

1882.
NEW ZEALAND.

SURVEYS OF NEW ZEALAND.

(REPORT FOR 1881-82.)

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

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

SIR,— General Survey Office, Wellington, 9th August, 1882.

I have the honor to furnish the annual general report on the operations of the Survey Department for the twelve months ended the 30th June, 1882.

In the Appendices will be found the maps illustrating the progress of the several classes of survey, extracts from the Chief Surveyor's reports on the surveys conducted in the several provincial districts, and report and detail of map publications, also tables enumerating the work of the field surveyors, and reports on the road-works through Crown lands under the direction of the department. These items of information have been arranged in a similar manner to that in former annual reports, so as to admit of easy reference and comparison with past years.

During the twelve months under review the department has addressed itself to the steady prosecution of the trigonometrical and topographical surveys over areas which had not previously been brought under survey except in the exploratory sketch of the reconnaissance surveyor. An area of 4,400 square miles has been mapped, showing correctly the features of the country, the altitudes of its main points, and the leading lines of the future main roads. The sectional surveys of lands for settlement have also progressed well, extensive areas have been surveyed in anticipation of sale, and a very considerable inroad has been made on the arrears of survey, for, while 320,000 acres were disposed of by sale and otherwise during the year, an area of 594,724 acres was surveyed, mapped, and recorded in the same period.

There are also the surveys of the Native Land Court and Native Land Purchase, Gold Fields, Land Transfer, and road surveys, and other matters, which require separate notice.

But, before taking these in detail, the following general statement of the complete field-work for the year is given.

	Area.	Rate per Acre.			Cost.		
		£	s.	d.	£	s.	d.
Major triangulation	1,107,994 acres	0	0	0·23	1,065	4	1
Minor triangulation without topography ...	528,055 „	0	0	1·14	2,529	17	2
Minor triangulation with topography ...	880,693 „	0	0	1·26	9,932	5	4
Rural and suburban section surveys ...	534,209 „	0	1	5·7	39,512	4	8
Town section surveys	1,025 allots.	0	15	2·6	779	13	3
Native Land Court surveys	148,459 acres	0	0	3·55	2,163	1	0
Native Land Purchase	43,026 „	0	0	4·8	861	12	0
Gold-Mining surveys	4,497 „	0	11	3·5	2,469	10	11
Road surveys	426·6 miles	12	12	1	5,377	12	0

1—C. 3.

TRIANGULATION.

Referring to previous annual reports, it will be unnecessary to again explain the basis or standard astronomical data which govern this work and enable it to be prosecuted from independent points, wherever wanted, with the certainty of the parts forming an harmonious whole. Could the surveyor have either a new country to himself entirely for a time, or an old country already settled, his plan of procedure would be a comprehensive network of triangulation first and details afterwards, but in the settlement of a country both processes must for a time proceed together, care being taken to keep the triangulation in advance of the settlement survey. This has now been more than accomplished for New Zealand, the triangulation having been extended over all the settled districts, and over many of those yet to be settled. There is now a continuous network of triangulation extending lineally a thousand miles from Mangonui to Stewart Island. There are however still considerable areas on the flanks of this network which await the extension of triangles over them.

The operations last year have been principally in the Provincial Districts of Auckland, Taranaki, Westland, Marlborough, Canterbury, and Otago, an area of 5,495 square miles having been included within the sides of triangles.

The best test of the general accuracy of a triangulation is the close on a base of verification, or the close of one triangulation on another; any radical error either in the measure of the initial base or in the triangles themselves is sure to be revealed when the work is so checked and verified. The closures last year have been almost in every case very satisfactory. Mr. C. W. Adams' triangulation of the Upper Waimakariri closed to .18 links per mile on the base of verification. Mr. Cussen extended a triangulation across a piece of difficult country between the Bay of Plenty and Tuhirangi Circuits, closing on a side of the major triangulation, $7\frac{1}{3}$ miles long, with an error of 3.4 links, or .46 links per mile. This result is gratifying, not only in itself as a part of the year's operations, but is another proof of the excellence of the major triangulation conducted in the Auckland District under Mr. Heale, when Inspector of Native Surveys. In Marlborough District, Mr. A. D. Wilson has extended a network of triangles over a large area of country from Awatere across to the coast-line at Cape Campbell. He is now working up results, and during the next season he will continue the triangulation down the coast-line past the Kaikoura to a close on the triangulation in the Amuri. His observations have diminished the hitherto accepted altitudes of Mount Odin or Tapuaenuka, the summit peak of Inland Kaikoura Range, by 238 feet, his mean height being 9,462 feet, as against 9,700 feet, the height given on the Admiralty Chart. The progress of the trigonometrical surveys is revealing very material errors in the nominal altitudes of many of the principal points: thus, last year, Mount Cook was reported as nearly 1,000 feet lower than the Admiralty determination; and it is now found that Tongariro and the Kaimanawa Range, in the North Island, are nearly 1,000 feet higher than the altitudes hitherto given. These variations are easily accounted for and understood when it is considered that the heights have been obtained in a variety of ways, by different methods, on no definite plan, and often under circumstances adverse to correct work; indeed, the wonder is they come so near sometimes to the trigonometrical determinations. In Westland, Mr. G. F. Roberts has continued the triangulation of the West Coast; he has now got well down towards Jackson's Bay. The accuracy of this officer's work, and the progress he has made, despite the difficulties of a very rugged bush country and a wet climate, entitle him to the warmest commendation. The coast-line from Milford Sound northward to Farewell Spit was never properly surveyed, the maps of it are simply a patchwork of good and bad work, with the result that the position of many points is very doubtful, and the coast-line is distorted at places on the maps to make it fit in. The triangulation will set this right, and the topographical survey, which is carried on simultaneously, will give a correct map of the country inland for fifteen or twenty miles. It would be too tedious to mention all the officers who have been engaged in trigonometrical and topographical work, but an acknowledgment is due to Messrs. Cussen, Baber, Roberts, and Wilmot for the exposure and hardships they had severally to undergo

in the difficult country they have had to encounter. I must also notice with approbation the excellent out-turn of work furnished by the young officers, Mr. H. M. Skeet, of Taranaki, and Mr. T. Brodrick, of Canterbury.

SETTLEMENT SURVEYS.

The operations under this designation comprehend the laying-out of road-lines, and the subdivision of rural, suburban, and town lands into sections for sale and occupation. Of rural and suburban lands, 534,209 acres were subdivided and marked on the ground into 4,344 sections, and 514 acres of town lands into 1,025 sections. These surveys are all under trigonometrical check, the starting and closing points of the traverses being the stations of the minor triangulation. The traverses are reduced and tabulated on the meridian and perpendicular of the trigonometrical survey, and compared directly with it. The limit of error allowed is 8 links to the mile, or 1 in 1,000; but in practice the error is usually well within this limit, except in rough bush country. In open land, and even in ordinary bush, by taking the angles of the slopes, and using the steel tape, the error can easily be kept under 4 links to the mile. As a matter of fact the error of many of the more experienced surveyors does not usually exceed 2 links to the mile. This accuracy is not the result of any finical painstaking—for the most accurate surveyor is also, as a rule, the most expert—but is the outcome of method, the possession of good instruments, and, above all, the acquisition of the trained habit of accuracy. The necessity for precision in the settlement survey of a new country becomes obvious when it is considered that there are no time-honored land-marks, as in an old country, defining the boundaries of property, but, instead, a blank wilderness, on which the surveyor creates boundaries, the surface-marks of which must often get obliterated before the settler has thought of securing them. These boundaries, once lost, could never again be restored with any confidence but for the possession of the plan and mathematically-reduced traverses of a correct original survey. With such data the lost boundary can be reproduced within a narrow limit of error. The successful working of the land-transfer system very much depends on the rigid accuracy in the execution and record of the sectional surveys. The system of relying on protractor and scale for check in traverse surveys does very well for topographical details, but for boundaries it is simply a convenient way of ignoring errors and covering them up, to perplex the surveyor who may be employed afterwards to restore lost boundaries, or subdivide and deal with the land under the Land Transfer Act.

The Ordnance survey of the United Kingdom is, so far as the survey of properties is concerned, a survey by plot and scale. By adopting a large scale for the plot the evils of the system are mitigated, and an accurate topographical map is produced; but, should the land-transfer system of the colonies ever be introduced, and much subdivision of land take place, the system of survey and plot hitherto pursued would be found quite inadequate to the necessities of the case.

In bush surveys where, on account of felling, clearing, and burning, the marks of the sectional surveys are so liable to obliteration, iron-tube pegs are inserted at the main traverse points and their adjacent stations, so that the survey, once made, is never lost, but can be picked up again, and the intermediate points re-established if necessary. This precaution is also adopted in the survey of new townships, for in them the buildings and enclosures soon cover up or remove the survey points.

NATIVE SURVEYS.

During the year 34 blocks, comprising 43,026 acres, were surveyed for the Native Land Purchase Department, and 98 blocks, representing a total of 148,459 acres, for investigation of title by the Native Land Court. "The Native Land Court Act, 1880," by enabling the Native owners to have the cost of survey defrayed in the first instance by the Government and registered as a lien on the land, has, with other favouring causes, led the Natives to avail themselves more and more of the opportunities of proving title, thereby rendering their land negotiable. The liens registered for survey up to the 30th June last amount to a total of £44,682, of which £1,526 has been paid off in cash, and £20,338 has

been merged in land purchased by Government, leaving a balance unpaid of £22,888 in the register of the office of the Native Land Court.

The applications for survey continue to come in, and such as are approved by the Court and the Government are passed on for survey. There are at present about 50 blocks, covering 398,473 acres, in hand and under disposal by the department.

ROAD SURVEYS.

The question of exercising the right of taking roads through Crown and Native lands within five years of the issue of the grant in the case of Crown lands, and within fifteen years in the case of Native lands, is one which frequently presses on the attention of the department. As stated in last year's report, the time has lapsed and is fast lapsing in many cases, and all that the department can hope to do is to take up the most urgent cases and dispose of them firstly. It would have been better had the Legislature allowed a longer period to select the road-lines, because in the case of many of the Native blocks especially little or nothing has been done towards their settlement, and the necessity of having to study a whole country-side for the purpose of intelligently selecting a road through an isolated block is, in a bush country, an expense and trouble apparently greater than the advantage to be gained, and a work which could very well be postponed in very many cases indefinitely, without detriment to any one. During the year 427 miles have been surveyed through blocks, and the selection and survey of roads is being continued in the various districts as circumstances permit.

PIONEER ROAD CONSTRUCTION.

In the preparation of Crown lands for future occupation the opening and formation of road-lines, especially in bush and hilly districts, is nearly as essential as the subdivisional survey.

The information furnished by the trigonometrical and topographical surveys of the levels of the country, of the nature of the valleys, and of the localities and extent of the fertile Crown lands, enables the selection of main lines of roads to proceed on an intelligent basis. In carrying on this important work the lines are graded, benched, and in most cases formed either as bridle- or dray-tracks. Until this is done the land cannot be said to be ready for the settler. Indeed, so important are these pioneer road-works to the opening out of the country and its future settlement, that the progress made in that direction will mainly depend on what is done in this way. During the past year 340 miles have been in progress of formation, at a cost of £35,935. These works are under the immediate charge of the officers of the Departments of Land, Survey, and Public Works, or of local bodies, as is found most convenient in the several districts. Reports giving details will be found in the Appendix. The operations during the current year will be in prosecution of works already in hand, and the keeping pace with the sectional survey of Crown lands in opening out more roads to give access to these lands as surveyed.

LAND-TRANSFER SURVEYS.

The surveys of private lands under the Land Transfer Act are all executed by private authorized surveyors. The duty of the department is to see that no plan is passed in as basis of title to be guaranteed by the Government until it has been carefully checked and examined, with the view of guarding against any overlap or double granting. As the subdivision of land in and around towns is frequently very minute, the check by distance and bearing from a known established point is, as already referred to under settlement surveys, the only satisfactory method of procedure. It will be unnecessary to repeat what has already been said in former annual reports about old imperfect surveys. But it may be said that during the last year, with the exception of the Nelson District, and one case in the Auckland District, nothing has occurred calling for special remark. In Nelson both the execution and records of some of the earlier surveys are very imperfect, and it would only be the beginning of trouble to allow certificates of title to issue in such cases in lieu of the old Crown grants, which, although quite satisfactory as holding titles, are too imperfect for dealing with under the land transfer. It

seems but reasonable that, if a landowner requires a certificate of title for subdivision of property, or other of his purposes, that he should provide the accurate survey and description of his land. This is stated more as a general principle than the rigid rule observed by the department, for there are circumstances where it is considered but fair that the Government should bear part of the expense; as in Auckland, where a landowner, through certain changes occurring between the time of his mortgaging his land and its reconveyance, was compelled to bring his land under the land-transfer system, although quite content with the old grant, imperfect and inaccurate though it was, as a description of the boundaries of the land.

PUBLICATION OF MAPS.

Good progress has been made in the production by photo-lithography of the maps on the scale of one inch to the mile.

The great utility of maps on this scale for general public purposes is well known, and the survey districts are being reduced to it, and published as soon as they are sufficiently filled in to make it worth while. Sale maps for runs on a scale of half an inch to the mile, and of Crown lands for settlement to a scale of two and four inches to the mile, have been published as required during the year. The number of copies struck off for each sale varies from 250 to 1,200, according to the importance of the land to be disposed of. In the larger maps the printing has to be done by hand-presses, and where there are several registrations this becomes a very tedious and laborious process. As for the smaller maps, they are machined and turned out with great facility. There is nothing to prevent the larger maps being done in the same easy way if we only had the necessary plant, and room to work it in. At present the Government Printer's department and the lithographic branch of the Survey Department are very much in each other's way, there not being sufficient room in the present premises for both. It would be true economy to have the lithographic presses shifted to more roomy quarters, and it is hoped this may be accomplished soon. From Mr. Barron's report it will be seen that 396,233 copies of maps and diagrams were printed last year, of which 168,784 were for other departments of Government.

FUTURE OPERATIONS—DEPARTMENTAL.

For the current year the trigonometrical and topographical surveys begun and projected aggregate an area of nearly 4,000 square miles. The greater part of this is in the North Island, where, on account of the numerous applications of the Natives to have negotiable titles to their land, the necessity has arisen for surveys in some of the most inaccessible portions of the Island. In this there is the opportunity of pushing forward the topographical surveys in the localities where otherwise it would be impossible to do so from the innate hostility of the Native mind to the mapping of the country. The applications for "Native Land Court" and "Native Land Purchase" awaiting survey amount to a total of 400,000 acres. The topographical surveys in a great measure supply all the information for investigation of title. The advantage of having this class of survey extended over every available acre of the colony is patent in this and in many other ways. From the accumulated information of this class of survey the department was enabled to furnish the public with contour maps of the three million acres of pastoral country, disposed of on lease during the past twelve months. Indeed no other survey was necessary to allot the boundaries of the runs, and the total cost of the original topographical survey, mapping, and publication did not reach 2d. an acre.

Of settlement surveys there is an area of 670,000 acres on hand, of which nearly 200,000 acres is for survey of lands in Auckland, Canterbury, and Nelson, already sold but not yet surveyed. These arrear surveys are now being disposed of, and by the end of the year should be nearly, if not altogether, completed.

There are no arrears in any of the other districts, and the balance of 470,000 acres is the area which is under survey preparatory to the land being offered for sale and settlement, as the various blocks are got ready, and plans of them published.

Recently there has been an extra demand for gold-mining lease surveys at Reefton. The usual staff in that district has been temporarily strengthened by surveyors from adjacent districts, so as to enable the demand to be met promptly.

There are 83 staff surveyors at work in the field, and 26 cadets in training under them, also 26 surveyors on the temporary list; in all, 109 parties at work. This force may be curtailed or augmented according as it is desired to effect the more or less rapid settlement of the country. But it would certainly be very inconvenient to reduce it at present, for, in addition to the work already alluded to awaiting disposal, there are several hundred miles of road which should be marked off through granted lands this season before the right to do so lapses. It is not unlikely that there may have to be a temporary increase in the number of survey parties employed during the summer to meet that and other emergencies. If so, there is a reserve force in the senior cadets, that can be drawn on if necessary.

The Hon. William Rolleston,
Minister of Lands.

I have, &c.,

JAMES MCKERROW,
Surveyor-General.

RETURN of FIELD-WORK executed by STAFF and CONTRACT SURVEYORS, and of the COST of the SURVEY DEPARTMENT, in the Colony of New Zealand, from 30th June, 1881, to 30th June, 1882.

Districts.	Surveyors.	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.		Miscellaneous Work.		Total Charges against the Survey Votes for Twelve Months.													
		Acres.	Cost per Acre.	Acres.	Cost per Acre.	Acres.	Cost per Acre.	Acres.	No. of Sections.	Cost per Acre.	Acres.	No. of Sections.	Cost per Acre.	Acres.	No. of Blocks.	Cost per Acre.	Acres.	No. of Sections.	Cost per Acre.	Miles.	Cost per Mile.	£	s.	d.	£	s.	d.								
Head Office and General Branch	...	...	d.	...	d.	...	s. d.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Photo-litho. Branch	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Auckland	S. P. Smith	932,200	0.23	296,941	1.09	330,405	1.2	94,320	748	1/8.28	235	373	13/0	138,755	36	2/77	9,606	5	3.8	74.1	11	4	0	304	5	7	2,024	10	2	19,602	6	0	7,461	15	10
Hawke's Bay	H. Baker	185,900	0.06	17,600	1.44	144,610	1.01	19,441	85	1/6.21	...	2,140	1	...	...	...	...	...	...	99.25	8	3	0.6	...	...	...	70	15	3	8,253	10	11	1,988	3	4
Taranaki	T. Humphries	...	...	22,000	2.5	123,000	1.9	35,572	400	1/7.5	82	94	16/77	100	1	3/7.8	33,420	29	5.2	30.5	21	5	4	...	...	...	2,804	3	5	6,100	10	0	1,707	6	10
Wellington	J. W. A. Marchant	...	...	4,540	2.17	178,975	1.5	47,101	240	1/9.5	...	7,102	19	11.25	...	...	...	...	...	76.75	10	0	6.5	...	...	...	2,650	0	9	10,399	18	4	5,024	3	1
Nelson	J. S. Browning	...	...	...	...	116,123	1.9	42,056	457	2/7.75	...	...	...	...	...	...	3,195	186	12/9	43.25	7	8	9	...	...	...	1,377	14	11	8,730	4	11	2,384	16	8
Marlborough	H. Clark	...	...	...	...	...	...	19,525	64	7	...	...	...	...	...	123	9	...	4.5	42	16	0	...	...	...	125	9	6	1,729	1	8	647	3	6	
Westland	G. Mueller	39,994	0.75	66,486	1.6	182,225	1.8	10,576	136	2/2.2	...	...	...	...	...	255	23	12/5.2	63.5	20	17	4	...	...	...	704	5	6	4,918	17	8	2,074	18	6	
Canterbury	J. H. Baker	...	...	120,488	0.71	129,901	2.12	140,128	1512	1/3.5	134	450	15/6	...	...	...	...	...	...	5.27	6	9	8	...	...	...	466	13	2	11,737	9	10	7,202	10	2
Otago	W. Arthur	...	...	...	...	675,454	0.72	80,464	418	1/10.6	26	32	31/6	362	41	10/9	...	...	...	28.5	15	6	2	55	0	0	756	19	5	7,308	6	5	4,108	12	7
Southland	J. Spence	...	...	...	...	...	...	45,026	294	1/4	37	76	15/9.5	...	...	...	...	...	1	6	0	0	...	...	...	168	5	0	2,550	10	7	1,750	1	0	
Totals and Averages	...	1,107,994	0.23	528,055	1.14	1,880,693	1.26	534,209	4344	1/5.7	514	1025	15/2.6	148,459	98	7/3.55	43,026	34	4.8	426.62	12	12	1	359	5	7	11,148	17	1	76,390	16	4	40,841	16	11

Total expenditure for the year £ s. d.
 117,232 13 3
 Less fees for surveys, sale of maps, &c. ... 5,074 8 8
 Net cost ... \$112,158 14 7

169 171 173 175 177

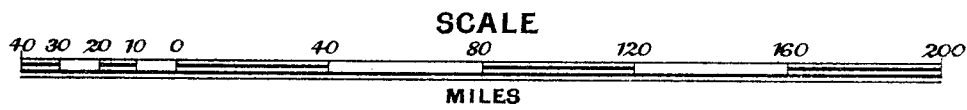
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JAMES MCKERROW
Surveyor General.

INDEX TO THE STATE OF THE PUBLIC SURVEYS IN NEW ZEALAND

June 30th 1882.



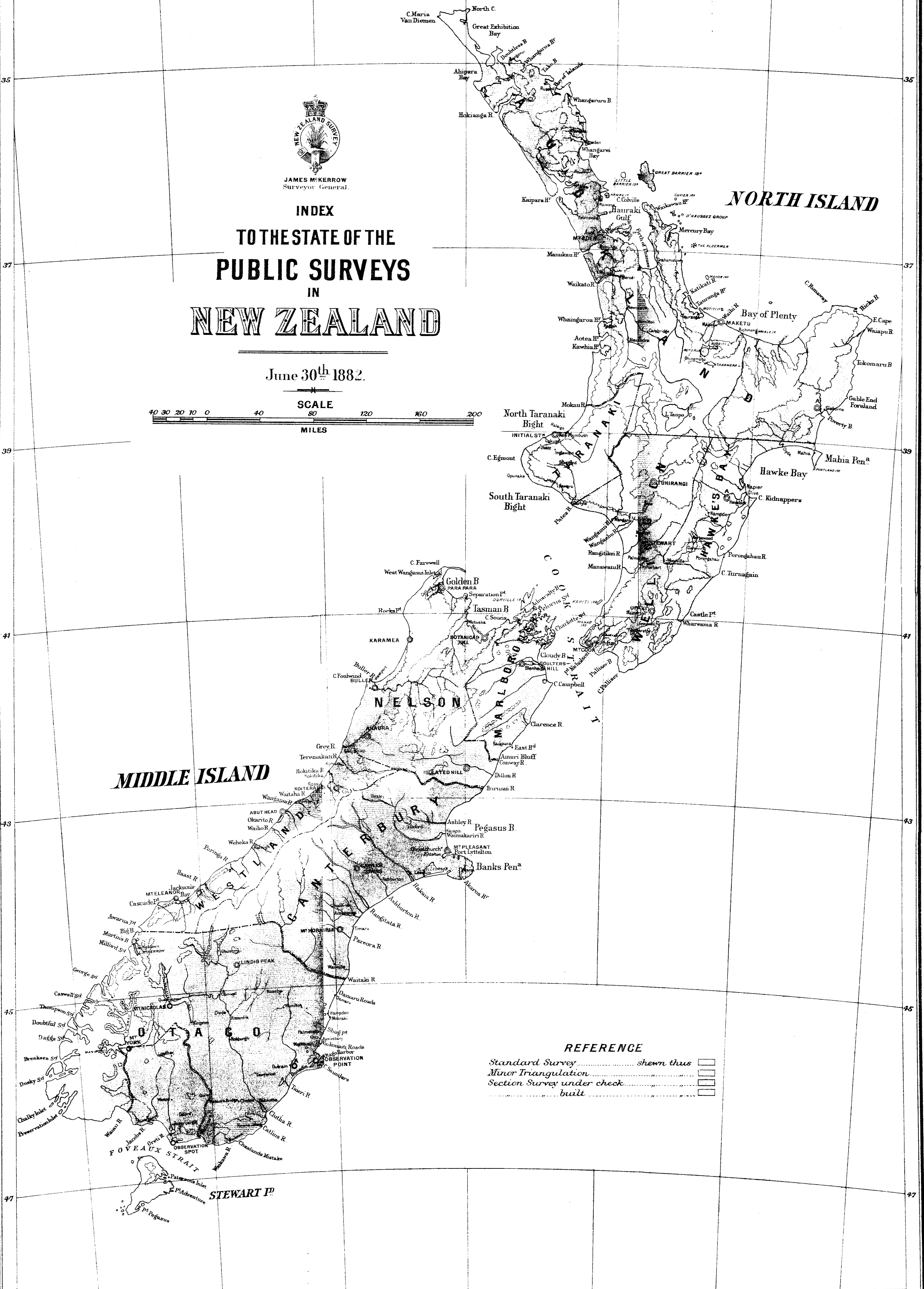
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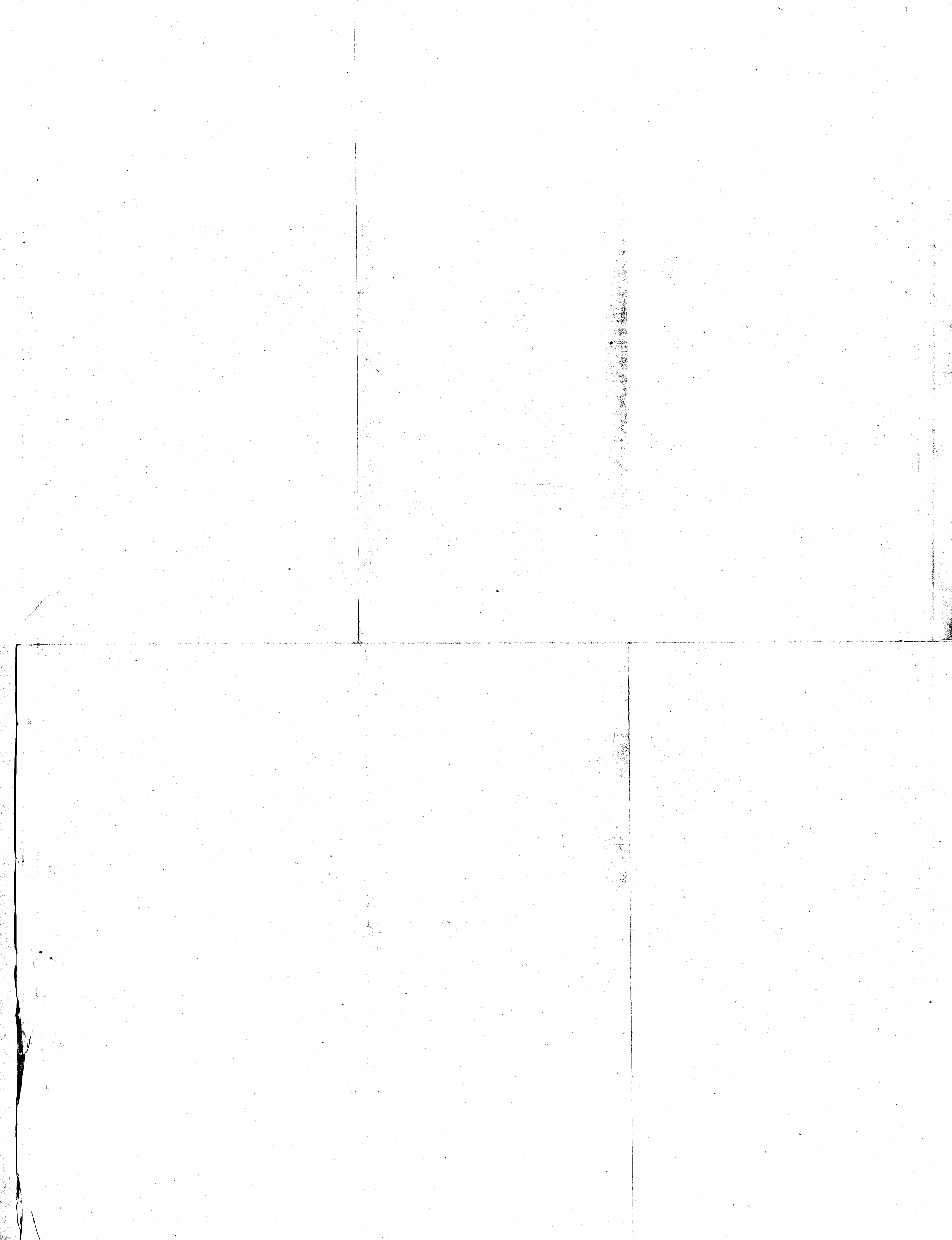
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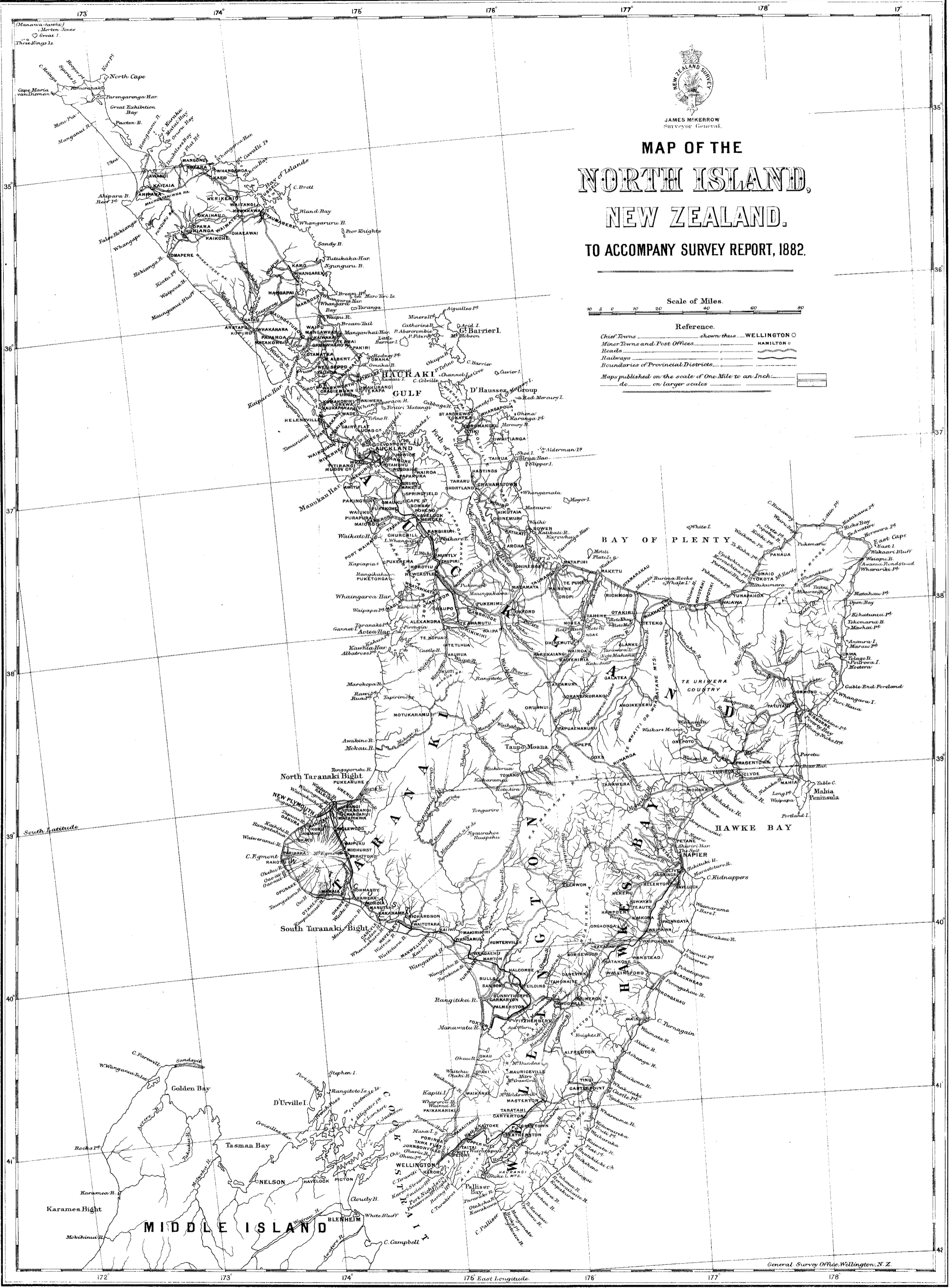
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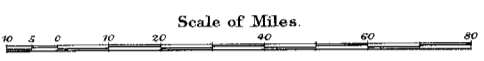
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Minor Triangulation		<input type="checkbox"/>
Section Surveys under check		<input type="checkbox"/>
.....	built	<input type="checkbox"/>



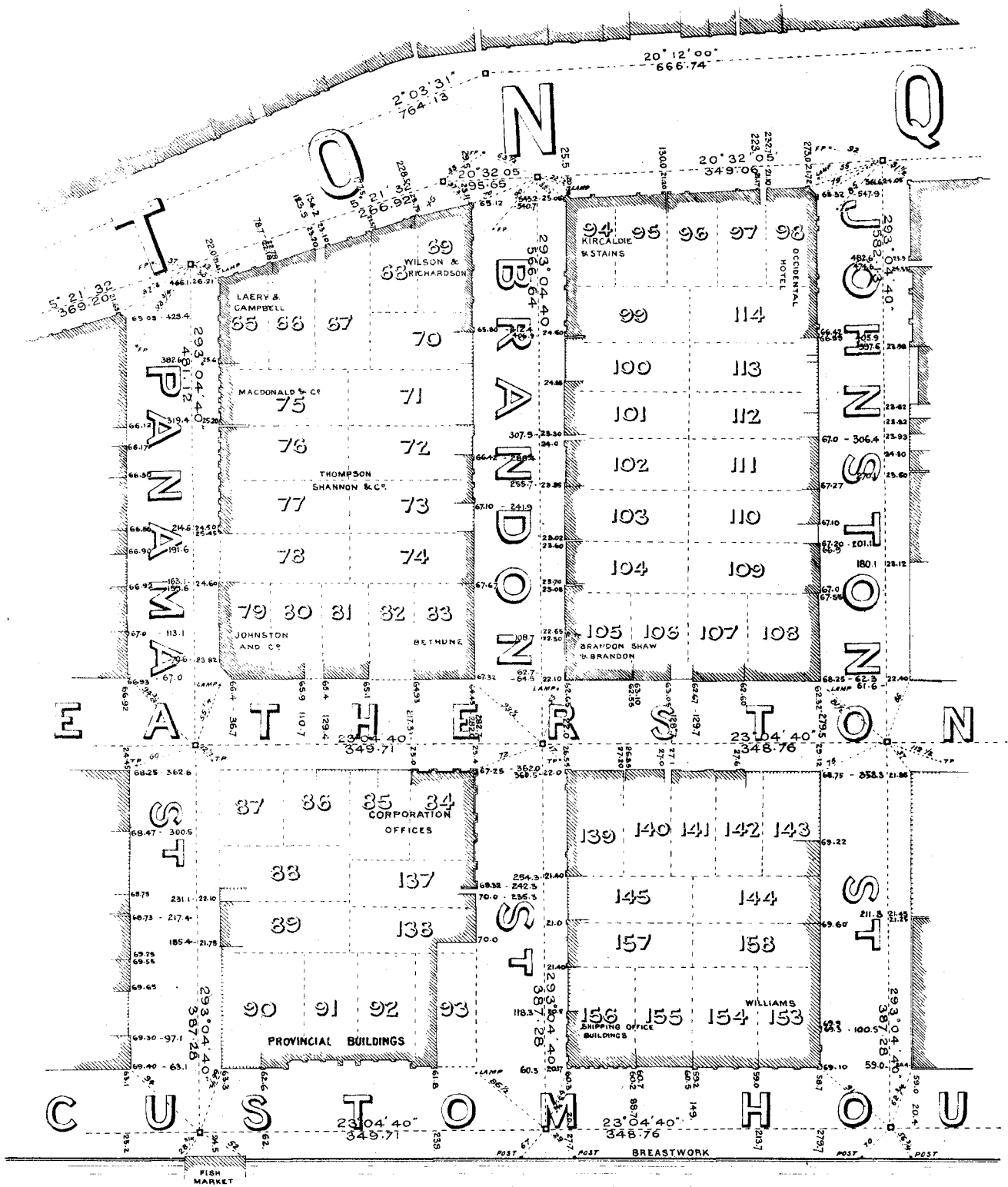


JAMES MEKERROW
Surveyor General.

MAP OF THE NORTH ISLAND, NEW ZEALAND. TO ACCOMPANY SURVEY REPORT, 1882.



- Reference.
- Chief Towns shown thus WELLINGTON
 - Minor Towns and Post Offices HAMILTON
 - Roads
 - Railways
 - Boundaries of Provincial Districts
- Maps published on the scale of One Mile to an Inch
do on larger scales



SPECIMEN OF THE WELLINGTON CITY STANDARD PLANS

Field work by M^r District Surveyor J.D. Climie. Drafting by the District Survey Office Staff.

NOTE.— On the Originals, the Standard Lines, Distances, and Offsets are in Red; Bearings in Blue; the Scale being 1 Chain to an Inch.

M O T I

P R A M D O M

W A T E R

A M

U N I

W A T E R

U S T O M

SPECIMEN OF THE WELLINGTON CITY WATERWORKS

Field work by the Field Survey of the Waterworks

NOTE: The title of this specimen is Wellington City Waterworks

APPENDIX.

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

AUCKLAND.

I must preface my remarks with the statement, that owing to the unprecedented bad weather prevailing during the last three months of the year ending on the 30th June, the field work has been seriously retarded, and the cost thereby materially increased, so much so, that I estimate the clear loss to the Department at £1,800.

Mean Degree of Precision in Survey attained during the Period.—In order to afford information as to the mathematical closures of surveys performed during the year, and to supply data for comparison with similar results obtained elsewhere, I called on the Staff Surveyors to supply a tabular statement of their field closures, of both trigonometrical and chainage work, the result of which, in as far as the Surveyors could furnish them (some not having kept records), is appended hereto.* From this you will observe that 54 trigonometrical closures, both major and minor, show a mean difference of 10.7 seconds in bearing, and a mean difference of 1.03 links per mile in length, whilst 98 chain closures of an aggregate length of 265.9 miles furnish a mean of 1.92 links per mile, as tested by the triangulation or by traverse simply. These results which are far within the limits of error allowed by the Regulations, are very creditable to the gentlemen producing them, and tend to induce a feeling of confidence that no troubles will hereafter arise through titles to land based on such work.

Major Triangulation.—Under this head a total of 932,200 acres is returned at a cost of less than a farthing per acre. The angles of the triangles have been observed with 10-inch and 6-inch instruments, the lengths of the sides varying from 6 to 14 miles. The portion executed by Mr. Goldsmith was undertaken to cover a country already minor triangulated, but in which a considerable accumulation of error existed. It resulted in reducing this error to small limits, whilst it at the same time afforded another closure between the Bay of Plenty and Mount Eden circuits, showing a mean difference of 0.5 links per mile on four sides. The larger area has been undertaken by Mr. Cussen in continuation of his last year's work in Patetere. It covers the country from the latter district to Lake Taupo, and thence follows the east side of the lake into the Kaimanawa Mountains, closing on to the Tuhirangi circuit in the Province of Wellington. Serious delays arose through the opposition of a party of natives at the south end of the lake, and later on by the exceedingly bad weather which caused Mr. Cussen and his party to endure great hardships and privations in the snow-covered mountains of Kaimanawa. The closure on to the Wellington work is as follows:—

Bay of Plenty circuit side stations ...	38—43=	58722.2	
Tuhirangi circuit side ...	38—43=	58725.6	
	~	3.4	= 0.46 links per mile.
Bay of Plenty circuit side ...	38—43=55°	48' 42"	
Tuhirangi circuit side ..	38—43=55°	50' 13" + convergence.	
	~	1' 31"	

This affords another example of the general excellence of the major work. The distance between the Maketu and Maraekakaho bases through the 53 triangle composing the Ray, is 184 miles. The closure in bearing is not so good, but it is affected by a quantity (47") which should properly be applied to the Bay of Plenty triangles, and this would then reduce the discrepancy to 44". No comparison of heights can be made, for the reason that those of Tuhirangi are merely approximate ones, obtained by myself with the aneroid in 1871, deduced from Napier, and are known to be inaccurate. The whole of the 657,000 acres has been topographically sketched by Mr. Cussen, and broken up into smaller triangles of about 4 mile sides; but owing to the late period at which he left the field and his subsequent illness, this work will not appear until next year's return. Twenty-two other trigonometrical closures were obtained during the progress of this work, showing a mean of 0.5 links per mile on closure, a result which is quite in keeping with Mr. Cussen's usual careful work. The season's work in this district has brought out the fact that the Kaimanawa Mountains are much higher than was supposed, the highest peak being 5,700 feet. The height of Tongariro was also approximately ascertained to be 7,515 feet, being nearly a thousand feet more than has been accepted of late years, though the result nearly agrees with observations made by Mr. Heale, in 1868. In addition to the work shown in return as completed, Mr. James Baber has 132,000 acres of major triangulation completed in the field, and stations up over other 172,000 acres in the Urewera country, but owing to the inclement season and the difficulties of a country covered with dense forest without tracks, and the

* See note.

higher portions of which are under snow, I had to recall him in June. His maps, therefore, are not yet complete, and the work will not appear in the returns until next year. Mr. Baber met with considerable obstructions from the natives, owing to misapprehension of the nature of the work, which has, however, been removed by the good offices of Captain W. G. Mair, and no further obstruction is therefore contemplated when he takes the field again next spring.

Minor Triangulation.—Of the 296,941 acres returned, over 80,000 acres were triangulated specially in the interests of Land Transfer Surveys, and 70,000 in the interests of Native Land Court Surveys. The rest is in extension of the meridian to section surveys.

Topographical and Trigonometrical Surveys.—Under this heading 330,405 acres have been completed, incidentally to the “breaking down” of the major triangles for settlement surveys, the cost per acre, $1\frac{2}{10}$ d. is just double that of last year; but the work is of better quality, though far from being what I think it should be. Mr. Newmann has produced the best topographical work, his map being very nicely drawn in sketch contours. It is a matter of regret that the large amount of topographical information now to hand, is not made available to the public, by publishing it in shade on the 80 chain maps.

Rural and Suburban.—The expectation expressed in last year’s report, has been realised as to quantity and price of work under this head. As more than three times the acreage at about one-half the cost per acre has been completed, viz., 94,920 acres at $1\frac{7}{10}$ s. per acre, as against 30,320 acres at $2\frac{8}{10}$ s. per acre. This is owing to larger blocks having come in for subdivision, four of them aggregating 53,000 acres. The greatest quantity of work, and at the least cost, has been produced by the younger members of the staff. The reason being, as you are aware, that the senior surveyors are, as a rule, engaged on the intricate and difficult work of surveying applications surrounded by old and inaccurate surveys, where their knowledge and experience are of most service to the Government. Although the efficiency of the public service is best secured by this course, it at the same time operates most unfairly against the surveyors themselves, for, in addition to the unceasing care required to guard against errors involving liabilities on behalf of the Government, and the labor involved in reconciling discordant and inaccurate surveys with an exact system: they find at the end of the year that they produce the least amount of work, and that at the greatest cost. These facts, though recognised by the Department, are not so well understood by the public, and hence the complaints, as to delays in attending to the wants of each particular settler. The cost of these isolated surveys, encumbered as they are by contiguous former surveys, is very high, so much so that Government often realises very little more than the bare cost of preparing them for sale. Under the heading of Rural Lands, must be mentioned the survey of 7596 acres in 44 sections by authorised surveyors, for settlers under the Homestead clauses of the Act; but, as these are paid for by fees deposited prior to survey, they are not included in the return. Native reserves are, however, included, they amount to 7511 acres in 66 sections, costing 0.87 pence per acre. During the period 7,903 acres at a cost of £1,570 6s. 11d have been surveyed, in order that old grants might issue, the data for so doing being previously deficient, and £508 0s 6d has been spent in defining boundaries of lands sold and granted many years ago, but which had not been marked on the ground.

Town Section Surveys.—Two hundred and thirty-five acres, in 373 allotments, at a cost of 13s. each, have been prepared for sale. These are nearly all in villages, laid out in the new blocks surveyed during the year.

Native Land Court Surveys.—A large area has been prepared for the operation of the Native Land Court; but as the Court sat before the largest blocks could be completely surveyed or mapped, an area of over 400,000 acres was shown on sketch maps and sent to the Court, which does not appear in this year’s return, but will do so in next. The surveys completed sum up 138,755 acres, in 36 blocks, the larger number having been surveyed by authorized surveyors, at schedule rates, the cost being advanced by Government under the Act, 1880, and secured on the lands, by liens registered in the Native Land Court. The Government staff surveyors are fully employed on other classes of survey, and, therefore, but a small amount (25,260 acres,) has been completed by them. The survey of native blocks executed by private surveyors at the cost of the natives, number 83, containing 303,757 acres, some of which are subdivisions of original blocks which had formerly passed the Court. Instructions for the survey of them, involving sometimes minute directions and often a search of the Native Land Court records, and the supplying of trigonometrical and other data, causes a very large amount of work, which, added to the correspondence with native applicants and agents, takes up fully one-third of my time, and that of some of the draughtsmen. Mr. Barnard, in charge of the Poverty Bay District, has to devote a large part of his time and that of his office assistants to this particular branch. The Act of 1880, which allows the Government to advance the cost of survey if the applicants wish it, is not taken advantage of to the extent it ought to be in the interests of the natives, the principal cause operating against it being the time which elapses between the signature of the applications and the date when they are received by me, approved for survey. During the year, 363 applications for survey have been received from the Court for this district, a large number of which are at present “tied up” through one cause and another.

Land Purchase Surveys.—Only 9,606 acres have been surveyed for the Land Purchase Department in 5 blocks. If this area is added to that of the Native Land Court surveys, an area of 426,858 acres, in 113 blocks, will be found to have been prepared for the issue of titles under the Native Land Act, when the lands shall have been all adjudicated on, besides about 400,000 acres now before the Court on sketch plans.

Roads.—Seventy-four miles, at a cost of £11 4s. per mile, have been marked out; about half of which quantity is in exercise of the road rights under Crown grants, the other half being roads for immediate formation, to open Crown lands before sale, most of which has been done by Mr. Lambert. This mileage bears a very small proportion to the amount that should be undertaken. Unless the Legislature will extend the period for taking roads, the rights in hundreds of cases will either lapse or have already done so. The works of actual construction carried on by the department are referred to in another report.

Detention and other Works.—Comprises all such services as cannot be entered in the tables, the principal items of which are field inspection of surveys, inspection of road works by members of the survey staff, standard surveys of towns, &c., and delays caused by obstruction of natives.

Standard Surveys of Towns.—A survey of this nature in extension of the City of Auckland Survey of two years ago, had become so urgent owing to the rapidly-increasing number of land transfer surveys received, that I was obliged to detail Mr. Inspector Williams to carry this on during the months of May and June. He has already laid down a number of stone standards in the suburbs, and by the end of July should have the survey sufficiently advanced to admit of his return to his proper duties. A very great deal of trouble has been caused by the removal of some of the standard points, by gas companies, and by contractors, through ignorance of their character and use; but notwithstanding these drawbacks, their practical use in affording starting and connecting points for city surveys has been very great. The towns of Gisborne, Cambridge, Ngaurawahia, Onehunga, and Devonport have had the survey partially applied to them, besides all new towns and villages.

Land Transfer Surveys.—A large increase in the number of plans, deposited from actual surveys, has taken place during the past year. I have passed 164, and Mr. Barnard at Gisborne 29. The work in this branch has kept two draughtsmen and a cadet fully employed in examining plans and placing diagrams on the certificates' forms for the District Land Registrar. The character of the surveys have been very good, and my requisitions have, in nearly all cases, been most willingly met by the Surveyors employed on the work. Owing to the improved prospects of the colony generally, I anticipate a considerable increase in the work of the ensuing season.

Inspection.—Mr. Williams has inspected a number of surveys during the season, diagrams of which, together with those by Mr. Barnard, in charge at Gisborne, have been sent to you. In several instances these inspections have resulted in the Surveyors having to amend their work before it could be passed. The number of Surveyors employed in this district on work of an official or semi-official character, whose plans have to be passed by this office, is 82: it is manifest, therefore, that only a small percentage of surveys can be inspected in the field. As a matter of fact it is only those surveys in which evident discrepancies or inaccuracies are rendered apparent by the office examination, that are inspected, and, as a consequence, the diagrams you see only represent these doubtful cases. Only one of the Staff Surveyors has had his work inspected this year. Mr. Williams experienced great trouble in inspecting some of the large forest blocks near Rotorua—he had, in fact, to execute some minor triangulation to accomplish it; this of course makes the work expensive. I have myself visited nine of the survey parties in the field, and six of the road parties, travelling 2,560 miles in the sixty-nine days I was away from the office, fifteen of which were occupied in a journey to Rotorua with yourself and the Hon. Minister of Lands.

Office Work.—The returns of the Chief Draughtsman, Mr. Kensington, show a large amount of work; the greater portion, however, of officers' duties cannot be exactly specified. The large number of Surveyors in the field, both staff and schedule, employed by the Government, together with the private Surveyors engaged on Native Land Court and other surveys which have to pass through this office and be properly recorded and checked, involves a large amount of work, more indeed than can be properly kept up to date; the office staff not being proportionate to the field staff. A large number of sittings of the Native Land Court have been held in different parts of the North Island during the year, the majority of the plans for which have to be sorted out, compared with advertised descriptions of boundaries, and then transmitted to the Courts. After each sitting, all the plans are returned here for custody, and the orders made, noted, and communicated to the Chief Surveyors of other districts, whilst for those in this district, where subdivisions, &c., are ordered, instructions, accompanied with tracings, have to be prepared and issued to the Surveyors. During the season the Draughtsmen have got out 300 block sheets, bringing the total number up to 960, prepared during the last five and a half years, on each of which more or less work is plotted.

The number of lithographs printed in this district has been considerably less this year, the cost has been, including drawing-printing and paper, £115 2s., whilst the sales have amounted to £75. I regret to say that a large number of the 80-chain lithographs are out of print. Indifferent as they were, they have saved the Department, in tracings alone, three or four times their cost.

I shall be able to send you within a fortnight the first sheet of the 4-mile map of the province, which has been in hand, off and on, for nearly two years. The number of marginal plans placed on Crown grants, certificates of title, native memorials and certificates, and copies of the latter sent to other districts, under the direction of Mr. Kennedy, Crown Grant Draughtsman, is equivalent to 2,139, whilst the Gisborne Office has placed on N.L.C Order and other forms, 140. Mr. Sturtevant, in charge of the Land Transfer Branch, has prepared marginal plans for 593 certificates, mortgages, &c., in duplicate, thus showing a total of 3,465 marginal plans. The number of certificates and grants on hand to be prepared, amount to 290, a large number of which cannot be made out for want of surveys. For roads taken and closed under the Public Works Act, 90 plans and descriptions have been passed. The correspondence relating to the business of the Department, is increasing, more especially that in the Maori language, Mr. Johnston, the accountant, has passed through his hands 1,620 vouches, representing £55,052 17s. 4d, which includes the survey, homesteads, roads, and Great North Road expenditure. The refunds for "services rendered" (surveys, &c.) amount to £557 12s 10d, which has been paid to public account.

Work for the ensuing Season, 1882-3.—A reference to the monthly abstract will show that we have on hand, for which instructions have been issued to the surveyors:—Triangulation, 1,676 square miles; rural and suburban, 88,004 acres; native blocks, 271,000; roads, 239 miles. This amount will take the staff fully twelve months to get through, without counting work which will come in from time to time, out of this total, about 15,000 acres of rural land is subject to the same difficulties, as to survey as much of last year's work, *i.e.*, it is adjacent to old surveys. I hope that the blank space on the map, known as the Urewera country, will disappear during next summer, and its natural features become known as the triangulation covers it. There are some very large blocks ready for survey there, which the native owners wish to pass through the court and obtain a title for. During the past

season one surveyor (Mr. Clayton) has left, and two young surveyors have been transferred from Southland. In a few months time two of the cadets here will have completed their three years of service, and will be available for more responsible work. With your sanction I have informed all the field cadets, that before passing they will be required to spend some time in the roads branch, in order to acquire a practical knowledge of the construction of roads and minor bridges.

S. PERCY SMITH,
Chief Surveyor.

HAWKE'S BAY.

Trigonometrical Surveys.—One party under Mr. Hallett has been engaged for six months on the minor triangulation and topographical survey of the tract of country on the coast line between Cape Kidnappers and Black Head, and extending inland from 10 to 20 miles. So far very satisfactory progress has been made: the area finished and mapped is 99,170 acres. In connection with the triangulation, standard traverses have been laid down in the townships on the plains. Mr. Hallett has also carried on a major triangulation over his minor stations, the observations being taken with a good 7-inch instrument. The other small triangulations have been made in conjunction with road surveys. The total area triangulated is 162,210 acres; cost, £714 7s.

Settlement or Section Surveys.—The arrears having been worked off, the area completed is less than in former years. The survey into sections of the Tikokeno Native Reserve, on which Mr. Rich was engaged, proved a tiresome and difficult piece of work, giving at least twice the surveying that a similar subdivision in new country would occasion. To illustrate the bother of reconciling old pegs and fences, it will be sufficient to state one case, where, on the boundary of an 80-acre property, there is a difference of 132 links in $63\frac{1}{2}$ chains, from the Crown granted distances, between the corners as fenced. The owner has made a declaration that he fenced by the pegs. The total area of rural lands sectionized is 19,441 acres; cost, £1,475 6s. 6d.

Road Surveys.—Here again Messrs. Laing, Rich, and Irvine complain that the old surveys cause additional labour, and materially increase the cost of their work, through the difficulty they experience in connecting the traverses with the boundaries of sections and native blocks. During the year 99 miles have been surveyed at a cost of £809 2s. 6d.

Land Transfer Surveys.—A standard traverse of the town of Napier has been entrusted to Mr. James Rochfort, satisfactory progress is being made. The Borough Council contributes one half of the cost of the survey. Bench marks have been laid down by Mr. Hallett, in the townships of Meanee, Taradale, Clive, Hastings and Havelock, other inland places will be provided for as the triangulations are extended. The area surveyed by licensed surveyors, and examined by the draughtsman, is 18,406 acres, in 460 allotments on 46 maps. A number of land transfer surveys have been checked on the ground.

Proposed Operations and Work on Hand, 1882–83.—Triangulation.—The trig and topographical surveys will be continued by Mr. Hallett, over the Kidnapper, Oero, Waimarama and Pourere districts, about 300,000 acres. Assistant surveyors Messrs. Laing and Irvine, will carry on triangulations in connection with the road surveys.

Section Surveys.—The area in progress in the field is 19,321 acres, leaving 8,037 acres on hand. Should the upset price of Crown land be reduced to the market value, there will probably be calls on the Department for the survey of an additional 30,000 acres.

Native Land Court Surveys.—The causes which were mentioned in last year's report, as operating against the survey of native lands, are still in existence. Under these circumstances the only course to adopt is to leave them alone, nothing the survey department can do is likely to move the opposing claimants into consenting to surveys. The Native Land Court is now engaged on the Waikire-Mohaka confiscated block, particulars concerning the surveys inside this block were reported to you in January last. The area to be surveyed is 237,000 acres in ten blocks. The estimated cost of the surveys is £2,600, survey of blocks one penny an acre, minor triangulation one half penny an acre, roads 130 miles at £7 a mile. If the triangulation block surveys and roads are made at the same time, the cost will be reduced by one-third.

Roads.—The mileage on hand for survey is 145 miles, which covers the pressing demands, but new cross or country roads are constantly being asked for by settlers. The moving of survey parties from one district to another to secure the roads before the rights lapse, entails extra expense, which, under existing conditions, cannot be helped. In connection with triangulation, Mr. Hallett will lay out roads in each district. Messrs. Laing and Irvine will be engaged in the Wairoa County on roads through native blocks.

HORACE BAKER, Chief Surveyor.

TARANAKI.

Triangulation.—Under this head 146,000 acres have been completed at a rate of 2d. per acre. 22,000 acres form the long desired link in the chain of triangulation round the coast, the accomplishment of which has, until this year, been strenuously and successfully resisted by the natives. The close of the two series is at the rate of .3 link per mile. The remaining 123,000 (combined with topography) lies in the interior, between Stratford and the Wanganui River, at Tangarakau. This country is densely wooded, and difficult of access, making the work exceptionally arduous, and the moderate rate (under the circumstances) is due to Mr. H. M. Skeets' untiring energy. There has been no opportunity of verifying this by closures on to other series, or bases, as it is but a portion of a series that will form a junction with the northern one near Waitara; but the closes of polygons evidence careful work, thus, .4, .9, .8 links per mile.

Settlement Work.—The return shows 35,572 acres of rural and suburban. This has been subdivided into sections, averaging 89 acres, at a cost of 1s. 7½d. per acre. But this hardly represents the actual state of the operations of this nature; for besides that amount there is a further area of 27,000 acres under survey, 22,000 of which is all but completed. Of the 35,522 acres finished, about one-

sixth is open, the remainder level forest land. This, together with that now being operated upon, is generally of such good quality, and some so superior, that its ready sale may be predicted, at prices ranging from £1 to £7 per acre.

Native Land Court.—Only 100 acres appear on the return, this being the only survey paid for by the Government. There is a lien lodged, but the amount has not yet been repaid. A Surveyor has been most of the summer engaged upon the Mangaotuku Block, but has lately had to desist, in consequence of the difficulty and heavy expense in prosecuting such work in the winter season; the survey will be resumed early in the spring. There has been the supervision of other blocks, the Surveyors of which have been engaged and paid by the natives themselves; arrangements having been entered into, prior to the coming into force of the Act of 1880.

Railways.—Surveys for land plans have been completed of $12\frac{1}{4}$ miles of line, the remaining 14 miles in hand is well forward. In this work great difficulty has been experienced, the lines running through districts, the surveys of which were made in some cases forty years since; and in no case have we had the good fortune to come on modern work. It is almost unnecessary for me to allude to the immense amount of detail work thereby involved, as it is so obvious. For land transfer purposes it is imperative that the piece of ground dealt with should be so defined as to enable the depicting with certainty the particular portion of the section of which it forms a part; and here is the difficulty, for not only has that section to be determined on the ground, but it often entails a traverse of four to five times the length of the piece of land to be dealt with, when the Surveyor is compelled to extend his investigation to several sections beyond, on finding overlapping, which often occurs.

West Coast Commission.—The expenditure incurred on account of this particular service (including £100 for inspection and office work,) has been £834 5s. 3d. This work has been laying out reserves and hapu divisions. By agreement, the department undertook the whole of the West Coast Commission surveys from Waingongoro to Taungatara, and Moutoti to Waiweranui. One of the main reasons for this arrangement was, that owing to a great amount of the work being so intermingled with our sectional work, we could of necessity do it very economically. The surveys of the hapu and other reserves on the Waimate and Titahi Blocks have cost only $6\frac{1}{2}$ d. per acre. The cutting out of 20,000 acres, reserve at Parihaka, cost £326 4s. Besides this there were some surveys seaward, of small reserves or burial grounds, which cost £28 18s. 5d., and other works in the Otauto Reserve, costing £11 10s. Summing up the whole, we have 33,420 acres, with 29 divisions, costing $5\frac{1}{2}$ d. per acre; which, with other charges for work done, mentioned above, amount in all to £834 5s. 3d. As the foregoing might be somewhat misleading without explanation, I would remark that the above cannot be made a basis for calculation of the cost of the remaining survey work to be done by the West Coast Commission, as the conditions have been more favorable than are to be expected in the future. These are in large blocks, good country, and half of the area mixed up in a measure with our settlement work, while the residue will be affected in a reverse manner, viz., smaller areas, rough country, and a great deal of it isolated.

Other Work.—The amount of £2,804 3s. 4d. includes work in progress, viz., 27,000 acres upon which £2,087 have been expended to date. The balance is for various kinds of work, such as inspection, west line, University Reserve, &c.

Inspection.—Three inspections have been made by Mr. Bird, thirty-three by myself; and it is a pleasing duty that I have to perform, in bringing to your notice the very excellent work done by the officers of the staff. I find that in no case has the closing error in meridian and perpendicular distance exceeded 16 links, and this special one was a traverse of 6 miles, wholly in forest, with no triangulation to lean upon, closing on to another surveyor's of 3 miles, making in all 9 miles. Another case has 13 links in $5\frac{1}{2}$ miles, and no other exceeds 8, the highest rate being 3.8 per mile, and the mean 1.9. On examining my field checks, which have from time to time been forwarded to you, I find that I have traversed 385 chains of different surveyors' work, the greatest difference has been at the rate of 2.8 links per mile, and I differ only 5.3 in the aggregate. The bearings have been equally good. I have tested them astronomically in the middle of traverses, with a maximum error of $1' 15''$.

Future Operations.—The work for the ensuing season will be the completion of settlement surveys now in hand, and also all the remaining area, about 20,000 acres, of available land between Waingongoro and Taungatara. When this is completed, I propose to take up settlement work to the eastward of the Mountain Road, in the Huiroa District, near the Waitara, and also in the Ngaire and Hawera, at the back of Whareroa. Surveys will also be proceeded with inland of Patea, as well as the subdivision of the University Reserve. Mr. Skeet will continue the triangulation he has now in hand through to the coast at Waitara. It is more than probable that a series will also have to be carried up into the Mokau country, as a basis for the Native Land Court surveys in that locality. During the year there appears to have been a thorough change in the attitude of the natives in regard to the survey of their lands, which was fully borne out in the Land Courts lately held at New Plymouth and Waitara, when the claims on about 200,000 acres (a large portion of it in the Mokau country) were investigated and interlocutory orders issued. Hitherto comparatively few Native Land Court surveys have been done, but, now that the ice is broken, it is probable there will be heavy calls for surveys of this nature in the future.

Office Work.—There has been the usual plotting of surveyors' work on the office block sheets, reducing and drafting them on the Crown grant record and other maps of smaller scales. A good deal of time has been occupied in the preparation of Crown grants for West Coast Commission. Of Crown grants proper, 68 have been prepared, and 467 certificates of title in lieu of Crown grants. The drawing of the maps on the latter was done by contract, but the work of drafting descriptions, checking, and recording fell upon the office staff. 60 deposited maps under Land Transfer Act have been examined and passed, and 847 plans drawn on ordinary certificates of title for the Land Transfer Office. Mounted tracings of 42 working block sheets have been prepared and forwarded to the Land Offices at Patea and Hawera, and 11 drawings made for photolithographing.

THOS. HUMPHRIES,
Chief Surveyor.

WELLINGTON.

Taking the surveys in the order in which they are arranged in the General Return, I have to remark in regard to :—

Minor Triangulation.—That the small area 4,540 acres, executed under this head, was effected by Messrs. Sicely and Tone, in detached pieces to govern their sectional surveys.

Topographical and Trigonometrical Survey.—With the exception of 5,700 acres returned by Mr. John Annabell, in the Waipakura Survey District, Messrs. Llewellyn Smith and G. A. Northcroft executed the triangulation, the greater part falling in the Kopuaranga and Puketoi districts. Mr. Annabell's work cost 4½d per acre, the cost is reasonable, taking into consideration the great number of stations which had to be cleared of forest in the small area, covered by his triangles. The total area triangulated sums 178,975 acres, and the average cost per acre amounts to 1¼d, a most satisfactory result as the country operated upon, comprises forest clad hills and parts of the Tararua and Puketoi Ranges; some localities being so inaccessible that the surveyors had to cut tracks, and swag their equipment and supplies to distant points. Mr. Llewellyn Smith's triangulation was extended northward from his last season's work, and embraced the Forty-mile Bush country, surrounding Mount Bruce, extending westward to the ranges: this has enabled the sectional surveys in the vicinity of Mauriceville to be started, and carried on with all requisite checks. In Mr. Northcroft's Puketoi triangulation, errors of observation average 10", and the discrepancies in polygonal closures average 0·7 link per mile; his maps are not only neatly drawn, but they are thoroughly complete and practical, with a careful attention to details. During his explorations he discovered a favorable route for a road through the Puketoi Ranges, from Pahiataua towards Aohanga, which cannot fail to be of importance when settlement extends eastward of the lower Tiraumea valley. As the present seems to be a convenient time to review the results of the various triangulations, which have been executed in this district in recent years, I have the honor to request your attention to enclosure marked A, which sets forth some interesting particulars of comparisons made between the several triangulations and their bases.

Rural and Suburban Surveys.—With the exception of a few hundred acres, the settlement surveys comprised forest lands. The area returned for the year totals to 47,101 acres, and the cost 1s. 9½d. per acre, being an advance upon that of the preceding three years. This is due to the high rate of Messrs. Snowden and Foster's work, to the expense caused by the extra labor bestowed by the staff in exploring road routes and running trial lines, and the increased cost of traversing the intricate grades in back country. Mr. Snowden accounts for the costliness of his survey (3s. 2d. an acre,) to loss of time in surveying and readjusting boundaries of defective prior work. Mr. Foster points out that his block, which cost 4s. 8½d. per acre to sectionize, adjoins some unsatisfactory old work, and that he had to alter his road lines more than once to conform to the views of the engineer who has charge of the constructive works. Notwithstanding the large cost of these two blocks, and the additional expense of cutting more back lines than usual, the average cost of the whole is not excessive. Being fully sensible of the importance of attending to the inspection of the field operations, I devoted a large proportion of time during the past twelve months to this duty. This enabled me to examine and get a thorough knowledge of all the country comprised in the surveys, to carefully inspect the road lines laid off by the staff, to verify their work, to see that they were proceeding in a judicious and economical manner. I had also ample opportunities of conferring with them upon all points connected with their duties. Every member of the staff was visited, several of them twice, and many three times. In all twenty-two visits were made to the survey camps. Sixteen check diagrams and special reports were forwarded to you. In addition fourteen inspections of the work of nine private surveyors were effected, and twenty check diagrams submitted for your scrutiny. Mr. District Surveyor Dundas made five of the above inspections in a thorough and able manner. The examination of the surveys of Messrs. Dundas, Knowles, Annabell, and Tone afforded me much pleasure by reason of the practical and finished manner in which they were performed. Messrs. Struthers and Thompson also are fast becoming experienced in the various branches of their profession. I append a schedule (B.), prepared by Captain Hewitt, which shows the quality of the work executed during the year. This, I think, will be considered to reflect credit upon the staff. Mr. J. D. Climie's standard traverses, of which samples are given, are considered as accurate in their determinations as those by minor triangulation. The other samples of work have been taken from the tabulations of traverses executed in hilly forest country, where frequent checks were impossible, and where, from the shortness of the lines, steepness of the ground, and other causes, instrumental and linear errors are apt to accumulate to the detriment of the work. The return contains fair samples of general work performed. There were no new townships laid off in this district.

The Native Land Court and Land Purchase Surveys accomplished by the staff, included two blocks of 6,087 acres, at a cost of 9½d. an acre. The contract surveys defined were 16 sections, comprising 1,015 acres, at a cost of 1s. 8½d. an acre. In addition twenty plans were received from authorized surveyors, representing 10,898 acres, which were surveyed at the expense of the natives, and not paid for in the first instance by the Government. It will be noticed that the area surveyed falls far short of the returns of former years, the main causes being—(1) Less activity in the operations of the Land Purchase Department; and (2) The completion of arrears of defective surveys. The only cases in which undue delay now occurs in furnishing reliable plans of claim in this district, are those for which private surveyors or their employers are responsible.

Land Transfer Surveys.—The road traverses are permanently pegged and marked by iron tubes, and as the work is carefully done they serve as an excellent basis for the surveys of licensed Surveyors. In the towns progress has been made with the standard traverses. Those of Masterton, Bulls, and Wellington City being complete, those of Wanganui and Marton are in progress. A large expenditure has been incurred by the Survey Department upon these; in the case of the city it amounts to £1,495; it may be desirable, therefore, to give an account of the operations, and the advantages which they are expected to secure. The following is an outline of the manner in which the survey was conducted. (1.) A triangulation of the city and suburbs was effected,

incorporating as many of the points used in the traverses as possible, this triangulation being ultimately reduced to the mean of the best base lines measured within the city. (2.) Traverses were made of all streets, the lines being kept, when practicable, about 20 links from the building frontages on the northern and eastern sides of the streets, so that the concrete blocks marking their extremities cleared the side drains. Measurements were made with steel tapes and straining gear, each chain being marked by a line on sheet lead let into boards; corrections were applied for temperature and reduction to the horizontal; angles were turned several times and mean values adopted; preference was given to the measurements where the work was rectangular. Offsets were taken from lines run parallel to the standard lines, on the sides of each street, close to the fences and buildings, the tape being kept in range by theodolite from end to end. The advantages resulting from the survey are:—(a.) Excellent plans, representing the buildings, fences, and other details of occupation, besides the bearings and lengths of traverse lines and the offsets therefrom. (b.) The accuracy and completeness of the survey and plans should frequently enable the public to ascertain the position of their properties without further survey; and if survey be necessary to get it done at a small fraction of the cost formerly involved, as surveyors will be enabled to make surveys with facility, and the Department can verify the work promptly and economically.

The accompanying tracing illustrates the style of mapping adopted for representing the survey, and I think it will be conceded that, taken as a whole, the work presents the essential features of accuracy, completeness, utility, with the further advantages of future saving of expense to the citizens by reason of the facility with which they can now have their properties surveyed. Surveyors need not be told that the standard lines will enable them to effect in a few hours what previously was an impossibility, even with days of labour, viz., the execution of a survey of a holding, referred to recognisable and indisputable permanent points.

Road Surveys.—Of the 76 $\frac{3}{4}$ miles of road surveys, part were undertaken by Messrs. Annabell and Sicely, in the Wanganui and Rangitikei Districts, to secure public highways, under the powers conferred by "The Crown Grants Act, 1866." The Department has co-operated with the local governing bodies, when desired, in this important matter. It would be well if more attention were devoted by some of the County Councils and Road Boards to this question whilst time permits of action being taken. There are tracts of country in this district which are not sufficiently intersected by roads, although hundreds of acres of "road allowance" were included in the Crown grants of the estates for that purpose.

Miscellaneous.—The return appended hereto of "other work" furnishes particulars of the miscellaneous duties of the staff, such as, report on the Taonui swamp drainage; legalising Foxton-Otaki road; standard surveys of Wellington City and Bulltown; besides various surveys of boundaries required by the public.

Office.—Regarding the office duties, Mr. James McKenzie, the Chief Draughtsman, reports that notwithstanding the reductions made in the number of officers employed, satisfactory progress has been made, and that the draughtsmen were attentive and industrious in the performance of their duties. There are now 89 Crown grant and 32 land transfer record plans, 78 trigonometrical diagrams, 26 topographical and 247 block sheets, besides many general compilations. The trigonometrical plans are for the main part complete, the other plans comprises only new surveys and the surrounding old work. Mr. Mason, in charge of the land transfer, and Mr. Tronson of the Native Land Court branches, gave every attention to the wants of the public, and kept their mapping arrears within small limits. In reference to publishing the survey plans, I have to state that during the year the whole of the Hutt and Wairarapa East and West County lithographs were completed and revised, and forwarded to the head office for republication.

Future Operations.—The following proposed survey operations for the current year are submitted for your approval:—Mr. Dundas to extend triangulation over the Apiti and Hautapu Districts, and superintend the sectional surveys and road works on the Otamakapua and Pohangina Blocks; Mr. Foster to continue his sectional surveys in South Mauriceville; Mr. Llewellyn Smith to subdivide the country south of Eketahuna and Mangaone Blocks; Mr. Northcroft to extend his Puketoi triangulation northward and westward to embrace the Mangaone, Mangahao, and Makuri Districts; Mr. J. D. Climie has in hand 150,000 acres of triangulation in the Rimutaka and Pencarrow Districts, of which 90,000 acres would have been completed last year if the weather had not been so unfavourable. He has in hand arrears of sectional surveys, amounting to 8,000 acres; Mr. John Annabell to triangulate the Nukumarū District, complete the standard survey of Wanganui Town, sectionize West Tokomarū, and lay off and legalize roads; Mr. Sicely to finish Marton standard survey, Paraekaretu back boundary survey, exercise his warrant in legalizing roads, superintend clearing of Murimotu Road, and extend triangulation in the Tiriraukawa District; Mr. N. J. Tone has in hand the West Carterton and Manahawea sectional surveys. He might take up the subdivision of Crown lands north of Rangitūmau trigonometrical station, and from time to time legalize certain roads required in the Wairarapa East and West Counties; Mr. G. Struthers, who is at present employed on sectional work in the Awhea District, can undertake the triangulation of the Haurangi and Kaiwaka Districts; Mr. C. W. H. Thompson to take up and complete the East Pohangina sectional surveys; Mr. A. E. Ashcroft is engaged in laying off roads in the Tinui District for the Highway Board. It is proposed to send him to Wanganui to co-operate with Mr. Annabell; Messrs. Greville and Crombie, if approved, will be detached to assist in the Forty-Mile Bush surveys; and Mr. Knowles is at present on sick leave of absence.

The areas which appear desirable to be surveyed under the different heads, are as follows:—Standard bearings, Upper Rangitikei and North-east Wanganui, 2,000 square miles; minor triangulation and topographical surveys, 430,000 acres; settlement survey, 43,000 acres; and road surveys, 50 miles.

In addition to the above, there are many miscellaneous surveys required which it seems unnecessary to particularise.

J. W. A. MERCHANT,
Chief Surveyor.

NELSON.

Topographical and Trigonometrical Survey.—Under this head an area of 116,123 acres has been executed, at an average cost of 2d. nearly. With the exception of the area covered by Messrs. Smith and Thompson in the Amuri District, the remainder has been chiefly extension of triangles sufficient only to cover outlying sectional surveys. In the Collingwood District, Mr. C. Lewis has in hand triangulation; but being employed also on sectional and mining surveys, and his services having been required for road exploration during three months of the summer season, but slow progress has been made there. A portion of the Grey District, lying round the Kopara Lakes, and in the Haupiri District must, if possible, be taken in hand next year, in order to locate a number of outlying applications, and triangles should be extended up the Ahaura Valley to connect with the work of Messrs. Thompson and Smith in the Amuri District, lying on the other side of the main range. The officers named above have 130,000 acres of triangulation well in hand, which cannot be returned this year. Most of the stations were erected and partially observed, when the winter set in with heavy snowstorms, compelling a cessation of their arduous work and a return of their parties to the lower lying lands. During the past season, exceptionally high winds were experienced, which greatly retarded their operations.

Rural Sectional Surveys.—The work executed during the past year shows an increase in the number of surveys made, and a larger area as compared with the work of the previous year, viz., 457 sections of an area of 42,056 acres, as against 395 sections containing 31,349 acres surveyed in 1880-81, while the average cost per acre is slightly less. The whole of this area may be classed as "isolated sections in bush," among old surveys, requiring revision.

Mining Surveys.—To the above must be added 186 surveys of mining sections, making a total of 643 sections, with an area of 45,251 acres of an average size of 70 acres. The mining surveys are all situated in rough broken mountain ranges, covered with bush, at altitudes reaching up to 4,500 feet. During the past year a great impetus was given to quartz-mining by good returns having been obtained from several low level leads, at a greater depth than had been previously worked, and also new indications of auriferous quartz having been found in the several parts of the coast, nearly simultaneously. A large area of auriferous cement composed of a white conglomerate of sandstone and quartz pebbles in Sankey's and Murray Creek localities, hitherto worked in a primitive way, has been applied for under lease, for the purpose of working more systematically by companies, while mineral leases are being applied for to work for minerals other than gold, the existence of hematite, antimony, native platinum tin and silver ores having been found. Leases have also been applied for to work auriferous quartz on the upper slopes of Mount Owen, at an elevation of 4,500 above sea-level, near which a seam of coal 14 feet 6 inches thick is reported. The excitement caused, became general, and a rush of applications took place for mining and mineral leases, many being in localities far away from previous surveys and on old workings, abandoned for want of funds and other causes. This taxed the energies of this branch of the department to the utmost in meeting the demand for surveys, and five surveyors have been employed, viz., Messrs. Montgomerie, Snodgrass, Jennings, Bullard (Cadet), and Mr. R. Young, authorized Surveyor. One hundred and eighty-six applications for leases have been surveyed, averaging 17 acres (with mineral leases), and there still remains 180 on hand on 30th June. Nineteen applications having been made during the last month, and, if they continue, I shall have to ask for more assistance, as at present rural section survey is falling into arrears again in that part of the district.

Land Transfer Work.—During the year 144 plans have been examined and passed, and 314 plans placed on certificate of title. As the arrears of Crown grants had been overtaken in the previous year, only 5 have been prepared, and 8 certificates of title for sections purchased, have been issued. Purchase has been completed of 60 rural sections, of which for 23 we have sufficient data to issue certificates, and 37 require revision survey before they can be prepared, and in addition to the last there are 40 town sections on magnetic survey requiring revision for certificates of title. Mr. F. Curtis only is employed on the above work, and requires assistance to prevent the work accumulating, as little assistance can be given him by other officers.

Office Work.—During the year three cadets have left the office for field work, and one office and one field cadet taken on. Mr. J. Knyvett has been temporarily employed for six months as clerk and assistant draftsman. Mr. D. Brown is in charge of the plotting work, and arrears are accumulating of surveys requiring to be placed on block sheets. Plans of 643 sectional and mining surveys have been examined and passed during the year, and another plotting draftsman is required, all the other officers being fully employed. Mr. J. Pollock, with Mr. P. Carrington's assistance, has been employed mostly in preparing sectional and mining leases. 601 plans have been placed on 394 leases and licenses containing 210,839 acres, and there are now 165 leases awaiting preparation. Besides the issuing of new leases, there is a current work of preparing new leases for the renewals, after the first term of years, during which they are held, has expired; and also of preparing fresh leases for rural and mining sections, which, after having been held, are cancelled or forfeited from various causes, the surveys of which, having been once made, do not appear in field work again. 5 Crown grant record maps, 47 new block sheets, and 2 application maps, have been constructed, and 96 tracings, with other information, have been furnished to Commissioner of Crown Lands, and others. A sketch map has been compiled, from additional data collected in the field, of 170,000 acres of pastoral run country, reported on and personally inspected by Chief Surveyor, assisted by Messrs. Smith & Thompson, previously to being submitted to public auction. Reports and sketch plans have been forwarded of explorations by Mr. C. Lewis, for practicable lines of road to connect the East and West Coasts, also the table land and Mount Arthur District with Takaka. I have also compiled, from all the sources available, the results of previous explorations and observation into one sketch map, extending from the Goulard Downs, on the north, to the Lyell Ranges, on the south, and Mount Arthur Ranges, on the east, and have condensed all the information obtainable to date, in a report on the north-west portion of the district, which has been already forwarded to you. The correspondence with Surveyors, other departments, County Councils, Road Boards, and the public, together with the accounts of the

department, is more than I can manage, although assisted by Mr. H. Trent, Chief Draughtsman, and occasionally a cadet for recording. This work also seriously interferes with the duties of the Chief Draughtsman on whom the chief part falls. 2,080 letters have been recorded as received and sent during the year, and I must ask for the assistance of an officer as clerk and draughtsman. The total cost of office, including general inspection by Chief Surveyor, amounts to £2,082 18s. 10d. A fireproof safe has been erected during the year at a cost of £259 6s. In this shortly the whole of the plans and most valuable documents of the office will be placed in security.

Arrears of Sectional Surveys.—The arrears of applications unsurveyed on 30th June, 1881, were 611 of 102,353 acres, and on 30th June, 1882, amounted to 524, containing 91,121 acres. During the past year, 194 applications for 14,570 acres have been received. The overtaking of the old arrears of applications is very slow work, the present staff having to deal with current applications and also with other work, comprising road surveys, triangulation, exploration, revision of old surveys, and mining surveys, which last has been the main work on the West Coast. The employment of several authorised surveyors, paid by fees deposited for cost of survey, has enabled me to prevent new arrears of unsurveyed applications accumulating, and to work a little into past arrears. If a sum is provided for cost of surveying old applications in arrear, on which no deposit for survey has been made, and also for revision of boundaries of present leasehold sections (now on magnetic meridian); where necessary for locating new applications, considerably more work in overtaking old arrears can be made next year. By the above means and the survey of about 30,000 acres in the Amuri district, now in hand by Messrs. Smith and Thompson, the old arrears should be reduced to small compass. The previous arrears on mining surveys, which at 30th June, 1881, had been overtaken and worked off on the West Coast; owing to the great rush of applications during the present year have now accumulated to 180 surveys in arrear, to begin the ensuing year with. The amount of fees remaining on deposit in the Reefton district, amounts to £1,975. New arrears are, however, arising from other sources. With nearly 400,000 acres of leasehold sections on old magnetic survey, having a purchasing clause, revision is necessary before certificates of title can be issued, when purchases are completed, and slow progress is made. No more revision is being done at present than is necessary to locate the older and current applications on the ground. The purchase of these leasehold sections is being completed each month in every part of the district, from Cape Farewell to the Grey, forming another set of "isolated surveys." The surveyors take these up where they are found to adjoin other work in hand, but the delay which must arise in many cases, is a great source of dissatisfaction to purchasers. The work done in revision survey, however, though slowly proceeding, is beginning to tell, and will do so more each year; thus of 23 leaseholds of which the purchase was completed, the surveys had been revised, and certificates of title can be issued at once. Of others requiring revision before title can be given, there has been during the past year, the purchase completed of 37 rural sections, containing 4,691 acres, and 40 town sections on magnetic survey, where standard lines are required to be laid down. The present conditions of title of land, held under freehold, is a great source of complaint from the public. Crown grants have been issued on the magnetic meridian from record maps, compiled by the building up of sections on each other, having no connection with fixed points. In most cases the diagrams and descriptions on old Crown grants, when presented for operation under the Land Transfer Act, cannot be accepted as correct, and the responsible officer is held to be obstructive. Some portions of the past year have been very wet, which has retarded operations, and the whole work of the year has been executed in rough broken ranges, heavily timbered, and in scattered localities.

JOHN S. BROWNING, Chief Surveyor.

MARLBOROUGH.

Triangulation.—Since my report of the 30th June, 1881, detailing the operations under the heading completed to date, Mr. Wilson has extended major and minor triangulation southward to the Ure River. The triangulation amounting to 320,700 acres is carried over open country ranging in height from the sea level to 5000 feet. The field work and computations are finished, and the preparation of the trigonometrical and topographical sheets is all that is required to complete the work. Mr. Wilson, assisted by the office, is now engaged on those plans, which I hope to be able to return as completed before the spring sets in. The greatest difference in closing the major triangulation on itself, equals 2·4 links on a side of 71,730·2 links or ·27 link in a mile. The minor triangulation in two instances giving a difference of 1·8 and 1·7 links to a mile; the average close, however, being only ·8 link to a mile. The calculated bearings between five geodesical stations, comprised in the work, show a difference between standard and calculated bearings, ranging from three seconds (3") up to a fraction over eight seconds (8"). With the object of obtaining further connections with the Wellington triangulation across Cook Strait, efforts were made by means of the heliotrope to observe from Trig E, Arapawa District, near Tory Channel, about 42 miles to Mount Matthews, Wellington. A clear sight to Weld's Cone, 42 miles distant, was obtained, the difference between the deduced and observed bearing from E, on Weld's Cone, being a fraction only over eight seconds (8"); unfortunately, however, during the whole time (nearly a month) Mr Wilson was engaged on this work, the weather was most unfavorable for observing towards Wellington, either a dense mist hanging over the strait, or a haziness in the atmosphere towards Mount Matthews, preventing signals being seen, he had, therefore, most reluctantly to abandon the attempt for a time. During the progress of the triangulation, observations were taken to Tapuaenuka (Mount Odin) the summit peak of the inland Kaikoura Range, from 5 trigonometrical stations, the mean height deduced therefrom is found to be 9,461 feet, above the mean sea level. (Stanford's map, published 1864, gives the height as 9,700 feet). The comparison of the heights for the five (5) stations is as follows:

	Links	Feet	Differences from mean.
Blairich	160,019·3	= 9,459·7	2·
Malvern	91,454·9	= 9,460	1·7
Ned	222,041	= 9,464·6	2·9
Weld's Hill	96,320·5	= 9,470·3	8·6
G.	219,074·8	= 9,454·2	7·5
	157,782·1	9,461·7	mean.

Mr. Wilson reports as a probable explanation of the difference between some of the results that the angles were not all taken under the same conditions, as on several occasions the top of the mountain was covered with snow, whilst on others it was entirely clear. All the observations, both of the major and minor triangles, were taken with a 6-inch Troughton & Simm's transit theodolite.

Rural and Section Survey.—The returns show under this heading that 16,532 acres of section survey, in 20 sections, and 2,993 acres of revision surveys, in 44 sections, have been completed during the year, in detail as follows:—Seven sections (80½ acres,) at an average cost of 1s. 6d. per acre, principally bush, surveyed on application for auction, or for selection under the deferred payment system. Eight sections (13,127 acres,) Awatere Shearing Reserve Block, partly open and partly manuka scrub, at an average cost of 4¼d. per acre. Two sections (2,000 acres,) Endowment Block for the Borough of Picton, at an average cost of 10½d. per acre. (The major portion of these sections is covered with heavy bush, and a great deal of preliminary work had to be done in setting out street lines and establishing the town boundary on the one side, and clearing hill tops on the watersheds forming the boundaries on the other sides, thus adding to the expense of survey.) Forty-four sections (2,993 acres,) of revision surveys, principally bush, at an average cost of 1s. 1d. per acre. (The above are mostly detached sections scattered about in the various bays of Pelorus Sound, the average cost includes traverses and sub. trig. connections with trig. points.) Three sections (601 acres,) open country, adjoining old surveys, at an average cost of 1s. 5¾d. per acre.

Gold Mining and Mineral Lease Surveys.—Of gold mining surveys 123 acres in 9 sections have been surveyed at an average cost of 14s. 8d. per acre. These gold mining surveys are in the Wairau and Pelorus Mining District, at Deep Creek, and Dead Horse Creek, in the Wakamarina Valley, and one section of 280 acres mineral lease survey at Shakspeare Bay, Queen Charlotte Sound. Surveys of this nature generally detached, of small area and in an inaccessible rough country, requiring survey as applications are sent in, entail long journeys and much loss of time, hence their greater cost over ordinary section survey.

In this district, surveys of this character have been limited; private authorized surveyors, therefore, are employed to execute them, as requisitions come in from the warden. Of late, however, the discovery of quartz-reefs in the Wakamarina Valley is attracting the attention of the mining community to the locality, and an increase of this class of survey may be anticipated during the current year.

Road and Railway Surveys.—No roads have been surveyed during the past year for the purpose of opening up Crown lands; but a separate report will inform you of the actual roads constructed tending to open up lands for settlement, the cost of which is not borne by the survey votes. The only survey undertaken in relation to railway survey is that of the Picton and Hurunui Railway extension (to Vernon) land plans survey, 4½ miles. As it was very desirable to at once put this survey in hand, upon receipt of your instructions, an authorized surveyor was engaged to do the field work, the office undertaking the plotting and preparation of the plans, &c., as the field work progressed, to expedite its completion as speedily as possible. Part of this survey runs through streets and quarter-acre allotments in the town of Blenheim (subdivisions of private lands, no proper survey plans existing to refer to, and very sparse information to guide the surveyor, obtainable, some few measurements only, but no angles being given), which have been partly laid out from time to time in a disjointed manner, so that a very large amount of extra work had to be done in determining the true positions of street lines and allotments passed through. The remaining part passes through rural lands ten (10) sections of which, some 1,500 acres, requiring reconstruction, before correct positions of lands taken in relation to section boundaries could be ascertained. With the exception of two old marks, all traces on the ground of the original survey of these sections are obliterated. These are some of the difficulties, well known to yourself and professional men, the department has to deal with, of which the general public have no conception.

Other Work, &c.—The details given in the accompanying returns under this heading, show miscellaneous work not returnable, in the general return of field operations; they consist of sub-triangulation, 9,440 acres, at 1d. per acre; 1,500 acres revision surveys partly executed, and work done for other departments, &c., such as Crown Lands, Public Works, Mines, and Marlborough County Council, and Blenheim Borough Council.

Office and Land Transfer Work.—Within the twelve months 26 plans have been received, checked, and the majority plotted on their respective block sheets, of which 17 have been constructed during the year, besides additional work having been put on those previously constructed. Four Crown grant record maps have been constructed, and the recording on these completed up to date. These are confined to town and village maps, the rural ones remaining in abeyance until trigonometrical connections are more advanced. Thirty-two application maps have been made for the use of the Land Office and general public. These are mounted lithos. of each survey district, with general topographical features and nature of land tenure shown thereon, and comprise the whole of the Marlborough district, with the exception of Gore survey district, the lithos. of which have not yet been received. It is needless to say they have proved very useful in reducing the number of tracings that would have otherwise to be made. Triangulation district sheets have been traced for photolithography of Mr. A. D. Wilson's major and minor triangulation of parts of Cloudy Bay, Linkwater, Arapawa, and Gore survey districts, and of Mr. R. F. Goulter's minor triangulation of parts of Linkwater, Arapawa, and Orieri survey districts. Land plans of the Picton and Hurunui Railway, Blenheim to Vernon contract, have been constructed; and plans of the Awatere shearing reserve survey made and forwarded to be lithographed. In addition, the usual calls of the Crown Lands Office have been responded to in the preparation of diagrams of gold mining leases, deferred payment, pastoral, mineral, and timber licenses, &c.

Land Transfer Work.—Owing to there having been no draughtsman in the Land Transfer Office, through the illness and subsequent death of Mr. Carey, much more work in connection with this department has been put upon the Survey Office staff—in fact, so much has this been the case that

equally pressing work has frequently to be laid aside in order to satisfy the urgent requirements of the Land Transfer Department. During the year 26 deposited plans of 200 allotments have been checked and recorded and passed on to the District Land Registrar. Thirty-nine applications have been examined and compared and checked with original records; and 60 certificates of title in lieu of Crown grants, and 87 ordinary certificates, representing 340 marginal plans, prepared. Owing to the increased call upon the time of the office staff in the preparation and completion of the railway land plans, in meeting the increased work of the Land Transfer Department, and in preparation, examination, and checking plans and descriptions in duplicate of some 80 pastoral leases for the Crown Lands Department, I have been unable to make so much progress as I anticipated with the Crown grant and land transfer town record maps. I purpose, however, to proceed steadily in this direction as time can be spared from more pressing work. The amount received for lithos., searches, tracings, &c., during the year, is £22 1s.

Arrears and Proposed Operations, 1882-83.—This year commences with 320,700 acres of major and minor triangulation, with topography; field work completed, but not mapped, and arrears of 950 acres of section survey. Six hundred (600) acres of this amount is land to be taken as payment for public works let by the late Provincial Government, in lieu of money, and cannot be surveyed until selected; and a deposit paid to cover the cost of survey in terms of the agreement entered into at the time. The balance of 350 acres is in the hands of Mr. Goulter, who will this year as last year, go on with section surveys as required; and continue to revise and connect with trig points the detached blocks and sections in the bays of the Sounds. In this direction good progress is being made in the Pelorus and Kenepuru Sounds, but there is still a large amount to do in in Queen Charlotte Sound of the same character, which I hope gradually to overtake. I recommend that Mr. Wilson extends major and mider triangulation southwards to close on the Amuri circuit, also to extend triangulation up the Awatere valley, from the Waihopai westwards, to close on the Nelson circuit. I am of opinion, on the grounds stated in my last year's report, that the extension southwards should be the first triangulation undertaken, unless it is your desire that the latter triangulation should be the next taken in hand.

HENRY G. CLARK,
Chief Surveyor.

WESTLAND.

During the year ending the 30th June, 1882, the following surveys have been completed:—

Major Triangulation.—Area completed, 39,994 acres, at a cost of 0.75d. per acre. This survey was executed by Mr. Roberts simultaneously with minor triangulation, and hence the low cost as compared with that of major triangulation in the preceding year, 1.16d. per acre. It covers the southern part of the Okarito Circuit, and part of Wills' Survey District, within the Jackson's Bay Circuit. The closing error of the triangles observed—24 in number—is 6.7 seconds.

Minor Triangulation, Topographical, and Trigonometrical Surveys.—Of minor triangulation proper (without topography), Mr. Roberts completed 46,081 acres in Okarito Circuit, and Mr. Price 18,405 in the Upper Arahura Valley, at the ordinary rates, while Mr. Lord is credited with 2,000 acres at the high cost of 3d. per acre. The latter work, however, is of an exceptional character, and comprises the fixing of a number of tubes within the Greymouth Municipality, in comparatively close proximity to each other, for the purpose of incorporating in the present system the old surveys of the town of Greymouth. The topographical and trigonometrical surveys consist of minor triangulation with topography, executed by Mr. Roberts, 128,000 acres, at 1.8d. per acre; and traverse circuit surveys in place of minor triangulation, carried out by Messrs. Murray, Lord, Smyth, and Price. The cost of the latter ranges, according to the varying difficulties in the several parts of the Westland District, from 1.3d. to 3.25d. per acre. Mr. Roberts's mean error of observation in 160 triangles of minor triangulation (with and without topography,) amounts to only 6.6 seconds. The closures of the traverse circuits are not so satisfactory, though they may well be allowed to pass, considering the rough and broken nature of the ground traversed. These closures stand as under:—

	Number of Traverse Circuits.	Total Length (Miles).	Average Error Per Mile.
Murray	5	22	5.2
Lord	15	38	3.6
Smyth	7	26½	3.1
Price	11	37½	3.1

Rural and Suburban Section Surveys.—10,576 acres, at a cost of 2s. 2.2d. per acre; scattered over the whole district. In many instances the connection of a section with a trigonometrically fixed point has been more expensive than the survey of the section itself. The connection of the early surveys in the Grey District with standard surveys has proved more troublesome than anticipated. Simple transposition of the magnetic to true bearing I found would not meet the case, seeing the difference (1.03 inches) between the present standard chain and the one used in the provincial days of Canterbury and Westland, was considerable, and hence distances required rectification also. This and sundry other local conditions helped to complicate transposition of surveys to such an extent as to make it cheaper, more expeditious, and in every way more satisfactory to determine the true position of early surveys by "picking up" the section pegs on the ground.

Road, Railway, and Water-Race Surveys.—63½ miles, at a cost of £20 17s. 4d. per mile. About 22 miles of these have been graded ready for contract, *i.e.*, pegged every chain and longitudinal and cross sections, bridge plans, &c., prepared. Some of the ground traversed has been very difficult, not

so much so as regards road construction, but difficult for selecting the best line obtainable on account of its broken nature, steep sidelings, &c., and to do this satisfactorily, miles of prospecting and trial lines had often to be cut. A lengthened experience in road construction has taught me to be particular to a degree in selecting the line; a few pounds judiciously spent in trial lines and systematic exploring will effect great saving in construction. In a densely timbered and broken district like the West Coast, more especially, there is need for caution in this particular; instances are not wanting where the anxiety to effect the survey of roads, at least possible cost, has led to heavy cuttings and embankments being made, which might have been avoided, and to "ups and downs" quite unnecessary.

Office Work.—Land transfer, certificates of title, &c., as per Return. The mapping has not progressed as satisfactorily as could be wished. Triangulation and block map plotting of the last six months has fallen in arrear. The causes are—1st. The loss of one draughtsman, Mr. Federli, transferred to Christchurch in the beginning of the year; and, 2nd. The prolonged illness of Mr. Willberg, draughtsman and lithographer. However, all the surveys completed have been plotted, the section surveys, &c., on the forms for filing in the guard-books, and the triangulation and other surveys on ordinary working plans. Only one map was lithographed at Hokitika office during the year. This, the triangulation of the northern half of Hokitika meridional circuit on a scale of two miles to an inch.

General.—Little has been done toward the survey of roads through lands sold prior to 1878; the right of taking which, without paying compensation, expires five years after the issue of the Crown grant. The pressure of other surveys prevented this being done, but in not a single case where a reservation for road has been really necessary, has the time been allowed to lapse. Within Greymouth and Okarito, and to some extent within Kumara and Ross municipalities, iron tubes, held by trigonometrically fixed points, have been sunk at the street corners and connected with the town surveys. This work requires still to be done within Hokitika municipality and some of the small townships. Field inspection has been attended to. With each of the surveyors I spent a number of days at camp, going through their work and applying checks. Besides this the road works under construction have been regularly visited—in all the survey and works inspection—during the year, necessitating my absence from Hokitika office for 121 days. Having been so much pinched for office assistance, I have not yet been able to complete the calculations of the true position and heights of the principal mountains in the Dividing Range—many of these were observed to during 1880 to 1881.

Proposed Operations 1882 to 1883.—Continue major and minor triangulation to Jackson's Bay. Already five major (iron) and nineteen minor (wooden) triangulation stations have been erected within the northern part of the Jackson's Bay circuit. Of section surveys 49,266 acres are still in arrear. These, together with the incorporation into present system of the remainder of the old provincial surveys, the laying off of roads, attending to mining and other surveys, will keep the staff surveyors fully employed.

GERHARD MULLER,
Chief Surveyor.

CANTERBURY.

I am glad to be able to report very satisfactory progress in the operations of this branch of the survey department, for the year ended 30th June, ultimo, practically the whole of the work during this period has been done by the permanent staff, or by officers temporarily engaged to assist in the completion of special surveys, under the village settlement clauses of the Land Amendment Act, of 1879, or in the survey of pastoral land proposed to be dealt with under the deferred payment clauses of the Land Act of 1877, and the cost, as shown under the respective headings of the return forwarded to you, will not, I think, be found to exceed the average for similar work in other parts of the colony, except, perhaps, in one or two cases hereafter explained, and I deem that the advantages of having the surveys done by staff officers who generally remain in the provincial district, and know that they will be held responsible for errors disclosed during the progress of the work or subsequently, more than counterbalance any cheapening of the rates by contract, to which, nevertheless, the pressure of overwhelming arrears, and the necessity of putting purchasers in possession of their boundaries with as little delay as practicable, compelled resort to, in former years. In making these remarks, I am far from desiring to throw discredit on all contract surveys, for I am sensible that I have had contractors who have executed their work with as much care and fidelity as could well be exercised by any staff officer, but it is none the less true, that when tenders are called, and the lowest usually accepted, it is not always practicable to obtain men who will give to the smallest details of the field operations, &c., that careful attention which is vital to the accuracy the department rightly strives to maintain.

Minor Triangulation and Topography.—Mr. C. W. Adams has finished the plans of 24,960 acres, executed in the field during the year, and the survey of 67,911 acres beyond Porter's Pass, in the back Waimakariri country, the average height of the stations selected being about 3,500 feet from sea level; some being over 5,000 feet. Mr. Adams states that the difficult nature of the country, the proportionately large number of stations, their height, the clearing of bush and the unfavorable weather, have all conspired to prevent greater progress. Mr. Broderick has completed 120,488 acres of triangulation without topography, in the Oxford district, 87,030 acres with topography on the Hunter Range in the Waimate country, the stations averaging 3,100 feet above sea level, and has executed a topographical survey of 104,525 acres, mostly over high and rough hilly country in the south portion of Canterbury, the plans of this work have been completed, and duly transmitted to this office before the end of June, but he commenced the triangulation in May, 1881, which would apparently show that it had occupied 14 months; were it not that out of that time he was engaged for 4 months on sectional surveys mostly in the Oxford Bush. I think it but fair, therefore, to call your attention to this officer, whose energy this amount of work amply illustrates. The total area added this year to the triangulation of the Canterbury district, is, therefore, 250,389 acres, and 104,525 acres of topography over country previously triangulated. The closure made by Mr. C. W. Adams, from base line measured by

the Inspector, with a base of verification measured by himself (Mr. Adams) at Castle Hill, on line A. B.B., in the Harper survey district, gives a difference of only .32 of a link in 12,946 links, showing the extreme accuracy of this officer's work even over difficult country. The closures made by Mr. Brodrick, and tabulated in the usual way, also exhibit very satisfactory results, giving a mean error of but little over one link per mile.

TABLE CLOSURES.

Survey District.	Lines.	Survey by.	Survey by.	Difference.	Error per Mile.	Mean Error per Mile.
Mairaki and Mount Thomas	19-22	T. N. Brodrick,	T. N. Brodrick,			
	19-22	Grey Base—	Oxford Base—			
		27,204.5	27,208.8	4.3	1.24	
	22-15	27,157.2	27,162.	4.8	1.41	
		15-6	18,156.7	18,161.4	4.7	2.07	1.82
"	6-5	25,080.	25,088.	8.	2.55	
Oxford	32-34	T. Maben—	T. N. Brodrick—			
		18,642.2	18,642.	0.2	0.09	
	34-35	18,804.3	18,802.1	2.2	0.94	
	35-36	22,255.5	22,256.3	0.8	0.29	0.65
	36-37	14,544.6	14,541.4	3.2	1.76	
	37-38	22,635.6	22,635.1	0.5	0.18	
Oxford and Mairaki	38 48	T. N. Brodrick,	T. N. Brodrick,			
		Oxford & Kowai Base—	Oxford Base—	6.8	1.32	1.32
		41,250.3	41,243.5			

Mean error per mile = 1.185 links.

Sectional Work.—During the year there have been surveyed 1,220 sections containing 94,403 acres, purchased under the Canterbury free selection land laws, giving an average of but 77 acres to each section. Of these 959 sections, containing 78,000 acres, are new work and 261 sections—16,403 acres are surveys which had to be revised before the Crown grants or certificates of title could issue. 24 sections = 40,055 acres have been surveyed under the pastoral deferred payment clauses of "The Land Act, 1877," and 222 sections aggregating 1,603 acres laid out under as Village Settlements. 46 sections, embracing 4,067 acres, have been surveyed for suburban and deferred payment blocks, and 450 town allotments = 134 acres, surveyed in the Waimate, Rangitata, and other townships. The Peninsula surveys upon which five of the fourteen staff officers have been engaged have, as in former years, been more costly than the others. However, the greater portion of the bush surveys is now completed, and most of the intricate and difficult coast-line traversed, therefore, though the unsurveyed sections and the necessary revisions will, I am afraid, take some time to finish, it is to be trusted that the end of the current year will show a marked decrease in the cost per acre. Of the character of the work, you will observe that the 378 sections, containing 22,598 acres, surveyed there this season, average only 60 acres each, and, I may add, has entailed the traverse of 207 miles of road or river, the ranging and chaining of 92½ miles of boundary-lines, and the ranging only of 84½ miles. Of this 56½ miles have been cut through bush and 3,563 pegs driven, proving that, though but a small area can be credited to them, and the cost per acre has been comparatively high, the officers engaged have been by no means idle. Two of the most energetic surveyors on the Peninsula, Messrs. Welch and Hay, though partly working in open ground, have not been able to bring down the cost below 2s. 6d. and 2s. 11d. per acre respectively. Of pastoral deferred payment land, 40,055 acres have been surveyed by Messrs. Pickett (of the staff) and Adam (on the temporary list) at the rate of about 5d. per acre. These officers having thus got through a commendable quantity of work during the season. 243 sections, = 12,956 acres, have been completed in the Christchurch and Timaru offices at a very small cost, most of them sections or pre-emptive rights now purchased, and being hemmed in by prior surveys, required but little field work to complete them.

Inspection.—The Inspector of Surveys has measured two base lines for the minor triangulation executed this year, and has visited and inspected the work of 12 staff, 2 temporary, and 5 land transfer surveyors, making 33 inspections, reports and diagrams of which have been duly forwarded to you, besides attending to, and reporting upon, various matters in connection with the department. I deem it most desirable that the land transfer surveys should be put to the same test as the Government surveys, for it is quite as essential that care equal to that devoted to the original surveys on which the Crown titles are founded should be exercised in checking the subsequent surveys on which the land transfer titles are based.

Mapping.—During the year 69 large and 123 small plans, in addition to the trigonometrical and topographical maps, have been received from the field officers; 241 plans have been checked and are ready for the issue of the certificates of title; 205 were entered on the Crown grant record maps, and 180 duplicated on the block sheets of the various survey districts. 48 new block sheets have been constructed in the Christchurch office and 12 in the Timaru office. 10 new district and 1 town Crown grant record maps have been made, and are ready for recording the surveys as soon as the work can be overtaken. Mr. Shanks, the officer in charge, reports that only 120 plans yet remain to be checked. The recording of these plans is, however, considerably in arrear, 588 having to be entered on the Crown grant maps and 773 on the district block sheets. The computers' work, however, being nearly overtaken, I hope during the current twelve months to make greater progress towards the completion of the record maps.

Provincial Surveys.—During the past year some reduction has been made in the arrears of un-plotted work, which are being gradually overtaken. In this office 54 sections (4,206 acres) have been plotted, and in Timaru office Mr. Wright has done 82 sections, = 8,884 acres. Area certificates have been forwarded to the Chief Commissioner, and titles can issue. This is now done as part of

the current work of the office, one of the computers being uninterruptedly engaged upon it, and, as he proceeds, surveys which will not close fairly are reported for revision to the staff officer who may happen to be in the district. It is, therefore, hoped that the end of the current twelve months will show them all plotted or in course of revision on the ground.

Trigonometrical Plans.—Good progress has also been made with these, eight new districts having been completed, together with tracings for the photo-lithographer. Two of the previous seasons' and six prepared this year have been lithographed, leaving but two in hand. The number of survey districts of which the triangulation is published being now fifty-five, and as these comprise the whole of the settled districts in which land-transfer surveys are likely to be required, all the triangulation is now easily available to the surveyors working under the Act; therefore, for the present, I have transferred the draftsman formerly engaged on this work to the compilation of the district maps showing the sectional work.

Reduction Office.—During the year a copy of the map of the County of Ashley has been made for the head office, and one for the Christchurch public office, and the map of the County of Geraldine is in hand. Two new district maps have been constructed, ten have been traced for the photo-lithographer, and seven others are in hand. Six districts have been traced and coloured for the public office in Christchurch, and two for the Timaru office, to be used as land-application maps. And there have been prepared and shown at the Exhibition a map of the Canterbury District delineating the surveys up to the then date, and another showing the trigonometrical surveys, together with copies of trigonometrical, topographical, block, and district plans. For these exhibits the Christchurch Survey Office was awarded a gold medal.

Crown Titles.—During the past twelve months have been prepared forty-six Crown grants, covering 4,322 acres under the old system, and 985 certificates of title, covering 1,519 rural or town sections, equal to 151,814 acres, have been delivered to the Land Transfer Office for issue. 2,107 certificates of area, embracing 197,736 acres, were forwarded to the Chief Commissioner to enable the schedules to be prepared and transmitted to Wellington for the necessary authority to issue titles. The delay of purchasers to pay for excess areas has, however, considerably retarded the certificates, which otherwise would have been issued much faster. Thus rather large arrears remain to be overtaken.

Land Transfer Surveys.—Very little has been done during the year in putting down standard stones for reference points for these surveys, Mr. Maitland, the officer formerly engaged on the work, having been absent on sick leave. He has, however, now resumed duty, and has commenced the standard survey of the Timaru borough, now very much needed; but sufficient progress has not yet been reached to enable me to do more than mention it. Mr. Monro, the officer in charge of the draughtsman's office, reports of the work for the past twelve months that there were 100 plans deposited, containing 2,288 allotments of from 10 perches to 588 acres; 15 plans of land taken for railway purposes for Public Works Department; 1,088 transfers for verification of descriptions, areas, &c., prior to drafting certificates; 19 mortgages for verification of descriptions, areas, &c.; 40 leases for verification of descriptions, areas, &c.; 9 proclamations for verification of descriptions, areas, &c.; 386 applications referred (9 in excess of number received by Land Transfer Office owing to requisitions on some previously received being complied with, &c.); 2,102 ordinary certificates issued; 1,052 certificates issued in lieu of Crown grants under "The Land Transfer Act Amendment Act of 1880. He also reports a slight but steady increase in the general work of his office, and it is a pleasure for me to state that, owing to his most effective supervision of the surveys coming before him, a great and marked improvement has taken place in them. The Land Transfer surveyors being made aware of what is required, nearly all send in their plans in a highly creditable manner, in accordance with the survey regulations. These plans are now carefully checked before they are sent in, and consequently the work of revision is much lightened, delays in passing them are lessened, and the frequent and unavoidable detentions formerly complained of seldom or never occur; in fact, I may say that, during the last twelve or eighteen months, no complaint of any kind has been brought under my notice in reference to the survey work of the Land Transfer Office, and this result being mainly due to the highly satisfactory way in which Mr. Monro carries out his duties, I am but rendering this officer justice in acknowledging it.

Proposed Operations for 1882-3.—The arrear surveys of sections purchased under the Canterbury Land Act are now considerably reduced, the work remaining to be done not exceeding 1,486 sections, containing 98,642 acres; but as these are very much scattered, the surveys will be more tedious than hitherto. I estimate that about 20,000 acres of revision will complete the old provincial surveys, except the peninsula work, anent which see my last year's report. These arrears I hope to greatly lessen during the current twelve months. Of the surveys I have instructions to proceed with, there are in progress 31,281 acres of pastoral deferred-payment land, and 5,200 acres reserved for settlement in the Oxford district; and I find also that there are yet unsurveyed 1,562 acres of town land in six reserves, and 3,761 acres of suburban and deferred-payment land set apart under "The Public Reserves Act, 1878," and in addition there are 35 reserves, containing 4,524 acres, which have been recommended as suitable for subdivision into village settlements, for which purpose they will probably be set apart during the present session of Parliament. The above, with the standard survey of Timaru, and the completion of the triangulation in the Waimakariri country, is the work I purpose to take in hand during the current year. I cannot conclude my report without bearing testimony to the constant and effective support I have received from the various officers of this branch of the department, and to the zealous discharge of their respective duties.

JOHN H. BAKER,
Chief Surveyor.

OTAGO.

The season generally of 1881-82 has not been propitious, there having been a great deal of rain, wind, and mist, which have caused much trouble and delay to the surveyors at work in the field. These drawbacks have been specially felt by the surveyors engaged in triangulations on the Lammerlaw

mountains, the Kakanui mountains, and West Coast, while it has greatly affected the ordinary section surveys in the Mataura district. Notwithstanding this, a very fair amount of work has been accomplished, and which I propose now to pass under review.

Minor Triangulation and Topography.—The principal work of the year has been triangulation, The object kept in view by me in directing this triangulation (as also of last year) has been, as you are aware, mainly to determine the topographical features of those Otago runs the leases of which expire in March, 1883, and of which the new leases were sold by public auction in February, 1882. In attaining this, as most of the country is purely pastoral, the triangles have been kept large—that is, from four to six miles side—but, owing to the peculiar configuration of the surface and the extreme difficulty of working in the trig. stations on adjoining old triangulations, this has not in every case been possible. I have also been careful to get all altitudes, fences, yards, and huts laid down on the maps sent in, so as to make these maps as useful and complete as possible for the public use. In this way the area of 675,454 acres of pastoral country has been surveyed, so that run boundaries can be laid down or identified without much difficulty. The value of, and necessity for this work is already manifest, as the new leaseholders are now applying for their leases. The cost of this work has been 0·72d per acre. The officers of the staff who have been engaged on this triangulation are District Surveyor Mackay and Assistant Surveyors Murray and Wilmot, supplemented by Messrs. Dennison and Grant as contract surveyors. Mr. Mackay's work has lain between the Clutha and Manuherikia rivers, near Alexandra on the west and the top of the Rough Ridge on the east. It is all rough, broken country, and rises from 500 feet to about 4,000 feet in height above sea level, covering runs 261, 262, 220, and 256. The total area overtaken by Mr. Mackay is 222,454 acres, at a cost of 0·92 per acre. The bearings observed by 5 inch theodolite are based on the geodesical bearings of Lindis Peak circuit, and close with the bearings of the old Gimmerburn triangulation, making allowance for the differences of meridian to 23" the least, difference being 14' and the greatest 30". The linkages are taken from the base of Blackstone district and close on Gimmerburn district, with a mean difference of 5·7 links per mile. This indicates the necessity for a revision of the old bases. Assistant Surveyor Murray has triangulated 175,000 acres, at a cost of 0·59d. per acre. The work has been mostly on the Lamerlaw, and Rock and Pillar Mountains, and covered portions of runs 186, 254, and 260. The bearings, which are on the meridian of trig A., north Taieri, close with those of the Serpentine triangulation, with a difference of 1' 35", allowing for convergence of meridians. The linkages are based on those of the Sutton district, and close on the Long Valley and Serpentine triangulations, but not so well as is desirable. As, however, there is some doubt regarding the accuracy of the base line in the Sutton district, I must defer reporting further at present on this point, until that base has been remeasured. This I have instructed Mr. Langmuir to do before finishing his present survey on run 254. Assistant Surveyor Wilmot has overtaken 118,000 acres, at a cost of 0·57d per acre, lying in the Nevis valley, covering the numerous old gold diggings there, also the celebrated antimony lode, the first smelting from which is now on exhibition in Dunedin. Portions of runs 380, 389, and 345, are included in this survey. The topographical map of this work is neatly executed, and supplies a blank of long standing in our records. The other work on which Mr. Wilmot's party has been engaged, besides laying off some gold mining leases, has been the building and flagging of the trig stations in the Hollyford Valley. This was all successfully done by the party under the direction of Cadet Burns, and considering the dangerous nature of the country, and its rugged and alpine character, reflects credit on so young a surveyor. It was on Mr. Burns' return towards the Wakitipu, after completing this work, to meet Mr. Wilmot, who proposed then to begin his observations with the theodolite, that young Mr. Raymond was unfortunately lost as already reported to you at the time. The weather from the end of December to the end of May, was unusually wet, even for so watery a region, so that during the latter month, when Mr. Wilmot attempted to begin his readings, it was impossible to do anything; and he had to leave it over for another season. He was then sent to push on with sectional work, on run 239, Lake Wanaka—the "Fork Run." The remaining trig work for the year, is that done by Messrs. Dennison & Grant, under contract. It lies mostly in the Kakanui and Waihemo survey districts, and embraces runs 11, 134, 209, 217, 300, and 301. The area triangulated in all extends to 207,795 acres, but, I have only included in this year's returns 160,000, which has cost 0·6d. per acre, the balance will go into next year's returns. The reports received by me during the progress of this work, showed that it was a much more difficult triangulation than would be supposed, this is due not only to the ruggedness and inaccessibility of the ranges, but also to the constant presence of mist and fogs, alternating with sleet and wind, so that the surveyors were much hindered in their operations. The bearings were taken from the geodesical readings, Highlay Hill to Swinburn Hill, and carried over the Kakanui Mountains, closing on Otepopo, Kauroo, and Domet Districts, with a mean difference of 46". The linkages were also based on the calculated length, between the same two geodesical stations, and closed on the above districts with a mean difference of 3·2 links per mile.

Run Surveys.—Of runs subdivided by survey for re-leasing, Mr. Barron has surveyed 12,150 acres of run 205, Mr. Armstrong 26,503 acres of run 224, and Mr. Farquhar 25,046 acres of runs 236 and 240a, pegging off the boundaries where necessary.

Rural Section Surveys.—Nine surveyors of the staff have been more or less occupied with sectional survey during the year, but only seven of them have been confined to that class of work, and of these some have been at work for six months only; the area therefore overtaken, viz., 80,159 acres, is satisfactory, and the cost—10½d. per acre—moderate. The character of the work has varied between two extremes, the costly survey of the small sections in different localities involving travelling long distances, and the cheap survey of the largest class of sections, the pastoral deferred-payment, lying in blocks together. Curiously enough the former class is what the public seem always to expect should be most easily and cheaply overtaken, while experience proves the opposite to be the case. Mr. Strauchon's and Mr. Mackenzie's surveys have been of small sections, many of these being in bush, and so necessitating much bush clearing. Very bad weather in the case of the former's work, and

shifting camp so often in the case of the latter's has made, of necessity, the cost per acre high. A similar explanation is applicable to Messrs. Wilmot's and Gibson's rural surveys. Of land reserved out of the Otago runs, Messrs. Barron, Langmuir, Armstrong, and Farquhar have surveyed 40,018 acres in Maniototo, Swinburn, Strath-Taieri, Lower Wanaka, Hawea, and Tarras Districts, and Messrs. Barron, Armstrong, and Farquhar have surveyed 13,851 acres in Maniototo, Strath-Taieri, Nenthorn, and Lower Hawea Districts. Of pastoral deferred-payment land set aside otherwise than as above, Mr. Murray has surveyed about 8,686 acres in Rankleburn and Glenkenich District, in sections of from 500 to 1,000 acres.

Town Section Surveys.—The town extension of Moeraki is the only one returned this year. The soil generally is good in this township, and the situation beautiful, with an unexceptionable climate; yet, excepting a few resident fishermen and visitors during the summer season, it is much neglected, and the pier in the bay is never used.

Native Lands Court Surveys.—Of surveys for half-castes, 362 acres in all have been made, viz., 28 acres at Otara, by District Surveyor Strauchon, and 334 acres part in North Harbour and Blue-skin District, by Mr. Mackenzie. There was detention to some extent to Mr. Mackenzie's work, through his having to wait till the half-castes agreed among themselves and pointing out allotments to the claimants. The average cost per acre has been 10s. 9d.

Gold Mining Surveys.—Of gold mining surveys, the area overtaken this year has been 924 acres, in 39 allotments or sections, at a mean cost of 5s. 11½d. per acre. This cost is so much less than last year's that I must point out that, it is owing to the greater area surveyed, and that in sections of which some were of large size. It also included coal mining leases.

Roads, Railways, and Water-Races.—Under this heading, roads are the only works surveyed this year, and the principal work of the kind is that of the Wyndham Valley Road for the Board of Governors of the Otago High School. An engineering survey of this road, and one from Fortrose towards the Waikawa, were very well executed by Mr. Strauchon, who sent in very creditable plans of them. Altogether 28½ miles have been surveyed, at a cost of £15 6s. 2d. per mile, whereof 9½ miles were merely re-surveys, not engineering surveys. I append a separate report on the work done in construction of roads.

Survey Parties and Inspection.—During the year (in whole or part,) 9 survey parties have been at work: 1 private survey party about Clyde, and 1 contract surveyor. Owing to much of my time having this year been devoted to office work at Wellington and in this office, in connection with the Otago runs released in February, I have not been able to overtake so many field inspections as usual; but I have inspected the survey parties on nine different occasions, and have sent in seven field checks on the work, besides making five other inspections, including district offices and road formation in the Wyndham Valley; also accompanying the Commissioners of the Waste Lands Board on their examination of lands reserved out of runs. The surveyors generally are working satisfactorily, and the younger officers give promise of becoming very efficient. The pegging and defining boundaries is well done; and in map-drawing Messrs. Strauchon, Mackenzie, Langmuir, Wilmot, and Farquhar are specially worthy of praise. Mr. McLean, draughtsman at Lawrence, keeps his office records very systematically and orderly.

Dunedin Office Work.—The draughtsmen in this office have been fully occupied during the year in copying, lithographing, recording surveys, and preparation of certificates of title and Crown grants. The Chief Draughtsman, Mr. Douglas, left the service in January, 1882, and his particular work has since then been divided between Mr. Skey, the present Chief Draughtsman, and Mr. Runcie, the Accountant. Mr. Wilson was removed to the Head Office in Wellington during the year. Mr. Thompson has examined and checked 96 plans, sent in by the staff; 65 road and railway plans, many under the Public Works Act; 30 gold and mineral leases; and 24 agricultural leases.

Land Transfer Work.—This work does not decrease, and occupies a great deal of the office Surveyor's time, Mr. Thompson, and the whole time of Mr. Treseder. Mr. Thompson has examined and checked 93 plans, and Mr. Treseder has examined and checked 191 applications, 1,607 transfers, 1,235 mortgages, 1,320 draught certificates of title, and placed plans on 2,640 certificates of title in duplicate.

Crown Grants.—Mr. Skey has prepared, recorded, and issued 358 Crown grants, representing 33,708 acres, and 165 certificates of title, representing 23,164 acres. He has also prepared and has ready for issue 318 Crown grants and 120 deferred payment licenses. Mr. Browne has prepared 70 copies agricultural leases, 40 mining leases, 18 exchange leases, and 18 miscellaneous leases.

Lithographic Branch.—Mr. Percival has prepared, on transfer paper, 32 block maps, 4 for photolithography, besides a number of circulars. Mr. Ross, assisted by Mr. Bain, has printed block maps, 12,800; traverse forms, 1500; circulars, 1,000; protractor forms, 500; envelope headings, 500; and Chinese proclamation, 3,000. Mr. Bain has mounted 425 maps.

Proposed Operations, 1882-83.—The work proposed is, first, the completion of triangulation necessary to determine accurately the position of the boundaries of runs recently re-leased, also, so far as possible, of those runs the leases of which expire in March, 1884. But the staff will be so fully engaged in cutting up the agricultural lands reserved out of the Otago runs, that without extra assistance it is quite impossible that all can be overtaken in time. Besides the ordinary triangulation I expect Mr. Wilmot will be able to finish the angular observations in the Ray trace of the Hollyford Valley, Martin's Bay.

W. ARTHUR,
Chief Surveyor.

SOUTHLAND.

Field Work.—Our operations in the field during the past year have almost exclusively been confined to rural and suburban surveys. Belonging to this category there have been executed during the year 294 sectional surveys, embracing 45,062 acres, at an average cost of 1s. 4d. per acre. This acreage, I may explain, comprises a considerable number of saw-mill areas, as well as a number of

bush-clad sections surveyed for sale, the number of sections surveyed in bush being 95, and the acreage covered by same being 6,516. The township surveys throughout the year have been of trifling extent, there being only some 76 allotments laid off, embracing 37 acres, of which some 22 allotments, covering 23 acres, were in bush, the average cost throughout being 15s. 9½d. per allotment. The work this year has been unusually dispersed, the result being that considerable time and expense have been entailed travelling. This cause, joined to the large proportion of bush surveys, has made the acreage cost of survey necessarily larger than would otherwise have been the case. The retarding effects of bush have been particularly experienced by Mr. John Hay, who, in the survey of the timbered country between Orepuki and the Waiau River, found it necessary for a distance of some 6½ miles to execute a road traverse averaging 15 chains from the coast-line, along which latter a traverse had also necessarily to be carried. It would be but justice also to Mr. Blaikie to state that in addition to his work being unusually dispersed, a large number of sections were laid off by him in Seaward Moss, where, owing to the chronic wetness of the ground, aggravated by heavy rainfalls during the period of surveys, considerable difficulties and discomforts required to be overcome. The work, though rough and wet, was, I am glad to be able to report, well and carefully executed. An analysis of the total work of the year would show that a large proportion of the surveys was for the purposes of deferred-payment settlement. Some 80 sections, embracing 15,000 acres or thereby were laid off expressly for this purpose; and there are other blocks, such as those between Orepuki and the Waiau River, which will partially, at least, be dedicated to this mode of settlement. It would appear that the agricultural deferred-payment system has, upon the whole, received a most successful application in Southland; and there can be little doubt that in many localities it is rapidly changing the surface of the country. The free selection surveys throughout the year have only been 23, but these embrace the comparatively large area of 11,912 acres. Considering that by far the best and the greatest bulk of the land has long since passed into private hands, I would look upon the sales as a very fair year's average, and a practical proof of confidence in the future of the district. The areas that have been laid off for saw-milling purposes number 11, covering an acreage of 1860. This would give an idea, though a somewhat imperfect one, of the importance which the saw-milling industry has assumed here—an importance, I should think, which is likely to increase for many years to come. The remainder of the surveys consists—apart from a few township sections, half-caste claims, and some special value lands—of the blocks already mentioned between Orepuki and the Waiau, and of some blocks in Seaward Moss, the selection and settlement of which latter can only be expected to be a matter of very gradual process, and attainable only by giving selectors the easiest possible terms.

Office Work.—Apart from much of the routine of office duties which it would be impossible to particularise, I may state that throughout the year 539 certificates, in lieu of Crown grants, have been prepared. It being necessary to have plans of these prepared in triplicate, it will be seen that this branch of the work involved the preparation of 1,617 plans. Of the ordinary certificates of title 659 were prepared, and, each being in duplicate, the number of plans prepared under this head has been 1,318. The number of surveyors' plans examined and passed in connection with the Land Transfer Department has been 36. These plans cover 166 original sections, the number of subdivisional allotments being 2,540, and the acreage embraced being 38,824. There being 240 applications to bring land under the Land Transfer Act which required examination, the time and trouble involved in testing the consistency and accuracy of the diagrams and descriptions must also be taken into account. The Crown and ordinary certificates of title, I need not say, required careful recording on the office maps; and in connection with this, I might say, that 55 fresh transfer record maps and 7 Crown grant record maps required preparation. The number of lithographed maps got ready to guide land selectors and the general public has not been so great as during the previous year. 7 maps of villages and deferred payment blocks, entailing 850 prints, were drawn and lithographed locally. There were also maps of 4 survey districts, comprising Oteramika, Waimumu, Invercargill, and Campbelltown Hundreds, prepared and forwarded to Wellington for purposes of photo-lithography. Each of these comprises a large number of sections, and embraces an extensive acreage. In addition to these, a topographical map of the whole Southland district, showing all the chief natural and artificial features, was prepared, on a scale of 2 miles to inch, and photo-lithographed in Wellington on a scale of 4 miles to inch, and subsequently on a scale of 8 miles to inch. This map, the necessity of which was very urgent, owing to the previous issue being out of print, was designed to supply the place of one seventeen years old; and as in the matter of roads, railways, and fresh townships the district has made immense strides in the interval, the new map, as a record of the features up to date, will be of great service in various ways. It has served as a convenient basis for the recent maps, showing the pastoral runs; while for property tax, electoral, statistical, and similar purposes, it is certain to prove of great utility.

General.—While the free selection surveys, and those of the outstanding deferred payment blocks, have nearly been brought up to date, a comparatively large acreage of land, situated in different localities, has recently been reserved for deferred payment purposes; and this, along with bush and village reserves, the subdivision of which is more or less urgently required, will afford scope for our comparatively small staff for some considerable time to come. As intimated in my last report also, the time is fast approaching when the comparatively large areas comprised in the whole of Seaward and in the southern fringes of Longwood Forests, will require subdivision for purposes of settlement. Meanwhile the sawmillers are successfully utilising the superior timber, not only to supply the local building, &c., wants but those of Otago and Canterbury. On the heels of the sawmilling will follow the firewood trade, and hand in hand with this, or following closely upon it, will come agricultural settlement. In the case of Seaward Forest particularly, it is impossible that such a large expanse of rich vegetable mould, lying so close to the centres of settlement, can long be left uncultivated. In anticipating the future, the subdivision of these areas must therefore be looked upon as work to be done.

JOHN SPENCE,
Chief Surveyor.

HEAD OFFICE.

SIR,—

General Survey Office, Wellington, 30th June, 1882.

I have the honor to report that the general correspondence and accounts of the department has continued to increase during the past year.

Mr. Lakeman, Chief Clerk, notes that 8,109 letters and memoranda have been received and despatched.

The expenditure of the Survey Department, it will be seen by the returns, amounts to £117,232 18s. 3d., and that for roads to open Crown lands for sale, is £35,223 18s. 5d.*

The increase in the correspondence necessitated the employment of a temporary clerk; but, notwithstanding this, the work of the record-room has been very heavy on the officers there.

In the drawing office, 19 new survey district maps, 6 town maps, 9 large run maps, and a great variety of more miscellaneous drawings have been executed principally for photo-lithography.

Mr. Spreat, lithographer, besides having designed and drawn a few book covers, &c., has been chiefly engaged on a 25-mile map of the Middle Island, now nearly completed.

In the early part of the survey year, the electoral maps and descriptions, and maps and descriptions of new licensing districts, engaged the time of many of the draughtsmen, and when it is considered that there are 91 electorates and 396 licensing districts, of each of which at least two maps had to be prepared, and also detailed descriptions of their boundaries, the work will be understood as involving some labor.

In the Photographic Gallery the number of negatives taken has not been quite so great as in previous years, but in the Lithographic Printing Office the work done has been of the average quantity. So far as the Survey Department work, the quality of the drawings and their printing have been decidedly superior. The tendency seems to be towards the desire for larger maps than the means at our disposal have been capable of producing without great cost and time. The necessity therefore for a larger machine and premises more suited to the work is very pressing. The publication of the maps of the Otago runs, for instance, could have been done in very much less time had the department possessed a steam printing press large enough to print them. As it was, all the presses capable of printing these maps were kept at work night and day for several weeks to supply the demand.

A site on the reclaimed land has been selected, and it is hoped the sum placed on the Estimates will be passed by Parliament, so that the building and machinery may be put in hand at an early date.

Some difficulty is experienced in getting draughtsmen to understand or to remember that drawings for photo-lithography should be made in line, and in pure black and white only, with every detail distinct and firm. For the New Zealand Institute Transactions lately, a number of drawings were photographed which were not all suitable for the process, and I dare say the artists were disappointed with the results. They will be so, unless they bear in mind that a drawing on, say, buff-coloured paper, will not produce a negative which will print well; and that lines which are not sharp and continuous can never become so by being photographed. It seems to be imagined that any rough diagram or careless tracing will, by being photographed, become equal to a steel engraving, whereas what is actually produced and printed is a facsimile of the drawing, with the weak and rotten lines frequently gone altogether.

In company with the Hon. the Minister of Lands and the Chief Surveyor of Nelson, I visited the northern portion of Nelson and Marlborough, from Collingwood to Nelson, and by the Buller and Matakaitaki to Reefton and Westport, returning by the Cannibal Gorge, Hanmer Plains and Awatere Valley, to Blenheim. I have already reported to you the results of this journey, which was mainly to see the country, with a view to its opening up by tracks prior to sale by the Crown. I have also reported to you on the utilization of the Hanmer Plains Hot Springs, which were visited on the route.

For the coming year the Head Office should endeavour to forward as much as possible the publication of the 80-chain district maps. Their use as the settlement of the country advances is becoming more necessary. At the present time the Property Tax Department is in very urgent need of them for rating and other purposes, and were they now published a great deal of cost would be saved to the Government.

A map of the northern part of the North Island will, I trust, be put in hand very soon, so as to supplement that just published by the Department on the 8-mile scale. The Middle Island should also be proceeded with so soon as the topographical work can be compiled.

A. BARRON,
Office Surveyor.

ROADS TO OPEN CROWN LANDS FOR SALE.

EXTRACTS FROM REPORTS ON WORKS UNDERTAKEN DURING THE YEAR ENDING 30TH JUNE, 1882.

AUCKLAND.

The past season, for the last three months, has been one of the worst experienced for many years, and, as a consequence, the road works have not progressed as fast as they should have done, whilst at the same time great damage has been done to some of the lines by floods and land slips.

Road, Head of Kaihu Valley to Kaiakohe.—Vote 107, item 1. Very little has been done on this line beyond completing some piece-work begun last year. There is no immediate hurry for it until the Manganui Bluff to Kaihu Road is open, and, as the votes were taken for three years, the extension of it can well be delayed.

* Full details of expenditure and liabilities, on roads to open Crown lands for sale, will be found on page 11 of the Public Works Statement Table, No. 6.

Road, Wairua to Sandy Bay.—Vote 107, item 4. A commencement on this line has been made by starting the grade survey, on which Mr. S. G. Anderson is now engaged. He had completed 4½ miles for contract on the 30th ultimo, at a cost in surveying of £95 12s. 9d. This road will run from the Great North Road, near the crossing of the Wairua River, through some homestead selections, and thence through the Crown estate in Opuawhango and native land, to a point on the Whananaki Harbour, suitable for a landing and future township. The nature of the country is such, that although a good deal broken, a good line on easy grades will be secured. Mr. Fairburn accompanied Mr. Anderson on the preliminary exploration, and chose the most suitable direction. The next item in the appropriations,—Wairua to Sandy Bay Road,—will be a branch from the above running almost wholly through Government land, and this it is contemplated to proceed with as soon as the survey of the other is completed.

Purua and Mangakahia Districts.—Vote 107, item 7. It is proposed to expend this vote in building a bridge over the Wairua River, which at present prevents the Crown lands being occupied on the further side. We have already made a considerable mileage of bridle road through Crown lands, which this bridge will render easy of access. Mr. Fairburn has obtained data for drawings of the bridge, though nothing further has been done owing to pressure of other work.

Manganui Bluff to Kaihu.—Vote 107, item 9. At the date of last year's report, 8½ miles of bridle road had been completed over the Bluff. In December last, the work was again commenced, under a foreman and party, and, since that time, about 7½ miles of road have been partly completed; but it will not be open for traffic until September, as there are contracts in progress for 4 bridges of from 12 feet to 20 feet spans, and draining and fascining to be done, which will bring the cost of the 7½ miles up to about £1,450. A large portion of the road has been done by piece-work. Although a nearly level line, a large number of swamps and streams have to be crossed, which makes the work expensive. At the end of the present work, a distance of some 4 miles has been constructed by the County Council. To effect a junction, therefore, with the work of last season, there will remain to be formed about 6 miles of level bush and easy ascent to the Crown lands which have been subdivided for sale. Mr. J. C. Blythe is in charge of this work.

Okaihau to Victoria Road.—Vote 107, item 12. On this line, which will in the future be the Great North Road, a distance of about 17 miles has been explored by Mr. Garsed, who obtained a grade of one in twenty-one, over the Maungataniwha Ranges, crossing them in a saddle at about 1,100 feet above the sea. This portion will be expensive to make as the cuttings will be very steep, and nearly the whole of it is through forest. At the Okaihau end an exploration is in progress to determine a line to effect a junction with the part already known. As the spring sets in it is hoped the work of actual construction may be commenced.

Helensville to Kaipatiki.—Vote 107, item 13. The works under this head consist in the construction of a swing bridge over the tidal waters of Kaipara, which is 251 feet long. A contract was let for £1,136 13s., on plans and specifications drawn out by Mr. Fairburn, but unforeseen difficulties, in the way of rock, has rendered extras necessary, amounting to £120, this, together with a small contract for about half a mile of road leading to the bridge, and the purchase of part of the road, will absorb the vote of £1,500. The works will shortly be completed. The lands recently sold by the Government, and those still open for selection, will thus have the greatest difficulty in approaching them removed, though to complete what has been begun, the road should be continued on for some four miles.

Lake Whangape to Block VII., Awaroa.—Vote 107, item 15. This road had been commenced under the appropriation for the previous period. During the present year 5½ miles have been constructed, at a cost of £887, under Mr. J. C. Blythe's superintendence. More than ordinary difficulties have been met with on this line, owing to rock-cutting, and the work of keeping open the first part of the road across the swamps. Mr. Blythe has built a good substantial cart bridge over the Maire stream, of 66 feet span, complete in every respect, and of good totara and rimu timber, for the very small sum of £90. This road may be taken as a fair specimen of the style of bridle road we are making all over the country, and as the nature of the country (excluding the swamps and rock-cutting) is also a fair average of what is usually met with, the cost per mile will serve as a guide for others. Taking 12½ miles of part bush and part open, the side cuttings 4 feet in the solid, all the streams bridged, the cost has been at the rate of £91 per mile, the work being done by day labour under a foreman. The grade, as you are aware, nowhere exceeds one in ten. We hope to push through to the open land on the West Coast this season. The end of the formation is now 15¾ miles from Churchill.

Waikato River to Block XVI., Awaroa.—Vote 107, item 14. Work was continued on this line in December last, and since then a party has been continuously at work by day labour, having completed 5½ miles, up to the 30th ultimo, of open and forest country, nearly all of which has been side cutting, 4 feet in the solid, at a cost of £687 for everything. Some expenditure has taken place, on portions completed last year, in raising embankments across swamps, removing landslips, and planting willows along the swamp embankments. The ensuing summer will see this line through to the open land of the West Coast. By means of this line, and that from Lake Whangape, a large extent of Crown land of very good quality, though broken, will have been opened. Mr. J. C. Blythe has charge of this line also.

Hikutaiia to Ohinemuri.—Vote 107, item 16. Shortly prior to the date of last report this work had been commenced, in spite of the opposition hitherto offered by the natives. It has now been carried into the village of Paeroa at Ohinemuri, and with the exception of a contract for raising one of the swamp embankments is completed, though in connection with it, a drainage contract has yet to be let, but for which tenders are now called. This, being one of the main roads of the Province, has been constructed for cart traffic 16 feet wide. The length is 6¼ miles. Owing to the length and number of swamps crossed (one being 76 chains long), and the necessity of providing long outfall drains, the work has been costly, averaging about £580 per mile. During the summer, as you are aware, it was used by one of the line of coaches forming a connection between Thames, Te Aroha, Hamilton, and Raglan. Mr. Nepean Kenny has had the immediate charge of the work, and has carried it out in a substantial manner.

Te Puke Roads.—Vote 107, item 17. The portion of this vote expended by the Survey Department has been spent under the direction of District Surveyor Goldsmith in forming a cart-road 18 feet wide from the Kaikokopu Stream, for a distance of $5\frac{1}{2}$ miles, to open up Te Pukeroa Block. It is a portion of the main line from Tauranga to Opotiki. Mr. Goldsmith started the work in March, with a gang of men under a foreman. The cost per mile for the completed portion (including a bridge not yet on the ground) is £132, a price which is exceedingly low, and shows that Mr. Goldsmith has exercised great care in directing it. There are $2\frac{1}{2}$ miles at present under construction, and a contract is in progress for bridging the Kaikokopu Stream. The plan has been adopted of building the small bridges at Tauranga, and then carting them out. This has proved to be very much more economical, there being no timber near the works.

Tauranga County.—The Engineer to the County Council of Tauranga reports that “the section between the Hairini Bridge and Grant’s Hotel, on the Te Puke Block, has been constructed by your department, except those portions formed by the Armed Constabulary, the total length being 13 miles and 8 chains; 2 miles and 23 chains of which was made by the Armed Constabulary, with the exception of bridges and culverts, the material for which was obtained out of the money granted by the Minister for Lands, but the labour furnished by the above force. The road throughout is formed 18 feet in width, and completed, with the exception of the long swamp at Kopuaroa, but is open for traffic, and will shortly be completed. These works consist of heavy face and side cuttings, formation of extensive embankments across deep swamps, and the erection of eight bridges, as follows: One plain bridge 17 feet long, five 8 feet in length, and two truss-bridges of one span each, viz., the Kopuaroa, 27 feet, and the Atuaroa, 42 feet; in addition to the above, 44 culverts have been constructed, varying from 9-inch to 2-feet-6-inch openings. This line is formed with easy gradients throughout, and will, when the embankments are raised over the several swamps to make good the subsidence, be a good summer road, and, if metalled, fit for any traffic throughout the year. The following have also been executed: (1.) The several embankments over the swamps have been raised 2 feet to make up for subsidence (some of which require again raising) over that portion of the road between Grant’s Hotel and the Waiari River. (2.) That portion of the line between the Waiari River and the Canaan Landing, on the Kaituna River, a distance of 1 mile and 10 chains. This section was surveyed by Mr. Turner and also constructed under his supervision. The road is formed 18 feet in width, including the erection of two bridges: one plain, 27 feet long, over the Parawhenuamea Stream, and a truss-bridge, of one span of 42 feet, across the Waiari River. (3.) A truss-bridge is now under construction over the Kaituna River, 124 feet in length, consisting of three spans of 40 feet each.”

Ormond to Opotiki.—Vote 107, item 19. Mr. Barnard reports that 21 miles of this road have been completed, the work consisting in opening out some $10\frac{1}{2}$ miles to the south of Motu River to 1 chain wide, the track formerly made being only cleared 12 feet through the bush, and the clearing of $10\frac{1}{2}$ miles on the north side of Motu. In addition, 22 miles of the old road have been repaired, slips removed, bridges built (part corduroyed) and made fit for traffic. During the stormy weather for the last three months, however, the road has become impassable, and additional expense will have to be incurred to put it in order. $15\frac{1}{2}$ acres of bush have been cleared for a resting place, and $11\frac{1}{2}$ miles of old road sown with grass. The difficulties of getting provisions into this country, a distance of over sixty miles, in the winter, has obliged us to defer the construction of the road until spring. The termination of the present year’s work is at the point where the Public Works deviation comes into the old road from Omarumutu. Under the direction of Mr. Crapp, of the Public Works Department, a contract for 10 miles on the Opotiki side is now under progress, and this will carry the formation of a 4-foot track to a junction with the works near the Motu River.

Huihuitaha Patetere.—Vote 107, Item 21. This road is a portion of the main line from Cambridge to Taupo. Work was commenced on the 4th February, and $8\frac{1}{2}$ miles, including two bridges of 14 and 18 feet, were completed on the 21st June, at a cost of £631 0s. Od. The country is very easy, with the exception of some heavy cuttings at the commencement. The work done (under the supervision of Mr. A. B. Wright) has opened up 11,000 acres of Crown land very effectually, whilst it at the same time renders a considerable portion of the Patetere district accessible by wheeled traffic. A comparatively-speaking small expenditure on the extension of this road, would open a communication for coaches with the Tauranga-Taupo Road, and thus complete the coach road from Auckland to Wellington *via* Napier. In connection with the above work, Mr. Wright has superintended the construction of the Alexandra Bridge, over the Waipa River, to give access to Tawhiao’s new settlement, Whatawhatahoe, and which will at the same time eventually be on the main line leading into the King country. The bridge will be open now in a fortnights’ time, it consists of 6-24 feet spans, and 3-40 feet trusses, a total length of 264 feet, the height being 42 feet above ordinary river level. The approaches and about a mile of road, and a large culvert have been made by Mr. Wright, with Maori labor. The whole will have been completed at a cost of about £1,800.

Roads through Ruakituri Block.—Vote 107, Item 22. Although in my district, these works are directed by Mr. Baker, Chief Surveyor, Napier, I learn that a road through Taramarama, from Ohuka towards Erepeti, for 11 miles 5 feet in width, has been completed; and that another from Marumaru on the Wairoa, into the Ruakituri, is partly under contract at the present time; and that a further extension of the latter is being carried out by Maori labor. Mr. Baker speaks in high terms of the manner in which Mr. Assistant Surveyor Lambert has carried out the supervision and arrangement of these works, and of the great advantage that has arisen through the employment of the natives in the more distant works.

Ormond to Waiapu.—Vote 107, Item 23.—Under Mr. Barnard’s direction Mr. Haig has $25\frac{1}{2}$ miles of this road surveyed, 17 miles of which are ready for contract so soon as finer weather sets in, at a cost of about £12 per mile. A good deal of obstruction was experienced from the natives to the survey of a part of the line, demanding great patience and forbearance on Mr. Haig’s part; this, however, has been happily overcome, and no trouble is now expected, if ordinary care is used in carrying on the works.

Gisborne to Waimata.—Vote 107, item 24. Mr. Barnard reports that this line is very nearly finished. Ten miles on the direct road, and $7\frac{1}{2}$ miles to render it accessible from Ormond and Gisborne respectively, are completed to a width of 8 feet in the solid, or about 12 feet general width, at a cost of about £1,850 a large number of culverts and small bridges have been built, under the immediate supervision of Mr. H. Krippner. Mr. Barnard reports that the road would have been completed and open for traffic, but for the heavy slips caused by the late heavy rains.

Gisborne to Wairoa.—Vote 107, item 25. This is part of the main road between the above places. The works have been carried out by Mr. Winter, the County Engineer, under Mr. Barnard's supervision. In all $27\frac{3}{4}$ miles are completed and under contract, the present termination of the work being at the Wahau village site, situated on the Crown lands lately surveyed for sale. It is hoped that the whole will be completed early in spring. The works have for the most part consisted in widening and improving the old line, building bridges and culverts, &c., a large number of which are necessary. Mr. Barnard reports that the late heavy rains and floods have seriously damaged the line, necessitating additional expenditure to clear slips.

Katikati Te Aroha Road.—This road does not come under the expenditure for opening Crown lands, but it is being constructed under the direction of the Survey Department, Mr. A. C. Turner, County Engineer, having the immediate supervision of it. The road is $12\frac{3}{4}$ miles in length, of which is $7\frac{3}{4}$ through forest on the Te Aroha range, which it crosses at an elevation of about 1,700 feet. Two contracts have been entered into for the construction of an 8-foot road on a one in thirteen grade, but, owing to the extraordinarily bad season, only $3\frac{3}{4}$ miles have been completed up to date, mostly in the open country. When completed, it will furnish a direct means of communication between Tauranga and Te Aroha, and will be much used. The magnificent view to be obtained on the summit of the range will prove an attraction to many travellers. The above are the works of construction carried on by this branch of your department in connection with the opening of Crown lands before sale under the Honorable the Minister for Land's votes. In addition to those, under the Honorable the Minister for Public Works we have directed the construction of bridges, and contracts for road formation on the Great North Road, the formation of a cart road from Helensville to Kaukapakapa (still in progress), and its continuation as the West Coast Road towards Port Albert as a bridle road, including in the latter a bridge of 186 feet length across the Makarau river, now nearly finished; the North Road being under the immediate charge of Mr. Fairburn, and the two latter works under that of Mr. Blythe. As so many of the works are still in progress, it is impossible to say exactly what it would be fair to count as complete, but the approximate amount is 85 miles for the year under the Honorable the Minister of Land's votes. A trial of over two years has fully demonstrated the fact that in the class of work undertaken by the department it is cheaper to employ first-class labourers, under a reliable foreman, than to let everything by contract; the work too is much better in quality. Large bridges, or other works which can be exactly specified, are better undertaken by contract. In this opinion I am supported by all the officers working under me, whose special attention was called to the matter when asking for their annual report.

S. PERCY SMITH,
Chief Surveyor.

Whangaroa Highway Board.—Mr. E. Frissell, Engineer to the Board, reports that the works have been confined to the main Raglan-Waipu road, with the exception of some pipe culverts, on the first branch road to harbour.

There have been 1 stone, 8 pipes, and 7 timber culverts laid down, 4 bridges repaired (using about 1,200 feet of timber), and 153 chains of earthworks, and 141 chains of surface formation with a formation width of 20 feet, completed, at a total cost of £226 14s. 10d., including about 800 feet of timber (distributed at different bridges for repairs as necessary) and 11 pipes on hand. I may mention that I consider the works have been done very cheaply.

The works have been done in detached portions, in order to distribute the benefit of them as far as possible, extending from the west boundary of district to the Waimarino creek, a distance of nearly 7 miles, not including that portion between the Waimarino and Tukorokoro creeks, the contractor for which has thrown up his contract.

Nearly all the portions of road missed badly require forming, but that, together with remainder of road to the Waitetuna Bridge, must be left in abeyance until funds are available.

There was one hundred pounds (£100) expended on the mountain road, outside district, but as that was done by day labour, under the superintendence of the Board, I need not further refer to it.

HAWKE'S BAY.

Ahuaturanga Block.—Blocks VI. and IX., *Woodville Survey District.*—During the past year 2 miles of road have been formed for dray traffic, including the erection of bridges and culverts, at a cost of £474 2s. 1d. Cross roads, cleared through the bush, 66 feet in width, 105 chains, cost £108 8s. 9d.; cleared 20 feet in width, 65 chains, cost £27 16s. 9d. The length of road through the Ahuaturanga Block, opened for dray traffic, but not metalled, is 4 miles, the bush has been felled and stumped 14 feet in the centre over another 2 miles, at a total cost of £1,841 9s. 9d., or 5s. 2d. per acre. The cost includes exploration, levelling, and the supervision of the work. These lands were offered for sale in March last, when 11 sections, containing 1,674 acres, were disposed of for £2,036 9s. 6d. cash, and 16 sections, containing 2,520 acres, value £3,415, were taken up on deferred payments. From the deferred payments one-third, or £1,138, will be handed to the Woodville Road Board to be expended on road works inside the block.

Puketoī Block.—*Tahoraiti Survey District.*—Block XIII. The bridle road has been widened and continued about 30 chains, 2 bridges built, and 30 chains of road cleared, at a cost of £180. Block XIV. 5 miles of road have been explored through the forest cost £45 17s. 2d. The sum of £75 out

of the vote is to be expended by the Woodville and Kumeroa Road Boards to open up direct communication between the places named. Specifications for this work have been prepared by the Survey Department, and the formation put in hand by the Road Boards.

Puketitiri Bush.—Pohui Survey District.—The sum voted for the formation of a road to the Puketitiri Bush is to be spent by the Hawke's Bay County Council, who have supplemented the vote by £240. Contracts have been let for the formation of 6 miles of road, cost £426, and for clearing the road through the bush, 2½ miles, £338.

Tukituki to Waipawa.—Makaretu Ruataniwha Survey District.—It having been found that the Crown lands in the Makaretu Reserve could not be sold until the reservation had been cancelled, the road works were not continued; but in view of legislation on the subject, the road formation and surveys have recently been commenced. A statement of the expenditure on this road will be found in the report for last year.

Tautane and Rotokakaranga.—The votes for the Tautane and Rotokakaranga Blocks, have not as yet been operated upon, for there is little probability that these lands would be taken up, until the law has been so altered as to allow of the upset prices being fixed at the selling value. In the case of the Rotokakaranga Block, the 39th parallel of latitude, the boundary of the provincial district, cuts the block into two narrow strips, thereby spoiling it for subdivision. It is intended to send out a party in July to explore for roads through the Tautane Bush, the object to be kept in view is to find a main road through the centre of the block, that will connect from the sea coast at Wainui with the railway at Tahoraiti, in the Seventy Mile Bush.

HORACE BAKER,
Chief Surveyor.

WELLINGTON.

The following works were undertaken to open Crown lands for sale in the Wellington Provincial District, during the year 1881-2, the funds being obtained from vote 107.

Item 37, £8,000, and 49, £500.—The whole of the works carried out in the Forty Mile Bush, were intrusted to the Wairarapa West County Council; I am only in a position to indicate generally what has been done in that district. (1.) In the Pahiatua Township a contract has been let for clearing and formation of a dray road between the main coach road and western boundary, of section number one, Block VIII, Mangahao, and from thence southwards to the cross road to the Tiraumea, distance about 3½ miles. (2.) The Hawera-Mangaone Cross Road has been laid off by the County Engineer, and contracts let for the construction of a dray road for a distance of 2 miles. (3.) Contracts are in progress on Foster's Line, South Mauriceville, to the extent of 2½ miles; the road will be sixteen feet wide; and is being constructed in a more expensive manner than usual in similar circumstances. No provision has yet been made for the necessary bridges; and the work has not been pushed on expeditiously, save on one contract; the time allowed expired on 31st May. (4.) Regarding the road works to open up the Wangaehu, No. 2 Block, I have no certain information: the County Council have accepted tenders for the formation of a bridle road.

Item 39, £500.—The Manawatu Highway Board are expending £350 in making the road from Knight's towards Fitzherbert Township, and the road eastward towards section No. 270, block XVI. Formation, 14 feet wide.

Item 40, £1,500.—The Hutt County Council brought the Akatarawa Block Road contracts to a conclusion, most of the work being done in 1880-1. About twelve miles of bridle-tracks were made, ranging from 3 to 7 feet in width.

Item 41, £1,000.—The only work done on the Waikawa Blocks was the felling of the forest 1 chain in width, and clearing 16 feet in centre, on a distance of 2½ miles, under the supervision of this office.

Item 42, £5,000.—The department is engaged in laying off a road through the Otamakapua block, preparatory to inviting tenders for the clearing.

Item 43, £1,000.—Proposals have been submitted for your consideration regarding the opening of the eastern side of the Pohangina Valley.

Item 44, £1,500.—Mr. G. F. Robinson is superintending, under your directions, the road works on the Momahaki Block. He was good enough to inform me, in May, that he had completed or in hand about 13 miles of road works, comprising—clearing 1 chain and stumping 30 feet in width, and earthworks and bridging, the width of road being feet. The marvel is how so much could be done for £1,500. Mr. Robinson requires some further funds to construct a line from Richardson Township towards Waverley.

Item 45, £1,200.—The Wanganui-Waitotara Highway Board, through their engineer, Mr. A. Atkins, are making the £1,200 voted to open Tokomaru Block spread over a considerable distance. The bush is felled 1 chain in width and stumped 18 feet in centre, formation being 8 feet in width. Contracts have been undertaken for about 16 miles of road.

Item 46, £2,000; and 47, £2,000.—The Wanganui County have been proceeding with the construction of Mr. Field's Mangawhero Line. The Marton-Murimotu Road has had no money spent upon its improvement yet.

Item 48, £2,300.—The Hutt County Council completed the construction of the bridle-road from Akatarawa to the Waikanae River, distant about 8 miles, width of road 5 feet.

Item 50, £1,330.—This vote was expended by the district engineer, Public Works Department, in completing the roads and drains on the Kairanga Block.

Item 51, £90.—Was expended by the Manawatu County Council on the Kiwitea Main Line.

Item 52, £1,500.—This is to be handed over to the Wairarapa East County Council to improve various roads leading towards Crown lands, but no road works have yet been undertaken so far as I am aware.

J. W. MARCHANT,
Chief Surveyor.

Hawera Road, to open up village reserve on Mangaone stream, about $3\frac{1}{2}$ miles long; part of £2,000 authorized out of the £8,000 vote. Contracts have been let as under:—

							£	s.	d.
1.	54 chains formation	...	...	...	...	...	264	0	0
2.	112 ,, ,,	...	...	...	...	...	735	0	0
							£999	0	0

Mauriceville South Road, to open up Crown lands at South Mauriceville.—The Government has not yet granted any money for this road. Contracts have been let as under:—

							£	s.	d.
1.	46 chains formation	...	...	...	...	...	105	0	0
2.	56 ,, ,,	...	...	...	...	...	261	0	0
3.	60 ,, ,,	...	...	...	...	...	229	0	0
4.	46 ,, ,,	...	...	...	...	...	189	10	0
							£784	10	0

Eketahuna to Alfredton Road is formed 15 feet wide, and cleared 33 feet on flat ground. All necessary or requisite bridges and culverts are built. No metalling done. Road Pahiatua Block.—This road is formed 13 feet wide throughout, the bush felled 66 feet wide, and cleared 33 feet wide. All necessary or requisite bridges are built, no metalling done.

The Mauriceville South Road is formed 16 feet wide, bush felled 66 feet wide, and cleared 33 feet wide. The contracts include all culverts, but no bridges or metalling. The road through township reserve, Corporation endowment, and other parts of Pahiatua Block are formed 13 feet wide, bush felled 66 feet wide, all culverts are provided for, but no bridges or metalling. Hawera Road.—The formation is 16 feet wide, bush felled 66 feet wide, and cleared 33 feet wide; all bridges and culverts are provided for, but no metalling. Wangaehu Valley Road.—Formation 13 feet wide, felling 66 feet wide; and clearing 33 feet wide; all culverts provided for, no metalling.

Manawatu Highways Board.—The Chairman reports as follows:—"The £500 grant is being laid out on roads, south and east, in the Fitzherbert Block, and the roads to Palmerston North and the Manawatu River. The length of the roads being formed with the £500 grant, is 3 miles 55 chains, in manner following. On ordinary lengths, 15 feet in width, with two side drains 2 feet wide and $1\frac{1}{2}$ feet deep. On sidelong slopes, 12 and 14 feet in width, with inner side drains $1\frac{1}{2}$ and 2 feet wide; together with the culverts required for removing surface water, and for leading creeks under the road."

TARANAKI AND WEST COAST.

Mr. Robinson, Crown Lands Ranger, reports as follows:—By the schedule you will see that in the Taranaki Provincial District over 46 miles of roads have been felled, and that over £1,862 has been spent in bridges, culverts, drains, and earthwork, besides improving by drains, grading, &c., over 4 miles of Tariki Road, and grassing over 55 miles of newly felled roads. Also other minor works.

With respect to the works in progress and to be carried on during the ensuing year, I do not know of any in the Taranaki land district, excepting an order I have just received for completing the felling of the Waingongoro Road (a few chains that is) beyond those I have shown in the statement. I should however, strongly recommend the opening of the Tariki Road to the Waitara River, a distance of under 4 miles, and the improving of the East Road from Stratford to the confiscated line. With regard to the latter, on receipt of your instructions of the 20th March last, I immediately wrote to the New Plymouth Borough Council, to the School Commissioners, and to the Manganui Road Board, asking them to subscribe in the following ratio: New Plymouth Borough Council, £75; School Commissioners, £45; and Road Board, £10. I received answers from the School Commissioners and Road Board agreeing to the proposal, but the Council adjourned the discussion on the question to a future day. I again wrote to the Council on the 15th May, requesting an early answer. The matter was again discussed, and at last referred to the Reserves Committee, which really means that the Council will do nothing to assist. I can therefore do nothing on this road without further instructions from you.

In the West Coast land district also the work to be done will be very limited unless the "continuous reserve" at Waimate is to be opened up by roads (to be charged against the rents), and the lands for sale to be further opened up by felling the cross-roads between the Eltham, Skeet, and Opunake Roads. Settlers in the Whakamara District are anxious to have lands opened up behind the Mokoia Reserve. They say it is equal in quality to the lands already sold in Whakamara, and that a good line of road can be got out, avoiding altogether the Otoki and other gorges.

SCHEDULE of ROADS opened up by Felling, Culverting and Bridging, in the TARANAKI PROVINCIAL DISTRICT, for the Year ending 30th June, 1882.

Name of Road.	Survey District.	Width of Roadway Felled.	Width of Cartway Clear.	Length of Roadway Felled, in Chains.	Cost of Felling.			Culverting, Bridging, Drains.			Total Cost.		
					£	s.	d.	£	s.	d.	£	s.	d.
Opunake	Ngaire and Kaupokonui	1 chain	16 feet	709.13	489	8	9	694	17	0	1,184	5	9(a)
Eltham	Kaupokonui	2 chains	"	658.14	822	15	6	511	4	11	1,334	0	5(b)
Skeet	"	1 chain	"	573.21	399	16	10	282	9	6	682	6	4(c)
Auroa	"	"	"	515.00	383	10	0	187	15	6	571	5	6(d)
Hastings	"	"	"	411.48	288	0	6	95	11	3	383	11	9(e)
Duthie	"	"	"	253.60	177	10	4	41	6	0	218	16	4(f)
Neill	Ngaire and Kaupokonui	"	"	592.40	419	3	6	..	..	..	419	3	6(g)
Tariki	Huiroa	"	"	..	..	..	..	..	..	..	250	0	0(h)
Ahipaipa	Kaupokonui	"	"	..	..	..	..	49	10	0	49	10	0(i)
East	Ngaire	"	"	..	..	..	..	..	..	..	42	7	6(j)
Anderson .. .. .	"	"	"	..	..	..	..	..	..	..	13	0	0(k)
	Ngaire and Kaupokonui	"	"	..	..	..	..	..	..	..	128	11	2(l)
	"	"	"	..	..	..	..	..	..	..	16	0	0(m)
Supervision—Ranger, £50 + £109 1s. 10d. travelling expenses. Overseer, £153 18s. 0d.											312	19	10
											£5,605 18 1		

- (a) Includes culverting from Mountain Road to near Manaia Road.
 (b) Includes culverting from railway line to near Auroa Road.
 (c) Includes culverting from Waingongoro to past Manaia Road.
 (d) Includes culverting from Main South Road to Opunake Road.
 (e) Felled and culverted from Skeet Road to Cornwall Road.
 (f) Felled and culverted from Skeet Road to Cornwall Road.
 (g) Felled from Waingongoro to Manaia Road.
 (h) Improving road from railway line to Mangaotea; four miles.
 (i) Approaches to Inaha Bridge.
 (j) Re-cutting undergrowth; 7½ miles.
 (k) Balance of payment due on felling last year.
 (l) Grassing bush roads; 55½ miles.
 (m) Painting office, Manaia; pump; closet.

SCHEDULE of Roads opened up by Felling in the Wairoa, Momahaki District, Wellington Provincial District, for the Year ending June 30, 1882.

Name of Road.	Width Felled.	Width of Cartway.	Length in Chains.	Cost.		
				£	s.	d.
Richardson Road	1 chain	20 feet	406.42	230	14	2
Motoroa Road	1 chain	20 and 16 feet	599.34	444	9	9
Cost of Overseer's wages				67	13	0
				£742 16 11		

Part of the Overseer's wages shown above should be charged against earthwork now in progress, and against bush-road-felling through University Reserve, Patea.

STATEMENT of WORKS in Progress, in TARANAKI PROVINCIAL DISTRICT, on the 1st July, 1882.

1. Felling and culverting Opunake Road from about three miles west of Manaia Road onwards towards Opunake.
2. Improving Opunake Road from Mountain Road to Waingongoro stream.
3. Culverting Eltham Road from Manaia Road, westwards, and felling same road from Auroa Road westwards.
4. Culverting Skeet Road, Manaia Road, to Oeo stream.
5. Improving Salisbury and Croydon Roads, Huiroa District.
6. Improving Tariki Road, Mangaotea to Ratapiko Road (D. P. Mooney.)
7. Felling and culverting roads through University Reserve, Patea.

STATEMENT of WORKS in Progress in WELLINGTON PROVINCIAL DISTRICT, on the 1st July, 1882.

1. Bridge over the Momahaki stream, Motoroa Road, Wairoa District.
 2. Earthwork (road formation), Motoroa Road.
 3. Earthwork (road formation), Richardson Road.
- The cost of the above works will be about £800.

MARLBOROUGH.

During the past year ending 30th June, 1882, 17 miles 20 chains of roads, and about 12½ miles of tracks have been constructed in this district, which may be classed as roads assisting to develop the occupation and opening up of Crown lands, viz.,—(1) In the Awatere Valley, 7 miles 20 chains; (2) in the Rai Valley, 7 miles; (3) in the Wakamarina Valley, 3 miles; (4) in the Sounds, 14 miles of 6 feet tracks.

Number 1.—7 miles 20 chains long, forms a portion of the main line of road through the Awatere Valley, from Picton, *via* Blenheim and the Taylor Pass, to the upper part of the valley, and thence southwards to Canterbury. This road passes through and opens up for profitable occupation, a block of good pastoral country, known as the Awatere Shearing Reserve, 13,127 acres in area, surveyed and subdivided into 8 sections, preparatory to offering for sale. The greater part of the line is on side cutting, through sandstone and pudding-stone, very hard to work in places, but forming an admirable metalled road when disintegrated by a short exposure to the weather.

The road has been carefully graded and cut 14 feet into the solid, making up roadway to an average of over 20 feet wide at a mean grade of 1 in 37, the steepest grade being one in 9 for a distance of about 4 chains, cut through a hard sandstone breast cutting, which was unavoidable. The cost of this road was £2,756 14s., or an average of £380 4s. per mile.

The engineering surveys and specifications were prepared by the Awatere Road Board's Surveyor and Inspector at the Board's expense, subject to my approval, the Board's Inspector supervising the works generally during their progress, with occasional and final inspections before payment, by myself.

To bring the contracts within the scope of small parties of working men during the slack time of the year, the work was divided into 13 contracts. To this and the care taken in honing out the road to the hill contours between grade pegs, is to be attributed the comparative small cost of the work, taking into account the broken nature of country passed over.

Roads numbers 2 and 3, and tracks number 4, have been carried out under the direction and supervision of the Public Works Department, and a report on them appeared in the statement of that department, pp. 58, 59.

HENRY G. CLARKE,
Surveyor.

NELSON.

Roads.—During the month of January, instructions were received to survey and construct a horse-track, with gradients for a dray-road from Hampden, Matakītiki to Walker's Track, Maruia. Mr. T. Sadd was sent to commence the work until the services of Mr. H. Tarrant, Road Surveyor, could be obtained. On the 10th of February, the first contract was let. The survey has been completed from Hampden to the Glenroy Junction, a distance of 14 miles, and contracts let for bush-felling and formation for that length. The total cost to 30th June on contracts let, including expenses of survey and an overseer, amounts to £3,063. No payments on contracts have been made during the year.

The remainder of the line is now being surveyed to the Maruia, a distance of about 7 miles. When this portion is constructed, it will be a good road from Hampden to Reefton for a horseman.

When the above is completed, it is proposed to commence grading a road line to connect the Tadmor and Sherry Valleys with the main road from Nelson to the West Coast, by way of the Hope Valley, which will open out a block of good land for selection.

JNO. S. BROWNING,
Chief Surveyor.

Road, Cobden via Coal Creek to Seventeen-Mile Diggings.—The sections of this undertaken under vote of £1,500 last year, were—(1st.) A length of 3 miles 1 chain in the Coal Creek Valley, not before constructed at all, and which will open up a good deal of fair agricultural land for settlement. Metal is difficult to obtain along most of the length. The road will probably be completed about end of October next, but a further vote of £500 is required to finish it properly, so as to be available for horse traffic throughout. The felling has been made 40 feet wide, clearing 6 feet, formation 6 feet, metal 3 feet, with side drains, culverts, and bridges. (2nd.) A length of 48½ chains of side-cutting at the Ten-Mile Bluff to make ascent at each end practicable for pack horses. An old track which was in existence was altogether too steep. This work, which involved a good deal of rock-blasting, is not yet quite complete, owing to difficulty of getting men for the work, also owing to wet weather. It will be finished not later than end of August. The felling here has been made only the width of the track and slopes, formation 6 feet, metal 4 feet.

Road, Grey Valley to Teremakau via Bell Hill and Bruce's Paddock to Upper Ahaura.—The work hereunder has consisted of—(1st.) Lake Poerua Contract, 1 mile 10 chains in length, now in progress. This extends from the open ground at Bruce's Paddock to the settlers' homesteads at Lake Poerua, and is to be metalled 8 feet wide for a dray road. The felling has been 1 chain wide, and clearing 16 feet wide. It will facilitate the settlers getting out their produce to the Christchurch Road, and thence to Hokitika and Greymouth, which at present they have great difficulty in doing. (2nd.) Hatter's Terrace to Haupiri Plains. Of this division a length of 6 miles has been surveyed, and of this length tenders have just been accepted for 3 miles. Tenders have also been called for the other 3 miles. The felling to be 40 feet, clearing 6 feet, formation 6 feet, metalling 3 feet. It is only contemplated to metal this for a bridle track. The survey of further sections is in progress.

F. W. MARTIN,
Resident Engineer, P.W. Dept.

CANTERBURY.

Mathias Pass Road.—The track has been made from the grass flat above the Junction (L on Mr. Mueller's plan) to the cliffs at the mouth of Cañon Creek. It has been made from 4 to 5 feet wide throughout, except at a few bad rocky points, and very little work would make it fit for packhorse traffic. The total length constructed is four miles forty-three chains. As far as I am able to judge, there will be about two miles more to make to reach the Saddle. There are two very bad cliffs to pass. The rest of the ground presents no special difficulty; although the sidling is very steep, the ground is clear and free from all scrub, so that it will not take long to make a good foot track.

Cost of Work.—The cost of the works to date has been as follows:—

	£	s.	d.
Wages	731	2	10
Plant and tools	97	8	8
Carriage, horse-hire, and packing	128	19	4
Engineering	155	8	1
Total	£1,112	18	11

Of the plant there remains enough of almost everything to finish the work, and there will be a number of tents and a stock of useful tools on hand when the work is done. Unless any unforeseen difficulties occur, the track will be finished for the balance of the £1,500; but, in case it should not be sufficient, it would be advisable to have £200 more to draw on in case of need. I might have made some saving in the work had I at the first fully realised the difficulties of the work, and the fact that the Saddle could not be reached by the party from either side this season; in which case I should have worked with a smaller gang, and a considerable saving made in the item of carriage. The packing for a large gang, besides the conveyance of tools, coals, &c., engaged a number of horses, and was very expensive. As it was, I hoped all the time to be able to get round the Cañon Creek cliff before the snow fell; and had I been able to do so with the number of hands I had at work, I believe I could have easily finished to the Saddle.

Description of Track.—The track rises at a grade of 1 in 12 for 1 mile 38 chains throughout this length, the sidling is steep and the ground much covered with rocks; thence it runs over a rock-covered plateau, 20 chains, this length is comparatively level, but very rough; thence 15 chains of easy sidling-grade, 1 in 15, ground rocky. In the next section a fall of 1 in 10 for 3½ chains, thence 20 chains grade falling at about 1 in 17, all easy sidling ground but much covered with rocks; from thence is run level, passing over a large face swept by avalanches, and over a snow channel. A better grade could be obtained by grading steadily down from C.; but the line would run through most difficult ground, as it would have to wind through moraines and very broken country. My line just heads the moraines and broken ground. To the cliffs of Cañon Creek is one steady rise, the grade varying from 1 in 15 to 1 in 17 throughout this length, the sidlings is very steep and rocky, the track runs through several snow channels and shingle slides, the last 36 chains is entirely through loose rock and shingle always on the move. During frosty weather rocks from the cliffs above frequently break away and roll down into the river.

A. DUDLEY DOBSON.

WESTLAND.

Mahitahi to Haast Road.—Length, 21 miles 30 chains; clearing, 33 feet; formation, 9 feet; metalling, 5 feet; 2 bridges, &c. Of this road 9 miles 30 chains were completed during the year ending 30th June, 1882, at a total cost of £2,779 0s. 5d.; and 11 miles 70 chains remain to be done during the present year, the contract price for which is £6,758 8s. 7d.

Mapourika to Gillespie's Road.—Length, 20 miles; clearing, 33 feet; formation, 9 feet; metal, 5 feet; 2 bridges, &c. Only 2 miles 65 chains of this road were contracted for during the past year, contract price, £570 10s. The next 15 miles are surveyed ready for tendering: the whole of the survey will be completed by next month.

Mathias Pass Road.—Length, 23 miles; clearing, 33 feet; forming, 7 feet; metal, 4 feet. In progress of survey only; no part of it contracted for yet; benching along the line of road (1½ to 2 feet wide, cost to June 30th, £622 11s. 10d.) is being carried on simultaneously with the survey.

The Dillman's Town to Christchurch Road and Lake Mapourika Road were constructed by County Council according to survey plans and specifications prepared by the department. The work is nearly completed.

On the Dillmanstown to Christchurch Road, 6 miles are cleared, formed, and metalled throughout; clearing, 33 feet; formation, 14 feet; metalled, 10 feet; cost, £1,891 17s. Mapourika Lake Road, 4½ miles, cleared and formed throughout, metalled for only 2 miles 68 chains; clearing, 33 feet; formation, 6 feet; metalling, 4 feet. Two bridges, of the respective lengths of 26 feet and 36 feet by 7 feet in width, comprised in this contract. Cost, £859.

GERHARD MUELLER,
Chief Surveyor.

OTAGO.

Within the Lawrence and Tapanui districts or localities some good and useful work has been done during the year under the various votes granted by Parliament, as the formation of a road from Law-

rence on to Run 106, recently sold on deferred payment; a road from Kelso up the Pomahaka river; and one from the Tapanui railway on to the lands recently surveyed on Run 140 A. Mr. Smail, County Engineer, who has the supervision of the works, reports thus on them:—

Vote 107, item 68.—The length of road leading to Run 106 along the east bank of Tuapeka stream, now under contract, is $4\frac{1}{2}$ miles, and will be formed to the width of 15 feet, including the necessary culverts, &c., the steepest grade being 1 in 9, and the extras, in the shape of ditching and metalling the worst places, at the contract schedule rates, including cost of supervision, will nearly absorb the vote. A further sum of £700 will be required to complete the works across the Crookburn on to the main ridge, including a deviation through Mr. Smith's land, facing the Waitahuna stream. When that is done the settlers will have two passable roads, one leading up the Tuapeka stream to Lawrence, the other *via* Waitahuna stream to Havelock.

Vote 107, item 70: Road Tapanui Railway to Run 140 A.—The length under contract is 144 chains, and is being formed to the width of 18 feet. The steepest grade is 1 in 9, and that only for a short distance. An additional sum of £600 will be required to complete necessary works on this road.

Road Kelso to Block XIII., Greenvale.—The work under contract on this road consists of a large number of culverts, with short pieces of embankment over each roadway at formation level, 22 feet in width, and grades very easy; also a timber bridge over the Heriot Burn, 67 feet in length, width of roadway 14 feet; and when the works are completed there will be a fairly passable road for a length of five miles from the township of Kelso towards Block XIII., Greenvale district. This road should be continued along the banks of the Pomahaka river to the Switzer's road; probable cost, £600.

Tuapeka Mouth Bridge, now under contract, is 100 feet in length by 14 feet in width, in three spans of 33 feet 4 inches each, abutments and wing walls of coursed rubble masonry, set in mortar and pointed with cement; piers and all timbers under roadway to be Australian iron bark; the deck and parapet to be of Tapanui black pine. The structure will be durable, and I have no doubt will give satisfaction. (This is a pile bridge.)

Vote 107, item 66: Road Beaumont to Miller's Flat, via East Bank of Clutha River.—Total length now under contract $4\frac{1}{2}$ miles, to be formed to the width of 15 feet, steepest grade 1 in 23. Also, two bridges, one over the Beaumont stream, 53 feet span, the other over Corstorphine Creek, 12 feet span; both bridges 10 feet wide, and will have stone abutments set in mortar, the timber of the Beaumont bridge to be Australian iron bark under the roadway. Tenders are invited for the formation of an additional length of 208 chains, and contracts will be prepared for the other portions before next August.

Vote 107, item 67: Road to Block X., Binger District.—Total length now under contract, and nearly completed, is 112 chains, to the width of 18 feet; the steepest grade being 1 in 9. This road, when completed, will be of great service to settlers. A table is appended, showing expenditure on above.

Wyndham Valley Road.—Under the direction of this office 4 miles 54 chains of this line have been made passable for dray traffic, that is up to the ford on the Wyndham river, near Anderson's station. One small bridge has been built, and numerous stone culverts. Already this road is much used by the settlers on Anderson's run, but as the money allowed by the School Commissioners for its construction was limited, and not sufficient to make a thoroughly efficient job of it, it will soon require attention from the County Council. A foot-bridge has also been erected, under my supervision, at the ford, on the Wyndham river, so that during heavy floods, which are frequent in winter, traffic will not be entirely suspended. The next section of this road, 4 miles 55 chains, had been let to Messrs. Meston and McConnochie, by the Board of Governors, Otago High School. But here, again, the money to be expended per mile is quite inadequate to do more than form a road which may be usable in very fine weather. The formation will be only 12 feet, with stone culverts and one bridge over Titri creek, and the above mileage reckons from the Wyndham ford at the township up towards the Chimney Saddle. According to arrangement I have had the assistance of an Inspector on the works, without which there can be no guarantee of good and genuine work being done. The remaining contracts on this road I should have had ready ere now, but, being shorthanded, that could not be; however, they will be prepared very soon now, and will, with the one just let, cover a length over all of 14 miles 53 chains to the boundary of the Board's endowment.

Road Fortrose to Waitawa, via Tokanui Gorge.—This work has been examined and surveyed by Mr. Strauchon, who has also made the necessary sections. Specifications will soon be prepared and everything ready for contract before the good weather comes. A small bridge will be necessary at the crossing of the Tokanui stream, but the road itself to be of much use should be formed 5 miles further, as that would make the lands on the Waitawa runs thoroughly accessible, and without which these lands cannot be successfully opened up.

Strath Taieri Works.—I have selected road lines from Strath Taieri to Moonlight Flat, and across the Nenthorn to Mount Stoker land, including bridge sites on Sheepwash and Nenthorn creeks. Contracts for both of these works have been let, the former for £1,719, and the latter for £1,943. These works will be of great use, but a bridge over the Taieri river itself I consider of far more importance in encouraging settlement.

Deepdell Road.—A good line has been selected by Mr. Barron and myself to give access to the Pastoral deferred-payment sections at present being surveyed on this run, 210, "Deepdell." It is being surveyed and sectioned by the County Engineer, who will forward his drawings and specification to this office for approval before calling for tenders.

Upper Clutha Valley.—The drawings have been examined and approved by me for widening the track Cromwell to Perriam's, east bank of Clutha, to 18 feet. A bridge plan for Firewood Creek has yet to come in. When this work is done, it will assist very much in the profitable sale of lands on run 236 and 239, now under survey, as all crossings of the Clutha river will thereby be avoided, and a good road from Clyde to Lake Hawea will be available at all seasons of the year.

STATEMENT showing CONTRACTS entered into; also the AMOUNT of said CONTRACT, and the VALUE of WORK PERFORMED on each up to DATE, at SCHEDULE RATES.

Title of Work, or Vote.	Amount of Contracts.	Total Amount of Contract.	Value of Work Performed to Date.	Total Amount of Work Done to Date.	Amount of Government Vote.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Vote 107, item 68: To open up Run 106—					
Contract No. 157	118 10 8	..	50 0 0	..	} 1000 0 0
" " 158	213 15 6	..	..	..
" " 161	187 10 0	..	..	..
" " 162	246 9 0	..	..	..
		(a)766 5 2		50 0 0	
Vote 107, item 70: Tapanui Railway to Run 140 A.—					
Contract No. 148	534 8 0	..	300 0 0	..	} 1000 0 0
" " 149	438 8 6	..	230 0 0	..	
		972 16 6		530 0 0	
Kelso to Block XIII, Greenvale District—					
Contract No. 145	239 13 3	..	50 0 0	..	} 500 0 0
" " 146	254 4 6	..	250 0 0	..	
" " 147	265 0 0	..	150 0 0	..	
		(b)758 17 9		450 0 0	
Tuapeka Mouth Bridge—					
Contract No. 154	639 17 0	..	No progress	..	{ Subsidy of £ to £.
		639 17 0			
Vote 107, item 66: Beaumont to Miller's Flat, via East Bank of Clutha River—					
Contract No. 159	230 0 0	..	..	..	} 3000 0 0
" " 160	374 18 0	..	..	..
" " 163	389 10 4	..	..	..
" " 164	315 1 10	..	..	..
		(c)1309 10 2			
Road to Block X, Bengier District—					
Contract No. 138	570 10 4	..	400 0 0	..	} 500 0 0
" " 143	662 4 0	..	600 0 0	..	
		(d)1232 14 4		1000 0 0	

(a) The cost of supervision will have to be added to the contract amounts. That can only be known after the contracts are completed.

(b) You will note this exceeds the Government vote by £253 17s. 9d. The Tuapeka County Council provides the balance.

(c) Tenders are invited for an additional length of 208 chains, and contracts for the remainder of the length will be prepared in August.

(d) You will note this exceeds the Government vote by £732 14s. 4d. The Tuapeka County Council provides the balance.

W. ARTHUR,
Chief Surveyor.

SOUTHLAND.

Seaward Moss Road.—The work upon this road executed during the last year consists partly of forming and ditching, but chiefly of gravelling that portion of the road, which during a previous year had been ditched and formed. The gravelling for the most part extends from near Woodend to the south boundary of Block VIII, Campbelltown Hundred, and for this distance into the "Seaward Moss," the road is now very passable at all seasons. For a mile further south the road was ditched and formed on a previous year; and when the winter is over this portion will be in a fair condition to receive a coat of gravel. Meanwhile, from the terminus of the old formation southwards to Awarua Bay, contracts have been let by the Invercargill Road Board, in whose hands the expenditure of the money has been left, consisting of double ditching throughout, also of culverting, bridging, and fascining where required. These contracts are now in progress, though owing to the wet and inclement weather which has lately prevailed, the work has been considerably retarded. When the works has been completed, and thereafter gravelled where necessary, through communication will then be opened up between Woodend and Awarua Bay. The advantages of this both to settlers on the line of route and to those who may ultimately settle at the head of the Bay, are very apparent, there being a good natural road along the beach.

The Clerk to the Invercargill Road Board reports "that during the past year the Seaward Moss Road, for which the sum of £924 13s. was voted has been expended as follows, on—185 chains gravelling, 63 chains formation, 110 chains ditch-deepening, 16 chains new ditching, and 2 box drains. These works were carried out on the Seaward Moss Road, through Blocks II. and VIII., Campeltown Hundred."

Wilson's Crossing Road.—On the strength of £1,000 allotted to this road, the expenditure of which sum has been handed over to the Southland County Council, several contracts have been let. The most westerly of these contracts begins at the junction of roads situated 1½ miles due east of Wilson's Crossing Railway Station. From this point the road formation extends continuously along the south boundary of Block VIII., New River Hundred, till Forest Hill Hundred is reached. At this

latter point, two branch roads begin, one running north-easterly towards Shark's Tooth, and the other south-easterly to the Makarewa River. All the contracts are now in progress, none owing to the unfavourable weather, &c., being finally completed. The work in progress on the main part of the road consists of bush-felling, ditching, and fascining; also of some culverts and a bridge. The work in progress on the branch roads consists for the most part of ditching, forming and fascining; also of culverts where required, more money will be required to properly open up, *via* Wilson's Crossing, the Deferred Payment Block north of Shark's Tooth; but when the present contracts are completed, the road in ordinary seasons will so far be fairly passable.

JOHN SPENCE,
Chief Surveyor.

STATEMENT of the EXTENT and COST of TRIANGULATION executed in New Zealand up to 30th June, 1882.

Districts.	Standard Survey.				Settlement Survey.			
	Meridional Circuit.	Cost per Acre.	Major Triangulation.	Cost per Acre.	Minor Triangulation without Topography.	Cost per Acre.	Minor Triangulation with Topography.	Cost per Acre.
	Acres.	d.	Acres.	d.	Acres.	d.	Acres.	d.
Auckland—prior to 1877 ...	...	...	8,060,287	32	125,000	25	134,400	140
" since 1876 ...	...	...	2,770,896	27	2,240,354	110	2,808,323	93
Taranaki—prior to 1877 ...	...	...	...	...	20,000	50	...	...
" since 1876 ...	590,000	110	...	...	233,500	162	181,000	190
Hawke's Bay—prior to 1877 ...	...	...	1,971,120	40	37,000	100	...	...
" since 1876 ...	...	...	185,800	06	169,448	172	745,300	98
Wellington—prior to 1877 ...	...	...	3,958,009	75	1,970,000	150	...	...
" since 1876 ...	211,000	19	251,040	76	57,076	144	1,759,753	144
Nelson—prior to 1877 ...	...	...	...	...	...	...	...	...
" since 1876 ...	4,997,120	125	...	...	231,601	105	1,356,693	205
Marlborough—prior to 1877 ...	...	...	...	...	...	...	...	...
" since 1876 ...	3,000,000	083	335,680	25	156,000	207	301,000	130
Westland—prior to 1877 ...	...	...	554,160	80	...	...	100,880	180
" since 1876 ...	...	...	1,144,083	127	146,620	194	723,475	243
Canterbury—prior to 1877 ...	...	...	...	...	2,818,800*	†	...	...
" since 1876 ...	6,143,000	173	133,000	12	1,706,152	74	2,535,034	164
Otago—prior to 1877 ...	10,300,000	066	358,400	50	...	...	6,581,407	150
" since 1876 ...	...	...	...	...	20,150	190	2,028,519	104
Southland—prior to 1877 ...	2,940,000	066	...	...	...	...	1,520,000	150
" since 1876 ...	...	...	...	...	...	...	357,660	142
Totals ...	28,181,120	...	19,672,466	...	9,931,701	...	21,133,444	...

* 1,843,700 acres of this either not reliable or stations lost. † Not known.

ABSTRACT of the SURVEYORS Employed in each PROVINCIAL DISTRICT, and of the WORK ON HAND, on 30th June, 1882.

Chief Surveyors.	Surveyors.		District.	Triangulation	Settlement Survey.	Native Block and Land Purchase.	Railway, Road, and Water-races.
	Staff.	Contract or other Surveyors.					
S. P. Smith ...	19	13	Auckland ...	Sq. Miles. 1,676	Acres. 185,827	Acres. 271,020	Lin. Miles. 239
T. Humphries ...	8	2	Taranaki ...	...	32,600	60,000	14
H. Baker ...	4	3	Hawke's Bay ...	105	27,268	57,734*	145
J. W. A. Marchant ...	12	4	Wellington ...	765	44,000	9,150	...
J. S. Browning ...	10	...	Nelson ...	...	95,091	...	...
H. G. Clarke ...	2	...	Marlborough ...	...	953	...	...
G. Muller ...	5	...	Westland ...	734†	49,266	569	43
J. H. Baker ...	13	2	Canterbury ...	166	{ P.D.P. 31,281 } 98,642	...	...
W. Arthur ...	8	1	Otago ...	340	91,546	...	...
J. Spence ...	2	1	Southland ...	...	15,258	...	...
Totals ...	83	26	...	3,786	671,732	398,473	441

* Native Land Court. † 56 lineal miles traverse circuit.

CROWN GRANTS and CERTIFICATES of TITLE from the Crown Prepared.

District.	Number.	Cost.	District.	Number.	Cost.
Auckland ...	630	£ 600 0 0	Westland ...	177	£ 30 9 6
Taranaki ...	535	276 0 0	Canterbury ...	1,031	279 12 10
Hawke's Bay ...	187	106 4 0	Otago ...	942	400 0 0
Wellington ...	310	143 5 0	Southland ...	539	200 0 0
Nelson ...	5	2 2 6	Totals ...	4,416	2,060 3 10
Marlborough ...	60	22 10 0			

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.
Auckland ...	164	593	£ s. d. 350 0 0	Westland ...	42	180	£ s. d. 21 12 0
Taranaki ...	60	847	200 0 0	Canterbury ...	100	6,422	779 0 0
Hawke's Bay ...	46	11	200 0 0	Otago ...	93	2,640	480 0 0
Wellington ...	49	1,756	174 8 0	Southland ...	36	1,318	210 0 0
Nelson ...	144	314	204 7 6	Totals ...	760	14,168	2,667 2 6
Marlborough ...	26	87	47 15 0				

LITHOGRAPHIC PRINTING executed during the Year 1881-82.

Department.	No. of Jobs.	Impressions by Hand.	No. of Jobs.	Impressions by Machine.	Department.	No. of Jobs.	Impressions by Hand.	No. of Jobs.	Impressions by Machine.
Survey ...	321	16,749	64	190,650	Railway ...	41	5,000	...	...
Public Works ...	156	14,683	10	19,350	Architect ...	10	500	...	...
Telegraph ...	7	974	2	3,300	Government Printer ...	14	324	5	7,400
Treasury ...	4	1,400	...	...	Immigration ...	2	100	...	...
Justice ...	34	3,400	...	...	Annuities ...	3	1,500	...	...
Geological ...	...	...	23	34,850	Property-Tax ...	3	3,840	...	...
Native ...	26	2,820	...	...	Library ...	...	...	1	600
Patent ...	4	400	...	...	Registrar-General ...	13	1,280	...	...
Customs ...	41	2,380	...	...	Prisons ...	16	406	...	...
Colonial Secretary ...	34	1,485	...	...	Mines ...	1	100	...	...
Education ...	75	8,469	59	43,600	Parliament ...	3	750	...	...
Marine ...	21	1,885	3	2,600	Total ...	843	70,283	168	302,950
Defence ...	2	220	...	...			
Postal ...	9	1,618	1	600					

TOTAL NUMBER OF PRINTINGS, 1,250.
MAPS MOUNTED, 1,792.

ABSTRACT OF LITHOGRAPHS PRINTED.

	No.	Average No. of Copies of each Lithograph.	No. of Impressions.
Head Office ...	1,011	369	373,233
Auckland ...	26	111	2,900
Otago ...	50	386	19,300
Southland ...	7	121	850
Totals ...	1,094	987	396,233

WORK ON HAND, PRINTING OFFICE.—Education, 300; Survey, 11,700; Property-Tax, 2,000; Postal, 2,700; Public Works, £,400.

PHOTOGRAPHS ON HAND.—1 plate, Public Works; 2 plates, Survey Department.

PHOTOGRAPHS.

Department.	No. of Plates Taken during the Year.	Department.	No. of Plates Taken during the Year.
Public Works ...	90	Architect ...	1
Survey ...	174	Insurance ...	2
Museum ...	18	Total ...	320
Marine ...	8		
Education ...	18	Silver prints ...	561
Government Printer ...	9		

AUCKLAND TRIGONOMETRICAL and CHAIN CLOSURES, 1881-82.

Surveyors.	Trigonometrical.			Chain.			
	Number of Closures.	Mean Differences of Bearing of Closures.	Mean Ratio of Diff-erence of Closure per Mile.	Number of Closures.	Number of Traverse Lines.	Total Length of Traverse Lines.	Mean Ratio of Error of Closure.
S. Weetman ...	6	13"	lks. .53	11	380	37.4	lks. 1.6
E. C. Goldsmith ...	4	4"	.50	6	67	11.9	4
L. Cussen ...	22	11".3	.50	...	...	...	...
F. Simpson ...	5	19"	1	5	128	15.6	1.4
F. H. Edgecumbe ...	...	...	...	10	224	41.7	1.36
R. Newmann ...	3	11"	3	6	102	11.7	1.1
B. Lambert ...	...	...	...	10	276	15.7	5.28
P. E. Cheal ...	...	...	...	5	95	22.4	2
W. J. Parris ...	...	...	...	6	46	7.1	2.5
G. A. Martin ...	...	...	...	9	83	13.4	2.2
E. H. Hardy ...	4	...	0.44	3	...	10.2	0.4
H. M. Smith ...	...	...	...	9	...	41.5	2.35
J. I. Philips ...	...	...	...	7	130	16.2	2
C. Stevens ...	2	10"	0.8	1	16	3.25	0.1
J. Hannah ...	6	...	1.9	...	...	...	...
H. A. Martin ...	2	7"	0.6	6	110	16	0.5
A. M. Ross ...	...	...	...	4	48	6.9	2
Means and totals {	54	75".3	9.27	98	1,705	265.95	28.79
	54	10".7	1.03	98	1,705	265.95	1.92

NOTE.—The above shows a fair average of the closures; it, of course, only includes a few of them.

SCHEDULE A.—WELLINGTON.

COMPARISON of BASES, taking Waipakura Base, measured by Mr. John Annabell, as Standard for Comparison, equal 16,128.02 links.

Base.	Length.	By Whom Measured.
The "Westmere" (computed from Waipakura, = 8,621.00)	8,621.53 8,623.4	Mr. John Annabell and the Chief Surveyor, Mr. J. Mitchell.
	diff. 1.87	= 1.74 per mile.
The "Okirae"	10,835.24 10,836.00	Mr. John Annabell. Computed from Waipakura.
	diff. 0.76	= 0.56 per mile.
The "Te Ruanui"	4,314.4 4,314.6	Mr. D. H. Munro, computed from Waipakura.
	diff. 0.2	= 0.39 per mile.

A mean correction of 1.83 links per mile was applied to the old Wellington provincial triangulation distances to reduce them to the new Wellington City standard survey measurements. This nearly agrees with the results obtained by major triangulation, which showed that the Wellington distances were short by 1.56 per mile.

COMPARISON OF WELLINGTON DISTRICT TRIANGULATIONS.

Surveyor and Survey District.	Average Error in Summation.	Side.	Bearings.	Distances.	Discrepancy per Mile.	Remarks.
G. A. Northcroft, Puketoi. (Comparison with original work by A. Dundas and J. Kelleher.)	10"	K, Rakonui, to J, Butters ...	... ..	lks. 28,350.1 53.1	lks. 0.9	Mr. Northcroft's lay within limits of original triangulation.
		Puketoi, to K, Rakonui ...	292 15 7 15 10	diff. 3.0		
		I, Table, to J, Castle Ridge	diff. 3	23,621.0 25.2	diff. 4.2		1.4

COMPARISON of WELLINGTON DISTRICT TRIANGULATIONS—*continued.*

Surveyor and Survey District.	Average Error in Summation.	Side.	Bearings.	Distances.	Discrepancy per Mile.	Remarks.
G. A. Northeroft, Aohanga. (Comparison with work by A. D. Wilson.)	15"	Polygon round <i>F</i> , Benmore...	° / "	lks. 25,208·7 10·2	lks. 0·5	
			diff.	1·5		
		<i>O</i> , Castle, to <i>Q</i> , Grant ...	333 58 42 59 1			
			diff.	19		
		<i>K</i> , the Peak, to <i>I</i> , Breakdown ...	...	33,088·3 88·8	0·1	
			diff.	0·5		
		<i>Q</i> , Kupukori, to <i>L</i> , Benvorlich ...	...	23,026·4 25·7	0·2	
			diff.	0·7		
		<i>Q</i> , Kupukori, to <i>U</i> , Scrub ...	...	24,344·1 46·1	0·7	
			diff.	2·0		
		<i>X</i> , Mount York, to <i>V</i> , Pukeamuku ...	...	23,051·4 49·9	0·5	
			diff.	1·5		
		<i>X</i> , Mount York, to <i>V</i> , Pukeamuku ...	...	23,054·3 49·9	1·4	
			diff.	4·4		
<i>V</i> , Pukeamuku, to <i>Y</i> , Scrub...	...	20,893·9 97·7	1·5			
	diff.	3·8				
<i>G</i> , Waihoki, to <i>I</i> , Breakdown ...	88 51 34 51 41					
	diff.	7				
<i>O</i> , Razorback, to <i>Q</i> , Kupukori ...	93 27 20 27 15					
	diff.	5				
<i>X</i> , Mount York, to <i>W</i> , Rara ...	43 32 11 32 23					
	diff.	12				
<i>I</i> , Table, to <i>D</i> , Razorback ...	...	34,255·0 53·5	0·3			
	diff.	1·5				
G. A. Northeroft, Mount Cerberus. (Comparison with work by A. D. Wilson.)	14"	<i>G</i> , Camp, to <i>E</i> , Manuhara ...	...	19,526·4 26·4	0·0	
				0·0		
		<i>J</i> , Pukewhinau, to <i>P</i> , Pukehou ...	...	17,805·2 07·0	0·8	
				0·8		
		<i>H</i> , Korora, to <i>Q</i> , Pukepoto...	...	19,761·3 61·5	0·1	
				0·2		
		<i>Q</i> , Pukepoto, to <i>J</i> , Pukewhinau	140 45 52 45 13			
		diff.	39			
		<i>J</i> , Towai, to <i>Q</i> , Pukepoto ...	104 17 54 17 52			
		diff.	2			
		<i>A</i> , Manuka, to <i>L</i> , Huiru ...	80 45 6 44 58			
		diff.	8			
		<i>F</i> , Tarahora, to <i>E</i> , Manuhara ...	57 48 45 48 24			
		diff.	21			
		<i>C</i> , Meech, to <i>D</i> , Cerberus ...	26 18 14 17 41			
		diff.	33			

COMPARISON OF WELLINGTON DISTRICT TRIANGULATIONS—continued.

Surveyor and Survey District.	Average Error in Summation.	Side.	Bearings.	Distances.	Discrepancy per Mile.	Remarks.	
Llewellyn Smith, Tiffin. (Comparison with work by H. Jackson, J. Mitchell, A. Dundas, and M. Carkeek.)	10"	<i>J</i> , Mitre, to <i>I</i> , Mount Dundas	...	lks. 40,474.3 88.0	lks. ...	Major triangulation assumed to be correct.	
		<i>F</i> , Harris, to <i>G</i> , Pukekino ...	...	diff. 13.7	2.7	
		<i>O</i> , Pope's Hill, to <i>P</i> , Waiohine	...	30,797.7 801.2	...		0.9
		<i>A</i> , Rangitumau, to <i>C</i> , Waka-papa	...	diff. 3.5	3.6		
		<i>T</i> , Reeves, to <i>P</i> , Waiohine	44,526.0 45.8	...		1.7
Akatarawa ...	...	<i>A</i> , Kapakapanui, to <i>G</i> , Renata	...	80,081.4 98.5	...	1.6
		<i>G</i> , Renata, to <i>F</i> , Pukeruru ...	...	diff. 17.1	0.5	
		<i>R</i> , Hector, to <i>P</i> , Waiohine ...	...	40,645.2 53.3	...	0.2
Llewellyn Smith, Mikimiki. (Comparison with old work by J. Mitchell, M. Carkeek, and J. D. Climie.)	9"	<i>J</i> , Mitre, to <i>E</i> , Temara ...	95 12 21 10 46 diff. 1 35	...	...	The bearings were brought through major and minor triangulation right across the Island.
		<i>N</i> , Holdsworth, to <i>L</i> , Pinnacle	101 33 36 33 39 diff. 3	...	...
		<i>N</i> , Holdsworth, to <i>P</i> , Waiohine	1 6 0 6 15 diff. 15	...	...
		<i>R</i> , Hector, to <i>P</i> , Waiohine ...	94 50 21 49 47 diff. 34	...	...
		<i>R</i> , Hector, to <i>G</i> , Renata ...	249 2 11 249 37 16 35 5 34 22 diff. 43	convergence of meridians.	...		
		<i>R</i> , Hector, to <i>A</i> , Kapakapanui	281 51 39 102 26 33 34 54 34 22 diff. 32	...	...
		<i>Waitohu close by positions between Moutere and Waitohu gives</i>	...	...	...
A. and M. Carkeek, Waitohu	9"	Waitohu close by positions between Moutere and Waitohu gives	...	N. 82,457.0 82,456.6 diff. 0.4	0.03	Distance between terminals, 11½ miles.	
				E. 44,318.3 44,314.6 diff. 3.7	0.3		
J. D. Climie, Akatarawa	14"	Saddle to <i>D</i> , Kakanui ...	...	15,345.6 47.5 diff. 1.9	1.0	...
		Kapakapanui to Quoin ...	...	50,624.2 34.9 diff. 10.7	1.7	...
		<i>H</i> , Kakariki, to Mungaroa ...	...	23,481.0 83.5 diff. 2.5	0.8	...
Position of Mungaroa by J. McKenzie = S. 27,691.9				E. 23,426.2			
" " J. D. Climie = " 27,687.3				" 23,437.7			
Difference in 50½ miles = 4.6				11.7			

COMPARISON OF WELLINGTON DISTRICT TRIANGULATIONS—*continued.*

Surveyor and Survey District.	Average Error in Summation.	Side.	Bearings.	Distances.	Discrepancy per Mile.	Remarks.		
J. D. Climie, Kaitawa	13"	Manganui to Wainui ...	...	lks. ...	...	Major trig. distance. By Climie through Stn GG.
				54,871.5				
		54,872.0	diff.	0.5	0.08			
		Kapakapanui to Wainui	54,878.0	diff.	6.5	0.9	By Climie through Maungakawa.
				68,108.3	...	68,110.0	...	Major trig. distance. By Climie through trigs. JJ and GG.
		G-B	30,106.9	diff.	5.1	0.6
...	...			1.8	0.6			
W. Snowden, Port Nicholson	25"	British Peak to Mount Victoria	32,189.9	diff.	40.4	0.1
				...	0.5	0.1		
		S-Hawkins Hill	21,974.5	diff.	71.0	1.3
				...	3.5	1.3		
		A-C	16,954.7	diff.	58.7	2.0
				...	4.0	2.0		
		A-T	22,181.2	diff.	80.4	0.3
				...	0.8	0.3		
		C-D	15 16 36
				16 09	diff.	0 27	...	
F-E ...	...	...	19 20 24	...	...	...
		...	20 49	diff.	0 25	...		
B-T ...	...	...	319 20 46	...	...	...
		...	20 38	diff.	0 8	...		
A. Dundas, Pohangina and Oroua	13"	Wharite to Mount Taylor ...	...	129,778.0	...	Polygonal closes within the work.	
				87.7*	diff.	9.7	0.6	
		Wharite to M, Mahara	51,545.4	diff.	50.9	0.8
				...	5.5	0.8		
		M-N	67,856.2	diff.	55.7	0.06
				...	0.5	0.06		
		Old Wharite to S	28,571.7	diff.	65.3	1.8
				...	6.4	1.8		
		A-S	22,565.3	diff.	64.5	0.3
				...	0.8	0.3		
		M-A	49,453.9	diff.	57.7	0.6
				...	3.8	0.6		
M-C ...	...	...	40,642.3	diff.	41.0	0.25
		...	1.3	0.25				
M-N ...	...	...	67,853.4	diff.	55.7	0.27
		...	2.3	0.27				
E-C ...	...	...	33,188.4	diff.	90.2	0.4
		...	1.8	0.4				

* From co-ordinates of old Rangitikei triangulation.

COMPARISON OF WELLINGTON DISTRICT TRIANGULATIONS—continued.

Surveyor and Survey District.	Average Error in Summation.	Side.	Bearings.	Distances.	Discrepancy per Mile.	Remarks.
J. Baber, jun., Wai-opehu, Arawaru, and Mount Robinson	18"	M-Cliff No. 3	lks. 48,260.6 66.9	1.0	Polygonal closes within the work.
				diff. 6.3		
		C-N ... ..	...	29,086.3 80.8	1.5
				diff. 5.5		
		H-E	23,922.2 25.7	1.2	
				diff. 3.5		
		C, Tawirikohu, to G, Mount Dundas	...	29,185.0 90.0	...	To bring Mr. Baber's work into harmony with the major triangulation, an angular correction of only 3" was required.
				diff. 5.0	1.4	
		D, Makahika, to HA, Ngapuketerua	...	28,918.9 13.5	...	
				diff. 5.4	1.5	
A, Tepaki, to K, The Peaks	...	21,504.1 01.0	...			
		diff. 3.1	1.2			

NOTE.—The mean discrepancy derived from the foregoing comparisons, without any attempt at selection, between the major and minor triangulations throughout the Wellington Provincial District, being the work of numerous surveyors, founded upon many independent bases, amounts to 0.87 link per mile.

SURVEYS IN WELLINGTON PROVINCIAL DISTRICT, 1881-82.—TRAVERSE CLOSURES.

Surveyor.	Survey District.	Traverse.		Length in Miles.	Closing Error.		Error per Mile.		Average Length of Lines in Chains.		
		From	To		Mn.	Pr.	Mn.	Pr.			
A. Dundas and C. W. Thompson	Pohangina ...	Stream traverse	Stream traverse	3½	4.3	17.3	1.2	4.6	5½		
		Cliff 3 ...	Cliff 4 ...	2	4.1	4.9	2.0	2.4	5½		
		" 6 ...	" 7 ...	1	3.4	1.0	3.4	1.0	5½		
		Beehive Creek traverse		5	0.9	13.0	0.2	2.6	5½		
		R peg ...	Trig. AA ...	3½	3.9	14.4	1.2	4.4	3½		
		Peg LIII ...	" CC ...	2	2.1	1.9	1.0	1.0	3½		
		R peg ...	R peg ...	1	5.5	7.5	5.5	7.5	3½		
		" ...	" ...	1½	4.4	6.4	3.0	4.3	3½		
		" ...	" ...	2	3.3	2.0	1.6	6.0	3½		
		Peg XIV ...	Peg LXXXVIII	2	7.0	5.6	3.5	2.8	3½		
		Trig. D ...	Township ...	2½	8.3	9.6	3.7	4.3	3½		
		Township ...	Cliff No. 4 ...	1½	2.6	1.3	1.5	1.0	3½		
		Cliff 4 ...	Peg XX ...	2½	2.8	10.2	1.2	4.5	3½		
		Peg XCVIII ...	" LXVII ...	2½	2.3	16.5	1.0	7.3	3½		
		" LXVII ...	" XCVI ...	1	2.6	4.8	2.6	4.8	3½		
		" XCVI ...	Trig. H ...	¾	3.7	1.2	4.8	1.6	3½		
Trig. H ...	" I ...	5½	11.3	4.6	2.1	0.8	3½				
Peg XC ...	" O ...	1½	7.9	8.3	4.5	4.7	3½				
F. W. Knowles ...	Waitohu and Wai-opehu	Trig. Beaven ...	Peg X ...	2	7.9	8.4	3.9	4.2			
		" Poroporo ...	V ...	2½	5.4	12.8	2.2	5.1			
		IT ...	Peg XL ...	3	1.5	0.4	0.5	0.1			
				1½	2.5	0.5	2.0	0.4			
		Sandy ...	Peg I ...	2	2.3	2.3	1.1	1.1	16		
		" I ...	" VIII ...	1½	2.4	0.0	1.6	0.0	16		
		" I ...	" XIV ...	1½	0.8	1.3	0.5	0.7	16		
		" VII ...	Block D ...	4½	1.8	2.7	0.4	0.6	16		
		E. R. Foster ...	Kopuaranga ...	" VII ...	Trig. Gray ...	2½	4.5	11.4	2.0	5.0	4
				Trig. Hewi-iti ...	" ...	2½	7.4	14.8	3.0	6.0	4
Peg CXXIX ...	Peg CXLII ...			1½	3.9	5.9	7.8	11.8	4		
" XCVII ...	Hewi-iti ...			1½	7.4	9.2	4.2	5.3	4		
W. Snowden ...	Port Nicholson...	D ...	T ...	5½	19.4	6.8	3.7	1.3	3		
		Printers' Flat ...	G ...	1½	8.1	0.9	4.6	0.5	3		
		G ...	H ...	1½	10.6	6.3	8.5	5.0	3		
		H ...	I ...	½	1.9	0.9	3.8	1.8	3		
		I ...	No. 80 ...	2½	0.6	5.9	0.3	4.7	3		
		Peg I ...	Peg X ...	¾	6.0	0.8	8.0	1.1	3		
		" X ...	G ...	1	1.9	2.2	1.9	2.2	3		
		" X ...	Grave flag ...	1½	12.2	1.4	7.0	0.8	3		
		Waiariki Stream ...		2½	8.7	6.3	3.2	2.3	3		
		J ...	Ohau Bay ...	1	2.6	0.2	2.6	0.2	3		
		J ...	Kaminaru ...	1.7	3.7	1.6	3.7	1.6	3		

SURVEYS in WELLINGTON PROVINCIAL DISTRICT—continued.

Surveyor.	Survey District.	Traverse.		in Length Miles.	Closing Error.		Error per Mile.		Average Length of Lines in Chains.
		From	To		Mn.	Pr.	Mn.	Pr.	
John Annabell ...	Waipakura and Ikitara	Peg I ...	Peg XXX ...	1	0.5	0.9	0.5	0.9	3½
		" I ...	No. 4 ...	2½	0.5	10.6	0.2	4.2	
		No. 1 ...	AA ...	1	2.1	2.1	2.1	2.1	
		Peg I ...	No. 5 ...	2	3.6	0.6	1.8	0.3	
		Rakautawa ...	Peg XV ...	¾	0.1	3.6	0.1	4.8	
		Tokomaru ...	" LXII ...	2¾	2.2	3.2	0.9	1.3	
		Trig. N ...	No. 6 ...	1¼	3.1	3.4	2.5	2.7	
		" O ...	Trig. R ...	2½	3.7	6.5	1.6	2.9	
		Rakautawa ...	" ...	1¾	0.4	0.8	0.2	0.5	
		Rawaho ...	Peg XV ...	1	1.4	0.0	1.4	0.0	
		Peg XV ...	Intersection ...	¾	11.3	4.1	15.1	5.5	
		Rangitawaki ...	62 ...	2	5.4	6.2	2.7	3.1	
		W ...	M ...	1¼	4.3	4.1	4.2	3.3	
		J. Annabell and J. F. Sicely	Ikitara	Waikupa ...	Martin's Hill ...	1½	1.9	0.2		1.5	0.2	3½
Martin's Hill ...	Nelson ...			1¼	0.5	1.2	0.4	1.0	
" ...	Low Ridge ...			1¼	3.7	5.6	3.0	4.5	
Parson's ...	Toetoe ...			2¾	9.8	6.6	3.9	2.6	
Low Ridge ...	Parson's ...			1¾	2.1	3.5	1.2	2.0	
Toetoe ...	Anderson ...			1	1.0	0.4	1.0	0.4	
Anderson ...	Peg XV ...			1	5.4	5.9	5.4	5.9	
Marshall ...	Cockburn ...			3¾	0.9	0.0	0.2	0.0	
J. F. Sicely N. J. Tone	Rangitoto ...	Old peg ...	3	1.0	1.9	0.3	0.6	5½	
	Aohanga ...	Peg IX ...	5	5.1	20.9	1.0	4.2		
	Kopuaranga	Horse ...	Bottle ...	1½	0.1	3.5	0.07		2.3
		Bottle ...	Peg XXVII ...	1¼	1.6	2.1	1.3		1.7
		Wangaehu ...	River ...	3	2.5	10.6	0.8		3.5
		Peg XIV ...	Peg I ...	1	0.4	2.9	0.4		2.9
	" I ...	" I ...	½	0.3	4.1	0.6	3.2		
	" XII ...	" LXIV ...	½	0.5	2.5	1.0	5.0		
G. Struthers	Haurangi Onoke	Wharekauhau ...	D ...	3	0.1	0.3	0.03	0.1	25
		A ...	Peg II ...	2	0.1	0.8	0.05	0.2	
		F ...	A ...	1¾	0.6	0.4	0.5	0.3	
		Battery ...	Peg XIV ...	5¼	0.9	2.7	0.2	0.5	
		Peg I ...	" I ...	3	2.6	3.3	0.9	1.1	
		Wharehill ...	" II ...	1¾	0.0	0.0	...	...
		Pukemanga ...	X ...	1¾	4.8	10.0	2.7	6.0	
		Knob ...	J ...	2¾	0.5	13.5	0.2	4.9	
A. E. Ashcroft	Wainuioru, Puke-toi, and Aohanga	J ...	Peg XXIX ...	1½	4.3	0.5	2.9	0.3	4
		Nairn Trig. ...	Ballance Trig. ...	1½	0.4	1.0	0.2	0.6	
		Terrace ...	Courtenay ...	½	0.9	0.4	1.8	0.8	
		Ingestre ...	Pirie ...	¾	0.8	0.6	1.1	0.5	
		Courtenay Trig. ...	Nairn ...	1	0.9	0.7	0.9	0.7	
		Banks ...	Howell's ...	½	0.9	0.2	1.8	0.4	
		Riddiford ...	" ...	¾	0.6	0.2	0.8	0.2	
		Flag No. 4 ...	" ...	1¼	0.3	1.6	0.2	1.3	
J. D. Climie	Wellington City standard survey	Mount Cook ...	Banks ...	¼	0.0	0.0	0.0	0.0	

NOTE.—The total length traversed, exclusive of standard survey, amounts to 163 miles, and the mean errors to 1.8 links and 2.36 links per mile. Nine-tenths of the work was in hilly forest country. The most discrepant closures occurred generally upon connecting links between other traverses; accumulated errors are likely to be disclosed in such cases.

RETURN of FIELD-WORK executed by STAFF and CONTRACT SURVEYORS, from 1st July, 1881, to 30th June, 1882.
PROVINCIAL DISTRICT OF AUCKLAND.

Surveyor.	District.	Major Triangulation.			Minor Triangulation.			Topographical and Trigonometrical Survey.			Rural and Suburban.			Town Section Survey.			Native Land Court Survey.			Native Land Purchase Survey.			Roads, Railways, and Water-races.			Detention by Native Opposition or other Causes.	Other Work.	Total Cost of Surveyor and Party from 1st July, 1881, to 30th June, 1882.	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 Divisions.	Cost per Acre.	Total Cost.	Acres.	No. of Allotments.	Cost per Acre.					Total Cost.	Miles.	Cost per Mile.	Total Cost.	Cost.	Cost.
G. W. Williams	Auckland	...	d.	£ s. d.	62,160	0.88	228 0 0	193	19	3	28 19 0	651 11 4	909 0 4	Field inspector. Trig. work in open country.	
J. O. Barnard	Poverty Bay	...	...	...	...	...	...	...	...	...	...	...	...	26	21	15	15 15 0	...	...	...	...	...	...	...	...	5	11.6	58 5 0	8 0 0	536 8 2	510 8 2	Field inspector in charge of district.
S. Weetman	Waitemata, &c.	...	...	...	19,800	1.28	123 3 0	...	...	...	3,231	45	4.7	760 7 2	...	...	...	...	...	...	...	...	...	...	3.25	13.4	42 19 0	...	...	905 10 1	Sections adjoining old work.	
E. C. Goldsmith	Tauranga, &c.	275,200	0.18	212 6 4	6,000	0.65	15 0 0	...	...	...	2,223	33	3.2	366 5 10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	215 13 0	800 9 0	...	
L. Cussen, cadet and assistant	Taupo, &c.	657,000	0.25	692 14 8	...	...	...	...	...	...	...	...	...	...	...	...	...	...	331	5	12	16 0 0	...	...	...	...	...	...	180 0 0	105 18 8	2,045 4 6	577,000 "acres trig." and topographical survey completed in field at 0.43d. per acre.
F. Simpson	Whangarei, &c.	...	...	...	...	...	...	41,950	1.45	253 8 11	2,527	41	2.59	323 1 9	...	...	...	...	...	...	...	130	2	24.7	16 15 10	6.06	16.2	98 4 3	44 0 0	45 7 0	759 18 9	Open and bush; partly adjoining old work.
J. Baber	Waipipi, Ahikereru, &c.	...	...	...	47,360	0.5	110 10 0	...	...	...	930	22	5.8	277 0 0	...	...	...	...	...	...	...	...	...	...	...	1.75	10.1	...	170 0 0	...	1,012 0 10	Sections adjoining old work. 217 square miles triangulation complete in field.
F. H. Edgecumbe and cadet	Pirongia	...	...	...	...	...	...	...	...	...	7,310	62	1.9	705 9 9	73	95	15.6	74 1 4	...	...	...	...	...	...	...	2.4	11.15	26 15 1	...	...	797 17 2	Sections adjoining old work.
R. Neumann and cadet	Mangonui, &c.	...	...	...	8,850	2.53	93 4 5	38,400	1.62	260 0 0	2,876	41	4	581 17 5	...	...	...	...	...	...	...	11	2	...	23 9 1	...	...	...	21 0 5	42 19 0	889 13 11	" "
B. Lambert	Taramarama	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2,805	1	4	46 15 0	...	...	...	35.5	10.5	375 15 0	25 17 0	211 15 8	499 1 2	Open, rough country. Also engaged in road construction.
P. E. Cheal	Hastings	...	...	...	7,040	1.4	43 14 0	...	...	...	3,169	23	2.9	466 13 4	...	...	...	...	...	...	...	...	...	...	3.75	18.7	70 0 0	...	10 0 0	703 19 5	Rough bush. Some old work.	
W. J. Parris	Opapeke, &c.	...	...	...	640	2.5	6 12 0	...	...	...	1,552	70	5	388 14 6	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	754 17 8	Adjoining old work. 317 acres, 58 sections, of suburban.
C. Clayton	Waiwera	...	...	...	32,000	0.6	79 1 4	...	...	...	439	7	3.8	84 10 0	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	172 12 11	Left 13th October, 1881.
J. H. Balneavis	Waimata	15,821	23	0.55	445 9 8	15,320	1	2.5	153 11 9	9,465	1	2.5	98 11 10	6	6.75	40 10 0	...	47 7 8	793 6 8	Open and bush.	
G. A. Martin	Kaipara, &c.	1,182	19	5.8	346 17 0	5	1	33	8 8 0	54 19 0	592 9 0	All bush; adjoining old work.	
W. C. Spencer	Waipapu	80,000	0.5	167 13 0	39 9 10	607 11 10	Triangulation; open country.	
E. H. Hardy	Tokatoka	...	...	...	...	...	...	49,000	0.64	130 19 3	4,161	42	2.07	430 10 3	34.2	33	28.2	48 12 1	...	...	...	...	...	...	...	2.8	10.3	28 17 6	...	60 0 0	697 10 11	Open and bush; partly adjoining old work.
H. M. Smith	Patetere, &c.	...	...	...	...	...	...	...	...	...	11,914	60	1.55	628 0 0	35	11.4	12.3	21 12 0	...	...	...	...	...	...	...	1.5	4.6	7 0 0	...	...	650 14 6	Open country; new work.
J. I. Philips	Maketu, &c.	...	...	...	...	...	...	...	...	...	16,667	83	0.75	644 0 0	48	60	8.3	20 0 0	...	...	...	...	...	...	...	6.5	10.8	70 7 11	3 8 2	...	746 17 2	" "
C. Stevens	Maramarua	...	...	...	...	...	...	24,837	1.5	155 4 7	406	9	5.9	118 8 4	2.5	3	120.6	18 19 4	...	...	...	...	...	...	...	...	...	...	...	...	381 14 1	Open country; partly adjoining old work. Joined department 5th October, 1881.
J. Hannah	Waipu, &c.	...	...	...	...	...	...	26,200	1.93	210 18 0	2,279	20	1.64	187 13 0	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	330 15 3	Open country; roads previously surveyed. Joined 5th October, 1881.
Temporary Staff— H. A. Martin	Waipoua	32,955	1.95	267 9 11	7,397	43	1.1	406 3 4	11.5	46	15	34 10 0	765 5 6	Open and bush; new work.	
A. M. Ross	Kaipara, &c.	2,431	20	2.5	303 5 4	22 0 0	4 0 0	20,000 acres trigonometrical; 1,300 acres sections completed also in field.
Totals and means	...	932,200	0.23	905 1 0	216,805	1.07	966 14 8	260,357	1.09	1,178 3 9	86,809	682	1.73	7,500 6 8	235	373	13	241 17 9	25,260	11	2.9	306 18 3	9,606	5	3.8	138 16 9	74.1	11.2	835 13 9	304 5 7	2,024 10 2	17,205 4 3	Includes £2,698 advances on contracts, &c., in progress.	
Authorized, contract, and schedule surveyors	80,136	1.16	388 9 11	70,048	1.6	479 16 0	7,511	66	0.82	326 8 1	113,495	25	2.78	1,316 0 5	4,955 8 1	...
Means and totals	...	932,200	0.23	905 1 0	296,941	1.09	1,355 4 7	330,405	1.2	1,657 19 9	94,320	743	1.69	7,826 14 9	235	373	13	241 17 9	138,755	36	2.77	1,622 18 8	9,606	5	3.8	138 16 9	74.1	11.2	835 13 9	304 5 7	2,024 10 2	22,160 12 4	...	

PROVINCIAL DISTRICT OF TARANAKI.

West Coast Commission.

J. Bird	Kaupokonui and Cape	...	...	...	...	...	...	...	...	200	14	5/8.6	57 4 6	...	...	...	...	...	...	...	6,750	1	3.9	110 0 0	...	...	...	...	...	713 13 10	880 18 4	All forest.
E. S. Brookes	Kaupokonui and Waimate	...	...	...	...	...	...	...	...	8,600	125	1/10.9	822 17 3	52	53	13/10	54 16 0	...	...	...	2,433	2	4.7	48 0 0	...	...	...	...	...	...	792 2 2	600 acres open, remainder forest.
Charles Finnerty	...	...	...	...	...	...	...	...	...	12,124	99	1/3.5	783 0 11	...	...	...	...	...	...	...	...	...	...	3	46/3/4	138 10 0	...	...	136 8 0	948 0 6	All rural and suburban forest. Cadet assisting.	
H. W. Climie	Waimate and Ngaire	...	...	...	...	...	...	...	...	5,490	53	1/8.8	476 16 2	...	...	...	...	...	...	...	...	4,610	2	7	133 18 4	...	...	...	...	505 17 5	799 0 7	1,000 acres open, remainder forest. Cadet assisting.
H. M. Skeet	Ngatimaru and Cape	...	...	...	122,000	2.5	225 0 6	123,000	1.9	998 6 3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	18.4	5/9/10	100 4 6	...	7 9 7	975 15 10	Partly open, but difficult country. Dense forest, rough country.	
W. H. Skinner	Oco	...	...	...	...	...	...	...	...	3,057	40	1/5	216 12 10	...	...	...	...	...	...	...	...	685	6	1/6	51 7 0	...	...	...	...	507 9 8	775 9 6	2,000 acres open. Cadet assisting.
F. Duthie	Kaupokonui and Ngaire	...	...	...	...	...	...	...	...	1,435	10	1/11.5	68 11 4	...	...	...	...	...	...	...	...	5,413	7	5.9	131 15 5	...	...	...	...	397 16 3	570 14 4	Partly open. Rough forest country.
A. O'Donahoo	Opunake	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	13,250	1	3.9	216 4 1	...	...	...	...	137 4 8	353 8 9	All forest.
C. W. H. Thompson	Opunake	253	9	2/3.5	28 13 5	28 13 5	...	28 13 5	Open.
Temporary Surveyors— T. Maben	Carlyle	2,179	24	2/3.3	248 0 6	115 2 0	363 2 6	Rough forest country.
E. C. O. Smith	2,487	35	1/9.2	220 1 0	30	36	13/0	23 8 0	26	1	2/	2 12 0	246 1 0	...	246 1 0	Open.
Authorized Surveyors— H. V. Barclay	Ngaire	13 5 4	Forest.
Skinner and Sole	Hawera and Paritutu	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	9.4	44/6/4	409 18 0	...	283 2 0	693 0 0	Railway land plans.
Means and totals	22,000	2.5	225 0 6	123,000	1.9	998 6 3	35,572	400	1/7.5	2,893 4 6	82	94	16/7.7	78 4 0	100	1	3/7.8	18 5 4	33,420	29	5.2	722 15 3	30.5	21.5/4	648 12 6	...	*2,804 3 5	7,444 17 3	...

* The item £2,804 3s. 5d. includes cost of settlement surveys in progress, amounting to 27,000 acres, 22,000 of which are nearly completed.

RETURN of FIELD-WORK executed by STAFF and CONTRACT SURVEYORS, from 1st July, 1881, to 30th June, 1882.
PROVINCIAL DISTRICT OF HAWKE'S BAY.

Surveyor.	District.	Major Triangulation.			Minor Triangulation.			Topographical and Trigonometrical Survey.			Rural and Suburban.			Native Land Court Survey.			Roads, Railways, and Water-races.			Other Work.	Total Cost of Surveyor and Party from 1st July, 1881, to 30th June, 1882.	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 Secs. or Divisions.	Cost per Acre.	Total Cost.	Miles.				Cost per Mile.	Total Cost.
Staff Surveyors—			d.	£ s. d.	d.	£ s. d.	d.	£ s. d.	d.	£ s. d.	s. d.	£ s. d.	s. d.	£ s. d.	s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.				
W. Hallett (one cadet assisting)	Te Mata, Oero Kidnapper Marakahu	135,800	06	35 3 1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Includes 15 miles standard traverse on main roads. Open country.	
	Te Mata	...	...	...	...	...	...	78,820	82	268 16 1	...	...	...	...	...	...	...	...	...	...	...
	Heretaunga	...	...	...	...	...	...	20,350	82	69 10 7	...	...	...	...	...	...	...	...	...	...	...
	Waihua	...	...	...	12,480	78	41 13 4	...	...	...	...	...	...	...	...	...	...	...	...	...	...		Open.
	Pohui	...	...	...	...	...	...	...	...	...	292	2	7 4	9 0 8	...	...	...	...	...	...	...		Open.
W. Laing	Matapiro and Patoka	...	...	...	...	...	...	...	...	2,131	7	7 4	65 19 4	...	...	...	...	...	...	...	...	Open.	
	Clyde and Mohaka	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Open.	
E. Rich	Mahanga	...	...	...	...	...	...	10,240	1 27	54 7 0	1,479	1 2/11	216 15 6	...	...	...	...	...	...	...	1,172 2 6	Open. Absent on sick leave nine months.	
	Wakarara	...	...	...	...	...	...	...	...	...	4,209	2	10 24	179 11 0	...	...	...	...	...	...	...	79 0 3	Part bush; very troublesome surveys; adjoining unreliable magnetic work.
J. D'Arcy Irvine	Ruataniwha	...	...	...	...	...	...	...	...	...	2,224	17 2/6	278 0 0	...	...	...	...	...	...	...	...	721 0 3	Moved from Takapau District before completing surveys there.
	Mahonga and Nuhaka	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Open
B. Lambert	Mahia	...	...	...	...	...	...	35,200	1 47	216 0 0	...	...	...	...	...	...	...	...	...	...	...	724 3 10	Open and bush } Extra work experienced connecting roads with old surveys.
	Clyde and Waihua	28 12 0	Open, hilly ground.
Contract Surveyors—																								
J. Rochfort	Wakarara	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	240 11 2	£47 14s., Contract No. 7, completed last year, standard survey, Town of Napier; one-half of cost to be paid by Corporation.
A. H. Ross	Ruataniwha	18 11 8	Roads completed last year.
C. D. Kennedy	Kuripapanga	34 15 8	Roads not completed.
Drummond and Gillett	Woodville	...	...	...	5,120	3	64 0 0	...	...	...	8,026	38 1/6 9	630 17 5	...	...	...	...	...	...	...	...	...	...
	Tahoraiti	1,080	18 1/9 14	95 2 7	178 0 0	Contract No. 9, bush.
Private—C. D. Kennedy		...	...	...	...	...	...	...	...	...	...	...	...	2,140	1	...	...	...	...	...	...	...	...
Totals		135,800	06	35 3 1	17,600	1 44	105 13 4	144,610	1 01	608 13 8	19,441	85 1/6 21	1,475 6 6	2,140	1	...	...	99 1/2	8 3 0 6	809 2 6	70 15 3	3,196 17 4	

PROVINCIAL DISTRICT OF WELLINGTON.

A. Dundas and cadet	Pohangina	...	...	...	...	...	...	...	...	6,600	41 1/8 1/2	558 12 10	...	...	...	...	...	...	...	...	70 18 4	1,202 8 8	Hilly, forest country; assisted in inspection.	
F. W. Knowles	Waitohu, &c.	...	...	...	...	...	...	...	...	7,227	38 1/4 1/2	506 8 6	500	22/8	66 18 4	...	...	...	...	...	59 13 10	565 10 4	Hilly, forest country.	
E. R. Foster and cadet	Kopuaranga, &c.	...	...	...	...	...	...	...	...	3,264	33 4/8 1/2	775 4 0	...	...	...	...	...	...	...	...	...	936 5 5	Hilly, forest country, adjoining old defective surveys.	
		...	...	...	...	...	...	...	...	60,775	1 1/2	363 1 7	...	...	...	...	...	...	...	...	...	150 4 7	818 13 9	Hilly, forest country.
L. Smith	"	...	...	...	...	...	...	...	...	87,500	1 1/2	628 18 0	...	...	...	...	...	...	...	...	...	...	...	...
G. A. Northcroft	Puketoi, &c.	...	...	...	...	...	...	...	...	25,000	1/4	33 0 0	84	11/2 1/2	5 0 0	...	...	...	...	...	...	107 1 11	948 18 5	Hilly, forest back country.
J. D. Climie and cadet	Port Nicholson	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1,494 18 7	1,322 3 4	Cost of Wellington City standard survey, comprising 31 trig. stations, 384-concrete blocks, and 38 1/2 miles standard traverse.
W. Snowden	"	...	...	...	...	...	...	...	...	1,414	93/2	225 0 0	...	...	...	...	...	...	...	...	...	...	...	...
J. Annabell	Waipakura, &c.	...	...	...	...	...	...	5,700	4 1/2	111 19 8	4,830	26 1/6	362 7 1	...	...	...	...	...	...	...	...	...	...	...
J. F. Sicely	Wangaehu, &c.	...	...	...	3,100	1 1/2	16 2 11	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
N. J. Tone	Aohanga, &c. Kopuaranga, &c.	...	...	...	1,440	4	24 18 0	...	...	...	12,626	41 1/3 1/2	840 11 8	5,587	1	7 1/2	174 16 2	3 1/2	15 2 9	56 15 6	12 10 10	667 19 8	Greater part hilly, forest country.	
	
L. Jackson	"	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
G. Struthers	Waipawa, &c.	...	...	...	...	...	...	...	...	4,715	14 1/9 1/2	419 6 0	...	...	...	...	...	...	...	...	...	...	...	...
C. W. H. Thompson	Pohangina, &c.	...	...	...	...	...	...	...	...	6,141	36 1/8 1/2	517 6 8	...	...	...	...	...	...	...	...	...	...	...	...
A. E. Ashcroft	Puketoi, &c.	...	...	...	...	...	...	...	...	200	11/7 1/2	16 0 0	...	...	...	...	...	...	...	...	...	...	...	...
E. V. Briscoe	Port Nicholson	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Contract and schedule surveyors		...	...	...	...	...	...	...	...	...	...	...	...	1,015	16 1/8 1/2	85 14 0	...	...	...	...	...	...	...	...
Totals		...	...	...	4,540	2 17	41 0 11	178,975	1 1/2	1,136 19 3	47,101	2 10 1/9 1/2	4,225 16 9	7,102	19	11 1/2	327 8 6	76 1/2	10 0 6 1/2	769 12 6	2,650 0 9	10,190 19 10		

RETURN of FIELD-WORK executed by STAFF and CONTRACT SURVEYORS, from 1st July, 1881, to 30th June, 1882.
PROVINCIAL DISTRICT OF NELSON.

Surveyor.	District.	Major Triangulation.			Minor Triangulation.			Topographical and Trigonometrical Survey.			Rural and Suburban.			Gold-Mining Survey.			Roads, Railways, and Water-races.			Other Work.	Total Cost of Surveyor and Party from 1st July, 1881, to 30th June, 1882.	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.		
G. B. Sinclair	d.	£ s. d.	...	d.	£ s. d.	4,000	3	50 0 0	1,290	17	3/2.8	311 6 4	...	...	...	...	...	...	79 18 4	715 7 3	£438 not completed last year and revised this year.		
A. P. Rawson	11,024	1.7	80 7 8	5,400	48	2/4	629 17 8	...	...	...	...	...	...	58 0 0	768 5 4	In bush; scattered sections.			
J. A. Montgomerie	1,905	32	2/4.3	224 18 6	...	...	...	...	...	...	235 18 4	1,459 0 0	Cadet over two years.			
R. T. Sadd	2,873	62	2/11.3	401 16 0	...	...	...	...	...	...	246 3 2	848 19 2	Triangulation, &c., in progress. One cadet.			
J. Snodgrass	6,000	1.7	43 17 0	3,040	51	3/10	582 13 0	...	...	...	...	...	...	35 0 0	911 8 0	One cadet assisting.			
J. H. Jennings	937	19	4/7.8	218 0 9	...	...	...	...	...	...	105 11 6	810 0 10	Heavy bush and rough.			
F. S. Smith	954	9	7/6.4	359 14 7	...	...	...	...	...	...	...	...	...
J. F. Thompson	79,781	2	664 16 10	9,492	5	/6	237 6 0	...	...	...	...	...	...	457 5 3	881 10 5	130,000 acres minor trig. and sectional work in progress. One cadet.			
C. Galwey	3,370	67	4/4.7	740 11 7	...	...	...	...	...	...	38 18 0	839 14 0	No cadet.			
C. Lewis	15,318	2	127 13 2	2,622	30	2/	262 5 6	...	...	...	...	...	...	121 0 4	587 18 0	Also engaged in explorations.			
Contractors, &c.—	5,107	55	2/2.7	568 13 3	568 13 3	Balance of last year's Contract No. 10.		
J. Rochfort	3,171	43	1/9	277 9 3	277 9 3	Paid by fees.		
J. B. Saxon	490	7	1/11.2	47 7 9	593 10 3	"		
R. A. Young		
Totals	116,123	1.9	966 14 8	42,056	457	2/7.4	5,575 1 5	3,195	186	12/9	2,035 2 0	43.4	7 8 9	319 18 8	1,377 14 11	9,739 13 5			
* Mineral.																				Less fees deposited for surveys		2,333	0	9	£ 7,406 12 8	

PROVINCIAL DISTRICT OF MARLBOROUGH.

A. D. Wilson	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1,036	14	8	Combined major and minor triangulation, embracing Cloudy Bay, Taylor Pass, and parts of Blue Mountain, Hodder, Cape Campbell, and Clifford Bay Survey Districts.	
R. F. Goulter	Gore	...	...	...	...	...	...	...	...	...	804	7	1/6	60 10 0	...	...	...	...	...	...	39	6	0	Heavy bush.	
"	Hodder	...	...	...	...	...	...	...	...	...	13,127	8	1/4.4	231 16 7	...	...	...	...	...	...	...	...	...	619 7 10	Partly open and partly manuka scrub.
"	Linkwater	...	...	...	...	...	...	...	...	...	2,000	2	1/10.4	88 3 4	...	...	...	...	...	...	...	...	...	40 0 0	Principally bush and broken country.
J. O. Western (schedule)	Cloudy Bay	...	...	...	...	...	...	...	...	...	2,993	44	1/1	159 11 11	...	...	...	...	...	...	...	...	...	...	Major portion heavily timbered; revision survey partly done.
"	Linkwater	...	...	...	...	...	...	...	...	...	601	3	1/5.4	45 0 0	...	...	...	...	...	...	...	...	...	91 3 6	Paid for by applicant. Open, level country; adjoining old surveys.
A. W. Carkeek (schedule)	Wakamarina, Onamalu	...	...	...	...	...	...	...	...	...	...	...	...	...	123	9	...	...	...	...	...	...	...	90 0 0	Heavily timbered and broken country. Paid for out of deposit fees.
Alfred Dobson (authorized surveyor)	4.4	42	16	0	192 13 3	This survey was executed on behalf of and paid for by Public Works Department.		
Totals	19,525	64	/7	585 1 10	123	9	4.4	42	16	0	192 13 3	125 9 6	2,029 19 3	Of this amount, £55 has been placed to credit of Public Account, £135 paid for by applicant out of deposit for survey, and £192 13s. 3d. by Public Works Department.

NOTE.—Major triangulation in progress by Mr. Wilson, 320,700 acres; cost to date, £1,257 5s. 4d.; commenced 1st May, 1881.
Total cost of office work (half-salary of Chief Surveyor and Draughtsmen), £576; incidental expenses, including chief surveyor's travelling expenses, £53; total cost of field-work, £1,665 6s. 2d.; total cost of department, £2,294 6s. 2d.

PROVINCIAL DISTRICT OF WESTLAND.

W. G. Murray	Totara, Waimea, Mahinapua, Kanieri, Toaroha	...	...	...	...	...	...	17,920	/3	223 16 10	1,165	18	2/7.2	151 12 6	178	8	10/3.5	91 14 6	7 44 9 3	311 5 0	329 6 6	1,107 15 4	Bush country; expensive district within a gold field. Unassisted by cadet. The road and water-race surveys were carried on in a part of the district very broken and difficult of access; the continuance of bad weather and floods during the last four months to a great extent also account for the apparently high rate per mile.
E. J. Lord	Greymouth, Waimea, Hohonu, Arnold	2,000	3	25 0 0	12,080	1/3	65 0 0	358	35	1/5.2	444 8 8	15	2	8/4.8	6 6 0	22.4	15 12 6	351 12 0	113 0 0	1,005 6 8	Broken forest country within a gold field. No cadet. The rural and suburban survey consists principally of revisions of old surveys and connections with survey on true meridian or with trigonometrical stations. Included in the cost of rural and suburban survey is the sum of £43 for extra trig. tubes placed at street corners within the Borough of Greymouth.
J. N. Smyth	Okarito, Waiho, Gillespie's	...	...	...	...	...	...	21,665	1/3	117 10 8	1,804	23	2/7.3	235 9 10	...	...	...	...	21 27 9 11	577 9 10	23 5 0	953 15 4	Expensive and heavily timbered country within a gold field. One cadet assisting for seven months.
G. J. Roberts	Okarito and Jackson's Bay circuits	39,994	0.75	125 0 0	46,081	1.6	315 0 0	128,000	1.8	947 16 1	...	...	...	...	...	...	...	...	8 4 0 0	32 0 0	...	1,419 16 1	Densely timbered country; expensive; within a gold field. No cadet. The cost of triangulation also includes the carrying of standard bearings (outside triangulated area) up the Rivers Karangarua and Mahitahi.
H. G. Price	Totara, Toaroha, Turihati, Waimea	...	...	...	18,405	1.3	102 2 2	2,560	3.25	34 13 4	1,434	6	4/6	322 13 0	62	13	19/6.5	60 11 0	5 10 11 7.2	52 18 0	238 14 0	811 11 6	Rough bush country, within a gold field. No cadet.
Totals	...	39,994	0.75	125 0 0	66,486	1.6	442 2 2	182,225	1.8	1,388 16 11	10,576	126	2/2.2	1,154 4 0	255	23	12/5.2	158 11 6	63.4	20 17 4	1,325 4 10	704 5 6	5,298 4 11	

RETURN of FIELD-WORK executed by STAFF and CONTRACT SURVEYORS, from 1st July, 1881, to 30th June, 1882.

PROVINCIAL DISTRICT OF CANTERBURY.

Surveyor.	District.	Major Triangulation.			Minor Triangulation.			Topographical and Trigonometrical Survey.			Rural and Suburban.				Town Section Survey.			Roads, Railways, and Water-races.			Other Work.	Total Cost of Surveyor and Party from 1st July, 1881, to 30th June, 1882.	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.	Miles.	Cost per Mile.	Total Cost.			Cost.			
<i>Staff.</i>																											
C. W. Adams	Selwyn					d.	£ s. d.	92,871	2 60	1,006 15 2													1,006 15 2	24,960 acres completed in the field last year. Country triangulated this season high and difficult.			
T. N. Brodriek	Ashley				120,488	71	360 15 8				849	27	4 10	254 7 8											} 19,000 acres topographical survey only in Ashley District; 285,525 acres topographical survey only in Waimate District; both over high and rough country. Cadet assisting. Sectional work Ashley District in forest. 3 Plus £142 15s. for work partly done but not completed last year (see Returns to 30th June, 1881).		
"	Waimate							37,030	94	145 7 2	202	6											186 6 10				
L. O. Mathias	Ashley										2,301	50												} 571 11 0 Principally suburban work; sections under 10 acres.			
"	Selwyn										1,800	11															
David Watt	Ashley										1,291	161	2 7	520 11 0	8	27	20 0	27 0 0	4 0 6 0 0	24 0 0							
"	Akaroa										231	6															
"	Akaroa										875	19															
J. E. Pickett	Selwyn										159	2															
"	Selwyn										4,483	37	2 4 1/2	722 11 0											722 11 0	Open hilly country.	
"	Selwyn										551	19															
"	Selwyn										8,040	56															
G. H. M. McClure	"										1,414	21	0 10 1/2	411 11 7											823 3 2	Mainly open pastoral country. Cadet assisting.	
"	"										19,042	12	0 5 1/4	411 11 7													
"	Geraldine										1,156	18															
"	Geraldine										126	3															
J. S. Welch	Akaroa										3,662	25	2 7 1/2	687 4 7												687 4 7	Open, rough, hilly country.
"	Akaroa										241	7															
"	Akaroa										2,935	60															
James Hay	"										3,360	66	2 7 1/2	837 13 1												837 13 1	Rough hilly country, with bush in gullies. Small sections.
Arthur Houghton	"										5,055	60														808 9 0	Partly bush land.
"	"										478	11	2 11 1/4	808 9 0													
Andrew Seaton	"										889	24														647 0 3	Intricate Peninsula surveys; bush land.
"	"										1,966	37	4 6 1/4	647 0 3													
"	"										1,614	43															
M. McNicol	"										1,175	17	5 1	714 15 3												714 15 3	" " "
"	"										12	2															
"	Geraldine										50	2															
"	Geraldine										14,992	164	1 2 1/2	938 16 0	37	74	15 0	55 10 0								994 6 0	Open land in Mackenzie country. Cadet and party assisting.
A. O'N. O'Donahoo	Ashburton										290	7															
"	Ashburton										6,857	90															
H. C. White	Waimate										150	2	1 4	471 15 7												471 15 7	Seven months' work. Transferred to North Island.
"	Waimate										9,271	90			22	8	12 6	55 0 0									
"	Waimate										5,439	35	1 0 1/4	779 7 10													
H. Maitland	Geraldine																									834 7 10	Open land; partly plains and partly bush.
Christchurch Office	Ashley, &c.										7,868	164	0 0 1/2	23 18 6									155 12 0	155 12 0	Standard work. Recently resumed duty.		
Timaru Office	Geraldine										4,833	75			5	19	7 6	7 2 6								23 18 6	} Principally sections surrounded by previous surveys.
"	Waimate										255	4	0 2 1/2	56 4 3												63 6 9	
McIntyre, Lewis, and Fooks	Selwyn, &c.				Work done at owner's expense							24	2														
William Darby	Waimate										433	27	5 4 1/4	116 18 0	62	242	16 10 1	204 11 6					93 0 3	414 9 9	} 4 1/2 miles standard work at £15, £63 15s.; work done, but plans not yet to hand, £29 5s. 3d.: total, £93 0s. 3d. Remainder town or suburban work.		
James Adam	Ashley										78	2	1 1	4 4 6													422 14 8
"	"										21,013	12	0 4 1/2	418 10 2													
Total staff					120,488	71	360 15 8	129,901	2 12	1,152 2 4	134,370	1,477	1 3 1/4	8,861 16 8	134	450	15 6	349 4 0	4 0 6 0 0	24 0 0	466 13 2	11,071 16 10					
<i>Contractors.</i>																											
J. Cumine	Waimate										720	7	0 11 1/2	35 12 6												35 12 6	} Balance of contracts not previously returned.
W. Darby	"										4,774	22	1 1	258 11 10												258 11 10	
W. A. Nalder	Ashley										264	6	1 9 1/4	23 17 6					1 22 8 0 0	10 4 0						34 1 6	} Partly bush survey.
J. Cumine	"																									143 5 7	
D. McGill	"																									113 14 2	
J. H. R. King	"																									82 4 9	
D. McGill	"																									286 16 6	
W. Darby	"																									40 11 5	
W. A. Harper	"																									154 7 10	
F. Howden	"																									16 0 0	
Total staff and contractors					120,488	71	360 15 8	129,901	2 12	1,152 2 4	140,128	1,512	1 3 1/4	9,179 18 6	134	450	15 6	349 4 0	5 22 6 9 8	34 4 0	466 13 2	12,237 2 11					

NOTE.—r, reserves; pc, pastoral country.

RETURN of FIELD-WORK executed by STAFF and CONTRACT SURVEYORS, from 1st July, 1881, to 30th June, 1882.
PROVINCIAL DISTRICT OF OTAGO.

Surveyor.	District.	Minor Triangulation.			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, 1881, to 30th June, 1882.	Remarks.				
		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 Sections.	Cost per Acre.	Total Cost.	Miles.	Cost per Mile.	Total Cost.	Cost.	Cost.	£ s. d.					
John Strauchon	Otago, Tuturau, Toitoto, Mokoreta, Slopdown, Kuriwao	100 0 0	5,969	35	1 13 4	346 14 4	28	3	6 8	9 6 8	...	19 1/2	18 2 6	346 13 3	...	67 0 5	929 14 8	£100 for triangulation begun in Waikawa and Mokoreta Districts, for which area cannot be estimated. £60 P.D.P. survey of Run No. 132, just begun. Cadet assisting. Unusually wet season.				
David Barron	Blackstone, St. Bathans, Turnagain, Maniototo, Naseby, Long Valley, Manorside	...	...	...	...	...	17,753	43	0 9 1/2	707 6 11	...	...	...	...	...	68	8 14 9 1/2	50 5 10	...	...	...	...	262 18 1	1,020 10 10	Cadet assisting.
A. R. Mackay	Leaning Rock, Tiger Hill, Poolburn, Nevis, Lander, Bannockburn, Fraserside, Wakefield	222,454	92	852 14 8	61 9 8	914 4 4	High, cold country, and surveyor has great amount of travelling.				
George Mackenzie	Kurou, Waikouaiti, Mount Hyde, Moe-raki, Otago Peninsula, North Harbour and Blueskin, Hawkesbury, Otakia, Clarendon	...	...	...	...	...	2,900	152	4 2	604 3 4	26	32	31 6	50 7 6	334	38	11 1	185 1 10	...	...	...	55 0 0	12 0 11	906 13 7	Mostly rough bush land and small sections. Surveys small and far apart, involving a great amount of travelling.
W. B. D. Murray	Waikaia, Wart Hill, Lammerlaw, Hedgehope, Glenkenich, Rangleburn	175,000	66	484 14 6	8,912	45	0 10 1/2	398 9 4	20 0 0	903 3 10	Cadet for four months. Rough and high, but all open country.				
John Langmuir	Waitahuna, Table Hill, Teviot, Tuapeka East	...	...	...	...	...	11,120	60	0 9 1/2	440 18 5	...	...	...	...	...	5	115 0	3 15 0	3	9 0 3	27 0 9	...	12 0 0	483 14 2	Cadet assisting five and a half months; on leave six months. All open country.
E. H. Wilmot	Coneburn, Shotover, Nevis, Kawarau, Earnslaw, Skippers Creek, Dart, Upper Wakatipu, Glenorchy, Martin's Bay	...	...	349 4 3	118,000	57	285 3 4	148	...	2 4	17 5 4	...	...	...	...	46	921 0	48 6 0	4	5 0 0	20 0 0	...	69 11 4	789 10 3	Cadet assisting. £349 4s. 3d. minor triangulation in Martin's Bay, work incomplete; all bush-work. £69 11s. 4d. cost of search for young Raymond. Rural sections, no number reported. Nevis triangulation is very rough, but open country.
W. Armstrong	Nenthorn, Strath Taieri	18,524	20	0 5 1/2	401 7 1	95 2 11	496 10 0	Open country.				
D. W. Gibson	Waitahuna, Teviot, Bengel, Pomahaka	...	...	...	...	...	1,143	22	4 10 1/2	278 12 2	...	...	...	...	...	111	7 10 8 3/4	59 5 7	2 3/4	...	42 14 0	...	...	380 11 9	A cadet assisting. Partly bush surveys.
H. A. R. Farquhar	Lower Wanaka, Lower Hawea, Cardrona	...	...	...	...	...	13,690	36	0 5	288 12 7	...	...	...	...	...	...	...	...	...	...	...	...	156 16 1	445 8 8	Open country.
Private Surveyor.	J. Campbell	449 4 3	515,454	76	1,622 12 6	80,159	413	0 10 1/2	3,543 9 6	26	32	31 6	50 7 6	362	41	10 9	194 8 6	230	25	14 0 1/2	161 12 5	28 1/2	15 6 2	436 8 0	55 0 0	756 19 5	7,270 2 1	Scattered and small surveys. Great delay caused by bad weather and excessive ruggedness of country.
Contract.	Dennison & Grant	160,000	60	400 0 0	400 0 0	...	400 0 0	...	
Means and totals	449 4 3	675,454	72	2,022 12 6	80,464	418	0 10 3/4	3,586 12 6	26	32	31 6	50 7 6	362	41	10 9	194 8 6	924	39	5 11 1/2	275 17 5	28 1/2	15 6 2	436 8 0	55 0 0	756 19 5	7,827 10 1	

RETURN of FIELD-WORK executed by STAFF and CONTRACT SURVEYORS from the 1st July, 1881, to 30th June, 1882.
PROVINCIAL DISTRICT OF SOUTHLAND.

Surveyor.	District.	Rural and Suburban.				Town Section Survey.				Roads, Railways, and Water-races.			Other Work.	Total Cost of Surveyor and Party from 1st July, 1881, to 30th June, 1882.	Remarks.
		Acres.	No. of Sections.	Cost per Acre.	Total Cost.	Acres.	No. of Allotments.	Cost per Allotment.	Total Cost.	Miles.	Cost per Mile.	Total Cost.	Cost.		
<i>Staff.</i>				s. d.	£ s. d.			£ s. d.	£ s. d.		£	£ s. d.	£ s. d.	£ s. d.	
John Hay ...	Longwood ...	3,780	63	4 9-7	909 0 0	14	54	0 10 0	27 0 0	1	6	6 0 0	27 10 0	969 10 0	Work almost entirely in heavy bush. Exceptionally long traverses in proportion to acreage. Two bush traverses, 15 chains apart, running parallel for some 6½ miles.
William Hay ...	Invercargill, New River, Mabel, Jacob's River, Forest Hill, and Waiau Districts	13,435	77	0 11½	657 15 0	23	22	1 10 0	33 0 0	...	...	...	140 15 0	801 10 0	The township sections in bush; also twenty-three rural sections, embracing 420 acres, in bush. Work scattered.
James Blaikie ...	Campbelltown, Invercargill, Taringatura, Eyre and Hokonui Districts	14,964	125	1 0-23¼	762 16 6	...	...	...	...	...	...	...	...	762 16 6	Five sections, comprising 455 acres, in bush. Surveys unusually dispersed. Some seventy-seven sections, covering 8,660 acres, were mostly in difficult swamp.
<i>Fee System.</i>															
J. A. Robertson ...	Longwood and New River ...	330	4	3 2-2	52 10 6	...	...	...	...	...	...	...	...	52 10 6	Two saw-mill areas and two mineral areas, in bush.
R. C. Taylor ...	Lindhurst and Wairio Districts	9,440	10	0 8-8	346 15 8	...	...	...	...	...	...	...	...	346 15 8	Spotting surveys (purchases).
T. S. Miller ...	Forest Hill and Mabel Districts	1,791	7	1 3-6	116 18 9	...	...	...	...	...	...	...	...	116 18 9	Spotting surveys. Two saw-mill areas, each 200 acres, included.
Dawson and Moors ...	Wairio and Invercargill Districts	312	2	2 2-5	34 9 6	...	...	...	...	...	...	...	...	34 9 6	Saw-mill area of 200 acres included.
George Hately ...	Invercargill and Winton Hundreds	400	2	2 10	56 13 6	...	...	...	...	...	...	...	...	56 13 6	Saw-mill areas. Fees stated are per scale, though, owing to exceptional circumstances, they were paid privately.
J. R. Guthbertson, jun. ...	Invercargill and Jacob's River Hundreds	410	3	2 6-6	52 7 6	...	...	...	...	...	...	...	...	52 7 6	Saw-mill areas.
Harold Brodrick ...	Winton ...	200	1	2 1	20 17 0	...	...	...	...	...	...	...	...	20 17 0	Saw-mill area.
Means and totals	...	45,026	294	1 4	3,010 3 11	37	76	0 15 9½	60 0 0	1	6	6 0 0	168 5 0	3,214 8 11	