

1889.  
NEW ZEALAND.

# SURVEYS OF NEW ZEALAND.

REPORT FOR 1888-89.

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

SIR,—

General Survey Office, Wellington, 7th August, 1889.

I have the honour to furnish the following report on the operations of the Survey Department for the twelve months ending the 30th June, 1889.

The Appendices hereto contain the reports of the Chief Surveyors for each of the ten land districts into which the colony is divided for administrative purposes, together with reports on the progress of the road-works carried out by the department, and tabular statements of surveys completed, with illustrative maps.

The field-work executed by the department may be briefly summarised under the following headings:—

	Area.	Rate per Acre, &c.			Cost.		
		£	s.	d.	£	s.	d.
Topographical survey ... ..	412,160 acres	0	0	0·425	730	16	8
Minor triangulation ... ..	598,102 "	0	0	1·15	2,872	5	2
Topographical survey for selection under "Land Act, 1887" ... ..	87,275 "	0	0	4·8	1,755	13	8
Rural and suburban ... ..	319,477 "	0	1	4·4	21,999	6	11
Town surveys (683 acres into 1,187 lots), at ... ..	...	0	15	4·6 p lot	913	4	6
Native Land Court surveys ... ..	18,833 acres	0	1	4·9	1,324	14	11
Gold-mining survey ... ..	17,160 "	0	6	8	5,716	13	5
Roads, &c. (272 miles 1 chain) ... ..	...	8	0	4 p mile	2,180	14	3
Miscellaneous ... ..	...	...	...	...	6,896	15	8
					<u>£44,390</u>	<u>5</u>	<u>2</u>

## TRIANGULATION AND TOPOGRAPHY.

The two areas shown above under this heading, amounting to 1,578 square miles, were executed at a cost of £3,603 1s. 10d., being 0·85d., or less than 1d., per acre. Of this area, by far the largest part, amounting to 722,099 acres, was executed by Messrs. Welch, Brodrick, Hay, and McClure, in the Canterbury District, where the surveys were needed in order to furnish information for compiling plans of the country prior to its being let in pastoral leases. These gentlemen carried their work on to the summits of the Southern Alps in some places, which involved considerable difficulty and privation to themselves and their men. The result, however, of their season's work has produced some excellent topographical maps which will serve for all purposes that this country can be applied to. During the course of Mr. Brodrick's work he found time to make some observations on the glaciers in the neighbourhood of Mount Cook, which will prove of lasting interest.

The other work under this heading was principally in the Nelson District, where Messrs. F. S. Smith and Thompson completed 80,000 acres of topographical work in the Waiau and Terako Districts, and Mr. W. D. Murray 30,000 acres in the Blind Bay District. Messrs. Bullard and Greenfield have also nearly finished a considerable area in the rough forest country on the Upper Buller and its neighbourhood, which was undertaken chiefly to regulate the mining surveys in that locality. All of this work is delineated on the maps drawn to a scale of 2in. to the mile, which furnish a very large amount of information as to soil,

vegetation, lines for roads, reserves, &c.—information which it is essential should be in the hands of the department, in order to an intelligent dealing with the lands for settlement purposes. The general triangulation of the colony has now advanced so far as to be well in advance of all requirements for settlement surveys, and it will, therefore, in the future be a diminishing quantity from year to year.

#### SETTLEMENT SURVEYS.

Under this heading, which comprises the sections of land marked out for occupation by the settlers, there was an area of 319,477 acres surveyed into 1,855 lots, at a cost of 1s. 4<sup>4</sup>d. per acre, which is slightly less than the average cost for last year, and considerably less than that for previous years, which is due to the larger-sized sections allowed under the present Land Act. The largest part of this area is under forest, and when it is taken into consideration that most of the road-lines are graded—in those places where it is required,—and that all the boundaries are marked so that the selector can have no difficulty in ascertaining the limits of his property, the cost must be considered very small. In addition to the area thus marked out, over 87,000 acres have been so prepared, by running road-lines through them, that the lands could be thrown open for “selection before survey.” By this means the department has been enabled to meet the wants of would-be settlers in much shorter time than under the former system; but from a survey point of view it has its drawbacks, and can only be applied when the circumstances are favourable, and a somewhat complete knowledge of the country has previously been obtained.

The cost of sectional surveys is not likely to decrease, for the most available and level lands are nearly all occupied, and therefore, as the surveys are pushed back into the more broken and rugged country, the cost must, to a certain extent, increase with the greater difficulty of securing properly-graded road-lines.

There are in many of the land districts arrears of surveys which have from various causes been standing over for years, such for instance as the demarcation of boundaries of properties sold prior to survey under the provincial administrations, and, again, surveys required for the issue of Crown grants for properties which were sold from survey plans which, in many cases, are deficient in the necessary elements for the preparation of titles.

This class of work is usually taken in hand when the surveyors happen to have work in its immediate neighbourhood, but many years must elapse ere all of these arrears can be worked off.

#### SURVEYS FOR NATIVE LAND COURT PURPOSES.

Surveys to carry out the orders of the Native Land Court, or to prepare fresh lands for the operations of the Court, or for the purchase of lands by the Government amounted in the aggregate to 745,952 acres, in 350 blocks or divisions. Very little of this work was executed by the Government staff, nearly the whole of it being done by the authorised surveyors under instructions from the department, but generally at the cost of the Maori applicants. This area does not represent so much land now for the first time brought under the operation of the Native land laws, but it more generally consists of partitions of lands already dealt with in former years in large areas, which came in during the year for subdivision, and included in it are also some Native reserves subdivided into small areas. A large amount of land is now under survey in the so called King-country, for the purpose of issuing titles ordered by the Court; and, so far, the Government has agreed to advance the cost of such surveys, securing themselves by liens on the land.

#### GOLD AND OTHER MINING SURVEYS.

Considerable activity in this particular branch of work has characterized the past year; 513 quartz, alluvial, dredging, and other claims, covering an area of 17,160 acres, having been marked out, partly by the Government staff and partly by the authorised surveyors. The cost in all cases is deposited by the applicants prior to survey. The discovery of tin in Stewart Island has led to a considerable number of claims for mineral leases being applied for in that locality, and the survey of some 50 additional claims is now nearly completed in the field.

#### ROAD SURVEYS.

Included in the 272 miles of road shown in the returns are about 50 miles of railway surveyed for purposes of Proclamation. The balance consists of roads laid out to give access to isolated blocks of Crown lands, or roads taken in exercise of the rights reserved under the Native Land and other Acts.

The demands on the staff for settlement surveys have prevented as much attention being devoted to this class of work as its importance deserves, and it is to be apprehended that in this respect the shortcomings of the past will be repeated in the future, and rights of road reserved under the grants will perforce be allowed to lapse in many cases through want of a sufficient field force to exercise the rights. The department is constantly in receipt of applications from local bodies or individuals to have roads defined which it is unable to attend to. The amount of arrear-work in this particular branch in some of the districts is very great and ever on the increase, whilst at the same time it has the effect of debarring settlement to a certain extent. The attempt has been made in some cases to call in the aid of the local bodies in laying out roads before the rights lapse, but it has not in all cases proved successful. It would seem that some alteration in the laws regulating these matters is necessary, by extending, in the future, the time within which reserved road-rights may be exercised, and also in the direction of legalising by a more simple process those lines of road which have been in use for a certain time without objection from the owners of lands affected.

#### MISCELLANEOUS WORK.

A sum of £6,834 has been expended in the various and multitudinous duties performed by the survey staff, which cannot be classed under any of the headings given in the returns. The items consist of explorations, inspections, reports on various matters, small surveys of varying public interest, contract inspection, costs of work incomplete in the field, and sundry small items too numerous to be necessary of mention here.

#### ROAD-WORKS GENERALLY.

By the direction of the Government the Survey Department took over from the Public Works Department all the roads in charge of that department on the 1st January last. Since that date all matters relating to road-construction and the various operations connected with the taking and closing of roads, the vesting of bridges, &c., in the local bodies, &c., has been performed by the Survey Department. Six of the Public Works officers have been transferred, in order to assist in carrying out these functions. In the Appendices will be found particulars of the various works undertaken by the department during the year; and for statistical purposes the road-works lately in charge of the Public Works Department have been included as for the three months ending the 30th June—notice of them prior to that date having been embodied in the Public Works Statement of the Hon. the Minister for Public Works. The roads under the charge of this department have hitherto been those especially designed to open up the Crown lands before sale, and, during the year under consideration, there were formed in all 61·2 miles of cart-road, 70·36 miles of bridle-road, 84·51 miles felled and cleared, and 36·9 miles improved in various ways, and a great length of main roads in Auckland, Nelson, Marlborough, and Westland maintained. The particulars for each district are given in the tables to be found attached to the Appendices; but, in addition to those shown, the department supervised the plans, specifications, &c., of a number of works undertaken by several of the local bodies under grants from the Government.

The total amount spent on roads, tracks, bridges, and grading—and in the improvements in the village-homestead special settlements—for the year amounts to £32,074 2s. 3d.

#### DEPARTMENTAL.

The work performed by the indoor officers of the department has consisted as usual in the checking, recording, and compiling of the plans received from the field surveyors, and in the various operations connected with the preparation of instruments of titles, account-keeping, and the other multifarious duties pertaining to a survey establishment. The publication branch at the head office, under Mr. Barron's special charge, has been kept fully at work, the results of which are shown in that gentleman's report below.

During the year the department lost the able services of the late Surveyor-General, Mr. James McKerrow, by his transference to the Chief Commissionership of Railways. Mr. McKerrow held office as Surveyor-General from the 1st November, 1879, until the 29th January last, when you did me the honour to appoint me to the office vacated by him. Within the past year two of the cadets have passed on to the grade of assistant surveyors. The strength of the department on the 30th June stood at 63 surveyors, 63 draughtsmen, 18 cadets, 7 clerks, 1 accountant, and 4 book-keepers.

S. PERCY SMITH,  
Surveyor-General.

The Hon. G. F. Richardson, Minister of Lands,

## HEAD OFFICE.

During the past year the correspondence and business of the head office has been in excess of that of previous years. The letters and papers dealt with were 11,228. The vouchers charged against appropriations were 9,519, of which 600 were for services chargeable to this office. The total expenditure of the department was £121,161 14s. 2d., of which £9,720 was distributed by local bodies by 43 separate agreements.

The construction of district maps has proceeded slowly, only 10 having been made during the year.

New maps of Canterbury and Otago, on the scale of 4 miles to an inch, have been drawn for photolithography, and will be published during the year, on the 8-mile scale, uniform with that of Nelson, published in 1885.

Of the four tourist maps, 33,000 copies have been printed in English and 12,000 copies in French. They have been widely distributed over the world through Messrs. Thomas Cook and Son, the Union Steamship Company, the Agent-General; and an edition was taken by M. le Comte de Jouffroy d'Abbans, for distribution in the Paris Exhibition.

The number of negatives taken during the year was 722. From these were printed 87 copies in silver. The photolithographs and lithographs printed amount to 620,170 impressions, from 987 stones.

Three boxes containing 127 transparencies for lantern exhibition at Home were prepared.

The litho-printing office has found better quarters in the rooms vacated by Mr. Didsbury; and another machine to print sheets 37in. by 52in. has just been erected.

A. BARRON,  
Superintendent.

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## APPENDICES.

### APPENDIX No. 1.

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

##### AUCKLAND.

*Major Triangulation.*—This year, as last, shows no return under this heading. The only gaps in the system in this land district are between the Northern Wairoa and Bay of Islands, and from Rangaunu to the North Cape; and also the Urewera country closing on to Poverty Bay.

*Minor Triangulation.*—The only work under this heading is a total area of 53,500 acres, or eighty-two square miles, which has been completed by Messrs. G. A. Martin, H. D. M. Haszard, and A. V. Harington. The two latter carried this work out to enable section-work to be properly connected in the Pakiri and Onewhero Districts, and the former, Mr. Martin, for Land Transfer purposes, in connection with surveys to bring lands under the Act.

*Rural and Suburban Sections.*—The output for the past year has been 661 sections, including an area of 81,725 acres, by the staff, at a cost of 1.53s. per acre, or, deducting the area of the two grazing-runs surveyed by Mr. Cussen from the total area, we have an average cost of 2.12s. per acre for the rest of the section-work done by the staff. Of section-work completed by authorised surveyors, the total for homestead and other surveys is fifty-two sections, containing an area of 8,972 acres, thus bringing up the total of section-work completed, exclusive of gold-mining surveys, to 90,697 acres. The township-work by the staff has been limited, only two resurveys, those of the Townships of Marsden Point and Leigh, having been done, comprising thirty-nine sections, of an area of 79 acres.

*Gold-mining Survey.*—All the surveys under this heading have been made by authorised surveyors, and comprise some 167 licensed holdings and special claims, containing an area of 3,591 acres, all of which have been submitted to a crucial examination, and the plans of same have been recorded and traced by the department. The errors discovered have been very few, notwithstanding the very rough and difficult country in which these surveys lie. The work has been very carefully done, and reflects great credit upon the surveyors.

*Water-races.*—In connection with the foregoing, some seven miles of water-race surveys have been received and passed.

*Native Land Court Surveys.*—Some twenty-two blocks, containing an area of 117,833 acres, have been surveyed by authorised surveyors, the first cost of which has been advanced or defrayed by the Government; and of this area, some seventeen blocks, 58,708 acres in extent, have been paid for by the Land Purchase Department. Of surveys paid by the Native owners or others, plans of 131 blocks have been received, comprising an area of 317,084 acres.

*Standard Survey.*—Under this heading the standard survey and street alignment of the Thames Borough has been completed by Mr. Philips in a very satisfactory manner. The cost of the above work has been borne equally by the department and the Borough Council.

*Roads and Railways.*—The staff have surveyed some seventy miles of road in exercise of road-rights through Native lands, and also roads for opening up lands for settlement, exclusive of roads in sectional work, at an average cost per mile of £9 18s. 6d. Some fifteen miles of road surveys have also been received from authorised surveyors, and forty-four miles of railway surveys under the District Railways Act; also some sixteen miles of Native block boundary-lines have been received.

*Land Transfer Surveys.*—These have been much fewer in number than during past years. Mr. Foster has passed 112 plans, containing 381 lots, of an area of 7,476 acres. I am glad to be able to report that there are at last practically no arrears of work in this branch, there being only twelve plans on hand not yet examined at the close of this year.

*Office-work.*—The office staff have had their hands very full during the past year, and the energies of the officers have been taxed to the utmost to keep pace with the work of property-tax revision, gold-mining work, and examination and preparation of plans for the very large number of Native Land Courts that have been held during the year. All the county maps (except East and West Taupo and Rotorua) have now been lithographed on a scale of one mile to an inch, and coloured copies supplied to every County Council as selection-maps, upon which the land-tenure is clearly shown; also, in many cases, copies have been supplied to the chief post-offices and telegraph-stations. The total number of lithographs printed has been thirty-one, comprising 4,600 copies, and costing £199 7s. 6d.; and the total office sales for lithographs and tracings have amounted to £138 13s. Of office-work done for other departments by the office staff, the total amount to be recovered by credit vouchers, &c., is £1,411 19s. 6d. The Crown-grant branch has turned out a total of 2,742 plans, placed on marginal forms, of an area of 276,562 acres; whilst Mr. Sturtevant, of the Land Transfer Office, has placed 654 plans on margins of certificates of title and transfer of a total area of 65,229 acres. The accountant, Mr. Johnston, has taken over all the Crown lands accounts during the past year, in addition to all his other numerous and onerous

duties, which have been performed with zeal and with a great sacrifice of his own time beyond that which office-hours demand. I also desire to place on record the untiring energy displayed by Mr. Kensington, Chief Draughtsman, upon whom, through force of unusual circumstances, so much has devolved during the year.

*Work for the ensuing Season.*—The demand for settlement-survey is very great, and apparently unsatisfied. All the staff have their hands quite full of instructions, and in addition to this I have on my books applications for 400 sections, of an area of 34,250 acres, the instructions for which are not yet in the hands of the surveyors; and, unless I have additional help allowed me, I do not see how the work is to be overtaken without such delay as will cause great discontent amongst the numerous applicants anxious to get on their land, whilst many probably will recede from their intention of selecting through disappointment, which necessarily retards the settlement of the country. Two more surveyors, at least, are required to fill up the gaps made by the removal of Mr. District Surveyor Goldsmith to Gisborne, and the perforce temporary cessation from work of Mr. District Surveyor Edgecumbe, whose regretted ill-health, undoubtedly intensified if not altogether brought about through his hard work in the service, has necessitated the granting to him of leave of absence. Of surveys under the Native Land Court Act, we have in progress or about to be undertaken, in the King country and other places blocks containing an area of 1,161,712 acres, the cost of which is in the first place being advanced by the Government; and of other surveys, to be paid for by Native owners, about 5,000 acres in various parts of the district. And, lastly, I would suggest the laying-off of some of the main roads through the King-country blocks, more especially when subdivision on subdivision is being made,—as, for instance, from Kihikihi southwards past Otorohanga. The Land Court would find it of great convenience, and many of the boundaries of the small partitions would be made to conform to the roads, instead of otherwise in the future being riddled by them.

THOMAS HUMPHRIES, Chief Surveyor.

#### HAWKE'S BAY.

*Settlement Surveys.*—During the year 52,696 acres of rural surveys for settlement purposes, divided into sixty-five sections, were completed. Out of this area the 34,262 acres returned by Mr. Armstrong, and which are held under the small grazing-run system, were divided into nine sections only; but it is fair to the surveyor to state that the cost includes the survey of nineteen miles and a half of roads. The section-marking of 8,997 acres in Wakarara District, which had been skeleton-surveyed by Mr. Tone during the previous year, was completed by Mr. Price, at a cost of 7·9d. per acre; the total cost being £504 15s. 6d., or at the rate of 1s. 1·4d. per acre. Mr. Tone completed the section-marking of 7,722 acres in the Norsewood and Weber Districts, the skeleton-surveys of which area were made by himself and Mr. Wilson during the previous year, the total cost being £786 7s., or at the rate of 2s. per acre; but in justice to Mr. Tone it must be stated that his own work, if taken by itself, does not come to more than half that rate per acre. Mr. Rich made a skeleton-survey of about 12,000 acres in Weber District, including trigonometrical and topographical work, at a cost of £1,000, or 1·66s. per acre. Mr. Price has prepared a similar survey of 7,200 acres of forest reserve in Wakarara District, which it is proposed to resume for settlement purposes under statutory sanction, as provided for in the State Forest Amendment Act of 1888.

*Unsurveyed Land opened for Selection.*—I wish to remark here that the opening for selection of so-called “unsurveyed land,” as provided for in the Land Act of 1887, although it has its drawbacks, has greatly facilitated settlement in this district; and, had it not been adopted to a considerable extent, it would have been impossible for the small staff here to have anything like satisfied the large demand for land which has been experienced during the last twelve months; in fact, as it is, the requirements of settlement are in advance of surveys.

*Settlement-surveys on Hand.*—The remaining Crown land in Weber District, comprising 14,000 acres, is under survey by Mr. Rich, and it is expected that this will be ready for selection within the next three months. In the same district Mr. Tone is finishing the section-marking of some 10,000 acres which was skeleton-surveyed by Mr. Rich and himself last year, and most of which has already been selected. In Tahoraiti District Mr. Price is preparing for settlement some 9,000 acres of forest reserve, which it is proposed to resume under the State Forests Act referred to above. This will probably be ready for selection in about nine months' time.

*Road-surveys.*—Road-surveys continue to occupy a prominent place in the duties of the staff at Poverty Bay. Mr. Armstrong completed six miles at a cost of £110 18s., or at the rate of £18 5s. per mile; he also surveyed nineteen miles and a half through and leading to the Arikihi and other runs; and Mr. Wilson completed in the field fifteen miles of roads taken through Native land under warrant; making a total mileage of forty miles and a half. Of road-survey *per se* there is nothing to return for Hawke's Bay, although the local bodies continue to take roads either under the authority of the Survey Department or by agreement with owners.

*Land Purchase Surveys.*—Crown interests in Native blocks situated in Waiapu and Mangaporo Districts, aggregating 4,377 acres, were surveyed by Mr. Barnard at a cost of £144 12s. 3d.

*Native Land Court Surveys.*—A very much larger area of Native land surveys at cost of applicants has been completed this than last year, forty-eight blocks, containing 173,497 acres, having been treated at Poverty Bay, and fourteen blocks, containing 188,482 acres, at Hawke's Bay, the total being sixty-two divisions of 361,979 acres. Owing to this increase of business, and to the numerous Court sessions within the last twelve months, the services rendered to that department have been considerable, and survey officers have spent a good deal of time in attending Courts at Tologa Bay, Wairoa, Waipawa, Hastings, &c.

*Standard Survey.*—Mr. Tone returns 94·17 chains of standard survey at the Spit, Napier, for the purpose of checking and fixing position of building lots laid off at that place last year. Mr.

Buscke has spent eight days on the standard survey of the Town of Gisborne in determining corners of blocks and permanently marking the points of reference with iron tubes set in concrete. Some trouble continues to be experienced owing to the removal and destruction of standard marks, both in town and country, by irresponsible persons, generally, however, acting under the local bodies, and I found it necessary some time ago to get a number of notices printed and posted up in public places warning all persons to refrain from interfering with the survey marks, in terms of clauses 10 and 11 of "The Land Act, 1885."

*Field Inspection.*—The ever-increasing duties connected with the Land Department have left me no time for formal field-inspection, although I have visited the field parties whenever opportunity offered, and seen to location of roads, ground-marking, &c. At Poverty Bay the officer in local charge has done as much inspection as time would permit; and he reports that, although the work of authorised surveyors is generally satisfactory as to technical accuracy, yet the ground-marking and delineation of topographical features leaves much to be desired. With regard to the latter, he remarks that features are put in so roughly and inaccurately as to be useless for supplementing the information on our block and other record maps.

*Other Work.*—Of the miscellaneous services included under the heading of "Other Work" the principal items are: Restoration and erection of trig. stations by the District Surveyor, Gisborne; the survey of six mining leases in Woodville District by Mr. Tone; a revision-survey by Mr. Neill of a number of sections at Norsewood, for the purpose of preparing certificates of title; revision-survey and road-exploration by Mr. Wilson; verification-survey by Mr. Rich; besides such recurring items as cost of field inspection, office work, and superintendence of road-formation works. In connection with this last item, I may point out that two road overseers, who were formerly employed on roads alone, have been dispensed with, and the duties performed by the ordinary staff, thus effecting a very considerable annual saving of expenditure.

*Surveys of Education Reserves.*—Of work which came under the supervision of this office, although not paid for out of the survey vote, may be mentioned the subdivision of about 3,000 acres of education endowments administered by the School Commissioners.

*Land Transfer Surveys.*—Mr. Dennon has examined and passed for approval seventy plans containing 588 lots and 17,352 acres, and Mr. Buscke has dealt in the same manner with nine plans of 18 lots and 275 acres, the cost being £118 13s. 4d. and £46 respectively.

*Public Works Surveys.*—Eight railway-land plans of seven miles of railway and eight road plans were examined by Mr. Dennon.

*Miscellaneous.*—A considerable item of office-work performed has been the placing of plans upon Crown grants, certificates, Court orders, leases, licenses, and other instruments of title, at a cost of £113 4s. 6d., the greater part of which has been undertaken by the ordinary staff without outside assistance.

*Lithographs.*—Nine tracings were prepared for photolithographic purposes, and much of this class of work remains to be done; but the exigencies of settlement and other matters, which will not brook delay, have hitherto prevented much being undertaken. The usual services have been rendered to various departments and local bodies, and a good deal of varied information has been collected and supplied for different purposes.

*Future Operations (Crown Lands for Settlement).*—The rainy season has set in with such unusual severity that all the field parties, except those which are near completion of work, have been called in, and, after bringing plans up to date, the surveyors' services will be available for assisting with office arrears. In the spring the proposals are, as to settlement-survey, to complete the resumed forest reserves already referred to, and to prepare for selection 100,000 acres of Crown land in the Motu Country, and about 30,000 acres at Nuhaka.

*Road Surveys proposed at Poverty Bay.*—About fifty-two miles of roads have to be taken under warrant within the next twelve months, or the right to take them will lapse. The Gisborne-Mahia-Wairoa Road should also be undertaken soon, as this will be one outlet for selectors of land at Nuhaka; and applications are constantly being received for road-surveys of more or less public interest and convenience.

I should state that the demand for land, both in Hawke's Bay and Poverty Bay, has been and continues to be very large; but, as all the available Crown land in Hawke's Bay will very soon be disposed of, it may be advisable to transfer additional surveyors to Poverty Bay to push on with settlement-surveys there, unless more Native land is acquired in the Seventy-mile Bush, which should be done unless settlement in that part of the district is to come to a standstill.

Mr. Weetman's well-merited promotion resulted in Mr. Goldsmith succeeding him as the officer in local charge of Surveys and Lands at Gisborne, and that gentleman's experience should be a sufficient guarantee that he will ably represent the departments.

G. W. WILLIAMS, Chief Surveyor.

#### TARANAKI.

I should perhaps preface my remarks by stating that I assumed charge of this office on the 1st May, consequent upon the removal of Mr. Humphries to the Auckland District.

During last year the field-work comes mainly under the two headings "Rural and Suburban" and "Native Land Court Survey."

*Rural and Suburban.*—There has been subdivided for settlement 10,078 acres into sixty-five sections, at a mean cost of about 1s. 2d. an acre, which may be considered very low, considering that the whole area is covered with forest, and that ridge-boundaries have in many cases been

adopted, involving a great deal of extra instrumental and pegging work. The exceptionally low cost of Mr. Dalziel's work, while no doubt due in some measure to his energy and application, is also due to the very low rate of his salary, which (without allowances) is less than that of his chainman.

*Native Land Court Survey.*—Under this heading 2,598 acres has been subdivided into twenty-eight partitions, which were dealt with by the Native Land Court for the purpose of individualising the Natives' interests in the reserves made by the West Coast Commission. The cost was at the rate of about 1.2s. an acre, and the whole amount—£152 6s. 10d.—is made a charge upon the land by survey-liens. The whole sum of outstanding liens amounts to £1,528 13s. 2d., for the survey of 238 partitions, covering an area of 97,761 acres.

*Roads, Railways, &c.*—Only a mile and a half of road has been surveyed: this was through the Toko Block, in exercise of the right under the Native Lands Act, to give access to the land sectionized by Mr. Dalziel.

*Other Work*—Includes the commencement of the survey of the Rahotu Block for settlement, by Mr. Skeet (from which he was called away for more pressing work, also for leave of absence). It also includes the back-pegging of 1,368 acres of old work by Mr. Dalziel, and the unfinished subdivision of Native land by Mr. T. L. Humphries, who was transferred to the Wellington staff on the 31st October.

*Land Transfer Surveys.*—Mr. Bird, Chief Draughtsman, has examined 60 plans, all of which have been approved: and the work of this branch is up to date.

*Office-work.*—The office branch has checked 41 surveyors' plans, prepared 6 new block sheets, 1 plan for Native Land Court, 2 for the Public Works Department, 185 tracings of various sizes, and checked 195 traverse sheets; 201 plans (in triplicate), including 701 sections, have been placed on Crown grants and leases, 85 plans (in triplicate) including 566 sections, on Native titles, and 76 plans, including 297 sections, have been placed on Land Transfer certificates. Work for other departments has been performed amounting to £185 2s. 9d.

*Work for the ensuing Season.*—Mr. Skeet has completed the field-work in connection with the proposed lines of road to the Central Railway-line, and is now busy preparing plans and reports, which he hopes to have ready in a few days' time.\* Mr. Buckeridge will commence the subdivision for settlement of the Crown land near Hawera, estimated at about 7,000 acres; after which the Waiweranui and adjacent Crown land will be subdivided; and, subject to your approval, I propose that Mr. Dalziel should continue the subdivision of the land to the west and north of the block just completed by him, as far as it is considered of sufficiently good quality to be readily taken up. There are also probably 1,500 acres in the Makara Valley south of Tikorangi which might be cut up, and for which there is likely to be a demand. With the small staff in this district it can be scarcely hoped that the standard survey of the town will be extended during the ensuing year into the suburbs, although it is a work which is very much required for locating land-transfer surveys. At present this means either that the proprietor must pay for long traverses of "connection" survey, or that the surveyor receives a very inadequate remuneration for his labour. With the exception of New Plymouth, standard surveys, in the proper sense of the term, have not been made of the chief towns of the district. Points have been laid down along one or two streets in Stratford, Hawera, and Patea; but in the case of Stratford the iron standards were put in at the corners of the blocks in the building-line, and one or two of these have, I am told, been removed by persons when fencing. Attempts will be made, as opportunities offer, to pull up the arrears of block sheets, &c., and to prepare Land Transfer record-maps, and also to collate the computations of the triangulation from the rough records, where not already done, and to record them on the new forms lately received from the head office.

I would respectfully draw your attention to the inadequate size of the safe-room attached to this office, which measures about 9ft. by 8ft., and there is literally scarcely room to turn round in. Consequently, when any plan is required the whole folio has to be carried out several yards on to the counter; and, what is of more importance, we have some valuable instruments, including a 12in. altazimuth, which cannot be kept in the safe, and consequently they run a continual risk of destruction by fire.

In pursuance of the retrenchment scheme, Mr. H. W. Climie left the service on the 31st August, and Mr. T. L. Humphries was transferred to the Wellington staff on the 31st October.

SIDNEY WEETMAN, Chief Surveyor.

#### WELLINGTON.

*Minor Triangulation.*—The only work executed under this head comprised 13,000 acres in the Omahine District, the object being to fill in a gap in the general triangulation, and to obtain governing points for the settlement-surveys. The pressure of "application" survey work so completely absorbed the staff that no officers could be detailed to undertake the extension of triangulation in the Upper Pohangina, Rangitikei, and other districts, although much needed to complete our topographical maps and to facilitate Native Land Court surveys.

*Rural and Suburban Surveys.*—The principal areas subdivided into sections comprised Mr. Llewellyn Smith's Hawera Special Settlement survey; Mr. Annabell's survey of accepted land-applications in Omahine Block; Messrs. Asheroft and Humphries' Horowhenua Block; Mr. Greville's South West Puketoi Block; Mr. Crombie's Wangaehu-Ihuraua Block; Mr. Murray's Mangahao Block; and Mr. C. A. Mountfort's Otamakapua Block, situated between the Wanganui and Palmerston Special Settlements. The Horowhenua Block, in consideration of its position and

\* See Appendix No. 3



quality, was subdivided into 257 quarter-acre lots, comprising about 120 acres; 71 suburban sections ranging from 3 to 20 acres, comprising 870 acres; and 28 rural sections, ranging from 20 to 247½ acres, comprising about 3,010 acres. It is due to Mr. Frith that I should state that he completed Mr. Crombie's Wangaehu-Ihuraua survey. The areas defined comprised, in the main, hilly country covered with a dense forest growth, requiring on the part of the surveyors care, skill, and energy in devising a scheme of sections suited to the character of the country and the requirements of the settlers, whilst conserving, as far as possible, public interests by selecting the key points, township sites, reserves for public purposes, and at the same time insuring the best location for roads, a fair apportionment of flat land, water frontages, homestead sites, and other natural advantages, and laying off selections where possible with good fencing boundaries along spurs and ridges. As the result of the practice which has prevailed for many years hundreds of miles of river-beds and their banks have been reserved wherever settlement-surveys have been carried out. As many of the streams in this land district are splendidly adapted for and as no doubt they will at no remote period be stocked with fish, the public will appreciate the privilege of unrestricted access to the rivers. One good object gained by reserving the banks and beds of rivers in this way will be that there will at all times exist on same a right to erect protective-works and plant trees with a view to controlling the flood-waters, which unfortunately cause such havoc in our rich alluvial valleys.

The area of the settlement-surveys aggregates to 45,397 acres; and, after making due allowance for the preliminary surveys in two cases, the cost is exceptionally low. In proof that the work has not deteriorated in accuracy I append, for your information, the following table, showing the results for the past five years:—

				Number of Closures.	Number of Stations.	Mileage.	Mean Error per Mile. Links.
1884-85	...	...	...	80	1,990	116	1·9
1885-86	...	...	...	101	2,275	149	1·6
1886-87	...	...	...	50	1,804	109	1·7
1887-88	...	...	...	95	4,911	266	2·0
1888-89	...	...	...	92	5,707	237	1·5

The following table shows the closures in the Wellington District for the year ending the 30th June, 1889:—

Name of Surveyor.	Number of Closures.	Number of Stations.	Number of Miles.	Total Error.		Total Error per Mile.		Remarks.
				Meridian.	Perpen- dicular.	Meridian.	Perpen- dicular.	
L. Smith .. ..	13	250	19·2	29·9	35·8	1·57	1·88	Undulating bush-lands.
J. Climie .. ..	7	542	16·2	10·5	23·9	1·0	1·6	Rough bush-lands.
John Annabell ..	28	952	13·0	64·3	54·0	2·1	1·6	Very rough bush-lands.
A. E. Ashcroft ..	17	593	32·4	52·1	59·8	1·6	1·8	Hilly and flat bush-lands.
R. P. Grevelle ..	..	921	39·4	54·8	78·6	1·4	2·0	Rough hill and bush-lands.
.. ..	..	391	18·9	13·9	11·0	2·17	2·2	
C. A. M. Crombie ..	..	608	51·0	41·1	34·1	0·8	0·7	Hilly and undulating bush-lands.
H. J. Lowe .. ..	15	608	51·0	41·1	34·1	0·8	0·7	Average hilly and flat bush-lands.
J. F. Frith .. ..	4	227	9·5	32·2	23·8	3·4	2·5	Hilly bush-lands.
T. L. Humphries ..	2	298	6·5	7·8	11·0	1·2	1·7	Very rough country, with scrub and bush.
G. F. Murray .. ..	6	925	30·6	39·7	35·9	1·3	1·2	Hilly bush-lands. There are three miles of disconnected traverse chained and observed not included.
Grand total and final means	92	6,315	287·7	387·4	422·0	1·34	1·46	

TRIG CLOSURE.

J. Annabell .. ..	7	..	13	18·7	1·4	Rough bush.
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The results for the past year cover the work of the whole staff—ten officers—exclusive of Mr. Mountfort, who sent in no data. For the information of those unacquainted with this country and the survey system, it is as well to state that nearly the whole of the traverses were executed in hilly forest lands; the chief instruments used were 5in. theodolites and 5 chains or 10 chains steel wire or bands for measurements. It is strange that the measuring apparatus in common use here is not universally adopted, and more strange still that it is not produced with the links and tallies marked so as to dispense with the steel tape. It is submitted for your consideration that the present limit of 8 links in the mile is an excessive allowance and might be reduced.

*Town-section Surveys.*—An extension of the Scarborough Township, the Ngaturi Village on the Tiraumea-Makuri Block, and the Horowhenua Township comprise the surveys under this head.

*Native Land Court Surveys.*—The only staff surveys were those of Mangatainoka and Piraunui Blocks; but the out-turn of work was increased to 260,578 acres by the contract surveys of Tawhakotapua and Awarua. The field-inspection of the latter block has yet to be made, and will be attended to as soon as the winter is past.

*Road and Railway Surveys.*—The lines returned this year include the Palmerston-Gorge and portions of the Eketahuna-Woodville Railway-lines. Much of the work was executed in former years, but not mapped. The roads include the Kakariki and Waimutu lines.

*Surveys for the Preparation of Selection-maps under "The Land Act, 1887."* — The 87,275 acres which appear in the schedule comprise the Maungakaretu, Ohoko, Waihoki, Makoura, Makuri, Puketoi, Pohangina, Waitotara River, and Omahine-Kaemanuka Blocks. The demand for land was so urgent that there was no time to complete the road-surveys on three blocks; it must therefore be clearly understood that the plans in these cases were compiled from prior surveys. As you are aware, this system affords the opportunity for throwing open for selection much more extensive areas than was possible under the Act of 1885, and this has been done without increasing the staff, except to peg off "applications." As an instance, more than 80,000 acres was prepared for notification as "open on the 15th August next," comprising nine blocks, situated in the Forty-mile Bush and West Coast Districts, whereas formerly only small areas were placed upon the market after the completion of the surveys. The public have a choice of selection ranging over several districts, embracing lands varying in character and quality of soil, climate, &c. These circumstances offer sufficient attraction and inducement to persons at a distance to incur the expense of a visit of inspection, besides the pressure and keenness of competition is distributed over a larger basis, to the great advantage of the selectors. The large number and the great extent of the applications for land necessitated the employment of several authorised surveyors to assist in defining selections, to expedite the issue of titles, and to enable settlers to enter into occupation of their holdings and proceed with their improvements.

*Other Works.*—I may enumerate under this head the pegging of back-lines for settlers, guiding intending selectors over lands open for application, the legalising of roads through Native and free-hold lands, the preparation of contracts for and the supervision of road-works.

The Chief Draughtsman, Mr. James McKenzie, reports as follows upon the office duties: "Perhaps the most prominent work—certainly the most important—has been the preparation of sale maps and lithographs of the large areas of Crown lands thrown open for selection; this, including the various schedules, descriptions, locality-plans, &c., involved a very large amount of labour, which cannot be gauged by the publication of the notifications and plans. . . . The system of selling land before the completion of the surveys shifts much of the labour from the field officer to the office staff. . . . During the earlier portion of the year the work of the office was enormously increased by the demands of the Property-tax Department for maps showing every subdivision, and tenure of the same. . . . The miscellaneous duties have been more arduous and numerous than in former years owing to the requirements of the public, local bodies, other departments, the staff, and private surveyors. . . . The number of trig. and settlement survey plans received, 46; Public Works, 45; Land Transfer, 145; Native Land Court plans received or compiled, 61; sale plans prepared, 25; titles and copies prepared, 3,520."

Mr. George Wright, Chief Clerk of the combined office reports that the number of recorded reports, returns, and letters received and despatched amounted to 9,657, in addition to notices, vouchers, &c., which sum to over 8,000; the number of leases and licenses prepared and issued amount to 464; the number of warrants, 42, comprising 387 titles. There was a considerable amount of business and book-keeping connected with the expenditure of £9,769 17s. 1d. on surveys and £7,317 1s. 6d. on road-works. As a matter of fact, the general business has nearly doubled recently; and if Mr. Wright and his assistants had not worked zealously, incessantly, and in overtime we could not have attended satisfactorily to the public requirements.

I have the honour to submit for your approval that the work requiring attention next season should be: The extension of triangulation and topographical surveys in the Upper Rangitikei, Moawhango, and Pohangina Districts, and over the Huangarua and Kaiwhata Districts in the Wairarapa; settlement-surveys, including the pegging of applications in Omahine-Kaemanuka, Waitotara River, Maungakaretu, Otairi, Otamakapua, Oroua-Pohangina, Puketoi, Kaiwhata, and the Crown lands lying along the eastern slopes of the Tararua Range; and a special effort should be made to throw open some of the Atuahae, Rangataua, and Waimarino Blocks. The duty of legalising roads under warrants should be taken up methodically and energetically; and standard surveys for aiding and controlling the Land Transfer surveys should be pushed forward in the settled districts, where the old surveys are not reliable. As regards the office, it has become absolutely necessary that new maps, on the mile scale, should be prepared and published, as was done in the Auckland District. Land Transfer and Crown-grant record-maps, which hitherto have only been commenced, should be completed, so as to represent all titles and new surveys.

I have the pleasure of stating that the staff officers in this district continue to perform their duties with zeal and ability. It is with much regret that public exigencies compel me to keep the field officers out so late this winter.

J. W. A. MARCHANT, Chief Surveyor.

#### NELSON.

*Minor Triangulation.*—There has been 110,493 acres completed, at a cost of 1.4d. per acre. Of this, 31,000 acres covers the bays and valleys on the west side of Blind Bay, and was executed by Mr. W. D. Murray, who has connected the old isolated surveys and laid down stations on the headlands and in the bays for connecting future surveys. Thirty-three miles of coast-line have been traversed for topographical purposes. Messrs. Smith and Thompson have finished 79,493 acres in the Terako and Waiiau Districts to control the resurvey of old leasehold boundaries necessary to locate new applications. The field-work of 173,785 acres of triangulation and topography, the outcome of two seasons' work, is completed, but not yet plotted, as owing to press of work last winter the parties had to keep the field, so that plotting has fallen into arrear. Messrs. Bullard and Greenfield during the past season have also completed the field-work of about 300,000 acres in the Owen, Tadmor, and Wangapeka Districts, the plotting of which is in hand. The work became necessary to control mining and mineral applications. Owing to pressure of work in the Buller District the connection of triangulation between the Buller and Karamea circuits, begun two seasons since, has not been finished.

*Sectional.*—There has been 27,486 acres in 177 sections surveyed during the year, at a cost of 1s. 9·3d. per acre. The applications for land outside the area set apart for Midland Railway purposes have increased slightly. The arrears of surveys at the end of the current year amount to 129 sections, containing 18,123 acres. The field-work of about 3,000 acres has been completed by Mr. Sadd in the Collingwood circuit, but is not yet mapped.

*Mineral Leases.*—Surveys of several large areas for coal leases have been made in the Buller and Grey Districts. During the year companies have been formed to work these, and work has been done on lines to connect the workings with the Government railways. The output of coal from the old mines is increasing.

*Gold-mining Surveys.*—There have been fewer of these surveys required during the year. The principal ones have been surveys of special areas granted for working the sea-beaches by improved machinery; but, with the exception of Messrs. Taylor and Harrison on the North Beach, Greymouth, there is no machinery at work on the areas.

*Town-section Survey.*—The Township of Hector, at the mouth of the Ngakawau River, and of Mikonui, on the river of that name, have been resurveyed and pegged; the development of coal areas in the neighbourhood will probably cause a demand for sections. A few sections have been surveyed at the Hot Springs, Hammer Plains, in connection with village sites.

*Other Work.*—Under this heading a greater amount is returned than usual, owing to a large amount completed in the field not being returnable until the mapping is done, and to Messrs. Smith and Thompson having an extra season's work in arrear of plotting.

*Land Transfer.*—Ninety-seven certificates and Crown grants have been prepared, requiring 292 plans; also 151 certificates under the Land Transfer Act, with 302 plans; 152 plans examined and passed, and 40 certificates of title are in hand. This work is in charge of Mr. Curtis, assisted by Mr. Spreat.

*Office-work.*—During the year 189 surveyors' field-plots have been sent in and checked and recorded on block sheets. Two hundred and forty-one leases and licenses have been prepared, requiring 528 plans. Eight new trig. district and forty-seven new block sheets have been prepared and current surveys recorded. Seven new application-maps have been recompiled from new surveys, and six new Crown-grant maps constructed. More than 1,400 letters have been received and answered, and 790 vouchers for payments prepared. During the year Messrs. Buckeridge, McKay, and Thompson have completed their cadetship and passed their examinations very creditably.

*Proposed Work for next Season.*—Mr. Murray to complete the triangulation and connection of old surveys in the bays. Messrs. Smith and Thompson will have several months' plotting, and then continue survey of leases and triangulation in the Amuri. Mr. Bullard, after plotting last season's work, will proceed to the assistance of the district surveyor at Westport, who is not able to overtake his work. Mr. Greenfield has also to plot his season's work, and will then continue sectional work. Mr. Sadd has 3,000 acres of sectional work to plot, and will provide for current sectional and mining work in the Collingwood District. Mr. Montgomerie will undertake mining and mineral surveys in the Reefton and Grey Districts.

JOHN S. BROWNING, Chief Surveyor.

## MARLBOROUGH.

*Minor Triangulation.*—Of the 39,200 acres commenced and completed during the year 10,200 acres consist of subsidiary triangulation in connection with settlement and mining surveys. The stations having been permanently marked and the observations taken with the same degree of accuracy as in minor triangulation, I have included it under that heading. Stations have also been established on the Mahakipawa Flats, to afford starting points for Land Transfer surveys, and the old magnetic surveys have been fixed thereto. The remaining 29,000 acres is a topographical and trigonometrical survey of a block of rough, mountainous country in the Cloudy Bay and Linkwater Districts, not included in previous triangulations. It embraces the whole of the newly-discovered auriferous country at Mahakipawa and Waikakaho, and the flat lands lying between the head of Queen Charlotte Sound and the Mahakipawa arm of Pelorus Sound. Nearly all the stations are on heavily-wooded hills from 2,000ft. to 3,500ft. in altitude. The work was much retarded by wet and foggy weather.

As was anticipated in last year's report, the discovery of gold in the Mahakipawa and Waikakaho Valleys and the gold-bearing reefs on the ranges at the sources of Cullen's and Waikakaho Streams has given a great impetus to mining surveys in those localities. A demand for topographical maps of this part of the goldfields has arisen in consequence. It is desirable therefore to publish maps to meet the wants of the public. With that object in view, I purpose preparing the necessary plans of the Cloudy Bay and Linkwater Districts, forward on to head office, and ask to have them lithographed. A supply of the plans will be of considerable benefit to the public, and no doubt tend to facilitate the development and administration of this portion of the Marlborough Mining District.

*Rural and Suburban Section Surveys.*—These are all rural forest lands. Of the 4,182 acres returned under that head, 3,134 acres in fifteen sections were surveyed, upon application, under the deferred-payment, perpetual-lease, and small grazing-run systems, on requisitions from the Land Board, and, with the exception of one, are situated in the Pelorus Sound in six different localities. The remaining 1,048 acres, in five sections, were laid off adjacent to the above, and are now open for settlement. There were thirty miles of traverse in connection with these surveys (mostly beach traverses), and ten closings, which show a mean error of 1·6 links per mile.

*Road Survey.*—This is a traverse of the recently-formed track, three miles and three quarters from Waitara Bay, Kenepuru Sound, to Clova Bay, Pelorus Sound. It passes partly through Crown and partly through freehold land, and has been constructed to facilitate the access between these sounds.

*Mining Surveys.*—Under this heading, out of the 823 acres, surveyed in twenty-nine sections, seven sections are in different localities, and the remaining twenty-two sections are on and about the summit of the dividing range, at the head of Cullen's and Waikakaho Streams, at an altitude of about 3,000ft. The latter were surveyed in conjunction with the minor triangulation. They are all in heavy bush country, and, as remarked in minor triangulation, a good deal of time was lost on account of wet and foggy weather. Mr. Goulter was engaged on this work and the triangulation for about six months of the year.

*Office and Land Transfer Work.*—Forty-three surveyors' plans have been received, examined, and recorded during the year, and five new block sheets compiled, and the various surveys plotted thereon and on the record-maps. In connection with the Land Transfer branch, eight plans were received, examined, and passed, dealing with nine original sections, subdivided into seventy-one lots, and covering an area of 253 acres. These have been placed upon the record-maps, two of which, one town and one rural, were compiled during the year. Twenty-five certificates in lieu of grants, representing seventy-five diagrams and thirty-four ordinary certificates, involving sixty-eight marginal plans, were prepared, and four applications, sixty-four mortgages, seventy-three transfers, and six leases examined and checked. The work for the Crown Lands Department has been of the usual miscellaneous character, such as placing diagrams on grazing-runs, perpetual-leases, pastoral, deferred-payment, timber, and miscellaneous licenses, descriptions, tracings, &c. Coloured lithographs and tracings of Native reserves were also prepared for the use of the Native Land Court, which recently held a sitting in this district. In addition to the above, there has been the usual correspondence, attendance on the public, and the ordinary routine work of the office, which it is unnecessary to particularise.

*Work for the coming Year.*—The section work in hand at the commencement of the season comprises subdivision of 174 acres of reserves at Kaikoura and Picton, 900 acres on application in Kenepuru Sound, and a block of 4,000 acres on the East Coast between the Rivers Kahautara and Kiekie. The survey and granting of this block has had to stand over pending the final selection and construction of the road from Kaikoura southwards, which intersects this block; also the exploration and grading of a stock-driving track, some seventeen to eighteen miles, through the forest country from Tennyson Inlet down the Rai Valley, to connect with the main road to Nelson at or about the junction of the Rai and Brown Rivers; and a similar track, about six miles from Nydia Bay, to join on in the Rai Valley. As soon as these surveys are sufficiently advanced, contracts will be let, and the tracks cleared and opened out. These tracks are intended to open up communication with the Sounds for the benefit of the deferred-payment settlers, and the cost will be defrayed out of the accrued deferred-payment thirds. I had hoped to have got this work through this year, but more pressing demands for mining and other surveys would not admit of it being done, with only one surveyor on my staff. In addition to the above, there will be the usual calls for surveys, from time to time, from the Land Board; and I think it very probable we may be asked to undertake the survey and partition of the Native reserves in the district under the Native Land Court Act.

HENRY G. CLARK, Chief Surveyor.

## WESTLAND.

*Topographical and Trigonometrical Surveys.*—In survey districts south of Okarito 41,020 acres have been surveyed, at a cost of 0.44d. per acre: it comprises the upper reaches of Cook and Karangarua Rivers and their tributaries.

*Rural and Suburban Land Surveys.*—Only thirty-eight isolated sections, averaging 23 acres each, and scattered over the district, have been completed: the cost of these amounted to 3s. 2½d. per acre.

*Town-section Surveys.*—These comprised the resurvey of the Native portion of the Town of Greymouth, and together with it was carried out the standard survey of that town. The cost of the latter could not well be separated from the cost of the section-survey proper, as the two surveys were carried on together by the same officer, and hence the cost of survey per allotment (£1 4s. 4.3d.) is higher than it would otherwise have been.

In regard to the original surveys of the Native part of Greymouth, I may state that they were carried out under the direction of the Native Department, and were made by half a dozen private surveyors, working practically without regard to previous surveys, and uncontrolled by standard or fixed points; and hence the necessity for a complete resurvey of that part of Greymouth. Owing to the many disputes amongst adjoining leaseholders, the numerous encroachments and overlappings, &c., in the most valuable or business part of Greymouth, the work proved most tedious and expensive; thus furnishing another proof that it is wisest and cheapest to have surveys properly and systematically carried out at the first.

*Gold-mining Surveys.*—1,813 acres at 5s. 2.4d. per acre. They consisted principally of licensed holdings in connection with quartz-reefs, and of special claims for dredging purposes along the sea-coast of this district. The latter, with few exceptions, comprise beaches already worked or beaches and river-beds which could not be worked before owing to the large influx of water on sinking shafts or padocks. Various dredging-machines are in course of erection now and will be put to the test shortly; if found to work successfully, an immense impetus will be given to beach and river mining on the coast, and large areas of known auriferous ground will be taken up which could not possibly be worked profitably without some such appliances as these dredgers.

*Other Work* amounts to £285 13s. 6d., consisting principally of office-work done by the surveyors in assisting in the preparation of record-maps and sets of plans and specifications for road-construction, checking property-tax and other maps, &c.

*Office-work.*—But for the occasional assistance I was enabled to receive when any of the field surveyors happened to be in, more of the office-work would have had to fall into arrear; as it is, many of the topographical, Crown grant, &c., maps have still to be prepared or else are awaiting completion. The Chief Draughtsman (Mr. Clarke) was appointed Receiver of Land Revenue during the past year, and much of his time—formerly devoted to survey record-maps—is now taken up with Land Department business.

*General Remarks.*—The work done for other departments is very considerable during the past year. In the case of the field staff surveyors it amounts to £850 9s. 2d., and in the case of the office staff to £416 11s.; total, £1,267 0s. 2d., which reduces the cost of the Westland Survey Department to about one-half of what it otherwise would have been.

*Work in Hand and Proposed Operations.*—The settlement-surveys in arrear amount to 172 sections, comprising 16,557 acres. As these are dispersed throughout the district, the surveys of them will, excepting in special pressing cases, be left over until a surveyor in connection with some other survey work happens to visit the district they are situated in. Apart from these settlement-surveys, work is certain to increase largely during the year, owing to the assured prosecution of the Midland Railway-works, which must of necessity conduce to settlement. Many of the applicants for lands within the reserved area, who, in consequence of the long stoppage of the company's works, were led to expect that Government itself would again resume the disposal of these lands, are prepared now to deal with the company about the lands they are anxious to purchase or lease. Besides the settlement-surveys, there are the mining and road surveys, which will keep the few Westland surveyors fully employed. I hope I shall be able to overtake the arrears in office-work during the ensuing year.

GERHARD MUELLER, Chief Surveyor.

### CANTERBURY.

*Minor Triangulation and Topography.*—This year, as in the previous one, four out of the five staff surveyors have been engaged in this work. Mr. Welch is completing the triangulation to connect with the Nelson trig. work, at the head of Lake Sumner, then crossing the Dampier Range, and working down to close with Mr. Brodrick's triangulation of the Upper Waimakariri Valley. Mr. Welch reports: "I exceedingly regret that the closures for distance are not as satisfactory as I could wish, although the bearings come out fairly well. All the distances come out less, both with the base-lines at Lake Taylor and also with the Nelson work, the error being all one way. I have found one cause of error in the instrument: the vertical arc is slightly out, and does not describe a vertical line at right angles to the plane of the instrument. Many adjacent trigs having a great difference in their heights will account, I believe, for the greater part of the discrepancy." The closing error is 2.2 links per mile with the Nelson work, and 1.3 links per mile with Mr. Brodrick's triangulation, which, though not showing such good results as Mr. Welch's past season's work, is satisfactory, considering the nature of the country triangulated, the average heights of the stations being 4,759ft., the highest 6,000ft.

Mr. Brodrick completed the triangulation of the Great Tasman and Hooker Valleys up to the base of Mount Cook, on both sides. Under my directions, he has made a complete survey of the Mueller and Hooker Glaciers, has ascertained the rate at which they are moving, and made numerous observations, which will be of much value to scientific men when visiting this magnificent and most interesting portion of the Southern Alps.\*

When at the Hermitage with the Classification Commissioners, Mr. Brodrick and I went nearly to the head of the Hooker Glacier; but, having no camping equipment with us, we had to return without getting to the highest attainable point. I instructed him to try and get to the top of a comparatively low saddle we discovered near the head of this glacier, but when he returned, later in the season, to complete the survey of it, he could not reach the saddle because of the huge crevasses, which were then uncrossable without special appliances, all the natural snow bridges having melted away.

From the surveys made of the Mueller and Hooker Glaciers by Mr. Brodrick, and of the Great Tasman Glacier by Dr. R. von Lendenfeld, I hope to be able to construct a highly-interesting map, showing the topography of the district, the courses of the above glaciers to their terminal faces, with the positions of the lateral moraines, and also of the largest overhanging glaciers, and the courses which the principal avalanches take as they are gradually forced over the precipitous rock on which they are suspended: this map to be exhibited at the Dunedin Exhibition next summer, where, I am sure, it will attract considerable attention and lead many people to visit probably some of the grandest scenery to be found in the Southern Hemisphere.

Mr. Hay has completed the triangulation and the topography of the Mount Hutt, Mount Somers, and Palmer Ranges, embracing a very large area of some of the roughest sheep-country in Canterbury. The completion of the topography of this block of country in time for the lithographs prepared for the late sale of runs was of the greatest assistance in getting these plans out. His trigonometrical plans are not yet finished, but he reports that very fair closures have been obtained with the previous work.

Mr. McClure has also completed a large area of topographical survey at the head of the Have-lock and Clyde Branches of the Rangitata River, also at the sources of the Potts, Ashburton, and Cameron Rivers, as far as the southernmost branch of the Rakaia. He says, "I was impeded in the earlier part of the season by bad weather, and during November there was fully 2ft. of snow round the camp. In consequence of the previous severe winter and the high altitude of the country, some of it being over 9,000ft., among the glaciers, there was a certain amount of danger attached

\* See Brodrick's report, Appendix No. 4.

to traversing the head waters of the rivers, through avalanches; and, later on, through the rivers being in flood, we had to work wet to the waist, continually crossing and recrossing the rivers; in fact, during a flood in the Clyde, one of my men was nearly drowned in attempting to cross with the theodolite."

In all, this season, 350,959 acres of minor triangulation, with topography, were completed, at a cost of under 1d. per acre, and 371,140 acres, topography alone, at a cost of 0·42d. per acre.

*Sectional Surveys.*—But little sectional work has been completed during the year. The surveyors engaged on the triangulation finished any sectional work coming within the district in which they were surveying. Mr. Brodrick did a number of detached sectional surveys in the Tasman Valley in the spring and autumn, before and after the time he could work at the triangulation. Mr. Hay, after he had completed the season's triangulation, also finished the subdivision survey of the Lake Ellesmere flat, containing over 7,000 acres. The other sectional surveys require no special remark. The total done this year is 229 sections, containing 12,670 acres, at a cost of 10·68d. per acre.

*General Surveys.*—Mr. Mathias has made subdivisive surveys of a number of educational reserves for leasing in smaller areas, and has laid out some mining leases. He was also engaged in traversing fences to fix the position of the boundaries of some of the runs; also in fixing the position of new line of the rabbit-proof fence in course of erection in the Hakataramea Valley.

*Land Transfer Surveys.*—The work of this branch of the Survey Department remains about the same as in previous years. Mr. Monro, the officer in charge, reports: "The amount of work which has passed through this office during the year ended the 30th June, 1889, has been approximately the same as the average of the two previous years, but less than the average in each year from 1878 to 1886. This decrease during the last three years is partly due to there having been fewer sales of properties, and partly to alterations in the Land Transfer Act, on account of which new certificates of title are not now requisite in the case of transactions which would formerly have involved the cancellation of existing certificates and the issue of new ones. There is a marked decrease in the number of certificates in lieu of Crown grants. Plans on original parchment copies are received from the Crown Lands Office, and plans of duplicate and triplicate copies are prepared in this office. In the case of eighteen certificates in lieu of Crown grants issued under the Christchurch Drainage Board Reserves Sale and Exchange Act of 1887 plans were placed on original parchment copies of certificates in this office, as well as on duplicate and triplicate copies of same. Previous to January, 1888, plans on original parchment copies of ordinary certificates were prepared in this office, and plans on duplicate copies of ordinary certificates and on duplicate and triplicate copies of certificates in lieu of Crown grants were made by contract from those on original copies; since that date all plans on duplicate copies of ordinary certificates and on duplicate and triplicate copies of certificates in lieu of Crown grants have also been prepared in this office. I estimate the amount which would have been payable the past year if copies had been made by contract at £63.

*Office-work.*—Since the reductions made in the office staff last year the whole of the office-work, as regards the checking and construction of all plans, district, county, and Crown-grant record-maps, has been supervised by Mr. Shanks, Chief Draughtsman. Fifteen new district plans have been made for the public map-room, and seven were revised and added to. Four new districts have been traced and sent to Wellington for photo-lithography; but the principal draughting work done this year was the construction of four run plans, on a scale of one mile to an inch, showing all the topography, fences, run-boundaries, &c. These were traced, and sent to Wellington for photo-lithography. This last work was only completed in time to let the public have the use of them before the run sales by the strenuous efforts of several of the draughtsmen, who, for many weeks, had to return to the office after the usual hours and remain nightly till 10 p.m. in order to get them finished. Twenty-eight large and forty-one small plans were sent in by the surveyors, most of which have been checked and passed. There were 313 certificates of title or Crown grants of 435 sections of rural, town, or suburban land, containing 20,298 acres, prepared. Plans were put on 104 leases in triplicate, involving the drawing of over 300 separate plans on these deeds.

*Proposed Operations, 1889-90.*—I propose to send only one surveyor (Mr. Brodrick) to complete the triangulation of the Lake Ohau and Ahuriri Valleys, which can probably be done in four or five months. We shall then have proper topographical plans of nearly all the occupied sheep-country. One other season will then complete the topographical survey required of the Hawea and Wilkin Valleys, in the southern part of Canterbury. The topography of the head-waters of a few of the other rivers, such as the Mathias, Bealey, and Poulter, will be required to complete the topography of the whole of the Canterbury District; but this latter work can remain until the settlement-surveys required next season are done. Four surveyors will therefore be available to go on with the subdivisive survey of the lands withheld for settlement in 1890, and to survey the blocks selected by the Midland Railway Company.

JOHN H. BAKER, Chief Surveyor.

#### OTAGO.

The field staff is the same now as at the date of my last report, viz.: six surveyors. There is only one cadet at present in this district, and he is in the field. In the office there are eight draughtsmen and the Accountant, and no cadets, as against nine draughtsmen and three cadets last year. There is every indication of an increased demand for land for settlement during the ensuing year, and the strength of both the field and the office staff will be taxed to the utmost to keep pace with the demand.

*Topographical and Trigonometrical Survey.*—Mr. Strauchon has completed the triangulation of the Glenomaru District, chiefly bush, and returns 30,000 acres, at 2d. an acre. Mr. Langmuir has also done about 950 acres.

*Rural and Suburban Surveys.*—Over 20,000 acres has been surveyed during the past year, at a little under 1s. 7d. per acre. As this includes a good deal of bush work, I think the cost very reasonable.

*Town-section Surveys.*—The chief work under this head was the laying-off of the mining township at the Nenthorn reefs.

*Native Land Court Surveys.*—The only item under this heading is the survey of the Native reserve at Waikouaiti, of 3,000 acres, by contract by Mr. G. Mackenzie.

*Gold-mining Surveys.*—Over double the area of land has been laid off this year. Out of a total of 109 sections, thirty-five were laid off in one locality at the Nenthorn reefs.

*Road Surveys.*—The chief item under this head is forty miles of the Catlin's to Taukupu Road through bush-country by Mr. Strauchon. This road connects with the road-system down the Mokoreta Valley to Wyndham. Mr. McCurdie laid off over six miles, all in dense bush, near Catlin's River.

*Detention by Native Opposition.*—The opposition which caused the expenditure under this head was not hostile to the surveyor, but, owing to contentions among the Native claimants to the different parts of the Waikouaiti reserve, a great deal of extra trouble and expense was incurred.

*Other Work.*—The chief item is an exploration survey by Mr. Wilmot of the head-waters of the Hollyford and Eglinton Rivers.

*Survey Inspections.*—During the year I have made three survey-inspections and three road-inspections; also, in connection with the road-works carried on by the "unemployed," I visited Tomahawk and Portobello Roads on several occasions, besides two visits to Catlin's River. I was also absent one month at Milford Sound, during which time I made a reconnaissance survey of the Arthur River from its mouth at Milford Sound to its source. I also measured the height of the Sutherland Falls, near the head of the Arthur River, and found it to be 1,904ft. In December last I spent eleven days inspecting runs for classification under the Land Acts Amendment Act of 1888, and seven days were occupied in making a tour of the Otago Survey District with yourself.

*District Offices.*—Lawrence office is under the charge of Mr. McLean; Queenstown office under Mr. Adair: Mr. D. Barron, District Surveyor, has charge of the Naseby Office, as there is no resident draughtsman there.

*Dunedin Office.*—During the year the following changes have taken place: Mr. Stables, cadet, resigned in December last year to proceed to Victoria; Mr. Neill, cadet, was promoted to the grade of Assistant Surveyor in Napier, and left this office in May last; Mr. Mouat, temporary cadet, having been over a year in the office, joined Mr. Langmuir's survey party in February last. Mr. Skey, with the assistance of Messrs. Wadie, Marsh, and Morrison, prepared 268 Crown grants and certificates of title, 120 perpetual leases, 64 pastoral leases, 44 deferred-payment leases, 26 occupation licenses, 8 coal leases, 9 agricultural leases, 6 exchange leases, and 59 small grazing-run leases, most in duplicate and some in triplicate, besides other incidental work, and examined and recorded 44 licensed holdings and special-claim grants. Mr. Nicolson, who is in charge of all records, including lithographs, records surveys, furnishes surveyors with data, makes tracings of surveys for Land Office, and attends to the public. Mr. Wadie has charge of the run maps, records all new surveys and alterations to boundaries, computes and checks areas, keeps record of road-improvements to open Crown lands, and executes plans on pastoral and other leases. Mr. Fynmore records new and closed road-surveys on working-plans and road, district, and county maps, reports on road matters, supplies descriptions and compiles returns of sold lands monthly, and attends to the public in connection with road affairs. Mr. Thompson checked the following plans: Land Transfer, 56; staff, 96; road and railway, in duplicate, 31; mining leases, 21; and also made the following surveys: Section No. 412, Town of Port Chalmers; disputed boundaries between Block III., Portobello Bay, and Block IV., Otago Peninsula District; Mr. Wilson's property, same district; fixing boundaries of land contained in certificates, and producing south-eastern boundary of Block XIII., Dunedin and East Taieri District, for the Land Transfer Department; also made survey of a coal-mining lease in Block V., Mount Hyde District. Mr. Marsh, besides assisting Mr. Skey, prepared information for the 80-chain district lithographs. Mr. Morrison, when not engaged on lithographic work, assisted the Chief Draughtsman. The Accountant, Mr. Runcie, besides the correspondence and book-keeping, recorded a *précis* of and indexed 3,324 letters received and sent; received, entered, and numbered 180 plans; he checked and tabulated the monthly survey and road reports; kept and distributed stores; paid salaries and wages in office, and proceeded to road-works with cash to pay wages; despatched all parcels, plans, and correspondence; and attended to all matters in connection with the office.

*Land Transfer Work.*—Mr. Thompson's work under this heading is already detailed under the Dunedin Office work. Mr. Treseder, whose time is wholly occupied with this kind of work, examined and checked 46 applications, 909 transfers, 583 mortgages, 240 leases, 145 transmissions, put plans on 110 certificates, and 650 plans on certificates in lieu of Crown grants.

*Lithographic Branch.*—Mr. Morrison reduced and drew one plan for photo-lithography and thirteen on transfer paper. Mr. Bain printed 2,570 lithographs therefrom, besides protractors' circulars, forms, &c., and mounted during the year 418 maps.

*The "Unemployed."*—Since the beginning of the year I have had charge of the roads formerly under the Public Works Department. The section of the Portobello Road in course of construction was finished under my supervision. The Tomahawk Road-works were stopped by instructions from the Minister of Lands before they were completed, and the "unemployed" were discharged, as it was thought they could obtain harvest-work up country. On the 26th of last April, acting under instructions from the Hon. the Minister of Lands, I sent twenty-four of them, under Inspector Cross, to clear and form roads near Catlin's River. This number has now increased to forty, and applications are still coming in from men in want of work. Only married men with families to support are taken on. The country they are working is all heavily timbered, and the earthworks are



heavy in some places. The men are put on piecework, and good progress is being made; although, owing to the clay soil and wet weather, planks have to be used in all cases for wheeling on. This causes extra expense, and I estimate that the work could be done at 20 per cent. less cost in summer.

*Proposed Operations.*—Owing to the increased demand for bush land in the Glenomaru, Catlin, and Woodland Districts I propose to employ three surveyors in that locality during the coming season. Messrs. Strauchon and McCurdie are at work there at present, and Mr. D. M. Calder proceeds there on completion of his work at Moeraki. Mr. Barron will be fully employed making settlement-surveys on the Mauiototo Plain and attending to the mining applications as they come in. Mr. Langmuir, on completion of a settlement-survey in Blocks VIII. and XIII., Tuapeka West, will proceed to Dunedin to extend the standard survey there. This work has been held over from year to year, but it must be done this summer, and is urgently required to base the Land Transfer surveys on. As there are no pressing mining applications in the Queenstown Survey District at present, Mr. Wilmot might be spared to make a rough topographical survey of the country near Te Anau Lake. He could examine the country between the north-west arm of the middle fiord and George Sound, and then grade and locate the best line of road up the Clinton Valley. He would thus have an opportunity of comparing McKinnon's Pass with the passes he has lately explored between the Hollyford and Cleddan River systems. In this office I should like to devote more time to the preparation of 80-chain maps, and to the renewal of several county maps which are so much worn that they are almost unserviceable; but with the limited staff I have at present I cannot do more than keep the ordinary routine work going.

C. W. ADAMS, Chief Surveyor.

### SOUTHLAND.

*Field-work.*—There have been executed during the year 238 surveys, embracing 13,564 acres. Eighty-three of these surveys have been of township sections, embracing 21 acres. The remaining surveys consist of forty-two subdivisions of Native reserves, covering 6,275 acres; of eleven rural applications, covering 1,027 acres; of thirty-two saw-mill areas, embracing 3,527 acres; of seven special claims (gold-mining), embracing 320 acres; and of sixty-three tin-mining areas, amounting to some 2,394 acres. As will be seen from the return, many of these surveys were executed on the fee-system, fees in accordance with the regulation-scale having previously been deposited by applicants. In addition to the surveys which have been completed, and the plans of which have been sent in, a considerable number of mineral areas (tin) have been surveyed in Pegasus district, Stewart Island; but, as the surveyors (Messrs. John Hay and H. R. Dundas) are still engaged with adjoining surveys, and have not yet had time to complete the plans, these surveys will necessarily be carried forward into next year's report. In connection with the work done by Mr. Hay during the year, I may say that the completed surveys consist entirely of subdivisions of Native reserves. These were mostly in bush-clad country, and involved long coast traverses. In addition to the surveys on the mainland and on Stewart Island, the Island of Ruapuke was subdivided, the subdivisional survey involving an accurate survey of the whole island and a coast traverse of some twenty miles. In the Native subdivisional surveys Mr. Hay had to locate the various family blocks, and to adjust the various disputes that arose among the claimants during the progress of the survey. In carrying out the work Mr. Hay had a task of no small difficulty, and, as he brought all the parties to an amicable settlement, and completed the surveys in reasonable time, considerable credit is due to him for the tact and good-nature displayed by him under the circumstances. In regard to Mr. Strauchon, I need scarcely say that for the greater part of the year he has been engaged in the Otago District, the work done by him in this district having simply been taken up in due course and as it came to hand. Mr. Strauchon will soon again return to the Catlin's country, where, I understand, a considerable amount of work awaits him. It will be seen that a considerable number of saw-mill areas have been applied for and surveyed during the year. This has been partially and, I have no doubt, largely owing to the demand for New Zealand timber that has recently arisen in Victoria and New South Wales, &c. The large amount of competition in the saw-mill trade is still keeping the price of timber extremely low, but I think that, as the demand is arising and increasing in the neighbouring colonies, the prospects of the millers are probably better than they were. I may say that the surveyor who makes the survey also makes the valuation of the timber. One of the surveyors on the fee-system has made a speciality of the work of valuing, and I am glad to report that the system works extremely well. The surveyor does the work of surveying and valuing for the single survey fee; but he is permitted now to make compass-surveys, and this concession, which eases the operations of the surveyor, enables the double work to be done without extra cost either to the Government or the saw-miller, the survey being still sufficiently accurate for the purposes required.

Throughout the year we have had a few applications to purchase unsurveyed land, and several special claims on the goldfields (at Longwood, Waipapa Beach, &c.) have been applied for and surveyed. At Pegasus (Stewart Island), however, there has been quite an outburst of mining excitement during the year, owing to the discovery, first, of alluvial and thereafter of lode tin. Considerably over a hundred mineral areas have been applied for at Pegasus; at Kopack, a locality nearly midway between Pegasus and Lord's River, about a dozen applications have been made; and in Paterson District several applications have also been made. Mr. T. S. Miller, authorized surveyor, being available at the time, was first sent to the field. Owing to the nature of the country, he had a deal of rough work to contend with, and, as over a hundred areas were rapidly pegged out in mingled bush and scrub, where access was difficult and where disputes were almost inevitable, the success that attended the work of adjustment and survey bears ample evidence to the care, tact, and efficiency with which Mr. Miller performed his duties. He has now returned to the mainland,



and has sent in the plan of some sixty-three areas, the leases of which we are now engaged preparing. Mr. Hay, staff surveyor, and Mr. H. R. Dundas, authorised surveyor, have been left on the field to overtake the remaining surveys, and I understand that they are progressing very well. My special report on the Stewart Island tin-field, sent up some months ago, will give particulars in regard to the country, the mineral prospects, and the surveys, which I am unable to dwell upon here. The mineral areas held have now probably reached high-water mark. I have no doubt of the ultimate success of the field, though probably many of the areas will by-and-by be abandoned. Capital, experience, and joint organized effort will be required ere the field can be developed to any extent, and it is hard to say what will be the chief centre of the mineral workings. The want of a large body of water will be a great drawback, particularly in the case of the alluvial workings.

The interior of Stewart Island never having been mapped, the coast features and outstanding hills having simply been got from the Admiralty chart, I would recommend that a topographical survey (and in places a trigonometrical one) be made of the southern part of the island. A small network at least of triangles will be necessary to connect Kopack with Pegasus; and a topographical survey showing the route of the newly-cut track from Pegasus to Paterson Inlet, including adjoining features, will be very desirable. This can be done by Mr. Hay ere he leaves the island.

*Office-work.*—In addition to the ordinary routine work of the office, the details of which I need not specify, ninety-six Crown grants, involving the preparation of 288 plans, have been prepared during the year. The number of plans that have been passed for Land Transfer purposes has been twenty-seven: these comprised thirty-eight original sections, subdivided into 687 allotments, containing 2,213 acres. The plans placed on certificates of title amounted to 500, being 250 plans in duplicate. The number of leases examined was seventy-six, and the number of applications (to bring land under the Act, &c.) examined was thirty-three. This year we had no lithographing done locally, the lithographs required having been drawn and printed in Wellington from tracings supplied by this office. The fact is that during the past, while Mr. Deverell was engaged in this office, we had the most of the districts lithographed, and in consequence of this we have not felt the same want of published district-maps that was formerly experienced. I may state that the Land Office has been exceptionally busy during the past twelve months, and this has necessarily made the Survey Office busy too. As the recent pressure of Land Office work has caused this report to be delayed longer than I could have wished, I need not, I think, lengthen it out further, having already dwelt upon the main points demanding notice.

JOHN SPENCE, Chief Surveyor.

## APPENDIX No. 2.

## DETAILED REPORTS ON THE ROAD-WORKS UNDERTAKEN BY THE SURVEY DEPARTMENT.

## AUCKLAND.

*Okaihau to Victoria Valley.*—During the season very little has been done to this road, owing to the Native contractors, through whose land the road runs, having been much engaged in land disputes, and attending Native Land Courts. One of the two contracts mentioned in last year's report has been lately finished and the other nearly so. The delay, however, has not been of much importance, as the finished part has passed the junction with the Oruru branch; and the cost has not been increased thereby, the inspection having been done in connection with that of the Fern-flat Village Settlement. The works done are 34 chains of bridle-track and 28ft. of bridging. The portion of bridle-road between the Mangamuka and Waihou Bridges (about eleven miles) has also been maintained and repaired. Mr. G. G. Menzies has charge of the works.

*Wairua to Helena Bay.*—Contracts have been let lately to widen about four miles of side-cutting, so as to make the bridle-road into a narrow cart-road, and also for about two miles of forest clearing one chain wide. A contract has also been let for a bridge of 42ft. span over the Mimiha Stream. The work done is one mile of road widened and forest cleared; also several land-slips have been cleared away. Mr. A. M. Sheppard is in charge.

*Paparoa to Waikiekie.*—This road is a continuation northerly of the four and a half miles constructed last season, and mentioned in last year's report under the heading of "Mangapai to Mareretu." Mr. J. C. Blythe; at the latter end of 1888, surveyed and graded five miles of this road, and of this five-mile length three miles were further surveyed for the purposes of conveyancing or taking under the Public Works Act, and the title thereof has since been satisfactorily arranged for. The work done consists of 130 chains of bridle-track, including 81ft. span. of bridges and culverts. Mr. Russell, under Mr. E. Fairburn's supervision, had charge of the works until their completion.

*Wairua Bridge.*—During the season a contract has been let for a bridge of 127ft. span over the Wairua River in Block XV., Hukerenui Survey District. Mr. A. M. Sheppard is in charge.

*Awaroa Swamp, Otama to Deed's.*—During the season the Waipipi Road Board has had performed, under the charge of their inspector, Mr. J. T. Mellsop, the following-works—viz.: One mile and three-quarters of fascines covered with clay to a width of 16ft. by 8ft. deep, with same length of side-drains cleared.

*Akaaka Swamp Drains.*—During the season Mr. A. B. Wright surveyed and levelled 110 chains of this swamp for draining purposes, and prepared a contract, for which tenders were invited by the Waipipi Road Board, and subsequently a contract was let for same. Mr. J. T. Mellsop has charge.

*Waerenga.*—Mr. Wright, during parts of April and May last, surveyed about two miles of this road, both for engineering as well as conveyancing purposes, extending between the school-house, Waerenga, and the commencement of Mr. Haszard's road, being the portion of it which runs through private ground, and the title thereof has been arranged for, free of compensation. A contract for the construction of 135 chains of this has been prepared and tenders called for. Mr. T. Grange, with a small party of men, commenced, at the beginning of June, forming a narrow cart-road on the portion of Mr. Haszard's line starting at edge of forest and extending eastward, and will also inspect the work on the other portion when the contract for it is let.

*Waingarō to Akatea.*—Work done—about 50 chains of road widened from 6ft. to 12ft., and eleven miles of road kept in repair. The work has been done by the Firewood Creek Village settlers, under the supervision of Mr. F. H. Edgecumbe.

*Akatea to Papakauri.*—About 120 chains of bridle-track have been made, and some bridges are under construction. The work is still proceeding: Mr. F. H. Edgecumbe has charge.

*Whaingaroa to Waitetuna.*—The works carried out on this road during the season have been some small repairs, and the construction of a portion of its southern end, required to complete it as a through line of communication between Huntly and Ngaruawahia respectively at the one end and the Raglan-Whatawhata Road at the other, and which has now been done by forming the late unfinished portion as a narrow dray-road; the remainder of the road northwards is only a bridle-road. The work done consists of 117 chains of formation 12ft. wide, and 24ft. of bridging, besides clearing away a few landslips. Mr. P. Cogswell, under Mr. E. Fairburn's supervision, had charge.

*Kawhia to Alexandra.*—During the season the Whatiwhatiho Bridge has been painted, and some small repairs made to its approaches and to those of a culvert a little south of it; also, the Oparau punts have been repaired; and a few slips and fallen trees cleared away from road. The works were carried out under Mr. E. Fairburn's supervision.

*Te Mata to Kauroa.*—This, a much-needed deviation, was surveyed more than two years ago, but the construction of it was delayed by compensation difficulties. These have since been satisfactorily settled, and the formation just completed. The work done consists of 92 chains formation—principally side-cutting 16ft. to 18ft. wide—and 16ft. of bridging. Mr. W. P. Cogswell, under Mr. E. Fairburn's supervision, had charge.

*Coromandel to Thames.*—Mr. A. B. Wright, of this department, during last summer made an engineering-survey of about five miles of this road. The work on it has since been let in two contracts. The county is in charge.

*Puriri to Tairua.*—The work done during the season consists of 47 chains of precipitous rocky side-cutting 5ft. to 6ft. wide, and 38ft. (united spans) of open culverting. About half a mile of

further extension is required to make the work done useful as a means of communication between the range and the valley below, the point at which the work stops being inaccessible from the country above it at present. Mr. A. B. Wright has been in charge.

*Te Aroha Drains.*—Work done during the season has been 62 chains of new drains 4ft. deep, and of old drains 37 chains deepened 3ft. and 115 chains deepened 2ft. respectively. Mr. A. B. Wright has been in charge.

*Rotorua to Oxford.*—Since this road has been under the charge of the Survey Department the work has consisted in maintenance. Mr. J. C. Blythe, Road Surveyor, who has charge, reports the roadway is in fair order, and that a small quantity of grass seed has been sown.

*Rotorua to Waiotapu.*—Mr. J. C. Blythe, who has charge also of this road, reports that the work done on it since beginning of April has been the making of tracks in the Waiotapu Valley, and putting up a rough foot-bridge across the Waiotapu Stream.

*Tauranga to Taupo.*—This section of a hundred miles was taken over from the Public Works Department in the beginning of June, and is now in the charge of Mr. J. C. Blythe. The work consists of general maintenance. Two bridges over the Mangarewa and Otaupua Streams on the Tauranga-Rotorua portion are now under contract; the latter is almost completed.

*Taupo to Waimarino.*—At the beginning of the season a little further work in addition to that of last season was done on this road, under the supervision of Mr. J. Howard Jackson, consisting of 52 chains of dray-road constructed and 27ft. of bridging.

*Village-settlement Roads.*—Included under this heading are two roads not strictly village-settlement roads, but mentioned here because they have been constructed by the labour of village settlers:—

*Ahipara to Herekino.*—The work done during the season has been 110 chains of formation 16ft. wide, 78½ chains of re-forming and metalling, 37ft. (united span) of bridging, 31 chains of ditching, and 44½ chains of embankments. The road has also been improved in many places by rounding off several sharp points, hollow bends filled over, and culverts lengthened for the purpose of receiving such filling; what has been done will no doubt render the road fairly passable during the present winter: during last winter and even up to December following it was practically impassable. The work has been done chiefly by the Herekino village settlers.

*Herekino Village Settlement Roads.*—The work done is as follows: 102 chains formation, 6ft. wide, 12 chains widened from 6ft. to 12ft.; 65ft. span of bridging, 6½ chains of embankment, 3 chains of double-ditching with 3 chains of fascining, and 53 chains of forest cleared one chain wide.

*Takahue Village Settlement Roads.*—There have been constructed this season 49 chains of road 8ft. to 12ft. wide, 22ft. of bridging, and 16½ chains of embankment. Authority was also granted for the work of metalling portion of the main road between Takahue and Kaitaia; but nothing has been done, for the reason that when it was received the season was too far advanced to allow of beginning operations with prudence, especially as, before metalling, the road would have required a light re-formation, which kind of work should be entered upon not much after the beginning of the dry season. Mr. D'A. Grut is in charge of this road, as well as of the preceding two last-mentioned ones, under Mr. E. Fairburn's occasional supervision.

*Fern-flat Village Settlement Roads.*—Road-formation, 12ft. wide, 3 chains; 131½ chains widened 4ft. in the solid, 11 chains fascining, 20 chains of double-ditching, 2ft. of culverts, and 15 chains of track made. Mr. G. G. Menzies has had charge.

*Motukaraka Village Settlement Roads.*—Work done: 56 chains formation 6ft. wide, 171 chains formation widened from 6ft. to 14ft., 45 chains of track opened, 11ft. of bridging, 33ft. of temporary bridging, 33 chains of embankments, and 2 chains of fascining. A contract has been let for a horse-bridge over the Wairupe River of 240ft. span, with long approaches.

*Herd's Point, Takahue.*—There have been done 10 chains of formation widened from 6ft. to 14ft., one mile of road repaired, and five miles and a quarter of overgrowth and fallen timber cleared away from road. The above-named work includes repairs done on the Rakautapu-Kohukohu branch-road. The work has been done by village settlers.

*Punakitere Village Settlement Roads.*—Works constructed are—145½ chains formation, 6ft. to 14ft. wide, 81 chains of road widened, 376 chains of track opened, 18 chains of fascining, 39ft. of bridging, 69ft. of temporary bridging, one suspension foot-bridge of 100ft. span, and 23½ chains of embankments.

*Waimamaku Village Settlement Roads.*—Completed up to date: 112 chains road 6ft. wide, 67 chains of road widened, 123 chains of tracks opened, 28½ft. of bridging, 179ft. temporary bridging, one suspension foot-bridge of 100ft. span, besides 50ft. span of timber-approaches thereto, 24 chains of fascines, and 4 chains of embankment.

*Waimamaku to Pakanae.*—Works completed are—62 chains 6ft. wide, 11½ chains road widened, and 12ft. bridging. The work has been done by village settlers. This, together with the four last-mentioned roads (preceding), is under the charge of Mr. G. G. Menzies, with occasional supervision by Mr. E. Fairburn.

*Hukerenui Village Settlement Roads.*—Road-formation, 181 chains, 6ft. to 12ft. wide; 193ft. of bridging, 21 chains of embankment, and 50 chains of forest cleared one chain wide.

*Whananaki Village Settlement Roads.*—Works completed are—383 chains of road formed 5ft. to 9ft. wide, 312ft. of bridging, and 27 chains of embankment.

*Parua Village Settlement Roads.*—The works completed are—Road-formation, 235 chains, 6ft. to 9ft. wide, and 123ft. of bridging. Mr. A. M. Sheppard, under Mr. E. Fairburn's occasional supervision, is in charge of this together with the two next preceding-mentioned roads.

*Omaha Village Settlement Roads.*—During the season the work done has been 93 chains road formed 14ft. wide, 20 chains 6ft. wide, and 23ft. of bridging. Mr. A. H. Vickerman has had charge.

*Swanson Village Settlement Roads.*—The works completed during the season are—63 chains road widened from 6ft. to 10ft., 39 chains formation 16ft. wide, 18 chains formation 12ft. wide, and 7ft. of culvert. Mr. E. Fairburn has charge.

*Firewood Creek Village Settlement Roads.*—The works completed during the season are those already mentioned under the head of Waingaro to Akatea.

T. HUMPHRIES, Chief Surveyor.

SUMMARY of ROAD-WORKS executed in AUCKLAND for the Year ending 30th June, 1889.

Name of Road or Work, and Nature of Improvements.	Bridle-road.	Cart-road.		Graded in Addition.	Drains.	Bridges not included in Roads.	No. of Contracts in Force.	Area opened.
		Constructed.	Improved.					
	Miles.	Miles.	Miles.	Miles.	Miles.	Feet.		Acres.
Okaihau-Victoria .. ..	0.3	..	..	..	..	..	1	7,200
Wairua-Helena, widened from 6ft. to 9ft.	..	..	1.0	..	..	10	3	2,000
Paparoa-Waikiekie .. ..	1.6	..	..	3.4	..	..	..	1,200
Awaroa Swamp-Otama to Deed's, "claying" road, clearing drains	..	..	1.8	..	..	..	..	3,000
Waerenga .. ..	..	..	..	2.0	..	..	..	3,000
Waingaro-Akatea .. ..	..	..	6.2	..	..	..	1	6,000
Akatea-Papakauri .. ..	1.5	..	..	..	..	..	..	5,000
Whaingaroa-Waitetuna .. ..	..	1.5	..	..	..	14	..	3,000
Te Mata-Kauroa .. ..	..	1.2	..	..	..	..	..	1,000
Puriri-Tairua .. ..	0.6	..	..	..	..	..	..	10,000
Te Aroha Drains .. ..	..	..	..	..	1.7	..	..	600
Taupo-Waimarino .. ..	..	0.6	..	..	..	..	..	25,000
Ahipara-Herekino, re-forming and metal-ling	..	1.4	1.0	..	..	..	3	6,000
Herekino Roads, widened to 12ft.	1.3	..	0.2	..	..	..	..	10,000
Takahue Roads .. ..	..	0.6	..	..	..	22	..	5,000
Fern-flat Roads, widened to 12ft.	..	0.1	1.6	..	..	..	..	3,000
Motukaraka Roads, widened to 14ft.	0.6	..	2.1	..	..	..	4	3,000
Herd's Point-Takahue, widened to 14ft.	..	..	0.2	..	..	..	9	20,000
Punakitere Roads, widened to 14ft.	1.0	0.8	1.0	..	..	100	3	3,000
Waimamaku Roads, widened to 12ft.	1.4	..	0.8	..	..	150	3	4,000
Waimamaku-Pakanae, widened to 12ft.	0.8	..	0.2	..	..	..	14	5,000
Hukerenui Roads .. ..	1.3	1.0	..	..	..	77	1	3,000
Whananaki Roads .. ..	4.8	..	..	..	..	20	3	3,000
Parua Roads .. ..	3.0	..	..	..	..	33	..	1,500
Swanson Roads, widened to 10ft.	0.7	..	0.8	..	..	..	..	400
Totals .. ..	18.9	7.2	16.9	5.4	1.7	426	45	133,900

HAWKE'S BAY.

*Tologa to Mangatokerau.*—During the past year 123 chains of this road were felled 1 chain wide, burned, and grass-sown in the autumn, and a bridle-track cleared within the chain limit. Of solid rock-cutting 5½ chains were formed 7ft. wide, and 38 chains of 5ft. width were formed. This road gives access to a grazing-run of 5,000 acres, and will, if continued, connect the Tauwhareparae Block—a Harbour Board endowment of about 45,000 acres—with the shipping-place at Tologa Bay.

*Tologa to Arikihī.*—The formation of this road has been extended to a point about seventeen miles inland from Tologa Bay, for the purpose of giving access to the Arikihī runs, and connecting with the Ormond to Waiapu Road. There has been 170 chains formed by day-labour 5ft. wide, but, as it will be widened into a cart-track as time goes on, the bridges and culverts have been made wide enough for wheel traffic. In addition to the length formed, parts of the road already formed have been maintained and improved.

*Ormond to Waiapu.*—The Cook County Council was authorised to expend £150 out of the £300 voted for this road upon renewing culverts, maintenance, &c., the work to be approved by this department; and the balance of the vote is proposed to be spent upon continuing formation northwards as a bridle-track to junction with the Tologa to Arikihī Road. This extension will give access to several small grazing-runs, and render more accessible a considerable quantity of land lately opened for selection.

*Gisborne to Opotiki.*—Four men have been employed upon the road from Poutatu to Motu, and four from Motu to Opotiki, under Mr. Crapp, for the last six months maintaining and improving same, the improvement taking the form of widening for cart-traffic, draining, and clearing away overgrowth of vegetation, &c. In view of the large quantity of Crown land at Motu which it is proposed to prepare for settlement in the ensuing summer, and to which this road gives the only access, I hope to be provided with the means for widening the track for dray-traffic, from the Poututu end, at any rate, as far as the entrance to the main forest.

*Waipaoa River to Oil Springs.*—A sum of £650 was handed to the Cook County Council to expend upon this road, and the formation has been carried to the Oilspring. The Council has asked for a further grant to connect with the Ormond to Waiapu Road.

*Wairoa to Rotokakarangu.*—The Wairoa County Council was authorized to spend £200 on widening the bridle-track for wheel traffic, but the work has not yet been completed.

*North Makaretu (Makaroro Road).*—This road was laid out for the purpose of giving access to about 8,000 acres, which was opened for selection, and all taken up during last spring. It was cleared, burned, and sown with grass seed for four miles, a dray-track 16ft. wide stumped in the centre for the first two miles and a half, and a bridle-track opened for the remainder of the distance. This road with its branches will also give access to about 7,000 acres of forest reserve, which it is proposed to resume for settlement purposes.

*Wainui to Tahoraiti.*—Very little but maintenance has been done upon this road by the department during the past year, but two formation contracts are in progress, with liabilities of £559 11s. 6d.; and the local Road Board has been spending a certain amount of accrued land revenue upon formation where most required. A very large quantity of land has been selected in the neighbourhood of this road within the last twelve months, and about 20,000 acres still remains available. Three bridges are much required between Mangatoro Station and the Tautane Village Settlement, and these should be undertaken early in the summer. The Danevirke settlers have recognised the growing importance of this district by having arranged to bridge the Manawatu River, and to open a more direct road leading to Danevirke, thus avoiding the circuit by Tahoraiti.

*Expenditure for Year.*—The total expenditure upon all roads within the district out of road votes for the year ended the 30th June last was £2,314 9s. 1d. Since the first votes to open up Crown lands were taken in 1880 to the present time £35,420 8s. 4d. has been expended upon roads giving access to lands which have been or are being prepared for settlement.

*Land Revenue handed to Local Bodies for Expenditure on Road-works.*—The amount of land revenue handed over to local bodies for road-works for the year ended the 31st March last was £3,070 1s. 9d., which, carried to last year's total, gives £27,183 2s. 2d.

*Grand Total of Expenditure upon Roads from all Sources.*—If this £27,183 2s. 2d. already mentioned be added to the road votes, we arrive at a grand total of £62,603 10s. 6d.

Having lately reported separately upon the Napier to Taupo Road, a proposed alternative road *via* Rissington, Patoka, and Waipuna, and the Napier to Patea Road, it will probably be unnecessary to say more about these here.

G. W. WILLIAMS, Chief Surveyor.

SUMMARY of ROAD-WORKS executed in HAWKE'S BAY LAND DISTRICT for the Year ending 30th June, 1889.

Name of Work or Road.	Cart-road.	Bridle-road.	Graded in Addition.	Bridges not included in Roads.	Contracts in force.	Area opened.
	Miles.	Miles.				Acres.
Tologa—Mangatokerau ... ..	...	2.08	...	...	...	5,000
Tologa—Arikihi ... ..	...	2.12	...	...	...	20,300
Gisborne—Opotiki ... ..	2.57	...	...	...	...	100,000
Waipaoa River—Oil Springs ... ..	4.0	...	...	...	...	...
Wairoa—Rotokakarangu ... ..	1.12	...	...	...	...	16,700
North Makaretu (Makaroro Road)	2.5	1.5	...	...	...	7,000
Wainui—Tahoraiti ... ..	...	...	...	...	2	...
Totals ... ..	10.19	5.70	...	...	2	149,000

TARANAKI.

*Pukearuhe to Mokau Road.*—This work is not specially for the purpose of opening-up Crown lands, but to keep open and improve the road connecting New Plymouth and Mokau. The expenditure includes the wages of the surface-man for three months, also that of an assistant in renewing a number of small bridges which had broken down. It also includes the piercing and timbering of the Parininihi Tunnel, in length about 5 chains. This tunnel was commenced in 1859, and a portion was pierced from each end, but the work was badly done and had, in large measure, to be done over again. As the roof began to shale off when the air passed through, the tunnel had to be secured by timbering with heavy puriri beams. It is now quite secure, and takes all the horse and cattle traffic along that part of the coast. The tunnel is of an average height of 12ft. by a width of 8ft., and was bored through papa rock.

*Roads through the Rimutauteka Block, near Inglewood.*—Opens up about three thousand acres of Crown lands in Block I., Huiroa, and Block XIII., Waitara. The work included the felling of about five miles of the Lincoln, York, and Everett Roads, the roads being felled 1 chain wide, and a cartway cleared and stumped in the centre of a width of 12ft.

*Roads East of Waitara to Ngatimaru.*—To give access to about 13,000 acres of Crown lands east of Tarata. The work consisted of culverting, grading, and forming about 4 miles 50 chains of the Junction Road, between the Village of Tarata and the Mataro Road, giving access to Crown lands and settled lands in Blocks III. and IV., Huiroa District, and Block XVI., Waitara District. A portion of the work was done by the "unemployed," in small contracts at current rates. The above expenditure also includes the felling 1 chain wide, and the clearing and stumping a cartway 15ft. wide in centre of road, of seven miles of Junction Road, from Mataro Road to Purangi. This work opens up the Junction Road to a point about twenty-three miles east from

Inglewood, and to within about seven or eight miles of where the proposed railway or main road from Stratford to Auckland will pass. About two miles and a half of the Junction Road between Tariki Road and Tarata has also been widened and improved. This is where the road passes over the watershed of the Waitara, and is generally known as the Zigzag.

*Waitara Bridge.*—This work was commenced in March, 1888; but, in consequence of the wet season and bad roads, little was done up to the 30th June beyond getting the plant and part of the material on to the ground. The bridge is 161ft. in length, in three spans, the centre span being 100ft. and one of the end spans 40ft. The west main pier rests on solid papa rock, the east main pier on a double row of piles (14) driven 21ft. 6in. into the bed of the river. The bridge was completed in January last, in a very satisfactory manner, and, being built of carefully-selected totara and mairi, will need but little attention for many years. The total cost of bridge and approaches was £1,020 15s. 3d.

*Junction Road, Graveling, &c.*—The metalling of the Junction Road, Inglewood to Tarata, being beyond the means of the local body, a grant of £500 was made by Government to assist in the work. Accordingly, about two miles of the worst part of the road, from Durham Road to Kaimata Road, and which had worked into deep pits, &c., was re-formed, and about 60 chains of graveling done. This will materially assist towards keeping the road open this winter, and enable the settlers in Ngatimaru to travel to and from Inglewood. More graveling would have been done but that suitable material was not obtainable without the service of a stone-crusher. The work benefits the unsold Crown lands in the Ngatimaru District.

*Eltham Road.*—Includes the culverting, grading, and formation of three miles and a half of the Eltham Road between Ponehu Village Settlement and Auroa Road, completing the formation of Eltham Road from Opunake to Auroa Road; also the erection of cart-bridges over the Ouri and the Kaipokonui Streams. The former bridge is in Block IX., Opunake, is 74ft. in length, and was erected at a cost, including approaches, of £165 15s. The Kaipokonui bridge, in Block XI., Kaipokonui, is 71ft. 6in. in length (main span being 55ft.), is built on concrete piers, and of heartwood of totara and mairi. The total cost, without approaches, was £295. Approaches are now being made, at a cost of £23 15s. The expenditure under this item also includes the felling of 18 acres of Kaponga Village, at the junction of Manaia and Eltham Roads, at a cost of £35 11s.

*Arawhata Road.*—Of this road, 65 chains was felled 1 chain wide, and cartway cleared and stumped 12ft. wide, to give access to Native lands leased by the Public Trustee.

*Roads Inland of Mokoia.*—Benefits about 7,500 acres of Crown lands in the Ngaere and Hawera Survey Districts. Nearly nine miles and a half of the Rotokare, Mangawhero, Meremere, Rimupoto, and Allen Roads in Blocks XV., Ngaere, and VII. and VIII., Hawera, have been felled 1 chain wide, and a cartway cleared and stumped in the centre 12ft. wide. These roads give access to lands now being cleared and settled upon.

The total cost of road-work for the year, including supervision, was £3,423 15s. 7d., and the work was let in fifty-nine contracts, all but two of which are completed.

The works of most urgent importance required during the coming year are: The improvement of the road Pukearuhe to Mokau, on which the traffic is rapidly increasing consequent on the establishment of flax-mills and land-settlement; the formation of the Junction Road from Mataro Road to Purangi (lately felled), to give access to 8,500 acres of lands in the Ngatimaru District now open for sale; the metalling of a portion of the Junction Road, Inglewood to Tarata, to give winter access to the Ngatimaru District (As this road will be one of the principal branches of the main trunk road to Auckland, the metalling of the worst portions, if not the whole of it, becomes a matter of urgent necessity); the felling of about twenty-five miles of bush roads running through lands recently sold in the Ngaere and Hawera Districts, and which are inaccessible until this is done; and the necessary roading through blocks of land now being sectionally surveyed.

G. F. ROBINSON, Crown Lands Ranger.

SUMMARY of ROAD-WORKS executed in TARANAKI DISTRICT, 1888-89.

Name of Road or Work.	Cart-road Formation.	Felling and Stumping only.	Bridges not included in Roads.	Contracts in force.	Area of Land opened.
	Miles.	Miles.	Feet.		Acres.
Pukearuhe to Mokau, including piercing and timbering Parininihi Tunnel, 5 chains, repairs to bridges, and surfacing ...	14.0	...	...	...	...
Lincoln, York, and Everett ...	...	5.0	...	...	3,000
East of Waitara (Ngatimaru) ...	6.5	7.0	...	...	13,000
Waitara bridge and approaches	...	...	161.0	...	...
Junction Road—re-forming ...	2.0	...	...	...	...
graveling ...	0.75	...	...	...	...
Eltham ...	3.5	...	71.5	...	...
Arawhata Road ...	...	0.8	...	...	...
Inland of Mokoia ...	...	9.5	...	...	7,500
Kaponga Village—Clearing ...	...	18 acres	...	...	...
	12.75	22.3	232.5	...	23,500

## WELLINGTON.

The road-works executed in the Wellington Land District during the year 1888-89 were scattered over such a large area, and the funds were so limited, that there was no opportunity of carrying out extensive and permanent works. Such, however, as were executed consisted mainly of the preliminary work of clearing and track-formation to make Crown lands accessible. In some instances these works were of much benefit to settlers whose properties lay along the routes. Taking the various lines in geographical order, the following is a summary of the operations:—

*Ohakune to Pipiriki.*—This road was taken over from the Public Works Department on the 1st April last, and it has since been partly maintained by a small day-party.

*Wairoa to Omahini.*—The Crown lands inland of Momahaki, at the back of Richardson, were partly opened by the felling, stumping, and clearing of the lines branching from the Ngutuera Valley. There were 5 miles 73 chains, comprised in three contracts, felled 66ft. in width and stumped 16ft. in centre. A gang was put on the Ngutuera Valley Road, with the result that it was made temporarily passable for the survey parties, by erecting eight temporary bridges and by forming about a mile and a half of the road. About 12,000 acres of Crown lands were benefited by the work done.

*Tokomaru Road.*—The Government subsidised the Waitotara County Council with £90 9s., being half the cost of extending the West Tokomaru Road to Mowhero. The length of the extension is 1 mile 51 chains, which was formed 12ft. wide and metalled 6in. deep for 26 chains. The expenditure served to make the Puketotara Crown lands, comprising 5,178 acres, more accessible.

*Wanganui to Murimotu Road (Field's).*—Two contracts were let for felling 66ft. wide and stumping 16ft. wide the bush at the Murimotu end, and three miles were completed. A day-party was kept on the road, who cleared and stumped 66ft. and 16ft. wide respectively along a length of 4 miles 62 chains, formed 70 chains 4ft. wide, built 14 bridges and 207 culverts, and maintained the whole length between Mason's and Murimotu. The expenditure was justified by the fact that this road is an important main road, and that it opens the way to the Waimarino and other Crown-land blocks, comprising about 400,000 acres.

*Wanganui to Murimotu Road (Hales's).*—This, the original horse-road to the interior, was formed 6ft. wide for 73 chains and maintained and improved generally by day-labour, and by the Upper Wangaehu Road Board the same width for a length of 1 mile 55½ chains was constructed through Addenbrooke's, the Government finding half the cost—£57 3s. The Crown lands benefited aggregated to about 25,000 acres.

*Marton to Murimotu via Hautapu.*—This road was taken over from the Public Works Department on the 1st April. Arrangements have been made to put on a party to improve and maintain the line, which follows about the best route to the interior along the main trunk railway-line.

*Otamakapua to Waitapu.*—Mr. Charles Field and his party completed 4 miles 24 chains of the Mangatutu Road, felling it 66ft. wide, stumping and clearing 25ft. wide, and forming 2 miles 55 chains 6ft. wide. They also did the same class of work on the Rangitikei Valley Road, the length of bush work being 4 miles 44 chains, and the formation 45 chains. The Waituna Valley Road was felled and cleared for 33 chains. All three lines were partly maintained, burned off, and sown with grass seed. The pack-track was made along the Tapuae-Mangapipi Spur, length 8 miles 59 chains. The Crown lands benefited comprise about 10,000 acres.

*Oroua to Apiti Road.*—The Kiwitea Road Board have been intrusted with a sum not to exceed £150 to fell, clear, and form a road from the Oroua River into the Feilding Special Settlement Block.

*Manawatu Gorge Road.*—This road was taken over from the Public Works Department on the 1st April, and it has since been maintained. Renewals of platforms and portions of bridges are now in hand, at an estimated cost of £200: and if funds were available a much larger sum is needed to place the road in proper order, as it requires remetalling very extensively.

*Pahiatua to Mangahao Road.*—Of this road 11 chains in the Pahiatua Township was formed and metalled by the Pahiatua Town Board, the Government finding £35 of the cost.

*Tiraumea to Makuri Roads.*—Six contracts were let, covering 11 miles 55 chains of these roads, which were felled 66ft. wide, and stumped and cleared 20ft. wide. A day-party has been employed making two miles of the Tiraumea Road passable for horses, commencing at the Tiraumea River. They have felled, stumped, and cleared 5 chains, formed the road where necessary 6ft. wide (12ft. at the river crossing), and erected two temporary bridges, one being 30ft. in length. The work was done under Mr. J. D. Clinie's supervision. These works opened the central Mangaone Crown lands, comprising some 20,000 acres, and the works should be continued on the extension up the Makuri, as this line not only serves a large area of Crown lands, but forms an important cross road between the East Coast and Forty-mile Bush.

*Mangaone-Tiraumea Roads.*—Five contracts, covering 10 miles 8½ chains, were let and completed for the felling 1 chain wide, stumping and clearing 33ft. wide. A day-party was put on, and they made a pack-track along the Tiraumea Road 50 chains in length and built twenty-four temporary bridges 10ft. to 37ft. spans. The roads were all burnt off and grass-sown. The Mangaone-Tiraumea Block and Crown lands to the eastward, comprising 15,000 acres, were benefited by the works. Mr. R. P. Greville had principal charge of the works.

The following works were executed under Mr. R. H. Reaney's supervision:—

*Bridge Road.*—This line runs westward from the Makakahi Bridge to open the Woodville-Mangatainoka Special Settlement. One contract of 1 mile 11½ chains was let and completed for felling and stumping 66ft. and 20ft. wide respectively, at a cost of £77 16s., and another contract of 1 mile 60½ chains of similar work is in progress, the amount being £77 2s. 3d.: to which has to be added £11 12s. for cost of advertising contracts, &c.

*Pukemiku Road.*—One contract of 73½ chains of road and railway-line was let, the work being felling 4 chains wide, and stumping 33ft. wide. The work was completed at a cost of £106 13s. 6d., including burning-off and grass-sowing. This was done for the village settlers in West Pahiatua.

*Pahiatua Rock Road.*—On this line 1 mile 46¾ chains were felled 66ft. wide, stumped and cleared 20ft. wide, and formed 6ft. wide, and two bridges of 20ft. and 25ft. were erected by contract, at a cost of £299 6s. 5d. Another bridge, 20ft. span, was erected on the same road by the Pahiatua Road Board, at a cost to the Crown of £20. This affected, to a certain extent, the unsold Crown lands in the Mangaone Valley.

*Tutaekara Road.*—The work on this road, which was done by contract, comprised 1 mile 35 chains of felling 66ft. stumping and clearing 33ft. wide. This road was started to benefit the Special Settlements of Masterton, Hawera, and Woodville-Mangahao, and the Crown lands adjacent to those blocks.

*Makakahi Road.*—By contract and day-labour 1 mile 31 chains of this road were formed 6ft. wide, and generally improved and culverted. The work was undertaken to give settlers access to a very inaccessible locality.

*Dreyer's Rock Road.*—Under Mr. Crombie's supervision, Barron's party, by day-labour, formed 1 mile 56 chains 6ft. wide, bringing the road to a junction with Barton's Wangaehu Valley Road, and facilitating the sale of some 35,000 acres of Crown lands.

*Mangamahoe Road.*—This road was felled 66ft., stumped and cleared 16ft. for 7 miles 4 chains, and formed 6ft. wide 3 miles 1½ chains by Barron's party, under Mr. Crombie, Mr. Ll. Smith, and latterly under Mr. Reaney; 400ft. of bridges were also erected. The expenditure benefited about 6,000 acres of Crown lands.

*Mount Bruce Road.*—One contract for 2 miles 29 chains of felling 66ft. and stumping and clearing 33ft. was completed, and another for a distance of 1 mile 60 chains was partly completed. This opened the Mount Bruce Block, an area of 5,000 acres. Mr. Lowe and Mr. Ll. Smith were in charge.

*Horowhenua Road.*—Three contracts, comprising 3 miles 35 chains of felling, 1¼ and 1½ chains wide in parts, and stumping and clearing 33ft. wide in centre, were carried out under Mr. Ashcroft. This expenditure benefited and aided the sale of some 3,000 acres.

A variety of miscellaneous works, surveys, and compensation-claims, supervision of works, &c., involved an expenditure of £382 9s. 8d., incurred mainly by Mr. Reaney, who is in charge of the Gorge and generally of the Forty-mile Bush road-works, except those under Mr. Climie. I have already had the honour of submitting for your consideration detailed proposals and estimates for proposed works to open up and make accessible the Crown lands in this district, to which I beg to refer you, in the hope that substantial provision may be made for the current year.

J. W. A. MARCHANT, Chief Surveyor.

SUMMARY of ROAD-WORKS executed in WELLINGTON DISTRICT, 1888-89.

Name of Road or Work.	Felled, stumped, and cleared in Centre.	Bridle-road.	Cart-road.	Bridges not included in Roads.	Bridges outside of Road-works.	Contracts in force.	Area opened.
	Miles.	Miles.	Miles.				Acres.
Wairoa-Omahini .. ..	5.91	1.50*	..	8†	..	..	12,000
Tokomaru Road .. ..	..	..	1.63	..	..	..	5,178
Field's Road .. ..	7.77	0.87	..	14†	..	..	400,000
Hales's Road .. ..	..	2.60	..	..	..	..	25,000
Otamakapua-Waitapu ..	9.26	3.25	..	..	..	..	10,000
Pahiatua-Mangahao Road ..	..	8.73†	0.13	..	..	..	..
Tiraumea-Makuri .. ..	11.70	2.0	..	2†	..	..	20,000
Mangaone-Tiraumea .. ..	10.10	0.62	..	24†	..	1	15,000
Bridge Road .. ..	1.13	..	..	..	..	1	..
Pukemiku Road .. ..	0.92	..	..	..	..	..	..
Pahiatua Rock Road .. ..	..	1.58	..	2	20ft.	..	..
Tutaekara Road .. ..	1.43	..	..	..	..	..	..
Makakahi Road .. ..	..	1.40	..	..	..	..	..
Dreyer's Rock Road .. ..	..	1.70	..	..	..	..	35,000
Mangamahoe Road .. ..	7.05	3.01	..	400ft.	..	..	6,000
Mount Bruce Road .. ..	2.36	..	..	..	..	..	5,000
Horowhenua Road .. ..	3.43	..	..	..	..	..	3,000
Totals .. ..	61.06	27.26	1.76	..	20	2	536,178

\* Rough pack-track, formation only.

† Temporary.

‡ Temporary pack-track, formation on ridge and spur.

NELSON.

*Nelson to Westport.*—That portion of the main road from Nelson to Westport situate in the Hope Valley has been maintained during the past three months. Two men with horse and dray are employed in renewing culverts and removing slips. A bridge over the Hope River will be advertised for contract shortly.

*Belgrove to Tophouse.*—Four men are employed maintaining this road. Mr. G. Fitzgerald, Assistant Engineer, has had charge of these works.



## MARLBOROUGH.

*Rai Valley to Blenheim.*—A contract was let for the construction of four miles and three-quarters of road between Kaituna and Tuamarina, the work on which is now making fair progress. About a mile and a quarter has been finished, and fifty-seven men are employed upon it. It was arranged to place the Nelson "unemployed" on gravelling the Rai Valley formation, but, out of twenty-seven names on the Mayor's list, only four turned up at the work, and two of these left after a very short visit to the road.

*Cable Bay Road.*—This road was maintained up to the 30th ultimo, but the men have now been discharged, and the work will devolve on the local authority.

Mr. G. Fitzgerald, Assistant Engineer, has had charge of these roads.

## WESTLAND.

*Pounamu to Teremakau* (Vote, £200).—Length nearly four and a half miles, making accessible about 1,200 acres of good agricultural land. A mile and a half was completed in the year 1887–88, and there is at present a contract for the construction of another mile (section 4) in progress—clearing 33ft., formation 8ft., and metal 5ft. The contract price is £162 1s. The road for the greater part is taken along the line of an old horse-track, and hence the very low cost for construction.

*Cook's River Flat* (Vote, £1,300).—Length eight miles, traversing a block of 4,000 acres of very good land, and making accessible about 5,000 acres of second-class agricultural land. A contract for the construction of 5 miles 13 chains of this road was let in February last, and about two miles of the road are already finished. The contract price is £906 18s.: clearing 33ft., formation 7ft., and metal 4ft. wide. The two and three-quarter miles of this road not under contract yet pass over easy country, and the cost of construction will be fully covered by the balance from vote of £1,300.

*Mahitahi to Paringa Road* (Vote, £1,600).—Length six miles, making accessible about 5,000 acres of good settlement lands. Four miles and a half of this road were constructed during 1887–88, and the remainder was finished this year. Mahitahi to Paringa forms part of the Main South Road, and its construction consisted of clearing 33ft., formation 7ft., and metal 4ft. The contract for the six miles amounted to £1,574 11s.

In addition to the above constructions the department had under supervision a number of gold-fields tracks, subsidised by the Government, and the construction of Cedar Creek Road, eight miles in length, which will be completed next month. The latter is a dray-road (12ft. formation and 10ft. metal) made, primarily, to give access to the Cedar Creek reefs, but it is also opening several good blocks of land along the banks of the Totara River.

GERHARD MUELLER, Chief Surveyor.

## CANTERBURY.

## MAIN ROADS.

*Christchurch to Hokitika.*—The road from Springfield to Bealey has been maintained since the 1st April, and a small party of five men have been engaged in some diversions in the Bealey Valley.

*Kaikoura to Clarence.*—This road is now finished to within about four miles and a half of the Clarence Bridge. It has been constructed entirely by the "unemployed," of whom fifteen men have been engaged on it since the 1st April.

*Lake Ellesmere Drainage and Reclamation.*—The contract for a new channel for the Halswell River and embankments, to retain the overflow of the lake, and other works in connection therewith, was completed on the 28th June. The total cost of the works, including liabilities, is £5,702, and 5,807 acres of the land rendered fit for occupation thereby have been surveyed for sale. All the above works have been carried out under the direction of Mr. F. Withers, Assistant Engineer.

## ROADS TO OPEN UP CROWN LANDS.

No new road-work has been started in Canterbury, the expenditure having been limited to some small balances previously authorised to be expended on the roads which I fully enumerated in my report last year, with the exception of the Mount Cook Road.

*Kuku Pass Road.*—A contract was let by the Ashley Road Board for £193 to make cuttings into and out of creeks, side-cuttings, drains, and fords between Mr. Milton's sheep-yards in Lee's Valley and the east bank of the River Ashley. This work included clearing several large slips which had occurred in some of the larger cuttings near the Kuku Pass and rendered the road impassable. The road is now reported to be open, and to make a good summer road from White Rock Station over the Kuku Pass and Okuku and Lee's Saddles down to the River Ashley. Other work has prevented me from finally passing this road, and I cannot now do so till next spring.

*Glentui Forest Road.*—Contracts were let by the Ashley Road Board for £59 18s. 9d. for additional metal to be put on the road and sundry small alterations between the edge of the bush and the saw-mill, and another for £77 8s. to widen the road beyond the saw-mill, remove slips, make a ford across a large creek, and a further cutting to get up the terrace on the other side of it, as noted in my report on this road last year. This work is completed, and I propose visiting and passing it shortly.

*Road to Mount Cook and to Glaciers.*—The sum of £430 was authorised to be spent on making a new piece of road a little over a mile in length. The work was undertaken by the Mackenzie County Council by day-labour, and has cost, according to their returns, £522 12s., of which sum they ask for £500 from the Government. Mr. Brodrick reports that the work is thoroughly well done, and that the cuttings entailed more blasting than was anticipated when the specifications were prepared, owing to a great many large isolated rocks of a very hard blue granite being found beneath the surface. The road is made where a nasty place had been washed out by a flood in the Tasman River, and the piece of road now formed takes the track out of the river-bed, and is a very great improvement on the old road. The road was carefully graded and laid out by Mr. Brodrick, the District Surveyor, the specifications being prepared by Mr. Wither, the District Engineer, and the work was carried out under the immediate supervision of Mr. O'Connor, who spared no pains to get the specifications properly carried out.

*Ohaui Bridge.*—This work is being undertaken by the Waitaki County Council, plans of it having, as I understand, been prepared and approved.

*Roads in Reserve 1263 (Village Settlement, Pig-hunting Creek).*—The sum of £82 13s. 4d., referred to in my report last year, has been paid this year, and a further sum of £50, the expenditure of which was authorised, has been spent in making a new piece of road across a gully. I have not yet inspected this work.

JOHN H. BAKER, Chief Surveyor.

SUMMARY of ROAD-WORKS executed in the CANTERBURY DISTRICT for the Twelve Months ending the 30th June, 1889.

Name of Road.	Cart-road.	Bridle-road.	Graded in Addition.	Bridges not included in Roads.	Contracts in force.	Area open.	Remarks.
	Miles.	Miles.	Miles.		No.	Acres.	
Kuku Pass Road ...	5.5	...	...	...	1	75,000	Pastoral country.
Glentui Forest Road	1	...	...	...	1	1,000	Bush land.
Mount Cook Road	1	...	...	...	...	...	Road to Mount Cook
Ohaui Bridge ...	...	...	6.9	...	...	...	Glacier.
Reserve 1263 Roads	0.75	...	...	...	...	160	Village settlement.
Totals ...	8.25	...	6.9	...	2	76,160	

OTAGO.

In addition to the tabulated statement which I forward herewith, I will make a few remarks on some of the works executed. On the track from Milford Sound to the Sutherland Falls three huts have been erected, and two huts have been put up on the track from Te Anau Lake. These, with the beech hut erected last year, will provide shelter for a limited number of tourists, and will obviate the necessity for carrying tents. Both tracks have been improved during the past season, but there is still a good deal to be done to them before they can be available to any but hardy tourists.

The original track explored by Mr. Strauchon through the Tautuku Bush extended from Waikawa to Catlin's River. In locating the permanent line it has been found desirable to take the road up the Taukupu Valley, and this road will eventually connect with the road down the Mokoreta Valley to Wyndham. The road in Block VIII., Glenomaru District, was begun by the Clutha County Council, but the lessee of section No. 37 would not allow the Council to go through his ground. I have since arranged matters with him, and have formed the road and put in the culverts by "unemployed" labour.

C. W. ADAMS, Chief Surveyor.

PARTICULARS of ROAD-IMPROVEMENTS, &c., to open up CROWN LANDS in OTAGO during the Year ending the 30th June, 1889.

Name of Road.	County.	District, Block, and Section.	Length.		Nature of Improvements.
			m.	ch.	
Track to Sutherland Falls from Milford Sound	Lake ..	..	5	8	Clearing, formation, improvement, &c.; also building three huts
Track to Sutherland Falls from Lake Te Anau	Lake ..	..	15	0	Clearing, formation, improvement, &c.; also building two huts <sup>1</sup>
Deepdell Run, up Horse Flat	Maniototo	Gimmerburn, XI., through 2 ..	0	15	Formation and culvert <sup>2</sup>
	Maniototo	Maniototo, south of 10, III., and 4, IV. (Rock and Pillar, from 9 and south of 2 and 4, VII.)	1	16	Formation and gravelling <sup>3</sup>
Road to open up VIII. and XVII., Glenkenich	Waihemo	Glenkenich, east of 4 and 5, XVII., and part of Derby Street, Tapanui, also north of 3 to 6, XVII.	3	0	Formation and culverts <sup>4</sup>
	Waihemo		1	0	Now under contract <sup>5</sup>
Taieri Mouth Special Village Settlement	Bruce ..	Clarendon, VI. and XI. <sup>7</sup> ..	..	..	..
Glenomaru-Owhake Road	Clutha ..	Glenomaru, VII., west of 31 and part 30	0	20	Metal <sup>8</sup>
Catlin's-Taupuku Road..	Clutha ..	Glenomaru, VIII., through 34, 17, and 41	0	47	Formation and 5 chains metalled <sup>8</sup>
	Clutha ..	Glenomaru, VIII., through 50 and 37	0	44	Acquiring land, bush-clearing, and fencing <sup>8</sup>
	Clutha ..	Glenomaru, VIII., north-east shore Catlin's Lake <sup>9</sup>	..	..	..
Total .. ..			28	05	..

<sup>1</sup> Not completed (liability). <sup>2</sup> Opens 1,800 acres small grazing-runs. <sup>3</sup> Opens 1,300 acres surveyed land. <sup>4</sup> Opens 11,170 acres surveyed land. <sup>5</sup> Not completed. <sup>6</sup> Opens 317 acres unsold land, and opens 226 acres recently sold. <sup>7</sup> Opens 1,085 acres village special settlement sold. <sup>8</sup> Land all disposed of. <sup>9</sup> Being done by "unemployed."

### SOUTHLAND.

*Road, Mossburn to Manipori.*—Work spread over twenty-five miles; acreage rendered more accessible, 5,000 acres. The portion of this road upon which money has been spent is, first, in what is called the Centre Hill Gorge (extending from near Centre Hill Station to the Mararoa Valley); and, second, on that part of road from the Mararoa River to Lake Te Anau. The work consists of 62½ chains of side-drains and forming, of 13 chains of side-cutting, of 162 chains of gravelling, of 6 chains of creek-diversion, of 240 chains of stone-clearing, also of bridge 41ft. long, and of three culverts, &c. The improvement of this road will, I have no doubt, materially add to the tourist traffic from Lumsden to Lakes Te Anau and Manipori, and will also help to open up lands in the Whitestone Valley; the latter, however, being School Commissioners' land. The Manipori and Te Anau Lakes have great natural attractions, and in time, when they become better known, they will doubtless be largely sought out by tourists. The land rendered more accessible is probably too remote from market at present to make cultivation profitable, but the improvement of the road will no doubt help to induce settlement.

*Blackmount to Deferred-payment Land.*—Mileage formed, half a mile; acreage rendered more accessible, 4,000 acres. The work done on this road during the past year consists of, up to date, 45 chains formation, fifty-four catchment-drains, and providing and laying 2 chains of stoneware pipes. The work begins at what is called the Blackmount Saddle, at the end of the formation done last year, and consists of side-cutting leading down from the saddle to the Redcliffe Creek. There are natural difficulties in the way of having good grades here, and, notwithstanding the care of the Wallace County engineer, who supervised the work, the road at this part is hardly so good as might be wished. The work may, however, still be regarded as in progress. As reported during previous year, the road, though not much used meanwhile, will probably become an important one ultimately.

*Waikaka Siding to Waikaka Town.*—Mileage formed, &c., two miles and a quarter; acreage rendered more accessible, 5,000 acres. This work consists of 174 chains forming and 148 chains gravelling. It is part of the main road up the Waikaka Valley from Waikaka Railway siding, near Gore. The road is an important one to present settlers in this locality.

*Appleby to Tisbury.*—Mileage formed, &c., a mile and a half; acreage rendered more accessible, 1,000 acres. This work consists of formation, ditching, bush-work, and corduroying. The road in question extends along the south side of the Seaward Bush Railway, from near Appleby to Tisbury Station. The road was originally all bush-clad, and some of the ground was low-lying and wet. The occupants of the village-settlement sections living opposite the respective portions of the road undertook to execute the work for half the estimated cost, and I am glad to report that the settlers as a whole stuck to their work and did it well. The road between the points mentioned is now nearly completed, and will be of great service not only to the present settlers living opposite, but to future settlers who may locate themselves on Crown lands around Tisbury Siding.

*Seaward Forest to Deferred-payment Block.*—Mileage formed, &c., a mile and a half; acreage rendered more accessible, 5,000 acres. The work consists of 100 cubic yards gravelling, 59 chains ditching, forming, and fascining, and eight culverts. The road in question is an extension to the ocean beach of the due south road running through Seaward Forest at Oteramika Bight. Several sections have been taken up alongside the extension. The land is not of first-class quality in this neighbourhood, but there is a large extent of it, and for this reason, as well as for the sake of having direct communication between the settled parts of Southland and the seaboard, the road is well deserving of having attention paid to it. Prior to the road being pushed through the Seaward Forest, the "Seaward Moss" lay unoccupied and almost unknown. The wedge of settlement has now secured an entrance, and I have no fear of the country, inferior as it is, gradually opening before it.

*Wyndham via Mimihau to Otararaia.*—This work consists of a bridge over the Mimihau, 40ft. span; also of approaches, and of 30 chains formation. The bridge is a much-needed work in the chain of communication from Wyndham to Otararaia.

*Tracks, Stewart Island.*—Mileage cut, fifteen miles, approximately; acreage rendered more accessible, say, 20,000 acres. The work done consists of a track cut from the open country at the head of Paterson Inlet south-westward to Port Pegasus. For some ten miles or so south of the open country referred to the bush and scrub were almost impenetrable. This has been pierced by a track, having log bridges at several places. The open country between the scrubby belt and Pegasus has been staked out with guide-poles—an essential matter to passengers in a country like Stewart Island, where the watershed wriggles deceptively about and where fogs frequently descend to mislead the wayfarer. A track has also been cut from Port Pegasus to the top of the Remarkable Ridge, and a branch track has been cut from the main track nearly midway between Table Hill and the open country above mentioned, leading down to the head of the south-west arm. As communication by sea is sometimes risky for small vessels, the utility of the tracks mentioned is very great indeed. A shelter-hut has, I may add, been erected near Table Hill for the benefit of swagsmen. Under favourable circumstances a passenger can now go from Pegasus overland to the head of the south-west arm and thence to Half-moon Bay in a day.

JOHN SPENCE, Chief Surveyor.

SUMMARY of ROAD-WORKS executed in SOUTHLAND for the Year ending 30th June, 1889.

Name of Road or Work.	Cart-road.	Bridle-road.	Bridges not included in Roads.	Contracts in force.	Area opened.
	Miles.	Miles.	Feet.		Acres.
Mossburn to Manapouri ...	6·0	...	41	...	5,000
Blackmount to deferred-payment land ...	1·5	...	...	...	4,000
Waikaka Siding to Waikaka Town ...	2·25	...	...	...	5,000
Appleby to Tisbury ...	1·5	...	...	1	1,000
Seaward Forest to deferred-payment land ...	1·5	...	...	1	5,000
Wyndham via Mimihau to Otararaia ...	...	...	40	...	...
Tracks, Stewart Island ...	...	15·0	...	...	20,000
Totals ...	12·75	15·0	81	2	40,000

## APPENDIX No. 3.

## RECONNAISSANCE SURVEYS OF ROADS BETWEEN TARANAKI AND THE NORTH ISLAND MAIN TRUNK RAILWAY.

The following report by District Surveyor Skeet describes the three most available routes by which a road-connection may be made between the railway-systems of Taranaki and Auckland:—

## STRATFORD LINE.

*Stratford to Confiscation Line.*—The first seven miles from Stratford to the confiscation line is through a settled district, along a partly-formed and -felled road that requires new culverts and the formation generally to be put in order, at a cost of £860.

*Confiscation Line to Mangaotuku.*—From the confiscation line to the Mangaotuku, nine miles. The line follows up Toko some four miles, then over a low ridge to Makuri, and over another ridge to Mangaotuku—both crossed with easy grades; earthwork moderate; three short bridges of 40ft. spans; culverts, and bush-felling make the cost come to £4,575 10s.

*Mangaotuku to Junction with Inglewood Line.*—The next section, thirteen miles, to the junction with the Inglewood line on the Makahu Stream. For ten miles it follows up the Mangaotuku Valley, over easy country for road-making. The line keeps to the foot of the hills, the grade being almost flat. The upper part of the valley is narrow and swampy. An easy grade over a low ridge, 240ft. above stream, brings the line to the junction on the Makahu, a distance from Stratford of twenty-nine miles. The lower part of Mangaotuku is through clearings for two miles. Cost of section (formation, culverts, clearing), £4,525.

*Makahu to Wangamomona.*—From the junction the road-line follows down the Makahu Stream to the Pohukura Stream: two miles and a half of easy formation; two small bridges. From Pohukura to Wangamomona, five miles, a ridge of 380ft. above streams has to be crossed, where the cost will be considerable on account of troublesome cross spurs: good grades can be laid off. Cost of section (seven miles and a half earthwork, culverts, bush-felling, bridges, &c.), £4,019.

*Wangamomona Valley.*—The next length is up to the head of the Wangamomona Valley to the foot of the ridge, seven miles long, over country that is a mixture of swampy patches, and side-cuttings, scrub, light and heavy bush. The road following the flow of the stream, it is comparatively flat, work moderately expensive: earthwork, five bridges, culverts, and clearing make the cost come up to £2,480.

*Wangamomona to Tahoraparoa.*—From Wangamomona to Tahoraparoa, four miles. An up-grade to summit of ridge, then along a lumpy ridge to avoid the head-waters of a branch of Waitara and Witianga. The road will require heavy cuttings to avoid the peaks, a down-grade to Tahoraparoa. Cost of earthwork, culverts, and clearing, £2,565.

*Tahoraparoa to Mangapapa.*—Tahoraparoa to Waingarara, Waingarara, and up Tangarakau to Mangapapa, where the line joins from Mimi, a distance from Stratford of fifty-five miles. Length of section, six miles and a half. One ridge to Waingarara, with a long grade over it, then a continuation of side-cuttings up the Tangarakau Gorge, brings the cost up to a high rate: including bridging, culverts, clearing, and earthwork, £3,516 5s.

*Mangapapa to Saddle on Waiaiaia Range.*—Tangarakau Gorge continues for nearly five miles; again mostly all side-cutting. Three bridges are required to avoid long and narrow bends. In one part, by keeping round a bend, making extra distance of 55 chains, two of the bridges could be done away with. Taking into consideration the extra cost of maintenance, it is a question whether the bridges would not eventually be more economical. An up-grade of two and a half miles to the saddle on the main Waiaiaia Range makes cost of section for earthwork, culverts, bridges, and clearing, £5,939 7s.

*Saddle to Heao.*—A down-grade from a height of 430ft. to the Heao Flat: two miles length of section, work heavy and expensive; will cost for clearing, earthwork, culverts, &c., £1,271. The Heao Valley for the next three and a half miles is very favourable for road-making; mostly flat formation: two short bridges of 25ft. span each, culverts, bush-felling, and earthwork total up £1,049 10s.

*Heao Valley.*—Between the head of the Heao and Mangaroa, five miles, a grade up and down over a ridge that turns a stream towards Mangaroa cannot be avoided. Three miles of this length heavy and expensive; grades will be easy. One short bridge of 20ft., culverts, earthwork, and clearing, £2,612 15s.

*Mangaroa to Kopuha.*—For the next three miles and a half the line passes over easy country for road-making, Mangaroa Bridge the greatest item; cost of section, £1,505 5s. The line is now at seventy-six miles and a half from Stratford, in the Ohura Valley, where there is a large extent of open country.

*Kopuha to Nihoniho.*—Some three miles and a half of nearly all open country, up the Ohura Valley. The line passes through a narrow saddle by way of Toitōi to avoid a long bend of Ohura. Work moderate; one expensive bridge over Ohura to allow for the high floods. Cost of section, £1,742 10s.

*Nihoniho to Ongaruhe.*—From Nihoniho up the Ohura Valley, across to Ongaruhe, nineteen miles and a half, the country is very favourable for road-making. The last eleven miles is mostly a pumice-covered soil that would at all times be nearly dry. No bridges of any length are required. Following the valley the grades are comparatively flat. Earthwork, bridges, culverts, and clearing would cost £4,302.

*Gravelling* is a most difficult item to estimate, as no traces of it have been seen for long distances; and the cost would therefore be very high. Through the Toko Valley there are traces; and along the Mangaotuku Valley in several places I saw material that would do for metalling. From Makahu to Tangarakau the country is papa; saw only indications here and there. Tangarakau Gorge has abundance of metal; in the Heao Valley several patches of metal were

seen; up the Mangaroa the shingle is seen in the creeks; up the Ohura Valley metal crops out in many places.

*Summation.*—To summarise this, we have:—

			£	s.	d.
Stratford to Makahu, the junction of the					
Inglewood line	... ..	29 miles	9,960	10	0
Makahu to Mangapapa	... ..	26 miles	12,580	0	0
Mangapapa to Mangaroa	... ..	18 miles	10,872	15	0
Mangaroa to Ongaruhe	... ..	26½ miles	7,549	15	0
<hr/>					
Stratford to Ongaruhe (road to make, 92½					
miles)	... ..	99½ miles	£40,963	0	0
Road to make	... ..	92½ miles			
Gravelling, 99½ miles, at £400 a mile			39,800	0	0
<hr/>					
Thus, to form and gravel a 15ft. road	... ..		£80,763	0	0

*Area and Quality of Land.*—For seven miles from Stratford, as before stated, the road runs through a settled district. Then the proposed line passes through three Native Land Court blocks in the hands of Europeans, viz.: Toko Block, of 16,340 acres, five miles; Huiakama, 8,540 acres, seven miles; then a length of two miles and a half through Crown land; and again seven and a half miles through the Pohukuna Block, 29,500 acres. This twenty-two miles, with a break of two miles through the narrow Mangaotuku clearings, is all covered with forest—pine, rata, tawa, and the usual soft woods of the district. It is all suitable for settlement purposes, a large proportion being first-class land, the balance pastoral. On the Upper Mangaotuku, some distance eastward, several narrow streaks of black-birch on the hill tops makes some of the land very inferior. Taking a ten-mile belt, we have about 130,000 acres (55,000 acres of which is Crown land), with 15,000 acres of it suitable for small holdings; the remainder may be classed as fair pastoral, with patches up the streams that, as roads are made, will be used for ordinary settlement. There are in private hands 54,380 acres, a large proportion really first class; this land in parts has been improved and is being occupied. The country from Makahu to the head of Wangamomona is much broken. The valleys of Makahu, Pohukura, and Wangamomona have in all 6,000 acres of first-class land, the remainder of the length being fit for large holdings only; the ridges numerous. Upper part of Wangamomona Valley is light bush, scrub, and swamps. From source of Wangamomona to junction with the Mimi line at Wangamomona there are only short distances where the country is suitable for settlement purposes. Down a branch of Waitara (Mangaowata), Witianga, Raekohua, and Waingarara there are several thousand acres of good land, only wanting a road to open it up. In the Tangarakau Gully no land is available for settlement, the timber and the coal being the only valuable constituents. The coal out-crops in several places, being evidence of a vast quantity that in the future will be the source of great wealth. Top of Paparata to Heao a fair piece of country of small extent (2,000 acres). This now brings the line, at sixty-four miles and a half from Stratford, to the fine Valley of Heao, and from this up to within eleven miles of Ongaruhe the country is all suitable for settlement. On the west side of Heao very little land is suitable, the high Waiaiaia Range rising so steeply and throwing off so many spurs. To the eastward the whole of the Okura Valley (a valley of mixed open and bush country, with fine flats near the streams) would be opened up. Heao and contiguous country would make an area of 17,300 acres generally settlement country, Heao to Mangaroa some 5,000 acres of mixed pastoral and agricultural available. From Mangaroa to Okura, through 3,000 acres of first-class land, brings the line, at seventy-six miles from Stratford, to the open Okura Valley, that continues for fourteen miles through good land. Several patches of bush have to be passed through. The upper part of Okura is through an almost continuous pumice-covered soil. The hill-sides on the south of valley are very inferior; on the north side the country is forest, and soil of much better quality. Spurs come down the stream so frequently that all would be classed as pastoral. Okura with its tributaries would give within a five-mile line, on the part free of pumice, 90,000 acres, 30,000 acres of which would be available for settlement. From Makahu to Ongaruhe the country is in the hands of the Natives, the first thirty-two miles through a block that, I believe, is under negotiation for the Crown; the balance of thirty-eight miles and a half, the King-country or Rohepotae Block.

#### INGLEWOOD LINE.

From Inglewood to Tarata, and some distance up the Taramouku Valley—in all, a distance of fourteen miles—the road has been formed. For a further length of seven miles to the second crossing of Waitara the line has been felled and cleared, requiring culverts and formation at a cost of £1,590 to make it passable for cart traffic.

*Waitara River to Matau.*—The next length—Waitara River to the Matau Stream—four miles. For a mile it is up the Waitara Valley and a small branch, then over an awkward ridge 480ft. above flat, with a grade of 1 in 15, that has been run. A flatter line, with more expensive works, can be laid off. With a bridge over river, culverts, clearing, and earth-work the cost comes to £2,611.

*Paiaka Valley.*—For three miles the proposed line then follows up a good valley, over easy country for road-making, to the foot of the dividing ridge between Makahu, Mangaotuku, and Matau. Two short bridges, culverts, clearing, and earthwork, £1,044 10s.

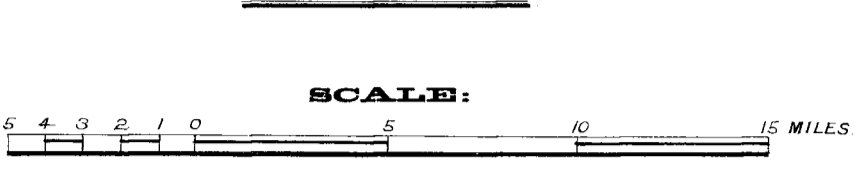
*Grade to Makahu.*—The road-line then has an ascending grade of a mile and half to where the three ridges join, with a down-grade of a mile and a half to Makahu, the junction with the Stratford line. The ruling grade run is at not more than 1 in 15 (in many parts it is much flatter); owing to the cross spurs, that cannot be avoided. The cost of this section is heavy, clearing, formation, culverts coming to £1,590 10s.

The length from Inglewood to the Stratford line is thirty miles, sixteen of which has to be made at a cost of £6,836. The same remarks about gravelling as on the Stratford line. In the Matau Valley there are indications of shingle.



# SKETCH MAP OF EXPLORATIONS FOR ROADS, TARANAKI TO ONGARUHE.

H. M. SKEET, DISTRICT SURVEYOR,  
1889.

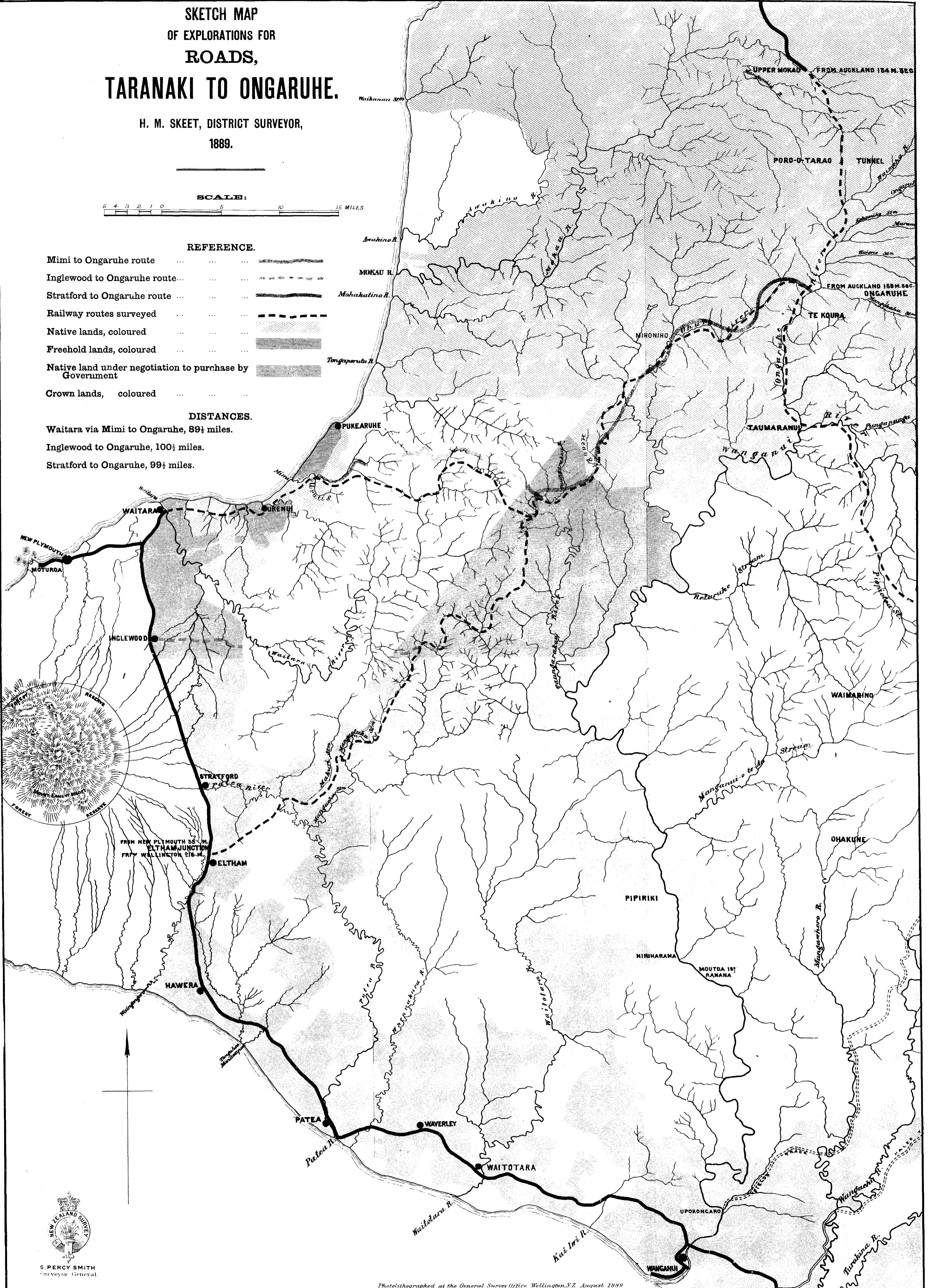


**REFERENCE.**

- Mimi to Ongaruhe route ... ..
- Inglewood to Ongaruhe route... ..
- Stratford to Ongaruhe route ... ..
- Railway routes surveyed ... ..
- Native lands, coloured ... ..
- Freehold lands, coloured ... ..
- Native land under negotiation to purchase by Government ... ..
- Crown lands, coloured ... ..

**DISTANCES.**

- Waitara via Mimi to Ongaruhe, 89½ miles.
- Inglewood to Ongaruhe, 100½ miles.
- Stratford to Ongaruhe, 99½ miles.







*Summation.*—Taking the proposed line as a through one to Ongaruhe, we have,—

			£	s.	d.
Inglewood to Makahu (16 of which to make) ...	30 miles	...	6,836	0	0
Makahu to Mangapapa ...	26 miles	...	12,580	0	0
Mangapapa to Mangaroa ...	18 miles	...	10,872	15	0
Mangaroa to Ongaruhe ...	26½ miles	...	7,549	15	0
Inglewood to Ongaruhe (road to make, 86½ miles)	100½ miles	...	£37,838	10	0
Gravelling, 100½ miles, £400 a mile	...	...	40,200	0	0
Thus, to form and gravel a 15ft. road	...	...	£78,038	10	0

From Inglewood to the Central Taramouku, fourteen miles, the road is through a settled district. Taramouku to the second crossing of Waitara the land is laid off ready for selection—22,000 acres of first-class and second-class land. From the Waitara to the Makahu junction the country is all fit for settlement purposes. Taking a belt ten miles wide, it gives 90,000 acres, 6,000 of which is in the Pohukura Block; the remainder being Crown land, 20,000 of which is suitable for moderate-sized holdings, the balance pastoral, and all fit for settlement purposes as the country is opened up. The whole is covered with forest—pine, rata, tawa, rimu, and the soft woods generally. The soil is papa formation. Bridges will be required in numerous places.

#### MIMI LINE.

*Mimi Valley.*—Starting from the Main North Road at Mimi, the proposed line follows the valley of Mimi for six miles and a half to the Mangahia, over country moderately expensive to form a road through, bridges, culverts, earthwork, and clearing costing £2,601.

*Mangahia.*—Up the branch of Mangahia for four miles and a half, along country easy for road-making, mostly all flat formation. Clearing, earthwork, and culverts, £998.

*Mangahia to Makarakia.*—A long grade of two miles and three-quarters takes the line to the top of the ridge that acts as a watershed for Waitara, Mangaongaonga, and Mimi; then for three miles along a lumpy ridge to the down-grade of two miles to the Makarakia Stream. The work on this section is very expensive, the country being a most difficult piece to make a road through owing to the number of cross-spurs and ridges that join to form the watershed above mentioned. Have succeeded in running a grade of not more than 1 in 15. There are no bridges required longer than 30ft. span. The earthwork, culverts, bridges, and clearing of this section of seven miles and sixty chains comes to £5,481. Makarakia Valley, of two miles, is almost all flat formation, the country being easy for road-making. Two short bridges, earthwork, culverts, and clearing bring the cost to £554. The next length is over the dividing ridge between Makarakia and Upper Waitara. The line goes over a saddle 380ft. above the flats on each side in a distance of 186 chains; work, in parts, heavy: cost of section, £1,752.

*Waitara Valley.*—For the next three miles and a half the line follows down the Waitara Valley. The first mile and a half is moderately heavy work, the remainder being easy. Three short bridges, with earthwork, culverts, clearing, &c., bring the cost up to £1,398.

*Waitara to Tangarakau.*—Four miles takes the line to the junction with the proposed Stratford line, as described in the first part of this report. The work on this portion is moderately heavy: a ridge dividing the waters of the Waitara and Tangarakau has to be crossed, then a long gully down to Tangarakau. Two small bridges are required, with earthwork, clearing, and culverts; cost of length, £2,109.

*Gravelling* on this line would be a difficult item to estimate, the same remarks applying as on the other lines.

*Summation.*—Taking the Mimi line as a through one to Ongaruhe, we have,—

			£	s.	d.
Main North Road at Mimi to Mangapapa					
(Tangarakau) ...	29 miles	..	14,339	0	0
Mangapapa to Mangaroa ...	18 miles	...	10,872	15	0
Mangaroa to Ongaruhe ...	26½ miles	...	7,549	15	0
Mimi to Ongaruhe ...	73½ miles	...	32,761	10	0
Gravelling, at £400 a mile ...	...	...	29,800	0	0
Forming and gravelling 15ft. road	...	...	62,561	10	0

*Area and Quality of Land.*—For twelve miles the road is in the Mimi Valley and its branch, Mangahia. Except the first two miles it is all covered with forest of pine, rata, totara, tawa, and black birch on the hill-tops of the upper portion. The width of the valley generally does not exceed half a mile on the flat ground; in parts it is much narrower. The soil is a heavy loam on the flats, and hill-sides of papa formation. The hill-sides are available for some distance back on the ridges where the black-birch does not exist. Muti, the main branch of Mimi, would leave an extra area of 5,000 acres of available country; Mimi Valley, 6,000 acres, of which 3,000 acres would be first-class, the balance pastoral. From Mangahia to Makarakia the country is much broken, and only fit for pastoral purposes. Makarakia Valley is all good forest land, suitable for settlement purposes; area, about 2,000 acres. The Waitara Valley has a considerable amount of available country. Cross roads from the Tawhitiraupaka Terrace and Waingara Stream would make a total of 11,000 acres, of which 5,000 acres are agricultural, balance pastoral. From Waitara to Tangarakau the land would be nearly all classed as pastoral, only small portions of it being agricultural. Twenty-five miles of the proposed road-line is through Crown land, two miles through the Taumatamahoe Block, under negotiation for the Crown; the balance through a settled district, near the Mimi Bridge.

In making out the estimate I have worked everything for a roadway of 15ft., with grades not to exceed 1 in 15; and I feel sure that this would not be exceeded, but in many parts the road would be laid off much flatter. Earthwork prices have been taken out to allow for papa-rock cuttings.

H. M. SKERT, District Surveyor.

## APPENDIX No. 4.

REPORT ON THE GLACIERS OF MOUNT COOK, BY MR. T. N. BRODRICK, ASSISTANT SURVEYOR.

Timaru, 3rd August, 1889.

Under separate cover I send you the plans of the Mueller and Cook districts, showing the Mueller and Hooker Glaciers, and also the terminal face of the Tasman Glacier. Acting under your instructions, I painted the numbers from 1 to 10, in white, on the largest and most conspicuous rocks situated in different positions on the Mueller Glacier (shown on the plan by small red circles), and have accurately fixed their positions by trigonometrical observations. A plan showing the calculations of them will follow.

The rocks were well marked in very large characters and on all sides, so that there is every reason to expect that they will not be lost sight of until they are finally discharged from the glacier. Apparently, after leaving the ice and getting on to the river-bed, the action of the water, by washing the loose gravel from underneath them, gradually buries them. This is especially noticeable at the terminal face of the Tasman Glacier, where huge rocks in great numbers may be seen, the more recently discharged ones just beginning to sink, and so on, until at fifty yards from the glacier there is not a large rock to be seen. The circle marked 11 was not painted: it is a singular conical hillock of ice, covered with gravel. Mr. Huddleston tells me it has kept the same form ever since he went to live at the Hermitage. As there were no conspicuous rocks on that side of the moraine, I fixed its position instead. We carried a traverse by chain and theodolite along the southern side of the Mueller Glacier, on the line shown on the map, until the crevasses were passed; and from thence, by the same method, along the centre of the glacier right up to its head and on to Barron's Saddle, 6,672ft. high, from which point we could see down the valley of the Dobson to Lake Ohau. We also followed the track shown along the northern side of the glacier, with great difficulty and loss of time, to the point marked "camp," where we spent the night on the moraine.

There is a very fine face of ice, 190ft. thick, at an altitude of 7,619ft. on the Moorhouse Range, a little south-west of Mount Sefton. From this face the fall of ice was continuous, and, as it fell into a kind of rocky amphitheatre, the noise, intensified by the echoes, was very great. While standing on the clear ice, near the above place, we had the pleasure of seeing a crevasse commenced: the ice cracked in a long straight line, with a report like a pistol-shot, and immediately absorbed all the water which was standing in pools along its course.

From the camp to the head of the glacier we encountered no difficulties. The ice was smooth, and covered to a depth of about a foot with dry snow; and, except for the extreme regularity of the small medial moraines leading from the two tributary glaciers on the south, which I have shown on the plan, I did not see anything specially worthy of remark. The scenery, of course, is striking and grand, but the same remark applies to all the glaciers. A fine view is also obtained of the three peaks of Mount Cook. As you are aware, only the two lowest are visible from the Hermitage. There is nothing except the fatigue of such a journey to prevent tourists from going, *via* our southern track, to the head of the Mueller at any time. We started at 6.30 a.m. from the camp on the moraine, and measured up on to the saddle; returned, and then swagged the camp back to the Hermitage, getting there at 3 p.m. the same day. I carried a rough ray trace survey up the Hooker Glacier, in the manner shown on the plan, and determined the altitudes of the peaks on the Mount Cook Range, of several places of interest, the three peaks of Mount Cook, and of the Hooker Saddle.

I regret to say we could not get any further than the rocky point between the Noeline and Empress Glaciers. Beyond that the ice was broken up into sharp peaks with huge crevasses between them, and was utterly impassable for us with the appliances we had for mountain climbing. It was not possible to get any further than we did without the assistance of a long ladder to span the numerous chasms. The scenery was exceedingly grand and wild, and would well repay any one for the trouble of getting there.

You will see from the plan that the point we reached is not very much further than the one you and I reached in January; but, by stopping when we did, we missed the best part of the scenery. On the 4th April, at 12 a.m., taking a fixed point on the other side of the glacier, I ranged a line across it on a bearing of  $101^{\circ} 43'$  from peg F, setting the rods at fairly regular distances apart in the ice; and again on the 7th April, at 8 a.m., reranged the same line, and found the rods had travelled the distances set down below. The rods are numbered from 1 to 5, counting from the west to the east.

No. 1.	No. 2.	No. 3.	No. 4.	No. 5.
3ft. 3in.	8ft. 2in.	12ft.	15ft. 4in.	12ft. 8in.

Thus showing that, although the centre moves the fastest, the eastern side travels more quickly than the west.

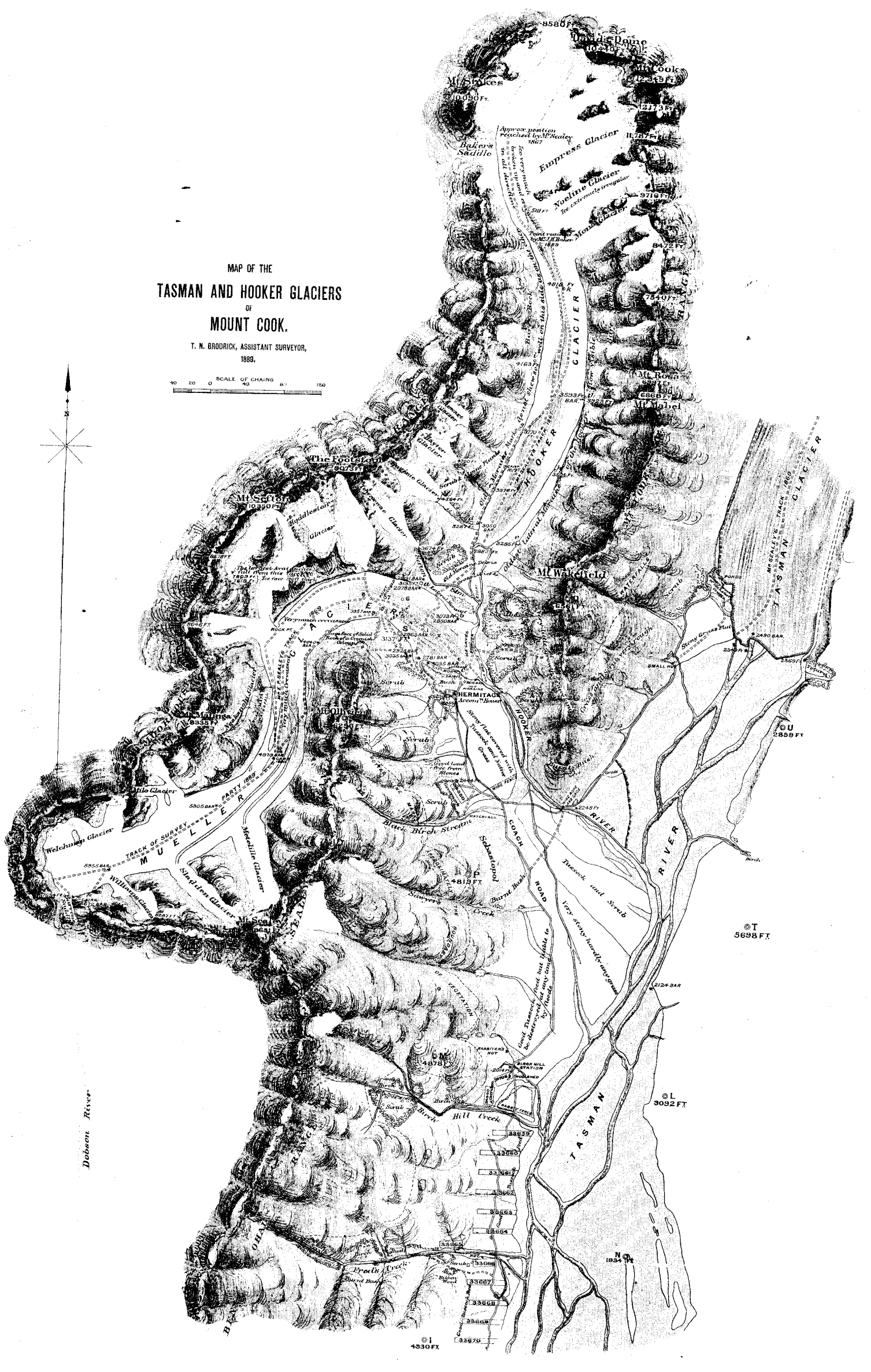
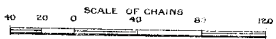
The old lateral moraine on the east side of the glacier, on which is placed peg E, is very distinctly marked between the shingle slips, as are also the ones between it and the present one now being formed.

This seems to show that, after occupying one position for a long time, the glacier had melted away, and then remained stationary for ages before melting again, and so on until, at the present time, it is 235ft. below the position it occupied at E.

The corresponding old moraine-lines on the west side, although not so distinct, can still be traced: the reason they are not so plain is to be accounted for by the fact that such a quantity of snow accumulates on the Moorhouse Range that avalanches and slips are more numerous, and have swept them away.

MAP OF THE  
**TASMAN AND HOOKER GLACIERS**  
 OF  
**MOUNT COOK.**

T. N. BRODRICK, ASSISTANT SURVEYOR,  
 1889.



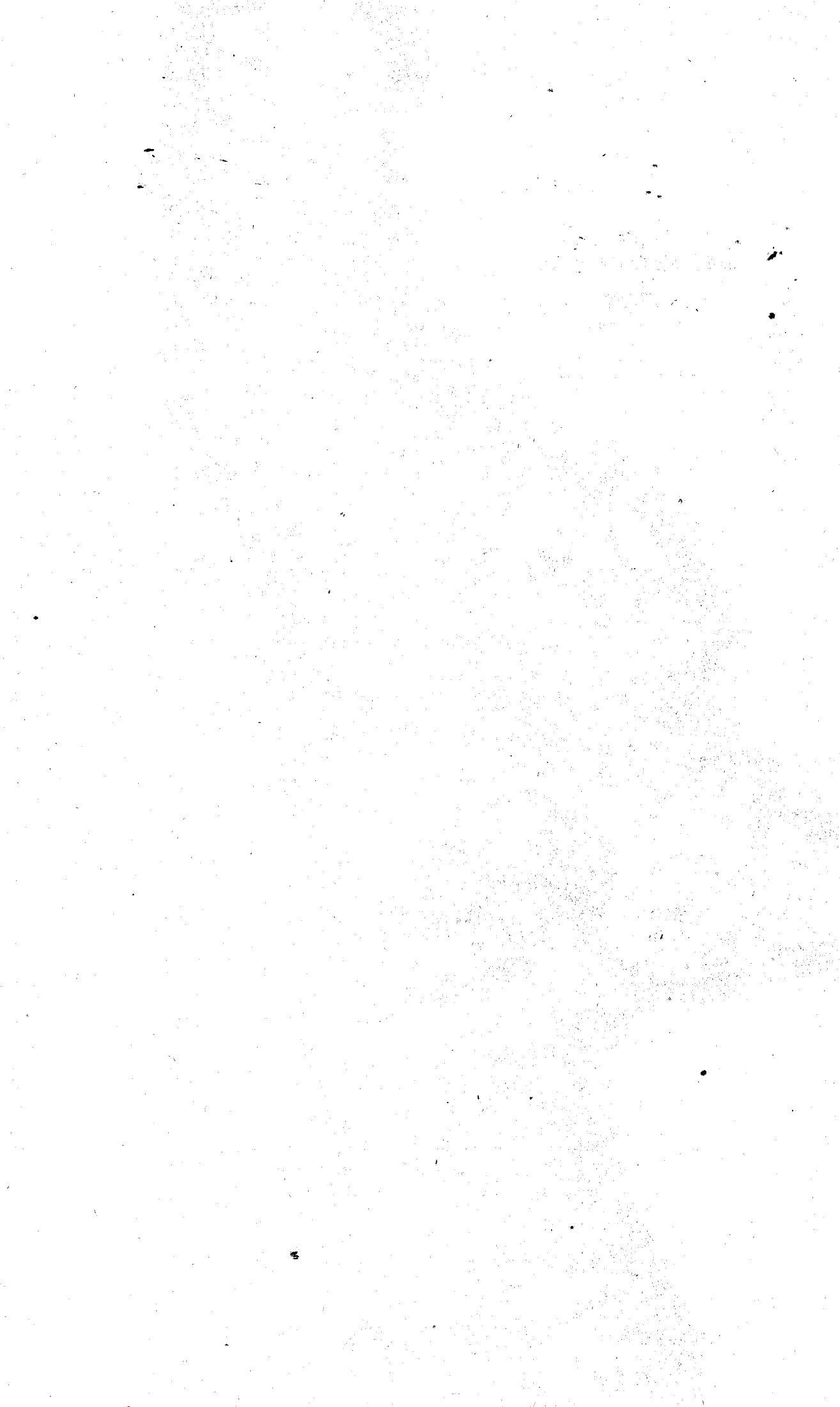
Dobson River

© I 4330 FT

© L 3092 FT

© T 5698 FT

N 1854



On the Hooker Glacier there were very few large rocks that we could rely on being found again after a number of years, so that we did not paint any of them.

We saw a few small glacier tables, from 1ft. to 2ft. high here, but none on the Mueller.

The highest peak of Mount Cook I make to be 10ft. lower than the altitude determined from the West Coast side, but my triangles were not very favourably placed for determining it. The peak is covered by a mass of snow, which, no doubt, varies in thickness; but, even assuming it not to do so, to be within 10ft. cannot but be deemed a wonderful closure, considering the distance our triangulation on this side has been carried from the eastern sea. I do not know how the height of Mount Sefton was determined before, but you will see I make a very great difference there.

I have not compared my survey of the terminal faces of the glaciers with Dr. Haast's old map, to see if the glaciers are retreating or advancing, because the difference in such a short space of time must be inconsiderable, and Dr. Haast's survey is necessarily so rough that I do not think much dependence could be placed on any deductions drawn from such a comparison.

I may add that, with a view to enabling such an interesting comparison to be made in the future, I have been especially careful to delineate accurately on my map the present position of the terminal faces.

In writing this report, and placing as much information as possible on the plans, I have endeavoured to carry out your instructions, and trust that the survey will meet with your approval.

T. N. BRODRICK, Assistant Surveyor.

No. 1.—RETURN of FIELD-WORK executed by STAFF and CONTRACT SURVEYORS, and of the COST of the SURVEY DEPARTMENT, from 1st July, 1888, to 30th June, 1889.

District.	Topographical Survey.		Minor Triangulation.		Topographical Survey for Selection under "The Land Act, 1887."		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.		Miscellaneous Work.		Total Charges against the Survey Vices for Twelve Months.			
	Acres.	Cost per Acre.	Acres.	Cost per Acre.	Acres.	Cost per Acre.	No. of Sections.	Cost per Acre.	Acres.	No. of Allotments.	Cost per Allotment.	Acres.	No. of Sections or Divisions.	Cost per Acre.	Miles.	Cost per Mile.	Cost.	Cost.	Cost.	Field-work.	Supervision, Office-work, and Publication.				
Auckland ..	..	d.	53,500	1.28	..	d.	90,697	661	1 7	79	39	18 11.6	..	..	s. d.	70 35	9 18 9	..	..	£	10,998	11 3	£	4,752	4 8
Hawke's Bay ..	..	..	..	..	..	..	52,696	65	0 10	..	..	..	4,377	4	0 8	6	0 18 5 0	20	0 0	709	18 4	4,064	15 7	2,663	14 3
Taranaki ..	..	..	..	..	..	..	10,078	65	1 2.6	..	..	..	2,598	28	1 2	..	1 40 15 4 0	..	..	220	11 4	1,454	9 2	1,474	15 1
Wellington ..	..	..	13,000	1.8	87,275	4.8	95,997	403	1 3.8	319	441	9 6.5	2,278	4	0 3.6	..	44 10 11 18 7.7	2 10 0	1,302	18 8	8,256	1 5	4,019	10 1	
Marlborough ..	..	..	..	..	..	..	4,182	20	1 2.4	..	..	..	..	..	..	3 60	4 5 4	..	..	..	812	18 2	767	18 5	
Nelson ..	..	..	110,493	1.42	..	..	27,486	177	1 9.3	56	221	16 2	..	..	..	10 0 5 4 8	..	..	2,236	3 5	6,253	12 2	2,426	17 9	
Westland ..	..	..	..	..	..	..	925	38	3 2.5	178	343	24 4.3	..	..	..	..	..	..	285	13 6	1,839	18 9	1,534	1 4	
Canterbury ..	..	..	371,140	0.42	..	..	12,670	229	0 10.68	..	..	..	806	7	2 0	3	1 1.5	..	..	138	7 4	3,036	19 1	2,832	12 4
Otago ..	..	..	30,950	2.00	..	..	20,192	154	1 7.25	30	60	15 11	2,999	101	1 0.13	109	5 9.5	40 0 0	..	758	15 3	4,314	2 8	3,232	1 6
Southland ..	..	..	..	..	..	..	4,554	43	2 8.5	21	83	10 0	6,275	42	2 7	70	3 4	..	..	65	18 10	841	0 9	1,145	19 11
Head Office and Litho-graphic Office	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	8,360	14 3
Means and totals	412,150	0.425	598,103	1.15	87,275	4.8	319,477	1,855	1 4.4	683	1,187	15 4.6	18,833	186	1 4.9	513	6 8	62 10 0	6,884	5 4	41,872	9 0	33,210	9 7	

Total expenditure .. .. £74,582 18 7  
 Less refunds .. .. 12,872 5 8  
£61,710 12 11

No. 2.—ABSTRACT of the SURVEYORS employed and of the WORK on HAND in each PROVINCIAL DISTRICT on 1st July, 1889.

Chief Surveyors.	*Surveyors employed.		Work on Hand.					
	Staff.	Temporary.	District.	Trig.	Settlement.	Native Block, &c.	Roads, &c.	Town.
T. Humphries ..	13	7	Auckland..	Square Miles. 135	Acres. 79,904	Acres. 1,161,712	Miles. 69	Acres. ..
S. Weetman ..	2	..	Taranaki..	..	6,600	..	..	..
G. W. Williams ..	6	6	Hawke's Bay ..	..	32,839	21,409	53½	..
J. W. A. Marchant ..	8	6	Wellington ..	300	413,265	475,209	262½	..
J. S. Browning ..	8	..	Nelson ..	..	21,068	..	..	..
H. G. Clark ..	1	..	Marlborough ..	..	5,064	..	24	..
G. Mueller ..	2	1	Westland..	2,787	16,558	..	252	164
J. H. Baker ..	5	..	Canterbury ..	..	8,617	..	..	..
C. W. Adams ..	5	..	Otago ..	..	12,707	..	..	..
J. Spence ..	2	3	Southland ..	..	5,198	..	..	..
Totals ..	52	23	..	3,222	601,820	1,658,330	661	164

No. 3.—CROWN GRANTS and other INSTRUMENTS of TITLE from the CROWN prepared.

District.	Number.	Cost.	District.	Number.	Cost.
Auckland ..	2,742	£ s. d. 350 15 6	Westland ..	102	£ s. d. 13 2 0
Taranaki ..	286	64 15 0	Canterbury ..	639	208 1 8
Hawke's Bay ..	592	53 3 6	Otago ..	648	395 0 0
Wellington ..	1,140	117 13 9	Southland ..	96	72 0 0
Nelson ..	97	87 12 0	Totals ..	6,367	1,367 1 5
Marlborough ..	25	4 18 0			

No. 4.—LAND TRANSFER WORK.

District.	No. of Plans passed.	Deeds and other Instruments examined.	No. of Plans placed on Certificates of Title.	Cost.	District.	No. of Plans passed.	Deeds and other Instruments examined.	No. of Plans placed on Certificates of Title.	Cost.
Auckland ..	112	..	654	£ s. d. 525 0 0	Westland ..	333	..	191	£ s. d. 24 9 6
Taranaki ..	60	..	76	80 11 3	Canterbury ..	134	..	897	524 8 4
Hawke's Bay ..	79	..	554	195 13 4	Otago ..	56	1,923	1,560	390 0 0
Wellington ..	145	..	893	168 17 9	Southland ..	27	109	500	120 0 0
Nelson ..	152	..	151	158 0 0	Totals ..	1,106	2,032	5,544	2,200 18 2
Marlborough ..	8	..	68	13 18 0					

No. 5.—PHOTOGRAPHS.

Department.	Number of Plates taken during the Year.	Department.	Number of Plates taken during the Year.
Survey ..	603	Defence ..	21
Public Works ..	5	Crown Lands ..	2
Mines ..	38	Education ..	3
Justice ..	6	Census ..	6
Telegraph ..	17	Melbourne Exhibition ..	8
Museum ..	13	Totals ..	722

## No. 6.—LITHOGRAPHIC PRINTING executed from the 1st July, 1888, to 30th June, 1889.

Department.	Number of Separate Printings.	Number of Impressions	
		By Machine.	By Hand.
Survey .. .. .	572	325,293	39,853
Public Works .. .. .	139	23,750	9,836
Railways .. .. .	6	3,600	254
Colonial Secretary .. .. .	1	..	35
Justice .. .. .	16	500	1,946
Mining .. .. .	11	29,000	865
Premier .. .. .	1	480	..
Defence .. .. .	44	..	2,589
Registrar-General .. .. .	5	..	300
Education .. .. .	5	..	810
Telegraph .. .. .	6	8,400	..
Grasses .. .. .	1	7,500	..
Forests .. .. .	123	112,500	8,258
Geological .. .. .	25	22,080	512
Marine .. .. .	10	8,200	1,052
Treasury .. .. .	2	2,000	30
Native .. .. .	20	10,000	527
<b>Totals .. .. .</b>	<b>987</b>	<b>553,303</b>	<b>66,867</b>

## No. 7.—ABSTRACT of LITHOGRAPHS PRINTED during the Year.

At the Head Office .. .. .	620,170 impressions.
Auckland .. .. .	4,600 impressions, 31 plans.
Dunedin .. .. .	3,240 "

Maps and photographs mounted at Wellington, 1,105; maps mounted at Dunedin, 418.

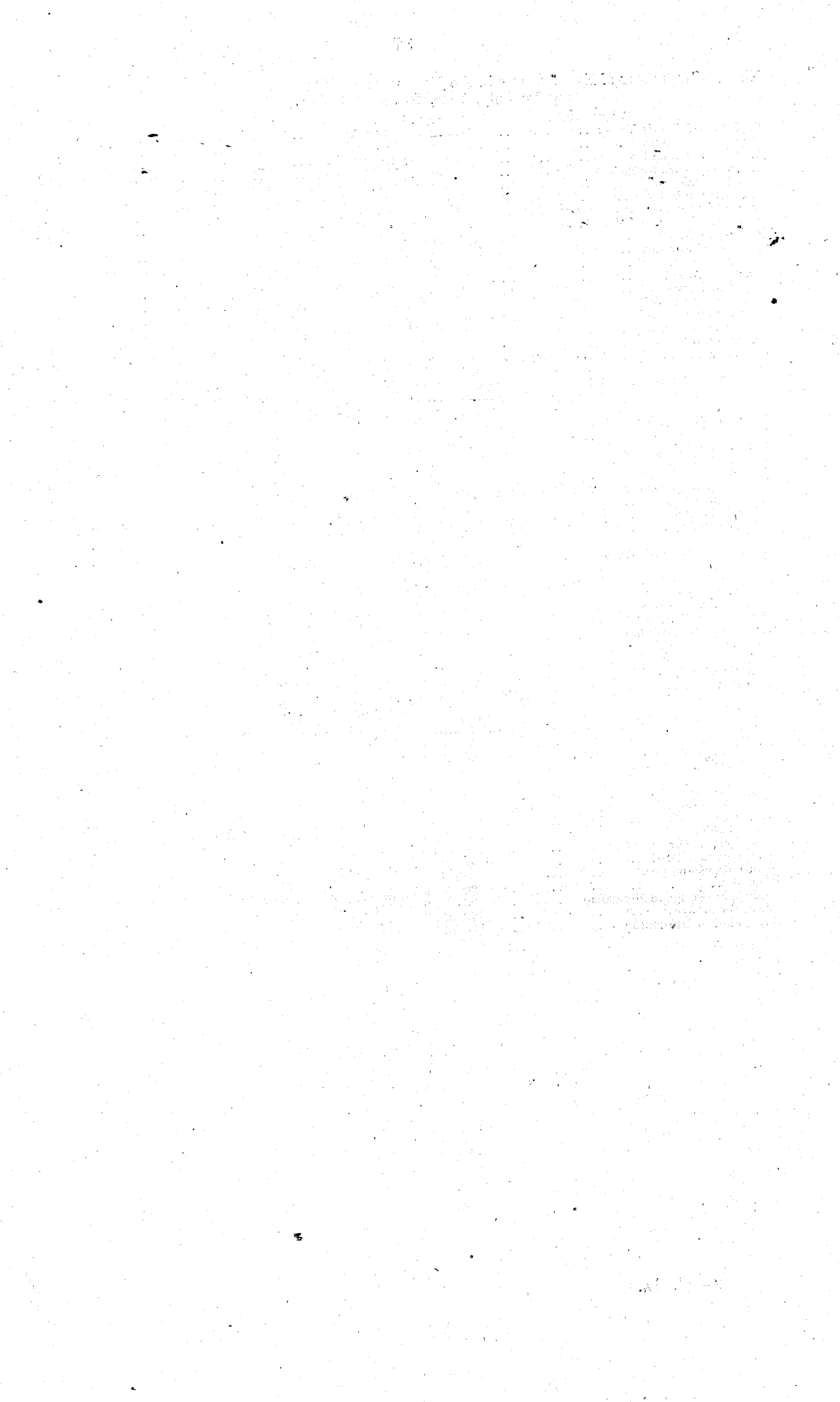
## No. 8.—STATEMENT of EXPENDITURE on MAIN and MISCELLANEOUS ROADS for the Three Months ending the 30th June, 1889.

Roads, Bridges, and Wharves, North of	£	s.	d.	Nelson—	£	s.	d.
Auckland .. .. .	255	0	0	Sandy Bay Road .. .. .	300	0	0
<b>Main Roads—</b>				Riwaka to Brooklyn Extension .. .. .	50	0	0
Oxford to Rotorua .. .. .	89	0	0	Lyll to Westport Road .. .. .	252	0	0
Tauranga to Napier, <i>via</i> Taupo .. .. .	916	0	0	Bridges on road, Nelson to Reefton and Greymouth .. .. .	1,113	0	0
Maintenance, Roads along North Island Trunk Railway .. .. .	261	0	0	Matakitaki Bridge .. .. .	7	0	0
Nelson, Tophouse, and Tarndale .. .. .	179	0	0	<b>Marlborough—</b>			
Nelson, Westport, Greymouth, and Hokitika, including Inangahua Bridge maintenance .. .. .	1,289	0	0	Main Road through Pelorus District and Rai Valley .. .. .	200	0	0
Haast Pass Track .. .. .	..	..	..	Bridge over Clarence River (painting) .. .. .	177	0	0
Hokitika to Christchurch .. .. .	985	0	0	Road, Kaikoura to Clarence .. .. .	269	0	0
	<b>£3,719</b>	<b>0</b>	<b>0</b>	Roads, Pelorus and Queen Charlotte Sounds .. .. .	185	0	0
<b>MISCELLANEOUS ROADS AND BRIDGES.</b>				<b>Canterbury—</b>			
<b>Auckland—</b>				Christchurch to Hokitika Road, construction in Bealey Valley .. .. .	144	0	0
Maungaturoto to Tokatoka .. .. .	157	0	0	<b>General—</b>			
Main Road, Warkworth to Kawakawa .. .. .	1,235	0	0	To cover numerous small liabilities on completed works for which it is not considered necessary to continue individual votes .. .. .	15	0	0
Road, Raglan to Waipa .. .. .	308	0	0	<b>Total .. .. .</b>	<b>£6,642</b>	<b>0</b>	<b>0</b>
Mercury Bay to Mahikarau .. .. .	400	0	0				
Road, Pukekohe to Waiuku .. .. .	50	0	0	<b>GRANTS-IN-AID.</b>			
Road, Hunua to Railway-station .. .. .	50	0	0	<b>Under Roads and Bridges Construction Act—</b>			
Road, Patumahoe to Steinson's corner .. .. .	50	0	0	Total required to meet engagements for the year .. .. .	100	0	0
Road, Maoro to Port Waikato .. .. .	50	0	0	<b>Contingencies—</b>			
Road, Katikati to Te Aroha (Thompson's Track) .. .. .	160	0	0	Work for "unemployed" .. .. .	1,170	0	0
Tauranga, East Cape, Whakatane, Te Teko, and sundry roads, Bay of Plenty .. .. .	274	0	0	<b>Total .. .. .</b>	<b>£1,270</b>	<b>0</b>	<b>0</b>
Road, Opotiki to Whakatane .. .. .	309	0	0				
Roads and Bridges in Native Districts .. .. .	226	0	0	<b>Consolidated Fund—Miscellaneous Services.</b>			
<b>Wellington—</b>				Maintenance, Manawatu Gorge Road and Bridge .. .. .	24	0	0
Napier to Murimotu Road .. .. .	515	0	0				
<b>Taranaki—</b>							
Junction Road from Inglewood eastward to Ngatimaru .. .. .	146	0	0				



No. 9.—STATEMENT of EXPENDITURE in the FORMATION of ROADS to Open up LANDS for SALE from the 1st July, 1888, to the 30th June, 1889.

AUCKLAND.		£	s.	d.			£	s.	d.
Okaihau to Victoria Valley .. .. .	.. .. .	186	12	11	Otamakapua .. .. .	.. .. .	203	15	6
Paparoa to Waikiekie .. .. .	.. .. .	327	1	5	Tokomaru Block .. .. .	.. .. .	90	9	0
Wairua to Helena Bay .. .. .	.. .. .	16	15	9	Waitapu Block .. .. .	.. .. .	950	8	6
Waerenga to Wangamarino .. .. .	.. .. .	9	5	9	Maungakaretu .. .. .	.. .. .	265	15	6
Puhoi to Makarau .. .. .	.. .. .	150	0	0	Wairoa Survey District .. .. .	.. .. .	17	19	7
Waimamaku to Pakanae .. .. .	.. .. .	27	18	6	Waitotara to Momahaki .. .. .	.. .. .	462	8	8
Awaroa Swamp, drains and roads .. .. .	.. .. .	100	0	0	Otaki to Foxton .. .. .	.. .. .	162	11	8
Taupo <i>via</i> Rotoaira to Waimarino .. .. .	.. .. .	156	11	7	Miscellaneous .. .. .	.. .. .	285	10	11
Kawhia to Waipa .. .. .	.. .. .	60	15	8					
Waingaro to Akatea .. .. .	.. .. .	3	6	0	Total, Wellington .. .. .	.. .. .	£3,205	18	5
Akaaka Swamp .. .. .	.. .. .	5	15	0					
Drain, Te Aroha .. .. .	.. .. .	56	19	6	NELSON.		£	s.	d.
Puriri to Tairua .. .. .	.. .. .	166	2	6	Pigeon Valley to Motueka .. .. .	.. .. .	78	9	3
Whaingaroa to Waitetuna .. .. .	.. .. .	57	16	11	Trass Valley .. .. .	.. .. .	60	0	0
Huka Falls to Puketarata .. .. .	.. .. .	8	5	0	Wakefield District .. .. .	.. .. .	60	0	0
Rotorua to Galatea .. .. .	.. .. .	1	18	0	Miscellaneous .. .. .	.. .. .	46	0	4
Mata to Kaururoa .. .. .	.. .. .	76	4	6					
Miscellaneous .. .. .	.. .. .	1,079	12	2	Total, Nelson .. .. .	.. .. .	£244	9	7
Total, Auckland .. .. .	.. .. .	£2,491	1	2	WESTLAND.		£	s.	d.
HAWKE'S BAY.		£	s.	d.	Mahitahi to Paringa .. .. .	.. .. .	689	0	0
Tologa to Mangatokerau .. .. .	.. .. .	94	19	7	Cook's River Flat .. .. .	.. .. .	9	12	6
Tologa to Arakihi .. .. .	.. .. .	230	18	0	Teremakau to Bell Hill Road .. .. .	.. .. .	200	0	0
Ormond to Waipatu .. .. .	.. .. .	152	0	0					
Ormond to Opotiki .. .. .	.. .. .	567	9	10	Total, Westland .. .. .	.. .. .	£898	12	6
Waipaoa River to Oilspring .. .. .	.. .. .	650	0	0	CANTERBURY.		£	s.	d.
Wairoa to Rotokakarangu .. .. .	.. .. .	100	0	0	To Upper Ashley over Kuku Pass .. .. .	.. .. .	100	0	0
Makaretu .. .. .	.. .. .	249	9	1	Mount Grey Downs .. .. .	.. .. .	118	0	0
Tautane Reserve .. .. .	.. .. .	249	12	7	Glentui Road .. .. .	.. .. .	148	5	6
Miscellaneous .. .. .	.. .. .	20	0	0	Road to Mount Cook and to Glaciers .. .. .	.. .. .	430	0	0
Total, Hawke's Bay .. .. .	.. .. .	£2,314	9	1	Miscellaneous .. .. .	.. .. .	82	13	4
TARANAKI.		£	s.	d.	Total, Canterbury .. .. .	.. .. .	£878	18	10
Pukearuhe to Mokau .. .. .	.. .. .	211	17	8	OTAGO.		£	s.	d.
Roads East of Waitara (Ngatimaru) .. .. .	.. .. .	1,007	13	0	Lauder Block .. .. .	.. .. .	145	0	0
Bridge over Waitara (Ngatimaru) .. .. .	.. .. .	1,001	8	6	Rock and Pillar District .. .. .	.. .. .	100	0	0
Roads East of Stratford .. .. .	.. .. .	13	1	9	Glenkenich .. .. .	.. .. .	69	19	6
Eltham and Branch Roads .. .. .	.. .. .	548	8	1	Glenomaru to Owake .. .. .	.. .. .	443	11	2
Native Trust Blocks .. .. .	.. .. .	62	1	10	Miscellaneous .. .. .	.. .. .	60	0	0
Roads inland of Mokoia .. .. .	.. .. .	387	19	2					
Miscellaneous .. .. .	.. .. .	191	5	7	Total, Otago .. .. .	.. .. .	£818	10	8
Total, Taranaki .. .. .	.. .. .	£3,423	15	7	SOUTHLAND.		£	s.	d.
WELLINGTON.		£	s.	d.	Athol to Nokomai Saddle .. .. .	.. .. .	200	0	0
Pahiatua, Mangaone, and adjacent blocks .. .. .	.. .. .	399	16	2	Mossburn to Manapouri .. .. .	.. .. .	300	0	0
Rangitumau, Wangaehu, Kopuaranga .. .. .	.. .. .	738	7	0	Appleby to Tisbury .. .. .	.. .. .	196	11	0
Mikimiki .. .. .	.. .. .	160	7	9	Wyndham, <i>via</i> Mimihi, to Otaraia .. .. .	.. .. .	200	0	0
Makakahi Road .. .. .	.. .. .	186	0	11	Waikaka Siding to Waikaka Town .. .. .	.. .. .	600	0	0
Tiraumea Bridge .. .. .	.. .. .	976	7	0	Blackmount to Deferred-payment Land .. .. .	.. .. .	75	0	0
Tutaekara Road .. .. .	.. .. .	3	13	8	Stewart Island .. .. .	.. .. .	63	1	8
South Pahiatua .. .. .	.. .. .	303	6	3	Miscellaneous .. .. .	.. .. .	505	9	3
Mangaone to Tiraumea .. .. .	.. .. .	690	8	8					
Tiraumea to Makuri .. .. .	.. .. .	848	11	8	Total, Southland .. .. .	.. .. .	£2,140	1	11
South Mangaone Road .. .. .	.. .. .	93	2	4	Total for the year .. .. .	.. .. .	£21,415	17	9
Puketoi .. .. .	.. .. .	230	4	6	VILLAGE SETTLEMENTS.				
Makakahi Bridge to Mangahao .. .. .	.. .. .	35	3	6	Improvement of Village Settlements, and Relief Road-works, Village Homestead Settlements .. .. .	.. .. .	£10,658	4	6
Mauriceville West .. .. .	.. .. .	270	16	3					
Wanganui to Murimotu .. .. .	.. .. .	830	13	5					







No. 10—continued.—RETURN of FIELD-WORK executed by STAFF and CONTRACT SURVEYORS, from 1st July, 1888, to 30th June, 1889.

PROVINCIAL DISTRICT OF WESTLAND.

Surveyor and District.	Topographical and Trigonometrical Survey.			Rural and Suburban.			Town Section Survey.			Native Land Court Survey.			Gold-mining Surveys.				Roads, Railways, and Water-races.			Detention by Native Opposition or other Causes.	Other Work.	Total Cost of Surveyor and Party from 1st July, 1888, to 30th June, 1889.	Remarks.			
	Acres.	Cost per Acre.	Total Cost.	Acres.	No. of Sections.	Cost per Acre.	Total Cost.	Acres.	No. of Allotments.	Cost per Allotment.	Total Cost.	Acres.	No. of Secs. or Divs.	Cost per Acre.	Total Cost.	Acres.	No. of Sections.	Cost per Acre.	Total Cost.					Miles.	Cost per Mile.	Total Cost.
W. G. Murray. Greymouth, Okarito, Totara, Oira, Waimea, Gillespie's, Waiho, Mount Cook, Karangarua, Bruce Bay	41,020	d. 0.44	£ s. d. 75 17 0	925	38	3/2½	£ s. d. 148 7 4	*20	57	£ s. d. 1 18 0¾	£ s. d. 108 10 2	..	..	..	£ s. d. ..	834	19	6/1¾	£ s. d. 256 6 0	..	£ s. d. ..	£ s. d. ..	£ s. d. ..	£ s. d. 71 5 0	£ s. d. 794 3 8	Quartz-claims on mountain-tops, and claims and section-surveys in rugged and broken bush country; very expensive. District within a goldfield.
G. J. Roberts. Greymouth .. ..	..	..	..	..	..	..	..	*158	286	1 1 7	134 3 0	..	..	..	..	..	..	..	..	..	..	..	..	202 0 0	302 7 1	* Town sections, Native township, Greymouth. Amalgamation, connection, and readjustment of old broken and piecemeal town-section surveys; areas principally covered with overlapping buildings.
W. Wilson. Greymouth, Totara, Waitaha, Waimea	..	..	..	..	..	..	..	..	..	..	175 4 3½	..	..	..	..	339	8	4/7	£ s. d. 77 14 8	..	..	..	..	10 6 0	241 6 0	Mining surveys along sea-coast; heavily timbered and swampy country; expensive district; in a goldfield.
<i>Contract Surveyors.</i> E. J. Lord. Arnold .. ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2 2 0	2 2 0	Readjustment of boundaries of Wallsend town sections, in consequence of action of Railway Department.
J. N. Smyth. Totara, Arawata	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	640	10	4/3-5	£ s. d. 137 11 6	..	..	..	..	..	..	Mining surveys; dredging claims; swamp and beach country; expensive district; in a goldfield.
Means and totals	41,020	0.44	75 17 0	925	38	3/2½	148 7 4	178	343	1 4 4-8	417 17 5½	..	..	..	1,813	37	5/2-4	471 12 2	..	..	..	..	285 13 6	1,339 18 9		

Minor Triang. and Top.

PROVINCIAL DISTRICT OF CANTERBURY.

Roads, Fences, and Streams.

Other Work.

Surveyor and District.	Minor Triang. and Top.			Rural and Suburban.			Town Section Survey.			Native Land Court Survey.			Gold-mining Surveys.				Roads, Fences, and Streams.			Other Work.				Remarks.					
	Acres.	Cost per Acre.	Total Cost.	Acres.	No. of Sections.	Cost per Acre.	Total Cost.	Acres.	No. of Allotments.	Cost per Allotment.	Total Cost.	Acres.	No. of Secs. or Divs.	Cost per Acre.	Total Cost.	Acres.	No. of Sections.	Cost per Acre.	Total Cost.	Miles.	Cost per Mile.	Total Cost.	Acres.		Lots.	Rate.	Cost.		
J. S. Welch. Ashley and Selwyn	111,512	1.05	487 19 0	893	10	1/7	70 13 11	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	665 7 10	Very high precipitous country.	
Topography only .. ..	62,340	0.53	137 13 4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	641 13 2	Very high precipitous country. Sectional surveys. Lake Ellesmere Flat.
James Hay. Selwyn and Ashburton	134,247	0.85	474 8 9	7,224	94	7/½	225 15 0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	637 5 0	Includes survey of Mueller and Hooker Glaciers, and a great deal of detached sectional surveys.
T. N. Brodrick. Mackenzie County	75,000	0.96	300 14 4	1,790	46	1/6	134 5 0	..	..	..	..	..	..	..	..	..	..	..	..	12½	2 16 0	35 0 0	..	..	..	..	..	571 13 1	* Survey of Educational Reserve 1112; survey not completed. Topography; very high precipitous country.
Topography only .. ..	90,000	0.48	180 0 0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
G. H. M. McClure. Ashburton County	30,200	0.77	97 13 6	1,195	24	1/2	69 14 2	..	..	..	..	..	..	..	..	..	..	..	..	26½	1 10 0	39 15 0	765	4	7/3-6	*11 12 0	..	..	
Topography only .. ..	218,800	0.37	337 6 4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
L. O. Mathias. Ashley, Selwyn, Waitamate	..	..	..	292	22	3/3	47 9 0	..	..	..	..	306	7	2/	30 12 0	1,640	3	1/1½	93 5 0	45½	4 3	7 188 4	53,674	20	7/8¼	126 15 4	505 1 0	Survey of Educational Reserves 1125, 1129, 1202, 1203, 1204. Survey of run-fences. In the cost appears time he was absent on leave, which cannot be charged to educational reserves surveys.	
Christchurch Office .. ..	..	..	..	1,276	33	7/3	15 19 0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	15 19 0	
Means and totals	350,959	0.93	1,360 15 7	12,670	229	7/10-68	563 16 1	..	..	..	..	306	7	2/	30 12 0	1,640	3	1/1½	93 5 0	84½	3 2	3 262 19	54,439	24	7/48	138 7 4	3,036 19 1		

Minor Triangulation.

PROVINCIAL DISTRICT OF OTAGO.

Roads, Railways, and Water-races.

Detention by Native Opposition or other Causes.

Other Work.

Surveyor and District.	Minor Triangulation.			Rural and Suburban.			Town Section Survey.			Native Land Court Survey.			Gold-mining Surveys.				Roads, Railways, and Water-races.			Detention by Native Opposition or other Causes.	Other Work.	Total Cost of Surveyor and Party from 1st July, 1888, to 30th June, 1889.	Remarks.							
	Acres.	Cost per Acre.	Total Cost.	Acres.	No. of Sections.	Cost per Acre.	Total Cost.	Acres.	No. of Allotments.	Cost per Allotment.	Total Cost.	Acres.	No. of Secs. or Divs.	Cost per Acre.	Total Cost.	Acres.	No. of Sections.	Cost per Acre.	Total Cost.					Miles.	Cost per Mile.	Total Cost.	Cost.	Cost.		
John Strauchon. Glenomaru, Waikawa, Tuturau, and Woodland	30,000	2	250 0 0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	40	9 6 5	372 16 8	..	..	..	..	..	749 15 10	Only eleven months' work; one month charged against the Southland office. Both triangulation and road surveys are in bush country. Provisions had at one place to be carried fifteen miles, and at another place packed forty miles. In addition to this work, a block of 2,500 acres in Glenomaru District is well forward. Roads graded and traversed throughout. Cadet assisting for four months.	
David Barron. Maniototo, Lauder, Hummock, Budle, Naseby, Kye-burn, &c.	..	..	..	2,264	25	1/5½	191 3 9	14½	58	0 15 0	43 10 0	..	..	..	..	1,472	57	5/	368 0 0	..	..	..	..	..	..	..	196 13 4	791 4 6	Open country within a goldfield. On leave of absence for six weeks. No cadet.	
John Langmuir. Waipori, Teviot, Maungatua, Glenkenich, Cairnhill, and Benger	950	2½	9 17 11	8,181	45	1/0	409 1 0	..	..	..	..	..	..	..	..	977	21	5/2¾	254 3 0	..	..	..	..	..	..	..	37 12 0	757 17 5	Partly bush country, very rough. Cadet (new from office) four months assisting.	
E. H. Wilmot. Bannockburn, Shotover, Middle Wakatipu, Skipper's, and Cardrona	..	..	..	229	6	3/10	44 0 0	..	..	..	..	..	..	..	..	1,010	26	7/11½	402 2 6	..	..	..	..	..	..	..	272 5 4	736 14 11	Within a goldfield; open country and very rough. Spotting surveys very much scattered. No cadet.	
D. M. Calder. Kurow, Longslip, Moe-raki, Awamoko, and Marewhenua	..	..	..	4,592	30	2/	457 1 3	16	2	2 3 0	4 6 0	..	..	..	..	156	3	2/9½	21 12 2	..	..	..	..	..	..	36 19 0	483 11 4	Bush and open country, over a wide field; therefore expensive. 1,160 acres of Native surveys well advanced. No cadet.		
W. D. R. McCurdie. Catlin's, Glenomaru, Woodland, and Warepa	..	..	..	4,749	44	2/	476 5 0	..	..	..	..	..	..	..	..	..	..	..	..	6.20	9 0 4	55 18 0	..	..	..	80 2 0	590 7 8	Thick bush, and very wet.		
Contract, G. Mackenzie. Waikouaiti .. ..	30,950	2	259 17 11	20,015	150	1/6¾	1,577 11 0	30½	60	0 15 11	47 16 0	..	..	..	..	3,615	107	5/9½	1,045 17 8	46.20	9 5 7	428 14 8	..	..	..	758 15 3	4,111 11 8			
Fees. R. Hay. Waihemo .. ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
G. Mackenzie. Maungatua and Glenomaru	..	..	..	125	2	4/7¾	28 17 0	..	..	..	..	..	..	..	..	22	1	8/6½	9 3 0	..	..	..	..	..	..	..	..	..	..	..
L. O. Beal, jun. Blackstone .. ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	30	1	4/7½	6 19 0	..	..	..	..	..	..	..	..	..	..	..
H. Maitland. Otamatakau .. ..	..	..	..	52	2	6/6	16 18 0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Means and totals	30,950	2	259 17 11	20,192	154	1/7½	1,623 6 0	30½	60	0 15 11	47 16 0	2,999	101	1/0¾	152 0 0	3,667	109	5/9½	1,061 19 8	46.95	9 7 1½	439 5 8	40 0 0	758 15 3	4,314 2 8					

No. 10—continued.—RETURN of FIELD-WORK executed by STAFF and CONTRACT SURVEYORS, from 1st July, 1888, to 30th June, 1889.  
 PROVINCIAL DISTRICT OF SOUTHLAND.

Surveyor and District.	Rural and Suburban.				Town Section Survey.			Native Land Court Survey.				Gold-mining Survey.				Roads, Railways, and Water-races.			Other Work.	Total Cost of Surveyor and Party from 1st July, 1888, to 30th June, 1889.	Remarks.	
	Acres.	No. of Sections.	Cost per Acre.	Total Cost.	Acres.	No. of Allotments.	Cost per Allotments.	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.
<i>Staff.</i> John Hay. Longwood, Ruapuke Island, Paterson District, Lord's River, and Pegasus	..	..	s. d.	£ s. d.	21	83	£ s. d.	£ s. d.	6,275	42	s. d.	£ s. d.	..	..	s. d.	£ s. d.	..	£ s. d.	£ s. d.	£ s. d.	762 16 5	£255 18s. 3d. carried forward from last year. Now in progress some 20 sections, mineral areas, Pegasus, bush-clad. Cost to date, £186 8s. 8d. Surveys mostly bush; long coast-traversing. Native disputes to settle, &c. No cadet. Surveyor chiefly engaged in Otago District. Road-traverse (4½ miles) through broken bush country, road graded, &c.
John Strauchon. Waikawa, &c.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4½	9 6 5	44 5 6	33 18 10	78 4 4	
<i>Fee-system.</i> T. S. Miller. Invercargill, Winton, Otara, Forest Hill, Waikawa, Pegasus, &c.	2,604	26	3 3½	432 1 0	..	..	..	..	..	..	..	..	2,519	67	3 3½	417 19 0	..	..	..	..	..	This includes 20 saw-mill areas, 6 rural surveys, 4 gold-mining areas, and 63 mineral areas (tin). Country mostly rough and bush-clad.
William Sharp. Hokonui, Wairio, Invercargill, &c.	546	6	1 9	48 10 9	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	Purchases, &c.
H. R. Dundas. Longwood, Otara, and Pegasus	..	..	..	..	..	..	..	..	..	..	..	..	195	3	3 9	36 15 0	..	..	..	..	..	Gold-mining claims, &c. In progress, say, 30 mineral (tin) areas, Pegasus District.
G. M. Barr. Longwood and Invercargill	1,140	6	1 9½	103 0 0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	Saw-mill areas, including valuation of timber.
William Hay. Longwood, Winton, New River, &c.	264	5	2 6½	34 0 0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	Chiefly saw-mill areas.
Means and totals ..	4,554	43	2 8½	617 11 9	21	83	0 10 0	41 10 0	6,275	42	2 7	810 10 5	2,714	70	3 4	454 14 0	4½	9 6 5	44 5 6	65 18 10	841 0 9	

[Approximate Cost of Paper.—Preparation, nil; printing (exclusive of plans) 1,700 copies, £45 10s.]