of Allotments.	Cost per Allotment.	Total Cost.	Acres.	No. of Secs. or Divs.	Cost per Acre.	Total Cost.	Acres.	No. of Sections.	Cost per Acre.	Total Cost.	Miles.	Cost per Mile.					Total Cost.	Cost.	Cost.	
John Strauchon, Otara, Mokoreta, Waikawa ..	50,000	d. 0 5	£ s. d. 104 3 4	..	d. ..	£ s. d. ..	..	d. ..	£ s. d. ..	7,898	24	d. 21 1/2	£ s. d. 708 18 9	110	85	12/2 1/2	£ s. d. 52 0 0	..	..	..	..	..	..	..	..	29	5/10/7 1/2	£ s. d. 160 8 2	£ s. d. ..	£ s. d. 28 12 6	£ s. d. 1,054 2 9	Mostly bush; district very expensive on account of wet weather. Not within a goldfield. Cadet six months assisting.
David Barron, Hawkdun, Naseby, Blackstone, Maniototo, Upper Taieri	..	..	..	2,079	31 1/2	275 12 9	40,000	0 8 5	141 8 8	4,476	30	17 1/2	331 7 2	..	..	..	..	..	..	..	..	45	4 15 10 1/2	35 15 0	..	..	..	..	..	156 10 10	940 14 5	Open country, within a goldfield. Cadet one year assisting.
A. R. Mackay, Motatapu, Tarras, Wakefield, Tiger Hill, Lake Wanaka	..	..	..	..	..	..	..	..	..	1,471	12	21 1/2	133 3 7	..	..	..	..	..	..	..	..	171	14 3 10 1/2	32 19 2	2 1/2	7/0/0	17 10 0	..	459 16 8	643 9 5	Nearly all open country. Very expensive on account of mountainous character. Within goldfield.	
George Mackenzie, Waikouaiti, Moeraki, Catlin's, Glenoamaru, Waikaia	..	..	..	..	..	..	..	..	..	5,189	37	24 1/2	528 8 8	4	3	130/	19 10 0	3,000	5	1/3 1/2	100 19 3	..	..	..	..	6 1/2	17/12/7	119 0 0	36 0 0	47 15 0	941 12 11	Partly bush, and sections scattered.
John Langmuir, Bengier, Teviot, Greenvale, Hedgehope, Port Chalmers	..	..	..	..	..	..	..	..	..	7,847	81	20	656 11 4	..	..	..	..	..	..	..	..	20	2 5 2	5 3 0	1/10	57/0/0	3 4 0	..	162 17 1	827 15 5	Open country. Bulk of sections small, and work intricate on account of dams and water-races. Cadet nine months assisting.	
E. H. Wilnot, Obelisk, Lorn, Lornside, Gap, Whitecombe, Kingston, Rockside, Earnslaw, Glenorchy, Wakatipu, Shotover	..	..	..	..	..	..	201,480	0 4 5	378 0 2	1,530	44	34 1/2	217 15 11	..	..	..	..	..	..	..	..	99	10 13 3	65 11 0	8 1/2	19/18/1	161 13 10	..	28 14 7	851 15 6	Open country, within a goldfield. Expensive district, on account of rough nature of country. Cadet assisting.	
D. W. Gibson, Lake Wanaka	..	..	..	..	..	..	..	..	..	4,969	65	17	331 4 1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	381 4 1	
Samuel Thompson, Port Chalmers	16 9 6	16 9 6	Port Chalmers Dock Endowment.		
D. M. Calder, Forbury	3 5 0	3 5 0	Torpedo slip for Defence Department.		
	6 1 6	6 1 6	For Defence Department.		
	50,000	0 5	104 3 4	2,079	31 1/2	275 12 9	241,480	0 5 1	519 8 10	33,380	293	20 9 0	2,907 9 6	114	88	16/3	71 10 0	3,000	5	1/3 1/2	190 19 3	335	30	8 3 8 7	139 8 2	46 7/16	9/19/0	461 16 0	36 0 0	910 2 8	5,616 10 6				
<i>Private Surveyors.</i>																																			
Robert Hay, Otago Heads, Taieri
John Cumine, Taieri
John Campbell, Bannockburn	50	1	18	3 15 0
	50,000	0 5	104 3 4	2,079	31 1/2	275 12 9	241,480	5 1	519 8 10	33,430	294	20 9 0	2,911 4 6	114	88	16/3	71 10 0	3,000	5	1/3 1/2	190 19 3	335	30	8 3 8 7	139 8 2	47 7/16	10/0/9	479 7 0	36 0 0	1,049 12 2	5,777 6 0				

PROVINCIAL DISTRICT OF SOUTHLAND.

<i>Staff.</i>																																					
John Hay, Longwood, Jacob's River, and New River	..	..	..	..	..	..	..	..	..	3,980	105	4/3	845 15 0	12	48	10/	24 0 0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
James Blaikie, Oteramika and Lindhurst	..	..	..	..	..	..	..	..	..	9,086	66	10/7	405 13 11	..	..	..	..	..	..	..	..	..	..	..	..	..	4 1/2	15 0 0	67 10 0	..	120 0 0	593 3 11	£55 11s. carried from previous year. Surveys in bush, except 80 acres. Partly in goldfield			
George Watson, Centre Hill, Winton, Invercargill, Mabel, and Campbelltown	..	..	..	..	..	..	..	..	..	7,237	81	1/11	695 18 9	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Fee System.</i>																																					
T. S. Miller, Campbelltown, Wairio, Winton, New River, and Takitimo	796	11	2/7 6	104 14 9
T. B. McNeil, Winton and New River Hundred	391	4	2/3 4	44 14 6
A. K. Robertson, Longwood and Jacob's River	..	..	..	..	..	..	..	..	..	626	5	1/11	60 7 6	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
George Hatley, Invercargill..	..	..	..	..	..	..	..	..	..	200	1	2/0 6	20 10 0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
William Hay, Invercargill ..	..	..	..	..	..	..	..	..	..	200	1	6 3	25 6 0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	..	..	..	..	..	..	..	..	..	22,516	274	..	2,203 0 5	12	48	10/	24 0 0	..	..	..	..	..	..	..	..	..	4 1/2	15 0 0	67 10 0	..	309 13 6	2,478 12 11				

APPENDICES.

APPENDIX No. 1.

REPORT ON OBSERVATIONS FOR LATITUDE, MADE WITH A ZENITH TELESCOPE, FOR THE YEAR ENDING 30th JUNE, 1885.

Mr. ADAMS to the SURVEYOR-GENERAL.

Gawler Downs, 1st July, 1885.

DURING the month of July, 1884, I was engaged in Wellington in preparing for publication Tables 1 to 7 in connection with my report on the determination of the difference of longitude between Sydney and Wellington.

On the 18th and 25th July I took observations to determine the altitude of Mount Cook Observatory and Kaukau Trig. Station. I also wrote a paper on the determination of time, latitude, and azimuth with an 8-inch transit theodolite.

On the last day of July, 1884, I left Wellington for Auckland in the "Hinemoa," and during the remaining eleven months I have been engaged observing latitudes and azimuths with the zenith telescope, visiting in succession Auckland, Mangonui, Tauranga, Gisborne, Napier, Nelson, and Burnham.

I need not here recapitulate the description of the zenith telescope, which will be found in the Annual Survey Report for 1882-83, but will give a description of an iron stand which I had constructed in Auckland, to be used in those places where it was not convenient to erect a stone pedestal. This stand is made wholly of iron, and is in shape a truncated cone, being 30 inches high, 16 inches in diameter at the top, and 21 inches in diameter at the bottom. The sides have thus a batter of 1 inch to a foot. The stand is constructed chiefly of sheet-iron, about one-sixteenth of an inch thick; it has a cast-iron flange round the top and an angle-iron flange round the bottom. There are two circular holes, 5 inches in diameter, opposite each other, one-third of the distance from the top, which serve as handles to move the stand, and also to admit light to the interior. The weight of the stand is 57lb. A cast-iron triangle, weighing 7lb., fits on the top of the stand, and has grooves to receive the three footscrews of the zenith telescope. By means of three capstan-headed screws the triangle can be readily fixed in any position, and thus when observing horizontal angles the zero may be changed in a few seconds.

I have used the stand at three stations only—namely, Gisborne, Nelson, and Burnham; stone pedestals being used at all the other stations.

At Auckland I observed on the transit pier used by the American transit of Venus party in 1882, in the domain, and I had a small wooden building erected over it as a temporary observatory. At all the other stations I used a frame tent which I had made in Auckland. I have found it well adapted for taking observations in, and it has already stood some severe gales.

On the 14th March, 1885, the Survey Observatory, Mount Cook, Wellington, was dismantled, and the instruments packed up and left at the head office.

In the selection of pairs of stars I have confined myself exclusively to Stone's Cape Catalogue of 12,441 stars, and have always found sufficient stars within 10° of the zenith.

I think I may say that the degree of accuracy obtained has been quite satisfactory, as the probable error of the latitudes only averages $''\cdot05$, or 5 feet on the ground, while the probable error of the azimuths is always less than one second of arc.

In the following tables, η = the average difference of each observation from the mean; r = the probable error of a single observation; r_0 = the probable error of the final result.

TABLE A.
Observations for Latitude, 1884-85.

Locality.	Date.	Station.	Alt.	No. of Obs.	Latitude.			η	r	r_0	Remarks.
					°	'	"				
Auckland ...	1884. Aug. and Sept.	American Transit of Venus Station, 1882	258	135	36	51	50·58	·93	·76	·066	Stone pillar
Mangonui...	Sept. and Oct.	20A	186·4	115	34	59	35·79	·66	·57	·05	Stone pillar
Tauranga ..	Nov. and Dec.	Domain	68·2	122	37	40	57·31	·68	·57	·05	Stone pillar
	1885.										
Gisborne ...	January ...	108	428	139	38	40	38·04	·68	·57	·05	Iron stand
Napier ...	February ...	60	330·7	147	39	28	43·52	·56	·47	·04	Stone pillar
Nelson ...	April ...	Botanical Hill ...	470·7	158	41	16	14·82	·72	·61	·05	Iron stand
Burnham ...	May and June	British Transit of Venus Station, 1874 and 1882	219·3	197	43	36	48·54	·62	·52	·04	Iron stand

TABLE B.
Observations for Azimuth, 1884–85.

Locality.	Station.	Alt.	No. of Obs.	Azimuth of Referring Lamp.			η r r_0			Distance to Referring Lamp.	Referring Lamp.	Alt. of Refer. Lamp.
				°	'	"	"	"	"			
Auckland ...	American Transit of Venus Station, 1882	258	19	173	18	51.4	4.1	3.2	.75	21143.5	One-tree Hill	602
Mangonui ...	20a ...	186.4	12	184	47	36.8	3.5	3.1	.90	11086.8	1610	449.7
Tauranga ...	Domain ...	68.2	22	8	21	01.9	5.4	4.6	.7	26640.9	V ¹	97
Gisborne ...	108 ...	428	21	8	02	23.2	3.9	3.2	.71	24099.2	107	947
Napier ...	60 ...	330.7	29	180	33	04.6	5.1	3.9	.71	16622.4	Trig. pipe	15.0
Nelson ...	Botanical Hill	470.7	30	193	22	25.3	4.6	3.8	.70	33447.3	J	2538.2
Burnham ...	British Transit of Venus Station, 1874 and 1882	219.3	30	350	32	55.0	5.1	4.6	.84	10809.6	42 U.C.	272.8
Napier ...	60 ...	330.7	...	179	55	33.6	...	...	.9	13188.5	J	16.6

NOTE.—The azimuth of the referring lamp has been found in all cases by means of "time azimuths" of σ Octantis.

On the 14th March, 1885, the Survey Observatory, Mount Cook, Wellington, was dismantled, the instruments packed-up and left at the head office.

C. W. ADAMS,
Geodesical Surveyor.

APPENDIX No. 2.

EXTRACTS FROM THE REPORTS OF CHIEF SURVEYORS IN CHARGE OF SETTLEMENT OPERATIONS IN DISTRICTS.

AUCKLAND.

Mean Degree of Precision attained in Survey for the Period.—In initiating the practice of calling on the surveyors for the results of their trigonometrical and chain closures—which has now obtained for the last four years—the end sought was the collection of data from which an average mean of angular and linear measures could be obtained for comparison with similar operations elsewhere. It is a reasonable assumption, deducible from the tables given below, that in all classes of country, with ordinary care, the use of Troughton's 5-inch theodolites and Chesterman's steel bands will produce work whose average error will be $1\frac{1}{4}$ links per mile for minor triangulation of about two-and-a-half-mile sides, and 2 links per mile for measurements conducted over the surface. These results will bear favourable comparison with those obtained in other countries, deduced from the same class of surveys, and are highly creditable to the surveyors who produce them. Although the tables are confined to the work of the staff surveyors, that of several of the authorized surveyors, which comes before the department for check, is equally good. The Inspector at Gisborne supplies the results of twenty-two closures by authorized surveyors as 1.1 links per mile, as checked by himself in the field which shows the reliable character of their work.

Major Triangulation.—In the last annual report mention was made of the fact that the long-delayed triangulation of the King country had been started, and that it was then being carried on by District-Surveyor Cussen and assistants, and that good progress had been made, notwithstanding the difficulties inherent in working in a country so far from supplies. Mr. Cussen is now able to return an area of 2,719,000 acres of major work, the maps of which are deposited in the office; and within which area the topographical features have been depicted with a considerable degree of accuracy. Some opposition to the erection of stations was offered by the Maoris in isolated places; but with the help of Rewi, Wahanui, and Taonui, and the tact displayed by Mr. Cussen, this has always been overcome. This opposition is due more to the desire on the part of local chiefs to assert their rights of ownership, rather than to any objection to the survey itself. The Maoris have now become so accustomed to seeing the survey parties traversing their district that little or no opposition is expected in bringing the work to a conclusion in the southern part of the district. The average length of the major sides in this year's work is 14.5 miles, while the mean defect from 180° in summation of the angles is $5''\cdot 8$. The greatest difference in closure on the radial sides of the polygons (by which system the work has been computed) is 0.6 links per mile, the least 0.07 links, and the average closure in ten polygons is 0.32 links per mile; whilst the greatest correction applied to the external angles in any one polygon is $4''\cdot 7$, a quantity far within the limit allowed by the power of the instrument used. The crucial test of this work so far (until the Chief Surveyor, New Plymouth, can furnish the length of the Taranaki sides on to which Mr. Cussen has closed) is the closure on to the Taupo triangulation, which shows in a circuit of 270 miles a difference of 0.63 links per mile on the side, and a difference in bearing of $51''$, whilst the heights close on the same work to 8ft. A further test of the heights is obtained from a comparison with those of the Public Works Department, as carried independently by them from sea-level at Auckland to Te Kuiti and Otorohanga, on the central line of railway, where the differences are 8ft. and 13ft. respectively. In addition to the work shown as complete in the tables attached, Mr. Cussen has the stations up and angles partly observed over 1,340,000 acres, which will come into next year's results, when the whole of the country in this province to the 39th parallel will have been completed. I append Mr. Cussen's report on the character of the country, which, together with the map being prepared for publication, will afford detailed information as to its resources.

The major work performed by Mr. Hardy was the revision of a few of the old triangles formerly observed with a very indifferent instrument. Discordant results have been eliminated, and very satisfactory closures made on the general triangulation. The major work which Mr. Baber was sent to the East Cape to undertake has been delayed through the opposition of the Natives, though he has made some slight progress. As soon as the Natives find that their own surveys cannot go on till this necessary work is finished, their opposition will probably cease, and in the meantime Mr. Baber has other work in the district to occupy himself with.

Mr. Adams has, no doubt, fully reported to you the result of his observations for latitude and azimuth at Auckland, Mangonui, Tauranga, and Gisborne. It is therefore unnecessary to refer to them here beyond stating that he has cleared up the discrepancy in the Bay of Plenty position, and verified the accepted positions of the other places, proving the former determinations at these places to have been fairly accurate considering the instrumental means then available for their observation.

Minor Triangulation.—All of the 269,743 acres covered by this process has been a reduction by the Ray Trace system from major sides, to fill in spaces formerly left, and has been accomplished by the surveyors expressly for the purpose of connecting other surveys they had in hand.

Topographical and Trigonometrical Survey.—The 644,304 acres returned under this heading is, with one exception, similar to that under the last heading, with the topography of the country added; and this exception is the 399,000 acres executed by Mr. Cussen in the King country, which was done in connection with the major work, by breaking down the longer sides into lengths of from four to five miles in preparation for the future Native Land Court surveys. Mr. Cussen has about 300,000 acres of this class of work, in addition, completed in the field, but the map of which could not be prepared in time for this return. The topographical maps furnished by Messrs. Edgumbe, Parris, Smith, Philips, Stevens, and Haszard, are replete with useful information as to the country passed over, and will prove extremely useful in scheming out roads, settlements, &c. It is to be desired that time could be found for the reproduction of this useful class of information by lithographing the plans for the use of the public.

Rural and Suburban Section Survey.—This year the return shows 76,688 acres, in 723 sections, as completed, being a decrease from last year of about 22,000 acres and 148 sections, although three more surveyors were partially engaged on the work; whilst the cost has risen to nearly 3d. per acre more. The surveyors have also completed in the field 5,370 acres of sections, the plans of which are not in and therefore not included in the return. The reason of this decrease in the output of section work, and the increase of price, is due to the fact that, except in five cases, no area of any considerable size in any one locality has been surveyed as one block, but the greater portion of the area shown has been surveyed in isolated sections adjoining old work, scattered from end to end of the province, where the difficulties of finding starting-points and the danger of encroaching on granted lands is very great, and leads to an enormous proportionate loss of time in securing that no such encroachment takes place, and in moving the survey parties from place to place. Mixed up, too, with the areas prepared for sale, and equally scattered and difficult to survey, are 7,030 acres of arrears of Crown grants for lands parted with many years ago, but for the issue of which the information did not exist in the office, or was so erroneous as to preclude its use, which has cost £1,496 10s.; and a further sum of £1,087 10s. has been expended in defining on the ground the boundaries of lands disposed of many years ago, which had never been marked on the ground. These last two classes of work, being provincial liabilities, are only undertaken when the surveyors have work adjacent, and their cost is thus somewhat reduced; but they are a heavy drag on the energies of the department, are very costly, and act directly as a bar to settlement by taking up the time of the surveyors which might otherwise be devoted to preparing new lands for sale. When we take into consideration the general nature of the Crown lands within this province, which may be briefly described as innumerable small patches of good land interspersed with stretches of indifferent land not at present sought after for settlement, and the fact that the larger areas of good land are at present not available for settlement owing to the want of access, it will be understood that the surveys for settlement must for some time remain of a dispersive and expensive character. A serious feature arising out of these conditions is the delay caused to applicants for lands, and a consequent decrease in land and other revenue. I regret to say that there are on the books now 145 applications for land unsurveyed, covering roughly an area of 11,200 acres, besides 31,000 acres of larger blocks which the Land Board require to be surveyed for sale; and some of these are of long standing. This is exclusive of the work for which the surveyors have received instructions. The number of fresh applications received from the Land Office during the year is 172. In addition to the area shown in the return, twenty-six sections, covering an area of 3,714 acres, were surveyed under the homestead system, the cost being defrayed by fees deposited by the applicants, such fees amounting for the twelve months to £643 2s. 6d. Although returned under the heading of "Roads," mention should be here made of the survey of the Opotiki confiscation line by Mr. J. I. Philips, which, from the exceedingly broken nature of the country, was an arduous undertaking.

Town Section Survey.—The work under this heading comprises an extension of the Town of Rotorua by Mr. Goldsmith, and the resurvey and repegging of the Town of Wolseley by Mr. Martin.

Native Land Court Survey.—Little has been done by the official staff under this heading, as they are fully engaged on other classes of work, the only one of any importance being the Whakarewarewa Block, near Rotorua, where a more detailed survey was required to show the hot springs, fumaroles, &c., to aid the Native Land Court in the subdivision. The assistance of the authorized surveyors was obtained to survey ninety-six blocks, containing 223,872 acres, all but one of which are new blocks to be brought before the Court for adjudication, and included in which are fifty-one small blocks for the Tauranga Commissioners' Court, containing an area of 12,929 acres, which nearly finishes up all the surveys required for the local Court. The cost of these surveys,

amounting to £3,748, has been secured by lien on the lands in favour of the Government. An additional area of 189,501 acres, in 117 blocks, has been surveyed at the cost of the Native applicants by the authorized surveyors. A total area, therefore, of 413,373 acres, in 213 blocks or estates, has been prepared for the operations of the Native Land Court, some of which, however, are subdivisions of old blocks, individualized under orders of the Court. Of this amount fifty-three blocks, containing 40,658 acres, were surveyed under the direction of Inspector Barnard, at Gisborne, and represent principally subdivision orders of the Court. The survey of the external boundaries of the King country block, which was proceeding at the date of last report, has been completed with the exception of one gap, where the boundary is found to differ so greatly on the ground from that shown on the maps before the Court, and the objections of the Natives to the paper boundary are so strong, that the question has been left for the Court to decide as to which boundary is to be taken. When once this is decided, the matter can be speedily completed. The determination come to by the Government not to advance the cost of Native block surveys after the 30th March last, joined to the difficulties that surveyors find in recovering payment for their surveys from their Native employers, has almost brought this class of survey to a close altogether—in fact, with the exception of a few subdivisions of blocks which have already been adjudicated on, no surveys of Native blocks are going on at all. Until the surveyors acquire some legal right to protection of their work, or the Government re-establish the system of advancing the cost to the Natives, I see very little chance of any surveys of fresh country being made. The area of unsurveyed Native land within this province is still very large (about five million acres); and were there any means by which the cost of survey could be defrayed the Natives would be very generally glad to change their Native tenure for that of the Crown, thus enabling them to deal with their lands by sale or lease, which they cannot do at present.

Land-purchase Surveys.—The only survey of any consequence was that made by Mr. Haszard, of the Wharaurua Block, on the shores of Aotea Harbour, which, although purchased by Government thirty years ago, the boundaries had never been defined on the ground, owing, firstly, to the King movement, and subsequently to the war. Part of it has since been subdivided for sale. It is a broken but a good country, covered with forest, and has within its limits one of the finest waterfalls in the province, round which a square mile has been reserved by the Land Board.

Roads, Railways, &c.—Of the 238 miles of road laid out by the Department, about 170 miles were taken in exercise of the rights reserved under Native and other grants, the rest being surveyed through Crown lands, or for taking under the Public Works Act, including Mr. McKellar's five and a quarter miles of Kawakawa Railway. We have again experienced considerable opposition from the Natives in exercising these rights, having in one instance to take proceedings against them in the Resident Magistrate's Court, and in another, at East Cape, to leave the matter in abeyance for the present. The difficulties generally arise out of the provisions of the Crown and Native Lands Rating Act; for the Natives, though fully alive to the unpleasantness of paying rates, do not see with the same clearness the enhanced value given to their lands by the formation of roads. The mean cost per mile for surveying these roads may be considered heavy; but it must be understood that most of them are under forest and in difficult country: a grade-line has been run as well. In the case of those laid out by Mr. Wheeler, specifications for forming were also prepared, and one line of five miles is now under contract for forming. Even if double this cost were spent in properly selecting lines of road, it would be a saving to the country. It is perhaps needless to add that all roads are now laid out to practicable grades, instead of being, as formerly, so arranged as to follow ridges only suitable for sledge-tracks, so many of which now involve the local bodies in endless expense. As formerly reported, it is hopeless to attempt to exercise all the road rights before they lapse. All we can do is to take the most pressing cases, trusting that legislation will yet effect what the department is unable to do.

Detention by Native Opposition.—The expense incurred by the stoppage of road surveys referred to in the preceding paragraph, together with delays in prosecution of the triangulation at the East Cape, are accounted for under this heading.

Other Work, &c., includes the cost of inspection in the field, inspection of road works, grading, defining old boundaries, reports, defence surveys, and sundry other items.

Standard Survey of Towns.—Little has been done during the past year in this most useful class of work beyond placing stone standards in the Town of Mangonui, where the foreshore was surveyed by Mr. Parris. It is much to be regretted that the frequent alteration of levels of the streets and roads in and around Auckland tends to destroy the permanency of the stone standard, and has already caused us much trouble and inconvenience and extra expense in verifying the position of doubtful standards.

Land Transfer Surveys.—Mr. Foster reports that 223 plans, comprising 3,953 allotments and containing 55,539 acres, were passed during the year, and that 97 plans in addition are passing through the office, 41 of which are in the hands of the surveyors for correction or additions, necessitated generally by the want of a more careful study of the regulations made for surveys, or the omission of information which it is essential the department should be in possession of before becoming responsible for their accuracy. The general absence of the original plans on which Crown grants were based is the cause of a great deal of trouble and delay, both to the surveyors and the department. Thanks are generally due to the licensed surveyors for the readiness with which they comply with our requisitions, which may often appear to them, without a full knowledge of the circumstances, to be unnecessary. In the Gisborne office twenty-one plans have been passed by Mr. Buscke under the Inspector's direction, all of which are properly recorded on the record maps. There are now four draughtsmen engaged on this work, one of whom is attached to the District Land Registrar's Office in attendance on the public, and whose duty it is to place the plans on the forms, 1,098 of which, in duplicate, covering an area of 223,422 acres, have been prepared. In the city and suburbs the frequent removal of the stone standards, referred to above, and on to which all

Land Transfer surveys are connected, joined to the want of any authoritative system of street alignment, will hereafter cause considerable trouble, and seems to call for special legislation.

Field Inspection.—Mr. Williams is kept fully employed throughout the year in visiting surveys which the office inspection of plans seems to render necessary, and, as he has to travel over a large extent of country, and to employ labour specially for his work, it becomes much more expensive than if his inspection were confined to the official staff, who always have men on the ground. The fact that so many plans have to be revised by the surveyors after the inspection is proof of the necessity of his visits. Mr. Barnard, in addition to having the charge of a large district, gets through a most commendable amount of inspection. During the past year he inspected 40,700 acres of Native Land Court Survey, 120,000 acres of triangulation, and sixty miles of road, besides generally supervising the construction of some forty miles of roads—all of this in a country difficult to move about in. Owing to the number of private surveys requiring attention, the official staff are rarely visited; but the inspection, where it does take place, proves their work to be first-class.

Examination of Surveyors.—During the past year Mr. Williams examined ten young men, six of whom passed; in addition to which two of the departmental cadets have passed their examination as assistant surveyors.

Office Work.—The Chief Draughtsman (Mr. W. C. Kensington) furnishes the results of the past year's work, in which is included the returns of Mr. Featon, in charge of the Gisborne indoor branch. Perhaps the most noticeable feature of these returns is the large amount of work accumulating in the office which is not yet available for use; this being due, firstly, to the fact that the office staff has never really been proportionate to the field staff (including private surveyors whose work has to be passed by the office); secondly, to the reduction in the number of draughtsmen on the 30th March last, when nine officers left; and, thirdly, to the complete stoppage of all our proper work for the space of one month (at the time of writing), consequent on the revision of the Property-tax maps. The arrears of work in the office now amount to the following: Twenty-six plans of section work, numbering 160 sections, containing 41,206 acres, in which are included some arrears of Crown grants, but mostly lands which have been applied for; twenty-one plans, of 49 blocks, containing 289,237 acres of Native Land Court surveys; and a number of plans of roads showing over eighty miles in length, none of which have been examined or recorded on the maps, and consequently the lands they represent cannot be dealt with. The number of 10-chain block-sheets now prepared, and showing more or less work on them, is 1,470, being an increase on the year of 195 for both offices; whilst five new record-maps, making 155 in all, are prepared. On the initiation of the standard survey system for the city and suburbs and other provincial towns, it became necessary also to prepare a series of large scale-sheets, generally on the scale of one chain to the inch; and there are now a large number of them, on which every Land Transfer survey is recorded. These are specially in Mr. Foster's charge. Of duplicate record-maps on the 20-chain scale, only five at present have been prepared, though, did time permit, a large number more might be added. In the lithographic branch fifty-seven maps, mostly of survey blocks on the scale of twenty chains, have been prepared and published, 7,500 copies having been struck off. The utility of these is fully felt at the present time for property-tax purposes. The cost of lithographing was £85 8s., whilst the sales realized £67 5s. 6d., the difference between the two sums being more than saved by the lesser number of tracings made. Seven tracings of survey districts for photo-lithographing have been sent to the head office. Up to the present time twenty-two districts have been published, covering the whole of Whangarei and Hobson Counties and part of Rodney. These should be pushed on during the ensuing season, as the saving to the Government and the utility to the public by their use are very great. Two 8-mile sheets of the major triangulation have been drawn and published, leaving one (that of the King country) to complete the province. Sheet No. 2 of the 4-mile map of the province is now with you for publication, as is also a plan of the standard survey of Gisborne. In the Crown grant branch of the office, 4,729 marginal plans, covering an area of 1,347,888 acres, have been placed on the forms, in which are included Crown grants, certificates in lieu of grants, Land Transfer certificates, and Native Land Court certificates and memorials; whilst there are on hand 183 Crown grants, 37 certificates, and 371 Native Land Court certificates and memorials, many of which are held back through defective surveys, or, as in the case of Native Land Court titles, for want of funds to carry out the orders of the Court; and, as the Native owners do not appear to take any interest in getting the survey made, they are likely to remain as arrears. One hundred and seventy-two applications for survey of new blocks were received from the Native Land Court during the first ten months of the year, some of which have been acted on, but the remainder await funds to carry them out. For the last two months none have been received. Sittings of the Native Land Court have been advertised for twenty-seven different sessions, the plans for which have been sorted out and sent, and the orders noted on their return. Mr. Johnston, the accountant, has passed 1,475 vouchers, for a sum of £45,971 3s. 4d., representing expenditure on surveys, roads to open up Crown lands, Public Works roads, homestead and Native surveys, as per statement attached. The value of services rendered to other departments by the indoor branch is £1,481 14s. 6d., whilst the money received as refunds for surveys made is £959 2s. 4d. The number of original maps now deposited in the office exceeds ten thousand, and the want of a commodious safe in which to keep these valuable records is becoming daily more pressing; indeed, they are at present packed so closely that the removal of them from time to time for daily use results in frequent injury, and prevents that ready access to them which is requisite for the despatch of business. It is to be hoped that the proposition lately made to locate all the departments dealing with land under one roof in a new building will be carried; for the actual loss to the Government and the public in referring from one department to another, separated as they now are by long distances, is a serious one.

Work for ensuing Season.—The surveyors have completed in the field—the plans of which will be received shortly—120 square miles of triangulation, 5,370 acres of sections, 5,200 acres of

Native Land Court blocks, and fifty miles of road and railway. The monthly abstract of surveyors' reports shows that the surveyors have on hand instructions for the survey of 2,268 square miles of triangulation (most of it being in the King country), 20,994 acres of section survey, and 420 miles of road and railway. In addition there is on hand—instructions not yet issued—55,800 acres of section survey, including the arrears of Crown grants, situated in 281 localities, and 180 miles of road in various districts, principally to be taken in exercise of the road rights. No estimate can be given of the number of applications that will come in during the year from the Land Board; but there seems to be a falling-off in their number as compared with what it was a few years since, and until the large arrears of good land are more opened out by roads no increase may be expected; nor can any estimate be made of the applications for Native-block surveys. At present, as already mentioned, hardly any such are going on. Mr. H. Baker informs me that by the end of July all the surveys in the Wairoa County except some few short roads will have been finished up, and that Mr. Price has returned to his own district, whilst Mr. Lambert will finish at the end of this month and then leave the service.

During the past year we have lost the services of six surveyors—one by death, and five whose services were dispensed with in accordance with instructions; and two more have received notice to leave as soon as their work is finished. It is a matter of deep regret to me personally that we lose the aid of these gentlemen, each one of whom has afforded me willing and efficient help in carrying out the duties intrusted to me during the last eight and a half years; and they have by their conduct won my sincere respect and best wishes for their success.

S. PERCY SMITH, Assistant Surveyor-General.

AUCKLAND TRIGONOMETRICAL AND CHAIN CLOSURES, 1884–85.

Surveyor.	Trigonometrical.			Chain.			
	Number of Closures.	Mean Difference of Bearing of Closure.	Mean Difference of Closure per Mile in Links.	Number of Closures.	Number of Traverse Lines.	Total Length of Traverse Lines in Miles.	Mean Difference of Closure per Mile in Links.
S. Weetman ... ..	...	...	...	5	130	18·5	0·38
E. C. Goldsmith ... ..	...	...	...	4	54	10·2	1·23
L. Cussen	10	1"·7	0·32	...	...	...	...
	19	11"·5	0·73	...	...	...	...
F. Simpson ... ..	...	...	...	12	364	36·0	1·1
F. H. Edgumbe	6	10"·6	0·67	4	47	7·5	2·5
R. Neumann ... ..	...	...	...	3	87	8·25	2·25
W. J. Parris	1	5"	0·16	7	166	10·2	0·7
G. A. Martin ... ..	...	...	...	6	71	10·4	1·23
E. H. Hardy	1	...	0·03	4	70	23·5	0·5
H. M. Smith ... ..	...	...	...	13	623	53·1	1·1
J. I. Philips	4	38"	4·3	10	302	13·75	2·0
C. Stevens	11	6"	2·3	18	305	49·8	0·6
D. W. Gillies ... ..	...	...	...	10	510	36·5	1·8
C. W. Macfarland ... ..	...	...	...	8	196	12·2	2·6
W. J. Wheeler ... ..	...	...	...	17	182	23·7	1·35
H. D. Haszard	2	16"	0·6	10	372	23·4	1·6
J. E. Pickett	4	2"	0·81	24	798	51·75	0·75
W. Armstrong	14	18"	0·6	10	228	22·7	1·5
H. D. McKellar ... ..	...	...	...	4	105	7·86	1·9
Means and totals, 1884–85	72	10"·8	1·05	169	5,566	419·11	1·37
Means and totals, 1881–82	54	10"·7	1·03	98	1,705	265·9	1·92
Means and totals, 1882–83	15	6"·6	0·62	146	3,022	390·0	1·67
Means and totals, 1883–84	51	19"·5	1·10	183	4,541	460·1	1·91
Means and totals, 1881–85	192	13"·9	0·95	596	14,834	1535·11	1·71

TARANAKI.

In last year's report I stated my intention of making further investigations into the very marked discrepancy in this district between the astronomical latitudes and those deduced from the triangulation. I have observed at Midhurst, a position due east of and eleven miles distant from Mount Egmont, and find 18" discrepancy with the value brought up from Mount Cook, Wellington. The attached table gives a summary of the whole observations. We have now a connection with Mount Eden, Auckland, through the closure lately made of the Auckland and Taranaki triangulation. The values in latitude and longitude of Mount Eden by triangulation from Mount Cook, assuming

the latter to be in latitude $41^{\circ} 17' 59'' \cdot 3$ S., and longitude $11\text{h. } 39\text{m. } 09 \cdot 92\text{s.}$, is latitude $36^{\circ} 52' 39'' \cdot 33$, against $36^{\circ} 52' 48'' \cdot 18$ deduced from observation at the American Transit of Venus Station, Auckland Domain—a difference of $8'' \cdot 85$; and longitude $11\text{h. } 39\text{m. } 7 \cdot 02\text{s.}$, against $11\text{h. } 39\text{m. } 6 \cdot 47\text{s.}$ by electric exchanges—a difference of $\cdot 55\text{s.}$ When the main series are connected, as alluded to later on, the results may be slightly altered, but not materially.

Triangulation.—Mr. Skeet has completed 250,000 acres with topography, extending from the coast at Mokau eastward across to Hikurangi. The cost of slightly over $\frac{1}{4}$ d. per acre is very reasonable considering that all his stations are on forest-clad hills, and three-fourths of the area covered by his work is rough, unknown, and uninhabited bush country. He has also partially done 400,000 acres, which will complete the whole of the triangulation in this district excepting a small area in the southwestern corner, for which I can see no immediate necessity. The connection with the Auckland series is based upon a small triangle on the sea-coast, and is adopted temporarily only. The close by main series of large triangles and polygons cannot be computed until two more stations in the interior are cleared and observed from. Had it not been for the unfavourable weather experienced it would have been completed in time for this report. The close as it is gives a difference of 2 links per mile. The mean of the bearings on the several lines common to both triangulations is $3''$, and difference in height of Trig. Tatata, the point of junction, is 1 foot. Mr. Skeet, in his report, remarks that in travelling over the country he was greatly impressed with the number of places occupied and cultivated by the Natives within the last ten years that are now entirely deserted, and alludes to the high rate of mortality among the Natives during the past year. He estimates that the present total Native population from the sea-coast at Mokau eastward to the Wanganui River, including the settlements of Taumarunui and Taringamutu, does not exceed five hundred.

Settlement.—There have been 43,009 acres completed during the year, at a cost of £3,797 11s. 8d. Twenty-one thousand acres of this, subdivided into sections averaging fourteen hundred acres, lie north of the Mokau River, in the Auckland District. It is a very rugged forest-covered country, and when cleared will only be fit for runs. The rate of 1s. 6d. per acre for survey is moderate, considering the arduous nature of the work and the cost of provisioning the parties. The remaining 22,000 acres are in the bush districts of Kaupokonui, Egmont, and Ngairi, and are cut up into sections averaging rather under 200 acres, at a cost of 2s. per acre.

Native Land Court.—Two blocks, of 700 and 29,500 acres respectively, have been surveyed, at slightly over 4d. per acre, the whole cost of which has been refunded by the owners.

Reserves Trustee.—The only survey under this head was the subdivision of 5,042 acres of the Waihi Native Reserve, north of Waitara. This, which cost $9\frac{1}{4}$ d. per acre, is the only work for this year in open land.

Railway Land Plans.—Surveys for land plans of five and a half miles of railway-line have been done by contract at a cost of £31 per mile. Land plans are in hand of twenty-nine miles more, which will complete the whole of the railway-lines in the district.

Back Pegging.—Considerable progress has been made in the lands that have been sold during the last few years. No less than 551 sections, comprising 56,248 acres, have been completed, at 8d. per acre; but we still have some 56,000 acres to operate upon. It has been thought that this work can be more economically done some years after settlement has taken place than in the first instance; but the occasional clearings met with do not by any means compensate for the loss of time through obliteration of marks, new growth, and fallen timber at the edges of the clearings.

Inspection.—During the year I have made numerous inspections, with very gratifying results. The work is quite up to the standard of previous years, and very commendable. The road-lines, I have noticed, have had special care taken over them, and good judgment has been exercised. The rural-section work of past years has had a severe test applied in the cutting of the back lines for back pegging. The result has been highly satisfactory, for in the 56,000 acres done there is not a single case of serious discrepancy, but in most the measured and computed distances are singularly accordant.

Office.—Owing to the completion of the work in connection with the West Coast Commission, and the greater part of the Reserves Trustee's, we have been able during the year to reduce the strength of the office staff by four draughtsmen. The work has been of the usual general nature, the principal items being the completion of fifty-three block-sheets, plans numbering 1,507 drawn on 378 Crown grants, 794 plans placed on certificates of title, drawing five maps for photo-lithographing, and the checking of surveyors' maps and reductions of them for office maps on other scales.

Proposed Operations, 1885-86.—The 400,000 acres of triangulation previously referred to should be resumed as soon as the season permits, as otherwise great loss of time and unnecessary heavy expense will be incurred through the signals being down and the numerous lightly-cut tracks through the forest being overgrown and obliterated. It is estimated that from four to five months will complete it, together with the whole of the topography. Of rural-settlement work we have some thirty-six thousand acres in hand to complete. There will also be surveys of other blocks eastward of Inglewood and up the Waitara Valley, which will doubtless find a ready sale. Two of the staff will be required in the West Coast Land District, to keep a little ahead of the demand there. In Native Land Court work, I think it likely that surveys will be called for of the Mokau-Mohakaitino and Mohakaitino-Parininihi Blocks, and probably one or two more. The standard survey of the Town of New Plymouth, which has been put off year by year through pressure of other urgent work, will be proceeded with as you have already directed.

THOMAS HUMPHRIES, Chief Surveyor.

ASTRONOMICAL AND GEODESICAL LATITUDES.—(Observer, T. HUMPHRIES. Instrument, 12" Altazimuth.)

Station.	Relative Position of Mount Egmont.	Number of Nights.	Number of Pairs of Stars.	Extreme Range of Nightly Mean.	Mean Diff. of each Observation from General Mean.	Probable Error.	Astronomical Latitudes.	Latitude by Triangulation, in terms of Mt. Cook (Wellington) Astro-nomical.	Diff. Astro-nomical and Geo-desical.
<i>North Coast.</i> Pukearuhe .. Marstrand Hill, N. Plymouth	Bearing. Mls. 222° S. 36½	3	55	0·64	1·33	0·15	° ' "	° ' "	"
	180° S. 16	11	54	1·54	1·17	0·13	38 53 56·78 39 3 57·85	38 53 45·38 39 3 47·82	11·50 10·03
<i>Inland.</i> Midhirst ..	270° 11	3	50	·41	1·38	0·16	39 17 53·35	39 17 35·35	18
<i>South Coast.</i> Hawera .. Patea ..	330° 23½	4	60	1·48	1·23	0·15	39 35 41·61	39 35 21·67	19·94
	326° 38	3	54	0·17	1·35	0·15	39 45 33·60	39 45 14·33	19·27

HAWKE'S BAY.

General Remarks.—A comparison with the returns for the previous six years shows that the cost of the different classes of surveys has varied very little, with the exception of section surveys. The average cost of section work for the period named is 1s. per acre, against 2s. 4d. per acre for the past year. This increase is attributable to the exceedingly wet spring experienced in the bush districts, and to the fact that the land prepared for settlement is covered with forest, and has been laid off in small-sized holdings, the average being 110 acres each lot. The officers of the field staff have executed their surveys in a satisfactory manner. Messrs. Rich and Wilson, who have been trained by the department, are making excellent work in all respects. In last year's report it should have been mentioned that the section survey executed by Mr. Wilson in Block IX., Woodville Survey District, included some four miles of railway reserve, the lines of which were cut and the numerous chords pegged on both sides of the reserve, thereby adding materially to the cost of the survey. The retirement of Mr. B. Lambert, owing to the reductions made in the staff, is to be regretted. The seven years Mr. Lambert has acted with me in the Wairoa County has given me ample opportunities of judging his capabilities in all classes of our work, and I desire to express my regret at losing the assistance of so competent and trustworthy an officer.

Triangulation.—The area triangulated is 209,300 acres; cost, 1½d. per acre. The triangulations are scattered over several districts, and have been confined to extending triangles over lands that will presently be surveyed for the purposes of the Native Land Court.

Settlement Surveys.—The area laid off is 19,701 acres, in 130 sections. A village settlement at Norsewood has been pegged off. It is found advisable, owing to the hilly nature of the land in the Tautane Block, to traverse the side boundaries of sections on lines suitable for fencing.

Native Land Court Surveys.—The area surveyed is 20,845 acres, in seven blocks.

Roads.—During the year sixty-seven miles have been laid out in various districts. The average cost (£10 7s.) per mile is much about the same as for previous years. The statement made by the chairman of the County Council conference at an interview with the Hon. the Colonial Treasurer on the 10th July, that the road surveys are not efficiently carried out, cannot be allowed to pass unchallenged. It may be presumed that the chairman, as representative from the Hawke's Bay County Council, referred to this district. In a sparsely-populated country the question of roads is a very difficult one to deal with, and reduces itself to two things—first, how much money is likely to be available for the formation of the road; second, what is the probable amount of the traffic—neither of which can be decided until the country is settled and peopled. In the early days of settlement in this part of the colony the settlers were glad to have the best natural or bullock-dray tracks laid off. In many cases this was done, and wisely, too; for to have strictly adhered to a defined limit of grade would have meant the expenditure of large sums of money in forming the roads before they could be used. In those days there was no money available for roads beyond what was laid out on the main lines of communication. This state of things continued in many cases until after the right to take roads under the Crown Grants Act had expired. The next stage was to pay the surveyors a higher rate per mile for road surveys. Often this was not beneficial, and in some parts of the district there are impracticable roads. In later years a system of grading the roads has been adopted, and I do not hesitate to say that, with one exception, the roads laid out during the last six years are practicable lines, such as meet the requirements of the districts in which they are situated. In the Hawke's Bay County the expenditure on roads to open Crown lands has been under the immediate control of the Council. The road to inland Patea has also been laid out by the County Engineer. In the other counties—of Waipawa and Wairoa—the supervision of the roads to open Crown lands has been offered to the Councils or Road Board. Alterations of some of the road-lines in districts which are now becoming populated are urgently required; but the means provided by the Public Works Act are too cumbersome, and until a less expensive mode of procedure is introduced, the local boards will delay making deviations. It often happens the local funds are injudiciously expended for want of competent supervision. In cases of this sort the blame is generally laid on the surveyor who surveyed the road. In bush districts, after the settler has cleared the timber it can often be

seen where a road might be improved; but in the dense bush, where a surveyor has almost to feel his way about, it is a very different matter to find the best line of road.

Standard Surveys.—The standard survey of the Town of Napier has been completed by Mr. Rochfort in a very satisfactory manner. The town has been divided off and mapped in twenty-four blocks. In the business and populated parts of the town the details given are very full, and show that a most careful research has been made of the record-maps before the positions of street-lines were determined. A standard traverse of the street-lines and roads in the Township of Woodville and suburbs has been made by Mr. Hallett. The first survey of the Town of Woodville was run out on the rough-and-ready system of cutting the lines on the compass bearings. Recent subdivisional surveys under the Land Transfer Act having brought to light several discrepancies that could only be remedied by a close investigation of the first survey and the location of standard points on which to base any future operations, Mr. Hallett has made a thoroughly good plan of his work, giving all the information likely to be required by the Land Transfer surveyor.

Field Inspection.—The different survey parties, with one exception, and the road works have been visited during the year. Owing to my duties in the Crown lands branch taking up a considerable portion of my time, it is impossible for me to give the same attention to inspection as in the past.

Land Transfer Surveys.—Mr. Dennan has examined and recorded sixty-nine plans, covering an area of 26,977 acres, divided into 554 lots. The plans of a considerable area—9,948 acres—have been examined, but are held back for various reasons.

Office.—The average number of field plans have been received. The diagrams drawn on the different forms of title, including Crown grants, certificates, leases, and licenses, number 339. Railway land plans of eight miles have been examined, and three miles have been mapped from the Crown lands surveys. The draughtsmen have discharged their duties efficiently, but the many calls on them for work outside the regular survey business, amounting in money value to £201, have kept back the examination and recording of the field-work.

Proposed Operations and Work on Hand 1885–86.—The requirements of settlement surveys in the Tautane, Ruataniwha, and other districts will occupy Assistant-Surveyors Messrs. Tone, Rich, and Wilson for fully the whole year. Mr. Hallett's services will be available for roads and the revision and survey of a number of old purchases that have been standing over for several years owing to the surveys not being sufficiently correct to allow of titles being issued. The Native Land Court surveys are almost at a standstill. Out of the 532,265 acres set down for survey, 237,000 acres—the Waikare-Mohaka Block—are revision surveys, and will be done with the triangulation by Mr. Hallett. The authorized surveyors will, by arrangement with the Native owners, survey 104,000 acres, leaving 191,000 acres not provided for. The private Native Land Court surveys come in very irregularly, and are often carried forward from one year to another. Particulars of the work on hand are as follows: Minor triangulation, 391,000 acres; settlement surveys, 72,426 acres; roads, 137 miles; Native Land Court surveys, 532,265 acres.

HORACE BAKER, Chief Surveyor.

WELLINGTON.

It will be seen that the out-turn of work falls far short of that in previous years. This is due to several causes—(1) reductions in the staff; (2) non-construction of roads laid off on Crown lands, it being unadvisable to extend sectional surveys in advance of road-works; (3) the allotment to special settlement associations of several blocks of land which had been explored, and on which roads had been laid off; (4) the demands upon the staff to execute miscellaneous surveys for Defence and Public Works purposes, and for the legalizing of roads or preparing them for construction; (5) and the adoption of the rule that Native Land Court surveys must be paid for direct by the owners of the land. Large returns under the heads "Triangulation," "Settlement Surveys," &c., could not be expected under such circumstances.

It does not appear necessary to enlarge upon several subjects which were considered in previous reports. The practical points are, that the field officers have had the usual difficulties and drawbacks to contend against which the dense forest-clad hills of this district present; and that the work performed by all is creditable in manner of execution, standard of accuracy, and cost. I can speak confidently of the cheerful and zealous attention to duty displayed.

As regards the indoor staff, the reductions effected compelled attention to routine duties and urgent work required by other departments, and these duties were also satisfactorily performed.

The clerk and cadet have attended to the Land Office business, as well as that of this office, for some months past. They have managed the increased work ably and efficiently, and have devoted much time to it after office-hours. In the Survey Office alone, the letters received or despatched amounted to 4,073.

The main operations this season should comprise—(1) a general triangulation and topographical survey of the Maori lands along the proposed North Island Trunk Railway, so as to prepare the way for the demarcation of tribal and individual claims; (2) a trigonometrical and topographical survey of the Mangahao, Makuri, and Oroua Districts, with a view to aiding the surveys of special settlement blocks; and (3) the settlement surveys of such blocks as Mangatainoka, Kopuaranga, Puketoi, and West Waitapu.

J. W. A. MARCHANT, Chief Surveyor.

TRAVERSE CLOSURES.

Surveyor.	District.	Number of Closures.	Number of Traverse Lines.	Total Length of Closed Traverse Lines.	Mean Ratio of Error per Mile.		Class of Country.
					Mer.	Perp.	
J. Annabell..	.. Ikitara, Waipakura, Nukumaruru, Rangitoto	17	315	25·7	Links. 1·7	Links. 2·0	Hilly bush and open country.
J. R. Annabell	.. Momahaki, Taranaki ..	9	400*	23·2	2·3	2·5	Broken bush.
A. E. Ashcroft	.. Waipakura ..	9	277	23·75	0·7	1·4	Hilly bush and open country.
J. D. Climie	.. Wellington City..	5	80	5·5	1·6	1·2	Formed roads.
C. A. M. Crombie	.. Wainuioru ..	2	232	6·2	2·5	3·1	Hilly bush and open country.
R. P. Greville	.. Mangaone ..	33	622	20·2	3·5	2·7	Hilly bush. All closing on old traverses.
H. J. Lowe	.. Kopuaranga ..	2	28	3·0	0·5	1·7	Open swampy land.
L. Smith ..	.. Kopuaranga ..	3	36	8·8	1·2	1·6	Hilly bush and open country.

* Approximate number.

NELSON.

Minor Triangulation without Topography.—Of this class of work an area of 101,445 acres has been executed, at a cost of 1½d. per acre, principally in extension of triangles in connection with section work.

Trigonometrical and Topographical.—During the year an area of 327,740 acres has been done, at a cost of 1½d. per acre. Of this area 209,490 acres, at a cost of a little over 1d. per acre, has been made by Mr. G. H. Bullard, in the Reefton, Lewis, Rahu, and Burnett districts, for the purpose of sectionizing a 10,000-acre block in the Maruia Valley. A check base was measured in the valley on side F-G, the calculated mean length of which from sides A-P and Y-F of the Reefton triangulation, brought up from the Totara Base, was 23,699·6 links, the measured length being 23,695·8 links, showing a difference of 3·8 links, or 1·2 link per mile. The average summation of eighteen triangles was 6", the greatest being 16" and the least ·1". The average close of four polygons was ·4 link to the mile, the greatest difference 1·3, and least ·1 link. Seven stations were over 5,000ft. above the sea, and at most of the stations the bush-felling was heavy. Work was much hindered by fog and rain. Messrs. Smith and Thompson completed 130,845 acres at a cost of less than 1d. per acre, of which 60,845 were without topography, covering old sectional surveys. These areas extended through the Maling, Dillon, and Hawkeswood districts. They have now in hand about forty thousand acres of trigonometrical extension not plotted, and about forty thousand acres covered by stations erected but not observed, and about twenty thousand acres of lease surveys. As the working season on the back ranges extends nearly to the end of the departmental year, the 30th June, it has been found advisable to work as long as fine weather lasts, and plot up the work done during the winter months; consequently a large amount done during the year is only returned as in hand. It became necessary during the past season to extend triangulation north of Westport to the Mokihinui reefing district, in order to locate mining surveys not connected. For this purpose an area of 48,250 acres was executed, at a cost of 2½d. per acre. Rain and fog rendered the cost of this work higher than usual. On most of the stations the bush-clearing was heavy, and the altitudes ranged from 2,000ft. to 4,500ft. above the sea. Mr. Snodgrass reports that in this area there are about sixteen thousand acres of coal formation, containing valuable seams, one outcrop being 16ft. in thickness. The remainder of this portion of country, excepting the granite peaks, is of slate formation, intersected by quartz veins, and more or less auriferous. The soil is generally poor in quality and timbered throughout, the flats growing red and white pine, the ranges silver birch, and the lower country silver pine. This work is not closed, and requires further extension to connect Karamea Circuit. Mr. Murray covered 18,750 acres in connection with his survey of the Whakapuaka Block for the purposes of the Native Land Court, and is extending work to the bays and sounds of the north-eastern part of the district.

Sectional Surveys.—During the year 420 sections have been laid off, containing 33,336 acres, averaging 81½ acres, at a cost of 3s. 2d. per acre. These consist principally of old applications in arrear of years' standing, scattered through the district, involving constant shifting of camps; hence their higher cost. There has been surveyed in the Whakapuaka Block 17,739 acres, at a cost of 5·4d. per acre. This would bring the total acreage surveyed up to 51,075 acres, at an average cost of 2s. 3d. per acre. Owing to the quietness of the past year in the mining work an opportunity has been given us to overtake arrears in those districts, and we have there only in hand surveys of current applications for settlement and mining purposes. At the beginning of the year the arrears of work was 411 sections, containing 72,922 acres; and at the end, on the 30th June, they amounted to 310 sections and 66,903 acres. Thus, in the year's work we have kept up with current applications made during the year, and also reduced the arrears by 101 sections and 6,019 acres. The bulk of the unsurveyed applications still remain in the Nelson and Amuri districts, consisting in those parts of 138 sections, with an area of 54,090 acres. These will still take some time to work off, owing to isolated positions in the bays and sounds of the former district, and in the latter the necessity of first marking on the ground the boundaries from office-plans of leases held under purchasing-clauses before other applications can be located. To do this triangulation is necessary first. Mr. G. H. Bullard has in hand a block of 10,000 acres in the Maruia Valley to sectionize, having completed

the necessary triangulation. Mr. T. Sadd has been employed on the Tadmor Block, and has sectionized 7,681 acres, but is now employed on arrears and current work, as this block has been temporarily withdrawn, being within the area withheld for the purposes of the East and West Coast Railway. A sale-plan of an area of 4,517 acres has been photo-lithographed. Mr. Sadd reports two thousand acres are available for settlement in the Sherry Valley, consisting of low hills under 1,500ft. above sea-level, of fair grass-growing land when cleared of bush, which is principally rimu and birch. Fewer visits of inspection have been made this year, owing to shorthandedness in office. The traverse closures of work reported by surveyors show that a good standard of execution of work is maintained.

Gold-mining and Mineral Lease Surveys.—This year there has been less demand for the first class of surveys, the mining districts having been very quiet. During the year a number of the gold-mining leases surveyed and taken up between the years 1882–84 have been cancelled for non-payment of rent. Twenty-eight mining surveys have been made, and there are twenty applications for lease surveys on hand, chiefly in the Buller and Lyell districts; the remainder in localities long distances apart. Six mineral leases have been surveyed, and eleven applications are in hand. Coal leases have been applied for, and are in hand, at Moonlight Creek, Grey Valley, the applicants having in view the formation of a company to work them. Should they succeed and the seams turn out equal to promise, the export of coal from Greymouth would be increased, as that port would be the outlet. Leases containing outcrops of copper have been surveyed in Aniseed Valley, near Nelson, and the Champion Copper-mining Company are just about erecting works for reducing ore, of which they have a considerable quantity at grass. The road to the mine is nearly completed, having been delayed owing to the large quantity of rock requiring removal. Mr. C. Lewis is now employed in the Collingwood District in connecting and locating old leases on this goldfield, and collecting data to compile a good mining map of this and the Parapara mineral field, for the purpose of locating the prospecting applications which are not surveyed. This has been undertaken at the request of the Warden, who has been hampered for want of such a map in administering his district, but which, having only one officer available for such a large district, the department has not been able to supply before.

Standard Surveys.—The standard survey of the Town of Reefton has been completed, and the remainder of the sections which had not been surveyed laid off. Reference stations have been placed for the Land Transfer surveys. Standard points have also been laid down in Black's Point Township, holdings surveyed, and an extension made. This work is completed, but the plans are not yet in. The miners employed at the Westport Colliery Company's works having, with their families, formed a small irregular township at Denniston, on a plateau at an altitude of about 1,800ft. above the sea and near the top of the incline, it has become necessary to survey it into sections, and Mr. Snodgrass has it in hand. A further extension of standard survey is required for the Town of Nelson, for Land Transfer purposes. Mr. W. D. Murray during last winter laid down twenty-one and three-quarter miles of standard survey in the Waimea District, which was sectionized in rectangular blocks, and the cultivation of many years' growth prevented connection with trig. for the purposes of Land Transfer surveys, or rendered it very costly. Standard points have been laid down at the intersections of roads, and will help to lessen the cost of survey where they are available.

Road Surveys.—Twenty-five and three-quarter miles of road surveys have been made in the Nelson District for the purpose of exercising the right of taking roads, and also for giving access to Crown lands, but passing through freehold sections in which the right has lapsed for some years, and for which compensation is required. These surveys have been chiefly made at the request of the Waste Lands Board and Commissioner of Crown Lands, and these cases are now under the consideration of the Board.

Land Transfer Work.—During the year 659 plans have been placed on certificates of title; 160 plans examined, passed, and the work recorded; fifty-two plots and thirty tracings and compiled plans made. The work in this branch is now more than one officer can keep up to date. More record-maps are required. This work is undertaken solely by Mr. W. S. Curtis, who is a very diligent and painstaking officer.

Office Work.—During the year one cadet has entered the office, and one has completed his apprenticeship. Mr. E. W. Buckeridge, who was serving his first year in office, has been employed as assistant computer to Mr. C. W. Adams, Geodesical Surveyor, having proved himself to be sufficiently advanced in mathematics and careful in his work to be of service to that officer. Messrs. Brown and Begley, assistant draughtsmen, have left, and Messrs. Wright and Igglesden have supplied their places. Mr. R. Park, clerk and draughtsman, has been transferred to the Geological Department; but his place has not been filled. There have been 715 plans placed on leases and licenses, twenty-two block plans have been made, twelve trig. plans of districts and portions; and 175 plans from surveyors have been examined and checked. Much work is required to be done to bring the data required for the information of the public up to date. The new surveys have now so far advanced in many districts as to require reduction and preparation of new application maps. Those in use at present have been compiled from old magnetic surveys, and it is very difficult to make up present surveys upon them. Record maps are required; but, with the pressure of work upon the present staff, the above and other necessary work must stand over.

Proposed Operations, 1885–86.—Messrs. Smith and Thompson to continue triangulation and marking out boundaries of large leaseholds, held under purchasing-clauses, and locating newer applications; also traverses of main roads for the purpose of legalizing them, in the Amuri District. Mr. Bullard to complete the survey of the Maruia Block, and connect triangulation with Messrs. Smith and Thompson on eastern side of main range. Mr. Murray to continue triangulation to the bays and sounds, and survey applications in arrears there. Mr. Snodgrass to complete survey

of Denniston Township, and lay off a block of suburban sections for sale to the Shetlanders settled on the Nine-Mile Beach, Charleston, and to connect triangulation with Karamea Circuit and survey applications waiting there. Mr. Rawson to survey the Motueka Cemetery, and arrears of applications in Motueka District. Mr. C. Lewis to complete topographical survey of Collingwood reefing districts and Parapara mineral lands; extend trig. connection to Native block, West Wanganui, and over the bays on west side of Blind Bay, for survey of applications there. The remainder of the staff on arrears and current applications. Many miles of traverses of main roads throughout the district are required, which are not yet laid down on the plans from actual survey. The weather for some months during the last season was unusually wet and foggy.

JOHN. S. BROWNING, Chief Surveyor.

MARLBOROUGH.

Triangulation.—My report last year shows triangulation in progress over the upper portion of the Wairau Valley. The work has been pushed forward during the year by Mr. Wilson, and a major and minor series carried up the valley, commencing a little to the south of the Waihopai River, and terminating at and connecting with the Nelson surveys near Tophouse, at the boundary of this district. The country covered by the triangulation includes the greater portion of the main range on either side of the valley, fully one-half being very high and rough, and in some parts covered with dense bush. The following are the various closures with the Motupiko triangulation in the Nelson District.

Line St. Arnaud-B	= 47807.2	Nelson.
	47801.5	Marlborough.
Line Top 1-A ^{1B}	= 25872.4	Nelson.
	25873.4	Marlborough.

Or about one link in a mile more, and about 0.3 link in a mile less respectively. The difference in height is as follows: St. Arnaud, 21.3ft., A^{1B}, 21.7ft.; Top 1, 24.4ft., less respectively than Marlborough. The heights were calculated from the major triangulation, and checked at St. Arnaud by results obtained from standard survey angles taken with a 10in. theodolite seven years ago, the difference being only six inches. In forty closures in the minor triangulation the greatest differences are 2.30, 2.48, and 2 links in a mile, none of the others exceeding 1.7 link, the mean being 0.88 link in a mile. During the early part of the season, for about four months the weather was very unfavourable for field-work, more especially in the high country. All the field-work of this triangulation, which comprises an area of 467,840 acres of major and 216,960 acres of trigonometrical and topographical survey, has been finished, the calculations and field-books checked, and there remains only the completion of the plans, which are now being gone on with.

Rural and Suburban Section Survey.—The eight sections under this heading were surveyed on application in four different localities. With one exception they adjoin old surveys, the boundaries of which had to be re-established, in addition to the actual section survey. They are scattered over the northern portion of the district, from ten to sixty miles apart, and much time is necessarily lost in frequent shifting of camp. This class of survey is therefore more expensive than in larger operations.

Revision Surveys.—Of the total of eleven sections revised, one is situated at the mouth of the Wairau River, and was surveyed in order to define the boundaries of the contiguous reserve for the Marine Department. The other ten are situated in the Pelorus Sound, in eight different bays, and are nearly all covered with heavy bush. The old surveys having originally been executed on independent magnetic meridians, and the ground-marking in most cases obliterated, these revisions practically amount, with the exception of putting in the back pegs, to a resurvey on true bearing and connection with trig. station. The revision and connection to trig. stations of isolated freehold sections in the Pelorus Sound is now completed.

Town Section Survey.—Part of the reserve near the mouth of the Hapuka River, laid off as a village settlement in fifty-two allotments from one to ten acres, to be disposed of under "The Special Powers and Contracts Act, 1884."

Standard Survey.—In my last report I proposed, if Mr. Goulter could be spared for the work, to commence a standard survey of the principal road-lines in the settled districts of the Wairau Plain. The limited amount of section survey required during the season has enabled me to proceed with this most useful work. The field-work of sixty-six miles is now completed. This work was commenced on the 2nd January, and continued until the 7th May. A 5-inch theodolite was used throughout the survey, the measurements were made with great care with the steel band and arrows in the ordinary way, and temperature corrections applied. Trig. tubes were put in at the intersections of all road-lines, generally twenty-five links from the section boundaries; and at intermediate stations, where the inequality of the ground rendered it necessary, smaller tubes, 1½in. in diameter and 2ft. long, were used. Eight readings, as in minor triangulation, were taken at all the principal stations; but at some of the minor ones, where the lines were short, four readings only were observed. Original marks, posts, corners of blocks, and Land Transfer survey pegs, were carefully picked up wherever met, and the position of the principal houses, &c., noted. In the Omaka District a line twelve miles in length was ranged along the middle road from Blenheim to the Waihopai River, and all the standard lines are either parallel or at right angles to it. The original

survey was supposed to be rectangular; but the difference of bearing between the standard lines and the original lines, as fenced, is considerable, varying from $-3'$ to $+4'$. None of the longer lines are straight, the middle road resembling the arc of a circle, the versed sine measuring twenty-five links. In the Spring Creek and Tuamarina districts the standard lines are parallel to the road-lines as fenced; in the latter district most of the lines were measured trigonometrically by breaking down from the triangulation. As the survey is still incomplete, I am unable to give the mean closing of all the traverses; but those already tabulated do not show a greater difference than 1.2 link^s per mile with the triangulation. The greatest closing error in bearing so far does not exceed 20". The advantage offered by the standard traverses will be greatly appreciated by the public and the local surveyors. To the Survey Office it affords reliable data for controlling and checking the surveys of private surveyors, the connection of previous Land Transfer and other surveys, the means of constructing Land Transfer and Crown grant record-maps, greater facility for computation, uniformity in bearing and distance, and in many cases it renders unnecessary further survey to determine whether there is any encroachment, often required by the Survey Department. To private surveyors it gives reliable starting and closing points, the width of roads, the positions of block-corners, the bearings of road-lines (hitherto ascertained on the ground, in most cases, by the fences; consequently no two surveyors agreeing as to their position and bearing), and the means of at once getting true bearing on their work without reference to the trig. stations. The public can now bring their land under the Land Transfer Act without the expense of a trig. connection for each survey of a separate property, often a matter of great difficulty, owing to the growth of trees and other obstructions.

Office and Land Transfer Work.—Of surveyors' plans, twelve were received this year, checked, recorded, and placed on their respective block-sheets and Crown grant record-maps. Nine new block-sheets were constructed, and both they and the record-maps are brought up to date. Topographical tracings, partly completed, of sixteen survey districts have been made. Twenty-seven plans, deposited under the Land Transfer Act, have been checked and recorded; and 128 certificates of title, representing 256 marginal plans, of 618 allotments, prepared for the Land Transfer Office. The amount of office work this year is necessarily less than last year, as for five months I have had only one draughtsman in the office, the assistant draughtsman having been absent on account of ill health for two months, and his services having been dispensed with on the 31st March last.

Other Work.—The items under this column consist of 21,570 acres of sub-triangulation, setting out portion of Native reserve at White's Bay for Postal and Telegraph Departments, and sixty-six miles of standard survey (above reported on). The sub-triangulation has been executed at an average cost of .79d. per acre: in Pelorus Sound 18,700 acres, in extension of triangulation up Tennyson Inlet, and from the entrance of the sound to Anakoa Bay, heavy bush country, and the remaining 2,870 acres in open country in connection with section survey.

Proposed Operations for the coming Season.—My report states that Mr. Wilson has in hand triangulation nearly completed over the upper part of the Wairau Valley. When this is out of hand, with your concurrence I propose that Mr. Wilson extend the work over the Waihopai and upper part of the Awatere valleys to Barefell Pass, on the boundary of the district. There are some 100 sections or more (old surveys) scattered about in various bays of Queen's Charlotte Sound, and I purpose revising and connecting these with the trig. stations on the same plan as that adopted in the Pelorus Sound. There are also about fifteen miles of standard lines required to complete the roads in the Wairau Plain. This also I purpose doing if Mr. Goulter's services can be spared from other work.

HENRY G. CLARK, Chief Surveyor.

WESTLAND.

Major Triangulation.—Area completed, 129,400 acres, at 10.7d. Of this, 92,360 acres are the work of Mr. W. G. Murray, comprising the country between Nelson District and head-waters of Otira; the rest was done by Mr. Roberts. When my last annual report was forwarded the calculations of the southern triangulation and those showing its relation to the Otago and Canterbury triangulations were not completed, and I now therefore append the result:—

Cascade Base-line—

Length by calculation	...	...	...	=24,580.479 links
Length by measurement	...	...	...	=24,579.286 links
Difference	...	...	...	1.193 links,

equal to 0.38 links (3.07 inches) per mile. Distance between Paringa and Cascade base-lines, about ninety-three miles. The network comprised 501 triangles, the mean error per triangle being 6".4.

Latitude, Longitude, and Convergency.—As the longitudes of the circuit initial stations are to be calculated through the triangulation from Mount Cook Observatory, the data for which are not to hand, I shall have to content myself with simply giving the differences of longitude between them:—

Abut Head to Mount Eleanor—				° ' "
Latitude, Mount Eleanor, derived by calculation from Abut Head	=	43	58	35·5
Latitude, Mount Eleanor, derived by observation (Mr. Adams)	...	43	58	23·0
Difference	...			12·5

Difference of longitudes = $1^{\circ} 39' 18''\cdot 4$.

Convergency between Okarito and Jackson's Bay meridians (calculated)	...	...	...	...	=	1	08	24·9
Convergency between Okarito and Jackson's Bay meridians (observed)	...	...	...	...	=	1	08	32·3
Difference between calculated and observed	...				=			07·4

Mount Eleanor to Lindis Peak—

Lat. Lindis Peak, derived by calculation from Mount Eleanor	...	=	44	43	50·5
Lat. Lindis Peak, derived by observation (Otago Meridional Circuit map)	...	=	44	44	07·5
Difference	...				17·0

Difference of longitudes = $0^{\circ} 51' 42''\cdot 8$.

Convergency between Mount Eleanor Jackson's Bay, and Lindis Peak meridians (calculated)	...	...	...	...	=	0	36	09·2
Convergency between Mount Eleanor Jackson's Bay, and Lindis Peak meridians (observed)	...	...	...	...	=	0	34	59·7
Difference	...							1 09·5

Mount Eleanor to Mount Horrible—

Lat. Mount Horrible, derived by calculation from Mount Eleanor	=	44	23	56·0	
Lat. Mount Horrible, derived by observation	...	=	44	24	04·0
Difference	...			08·0	

Difference of longitudes = $2^{\circ} 27' 04''\cdot 2$.

Convergency between Jackson's Bay and Timaru meridians (calculated)	...	...	...	...	=	1	42	30·5
Convergency between Jackson's Bay and Timaru meridians (observed)	...	...	...	...	=	1	42	51·7
Difference	...							21·2

Abut Head to Mount Horrible—

Lat. Mount Horrible, derived by calculation from Abut Head	...	=	44	24	04·5
Lat. Mount Horrible, derived by observation	...	=	44	24	04·0
Difference	...				0 0 0·5

Difference of longitudes = $0^{\circ} 47' 46''\cdot 8$.

Convergency between Okarito and Timaru meridians (calculated)	...	=	0	33	02·5
Convergency between Okarito and Timaru meridians (observed)	...	=	0	33	19·4
Difference	...				16·9

Mount Eleanor to Mount Aspiring—

Lat. Mount Aspiring (based on Mount Eleanor)	...	=	44	03	31·6
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Difference of longitudes = $0^{\circ} 33' 58''\cdot 4$.

Heights of Principal Mountains on Dividing Range (excepting Mount Cook, already reported upon), as per table annexed. Column 3 gives the number of trig. stations from which altitudes have been observed and calculated; column 4 gives the difference between the highest and the lowest result.

Name of Mountain Peak.	Altitude (mean result).	Number of Trig. Stations.	Greatest Difference in Determinations.
	Feet.		Feet.
Mount Tasman	11,475.38	18	11.4
Gordon Peaks—			
East Peak	10,058.0	3	7.8
West Peak	10,021.6	4	12.9
Glacier Peak	10,107.2	6	10.0
Mount Sefton	10,101.27	4	11.8
Gable Peak	10,359.22	4	19.2
Mount Haidinger Peaks—			
East Peak	10,199.7	8	18.5
West Peak	10,021.62	5	18.8
Mount Aspiring	9,960.2	4	6.5
Castor	8,286.1	7	11.3
Pollux	8,341.0	6	21.1

Topographical and Trigonometrical Surveys.—Area completed, 118,980 acres, at 1d. per acre. Three-fourths of it (90,000 acres) is situated south of Jackson's Bay, and is the work of Mr. Roberts; the remainder consists of detached traverse circuit surveys executed by the other officers. The cost of the latter is necessarily high, ranging as it does from 1.9d. to 5.7d. per acre. The closures of the circuit traverse surveys are satisfactory: summarized, their results are as under:—

Name of Surveyor.	Length of Traverse in Miles.	Total Error in Links.	Error per Mile in Links.	Total Number of Traverse Lines.	Number of Traverse Lines per Mile.
W. G. Murray	6.9	14.4	2.1	66	9.5
E. I. Lord	11.0	23.5	2.1	131	11.9
J. N. Smyth	42.7	69.0	1.6	362	8.4
R. Wither	34.3	40.8	1.2	165	4.8
Totals for districts... ..	94.9	147.7	1.5	724	7.6

Rural and Suburban Section Surveys.—At 1s. 7d. per acre, 19,742 acres. During the previous year the cost of section surveys was nearly double that noted above. The explanation is that the former surveys comprised small scattered holdings only, whereas the latter includes the survey of several large endowment reserves, which help to reduce the cost of survey of the small sections very considerably.

Town Section Surveys.—In the Township of Dobson, 138 allotments, at £1 1s. 6d. per allotment. The whole of the ground is densely timbered, and the survey involved a great deal of heavy bush-cutting.

Gold-mining Surveys.—At 17s. per acre, 406 acres. Most of these surveys were quartz-mining leases in the Totara District. The receipts by way of fees during the year amounted to £263 4s.

Road, Railway, and Water-race Surveys.—At £8 6s. 5d. per mile, 40½ miles. These surveys, as usual, comprise exploring for and laying off new road-lines, preparing plans and specifications for contract, as well as survey of constructed roads. Most of the former kind of surveys were executed for the County Council, and for the cost of them (£142 15s.) the Government has been reimbursed by the county.

Office Work.—The block and triangulation district maps, though not yet up to date with all the field-work completed, are well advanced; but the Crown grant record-maps are still greatly in arrear: the pressure of other work more necessary than these maps made it impossible to do any thing toward their completion.

General.—The field-work of the surveyors has, as usual, been checked by me on the ground. All the parties I have visited twice, and some of them three times during the year. Road-construction also had my personal supervision as occasion required; and during January and February I completed the reconnaissance survey of the Upper Arawata and Waitototo country. A separate report on the work is accompanying this.

Proposed Operations during 1885-86.—If at all possible the Westland triangulation should be extended to Martin's Bay, to connect with the Otago triangulation there. This would complete the coast-line survey, and rectify the errors in the Admiralty charts to which I drew attention in my last annual report. The erection of the trig. stations to two miles south of the Hope River is already completed, and that work will have to be done over again if the triangulation is delayed beyond the ensuing season. Besides this, the triangulation, or a simple Ray Trace survey, will require to be taken up the Kokatahi and Arahura rivers to Browning's Pass, where a number of quartz-mining leases have lately been applied for. The reefs on the Wilberforce side of the pass were discovered many months ago; but it is only lately they were traced across the boundary into Westland District. The settlement surveys in arrear will probably be overtaken during the year,

as there is not much likelihood of this class of work being increased, seeing all the land north of the Waiho River has been withdrawn from sale pending the negotiations about East and West Coast Railway construction.

GERHARD MUELLER, Chief Surveyor.

CANTERBURY.

For nine months of the year ended the 30th June, 1885, the Canterbury surveys have been executed under the supervision of the Inspector, Mr. Kitson, who had charge of this branch of the department during the time I was away on leave of absence; therefore the work has been done principally under his direction, and has comprised arrears of sectional surveys, gold-mining leases, subdivision of reserves, and trigonometrical surveys, in all of which the returns show that very considerable progress has been made, notwithstanding the reductions in the staff by the resignation of Mr. H. Maitland and the transfer to the North Island of Mr. J. E. Pickett, both excellent officers, whose valuable services I regret to have lost.

Minor Triangulation.—This work has been executed mainly by Mr. H. C. White, who was to have left the department at the end of March last, but whose services are retained until the middle of July to enable him to finish the plans of the work upon which he was engaged—viz., the filling-up of the gap in the trigonometrical survey between the Hakateramea and McKenzie country known as "Gibson's country." The area is over a hundred and fifty thousand acres, and the field observation, topographical work, and calculations have been completed and received at the office. I cannot, however, report on the closures obtained, for, owing to the press of work for the Property-Tax Department, I have been unable to get the calculations checked; but I can state that the closures, as shown by Mr. White, will come within the ordinary limit of error allowed for this class of work. Mr. Brodrick and Mr. Mathias have also completed a few thousand acres of minor triangulation without topography, to enable them to connect sectional surveys with the existing trigonometrical stations.

Sectional Surveys.—Last year's returns showed that there were 36,173 acres arrear surveys to commence the season with; but this area has been considerably augmented by new land-purchases, by sections it was found necessary from one cause or other to resurvey before correct titles could issue, and by reserves it has been decided to subdivide into smaller allotments previous to the Crown Lands Department dealing with them: thus, though our returns show that we have completed 675 sections, containing 35,478 acres, the arrears that this department has yet to overtake are nearly 17,000 acres. The average cost of the field-work—viz., 2s. 1½d. an acre, is slightly less than it was during the preceding year, notwithstanding that the Peninsula bush surveys have proved exceptionally costly this year, owing probably to the sections in several instances being detached from other work, necessitating proportionally a much greater extent of road- and boundary-lines to be cut and traversed than is the case when sections abut upon each other. It may be anticipated that each succeeding year, as the Peninsula surveys approach completion, they will prove increasingly costly, the land now being purchased consisting principally of rough mountain-tops, or nearly inaccessible gullies or mountain-sides, entailing tedious and laborious work to get the boundary-lines cut and chained.

Inspection.—The officers now left on the staff being most of them highly-experienced surveyors, whose work has been often proved, their surveys have not been tested on the ground so often as has hitherto been the practice; nevertheless each party has been visited at least once by the Inspector, who, in addition to his other duties, now acts as Crown Lands Ranger north of the Rangitata, *vice* Mr. Foster, of the Sheep Department, and is also Inspector under the Forest Trees Planting Encouragement Acts.

Old Surveys in the Timaru District.—The bulk of these surveys having now been plotted on the Timaru plans, and copies thereof made on block sheets and sent to the Christchurch office, this branch of the department has been able to dispense with the services of Mr. W. C. Wright, who was specially engaged to complete the plotting of the old provincial surveys in this district, which, remaining uncharted for so many years, had so hampered the issue of titles to the land. The department is greatly indebted to Mr. Wright for the systematic and careful way in which he has plotted and checked these surveys, the difficulties surrounding which only those can estimate who have been engaged in unravelling work done so many years ago, and then often hastily and imperfectly. Mr. Wright having been transferred to another district, his services, I am happy to say, will not be lost to the department.

Gold-mining Leases.—Ten of these, in the Wilberforce District, have been laid out by Mr. G. H. M. McClure, or, rather, the frontage and ranging pegs, to denote the dividing boundary-lines, have been put in, the places where the back pegs should be being totally inaccessible. Mr. McClure, in one instance, nearly lost his life by falling down a crevasse, the brink of which he incautiously stepped too near to when trying to get round it, in order to reach a point in connection with his work. The cost of these mining-lease surveys is borne by the applicants. Whilst in the Wilberforce District Mr. McClure also surveyed a small township, and three fifty-acre sections for agricultural leases on Moa Flat, on the south side of the Wilberforce River.

Land Transfer Surveys.—The work in this branch of the Survey Department has fallen off during the past year, Mr. Monro, the officer in charge, reporting that it has only reached about three-fifths of that of previous years. Thirty deposit plans, embracing 548 allotments, have been checked; fourteen plans showing lands taken for railway purposes, and twenty-six plans of road deviations, have been passed; 511 ordinary transfers, 207 applications to bring land under the Act, 1,414 ordinary certificates, exclusive of duplicates, and 1,163 certificates in lieu of Crown grants, exclusive of the two copies required of each certificate, have been prepared.

Office Work.—Mr. Shanks reports that the surveyors have sent in during the year 108 plans of sectional work, one township, twelve subdivisions of reserves, and eleven mining leases. Addi-

tional work has been placed on a large number of the block-sheets in the survey districts of the Waimate County, but no new ones have been constructed. One town and five new district record-maps have been constructed, 151 plans have been checked by the computers, 147 have been recorded on the Crown grant record-maps, and the certificates of title and Crown grants issued during the year have been duly recorded in the usual way.

Reduction Office.—Mr. McCardell reports that the Akaroa County map was traced for the Wellington office, eleven district maps on the scale of forty chains to an inch have been constructed, and three traced for use in the public map-room, and that there have been traced for photo-lithography maps of the Waimate Borough, reserves 642 and 1644, Timaru standard work, map of runs offered for sale, and minor triangulation of the Strachey and Pukaki West survey districts. In addition to this a great deal of general work for other departments has been done during the year.

Crown Grants.—Ten Crown grants, 1,103 certificates of title, embracing 2,010 sections or allotments, covering 173,842 acres, have been prepared and delivered to the Land Transfer Department, and, to enable the amounts due for excess area to be collected, or the sums for deficient area refunded, 1,162 area certificates have been made out and forwarded to the Crown Lands Department.

Reductions in the Staff.—In compliance with the instructions of the Government which from time to time you have conveyed to me, the field and office staff has been considerably reduced during the past year. Four field officers and their parties, costing £2,674 per annum, have been dispensed with; also the officer hitherto in charge of the Timaru office, and six draughtsmen in the Christchurch office, making a further reduction of £1,454 per annum; to which has to be added two temporary draughtsmen, £282, one-half of my salary as Chief Surveyor, now charged to Crown Lands, I performing the duties of Chief Commissioner without additional salary, and £100 of the Inspector of Surveys' salary, also charged to that department, this officer having undertaken the duties of Crown Lands Ranger as well as that of survey inspection: thus showing that the expenditure of this branch of the Survey Department has been reduced by at least £4,800 per annum.

Proposed Operations, 1885-86.—The field staff having, as already noticed, been reduced by four parties, its present strength will not permit it to do more than keep pace with the current work—namely, the completion of the arrears, amounting to 398 sections, containing 16,979 acres; nearly 7,000 acres which require resurvey, and 421 square miles of minor triangulation and topographical survey in the Upper Waimakariri country and the north-west corner of this provincial district; also, in all probability, some subdivisions of land for village settlements or for lease under the perpetual-leasing system. But it must be borne in mind that the present run-leases expire in 1890, so that within the next few years it will be necessary to undertake a great many surveys in order to obtain the actual boundaries of these, as it is well known that the present areas, calculated from the boundaries as originally laid down by arbitrary lines, are only approximately accurate.

JOHN H. BAKER, Chief Surveyor.

OTAGO.

I HAVE had nine staff surveyors and four cadets at work in the field, also three private surveyors; while the office assistants were twelve, with two cadets; three temporary draughtsmen and two draughtsmen in the country offices.

Exploration Survey.—Mr. Strauchon, district surveyor, has been engaged from the beginning of February to the end of May exploring the bush country which lies between Waikawa Harbour and Catlin's River, and commonly known as the Tautuku Bush. The object is to determine the capabilities of this region for settlement, by ascertaining the practicability of road-lines and of harbours and rivers, and the quality of the soil, bush, &c. Owing to the exceptionally wet season, it having rained half the time, the preliminary work is only half-done. Still, all that could be done has been effected, fifty thousand acres of bush land intersected by rivers having been explored, and the soil, rocks, and bush examined. Besides this, a horse-track 6ft. wide has been cut and surveyed from the top of the open branch valley two miles due east of Mr. McRae's woolshed, on the Waikawa River, through the bush all the way to Tautuku River. The extent of the track within the bush is about seventeen miles from the Tautuku to where it emerges in above valley, and which lies immediately south of Bush Cone. From the preliminary or provisional reports received from Mr. Strauchon from time to time, it appears the country, although generally low-lying, is intersected by ridges, which run from the main range surrounding Tautuku Bush on the north in a south-easterly direction to the south coast of Otago, where they terminate in high rocky bluffs. Rivers flowing into the same coast-line separate these ridges. There is a considerable amount of good land in the valleys, but all covered with bush excepting a few patches of grassed land alongside the rivers, which next the coast are somewhat swampy. As regards timber, I cannot do better than quote Mr. Strauchon's words: "The principal timbers are birch, red pine, ironwood, and here and there a few black pines and miro; also a few totaras, but not many, except about the centre of Taukupu Valley, where there are a good many splendid black pines, and totaras very large. Among the smaller timbers are two or three different kinds of the broad-leaved gum, which grows abundantly, and of which the wild cattle are very fond. I do not think I ever was in a bush where the cattle-feed was so plentiful. The cattle are all in prime condition towards the coast; but up at Black Horn, where most of them are, they are not in very good condition, the feed not being so good or plentiful." As to access from the seaboard by the rivers, and further details, these I must leave to Mr. Strauchon's enclosed report and map to explain. I would only add that the Waikawa Harbour is a good one, with deep water at the entrance, and no bar. Mullet and flat-fish are plentiful in Waikawa Harbour, and the open roadstead outside has proper, red and blue cod, and other common coast fishes. Considerable difficulty in conveying provisions to the party was a great drawback, as these had to be carried by the men for many miles on their backs. This, with the bad weather

and exposure, made the work laborious and harassing; but the party worked well, and deserve credit for their energy and perseverance throughout.

Minor Triangulation and Topography.—Of this work 241,480 acres have been finished, at a cost of about $\frac{1}{2}$ d. per acre, thus completing the Hawkdun, Kingston and Rockside, Gap, Whitcombe, Lornside, and Obelisk survey districts. The triangles were made as large as possible, as the country included is purely pastoral and at great altitudes—3,000ft. to 6,500ft. above sea-level. Also, in the case of all the above-named districts after Hawkdun the third angle in the triangles could not be observed, as Mr. Wilmot had been greatly retarded in his work by bad weather and mist on such high ranges, and finally had to leave it to push on the road surveys on the Shotover River and at Wanaka. The topography, however, is completed, and that really was the main object to be obtained, so that in future the boundaries of runs could be accurately shown. Nothing of very great interest topographically has been determined; but Mr. Wilmot found a cave near Mount Cameron, or Trig. L, Rockside, 5,250ft. above sea-level, with an almost complete skeleton of a moa in it, but not in good preservation.

Messrs. Barron and Wilmot are the only officers who have been engaged on this trig. work.

Rural Section Survey.—The total area of this class of work done during the past year has been 33,430 acres, at a cost per acre of 1s. 8-9d. The average size of sections is about a hundred and twenty acres, and the work in many cases has been scattered over a wide area and in isolated sections. The sections laid off lie principally in the following districts: Otara, Mokoreta, Waikawa, Blackstone, Maniototo, Motatapu, Lower Wanaka, Tarras, Wakefield, Tiger Hill, Benger, Kawarau, and Teviot; also, Hawksbury, Moeraki, Catlin's, Glenomaru, and Waikaia. Messrs. Strauchon, Barron, Mackay, Mackenzie, Langmuir, Wilmot, and Gibson were the staff surveyors occupied on this description of survey during the year.

Town Section Survey.—Very little has been required in the way of townships survey, the only one of any importance being that of Otara, which is in a growing district of the same name near Toitoto. The total acreage under this designation is 114 acres, in eighty-eight allotments, costing 16s. 3d. each, or a total of £71 10s. Messrs. Strauchon and Mackenzie were the officers who did this work.

Port Chalmers Standard Survey.—In connection with this work, and to make it more complete, at the request of the corporation, Mr. Langmuir, was allowed to take complete levels and make longitudinal sections of all the streets. This work he carried out with accuracy, and to my entire satisfaction. Nine sheets of these sections, showing all the streets, with proposed permanent levels, were forwarded in February last to the Mayor, with a request that, so soon as the Council decided the permanent levels, the sheets should be returned, so that the grades might be inked in. This as yet has not been done, and it is to be regretted, as it will be a more difficult matter to settle in the future than now. In last year's report of the standard survey I see an error has crept in, which I will now correct: Page 44, printed report, line 22 from the bottom should read, "Generally the blocks, as shown on the Crown record-maps, were found to not exceed in area or frontages the blocks as occupied;" in other words, there was sufficient ground to meet any claims, as a rule.

Native Land Court Survey.—This, originally begun by Mr. Mackenzie as a survey to connect the present main north railway-line with Mr. D. McLeod's survey, made in the year 1868, of the subdivisions of the Native reserve at Waikouaiti, had to be extended to include the whole reserve. This was owing to no original pegs being found anywhere to show that the land had been subdivided, the Natives themselves not knowing of the existence of any such pegs or of any fences in place of them. The Natives also assert that there were five divisions, and not four, as instructed from the Native Land Court; in consequence of which the divisions are not yet quite determined, and I should like instructions as soon as possible, before Mr. Mackenzie leaves the department, or it will be somewhat expensive and troublesome to put in the final pegs. Total area surveyed, three thousand acres, at a cost of 1s. 3 $\frac{1}{2}$ d. per acre.

Gold-mining Surveys.—Scattered, as these surveys always are, over a wide extent of country, and sometimes situated in almost inaccessible positions, the cost per acre—8s. 3d.—is considerably less than the rate last year. Thirty sections have been pegged, surveyed, and connected with triangulation, so that their exact position can be shown on our maps, aggregating 335 acres. This work has been performed by Messrs. Barron, Mackay, Langmuir, and Wilmot.

Roads, Railway, and Water-races.—Of these, thirty-eight miles are roads, six and three-quarter miles the main north railway at Waikouaiti Native Reserve, and the remainder of the forty-seven miles are water-races. Included in these there are several roads which will be of immense utility in the future settlement of the country by opening up Crown lands to those settlers who may acquire the land. They are, in the Tokanui Gorge, now under contract, a road which will give communication between Fortrose, or Toitoto, and Waikawa Harbour; a road from the head of Lake Wakatipu up the Rees River and across the flat by the foot of Mount Alfred to the west; and the formation of a permanent dray-road round the bluffs on the Shotover River, at that part of the present track known as the "Zigzag." This latter, when completed, will be a great boon to gold-miners and the public, as then between Queenstown and Skipper's a good dray-road will have been formed, excepting a portion midway, four miles, which must still be a sledge-track until improved.

Village Settlements.—These are a new feature in our field operations, that requires notice. Mr. Barron has laid off 2,079 acres, at a cost per acre of 2s. 7 $\frac{1}{2}$ d., in Blackstone District, near the Idaburn, and convenient to the Rough Ridge quartz reefs and the surveyed line of the Otago Central Railway.

Other Work.—The services performed by the field staff under this head I find to be: Mr. Strauchon—Meeting the Chief Surveyor, also the County Engineer, conferring and travelling with them over the Waikawa District in connection with the best road-lines and facilities for opening up the locality. Mr. Barron—Various reports on roads, run-valuations, and special surveys. Mr. Mackay—Work done for the Warden, police, and rabbit officers. Mr. Langmuir—Making the

valuations of improvements of several runs; taking correct levels and making sections for the permanent levels of the streets of Port Chalmers in connection with the standard survey. Mr. Mackenzie—Reporting on run-boundary at Otepopo; check surveys; and obtaining the names of half-castes who have land claims.

Survey Inspection.—This year I have made nine inspections of survey parties and offices, making two field checks, as sent to head office; an inspection of proposed Kurow Blocks, with Commissioners Clark, Green, and Duncan, of the Waste Lands Board; also road inspections at Glenorchy to Precipice Creek, Skipper's Road, Wanaka roads, Strath Taieri to Nenthorn, Tokanui Gorge Road and other lines in vicinity, and Waikaia roads. The surveyor's field-work has all been very well done, particularly in the pegging and marking boundaries on the ground, while the draughtsmanship of the maps generally is superior to that of the previous years. The staff, though smaller now than it has been, is good, efficient, and experienced, and so of very great value to the public service, as the divers duties put upon it prove pretty clearly. There are four cadets in the field, who give every promise of becoming good surveyors and useful public servants. Two Government cadets and four from private surveyors have passed their examinations by me this year, and are now authorized surveyors.

Dunedin Office Work.—Some reductions in the office staff have taken effect during the past year; but, besides the carrying-on of the ordinary routine work so far as possible, a great deal has been done for other departments or other bodies by the staff in charge of Mr. Skey, Chief Draughtsman. The reproduction of old records, which are rapidly being destroyed by constant use, is a work which I have not lost sight of, but which, I am sorry to say, has made little progress, owing to above reductions and press of other duties. For the same reasons the Record Land Transfer maps have been stopped; but this I shall have resumed again at once. Mr. Skey has examined and prepared the following: Thirty-six Crown grants prepared and recorded, comprising 2,126 acres; 279 certificates of title, comprising 32,555 acres; sixty-seven perpetual leases, in triplicate; thirty-one pastoral leases, in duplicate; fifty-seven deferred-payment licenses, in duplicate; and forty-six occupation licenses, in duplicate. Mr. S. Thompson, checked and examined 115 staff surveyors' plans; sixty-four Land Transfer, and sixty-nine road and railway plans; thirty-eight gold-mining leases, and fifteen agricultural leases: surveyed for the Defence Department a slip for the torpedo boat at Carey's Bay, and for the Otago Harbour Board the dock endowment at Port Chalmers. Mr. Nicolson, as usual, has had charge of the public room and the safe. Mr. W. F. Browne has been engaged on the ordinary routine work of recording goldfield surveys, triangulation, &c.; compiled fifteen working maps, and prepared, in duplicate, thirty-five mining, seventeen agricultural, and nine exchange leases as well as assisting on the property-tax maps. Mr. Wadie has reduced and recorded the topography on Waiau run map and other new run maps; has completed plans and road-sections of various road-works at Tokanui and Wakatipu, taking out the quantities for estimates; completed Southland County map and examined it; assisted in compiling run returns, &c., and arranging and filing contracts and correspondence connected with old Provincial Engineer's Department, and supplying information to other offices from these. In road office work Mr. Fynmore has recorded forty-six new and closed road surveys on working plans, road district plans, and county maps; reported on twenty road matters for the Crown Lands Office; supplied descriptions of new school district to Education Office, and marked them on their maps; since the 13th May has been engaged on property-tax maps and returns. Mr. Runcie, the accountant and correspondent, besides the ordinary book-keeping and correspondence, recorded a *précis* and indexed 3,604 letters, reports, 326 plans, and despatched all correspondence, parcels, &c., and attended to the usual routine work of the office.

Land Transfer Work.—Mr. Thompson has examined and passed sixty-four maps for deposit, which I have already enumerated with his other work; and Mr. Treseder has examined and checked seventy-eight applications, 1,249 transfers, 866 mortgages in duplicate, eighty-one leases in duplicate, 112 transmissions, 1,114 draft certificates, and put 820 plans on certificates in duplicate.

Lithographic Branch.—Mr. Percival has reduced and lithographed thirty-six block-maps and four photo-lithographs, from which 12,000 copies have been pulled; also, several circular forms, from which 500 copies have been printed: making a total of 12,500 printed copies. Mr. Ross has printed forty block-maps, four of which were photo-lithographed—12,000 copies; he has printed also 3,000 circulars, 500 protractor forms, and 500 traverse forms. Mr. Bain has mounted 456 maps.

Proposed Operations.—As regards the future, I would urge the triangulation of the country at present under exploration by Mr. Strauchon after the track to Catlin's River has been cut, and one also up the valley of McLennan's or Taukupu River, as necessary to the accurate mapping of the same prior to its being opened out for settlement. Topographical maps are also required to show the available land about the Matukituki and Matatapu valleys. In section surveys, besides the usual accumulation of detached surveys, there are several blocks yet to be done in the Upper Clutha, Maniototo, and Waikawa districts, which will be completed this year. There are a number of roads being formed under the Counties to open up Crown lands, over which I shall have to exercise supervision and certify to the payment as usual. In the Dunedin office, besides the routine work, I shall endeavour to get new maps made in lieu of the old Crown grant record-maps, which are rapidly being destroyed by constant use by the public and the department. The Land Transfer record-maps also will be resumed. I have also the inspection of the following road-works to attend to: viz., Fortrose to Waikawa, let to Dunn and Anderson; Tokanui Gorge contract, let to Francis King; and Wyndham to Otarua, let to John Muir; all on the 6th of May last.

W. ARTHUR, Chief Surveyor.

SOUTHLAND.

Field-work.—Under the head of “Rural and Suburban” surveys there have been executed during the year 274 sections, embracing 22,516 acres. Of these, 150 sections, covering upwards of six thousand acres, were in bush, and this fact must be taken into account when considering the acreage cost. We have executed very few town surveys during the year, the greater bulk of the work of the department falling into the category of the rural and suburban surveys above mentioned. In analyzing these surveys I find that the larger proportion of them were of blocks partly in bush and partly in the open, that were laid off respectively in rural and suburban sizes to meet chiefly the wants of deferred-payment settlers. The remainder of the surveys consists partly of areas which were applied for on the “selection-before-survey” principle, and partly of sawmill and mineral areas. The chief localities where the block surveys were made were in Centre Hill District, near the Hamilton Burn; in Longwood Forest, along the coast-line between Colac and Wakapatu bays; in Waimatuku Bush, comprising all the previously-unsurveyed land lying north of the sand-hills; and in Oteramika Hundred, lying between Seaward Forest and the coast-line. The sections in Centre Hill District were laid off suitable for rural deferred-payment application, and ranged from 200 to 320 acres. Those along the coast-line west of Colac Bay comprised bush land, situated on both sides of the Riverton-Orepuki Railway, and, owing to the nature and position of the land, were laid off at the request of the Land Board so as to average some fifty acres each. The surveys in Waimatuku Bush embrace timbered land that has now almost entirely been cut over and abandoned by sawmillers. The block surveyed is a compact one, and has been cut up into sections averaging a hundred acres. On account of this compactness, and of the proximity of the land to the railway and to the main centres of population, it is perhaps as well suited as any other Crown block in Southland on which to test the success of the special settlement scheme. The block recently surveyed between Seaward Forest and the coast-line was cut into sections averaging some three hundred acres, which were designed for rural deferred-payment application. The land is of mixed character, and patches of peat occur over the block; but if access be given to it as proposed, I have no doubt that in time many of the sections will be taken up and settled upon. Our field staff, as you will observe, has throughout the year been small, and, consequent upon retrenchment, I regret that we were compelled to part with the services of Mr. James Blaikie, who for some years occupied the position of temporary Assistant Surveyor. It gives me pleasure to report that Mr. Blaikie, as evidenced by the tabular returns, did a large amount of very excellent work, much of it, owing to the wetness, &c., of the ground, being of a laborious and disagreeable character. I have already brought his efficiency and reliability before your notice, and trust that, should Government work increase, his services will not be overlooked. The number of land applications throughout the year has been small, money being scarce, and, of course, the greater bulk of the agricultural land in this district has long since been parted with. The number of sawmill applications made during the year has also been few, the low price ruling for timber, consequent upon a limited demand and upon over-competition, having interfered with the activity and extension of the industry. I might, under this heading, allude to the topographical surveys made near the Bluff for colonial defence purposes, the surveys, owing to their special character, requiring care and time in execution.

Office Work.—In connection with the Land Transfer branch of the department, I have to report that during the year 521 certificates of title (involving 1,042 plans) were prepared. In addition to these 349 certificates in lieu of Crown grants (involving 1,047 plans) were also prepared. The number of deposited plans examined and passed has been smaller than usual this year, there having been sixteen plans, dealing with forty-nine original sections, the number of subdivisions being 278, and the acreage embraced being 40,378. There have been sixty-seven applications passed during the year, and seventeen Land Transfer record-plans prepared. In regard to lithographic work, there have been eight drawings (comprising townships, deferred-payment blocks, &c.) prepared. These were printed locally, the number of prints being 1,050. In addition to these, former drawings of Forest Hill Hundred and of a local township were worked up to date and photo-lithographed in the Head Office. A drawing is now in progress on a large scale designed to show the topographical features (including main roads, railways, townships, &c.) of the Southland and Wallace Counties. This map, the preparation of which has received your sanction, will be of great utility for statistical and general purposes, the defect of the present published map of the Southland District being that it leaves large and important portions of both counties out. I might add in this connection that a map of Eyre Survey District (scale, mile to inch) was compiled and forwarded to the Head Office for the purpose of being photo-lithographed. We have now had some twenty survey districts showing sectional surveys prepared and lithographed (or in process of being lithographed), there being only three districts remaining unpublished—namely, Centre Hill, Wairaki, and Takitimo. I need scarcely remind you that the time of the department for the last two months or so has been largely monopolized by the preparation and completion of the property-tax maps. The work of making a careful search in the Deeds and Land Transfer Offices opposite each and every section in the district, with the view of seeing what subdivisions, if any, had been made since the sections had been purchased from the Crown, was one which became absolutely necessary ere the information desired by the Property-Tax Department could be obtained; and I need not add that it was a work that entailed and is entailing an immense amount of time and trouble. The draughtsmen of the office, however, with the assistance of two officers of the Land Transfer Department, whose services were kindly granted by the District Land Registrar, have been applying themselves to the work very vigorously and assiduously, and I hope that in a few days all the plans, &c., will be completed. In addition to this work for the Property-Tax Department we have done some items of work for other departments, but these need not be particularized here.

JOHN SPENCE, Chief Surveyor.

APPENDIX No. 3.
GEOGRAPHICAL SURVEYS.

THE TRIANGULATION OF THE KING COUNTRY, AUCKLAND.

REPORT by District Surveyor LAWRENCE CUSSEN.

In compliance with your instructions, I have the honour to report on the general character of the land in the King country over which my survey extends.

To illustrate this report a map showing the natural features of the country has been hastily compiled. The area included is 2,100,000 acres—that is, all that portion of the King country within the Provincial District of Auckland. For the purpose of description, I have divided this area on the map into three classes of land. The first class is that which has the greater part of its area good agricultural land; the second is more broken, and is better suited for pastoral purposes; and the third class is chiefly very broken or poor country, and has a smaller proportion suitable for settlement.

The first-class land lies within the open country through which the Waipa and Mokau rivers, with their tributaries, flow. The area is about 390,000 acres, more than one-half of which is good agricultural and the remainder good pastoral land.

The second-class is chiefly in the limestone country to the west of the Mokau and Mangapu rivers, and on the plateau which lies between the valleys of the Mokau and Ongarue. Its area is about 724,000 acres; the greater part of this is capable of being made good pastoral land, and here and there throughout it there are small patches suitable for agricultural purposes.

The area of the land which I have called third-class is about 986,000 acres. It includes the high wooded ranges of Hurakia, Hauhangaroa, and Rangitoto, the rugged mountainous country on the West Coast between Kawhia Harbour and the Mokau River, and the pumice-plains in the valley of the Ongarue and on the west side of the Waikato River. Here and there throughout this large area might be found arable patches, and a great deal of it is capable of being converted into pastoral land; but in the present state of the farming industry throughout the country, and while better land can be had cheap in more accessible places, this will be valued more for its timber or the minerals it may possibly contain.

The area over which limestone outcrops occur is about 493,000 acres. This includes a portion of the agricultural district in the Mokau Valley and a portion of the pastoral land already referred to. I consider it is the best land for general settlement purposes in the King country. There are outcrops of brown coal in many places throughout the limestone formation, which are shown on the map; and since the same formation extends southwards from the Taupiri coal-mines by the Hakarimata and Hauturu Ranges to Mokau, where large deposits of a good class of brown coal have been opened up, there is good ground for hoping that valuable coalfields will soon be developed in this district. The clay underlying the limestone formation would also encourage the hope that iron may be found in this locality.

Having thus given you an outline of the general character of the land comprised within each of the three classes, I shall now endeavour to describe in detail the various parts of the district in regard to the inducements they offer for settlement.

Taking first the open country adjoining the settled districts of Waikato, and including all the open valley through which the Puniu and Waipa rivers and their tributaries flow, extending eastwards to the Waikato River and southwards to Hangatiki, or about eighteen miles in a direct line from Kihikihi: This valley contains about 275,000 acres all well adapted for settlement, about two-thirds of it being arable and the remainder chiefly good pastoral land. The character of the soil is for the most part a volcanic loam, with considerable alluvial flats along the rivers. These alluvial flats are derived partly from the limestone formation drained by the Mangapu River, and partly from the marl formation on the Rangitoto Ranges, through which the Waipa River flows. In the centre of this valley the land is flat or undulating, excepting the volcanic cones of Kakepuku, Te Kawa, Puketarata, and Taurangakohu, which are admirably suited for pastoral purposes, and on their lower slopes are most beautiful homestead-sites, commanding grand and varied prospects of the surrounding country. Approaching the bush on the south and west sides of the valley the land becomes more broken, cut up by flat-bottomed gullies into fern ridges, which run from the forest ranges: these gullies will afford considerable areas for cultivation, while the fern spurs would make excellent pasturage. The height of the valley generally is from 200ft. to 500ft. above the level of the sea; it lies well, receiving shelter from the southerly winds by the high wooded country to the south and south-east; the climate is excellent, grapes ripen freely in the open air. The valley is all well watered by the Waipa and Puniu and their tributaries. Communication can be easily established with the Main Trunk Railway, which traverses the valley, and with Te Awamutu, Alexandra, and Kihikihi. At Otorohanga there are 1,300 acres of kahikatea or white-pine bush, close by which the Main Trunk Railway passes: thus a large supply of useful building-timber for the district is available.

The country is covered generally with a high vegetation of fern and scrub, which grows very luxuriantly; but it is somewhat remarkable that here clover and English grasses do not seem to thrive well along the tracks and in the clearings where cattle have been running for years, whilst in the limestone country further to the south both clover and grass are seen plentifully growing by the tracks and amongst the fern.

Towards the Hauturu Range, on the west side of the valley, a strip of the limestone country comes in, extending from Hauturu to Hangatiki, being about seven miles long by three miles wide. It is partly forest and partly open fern ridges, with flat-bottomed gullies between them, where the Natives have largely cultivated. This is fine pastoral land, and a good portion of it along the valley would be suitable for cultivation; it has been a splendid fruit district, but the trees have been destroyed by cattle, and the prevailing blight has killed out the peach-trees.

All this valley is certainly capable of being made a very fine district, possessing all the advantages of an excellent climate, good land, easy communication, and beautiful and varied scenery; whilst taken as an integral part of the Waikato settlements it should be one of the finest and most extensive agricultural tracts in the country. At one time the Natives cultivated very largely all over this district; but now they do very little in that way, and, excepting the few horses, cattle, and pigs which it supports, and the small areas cultivated around the settlements for home purposes, the whole valley is lying idle.

Going southwards from Hangatiki the character of the country changes a good deal. Here the limestone outcrops commence, and the country becomes much more broken. Seen from the hill-tops, it presents a rugged and cut-up appearance, with white limestone cliffs cropping out in all directions. The soil is very rich and fertile, and along the banks of the Mangapu and Mangokewa there are fine alluvial flats; whilst on the hill-sides are also many small patches which could be cultivated. The district abounds in picturesque and interesting limestone caves, whilst the number of its subterranean watercourses are characteristic of the limestone formation. Along the banks of the Mangapu there is a large quantity of useful building-timber, chiefly kahikatea. At the head of the Mangaramarama there is also an extensive kahikatea forest. In this district a large quantity of useful building-timber is available, and can be easily made accessible from the Main Trunk Railway. All around here, including Te Kuiti, Te Kumi, and nearly to the slopes of the Rangitoto Ranges, there is a large area of fine fertile land. Most of it is too broken for agricultural purposes; but it certainly will be a very fine pastoral district.

The Pukearuhe and Maraetawa Ranges form the watershed between the Mokau and Waipa rivers. Crossing over the saddle at Pukearuhe, about 900ft. above the sea, you gradually descend into the Mokau Valley. At the head of the valley the open country is about two miles wide, and opens out a little lower down to about four miles. This open valley of the Mokau between here and Totoro is about twenty miles long and three miles wide. It contains the best agricultural and pastoral land in the King country. Along the Mokau River there are fine stretches of rich flats admirably suited for agricultural purposes, whilst much of the undulating country and the hill-sides are also arable. Perhaps one-half of this valley is ploughable, and the rest would be excellent pasture land. Clover and English grasses grow freely all over the district, and a large number of cattle and horses are running here, which seem to be in excellent condition. Communication can be established by road with the Main Trunk Railway at Te Kumi. The underground watercourses before alluded to prevail also here, and will probably leave the surface in places without water. The Mokau receives four large tributaries from the east in its course down the valley. Along the sides of these streams and on the slopes of the adjoining hills there is also a large area of good arable land.

We come now to the second-class land. Lying between the valley of the Mokau and the Ongarue, and extending northwards to the slopes of the Rangitoto Ranges, is a plateau from 1,400ft. to 1,800ft. above the sea. It is cut up by flat-bottomed gullies into long winding ridges, which have generally table-lands on their tops. The table-lands are for the most part clothed with forest of mixed timber, and the valleys are open. The character of the land varies a good deal: some of the valleys are poor and covered with pumice-stone sand; whilst here and there are rich patches of alluvial deposit. The formation is chiefly shale and brown sandstone. I think about two-thirds of this plateau might be made good pasturage, whilst here and there might be found arable pieces; but there is no great extent of good agricultural land amongst it. The Main Trunk Railway traverses the plateau, and communication can be established with it; but the roads will require careful exploration. The plateau terminates in abrupt steep spurs, which fringe the open valley of the Ongarue. Along the edges of the bush on these spurs are many old Native cultivations, and the land seems of fairly good quality; but it is all too broken for agricultural pursuits on anything of an extensive scale.

The remaining portion of the second-class land is in the limestone country which lies south of the Hauturu Ranges, and between the Mokau Valley and the broken wooded country along the West Coast. Here there is a valley or depression, extending southwards from Hauturu to the Mokau River at Totoro: its length is about twenty miles, and its width about ten miles. There are outcrops of limestone all through it. Of the character of the land I can only speak in a general way, having travelled from Mangawhitikau to the West Coast, and having seen it from the tops of the Herangi and Totoro Ranges. It is about one-third open, and the rest bush, the open land being situated here and there throughout the forest country. The bush is rather broken; but I believe a great deal of it might be made good pasturage, with occasionally arable patches in the valleys and on the hillsides.

Leaving Mangawhitikau, the old Native track to Marokopa crosses the Tapuae Ranges, partly through bush and partly through fern openings, passing through old Native cultivations, where the land is very rich and the vegetation luxuriant. This old track has not been used for years past, and it is a rough and very difficult one to travel: it crosses from spur to spur, from valley to valley, in some places very steep and rugged. About half the distance between Mangawhitikau and Marokopa it leads through fern openings, which are generally of an undulating character; the formation clay, with limestone outcrop. This district is remarkable for the number of subterranean watercourses and rivers: the streams flow under the hills in some cases for two or three miles, appear in the valleys on the other side, and disappear again under the next range. To what extent this takes place with the large rivers will be shown when the minor triangulation and topographical survey has been completed here. The track strikes the Marokopa River at a place called Te Anga, where there are old Native cultivations, and clover and grass seem very plentiful. The country about here is broken, and very picturesque, high limestone cliffs fringing the river's banks, and appearing above the trees in the forest. The river is navigable for canoes up to this point, or about eight miles in a direct line from its mouth. From here to the West Coast, and as far south as the mouth of the Mokau, the country is extremely broken—nothing but a

succession of rugged mountain-peaks, bare rocks and precipices, except indeed the narrow alluvial flats along the river-banks, where the land seems very fertile and the Natives have cultivated. At the mouth of the Marokopa River are a few Native whares, and in all about a dozen Natives reside here. At low tide there is about 4ft. of water in the river near the mouth, the channel being narrowed to about 100ft., leaving long mud-flats bordering the river, which are flanked by drift sand-hills. There is no good land in the neighbourhood. The coast-line to the northward of the Marokopa River is extremely rugged and precipitous; high steep cliffs fronting the sea, and behind them a broken bush country. There is a sandy beach along the shore, over which is the only road between Marokopa and Kawhia.

I noticed some heavy ironstone on the coast at Harihari, but it was impossible to see what quantity there is, as the drift sand covers the whole coast-line from here to Albatross Point. At Taharoa there was at one time a considerable extent of good agricultural land, and it was a very prosperous Native settlement; but now the drift sand covers most of it, and is making rapid strides inland, so that probably before long all the arable land about Taharoa will be covered by it.

The open valley through which the Ongarue and Waimeha rivers flow is a pumice tract, covered with stunted scrub and tussock-grass, the streams having cut their way into the pumice-beds, leaving steep banks in which almost nothing but pumice-sand appears. Whether the land in this valley will develop grass-bearing qualities I should not like to say; now, at all events, it presents the appearance of a sterile pumice tract. There are, however, small alluvial flats along the banks of the Ongarue, where the Natives have cultivated, and on the sides of the hills which border the valley there is some fairly good pastoral land. In the neighbourhood of Te Koura and Taringamutu there are good fertile fern hills, which, however, are much broken, and suitable only for pastoral purposes. In the Tuhua District the country is much broken and variable in quality: here and there are good patches of arable land in the bush, the open valleys, for the most part, being poor and covered with pumice.

Around the old Native settlement at Otomakai, on the western slopes of the Tuhua Mountain, there are about two thousand acres of good land, about half bush and half fern; perhaps about one-half of it would be ploughable. Pumice appears on the surface, but it is mixed with a good volcanic loam. Around here there is a good deal of useful timber, including totara, which could be made accessible from the Main Trunk Railway.

From the Tuhua Mountain, extending to the most northern peak of the Hurakia Range, and lying between the open country to the west of Lake Taupo and the Ongarue Valley, there is a high and much broken wooded country, containing some three hundred thousand acres. Its height is about 3,000ft. above the sea. The formation is generally volcanic, except in the Hurakia Range, where a clay-slate appears. The district is cut up by deep gullies and ravines into long steep spurs, where there is but very little arable land. In places there seems to be amongst the pumice a good mixture of volcanic loam; but it is generally a very broken district.

Between Taringamutu and South Taupo the country is very broken. The bush contains some very good soil, and there is a good deal of useful timber, including totara, which, however, will be very difficult of access, and roads through the country will cost a great deal to form.

The Pungapunga River flows through a valley of light pumice-sand, with here and there small alluvial patches along the river-banks. Particles of quartz are to be seen in the bed of this river, and the Natives believe that gold has been found in the Hauhangaroa Ranges, where the Pungapunga takes its rise; but beyond the quartz already mentioned I saw no indications of gold in this neighbourhood. Southwards of this place, near the Wanganui River, and in the country traversed by the Main Trunk Railway, between Taumaranui and Taupo, there is said to be some very good bush land; but, as it is not yet included in my survey, I can give no description of it beyond the fact that the country is very high and broken.

Around the west side of Lake Taupo there are large flat table-lands divided by steep ravines, which are cut into deep beds of pumice-sand. Some of these ravines are wide and flat at the bottom, where the land is fairly good and the Natives have cultivated. These table-lands and pumice-flats look very poor. I may, however, quote Dr. Hochstetter's remarks in speaking of them. He says, "They are plains which, though now presenting a sterile appearance, will, I hope, at no distant date be converted into fine grassy plains, capable of supporting large flocks of sheep."

Along the edges of the bush on the eastern slopes of the Hauhangaroa and Hurakia Ranges the land is fairly good, and there are many patches and clearings where the Natives have cultivated. In these old cultivations clover and English grasses seem to grow very well.

The shores of the western bay of Lake Taupo are formed chiefly of steep bluff cliffs from 600ft. to 800ft. above the lake, with deep water at their base. Landing is difficult in this bay except on the sandy coves at the mouths of the rivers which empty into the lake. The depth of Lake Taupo is said to be very great, especially in the western bay and off Karangahape Point. I regret that pressure of work prevented me from taking the soundings of the lake, which would possess peculiar interest, as it is the largest volcanic crater in the country. On the north side of the lake the land is of better quality: although pumice appears freely on the surface, yet the soil is not bad, as is shown by the heavy growth of fern and scrub which is to be found in many places. Near the old settlement of Waipapa there is a fine piece of forest-country, covering about thirteen thousand acres. A large portion of the timber is totara. The soil is good volcanic loam, and in the bush and on the edges of it there is a considerable quantity of good arable land.

West of the Waikato River, and extending about twenty miles northwards from the tail of the Hurakia Range, is a broken tract of open country containing about a hundred thousand acres. It is intersected by deep gullies and ravines. The land is for the most part poor: bare rocks and landslips are visible all over it. This country might be utilized as a large cattle-run. Towards the bush the soil is better, and in several places there were formerly Native cultivations; but the arable land is very limited.

The high wooded country comprising the Rangitoto, Ranginui, and Wharepuhanga Ranges includes an area of over eighty thousand acres, and stands over 2,500ft. above the sea. It is much broken and cut up by deep ravines. The timber on the ranges is of a mixed quality, containing little that would be useful for building or milling purposes, and it would be very difficult of access. Quartz containing gold is said to have been found on the Rangitoto Ranges, and the character of the formation would give rise to the hope that the country is gold-bearing.

The country between Kawhia Harbour and the Mokau River affords a very interesting field for the geologist and palæontologist. There are here evidences of very great disturbances in the stratification: in some places the strata are seen standing almost perpendicular, whilst along the coast they slope inland at an angle of about 40°; the character of the formation is also very varied, from the old primary formations to the stratified fossiliferous limestone.

Of the Native population I have little to add beyond what I have stated in my former report. If anything, I consider the estimate I then made of the population of the King country (*i.e.*, 4,000) is too high. During our last twelve months' operations I have visited very nearly all the settlements in the country, and was everywhere struck with the paucity of population. I do not think I saw in all fifteen hundred Natives, including men, women, and children. But, the Maoris being almost constantly on the move, and a large number of them generally absent from their settlements, attending meetings, &c., it would not be safe to estimate the population from the number one meets in travelling through the district. They cultivate very little—merely a few acres in small patches around their settlements. Their cultivations and enclosures and the settlements generally have a neglected appearance, and one meets everywhere with strong proofs that the population is very rapidly decreasing. Most of the younger men work on the railway and roads under the Public Works Department, or go away to dig kauri-gum in Hauraki and elsewhere, neglecting their cultivations and settlements, where only the old people remain.

Very little opposition to my survey has been offered by the Natives during the last twelve months. It was confined to three or four cases, where the Maoris acted against the wishes of the head chiefs. Their opposition was of a feeble character, and took the form more of an assertion of ownership to the land. The chiefs Wahanui, Taonui, and Rewi have always shown a readiness to assist by every means in their power. The chief difficulty which I experienced was to get men who possessed a reliable knowledge of the country, most of the men of the present day being remarkably ignorant of Native names, except, indeed, the chief rivers, mountains, or settlements.

The balance of the survey in my charge will, I hope, be finished during the present season, when the whole country will be mapped more in detail, and a further description, including Kawhia and the other localities now omitted, will be submitted to you.

LAWRENCE CUSSEN, District Surveyor.

THE NORTH-EASTERN CORNER OF TARANAKI.

REPORT by Mr. H. M. SKEET, Assistant Surveyor.

ACCORDING to your instructions, I have the honour to forward a brief report on the country that I have recently triangulated. On looking at the map you will notice that the main range dividing the Mokau and Wanganui waters stretches across the upper end from west to east, and also the basin of Ohura is included, with the ridge from Tangitu to Rangiriri, that divides other branches of the Wanganui. On the west side the high range of Waiaraia, 2,000ft. high, separates Tangarakau and its branches.

From Totoro to Huioteko, and stretching across to Pareheka, 30,000 acres, is a mixture of open downs and easy hills, covered with light forest, that, taken altogether, would be classed as agricultural; the soil good, with outcrops of limestone.

The range about Umukaimata, taking slopes of Arataua and spurs of the ridge that runs down to lower Waikaka, 53,000 acres, all broken country, mostly covered with black birch, at present only valuable for its timber. In the Waitohena and Hapurua valleys there are 14,000 acres of pastoral land.

Ohura Valley, north and south from Nihoniho, including Mangapapa, across to Ohura, taking lower slopes on south side of Ohura, back to Toitoti, across to Mangaroa, I would class as agricultural, the upper slopes pastoral. The piece north of Mangapapa, from Arawaire to Tangitu, down the range to Pukepoto, 56,000 acres, all pastoral. From Toitoti to Kururau, across to Eao, 40,000 acres, pastoral. In this there are some fine patches of good land along the Mangaroa.

Kururau to Otuiti, taking the low hills between the stream and the flats towards Ohura, some seventeen thousand acres in all, I would call first-class; the higher parts, eastward towards Wanganui, pastoral. This part would be most suitable for settlement purposes, being on the line where one of the feeders to the Central Railway could come in from the Taranaki coast, also contiguous to the three blocks, Opaki, Retaruke, and Kirikau, of Crown lands, and adjacent to the Tangarakau Block, now under negotiation. Wharehanga Ridge, the high spurs that run down to Kakaihi and Otunui, and along the Rangiriri Range, is a series of rough ridges, with a great deal of black-birch forest, all very difficult of access, third class, area about twenty-three thousand acres.

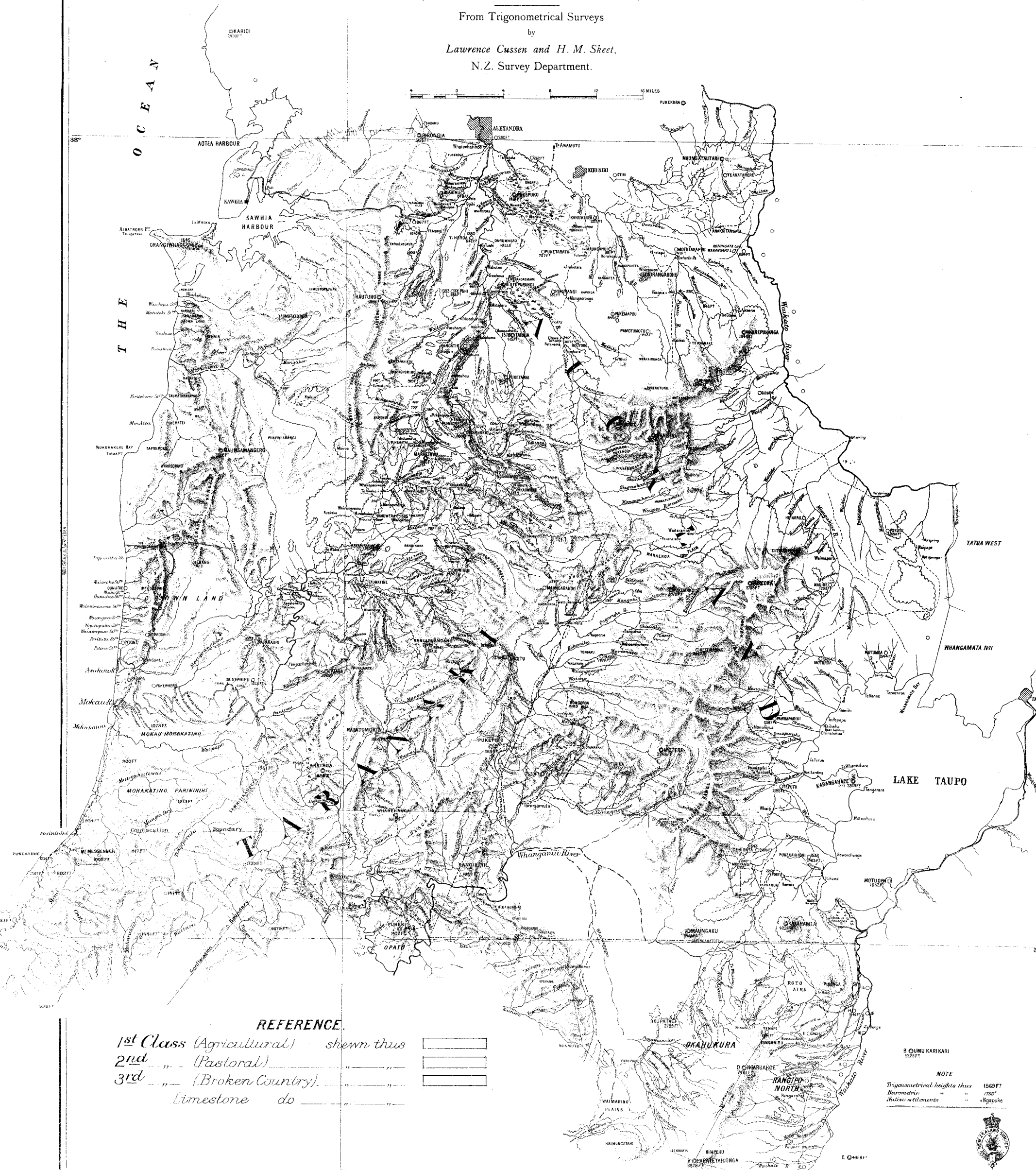
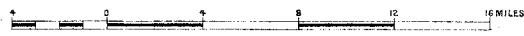
From Otuiti up the Wanganui to Ongaruhe, the country on both sides has a considerable amount of pumice-grit in the soil; so that I put it under the class "pastoral."

Up the Ongaruhe to Mangakahu, from the Rangiriri Range on west side to four miles on the east side, forty thousand acres, there is an amount of true pumice, with that barren-like appearance; though there are fine-looking downs in parts, where the soil is of a better kind. This I also put under the class "pastoral," as I do not think it is of a quality fit for agricultural purposes.

Means of Access (taking the Central Railway as a basis).—One road could come down the Ohura Valley over to Mangaroa and out to the coast near Urenui in almost a direct line, without any serious or difficult works—no streams requiring expensive bridges, &c. Roads coming down

TOPOGRAPHICAL MAP
of a portion of the
INTERIOR OF AUCKLAND & TARANAKI
(INCLUDING THE KING COUNTRY.)

From Trigonometrical Surveys
by
Lawrence Cussen and H. M. Skeet,
N. Z. Survey Department.



THE OCEAN

NEW LAND

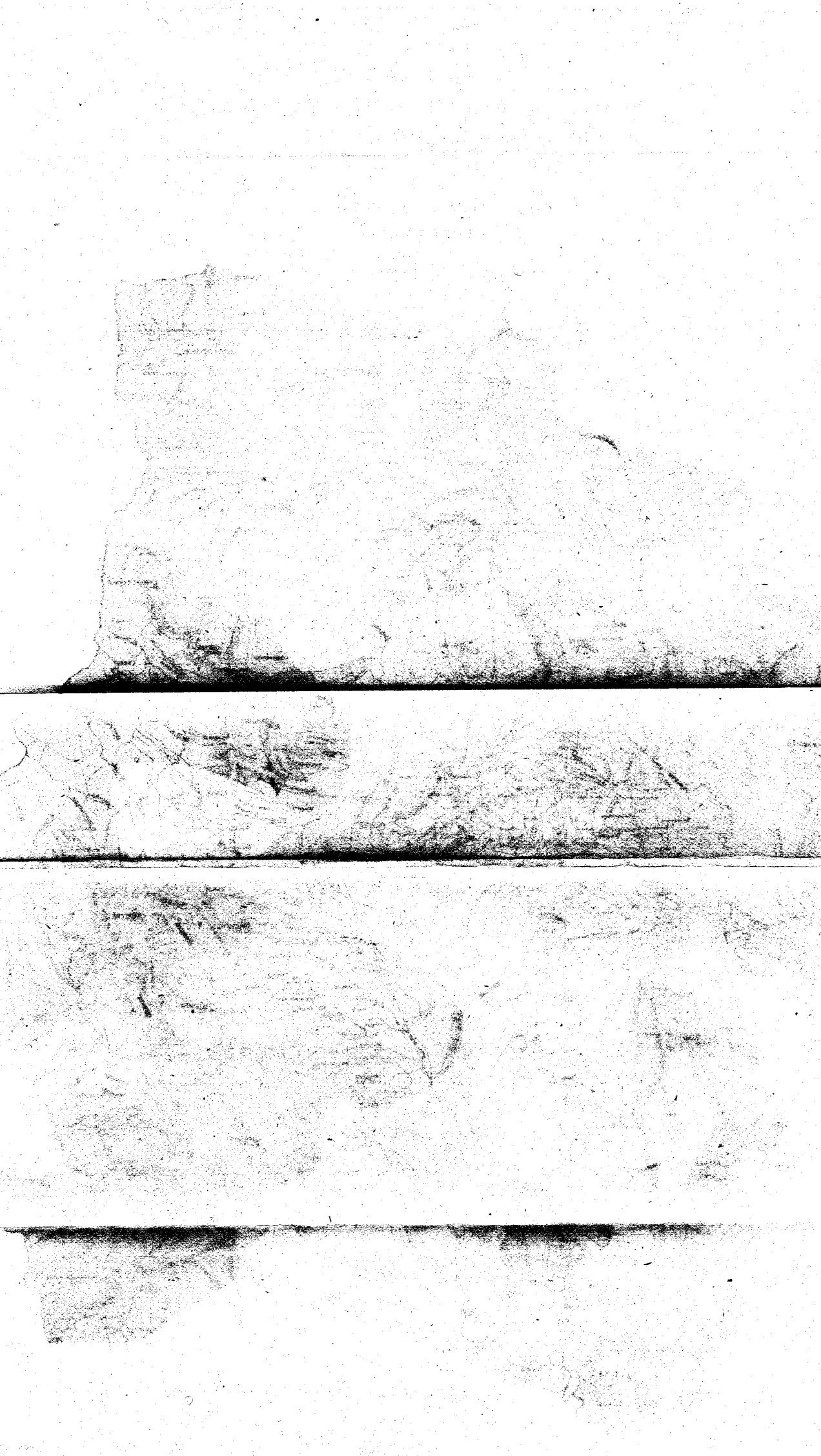
LAKE TAUPO

REFERENCE.

1st Class (Agricultural)	shewn thus	
2nd " (Pastoral)	" " "	
3rd " (Broken Country)	" " "	
Limestone do	" " "	

NOTE
Trigonometrical heights thus 1565 FT
Barometrical " " 1750"
Native settlements " " Ngapue







JAMES MCKERRON
SURVEYOR GENERAL

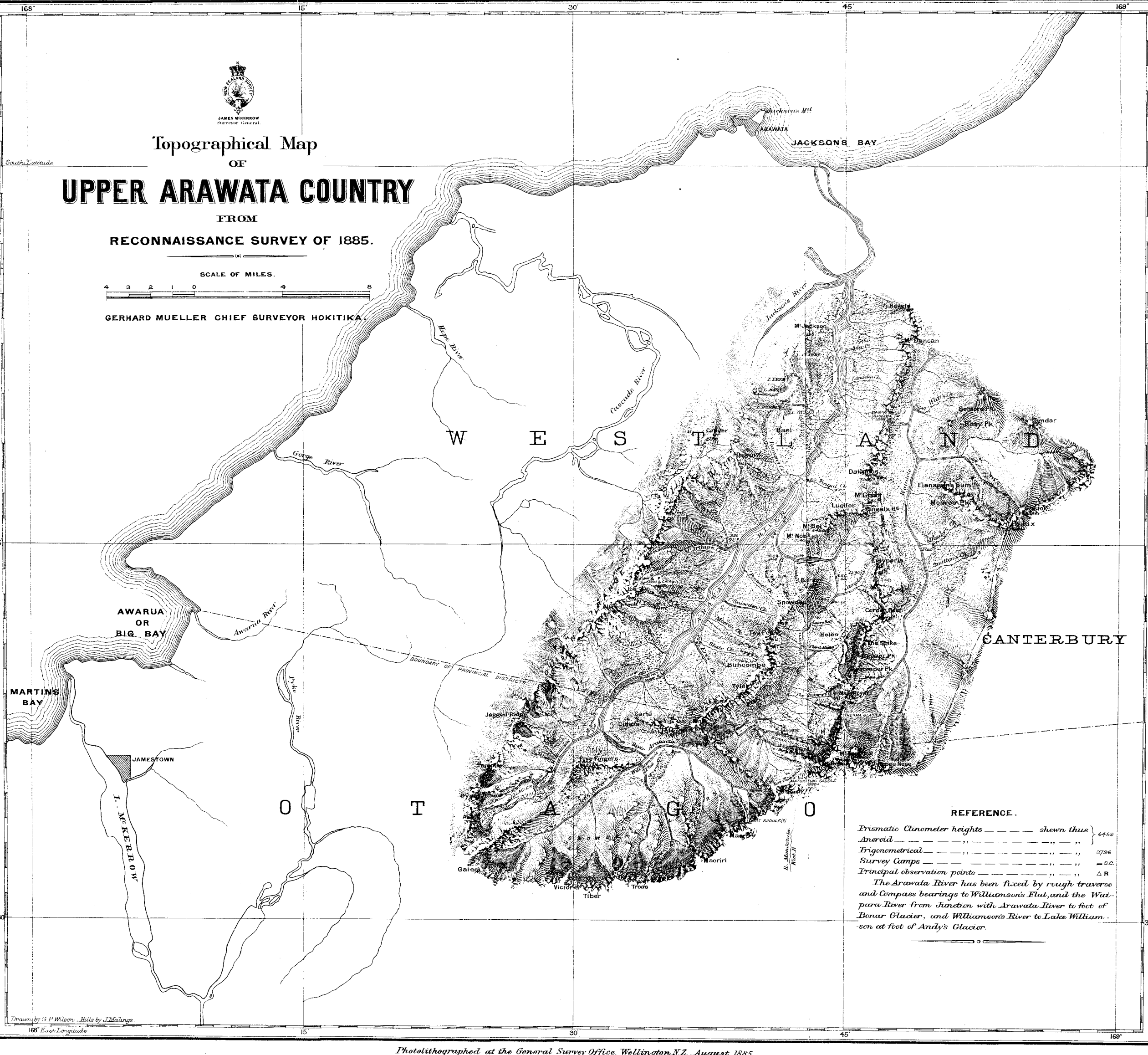
Topographical Map OF UPPER ARAWATA COUNTRY

FROM
RECONNAISSANCE SURVEY OF 1885.

SCALE OF MILES.



GERHARD MUELLER CHIEF SURVEYOR HOKITIKA.



REFERENCE.

- Prismatic Clinometer heights ----- shown thus } 6459
- Aneroid ----- " " " " } 3796
- Trigonometrical ----- " " " " } 3796
- Survey Camps ----- " " " " } s.c.
- Principal observation points ----- " " " " } Δ R

The Arawata River has been fixed by rough traverse and Compass bearings to Williamson's Flat, and the Wai-para River from Junction with Arawata River to foot of Bonar Glacier, and Williamson's River to Lake Williamson at foot of Andy's Glacier.

Drawn by G.F. Wilson. Hills by J. Malings

Waitohura and Waikaka from the Mokau District would tap the available country that way. Roads would follow down the Ohura, Mangaroa, and Eao valleys, to join the only other practicable road, that would start from Taumarunui, passing through Aorangi and on to Eao by the Tokirima Stream. A short road either down the Ohura or down the Otuiti Stream to Wanganui would connect with the steamers that in the future may come up the Wanganui River.

The population of the country, some four hundred and fifty square miles, I do not think exceeds five hundred all told. The largest villages are Taumarunui and Taringamutu, on the Ongarue. Totoro and Te Ruangarahu, on the Mokau and Mokaiti, have about forty adults each; and from the latter village to Aorangi no Natives are living, though there are several deserted villages. Aorangi has about thirty adults. The Natives informed me that they intended this spring to reoccupy some patches of the best land near Nihoniho.

The forest outside of the birch parts is rata, pine, tawa, with a little totara occasionally, and the usual soft woods, with undergrowth of supplejacks, &c. Except in the birch portion the soil is a vegetable deposit of rich quality. The papa rock formation shows out over the whole country when once clear of the limestone of the Mokau and Mokaiti districts. Outcrops of coal at different levels are met with in the country from Mokau to Tangarakau, some twenty miles in length.

To summarize the whole, I make—First-class, or agricultural land, 73,000 acres; second-class, or pastoral land, 199,000 acres; third-class, or broken country, not fit for settlement, 76,000 acres: total, 348,000 acres.

H. M. SKEET, Assistant Surveyor.

RECONNAISSANCE SURVEY OF THE HEAD-WATERS OF ARAWATA AND WAIATOTO RIVERS,
WESTLAND

REPORT by Mr. GERHARD MUELLER, Chief Surveyor.

LAST year's exploration did not take in the country about Mount Aspiring, and I therefore started again for the south early in January to complete, if possible, the survey of the southernmost portion of the Westland District, of which we knew little or nothing. I left Jackson's Bay on the 28th January for the head-waters of the Arawata, and returned to it again on the 23rd February. On the whole I had favourable weather, and succeeded in fixing the topographical features of that wild part of the West Coast satisfactorily.

The Arawata River, about forty miles long, has been rough-traversed to Williamson's Flat, the Williamson River to the foot of Andy's Glacier, and the Waipara River to the foot of the Bonar Glacier; and all the mountain-peaks shown on map, with the exception of Yates, Victoria, Tiber, Lydia, Troas, Maoriori, and Maori, are well and finally fixed. The relative positions of those named are, I believe, fairly correct; but I expect that the whole of them will be found to be placed too far to the south. I got observations to most of them from Cairns O and P, at the head of Clark's Creek, and to all of them from Point Q, on Ionia. From Point T not one of them could be got at, the high range stretching from Mount Barff to Ionia shutting them completely out from view; and, though I managed to get a few shots from the Arawata and Williamson river-beds, still, as a rule, the shoulders only of the high spurs running down from these mountain-peaks were visible. Temple, Gyræ, and Ark are well fixed; but in no case, as regards the peaks between the Ark and Mount Barff, were the triangles what they ought to be to insure satisfactory work.

For grandeur of scenery I do not think there is another spot in New Zealand to equal the Mount Aspiring country. I have seen magnificent Alpine scenery in my travels, but I have never seen anything to approach in awe-inspiring effect the view from Mount Ionia. At an elevation of 7,000ft., with a glacier, crossed and recrossed by yawning crevasses, 2,000ft. sheer below, and five other glaciers at about the same elevation clear to view, within a few miles of the beholder; behind these that circle of towering peaks, some snow-capped and some black, ominous masses of rock, the snowfields extending, seemingly, as far as the eye can reach to the east, and that "king of giants," Mount Aspiring, pure white from base to top, rising to a height of well-nigh 3,000ft.; the intense blue sky overhead, and the deadly stillness, broken only now and then by the sound and roar as of heavy thunder in the distance, caused by the falling avalanches and mighty landslips, is a scene that cannot be surpassed.

Amongst the variety of glaciers there is a little one worthy of special notice. I am referring to the Shelf Glacier, below Jagged Ridge. It is quite a curiosity in its way, inasmuch as there is no connection whatever between it and the snow or ice on the range above. It is bounded on all but the south-east side by perpendicular cliffs of immense height, and its existence can therefore be due only to continued drifting in the snowstorms of winter, and not to any pressure of snow from above, as is the case with all the other glaciers.

It took me two days and a half hard climbing to get to the top of Ionia. The rope had to be used again and again, both in ascending and at descending, and for well nigh half a mile steps had to be cut into the frozen snow to get footing; but the trouble and exertion were well repaid. I could not have had finer days for observing, and, what is more, Ionia proved to be the only suitable peak thereabout. Eros no mortal will ever ascend the top of. Both Caria and Cilicia, if practicable at all, are very difficult to climb, and Turk's Head is too low, having most of the back country cut off from view by the high Five-Finger Range.

As all my camps and points of observation are marked on the map, I need not go into particulars as to procedure beyond simply stating that, after I finished work at head-waters of Arawata, I descended to junction with Waipara, travelled up its western bank and returned by eastern bank, observed at Mount Hyperia (points S and A), and returned to Jackson's Bay. The carrying of heavy swags on a journey like this being a matter of very serious consideration, due allowance for

bad weather had not been made, and our stock of provisions ran out. For several days we had to go on short allowance, but for the last three days we had absolutely nothing else to eat but the birds we caught, and we felt rather "weakish" by the time we got back to the bay.

Regarding the land suitable for settlement, pasturage, &c., I have to report as follows: All the way up from the junction of the Jackson River with the Arawata to the Ten-Hour Gorge there are good agricultural flats on both sides of the river; but they are limited in extent, the largest not exceeding six hundred acres. Till up to McArthur's Creek on the west, and Eros Creek on the east, the hills, with few exceptions, are sloping gently towards the river, and many of these slopes will be found to be suitable for settlement purposes. Allowing for these, I think that the available agricultural land south of junction with Jackson's River amounts to about ten thousand acres. From the two creeks named to Ten-Hour Gorge there may be another fifteen hundred acres in small patches of from thirty to fifty acres here and there under the steep hillsides. Beyond the Ten-Hour Gorge—so called because it takes that time to get through by crawling under or over the masses of detached rocks, which range in size from a "digger's hut" to a "Courthouse"—there is only McArthur's Flat and a narrow fringe along Williamson River which may be classed as fairly good land. All else is perfectly useless for settlement purposes.

As to pasturage land, the quantity available is also small. On the west side the hill-top pasturage extends from the Jackson River to abreast of McIntosh's Creek. The Arawata slope of the Olivine Range south of McIntosh's Creek is too rough and broken and practically useless for pastoral purposes, although in many places there are patches of good feeding-ground to be met with. Between the Arawata and Waipara no pasturage is to be had south of Tyler: what little there is is inaccessible to sheep. From Tyler northward the pasturage, especially along the Arawata slope, is good; but I fear it will be found to be very difficult to bring stock up to it. Between the Waipara and Waitoto Rivers, from Fingal's Head south, the range is useless for pasturage, while to the north of Fingal's Head it seems to be fair. I have not been on the top of that range, but from below it looks well: many of the open-land slopes are gentle, and appear to be well-grassed.

As to cattle-feed in the low country, the Arawata is about an average river. Karaka, the best cattle-feed that is to be had in the bush, and broad-leaf is to be found all through the flat country.

Although I cannot report as favourably upon the settlement and pastoral lands of the Arawata as I hoped to be able to do, there are some special features about this part of the district which make it both valuable and highly interesting.

The first is this: Red birch (*Fagus fusca*) grows in abundance and great luxuriance in the Arawata Valley. It is found on both sides of the river immediately after passing the Snag Rapids, and increases in quantity until, near the junction of the Waipara and Arawata, it takes the place of the common white birch almost entirely. From there to the Ten-Hour Gorge the red birch grows on the flats and up all the gullies and spurs to an altitude of 2,000ft. The timber is large and straight; trees above 100ft. high are to be found there in abundance. They range in diameter from 2½ft. to 6ft.; some amongst them are perfect giants. One on the flat abreast the camp near the mouth of the Waipara River has a circumference of 27ft. about 5ft. above the ground, equal to 9ft. diameter, and, to all appearance, is perfectly sound. The Arawata is a good river for rafting, and along its whole course from the gorge down to the sea the only obstacles in the way are the Snag Rapids, and an expenditure of a couple of hundred pounds will, I believe, suffice to clear them of drift timber, and make them workable for rafts. It is strange that this timber grows so prolific in the Arawata Valley, while it is not to be found in quantity anywhere else in Westland. We have a few patches of it in the Teremakau Valley, but I do not recollect having met with it either along the sea-coast or up any of the rivers between Hokitika and Jackson's Bay. As to the value of this timber I need not say much: it has been proved beyond doubt that its durability and strength are first-class. The two arch truss-bridges in the Otira Gorge, Christchurch Road, I built entirely of this timber. In winter time they get little or no sun, and are consequently always in a wet or damp state; and in summer time they are, by reason of the heavy moisture and frequent rains, undergoing a perpetual steaming process, which is perhaps the severest test that can be put upon timber: and still the bridges are, after a lapse of nearly eleven years, almost as sound as the day they were put up.

Next to this I desire to draw attention to the mineral wealth in which this district evidently abounds, and particularly so the mountain-range between the Waipara and the Waitoto rivers. The formation is green slate, hard and solid, and crossed by many reefs, visible from the Waipara river-bed, which to examine, however, I could not afford the time. Still, an idea may be formed of the minerals in existence there from the specimens of copper ore, galena, &c., I picked up at the mouths of five of the creeks coming down from that range. On my way up to the top of Hyperia (Point U) I crossed seven well-defined quartz reefs or leaders from 1ft. to 2ft. wide, running north by east, and traceable for a great distance either way. I could see no gold in them, but that is no proof that they are barren, seeing the "colour" of gold is to be had in many places along the Waipara River banks. My observations lead me to expect that at some future time this range will be proved to be rich in valuable minerals, more especially that part about Lucifer and Fingal's Head. Good indications of gold were also got in several creeks running into the Williamson River and the Arawata south of the Ten-Hour Gorge; but our attempts to trace gold in the Arawata flat proper have been a failure.

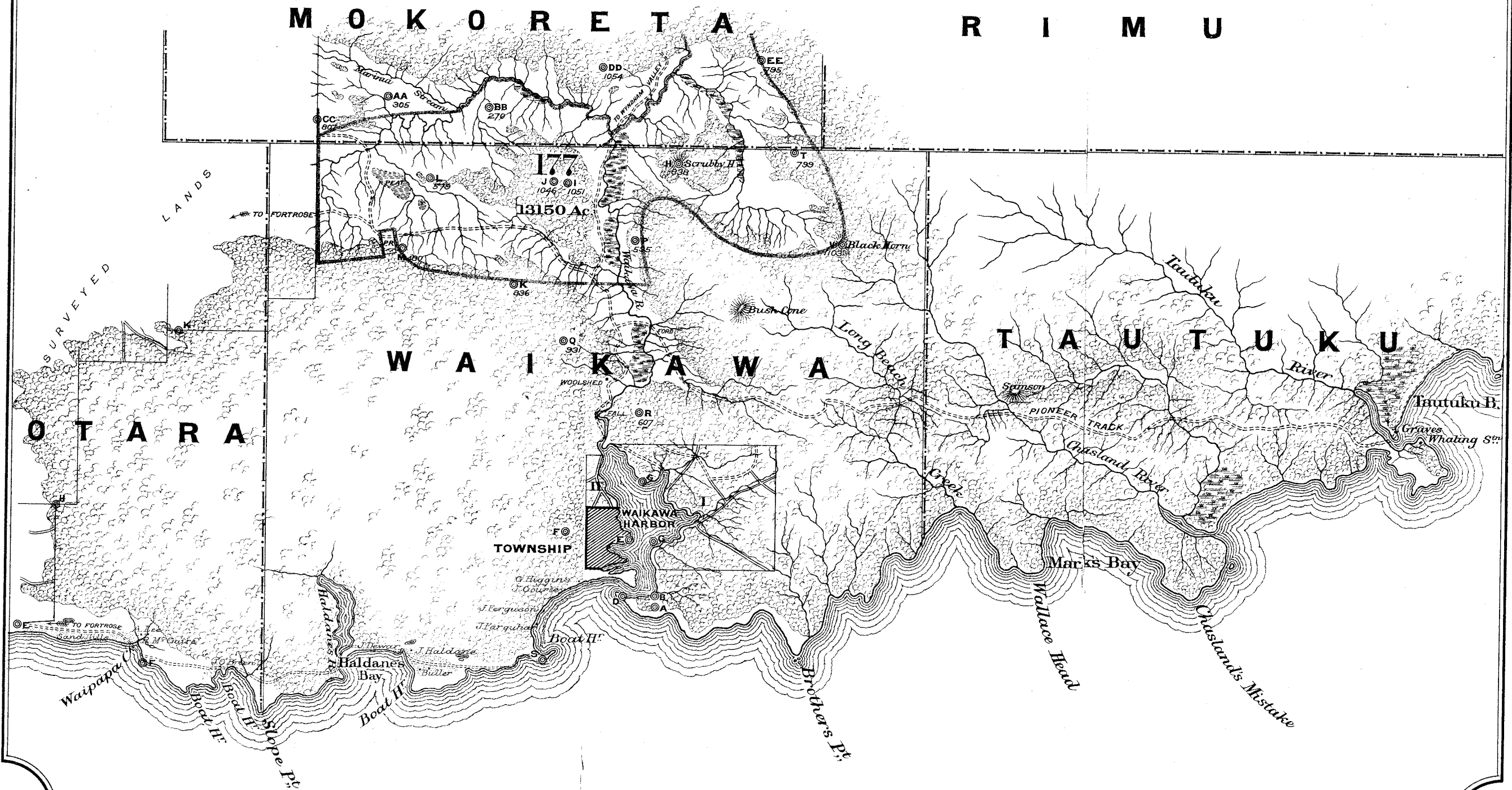
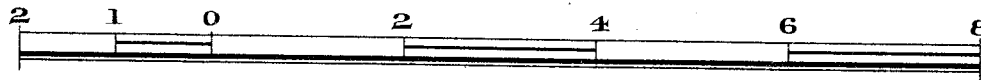
In conclusion, a few words as to passes across the dividing range. There are none practicable for either railways or roads. The Matukituki Saddle itself is inaccessible from the Westland side. It is a smooth, steep rock-face, devoid of every vestige of vegetation from the Bonar Glacier up to its top. The only possible way I could see of reaching the top was by ascending Mount Barff by a very circuitous route, and then descending about 2,000ft. to the Matukituki Saddle. I need not



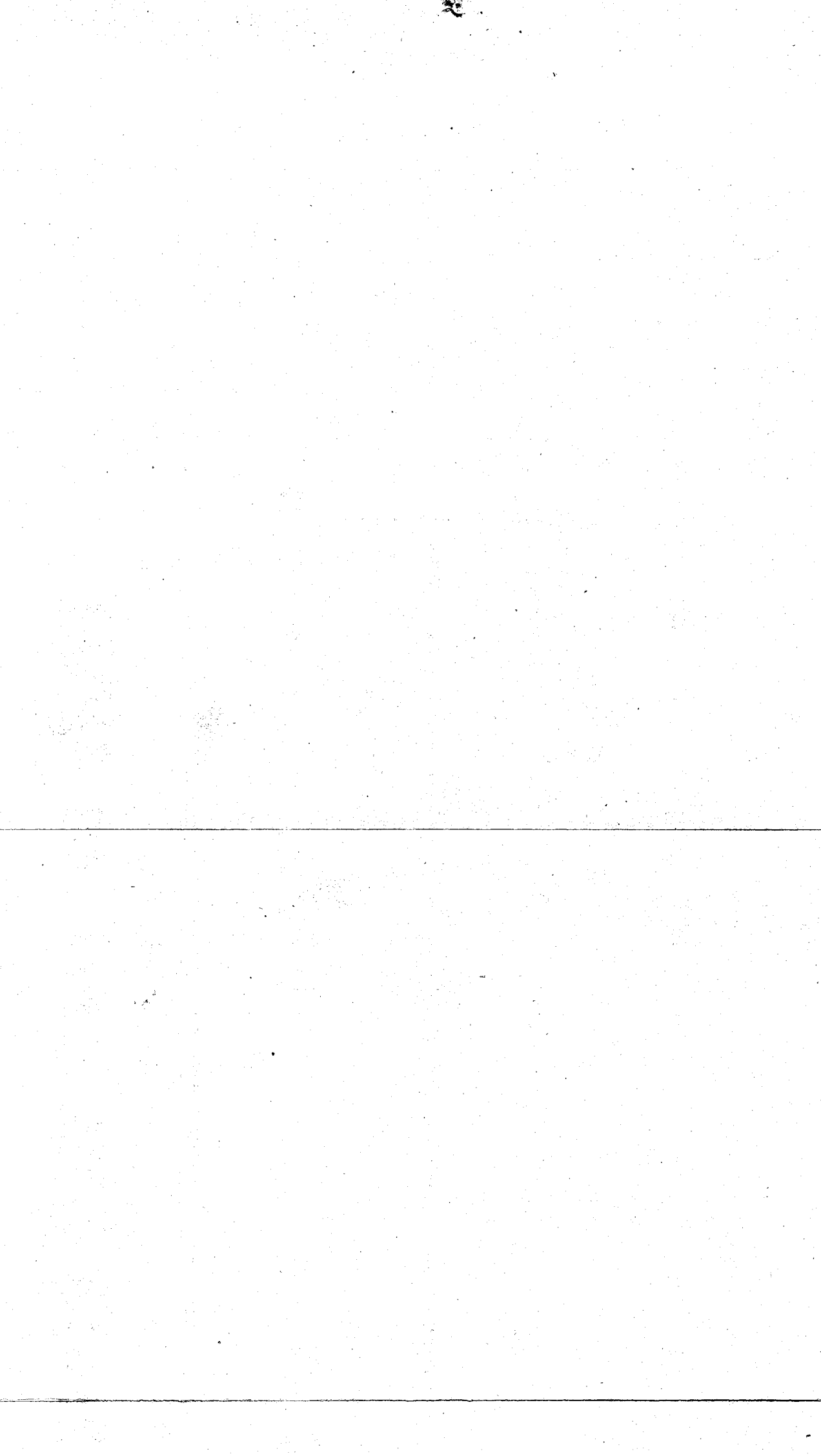
JAMES MCKERROW
Surveyor General.

Topographical sketch OF PART OF TAUTUKU BUSH

Scale of miles.



William Arthur, Chief Surveyor, Dunedin.



say that I did not attempt to carry out that plan. As for the saddle into the Dart—assuming I am correct in taking the indentation marked on the map for the Dart Saddle—it is as bad as the other; and the rest of the dividing range, from Dart Saddle to the Ark, is a complete block—eternal snow and ice, 6,000ft. to 8,000ft. high. A road can be easily taken up the Arawata River to the Ten-Hour Gorge; but there it must stop until, by some convulsion of nature, the enormous rocks in that gorge have been somewhat sorted. Up the Waipara River a road can also be taken; but it will involve heavy work at some of the projecting cliffs.

GERHARD MUELLER, Chief Surveyor.

EXPLORATION OF THE SOUTHERN PORTION OF TAUTUKU FOREST

REPORT by District Surveyor JOHN STRAUCHON.

I HAVE the honour to forward herewith sketch of portion of Tautuku Bush, lying between the Waikawa River and north-east end of Tautuku Bay, which is as far as my recent survey extends.

A pioneer pack-horse track has also been cut through the bush between these points, and a traverse survey made of it. The bearings were taken with prismatic compass, and the distances measured with steel band. The total length of traverse is $18\frac{3}{4}$ miles, with a track from 6ft. to 10ft. The grades are, for the most part, very good, and could in several places be greatly improved should the advance of settlement require it. There is only one place of any length where the grades are really very bad, and that is a steep spur running down to Longbeach Creek from the westward. The length of the spur is nearly a mile, and it is in many places very steep, and would be difficult to improve. It is, however, the best obtainable thereabout. When a main dray-road is required it will have to pass considerably to the north of the present track, joining it just beyond Longbeach Creek.

Character of Land.—This is just like the general run of bush land in the Southland District, and is, on the whole, very fair. On the high ridges there is the usual heavy deposit of vegetable matter, of a dry, mossy nature; while on the lower slopes and valleys the soil is firm and good. Indeed, the various growths of timber indicate very clearly the changes in the soil. Where not too steep the ridges and valleys are suitable for settlement if opened up by good roads to convenient ports. The portions shown as open in the Longbeach and two Chasland valleys are covered with a very luxuriant and dense growth of snow-grass and scrub, and are almost impenetrable, no fires ever having been over them. Even the wild pigs do not root among it, preferring the more open bush. On account of this dense growth the ground appears wet and spongy now, but, if burned and exposed to sun and wind, would, I have no doubt, make good soil. There is also a considerable area in these valleys covered with light bush and scrub, which would be easily cleared. The large flats behind sandhills fronting Chasland and Tautuku Bays are unfortunately both very wet and mossy, would be difficult to drain, and lie very much in the way of direct communication with the upper portions of these valleys, especially of the East Chasland, which I consider the best.

Timber.—On the main ranges the principal kinds are large red birch and carmi, red pine, ironwood, broadleaf, and here and there a few black pines and totaras; the smaller woods and undergrowth being several kinds of broad-leaved gum, dogwood, and a great number of fern-trees, some of very large size. On the flats and lower spurs scrub, ribbonwood, manuka, and small straight birch abound, the two latter very suitable for fencing purposes. Here also the undergrowth consists of gum, dogwood, holly, akeake, veronica, and native broom. On the whole, the bush is not a very valuable one for sawmilling purposes, the trees suitable for that purpose being too much scattered about; and, indeed, red pine is the only variety found in quantity. In a good many places along the coast there are considerable areas with no large timber, but dense veronica and gum scrub, which would not be difficult to destroy; and the land is generally good.

Grasses.—Snow-grass and toitoi are the only kinds met with inland, while on the coast there is a good deal of wild parsley. At Tautuku, on the clear ground, English grasses and white clover grow luxuriantly. Maori cabbage, wild carrots and parsnips, and also potatoes, are growing all about, having doubtless been left there by the whalers years ago, and now gone wild. We dug up some of the potatoes, and found them very fair eating and a welcome change.

Rocks.—These belong to the sedimentary order of formation, being almost all either sandstone or conglomerate, chiefly the former.

Lignite.—We found traces of it only in one gully, between branches of the Chasland River, but did not discover the seam—only some fragments. No minute search, however, was made for it.

Gold was found, though not in payable quantities, at all the camps excepting Tautuku. No extended search was made for it anywhere; only a few prospects tried near camps at odd times.

Rivers.—There are none of any size except at their tidal estuaries.

Harbours.—Tautuku, Chasland, and Mark's bays would all afford good shelter to ships of any size from south-westerly weather, provided the bottom is suitable for anchorage. Of this I had no means of judging except by the sandy beaches, which in the two former extend to about two miles eastward from the respective points; while in the latter the sandy beaches are shorter and alternate with small rocky projections. The Admiralty charts of the coast would probably furnish the information as to anchorage. There are large estuaries at the mouths of Tautuku and Chasland rivers, up which, at high water, large whaleboats or surf-boats could convey cargo for probably a couple of miles inland. Having no boat, I could take no soundings, but the rise and fall of the tide are considerable, amounting probably to 6ft. or 8ft. Besides these bays there are numerous places

where boats could land in ordinary weather (some sheltered from south-west, others from north-east) at intervals along the coast from Tautuku to Waikawa.

Access.—To make settlements in this country a successful communication must be provided by sea, and be regular, the distance from other settled localities being too great, and the prospect of good roads too remote, to permit of sending produce to or drawing supplies from them overland. Tautuku and Chasland bays are the natural outlets for most of this country; and the former will also be the outlet for the Taukupu Valley (McLennan's), which, although it possesses a much longer and finer river, has, unfortunately, quite a reef of rocks, extending right across just inside the river, and there are also rocks about outside. A boat might probably land safely in very fine weather at high water, but it would be at considerable risk. I have been up and down the whole length of this valley several times during the past season, and also cleared a portion of track; but as no survey was made of it I have not included it in present sketch. I may, however, say in passing that, both in regard to quality of timber and soil, it is by far the best, more especially the middle and upper portions; and I do not think it would be difficult to connect it by a good road to Tautuku Bay. The track already cut will do a good deal towards opening up the bush, as it renders it safe and accessible for exploring and prospecting; indeed, I hear that a party is already forming in Invercargill for the latter purpose, with a view of trying this country. When the track is extended to Catlin's River and the Taukupu track cut to join it, the whole bush will be accessible. I had no horses through the track, but believe they could be taken through in summer time, although there are a good many soft places, more especially on the high ranges. Most of them are not very deep, but would require to be fascined or corduroyed before much traffic could pass them.

Animals.—From Waikawa to west branch of the Chasland River wild cattle are to be found. They are in prime condition, and were a welcome addition to our larder. They thrive exceedingly well on the gum and broadleaf. From the west branch of Chasland to Taukupu River not a trace of cattle is to be seen, although the feed is abundant. Wild pigs are, however, to be found in all the valleys and on lower spurs, but no trace of them on higher ranges. There are also a good many of them along the coast; but here they are very poor, and the flesh strong, caused, I believe, by eating large quantities of decaying kelp and other sea-weeds. Saw some traces of "bunny" at Tautuku, Chasland, and Taukupu; but not many. He has not yet got thoroughly established there.

Birds.—Pigeons, kakas, tuis, wekas, and other small birds common to our bushes are to be found in plenty, also a few native crows and saddlebacks.

Waterfowl.—Teal and grey ducks are the most plentiful, although on the Taukupu there are a good many blue and mountain ducks. Paradise ducks are very rare. Saw a few red-crested grebe, white cranes, bittern; and black and white shags are very numerous, especially at Chasland, where they have a regular rookery.

Fish.—Eels abound in all the streams, and can be caught in large numbers about the logs lying near the banks. Mr. McLennan also informs me that he has frequently seen good-sized trout in his branch of the Taukupu River. From the rocks at Tautuku we caught a few butterfish. Having no boat, had no chance of catching any other kinds. One seal was seen here also.

Climate, &c.—We were very much too late in going into the bush last season, and had very wet and stormy weather all the time—the longest spell of fine weather at a time was four days; and we had many difficulties and hardships to contend with in exploring a large bush like this, and had to sleep out many nights without either tent or blankets when exploring the line. Provisions, camp equipments, and tools had all to be carried on our backs. On one or two occasions we were pretty hard pushed for provisions, having to go without several times. All hands, however, enjoyed good health throughout.

JOHN STRAUCHON, District Surveyor.

APPENDIX No. 4.

ROADS TO OPEN CROWN LANDS FOR SALE.

Extracts from Reports and Statements by Supervising Officers and Local Authorities on the Work done from 1st July, 1884, to 30th June, 1885.

AUCKLAND.

Homestead Blocks, Mangonui.—Since the date of last year's report two miles of 4-ft. bridle-road have been completed, terminating at an old road, and thus affording through traffic.

Whangarei through Taheke.—The line through the Taheke had been graded at the date of last report. Work was commenced on the 1st July and continued till the vote was expended, when a distance of six and a half miles of from 4ft. to 12ft. wide was completed, with three miles of grading in addition. Mr. J. C. Blythe superintended the work, which was cheaply done by piece-work. Many of the settlers are anxious to see this line extended, believing that a better outlet to the good lands in Taheke will be obtained by continuing it to Parua Bay.

Tangihua No. 2.—Mr. Blythe started this road on the 1st August, and carried it through to connect with a former road made by the department. The country being level, the two miles opened consisted principally in bush-felling and placing culverts,

Okaihau to Victoria Valley.—At the date of last report the works on this main line of road were in abeyance. But the eleven and a half miles previously graded were contracted for in the summer, and good progress has been made, under Mr. Garsed's supervision; up to the present time seven miles and three-quarters of 6-ft. bridle-road being completed, the rest being still under contract. The line passes through the new settlement formed by Mr. Federli for producing subtropical fruits, and will shortly tap the valley leading to the Waikoropupu kauri-forest and Government lands in that locality. Seventeen miles and three-quarters of this road are now finished, the first ten miles being a cart-road much in use by the settlers and Natives. Mr. Fairburn has had general charge of all the works from the beginning.

Otonga Bridge.—This necessary work was designed by Mr. Fairburn and carried out by contract, and a distance of one and a quarter miles of road made in addition by Mr. E. J. Fairburn. It furnishes the requisite connecting-link between the main north road and two roads made by the department in previous years through a country which is fast becoming settled.

Waitemakau Bridge.—Mr. Fairburn, after visiting the ground, prepared plans for this work, which is now proceeding under contract. It spans a very dangerous river on the road between Hokianga and Dargaville, whilst at the same time giving access to a considerable area of Crown lands which will hereafter come in for settlement.

Kohukohu-Rakautapu Road.—A length of five and a half miles is under contract and work progressing favourably under the supervision of the Hokianga County Council. It is a bridle-road, made on Mr. W. J. Wheeler's specifications.

Maungakaramea to Tangiteroria.—One mile and three-quarters have been added to the two and a quarter miles finished last year, by Mr. D. C. Wilson; and I believe the counties have done something to the rest of the road to render it available for traffic.

Paparoa-Waikiekie.—This line has been explored for some miles by Mr. Fairburn, and a grade and proclamation survey are now in hand, on the completion of which tenders for its construction will be called for.

Awaroa Swamp Drainage.—This work, which the Waipipi Road Board kindly undertook through their Inspector, Mr. Mellsop, will have the effect of draining a considerable area of very good swamp-land prior to its sale, and at the same time afford a road to lands beyond. It is undertaken with a view of draining a portion of the Awaroa Swamp situated between the Whiriwhiri settlement, on the north-west, and the Otatau Creek, on the south-east, and also to make a road to Maioro and Port Waikato, the present road to these places being rapidly destroyed by the encroachment of the sand from the West Coast. A drain 125 chains long has been commenced, and nearly finished, from a point about the centre of Whiriwhiri to a point on the Otatau Creek about three miles from its entrance into the Waikato River. The drain, when finished, will be of an average depth of 5ft. and average width of 8ft., and will be sunk at least 6in. into a hard bottom of decomposed pumice and white clay. All the stuff taken out of the drain is placed 6ft. clear of the eastern bank—except timber, which is put the other side—and is now a dry footpath all across. The work was commenced the last week in March, and continued until the 30th June, when work was obliged to be discontinued until next summer. The drain is now the full width the whole way across, and the depth also, to a distance of seventy-five chains. The rest of the way is about 4ft. deep only, but is so full of timber below that depth that it proved impossible to go on with the work after the first heavy rains.

Waerenga, through Whangamarino.—A distance of three and a half miles on this road has been opened by felling the bush, making a bridle-track, and building a bridge. It is now complete, and gives access to a considerable area of Crown lands, which will be available for settlement.

Waingarō-Kahuru.—This road, which is a branch from one formerly made by the department, forms part of a main line of road which, starting at Huntly, on the railway-line, will eventually join the road from Waitetuna to Aotea and on to Kawhia. During the past year Mr. Blythe constructed eight miles as a bridle-road, and graded four and a half miles in addition. It passes through a country where the land is of fair second-class quality, which will be settled on when the contemplated bridge over the Waikato is built. It also opens up a road to the Hot Springs on the Waingarō, which are used a good deal even now for healing purposes. An extension of it to join the Waitetuna Road is much wanted.

Alexandra-Hikurangi Road.—This line starts from the bridge over the Waipa at Whatiwhatiho, and runs in a southerly direction to join the Kawhia-Waipā Road. Mr. Blythe graded nine miles and three-quarters before he was relieved by Mr. Fairburn, who has since let several contracts to the Natives for its construction, the work on which is proceeding; but no portion is as yet actually completed. The first part will be a dray-road; but the limited amount of money will force us to continue it as a bridle-road.

Kawhia-Waipā Road.—At the date of last report Mr. Hursthouse had completed four miles of this road at 15ft. wide. In consequence of instructions from Government, this width was shortly afterwards reduced to 6ft., and carried out at that width over the ranges and down to the Ngutumanga Stream, some four miles from Waipā River—in fact, to the point where the road mentioned in last paragraph will join it. In all, eighteen and a half miles have been made this season; or a total from Kawhia Township of twenty-two and a half miles, four and a half miles of which is cart-road. Some excellent work was done by the Constabulary on the big hill, where the work was very heavy and much of it rock; and, again, at Puti, where, owing to the constant slips, the work had to be done over and over again. Consequent on the withdrawal of the Constabulary for defence works, the Native contractors have been left to widen out the track to a cart-road, which they are now doing under Mr. Fairburn's direction. A ferry has been established at Oparau, the only river on the line of any consequence.

Aotea-Kawhia.—The two miles of this road left unfinished at date of last year's report have been completed by Mr. Hursthouse, which gives an excellent road from Kawhia to Aotea.

Kenana-Rangiwuru Road.—Mr. Goldsmith, at date of last year's report, had completed four and a half miles of this line as a 12-ft. road, and since then he has carried it through the Crown lands a further distance of two and a quarter miles, at a cost of about £70 per mile, being one of the cheapest cart-roads I know of. The lands it was intended to open were all taken up the day they were offered on perpetual lease.

Tokaanu-Waimarino, which is a continuation of the Taupo-Murimotu Road, thirty-six and a half miles of which had been constructed by Mr. A. B. Wright at the date of last report, is a line of road which the Government directed should be made by aid of the Constabulary, to serve as a feeder to and to effect connection with the Central Trunk Line of railway at Waimarino, a Native village on the plains of that name, situated at the south-west base of Ruapehu. Up to the date when the Constabulary were recalled to aid in the construction of the defence works of the colony, ten and a half miles of 15-ft. road had been completed, excepting a bridge over the Poutu River, the timber for which is still preparing. Since the end of April no work on the road has been done (excepting preparing bridge-timber), though Mr. Wright has graded three and a half miles ahead of the road-work. Mr. Wright also made three explorations from Tokaanu to Taumarunui, on the Wanganui, with a view of determining whether the road could not be taken that way; but the difficulties of the country would have made it too costly an undertaking to adopt. The present line will run through open undulating country nearly all the way to Waimarino, and, skirting the bases of Tongariro and Ruapehu as it does, will afford the most charming views of those fine mountains. It is quite certain that, when this road is opened to Waimarino and the trains running there daily, few roads in the country will be more used by tourists, who will take this route, and then *via* Taupo to Rotorua. The country it passes through near the mountains is all fair pastoral land, with rolling grass-covered hills, diversified by many streams and clumps and belts of wood. A few men are engaged on the formed portion of the road in removing the slips which always occur on new works.

Wairoa and Gisborne.—Works on this line appear to have been mostly in the building of bridges, forty-four in number, and a few chains of formation. The road is now open for drays from Wairoa to Te Reinga; but, Mr. Baker adds, "until it is metalled it will never be a good winter road." Mr. B. Lambert has had charge of the works here. The works at the Gisborne end of this road have been delayed owing to difficulties about a deviation, which the Cook County propose to overcome by taking it under the Public Works Act.

Rotorua via Galatea to Wairoa.—The accompanying detail report by Mr. J. C. Blythe of his exploration of this line will furnish full information as to its capabilities of construction and of the difficulties of the country. As instructions in regard to this work are of so late a date, nothing beyond the exploration and the starting of a grade survey from the Village of Wairoa, Tarawera, has been done; but Mr. Blythe will push on with his grading, and, as the country as far as Galatea is very easy, this will not take long.

The Clerk to the County of Cook furnishes the following abstract of works executed by the county out of grants from Government to open up lands before sale during the year:—

Gisborne-Waipu Inland Road (Gisborne End).—Sixteen miles thirty-two chains of road widened to 12ft. and sharp bends flattened: five bridges constructed—namely, one truss-bridge, 45-ft. span; one truss-bridge, 45-ft. span, and two plain spans of 25ft. each; one plain bridge, 25-ft. span; and two of 20-ft. span each: fifty-eight culverts constructed with kauri timber, sizes varying from 2ft. by 2ft. to 9in. by 9in.: 244 chains of bush and scrub fallen, 66ft. wide: 100 chains of new drains cut: wheel-guards affixed to seven old bridges. The culverts and bridges on sections 4, 5, and 6 have yet to be constructed, and two and a half miles of new formation on section 6 to be completed. Total cash received on account of this road, £2,000. Expended to date, £1,977 19s. 6d.; balance due to contractors exclusive of extras, £1,564; Engineer's supervision, advertising, &c., say £150: total, £3,691 19s. 6d.

Gisborne-Waimata Road (Gisborne End).—Nine miles sixty chains of bridle-track, widened to 10ft. on solid: 154ft. drain-pipes laid: 105 box-culverts constructed of kauri timber, sizes varying from 3ft. by 3ft. to 9in. by 9in.: four and a half chains fascining: seventy and a half chains of bush and scrub cleared 66ft. wide: one mile sixty-eight chains of old drain widened and deepened: one mile fifty chains new drain cut: one bridge, 66ft., of two 25-ft. spans and one 16-ft.: one bridge, 20-ft., and one of 16-ft. span: seven miles new line laid off ready for calling for tenders, and several deviations made. Expended to date, £1,292 18s.; balances due to contractors, £250; Engineer's supervision and advertising, say £90: total, £1,632 18s. Total cash received from Government to date, £943.

Arakihi Road, Tolago Bay.—Ten miles of this road have been pegged out, and considerable deviations made from the original line. The plans of bridges and sections of drains have been prepared in readiness for calling for tenders for the work. Total expenditure on surveys and plans prior to notice that work would not be gone on with at present, £195: about £25 more will be required to complete surveys and plans. No money received on account of this road.

Gisborne-Wairoa Inland Road (Middle Portion of Line).—Six miles ten chains surveyed; six miles pegged off ready for calling for tenders. Plans of deviations of two and a half miles through Waihou Native Reserve have been forwarded to Survey Department. Total cost of surveys and plans, £319 4s. 6d.; part payment to Wairoa Council for Opoiti Bridge, £125 12s.: total, £444 16s. 6d. Total received from Government, £425 12s.

Mr. Barnard has had the general supervision of the above roads being constructed by the county.

I furnish below a statement in tabular form of the works performed under direction of the department for the past year.

S. PERCY SMITH Assistant Surveyor-General.

SCHEDULE of ROAD-WORKS to open Crown Lands before Sale completed and on hand within the Provincial District of Auckland for the Twelve Months ending 30th June, 1885.

Name of Road.	Bridle-road.	Cart-road.	Graded in Addition.	Bridges not included in Roads.	Remarks.
	Miles.	Miles.	Miles.	Feet.	
Homestead blocks, Mangonui ...	2	...	...	...	Completed.
Whangarei, through Taheke ...	6·5	...	3·5	...	Delayed.
Tangihua No. 2 ...	...	2	...	...	Completed.
Okaihau-Victoria ...	7·75	...	...	...	In progress.
Otonga Bridge ...	1·25	...	...	77	Completed.
Waimamaku Bridge ...	...	...	...	...	In progress.
Kohukohu-Rakautapu ...	...	...	...	...	"
Maungakaramea-Tangiteroria ...	...	1·75	...	...	Completed.
Paparoa-Waikiekie ...	...	...	...	...	In progress.
Awaroa Swamp drainage ...	...	...	...	...	125 chains in progress.
Waerenga, through Whangamarino ...	3·5	...	...	...	Completed.
Waingaro-Kahuru ...	8	...	4·5	...	Delayed.
Alexandra-Hikuranga ...	...	...	9·75	...	In progress.
Kawhia-Waipā ...	18·5	0·75	...	...	Widening in progress.
Aotea-Waipā ...	...	2	...	...	Completed.
Kenana-Rangiuru ...	...	2·25	...	...	"
Tokaanu-Waimarino ...	...	10·25	3·5	...	Delayed.
Wairoa-Gisborne ...	...	...	...	44 bridgs	"
Rotorua, <i>via</i> Galatea, to Wairoa ...	...	...	...	...	Grade survey in progress.
Ormond-Waiapu ...	...	4·5	...	...	Delayed.
Gisborne-Waimata ...	...	...	5	...	Widened out to cart-road.
Totals ...	47·5	23·75	26·25	...	

MR. J. C. BLYTHE, Road Surveyor, reports the exploration of a road from Rotorua, *via* Galatea, to Waikaremoana and Tekapu (Frasertown), as follows:—

GALATEA TO ONEPOTO.

I left Galatea on Monday, the 1st June, taking one man with me besides Morgan and Lunduis, and met Hare Hare and another Native at Whirinaki. Stayed there one night, making an early start for Ahikereru next morning, staying on the northern bank of the Whirinaki River on the night of the 2nd June; crossing the river on the 3rd; and on the night of the 3rd Hare Hare made all the arrangements for my going on to Ruatahuna, but had to spend all day of the 4th in making final arrangements *re* payment, &c. From Ahikereru I sent Lunduis back with our own horses to Galatea and Wairoa, Tarawera, and took two Natives and two horses on towards Ruatahuna, leaving Ahikereru ourselves on Friday, the 5th June, but did not reach Ruatahuna until Saturday midday, which being the Uriwera Sabbath, no arrangement could be made for leaving. The 7th, 8th, and 9th being wet days, we only made the Mimi Settlement from Mataatua (Ruatahuna proper), and, starting from there on the morning of the 10th June, made Whakarewarewa the same night, and, hiring a canoe, I reached the Constabulary station on the evening of the 11th. Pushed on for Rotorua, *via* Wairoa, Napier, and Taupo, as no steamers were available *via* Tauranga. I saw both Captain Preece and Mr. Baker, giving them a brief report of my journey through.

The route I took was all along the old Native track: and I am of opinion that a good road, with gradients not to exceed 1 in 15, can be obtained all through, from Galatea to Waikaremoana; but the works will be very expensive, as there is so much rock to contend with, and after leaving Ahikereru it will be all bush side-cuttings.

From Galatea, as I propose going on the western side of Whirinaki Stream for the first five miles, the road will run through level land, then for about eight miles the road will follow up the Whirinaki and Mangawhiri streams, that portion from the entrance of the Whirinaki Gorge to the Mangawhiri junction being heavy rock-cutting for about one mile. At the end of the eight miles I think the road will leave the stream, and begin to ascend to a low saddle in the bush near Tikorangi, from thence descending to Ahikereru Stream (Whirinaki), opposite the old mission station, making a distance of about twenty miles from Galatea, or, rather, Rangitaiki River, to the old mission-house. The last seven miles will be through timber-country, and the fifteen miles from Whirinaki Gorge will be all side-cuttings. The highest point to be crossed on this portion of the road will be 1,650ft. above sea-level, and, as I make Ahikereru 1,000ft., no heavy grades will be required, as the distance from saddle to river near the mission station will be between three and four miles. From Whirinaki River near the mission station the line ought to pass at the back of Ngatiwhare Settlement, crossing a low saddle into the Okaho Valley, following up Okaho Stream for at least six miles to its junction with Manawahiri, where it will need to be crossed, so as to allow of the road being taken up this valley so as to cross Tarapounamu Range. The time occupied in travelling from Ahikereru to the foot of the Tarapounamu Range was five hours, and during that time we had only ascended 730ft., making the foot of the range read 2,050ft. above the sea-level.

In thirty minutes we reached the top, and the aneroid read 2,950ft. The track then descends into the Mangakakeho Stream, the height of which is 1,950ft. above the sea-level; and the time occupied in travelling down the spur along a good track was one hour. The track crossed the stream, and then ascended up a very steep mountain-side to the top of Tahuaroa Range, where we slept for the night. The road will need to follow the general line of the track from the top of Tarapounamu Range, as the Mangakakeho Stream is a tributary of the Whakatane River; but will follow along the south-western bank until it crosses the head of the Whakatane junction, not far from Te Mimi Settlement; then will follow up Ruatahuna Stream to a low saddle on the Huiarau Range. The next morning, 6th June, being a fine morning, and seeing a stretch of country lying below me, I attempted to take a few compass bearings; but just as I was starting work one of the Uriwera people came up to the whare, and my guides, seeing his approach, advised me not to do any writing within sight of the Uriweras, as they would at once turn me back, and as this Native escorted us down to Matatua, the principal settlement of the Uriwera people at Ruatahuna. The following day a meeting was held on the subject of my coming, and the speakers spoke very strongly against my having been sent, and told me "if I intended to do any surveying of any kind I must go back;" but after the Native that Hare Hare sent through with me having explained that I had not come to do any work at that time, but only to see if a good road could be made from Rotorua to Waikaremoana, they said, "they offered no objection to my journeying through, but that they would not allow any roads to be made, as they did not wish in any way to have any dealings with the Government or pakehas."

I may mention here that if it had not been that Hare Hare, the Ngatimanawa chief (residing at Galatea), supported me, I could not have gone any further than Ahikereru, as the Ngatiwhare wished to send me back there; but Hare Hare reminded them that their chief Hamiora was the one that had requested the Government to make the road as far as Ahikereru, and they could not consistently send me back; they then remained passive in the matter; thereupon Hare Hare offered to send a Native named Blanket through with me, not that I was to travel on Hare Hare's name, but, as Blanket had heard Hare Hare explain the reason of my coming to his own people at Galatea, at Whirinaki, and at the northern bank on the opposite side of Ahikereru River, to Ngatiwhare settlement, this man Blanket would go through to Ruatahuna to explain matters to the Uriwera people, as the letter sent to the people at Ruatahuna from the Native agents at Opotiki had made them (the Uriwera) determined not to let me through, as it told them "the surveyor is coming to survey and make roads through your land to Waikaremoana." Captain Preece's Native, Hetaraka, mentioned in my letter of the 30th May, did not make himself known to me at Galatea, although he was in the whare talking about the road; and I have found out since that he could not have taken me through, as the Uriweras warned him against doing so: therefore the whole of the credit is due to Hare Hare, of Heruiwi, and he has done so much as he was the principal one to ask the Hon. Mr. Ballance to make the road to Ahikereru. On leaving Matatua we follow the old Native track up Whakatane for about three miles, to the Mimi Settlement; and as the weather was so unsettled, the head chief, Whenuanui, advised me to send a Native on ahead of me to Waikaremoana Lake for a canoe, and also to see that no trace of snow was visible on Huiarau; and I took his advice, and sent one on to the lake, to provide for a canoe to meet us at landing at North Arm.

We left the Mimi at 8 o'clock on the morning of the 10th June, and following up Ruatahuna Stream, travelling for four hours through open bush, on very good tracks, and rising about 1,000ft. during that time, when the steep ascent to Huiarau was reached at a height of 4,175ft. by my aneroid. Here a good view of the lake and surrounding country could be got; but, unfortunately, my guides would not allow me to take any prismatic bearings, as they were afraid of the dark setting in before we reached the lake. The track from Huiarau down to the lake is the worst portion of the road through, as it follows down old landslips and creek-bottoms among fallen timber. About half-way between Huiarau and the lake a good view is to be obtained of the Huiarau Range, and I saw a low saddle, at least 500ft. lower than the place we crossed, and about 1,250ft. above the lake, through which the road will have to pass, and then follow down the spurs and ranges towards the north-eastern arm of the lake, and so on round to Onepoto. I did not attempt any exploration around the lake, as the weather was so unsettled, and, having run short of food, and very little to be obtained at Onepoto, I sent the Natives back, and made my way round to Rotorua, arriving there on Monday, the 22nd of June. The road will not be far from Te Mimi Settlement, and will follow same direction as the track; but will be higher up on the ranges, more to the westward of the track, to enable an easier ascent to be made to Huiarau. From Huiarau Saddle a grade of about 1 in 20 can be obtained, if necessary, to the lake; but, as all the country between Ahikereru and Onepoto requires thoroughly exploring, and that can only be done in summer weather, as it is too cold and wet, not mentioning Native objections and obstructions, I have only based my estimates upon the nature of the country travelled through, and time taken in travelling to obtain distances, and aneroid heights for grades, my aneroid being about 150ft. out by altitude scale reading at Wairoa, Hawke's Bay, having set it at 860ft., Rotorua Lake.

I submit the following as an estimate:—

Rotorua, starting from Wairoa Village to Galatea, Rangitaiki River,					
forty-five miles	...	...	...	...	£2,000
Rangitaiki River, if bridged	...	...	...	...	1,000
Rangitaiki to Whirinaki Settlement, five miles	...	...	...	...	200
Whirinaki to edge of bush, average cost per mile for side-cuttings, 6ft.	...	...	...	...	...
in solid, £220 per mile, eight miles	...	...	...	...	1,760
Remaining portion, estimated at seven miles, all bush side-cutting, £160	...	...	...	...	...
per mile	...	...	...	...	1,120
Addition to original estimate	...	...	...	...	500
Total, sixty-five miles	...	...	...	...	£6,580

Average cost per mile, £240:—

From Ahikereru to Okaho Junction, six miles ; with Manawahiri, along-side Manawahiri Valley, and over, fourteen miles ; Taraponamu to opposite Te Mimi, from Te Mimi to Waikaremoana, sixteen miles ; around north-east side of lake to Onepoto, nine miles : total, forty-five miles	10,800
Total cost for 110 miles	£17,380

As the last forty-five miles will be through heavily-timbered country, I do not think that a bridle-track could be formed 6ft. wide under a cost of from £3 to £4 per chain, which, at £240 per mile, would bring the cost of this portion to £10,800 ; and at least a quarter of the forty-five miles will be in rock side-cutting. I do not think I have over-estimated the cost. And, again, the 6ft.-wide roadway will require to be cut out of solid earth nearly the whole of the way, as the country is so steep. The land between Rangitaiki and Ahikereru is of good quality, and the bush land contains very valuable timber—plenty of totara and rimu ; and there is also a goodly extent of undulating country at head of Ahikereru Valley, which would be greatly increased in value by this road being formed ; and, as the Ngatimanawa are very anxious for the work, I anticipate some cheap labour. The country between Ahikereru and Waikaremoana is very broken, but the soil is of fair quality, and the principal timber is black birch. But, in the event of the road being carried through to the lake, this portion of the country requires a thorough exploration, so as to become acquainted with all the country for at least ten miles on each side of my present reported line, which it would be impossible to do until after the end of October, even if the Natives would not obstruct, as the days are now so short, and the expense of getting food so great, and the nature of the country so broken, that it is only fit for summer work. I have written “ten miles,” as I do not know if you will approve of the road being taken *via* Ahikereru, which line when one is standing on the highest point of the track on Huiarau, looking northwards, the country below is all visible to Tarawera Mountain, and the track we travelled over nearly a straight line, in no place between Ahikereru and Huiarau deviating more than 10° ; but the great difficulty is the Mangakakeho Stream, which runs in a south-westerly, or more nearly west direction, and will take the line a long way to the west of the present track to the back of Te Mimi Settlement. Whilst in the Uriwera country I noticed that the young men were well dressed, and found that they went a long way from home to earn money ; and I think that, if the road-works are carried on steadily towards Ahikereru, and Hare Hare use his influence with the Ngatiwhare for the road to be carried on from Ahikereru to Taraponamu range (Uriwera boundary), and these young men are willing to earn money by taking small contracts, that they, seeing the advantages of the road and the benefits of earning money, will help the Government in continuing the road through to the lake, as it is only the elders of the people that are so conservative, and many of the smaller settlements, especially those on the sides of Waikaremoana, are anxious for roads, but cannot offer any help, as they are men of no influence—as they put it, “they are living outside the room,” the room being Mataatua. I propose, with your approval, to go on with the road, grading from Wairoa Village on towards Galatea, and will by the end of the present month be able to properly explain mine of the 30th ultimo, written from Galatea.

OPOTIKI-ORMOND ROAD.

Mr. SIDNEY CRAPP, Inspector, Public Works Department, reports:—

Opotiki-Ormond Road.—Section 7: length, four miles fifty-two and a half chains.—One mile fifty-two and a half chains has been formed 5ft. wide (side-cutting), and one mile fifty-two and a half chains of bush felled one chain wide. The above completes the section, and also the connection of the new line with the old road, about ten miles to the westward of the Motu River. There has also been a contract let to widen this road at the worst portions (where precipitous and rocky) from 4ft. to 8ft. wide, and the following is the amount of work done: 2,726 cubic yards of blasting-rock, and 2,492 cubic yards of picking-rock has been excavated, and fifty-seven and a half chains of rock-stripping done.

Maintenance.—Two surfacemen have been employed on the road up to October, 1884, and since then four men have been employed constantly on this work. The length of road maintained is sixty miles, through heavy bush. The road will require constant attention to keep it open for traffic. At present it is in fair order considering the small number of men employed.

This road, as you are, no doubt, aware, connects the district of Poverty Bay with the Bay of Plenty, and opens up the whole of the inland country between the Opotiki Township, in the Bay of Plenty, and the Township of Ormond, in Poverty Bay, the distance being about ninety-two miles. The most important of these lands, lying in the Motu Valley, about half-way between the two above-named places, portions of which have lately been cut up for settlement and offered for sale, will be greatly benefited and enhanced in value by this road passing through. The road also passes through the Whiti-kau Block, of about thirteen thousand acres, Crown lands. This block is situated on the west side of the Motu River, about thirty miles from Opotiki. The remainder of the lands along the line of road are still, I believe, in the hands of the Native owners.

The Clerk to Rodney County reports that the works undertaken by the authority of the Minister of Lands are—Clearing slips and fallen trees, widening road, repairing culverts on the Matakana-Te Arai Road, at a cost of £109 3s., benefiting the Crown lands, some 12,000 acres of the Pakiri Block.

TARANAKI.

THE only road-work to open up Crown lands under my supervision is on the road from Pukearuhe to Mokau, Mr. Robinson, the Crown Lands Ranger, having charge of the remainder in this district.

The work on this particular road has been done entirely by a Constabulary working-party and Native contractors, chiefly the latter. The former was struck off at the end of April, owing to the reduction in strength of the station at Pukearuhe. During the ten months they were employed, with an average strength of nine men, they have made 187 chains of side-cutting for a bridle-track over the Parininihi Range. This track is 6ft. wide, and a mile of it through papa rock, in some places almost perpendicular cliffs. Ten rough bridges of small spans were constructed, and repeated repairs were made to the zigzag over the cliff. The horse-track to Tongaporutu has also been kept in order.

The total cost, including supervision, tools, blasting-powder, &c., has been £190 0s. 11d. The men have worked well, and the Government made a considerable saving by their employment, as the work, done in the usual way, would have cost at least £450.

The Natives, by contract, have cleared five miles and three-quarters of the road, one chain wide, with a cart-track in the centre, the price paid to them being £92.

Earthwork they do not take kindly to, and this drags slowly along. During the year only sixty chains have been completed; they are now working on another forty chains, most of the cuttings (which are heavy) being nearly completed.

The total amount paid to Natives during the year is £258 2s. 9d., but to this has to be added the cost and carrying of drain-pipes to Mokau, and supervision, which amount to £109 19s. 2d.

The total expenditure on this road for the twelve months has been £558 12s. 10d.

If the present plan of employing only Native labour is continued, I fear no great progress will be made, as they seem to be getting daily more disinclined to work.

THOMAS HUMPHRIES, Chief Surveyor.

MR. G. F. ROBINSON, Crown Lands Ranger, reports very little new work entered into during the year, the chief part of the work consisting in completing the contracts entered into for felling roads through Crown and Native lands in Blocks X. and XI., Opunake, and Blocks IX. and X., Kaupokonui, and in culverting the roads in Blocks XI., Opunake, and IX. and X., Kaupokonui. The completion of the felling included the Kaweora and Waiteika roads through Native lands, and the Opunake, Mangawhero, Wiremu, Oeo, and Rowan roads through Crown lands, the payments made on this road during the present year being £855 0s. 11d. The following roads were culverted, partly drained, and in parts formed, so as to make them passable for traffic: the Watino, Kiri, and part of Opunake Road, in Block XI., Opunake; part of the Opunake and the Oeo roads, in Block IX., Kaupokonui; and the Mangawhero, Rowan, and part of the Opunake roads in Block X., Kaupokonui; the total length culverted being about twenty miles, at a cost of £1,106 18s. Of the new works entered into, 302 chains of the Lepper, Dudley, and Durham roads, in the Ironsand Block, Egmont Survey District, have been felled one chain wide, and roadway cleared 16ft. wide in the centre of the chain, at a cost of £275 10s. The whole of the roads in this block have not yet been opened through want of funds; but the above work has opened up about 3,500 acres, a large portion of which has since been sold and is now being cleared.

Rama Road (Block II., Waimate District).—Of this road 107 chains has been drained and formed 15ft. wide, a small bridge and four culverts constructed, also the necessary earthwork done to form approaches. The whole work was completed at a cost of £200, of which amount £100 was provided by the Waimate Road Board.

Eltham Road.—Of this road 203 chains, commencing from the Main South Road, near Opunake, has been graded and formed 20ft. wide, with necessary culverts and drains, and about 176 chains of this has been gravelled 12ft. wide by an average depth of 10½ in. This work, excepting the carting the gravel, has all been done by Armed Constabulary labour; the total cost, including compensation for gravel, cost of tools, and sundries, being £522 7s., a saving being effected as compared with contract values of over £150. Payment at the usual rate to the Armed Constabulary is included in the above.

Roads through Native Leased Lands between Opunake and Stoney River.—The culverting, draining, and formation of the open roads, and the felling and clearing roadway in the usual manner of the bush roads, through these lands is now well advanced, and I expect all the contracts to be completed this month. So far the sum of £317 4s. 9d. has been paid on account of the contracts as progress-payments, the work being on the Namu, Opua, Arawhata, Kina, Witiara, Ruakere, Paora, Puniho, and Minerapa Roads, the length of roading under contract being over eighteen miles, which, when completed, will give every lessee access to his land. The grassing of roads has cost £77 11s. 8d., part of which amount is, however, in payment of work done prior to the 30th June, 1884.

The total expenditure for the year, including supervision, was £3,546 14s. 2d. The work was let in forty-three contracts, and the cost of supervision was £190 13s. 11d., or a little over 5 per cent.

The works I have now in hand are—the completion of the roads through Native lands between Stoney River and Opunake; the formation of part of Tariki Road from Mangaone clearing to the Waitara River; the opening of a road from Rahotu through Native lands towards the Mount Egmont forest reserve.

HAWKE'S BAY.

Maharahara Block.—These works have been let in small contracts. Five contracts for clearing ten miles of road, one chain in width, have been finished. At present there are seven contracts, for five miles clearing and one mile of formation, in progress. The expenditure to date has been £2,453 3s. 8d. The liabilities on contracts in progress stand at £678, leaving the sum of £305

16s. 4d. still available. In March and April last the Maharahara lands were offered for sale, when every section except three was taken up. From the sale of the deferred-payment lands the Road Board will derive a considerable revenue—about £4,000—quite sufficient to carry on the works that have been commenced.

Umutaoroa Block.—Since December four miles have been cleared, one chain in width. The clearing was let in small contracts, at a total cost to date, including supervision, &c., of £795. It is intended to clear the roads to give access to each section in the Waipawa and Danevirk special-settlement blocks, to form the roads on sidling ground, and to erect a few small bridges and culverts.

Tautane to Tahoraite (Tautane Block).—During the year eight miles of road-clearing contracts have been completed, and a contract has been let for clearing a cross-road three miles in length. The total length cleared from the Wainui Settlement towards Tahoraite is fourteen miles, reaching from the sea-coast to within six miles of the clear land on Mr. Hamilton's leasehold. The sums voted for the road will not do more than cover the liabilities on the contracts in progress. The fourteen miles that have been cleared open out the country into the heart of the block; but there remains a great deal more to do before the land should be thrown open for settlement. I estimate that at least £10,000 will be required to finish the clearing of the road and the formation on the hilly ground, a distance of thirty miles or thereabouts. It is now a year since the road was graded and the levels taken through from end to end. Should it be deemed advisable, the contracts for the clearing and formation of the road can be put in hand at once. The area of Crown land to be opened out is 59,000 acres.

Rotokakarangu Block.—The obstacle standing in the way of this road has now been removed by the transfer to the Queen of a right of road through sections Nos. 21 and 22, at Ohinepaka. The sum voted is too small to do more than to make a start with the work.

Mohaka to Waitara.—Nothing further has been done than to grade the road a distance of twenty-two miles.

Block XIV., Tahoraite Survey District.—The sum of £405 has been expended in payment of liabilities on work returned as completed last year. A grant of £50 has been promised to the Kumeroa Road Board to aid in opening out a bridle-track to the back sections in the valley of the Otawhao Stream.

Victoria and Bush Mills Settlements.—The expenditure of the vote of £800 has been handed over to the Woodville Road Board. Plans and specifications for ten small contracts for formation, including culverts on the roads through the settlements, have been prepared by Mr. Barge for the Road Board, and the work is nearly completed.

WELLINGTON.

THE road-works undertaken by the Survey Office comprised: The extension of the Kimbolton Road into the Waitapu Block, carried out by Mr. Charles Field and party under the supervision of Mr. A. Dundas, District Surveyor. The work completed to the 30th June, 1885, included 221 chains felled and cleared, 112 chains formed 18ft. wide, and 20 chains gravelled 12ft. in width. The cost amounted to £660. The work has been done in a satisfactory and workmanlike manner.

Three contracts were let on the Mangaone Block for the felling 1 chain in width, and stumping and clearing 33ft. in centre, upon 446½ chains of road-lines in Mangaone and Tawataia Valleys, the amount being £627. The works were well advanced towards completion at the close of the year.

The Rangitikei County Council are carrying on the extension of the Hunterville Road under Mr. Toms's directions. That gentleman informed me that fifty-six chains of dray-road had been completed, terminating at Otairi southern boundary, and that two other contracts, comprising 171 chains, were in hand, to be finished by the 26th September next. This road will be of great service to the contractors who may have the extension of the Main Trunk Railway.

The Clerk of the Rangitikei County reports, by direction, the subjoined particulars relating to works on the Marton-Murimotu line to open up Crown lands in the Otairi Block, which were undertaken by authority of the Minister of Lands out of a grant of £700 allocated for that purpose: Works let and in progress prior to the 30th June: formation, 241 chains at £460. Portion completed on the 30th June: seventy chains at £150. Timber on ground for bridges and culverts prior to the 30th June: value, about £50.

The state of the surveys in other localities will be found below:

Tokomaru Block.—Messrs. John Annabell and R. H. Reaney completed the surveys of seven miles of West Tokomaru Road, of which three miles were prepared for contract.

Karewarewa Block.—The same officers completed the surveys of two miles and a quarter, and prepared the necessary plans and specifications for contract.

Parahika Block.—They also completed four miles on this block in the same manner.

Waitapu Block.—Mr. A. Dundas reports that the surveys of eight miles were well advanced.

Pohangina Block.—Mr. Dundas has only to complete the plans of three miles and three quarters which he surveyed.

Mikimiki, Te Maru, and Wakapapa Valleys.—Mr. Llewellyn Smith located eleven and a quarter miles of road; but the surveys have not been effected, owing to press of other duties.

Tiraumea Valley.—Mr. Smith also laid off twelve miles of road in this valley, from the Manawatu to the Makuri Stream, and completed the levelling over one and a half miles of the same.

Dorset Road.—He finished two and a quarter miles of this road. The construction must be delayed till the road has been legally opened.

J. W. A. MARCHANT, Chief Surveyor.

NELSON.

Tadmor and Sherry to Buller Road.—Contract No. 19, in hand at the end of last year, has been completed. The total cost of construction of twelve miles of dray-road has been £4,153 8s. 6d., or £346 2s. 4d. per mile. On the completion of the above the work was stopped, and a further length of five miles and a half is yet required to connect with the main West Coast road. This road would open up about 10,000 acres of Crown lands.

Aniseed Valley Dray-road.—Contract No. 23, of two miles' length, at the lower end of the valley, in hand on the 1st July, 1884, has been completed for £471 13s. 8d. During this year contracts Nos. 24 and 25 have been let for £2,752 3s. 9d., and are now in hand. This work has taken longer than the estimated time for construction on account of the large quantity of rock met with and other causes, but will probably be completed in four weeks. On this work the Champion Copper Mining Company pay one-fourth of cost of construction, including survey and inspection. A branch line is also in course of construction from the above road to the company's machine site, United Creek, for a length of one mile and three-quarters, at a grade of 1 in 19, as a dray-road. For this work contract No. 27 has been taken, at a price of £909 2s. 6d. The Government have granted a sum of £600, the company to supply the balance of cost, and the work is now in progress.

Richmond Hill Horse-track.—A graded road of 1 in 19 has been surveyed from the summit of the hill to the crossing of the Aniseed Valley Road, at the Roding River, and some steep pinches eased on the Richmond side, for which contract No. 28 has been let for £213 2s. The Government have granted £100, and the company to find the balance. The portion graded is three miles and a half for a 5-ft. horse-track, 3ft. in the solid. This work is now in hand.

Pigeon Valley and Dovedale Road.—Mr. H. Tarrant is now employed grading a road over the summit of the hills between these places for the Waimea Road Board, who pay the cost of survey. This work is preparatory to bringing this road under "The Roads and Bridges Construction Act."

Inspection of the above works has been made from time to time.

JOHN S. BROWNING, Chief Surveyor.

WESTLAND.

Kumara to Beach Road (vote, £1,000).—This road is being constructed by the County Council under supervision of the department. It has been let in three contracts for a total of £1,075 10s. 3d. Progress payments made to date, £506. Its length is two miles and three-quarters, two miles of which are now completed. Formation width, 14ft.; metal, 10ft.

Moeraki to Otumotu (vote, £1,500).—Constructed by department. Amount of contract, £1,386 15s. Progress payments made, £234 18s. Length of track, nine miles, two of which are completed. Formation, 5ft.; metal, 3ft.

Smoothwater to Cascade (vote, £300).—The work was done by day-labour. It consisted of benching 2ft. wide along the properly-graded road-line. The amount voted proved to be insufficient to carry the benching to the open on the Cascade plateau; it ends at Carmichael's Creek, a distance of ten miles from Smoothwater Road, and about two miles from the plateau.

Ross to Greenland.—This and the following roads and tracks are constructed by the County Council, under my supervision. They are subsidized by Government, and, though primarily intended to meet goldfields requirements, they to a very great extent answer also the purpose of opening up Crown lands suitable for settlement. Ross-to-Greenland Track is let in five contracts: total of these, £1,280 18s. 9d. Total of progress payments made by county, £609 15s. Government agreed to a subsidy of £960: of this £233 16s. 8d. has been paid. Length of track, six miles and a half, of which four miles and a quarter are already completed. Width of formation, 6ft.; metal, 3ft.

Kanieri Lake to Humphrey's Gully.—Total length, one mile and three quarters; width of formation, 7ft.; metal, 4ft. Part of work was let in two sections. Total of contracts, £277 2s. Payments made by county, £277 2s. Government agreed to a subsidy of £373 6s. 8d., but no progress payments have as yet been made.

Larrikin's to Loop-line.—Let in three sections. Total length, two miles and three-quarters. Total contract price, £439 1s. Government agreed to a subsidy of £333 6s. 8d. Neither county nor Government have made progress payments yet, as the contracts were entered into only a month ago. The width of formation of track is to be 6ft.; metal, 3ft.

Cedar Creek Road (vote, £3,000).—Survey proceeding. Tenders for the first few miles will be invited within a month. Length of road, eight miles; formation width, 14ft.; metal, 10ft.

Greenstone Road (Duffer's Creek) to Christchurch Road (Fifteen Mile Post).—Length, three and a half miles; let in three sections. Total of contract price, £720 6s. 9d. The first half-mile was constructed a dray-road, 14ft. formation and 10ft. metal; the rest a horse-track, 6ft. formation and 3ft. metal. The contracts are completed and paid for. Government subsidized the work to the amount of £480 4s. 6d.

Extension of Back Creek Track to Eel Creek.—Length, one mile and three-quarters; formation width, 6ft.; metal, 3ft. Let in two sections, for total of £249 5s. The contracts are completed and the work paid for. Government subsidy amounted to £166 3s. 4d.

Boucher's Creek to Gentle Annie Terrace.—Length, one mile; formation width, 6ft.; and metal, 3ft. The work was done for £162 8s., towards the payment of which Government contributed £80.

GERHARD MUELLER, Chief Surveyor.

MR. THOMAS KERR, County Engineer, Westland, reports:—

Kumara Sea-Beach Road Extension.—Length, two miles and three-quarters; width, 10ft. About two miles of this road extension is now completed, and the whole will be finished in about a month from this date. A vote of £1,000 was allotted for this work by the Government, but the total cost will be £1,527 8s. when the final payments on the present contracts are made; so that

the County Council will have contributed £527 8s. towards the cost of the work from its own funds. The contracts were as follows: Clearing and grubbing Sections 3, 4, and 5 (two miles and three-quarters), £451 18s. This work was completed in December, 1884, and contracts were then let for forming and gravelling a 10-ft. (gravel width) road over these sections, the amount of said contracts being £1,075 10s., of which sum £506 has been paid to the contractors, the balance, £569 10s., being still due on the work, but the whole amount will be paid when the contracts are completed. When the present contracts are finished the road will be open through from Kumara Borough boundary to the sea-beach; total distance, four miles and three-quarters. This road will open up about two thousand acres of heavily-timbered land, which will be most useful to the mining population of Kumara and neighbourhood, as a constant supply of mining timber for years to come is made available. The country is flat, and average West-Coast land; and when the timber is all cleared away, of course the land will be available for settlement.

CANTERBURY.

Teviotdale Road.—The Waipara Road Board has completed the heavy cutting at the Omihⁱ Creek, for which £150 was granted to that Board. The road is now completed to the four mile forty-eight-chain peg, the last mile and fifty-eight chains being done this year at a cost of £285. It is not proposed to spend any more on this road.

Kuku Pass Road to the Upper Ashley.—From five miles seventy-nine chains to thirteen miles seventeen chains, or seven miles eighteen chains, have been constructed during this year, at a cost of £1,500. This brings the road to within about forty chains of the Okuku Flat, after the present contract is finished. The Chairman of the Ashley Road Board reports: Total length of road constructed during the year, seven miles ten chains. Width of road, 12ft. on the solid; the spurs in most cases cut back to 16ft. This road is now open for dray-traffic a distance of sixteen miles fifty-four chains, from the Kuku Creek Bridge, north of the White Rock Quarries, to the top of Lee's Pass. This pass is west of the south branch of the Waiparu, and distant from the Okuku River about one mile and a half. This road will be the means of giving access to a large extent of first-class pastoral land on both sides of the road, and a considerable area of agricultural land. The road is completed within thirty chains of a level tract of land extending on to the Okuku. From the top of Lee's Pass over the Ashley Saddle to the head of Duck Creek, Ashley Valley, is about four miles and three-quarters. With the exception of about one mile forty chains of ordinary side-cutting, the road for the above distance is over level country. There are a few swamps and creeks to cross, which will require drains to be cut on either side, and also some stone fords to construct before the road will be available for dray-traffic. I regret that I am not in possession of a tracing to send along with this, as I understand no survey has been made except for a distance of about three miles and a half in the front, that was surveyed by Mr. Dobson, C.E., when laying off the road.

Oxford Bush Road to the Upper Ashley.—From six miles forty chains to eight miles forty chains, or two miles, have been formed on this road during the year, at a cost of £1,221 3s. 2d.; but a considerable portion of this money has been spent clearing and improving parts of the road done before. The Chairman of the Oxford Road Board reports: During the year ending the 30th June, 1885, three miles of this road has been formed at a cost of £858 7s. 4d., or about £3 11s. 6d. per chain, including bridges and culverts. There has been spent £230 5s. 10d. in extra culverts and in opening side-channels on the road already formed, and in repairs from slips at several places. The total amount spent during the year is £1,221 3s. 2d., and the amount expended to the present time is £2,893 13s. 2d., leaving a balance of £494 17s. 7d. In the amount expended £132 10s. is charged for superintendence. Four miles and ten chains have been let, which will bring the road on to the open; but some expenditure will be necessary to join to the Kuku Pass Road. The road as far as completed will open eight or ten thousand acres of Crown land, which when cleared would make good grazing land.

Blackhills Road.—The Waipara Road Board has expended the grant of £220 made last session for making ditches and other additions.

Roads on Reserve 1263, near Timaru.—There has been £200 spent under the superintendence of the Levels Road Board, and a further sum of £104 has been authorized to be expended out of £150 sanctioned by the Government.

Eyre Water Race.—The Chairman of the Oxford Road Board reports: During the present year the dam and head-works have been nearly completed, and the race to the tenth mile. A considerable quantity of extra work has been done at the dam, as it was found that the scour had reached the foundation of the wall on the lower side; and a lower apron has been completed, which effectually prevents scour, and has not been affected by the recent heavy flood. The amount spent on the race is £3,001 16s. 5d., or £225 16s. 5d. in excess of grants. If the amount paid to Mr. E. Dobson be added, it would be £3,225 16s. 5d. Some concrete falls are still required to prevent scour, and a retaining-wall is required near the head-works.

Blackford to Redcliffe.—The Engineer to the Ashburton County reports: Out of the Government grant of £300 for this road, a sum of £129 15s. has been expended in the formation of 260 chains, extending from Blackford to south-east corner of Rural Section 32408. The balance available will suffice to form the road to the vicinity of Terrible Gully, near south-east corner of Rural Section 32428, and tenders for this section of the road will be invited next month. All the Crown lands through which this road passes are beneficially affected by its formation. To some extent also all the Crown lands in the Double Hill runs, towards which this road is being extended, will benefit by its formation.

W. KITSON,
Inspecting Surveyor.

OTAGO.

The only work undertaken under direct control of the Chief Surveyor was Glenorchy up Rees and Dart. A contract was let for forming about three miles of this road, to open about three thousand acres of surveyed land ready for disposal. The works are now in progress, and the land will shortly be open for perpetual lease.

Mr. William Smaill, Engineer to the County of Tuapeka, reports that the works undertaken to open Crown lands for sale during the year ending the 30th June, 1885, consist of three contracts, entered into for the formation of 209 chains of the road Beaumont to Miller's Flat, *via* east bank of Clutha River; total liability, £1,000. The contracts are now in progress, and when completed, and the Talla Burn bridged, contracts for which will be let shortly, a road 15ft. in width will then be available for traffic between Beaumont and Miller's Flat, *via* east bank of Clutha River.

Mr. L. D. Macgeorge, Engineer to Vincent County, reports:—

Waikaia Bush Road (Government grant, £2,000).—The work was let by contract at the end of January last, and was completed about the middle of May. The amount actually paid for work done, including extras, is £1,928 18s. 11d., which, together with a sum of £71 7s. 6d. for survey and inspection, brings the total expenditure to £2,000 6s. 5d. The Crown lands beneficially affected at the head of the Waikaia and Pomahaka rivers embrace an area of, say, a hundred square miles; but the immediate object of the road is to render the timber of the Waikaia Valley available to the settlers and miners in the Clutha Valley.

Upper Clutha Blocks (Government grant, £360).—Liabilities amounting to £160 have been incurred, of which sum £105 is on contract and £55 on day-labour work. The lands beneficially affected are Blocks III. and part of Block VI., Lower Hawea, and Blocks V. and VI., Lower Wanaka District, and are situated on what is known as the Fork Run. These blocks are now accessible from the Hawea Flat, and it is intended with the remainder of the grant to carry on the work to the punt situated on the Clutha River, just above the Hawea junction, when they will also be accessible from Albertown, Pembroke, and surrounding districts.

Mr. Richard Browne, Engineer to the Maniototo County, reports:—

Deepdell Road, Run 210.—The amount required to open up this road is £300.

Block XI., Naseby (White-Sow Valley).—The contracts referred to in last year's report, amounting to £288, have been completed, and the available balance of £12 expended in improving the road; the total expenditure being £300, the length of road being about two miles, the works being formation, draining, and small bridge.

Block XV., Maniototo.—A sum of £200 was available for this block. A contract has been let, amounting to £99 2s. 6d., and is now being proceeded with. Some minor works are being done by day-labour, estimated to cost £20, leaving a sum of £80 17s. 6d. yet unexpended. Plans are being prepared for work to this amount. The above available sum is totally inadequate to complete the formation of even the worst portions of this road: £200 more will be required within this block. When the railway (Otago Central) approaches the Taieri Lake this will become a very important road.

Block V., Lauder.—The sum of £500 was available for this block within this county. Previous to taking levels and preparing plans for improving this road, it was found necessary, owing to the greater portion of the road between sections 13 and 8 running through a succession of swamps, to first of all drain off the surface-water by means of deep ditches, having a fall into the Lauder Creek. This has been done by day-labour at a cost of about £85. Plans, &c., have now been prepared, and, when approved by the Chief Surveyor (Mr. Arthur), tenders will at once be called for the work. Estimated to cost £400. The work extends over one and a quarter miles of road, and includes three small bridges. A bridge across the Lauder Creek (the boundary between Vincent and Maniototo Counties) on this line of road is much required; but the amount placed at the disposal of this county for this block will not admit of its construction. A bridge and approaches could be erected for £200.

Block II., Blackstone District.—The sum of £200 is available for this block. Survey and plans are completed for work on the road leading to sections 50 and 51. When approved by the Chief Surveyor, tenders will be called for the work.

Until the above works in Block V., Lauder, and Block II., Blackstone, are completed the adjacent lands are inaccessible for vehicles unless by long detours.

The Engineer to Taieri County reports that a sum of £475 has been intrusted to the county for the purpose of forming roads through Block I., Nenthorn Survey District, Otago. Dry-stone rubble culverts of various sizes have been placed in all the races and water-channels, and the road formed to a width of 16ft., and the whole road cleared of any tussocks or scrub for a width of 20ft. on the centre. The work commences at the suspension-bridge across the Taieri, which is within a few chains of the main road from Dunedin to the Strath Taieri, and uninterrupted communication is thereby established to Blocks I. and II., Nenthorn District. The contract, which has been in progress for the last two months, will be completed in about a month.

Mr. A. Valentine, Road Inspector to the County of Waikouaiti, reports three contracts were let and finished on the Hummockville Road at a cost of £279 1s. 6d., which completes the formation from Ballingdon Station to about three-quarters of a mile beyond the north-western corner of preemptive right in Block IV., Hummockside. Three contracts were also let and finished on the Mount Watkins Road at a cost of £354 10s. 5d., and others now in progress will complete the formation of the most necessary portions of the road to the river-crossing at Section 3, Block I., Hummockville.

Mr. C. H. Howorth, County Engineer, furnishes the following report of work done by the Southland County Council:—

Road through Blocks II. and III., Campbelltown Hundred.—The vote of £100 has been spent in work as follows: Forty-six chains of formation, fourteen chains of ditching, thirty-two chains of

gravelling, and the building of ten log culverts, between the Main Road, Invercargill to Bluff, and Section 14, Block III., Campbelltown Hundred.

Road, Waikaka to Switzers.—The vote of £200 has been spent in carrying out the following work: Fifty-five chains of formation and gravelling, and the erection of two timber culverts.

Road, Pyramid Bridge to Waikaia.—The vote of £200 has been spent in carrying out the following work: Sixty-seven chains of formation and gravelling, and the erection of two timber culverts.

Road through Block I., Wendon and Wendonside.—The vote of £100 has been spent in carrying out the following work: Twenty chains of formation and gravelling, twenty chains of ditching, two chains of fascining, two and a half chains of creek diversion, and the erection of one box culvert.

W. ARTHUR, Chief Surveyor.

SOUTHLAND.

Bush Land East of Makarewa.—Mr. Howorth reports:—"The balance of vote of £500—namely, £195 13s. 4d.—has now been expended in carrying out the following work: Extending bush-felling, clearing, grubbing, formation, and ditching a further distance of ten chains, and forming and gravelling twenty-five chains of the worst portions of the road done the previous year." This road extends from the main north road running through Makarewa Township, in a due east direction for about a mile and a half. The work done during the past year, which consisted of some twenty-five chains of forming and gravelling and of some ten chains of bush-clearing, forming, and ditching, was with a view partly of extending the road-line further into the block and partly with the object of improving and making fit for permanent use portions of the road that had been cleared and partially formed during the previous years. I might report that the block is all bush-clad; but, as it lies in a good locality and is very accessible from a main road and from the railway, I have little doubt that by-and-by, in consequence of the road expenditure that has taken place, the sections will be for the most part taken up. A considerable number of sections have been already purchased and settled upon, these being situated chiefly upon the road that has been formed; and the ultimate settlement of the remainder is merely a matter of time. Those sections of the block which abut upon other roads have not been taken up so largely as those along formed road; but as settlement progresses they will probably be all taken up.

Road, Trig. FF, Oteramika Hundred, via Seaward Gorge, to Mataura River.—Mr. Howorth reports:—"The vote of £500 was apportioned as follows: £100 to be spent between Trig. FF and Section 14, Block IX., and £400 from thence to Mataura River. The following work on the first portion has been done to this date—namely, twenty-three chains of formation, twelve chains of ditching, and the building of nine log culverts; and on the latter portion 250 chains of ditching, 120 chains of formation." This road extends from near the head of the Oteramika Gorge south-eastward through the gorge for several miles, till it strikes the Mataura River. The lower portion of the road, near the Mataura River, has been through heavy though rich swamp-land, there having been 250 chains of ditching and 120 chains of formation at this part. The road from near the head of the gorge to the beginning of the swamp has also been greatly improved and made passable; some twenty-three chains of formation, twelve chains of ditching, and nine log-culverts having been found necessary along the route. The latter piece of work, while being indispensable ere the lower portion of the road could be easily got at, will, in addition to serving the purpose of opening up Crown lands, be an immense boon to many of the settlers in the gorge, who for years have enjoyed only a very precarious kind of access to their homesteads.

Road through Seaward Bush between Blocks III. and IV., Oteramika Hundred.—Mr. Howorth reports:—"A contract has recently been let to absorb £319 voted for this road to make an opening through the bush, and up to this date twenty chains of bush-felling has been done." This road runs from Oteramika Open due south through Seaward Bush to what is known on the map as "Seaward Moss." During the year the County Council, into whose hands the work was committed, called for tenders for some two miles or so of bush-felling; and this work is now in progress. To effect the purpose in view, and to tap the land on the south side of Seaward Forest, which was lately cut up into sections suitable for deferred-payment application, a further expenditure would be required, and in the list lately forwarded by me of moneys recommended to be spent to open up Crown lands you will find this road included. There is a considerable acreage of Crown land lately surveyed that is suited for settlement, and, though peat occurs here and there over the block, I think, if the land be offered on deferred payments and a passable means of access provided, a good many of the sections will probably be taken up. The land in this locality is in a most outlying and hitherto unapproachable position, and the desirability of having it opened up and settled in some form is very apparent. It is true that in the large block lying between Seaward Bush and the ocean there is an immense amount of comparatively useless land; but here and there, particularly in the region lately cut up into sections, there is a good deal of comparatively promising land that is bound to be taken up and settled upon within the next few years. Without a road to give it access, however, it may remain unapplied for for many years to come.

Road running along Mokotua Creek from Bluff Road towards Block XII., Campbelltown Hundred.—A small amount of money has been spent during the year in partly forming and rendering passable this road for a distance of nearly two miles from Bluff Road. The work done consisted of forty-six chains formation, fourteen chains of ditching, thirty-two chains of gravelling, and ten log culverts. A considerable amount of work has been done for the comparatively small sum expended, and I have no doubt that what has been done will be the means of inducing some of the sections in this locality to be taken up. Hitherto they have been totally neglected, and probably would long have remained so had some means of access, however imperfect, not been provided. It would be well, however,

that a small additional sum should, if possible, be granted, so that the road could be carried a mile or so further southward, and by that means tap a little passable land that cannot meanwhile be approached, and is thus unlikely to be taken up until something be done.

JOHN SPENCE, Chief Surveyor.

Mr. E. R. USSHER, District Engineer, Public Works Department, reports on the Forest Hill Tramway: The second section of this tramway begins at the termination of the first section (five miles twenty-one chains), from its junction with the Kingston Railway at Winton, and is five miles in length. The contract amount is £5,455 2s. 8d., and it was let to Henry Jagers on the 2nd November, 1883, to be completed on the 2nd May, 1885. The contract includes formation, fencing, laying 28-lb. rails on longitudinal beams supported on transverse sleepers, and ballasting. The works are progressing favourably, but some delay in completion is anticipated, owing to the difficulty experienced by the contractor in procuring suitable timber for the longitudinal beams.

By Authority: GEORGE DIDSBURY, Government Printer, Wellington.—1885.