

1917.
NEW ZEALAND.

DEPARTMENT OF LANDS AND SURVEY.
SURVEYS
(ANNUAL REPORT ON).

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

The SURVEYOR-GENERAL to the Right Hon. the MINISTER OF LANDS.

SIR,—

2nd July, 1917.

I have the honour to present herewith the report on survey operations for the year ended 31st March, 1917.

I have, &c.,

E. H. WILMOT, Surveyor-General.

The Right Hon. W. F. Massey, P.C., Minister of Lands.

REPORT.

THIS report will deal with survey operations for the year in a general way. Details will be found in the tables attached, and in the reports supplied by the various Chief Surveyors, which are filed as departmental records.

Contrasting the acreages of rural and Native land surveyed with the acreages surveyed last year (see Table B) a considerable falling-off in those of this year is apparent, amounting to rather over 23 per cent. in rural lands and over 36 per cent. in Native lands. Several factors contribute to this result. One of these is that the acreage returned in rural lands last year included exceptionally large areas of pastoral land subdivided for settlement in Otago, while others are the depletion of the field staff by enlistments, the difficulty in getting efficient field hands, and the abnormally wet season in the north of the Dominion, where the bulk of the surveyors, both staff and private, have been working. The last two factors will probably account for a very slight increase in cost per acre, the cost still, however, being very satisfactory. Tables A and B, which follow, gives a summary of the survey-work executed during the year.

TABLE A.

Class of Work.	Area.	Average Cost per Acre.	Total Cost.
	Acres.		£ s. d.
Triangulation, by staff surveyors	5,200	2.94d.	63 16 0
Topographical, by staff surveyors	61,300	1.45d.	370 10 11
Rural, by staff surveyors	635,924	1.01s.	32,011 11 5
Rural, by licensed surveyors	17,168	2.09s.	1,797 19 9
Rural, by licensed surveyors (costs not available)	26,001		.. .. .
Village and suburban, by staff surveyors	4,494	4.22s.	948 13 4
Village and suburban, by licensed surveyors	10	16.00s.	8 0 0
Village and suburban, by licensed surveyors (costs not available) .. .. .	..	..	.. .. .
Town, by staff surveyors	251	24.24s.*	407 7 6
	(in 336 sections)		
Town, by licensed surveyors	22	..	Not available.
	(in 5 sections)		
Town, by licensed surveyors (paid by applicants)	77		.. .. .
Native Land Court, by staff surveyors	29,365	8.72d.	1,067 19 11
Native Land Court, by licensed surveyors	206,696	22.00d.	18,945 1 9
Native Land Court, by licensed surveyors (paid by applicants)	11,451	..	.. .. .
Maori Land Board, by staff surveyors	8,813	27.00d.	991 9 3
Mining, by licensed surveyors (paid by applicants)	2,842	..	.. .. .
Mining, by staff surveyors .. .. .	..	..	.. .. .
Roads, by staff surveyors	326.12 miles	£18.18†	5,930 0 10
Roads, by licensed surveyors	69.5 „	£18.51†	1,286 16 8
Roads, by licensed surveyors (costs not available)	6.25 „	..	.. .. .
Roads, by licensed surveyors (paid by applicants)	3.75 „	..	.. .. .

* Per section.

† Per mile.

TABLE B.

Land District.	Rural Surveys.	Native Land Court Surveys.
	Acres.	Acres.
Auckland	151,627	114,949*
Napier	22,559	96,054
Taranaki	11,302	18,872
Wellington	21,731	23,550
Marlborough	20,987	2,028
Nelson	32,647	..
Westland	17,445	590
Canterbury	40,414	282
Otago	334,258	..
Southland	26,123	..
Totals	679,093	256,325

* Includes 8,813 acres Maori Land Board.

TRIANGULATIONS.

As was indicated in last year's report would be the case, only such triangulation work has been undertaken as has been absolutely necessary for the connection and control of settlement surveys.

TOPOGRAPHICAL.

The principal items included under this heading are the preliminary surveys of kauri-gum lands in Auckland and of the Clayton Run in Canterbury.

STANDARD SURVEYS.

Work on these highly necessary surveys has been continued by Messrs. C. A. Mountfort, W. T. Neill, H. M. Kensington, and H. E. Girdleston in Napier, Dunedin, Auckland, and Wellington respectively. A certain amount of rural standard traverse has been done in Hawke's Bay and Canterbury, by Mr. C. A. Mountfort in the former and Mr. A. J. Mountfort in the latter.

SETTLEMENT SURVEYS.

Of these, which comprise Crown lands, land for settlements, and land for discharged soldiers, the bulk appears under the heading of "Rural" in Table A, the acreage there shown being 679,093 acres, and the remainder includes village and suburban and town lands. The bulk of the village and suburban (3,907 acres) in the Auckland District consisted of small holdings taken out of kauri-gum reserves. In Table B the rural acreage has been allocated to the various land districts.

NATIVE SURVEYS.

During the year staff surveyors completed the survey of 38,178 acres, while 218,147 acres was surveyed by private surveyors. Table B shows the total area surveyed in each land district.

GOLD-MINING SURVEYS.

The area surveyed under this heading was 2,842 acres, the whole being surveyed by private surveyors and the fees being paid by applicants. More than half the area surveyed was in Westland.

INSPECTIONS.

Owing to the depletion of the field-survey staff in consequence of the war it has not been practicable to fill the vacancies caused by deaths and retirements. Sufficient inspection-work has, therefore, not been done, and most of that undertaken has been done by Chief Draughtsmen and District Surveyors. As in the past, inspections show that generally good work is being done, but there is no doubt that the fact of inspection-work being somewhat in abeyance has had a tendency to induce carelessness in some surveyors, the more so as these are handicapped by having at present often to employ inefficient field hands.

PROPOSED OPERATIONS FOR 1917-18.

Triangulation.—This work must still remain in abeyance, and only such as is absolutely necessary in connection with settlement surveys will be undertaken. This is much to be regretted, seeing that in some districts, more especially Hawke's Bay, the minor triangulation, owing to its low grade and the differences of standards used for the bases, is not suitable for the control of settlement surveys, for which purpose it must as soon as possible be revised and extended.

Standard Surveys.—This work will be continued in Auckland, Napier, Hastings, and Dunedin. Rural standard traverse will be undertaken over the country between Napier and Hastings and near Feilding.

Settlement Surveys.—At the close of the year there were in the hands of the staff and temporary surveyors 592,631 acres of settlement lands and 61,879 of Native lands, while in the hands of private surveyors there were 8,627 acres and 367,829 acres respectively. The distribution of these areas into the several land districts will be found in Table 3. As is always the case, the field-work of a large amount of this has been completed, and the mapping will be finished during the months of July and August, when most of the surveyors are called in from the field to the office. There was also on hand, but unallocated, an area of about 17,000 acres. This work now in hand, together with the survey of estates that will be acquired during the coming year for discharged soldiers and ordinary settlement, and of Crown lands that it may be decided to put into the market, will occupy the staff surveyors fully for the year 1917-18 and give work to a large number of contract surveyors.

HEAD OFFICE DRAUGHTING STAFF.

The work of the year has been chiefly routine. The maps for the census of 1916 were prepared and put through. The new map of the City of Wellington was printed and published, and also Coleridge Farr's magnetic survey report. The year's work has shown the effect of present conditions very noticeably. In respect of economy and as to the production of our publications for sale certain reforms are in contemplation, but nothing new can well be attempted, nor any changes of importance, although the need for bringing the general publications more into line with public demand is every day emphasized. In connection with this I may say that in the preparation of new county maps greater attention is now paid to certain details than formerly. New four-mile maps of the South Island are in preparation, and a long-delayed new map of the whole Dominion on a ten-mile scale, showing all counties, &c., will soon be issued.

SURVEYORS' BOARD.

The chief feature of the Board's work for the year was the preparation of the papers for the examination held in March, 1917, which fell to it in rotation. At the examination in September, 1916, eight candidates sat and three passed; at that in March, 1917, two sat and one passed.

DRAUGHTMEN'S EXAMINATIONS.

With a view to raising the standard of draughting and computing, the Public Service Commissioner framed regulations providing for an examination to be held each year, and that certificates of proficiency should be issued in connection therewith. Owing to short notice there were not many candidates, and no certificates were granted. It was found that it would be better to divide the examination into two parts, and to issue certificates for draughtsmanship and for computing separately. Fresh regulations and a syllabus are being prepared, and an examination will probably be held about August next, when it is hoped that a considerable number will present themselves for examination.

TIDAL WORK.

For some years past, under arrangement with the Marine Department, Survey officers under the direction of the Chief Computer, Dr. Adams, have computed the predictions of tides for the ports of Auckland and Wellington. During the past year the officers engaged on the work were Messrs. Gillespie and Hay, Dr. Adams himself being occupied in respect to this work with a reinvestigation of the processes of analysis and prediction as now carried out. This became necessary on account of certain differences being found to exist between the United States predictions and the New Zealand predictions for the two ports mentioned. At the close of the year the investigation was not far enough advanced to give any clue to the cause of the differences, which it may be said are not of a serious nature. The work proposed for next year is the predictions for the year 1919 and the completion of a new analysis (commenced this year) for the Port of Auckland to form the basis of the predictions for that port for the succeeding five or six years.

MAGNETIC OBSERVATORY.

Mr. Skey has carried on the usual work of this observatory, and reports as follows:—

“The tables of hourly values of the magnetic declination and the horizontal magnetic force have been drawn up from the measurement of the year’s magnetograms at hourly intervals. The mean value of the magnetic declination for the year thus obtained is 16° 49’ 84” E. of N., and the mean value of the horizontal magnetic force is 223550 c.g.s. unit. The approximate mean dip for the year was 68° 04’.

“The usual monthly curves of diurnal change and the seasonal vector diagrams for the year have been drawn, and it has this year also been possible to draw an annual vector diagram for the mean year of the years 1902, 1903, 1904, 1905, and 1913, 1914, 1915, 1916. These two groups of years are separated approximately by a sun-spot period, and it was therefore justifiable to mean them all together. The resulting vector diagram exhibits clearly the average non-cyclic change throughout twelve months, there appearing a maximum H in summer and another maximum in winter. Other features of the diagram are drawn attention to in the report. In future years it will be interesting to determine how this diagram varies with position in the sun-spot period.

“The Eschenhagen magnetographs at Amberley substation have been kept continuously recording, and have yielded most valuable magnetograms.

“The usual meteorological observations have been taken thrice daily on six days of the week, twice a day only on Sunday. The self-recording meteorological instruments have all performed well during the year, recording continuously temperature, air-pressure, and rainfall.

“On the Milne seismograph eleven considerable earthquakes of origin outside the Dominion were recorded.”

GENERAL.

I have again to report that during the year a large number of officers has enlisted. They include seven surveyors, seventeen draughtsmen, three field cadets, and seven draughting cadets. Their names will be found in the report by the Under-Secretary. To keep the work going it has been necessary to employ temporary men, and preference has been given where possible to discharged soldiers. I am pleased to say that these have mostly been doing excellent work. Notwithstanding this all the offices are understaffed, and in consequence much necessary mapping, such as the preparation of four-miles-to-inch maps and the one-mile-to-inch maps of survey districts, is falling into arrears. In most districts there has been a falling-off in survey work generally, and so it has been possible to carry on with staffs that could not possibly keep things going under normal conditions. In one office, however—New Plymouth—the work has increased by reason of the operation of the West Coast Settlement Reserves Act, which has involved the preparation during the year of some four thousand freehold orders (in quadruplicate). More use has been made of sun printing than heretofore, and still more will be made during the ensuing year.

Numbers of field hands have also enlisted, and it is with great difficulty that surveyors have been able to keep up their parties. This difficulty is consequently increasing, and will apparently soon seriously hamper survey operations.

By the retirement of Mr. W. Deverell the Department has lost one of the best draughtsmen it possessed, and by the death of Mr. Bronte the Head Office was deprived of a most useful officer. Special mention of these officers has been made by the Under-Secretary in his report, but I should like to say a word in appreciation of the particularly manly way in which Mr. Bronte stuck to his post and performed his duties while combating a long and prostrating illness.

I regret to have to record that the following officers, lost their lives in defence of their country: Surveyors—W. M. Gray and S. O. Esam; draughtsmen—R. C. Calman and R. V. Parker. These were killed in action, while three cadets, G. A. Harvey, T. H. Hudson, and J. C. Thompson, died of disease. They were all good keen young officers whose loss will be much felt. The sympathy of their fellow-officers goes out to their relatives.

The departmental list for the 31st March, 1917, shows that the field staff numbered seventy-seven, but at that date twenty were away with the Expeditionary Forces, leaving an available number of fifty-seven. They comprise one Inspector, forty-four staff surveyors, five temporary surveyors, three cadets, two staff assistants, and two temporary assistants; and of these leave to join has been granted to two staff surveyors and one survey cadet. Of the twenty who have already joined, ten were staff surveyors, nine were cadets, and one a staff assistant.

In concluding this report I am pleased to be able to record that the various Chief Surveyors all bear testimony to the willing and efficient way in which the officers under them have performed their duties during the year.

Table 1.—RETURN OF FIELD-WORK EXECUTED BY HEAD OFFICE STAFF.
From 1st April, 1916, to 31st March, 1917.

Land District.	Standard Surveys.				Inspections.		Other Work.
					Number of Surveyors.		
	Completed.		In Progress.		Staff.	Private.	
	Miles.	£	Miles.	£			£
Auckland	29.16	1,895	75	2,398	..	..	220
Wellington .. .. .	..	..	..	353	..	2	708
Hawke's Bay .. .. .	..	..	..	1,743	..	..	..

Table 2.—RETURN OF FIELD-WORK EXECUTED BY STAFF AND CONTRACT SURVEYORS FROM 1ST APRIL, 1916, TO 31ST MARCH, 1917, IN THE SEPARATE LAND DISTRICTS (NOT INCLUDING INCOMPLETE WORKS).

Land District.	Minor Triangulation.		Topographical Survey for Selection as Unserved Land.		Rural.		Village and Suburban.		Town Section Survey.			Native Land Survey.*			Gold-mining Survey.	Roads, Railways, and Water-races.		Other Work (Cost).	Total Cost of Surveyor and Party from 1st April, 1916, to 31st March, 1917.	
	Acres.	Average Cost per Acre.	Acres.	Cost per Acre.	Acres.	Number of Sections.	Cost per Acre.	Acres.	Number of Sections.	Cost per Section.	Acres.	Number of Sections or Divisions.	Cost per Acre.	Acres.		Miles.	Cost per Mile.			
Auckland	1,000	1.51	11,400	d. 2.28	138,355	s. 1.90	3,917	133	s. 3.30	212.50	267	s. 24.5	103,498	1,119	s. 1.94	563	s. 265.75	18.01	£ 27,963 11 1	
Hawke's Bay	..	..	..	..	22,559	1.32	93	27	11.25	2.00	2	138.0	96,054	521	1.50	..	13.30	12.53	5,466 2 3
Taranaki	..	..	..	..	11,302	2.90	0.25	1	180.00	1.25	5	30.0	18,872	205	1.26	..	11.21	25.01	3,197 14 4
Wellington	..	..	..	..	21,731	1.80	298	44	8.52	0.06	1	70.0	23,550	207	1.88	..	0.97	23.92	4,481 4 0
Marlborough	8,559	0.90	2,028	13	2.62	77.60	1,089 15 8
Nelson ..	4,200	3.30	..	..	32,647	2.03	64	8	13.77	0.15	1	92.5	..	..	..	553	11.82	30.60	5,621 6 1
Westland	..	..	13,350	2.90	17,445	2.90	2.25	1	62.70	..	..	..	590	3	2.10	1,527	6.50	14.10	2,840 10 9
Canterbury	..	..	13,800	1.00	40,414	0.84	..	..	..	..	..	..	282	6	2.62	..	6.50	16.85	2,685 12 5
Otago ..	..	..	22,750	0.50	334,258	0.19	..	..	..	32.00	50	11.0	..	..	..	..	77.00	16.60	4,428 1 8
Southland	..	..	..	..	25,822	3.36	130.20	11	12.04	3.12	10	46.9	..	..	..	..	8.20	15.85	3,297 17 1
Means and totals	5,200	..	61,300	..	653,092	..	4,504.70	251.08	244,874	2,643	401.25	..	5,148.16	61,071 15 4

* Includes Native Land Court, Maori Land Board and other Native lands under this head.

Table 3.—RETURN SHOWING SURVEYORS EMPLOYED AND THE WORK ON HAND ON 1ST APRIL, 1917.

Chief Surveyors.	Surveyors employed.			Work on Hand.					
	Staff.	Tempo- rary.	Contract.	Land District.	Trig.	Settle- ment.	Town.	Native- land Sur- vey.	Roads.
H. M. Skeet ..	15	7	53	Auckland ..	16,000	Acres. 167,456	Acres. 30	Acres. 321,341	Miles. 228.25
W. F. Marsh ..	7	..	10	Hawke's Bay ..	..	80,171	..	28,231	..
G. H. Bullard ..	3	1	8	Taranaki ..	27,000	46,210	..	28,696	4.00
G. H. M. McClure	3	..	11	Wellington ..	..	16,663	15	51,440	1.75
F. A. Thompson ..	4	..	4	Nelson ..	..	49,520	..	..	8.40
H. D. McKellar ..	..	1	..	Marlborough ..	..	6,900	..	..	..
T. Brook ..	2	..	1	Westland ..	..	*25,400	..	..	..
W. H. Skinner ..	3	..	..	Canterbury ..	..	78,662	..	..	21.00
R. T. Sadd ..	4	..	..	Otago ..	..	143,766	..	..	..
H. D. M. Haszard	3	..	1	Southland ..	..	8,510	..	..	0.10
Total staff sur- veyors	44	9	88	..	43,000	623,258	45	429,708	263.50

* Includes 5,000 acres topographical.

Table 4.—PRINCIPAL CLASSES OF OFFICE-WORK DONE FROM 1ST APRIL, 1916, TO 31ST MARCH, 1917.

District.	Plans placed on Instruments of Title.			Deeds and other Instruments passed.	Plans examined.	Maps drawn.			Lithos published.	Lithos sold.
	Leases and Licenses.	Freehold.	Miscellaneous.			Deeds or other Instruments.	Standard Publications.	Sale Plans.		
Auckland ..	1,152	8,570	6,037	3,269	1,782	..	..	243	1,500	£ s. d. 163 17 6
Hawke's Bay ..	154	2,453	1,333	965	588	395	..	22	..	58 12 9
Taranaki ..	321	1,128	367	1,709	328	289	5	9	..	30 11 10
Wellington ..	414	4,315	506	2,424	446	589	9	33	..	39 18 4*
Marlborough ..	85	211	2	..	39	..	..	4	..	3 11 0
Nelson ..	343	645	..	234	184	333	..	25	..	27 18 0
Westland ..	124	128	101	..	75	8	6	..	..	14 16 10
Canterbury ..	214	2,784	30	1,805	311	..	..	18	..	22 12 6
Otago ..	874	1,614	71	5	147	874	1	29	812	39 1 10
Southland ..	365	877	15	368	92	427	2	55	..	33 11 0
Totals ..	4,046	22,725	8,462	10,779	3,992	2,915	23	488	2,312	434 11 7

* Includes counter-charges, tracings, &c.

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