

1931.
NEW ZEALAND.

DEPARTMENT OF LANDS AND SURVEY.
SURVEYS

(ANNUAL REPORT ON).

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

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

SIR,—

Wellington, 21st July, 1931.

I have the honour to present herewith the report on survey operations for the year ended 31st March, 1931.

I have, &c.,

The Hon. E. A. Ransom, Minister of Lands.

H. E. WALSH, Surveyor-General.

REPORT.

A SUMMARY of the operations carried out for the year ended 31st March, 1931, follows, grouped under appropriate headings. A concise summary of the field-work completed during the year is tabulated in Tables A, B, and 1 to 5 herewith.

Table A shows that the average costs remain much the same as formerly, with the exception of the Native Land Court surveys, where the increased area and larger blocks dealt with reduced the cost per acre to less than one-half that of the previous year.

Table B shows that a much larger area of both Crown lands and Native lands has been surveyed during this year than was done last year, North Auckland and Otago accounting for the major part of the increase in Crown lands and Auckland for the increase in Native lands.

TABLE A.

Class of Work.	Area, &c.	Average Cost.	Total Cost.
			£ s. d.
Minor triangulation, by staff	33,872 acres	1·52d. per acre	213 19 10
Contoured topographical, by staff	236 sq. m.	£4·39 per sq. m.	1,037 0 1
Rural, by staff	134,672 acres	2·13s. per acre	14,347 15 6
Suburban, by staff	2,134 „	15·38s. „	1,641 9 1
Town, by staff	357 sections	£2·20 per section	786 3 2
Town, by private surveyors	14 „	£5·54 „	77 11 7
Native Land Court, by private surveyors	142,535 acres	0·70s. per acre	4,986 3 4
Native Land Court, by staff	34,625 „	1·05s. „	1,816 14 8
Roads, by staff	250 miles	£25·96 per mile	6,484 14 0
Other work by staff	..	..	6,891 11 0
Total cost of completed work	..	..	38,283 2 3

TABLE B.

Land District.	Rural Survey.	Native Land Court.
	Acres.	Acres.
North Auckland	44,789	1,627
Auckland†	16,199	146,431
Gisborne	13,579	8,833
Hawke's Bay	2,860	1,734
Taranaki	1,615	904
Wellington	5,474	17,357
Marlborough.. ..	..	89
Nelson	..	..
Westland	4,341	..
Canterbury	6,124	160
Otago	37,783	25
Southland	1,908	..
Totals	134,672	177,160

MINOR TRIANGULATION.

An area of 33,872 acres is returned under this heading, principally in the Hawke's Bay and Nelson Districts.

CONTOURED TOPOGRAPHICAL SURVEYS.

Small areas under this heading were surveyed in Taranaki and Canterbury. Experiments by means of aerial photography were made during the past year in the Nelson District, but the plotting from the photographs has not yet been completed. Further experiments will be continued during the year.

SETTLEMENT SURVEYS.

The Crown lands and lands-for-settlement surveys are set out in Table 2 under their appropriate headings for each land district.

NATIVE-LAND SURVEYS.

This work, the greater portion of which was carried out by private surveyors, shows an increase of 104,000 acres, due to the work necessary for the consolidation of Native blocks.

GEODETIC TRIANGULATION.

The progress made this year has been much better than in former years, mainly due to the substitution of luminous signals (lamp and helio) in place of beacons. In all, twenty-one triangulation stations have been observed from, while latitude has been observed at eleven stations wherever weather conditions were favourable and could be taken without delaying horizontal angle measurements, and azimuth observations were made at five selected stations.

The summation errors of the fifty-three triangles closed by this year's observations average 1"·13 per triangle, while the average closing-error of the twenty-eight triangles in which luminous signals exclusively were used is 0"·93.

The work now connects three bases—Kaingaroa, Wairarapa, and Eltham—by a complete network, and a fourth base—Matamata—will be included in the same network when the observations in its base net are completed.

The preliminary computation to fix a geodetic datum is well under way, and this is being utilized in the readjustment of the minor triangulation to bring the latter under a more rigorous control than it has previously had.

STANDARD SURVEYS.

During the year the plans of the Invercargill standard survey were completed; good progress was made with the survey in the Auckland metropolitan area, and extensions to the Wellington and Christchurch standard surveys. Some eighty miles of rural standard traverse, principally in the Taranaki and Southland Districts, were completed.

The protection and maintenance of standard survey marks due to road-reconstruction and permanent surfacing has again occupied considerable time in the various districts.

FIELD INSPECTIONS.

Owing to the financial stringency, field inspections have not been carried out as often as is desirable, but where this has been done the results, with one or two exceptions, show that a high standard of work is still maintained. In one case the result of the inspection was referred to the Survey Board for action, and the Board, after inquiry, cancelled the registration of the surveyor responsible.

MAGNETIC OBSERVATORY.

The work of the Magnetic Observatory has been carried on throughout the year. Hourly values of the magnetic declination, magnetic horizontal force, and magnetic vertical force have been computed from the hourly measurements of the Eschenhagen magnetograms obtained at the Amberley Substation. The resulting mean values for the year 1930 are—

	Amberley Substation Mean Values, 1930.	Equivalent Christchurch Values.	Change since 1929.
Magnetic declination (east) ..	.. 17° 51'	17° 48'·3	+5'·9
Magnetic horizontal force ..	.. 0·22350	0·22108	—15 γ
Magnetic inclination ..	.. —67° 58'·5	—68° 18'·3	—0'·7
Northerly component ..	.. 0·21274	0·21049	—28 γ
Easterly component ..	.. 0·06851	0·06760	+30 γ
Vertical component ..	.. —0·55247	—0·55570	+5 γ
Total magnetic force ..	.. 0·59597	0·59806	—11 γ

In the summary for 1929–30 the easterly component for 1929 was accidentally given as 0·06713, instead of the correct value 0·06730; and the variation of the quantity since the previous year was given as +14, instead of the correct +31, which is in harmony with the +30 given in the above table for the amount of change of easterly component from 1929 to 1930.

The secular change in declination is seen to be still high, as has been noted during the past few years at Christchurch.

The tabulated hourly values as published are the values for the absolute magnetic station, "Peg Absolute," at Amberley, to the immediate south of the Eschenhagen Variation House.

It is of interest to note that at the epoch of the magnetic survey of New Zealand, the middle of 1903, the magnetic declination was 16° 18' E. of north: in 1930 the mean value is 17° 48' E., the increase of declination in the twenty-seven years being 1½ degrees.

On the 17th March, 1930, Mr. Frank T. Davies, physicist to the Byrd Antarctic Expedition, with Mr. Clark, his assistant, took his absolute magnetic instruments to Amberley, and a comparison of standards was made from one day's observations. The Christchurch standard magnetometer No. 1 and the earth inductor 109 were observed with simultaneously with Mr. Davies's observations. The resulting instrumental differences were only small, and magnetogram data has been forwarded to Mr. Davies for use in publishing his results.

During the year the Milne seismograph No. 16 recorded seventy-two earthquakes, less than one-fourth of which originated in New Zealand. The list of earthquakes will be published later, and results have been communicated previously to the British Association Seismological Committee at Oxford.

I am very grateful for the fact that during the year the Department ordered an excellent set of three component Galitzin seismographs, which arrived in the following year. In a country where local destructive earthquakes occur it is wise not to concentrate all instruments at one place, and it is satisfactory that New Zealand now has two separate stations with good teleseismic equipment under the control of trained observers. It is obvious that two such stations is the least number required in such a country. As time goes on, still greater progress will be made when more instruments, particularly suited for recording shocks originating within New Zealand, become available.

In December, 1930, rugged country in the mountains at the head of Edwards Valley, near Arthur Pass, was visited, and effects produced by the earthquake of the 9th March, 1929, inspected. This somewhat inaccessible country was practically unknown until a party from a local mountaineering club traversed it and saw signs of earthquake damage. It would be easiest seen from an aeroplane. Opinions formed from the observations—and later corroborated by the Chief Surveyor for Canterbury, who made a visit to the country near Trig. N—indicate that "Arthur Pass" is somewhat of a misnomer for that earthquake. Actually the origin seems to have been in country, both unoccupied and unmapped, north of the Esk River on to the headwaters of the Poulter River.

The computations in connection with the astronomical work of the geodetic survey have been continued.

Last year an area of land at Eyrewell was under consideration and tested as a suitable site for the observatory. It was suggested that as the plantation of pine grew up the pollen might interfere with precise atmospheric electric work, and nothing further was done in the matter. Personally, I feel that the pollen and general atmospheric dust nuisance is to be feared at almost every place where such observations are being carried on nowadays.

The aerological work has been continued by the aid of pilot balloons, and daily information sent to the Director of Meteorological Services for use in forecasting.

The Benschdorf electrograph has been kept in operation continuously, and the records have been measured and hourly values tabulated for all days with satisfactory records. Internal dewing still gives a lot of trouble, and can only be satisfactorily cured by the provision of an all-enclosed electric heater, using alternating current supplied by (preferably) an underground cable from the existing power-main running past at some chains away from the electrograph-house. The spider nuisance has been much reduced by providing a metal cowl over the base of the projecting collector arm. The ebonite insulator on the torsion head is at intervals a source of weakness, although it is tested daily, and other insulation is maintained satisfactorily. Some further culling of values is being done to the electrograph records just now before they are published. The results for 1928-29 have been published in the *Journal of Terrestrial Magnetism*, September, 1930, and were found to confirm the peculiarity of phase-angles of the atmospheric electric potential component variation found in other parts of the world. The diurnal pulse is evidently world-wide simultaneous in its action, and must be further investigated. The next point of interest is the character of the annual variation in this latitude; and in this connection undisturbed measures of air conductivity and ionization will be of value.

The usual thrice-daily meteorological observations have been continued and the resulting information made available to the daily papers. Government Departments and other organizations have been supplied with various detailed information from our past tabulated meteorological records, which are proving increasingly useful.

Commencing early in January, Mr. Baird carried out a small magnetic survey near the Moturoa Oil-well. The elements observed were dip and vertical force. On the completion of this work the opportunity was taken to reobserve the magnetic dip at the old stations A and B, New Plymouth.

At Western Park it was found that excavation and levelling of the ground had removed the old magnetic station; however from the horizontal co-ordinates the position was fixed by Mr. C. Kenny, a surveyor from the District Office, New Plymouth. A totara peg was put in, and this station was observed at on the 3rd February, 1930. The observed dip (circle 147, needles 1 and 2) was found to be $-64^{\circ} 08' 4$ at 10.35 N.Z.S.T. At New Plymouth Racecourse the site of the old magnetic station had evidently been excavated some 6 ft. This station was also refixed by horizontal co-ordinates by Mr. Kenny, and the dip was observed on the 3rd February, 1930. The resulting dip (circle 147, needles 1 and 2) was $-64^{\circ} 36' 38$ at 15.00 N.Z.S.T. In 1903.5, the epoch of the magnetic survey, the dip at Stations B and A, New Plymouth, were $-63^{\circ} 29' 7$ and $-63^{\circ} 56' 1$ respectively; hence in 26.75 years the dip has increased $-38' 7$ and $-40' 3$ at these stations; the average annual rate is $-1' 47$ (angle of dip increasing). At the Christchurch Magnetic Observatory over these years the average rate of change of dip has been $-1' 33$ per annum.

TIDAL SURVEY.

The tide-tables for the year 1932 for the seven New Zealand standard ports (Auckland, New Plymouth, Wellington, Lyttelton, Dunedin, Bluff, and Westport) for which tidal predictions are published were received in Wellington on the 13th June, 1930, from the Hydrographer to the Admiralty.

The work of measuring the times and heights of high and low water was again performed at the Tidal Institute, University of Liverpool, England.

The investigations carried out to determine any vertical movement in the Earth's crust at Westport as a result of the disastrous earthquake which occurred in June, 1929, show that no appreciable movement has taken place. The deviations from the derived value of mean sea-level for five years (1918 to 1922) are as follows: For period one year prior to earthquake, $+0.139$ ft.; one year subsequent, $+0.084$ ft. As Westport is a riverain port, these differences cannot be taken as definitely indicating any change.

Mean high water and mean sea-level has been determined for Hokianga from automatic tide-gauge records, as follows: Mean high water, 14.65 ft. above zero of standard gauge; mean sea-level 10.50 ft. above zero of standard gauge. Concrete block centred with iron pipe 20.79 ft. above zero of standard gauge, therefore mean high water equals 6.14 ft. below concrete block.

PROPOSED OPERATIONS, 1931-32.

On the 3rd February, 1931, the Hawke's Bay District suffered considerable damage as a result of a disastrous earthquake, followed by fire, in which the departmental records were destroyed. With the exception of a certain amount of survey data which is being collected from private surveyors, and all other available sources, practically the whole of the survey records in this district have been destroyed.

For the purposes of re-establishment, and as a basis for future surveys, it is proposed to revise the present triangulation in the district, as well as the standard surveys of Napier and Hastings; also to run a series of rural standard traverses along the main roads.

Geodetic Triangulation.—Owing to the loss of the Hawke's Bay records, it will be necessary to undertake the revision of the triangulation in that district, and the field-work of the geodetic triangulation will, unfortunately, have to cease temporarily and the surveyor proceed to the more urgent work in Hawke's Bay. The connection to the Matamata base will, however, be completed before the temporary cessation, so that, of the five bases in the North Island, four of them will be interconnected.

Minor Triangulation.—The only work proposed to be done of this class is the reobservation of the Hawke's Bay circuit, the records of which have been destroyed.

Precise Levelling.—Instrumental equipment for this work is now available, but while it is very desirable that this work should be commenced, especially in the Hawke's Bay District, where an unknown area has been uplifted, it is not proposed to proceed with the work during the present year, for financial reasons.

Standard Surveys.—Auckland City survey and Invercargill and Taranaki rural surveys will be continued to a point where they can be satisfactorily terminated temporarily, and the surveyors engaged thereon transferred to Hawke's Bay District to carry out the revision of the standard survey in the towns of Napier and Hastings, and survey rural standard traverses along the main roads as a basis for future surveys. The standard extension in Christchurch will be continued and any necessary work carried out in connection with the maintenance and protection of existing standard marks.

Town-section Surveys.—The work in hand under this heading comprises an area of 283½ acres, principally in the Otago and North Auckland Districts.

Rural Settlement.—Future operations show an area of 138,645 acres, the greater portion of which is in the North Island. Further areas for settlement may be anticipated during the year.

Native Land Court Surveys.—Authority for the survey of 19,859 acres of Native land is in hand, a large proportion of which represents surveys of consolidated blocks in the Auckland District.

Office-work.—The routine examination and recording of plans, field inspections, photo-lithographic drawings, and the computations of the geodetic, magnetic, and tidal surveys will be continued, as well as the field-work outlined above. The recomputation of the revision triangulation in Hawke's Bay will be put in hand as soon as the observations in the field are sufficiently advanced. The collection of Hawke's Bay survey information, of which the original records have been lost, will be searched out and made available for the re-establishment of that district.

GENERAL.

Map-publications.—In the Chief Draughtsman's report appended hereto will be found details of the maps published during the year.

Town Subdivisional Surveys.—There was a considerable decrease in the number of plans, and also the area subdivided, compared with the previous year. An analysis of the number submitted and of their division into classified areas is given in the Chief Draughtsman's report.

Proclamation of Roads, &c.—During the past year a number of applications for the proclamation of road-lines laid out by the Native Land Court under the provisions of the Native Land Act, 1909, and amendments were considered and dealt with. The statutory notices under section 15 of the Native Land Amendment Act, 1914, were forwarded to the local authorities of the districts concerned, and in the majority of cases no objections were raised to the proclamation of the road-lines as public highways.

Under the Land Transfer Act, 238 warrants for the issue of certificates of title were examined and certified to in terms of section 13 of the Act. A number of applications to bring land under the Land Transfer Act were also considered and approved in pursuance of section 19 of the Act.

Under section 106 of the Land for Settlements Act, 1925, fifteen Proclamations were issued closing unformed and unused roads intersecting or adjoining land acquired under that Act.

Magnetic Observatory.—The three component Galitzin-type seismograph was received from the makers in March, and will be installed after testing.

STAFF.

Retirements.—E. H. Farnie: Mr. Farnie joined the Department as a temporary surveyor in 1893, and after carrying out many important surveys, principally in the Hawke's Bay District, he was in 1919 appointed to the Gisborne office, where he held the positions of Land Transfer Draughtsman and Chief Draughtsman, and finally in 1925 was appointed Commissioner of Crown Lands and Chief Surveyor in that district. Both in the field and office Mr. Farnie carried out his duties, in which he took a very keen interest, in a highly creditable and able manner.

S. L. Fairhall: Mr. Fairhall joined the Department as a temporary surveyor in 1906, and carried out many surveys, principally in the Nelson and Wellington Districts. He was appointed Chief Draughtsman at Invercargill in 1925, and in 1930 was promoted to the position of Chief Surveyor in that district. Mr. Fairhall always took a keen and able interest in the affairs of the Department.

Messrs. H. Kensington and F. Martin retired from the Service during the year. I regret to record the death of Mr. W. G. Pratt, a young draughtsman of considerable promise, in the North Auckland office.

Appreciation.—In conclusion, I wish to bring under your notice the appreciation of the various Chief Surveyors of the manner in which their officers have carried out their duties during the year, and I desire to add my personal thanks to the whole of the technical staff, both office and field, for the efficient manner in which the work has been performed during the year.

H. E. WALSHE, Surveyor-General.

Table 1.—RETURN OF FIELD-WORK EXECUTED BY HEAD OFFICE STAFF FROM 1ST APRIL, 1930, TO 31ST MARCH, 1931.

District.	Standard Surveys.				Geodetic Triangulation.				Other Work.
	Completed.		In Progress.		Completed.		In Progress.		
	Miles.	Cost.	Miles.	Cost.	Square Miles.	Cost.	Square Miles.	Cost.	
North Auckland ..	7.7	£ s. d. 438 14 3	25	£ s. d. 833 13 9	..	£ s. d.	..	£ s. d.	£ s. d. 375 8 3
Auckland ..	}	..	..	..	12,500	5,225 0 0	1,000	..	..
Taranaki ..									
Wellington ..									
Invercargill ..	86	9,959 12 9	..	..	..	..	..	..	..

Table 2.—RETURN OF FIELD-WORK EXECUTED BY THE STAFF AND CONTRACT SURVEYORS ON LANDS ADMINISTERED BY THE LANDS AND SURVEY DEPARTMENT FROM 1ST APRIL, 1930, TO 31ST MARCH, 1931.

District.	Minor Triangulations.				Contoured Topographical Survey. 1-15340.				Rural.				Village and Suburban.			
	Acres.	Cost per Acre.	Total Cost.	d.	£ s. d.	Sq. Miles.	Cost per Mile.	Total Cost.	Acres.	Cost per Acre.	Total Cost.	Acres.	No. of Sections.	Cost per Acre.	Total Cost.	
North Auckland	2,944	2-20	27 0 0	..	..	..	..	£ s. d. ..	44,789	2-28	5,095 10 11	1,421-99	67	11-94	£ s. d. 849 2 4	
Auckland	..	..	..	..	..	..	..	..	16,199	3-15	2,546 3 10	289-71	26	17-05	246 18 4	
Gisborne	..	..	..	..	..	..	..	..	13,579	2-92	1,984 19 4	36-71	3	4-58	8 8 0	
Hawke's Bay	20,000	1-08	90 0 0	..	..	..	..	..	2,860	1-76	252 0 0	19-00	1	22-11	21 0 0	
Taranaki	..	..	..	200	4-15	830 5 8	..	..	1,615	0-79	63 18 0	4-02	2	41-00	8 8 0	
Wellington	..	..	..	..	..	..	..	..	5,474	3-70	1,016 1 4	..	..	..	..	
Marlborough	..	..	..	..	..	..	..	..	..	..	..	44-00	10	12-60	27 9 2	
Nelson	10,928	2-13	96 19 10	..	..	..	..	..	4,341	3-70	803 11 5	135-00	25	53-81	363 5 2	
Westland	..	..	..	36	5-70	206 14 5	..	..	6,124	1-07	327 7 10	133-00	4	12-62	83 17 7	
Canterbury	..	..	..	..	..	..	..	..	37,783	1-07	2,032 0 3	..	..	..	..	
Otago	..	..	..	..	..	..	..	..	1,908	2-37	226 2 7	50-86	5	12-98	33 0 6	
Southland	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
Totals	33,872	1-52	213 19 10	236	4-39	1,037 0 1	213	14,347 15 6	134,672	2-13	14,347 15 6	2,134-29	143	15-38	1,641 9 1	

District.	Town Section Survey.				Roads, Railways, and Water-races.				Other Work.		Total Cost of Completed Work.
	Acres.	No. of Sections.	Cost per Section.	Total Cost.	Miles.	Cost per Mile.	Total Cost.	Cost.	£ s. d.		
North Auckland	50-94	68	£ 2-19	£ s. d. 148 15 10	6-32	22-73	143 13 7	£ s. d. 1,416 11 10	£ s. d. 7,680 14 6		
Auckland	12-82	7	10-78	75 10 0	67-62	16-79	1,135 8 0	1,215 15 5	5,219 15 7		
Gisborne	..	..	..	..	3-00	18-80	56 8 0	40 14 8	2,090 10 0		
Hawke's Bay	16-00	87	1-33	116 0 0	..	..	..	673 0 0	1,152 0 0		
Taranaki	..	..	..	..	81-50	31-27	2,548 15 6	158 0 2	3,609 7 4		
Wellington	65-25	130	1-80	234 4 10	1-28	68-90	88 3 10	2,369 18 6	3,708 8 6		
Marlborough	..	..	..	..	2-15	19-29	41 9 4	46 11 8	115 10 2		
Nelson	4-72	7	4-60	32 4 3	23-90	38-45	916 17 5	85 6 6	1,494 13 2		
Westland	7-75	28	2-85	79 16 0	2-40	21-40	51 7 0	92 17 8	1,111 9 8		
Canterbury	4-13	16	1-05	16 16 0	18-01	27-78	500 8 3	277 12 8	1,328 19 2		
Otago	9-52	11	6-75	74 6 3	4-66	15-87	74 0 0	318 9 2	2,498 15 8		
Southland	1-16	3	2-83	8 10 0	39-02	23-78	928 3 1	196 12 9	1,392 8 11		
Totals	172-29	357	2-20	786 3 2	240-86	25-96	6,484 14 0	6,891 11 0	31,402 12 8		

Table 3.—RETURN OF FIELD-WORK EXECUTED BY THE STAFF AND CONTRACT SURVEYORS ON LANDS ADMINISTERED BY OTHER DEPARTMENTS FROM 1ST APRIL, 1930, TO 31ST MARCH, 1931.

District.	Town Section Survey.				Native Land Survey.				Roads, Railway, and Water-races.				Other Work. (Cost.)	Total Cost of Completed Work.
	Acres.	Number of Sections.	Cost of Sections.	Total Cost.	Acres.	Number of Sections or Divisions.	Cost per Acre.	Total Cost.	Miles.	Cost per Acre.	Total Cost.			
North Auckland	15.41	9	£ 6.59	£ s. d. 59 7 1	1,627	16	s. 2.20	£ 179 7 9	..	£	£ s. d. ..	£ s. d. 65 0 0	£ s. d. 303 14 10	
Auckland ..	..	..	..	..	146,431	369	0.48	3,519 0 0	..	..	..	..	3,519 0 0	
Gisborne ..	..	..	..	..	8,833	37	2.77	1,221 17 9	..	..	..	..	1,221 17 9	
Hawke's Bay	..	..	..	..	1,734	85	3.55	308 0 0	..	..	..	..	308 0 0	
Taranaki ..	..	..	..	..	904	46	7.84	354 8 3	..	..	..	..	354 8 3	
Wellington ..	..	..	..	..	17,357	127	1.23	1,072 9 3	..	..	..	..	1,072 9 3	
Marlborough	0.12	1	5.57	5 11 6	89	7	11.60	52 0 0	..	..	..	..	57 11 6	
Nelson ..	..	..	..	..	..	..	..	..	..	..	..	..	..	
Westland ..	..	..	..	..	..	..	..	..	..	..	..	..	..	
Canterbury ..	1.03	3	2.57	7 13 0	160	12	9.90	79 5 0	15.2	20.5	313 0 0	11 4 3	411 2 3	
Otago ..	..	..	..	..	25	21	13.10	16 10 0	0.8	28.7	22 19 3	..	39 9 3	
Southland ..	0.25	1	5.00	5 0 0	..	..	..	..	19.0	7.8	147 14 1	2 0 0	154 14 1	
Totals	16.81	14	5.54	77 11 7	177,160	720	0.74	6,802 18 0	35.0	13.8	483 13 4	78 4 3	7,442 7 2	

Table 4.—RETURN SHOWING SURVEYORS EMPLOYED AND WORK ON HAND ON 1ST APRIL, 1931.

Chief Surveyors.	Surveyors employed.		District.	Work on Hand.					Standard Traverse.	
	Staff.	Contract.		Topo-graphical.	Settlement.	Native.	Roads.	Towns.	City.	Rural.
				Sq.Miles.	Acres.	Acres.	Miles.	Acres.	Miles.	Miles.
O. N. Campbell ..	5	..	North Auckland	..	32,747	5,708	0.1	74.4	..	..
K. M. Graham ..	7	8	Auckland ..	420	32,620	12,326	35.0	..	..	..
H. L. Primrose (deputy)	1	1	Gisborne ..	..	10,000	3,082	1.8	..	..	10
J. D. Thomson ..	2	2	Hawke's Bay..	20	17,000	..	..	..	100.0	1,000
W. D. Armit ..	2	4	Taranaki ..	..	3,300	968	..	..	..	..
F. H. Waters ..	2	6	Wellington ..	..	22,500	7,258	0.8	..	..	..
P. R. Wilkinson ..	..	..	Marlborough ..	..	..	500	60.0	..	..	..
A. F. Waters ..	2	..	Nelson ..	..	1,042	..	1.5	..	..	..
T. Cagney ..	1	..	Westland ..	..	353	..	1.0	..	..	..
W. Stewart ..	3	1	Canterbury ..	..	2,924	17	8.7	9.1	14.5	..
N. C. Kensington..	2	..	Otago ..	..	14,850	..	8.0	200.0	..	..
H. R. Mottram (deputy)	2	..	Southland ..	..	1,309	..	2.0	..	..	20
Totals ..	29	22	..	440	138,645	19,859	118.9	283.5	114.5	1,030

Table 5.—PRINCIPAL CLASSES OF OFFICE-WORK DONE FROM 1ST APRIL, 1930, TO 31ST MARCH, 1931.

District.	Plans placed on Instruments of Title.				Deeds and other Instruments passed.	Plans examined and passed.				Maps drawn for Lithography.		Lithographs, &c., sold.
	Crown.		Native Land.	Land Transfer.		Crown.	Native.	Land Transfer.	Other Departments.	Standard Publications.	Sale Plans, &c.	
	Leases, Licenses.	Free-hold.										
North Auckland ..	536	620	128	9,868	5,398	142	9	441	166	10	100	£ s. d. 188 17 8
Auckland ..	728	393	579	4,012	2,469	147	92	296	137	3	93	143 5 9
Gisborne ..	209	..	217	727	..	19	44	46	26	3	10	57 16 6
Hawke's Bay ..	73	54	88	777	557	19	11	104	55	4	3	44 4 11
Taranaki ..	292	..	122	1,708	870	24	47	103	49	1	1	42 12 0
Wellington ..	527	380	714	8,485	2,981	32	61	417	120	7	48	52 3 0
Marlborough ..	19	16	26	462	136	26	8	37	49	..	1	17 2 0
Nelson ..	187	95	..	1,435	688	28	..	105	53	4	50	35 7 1
Westland ..	253	..	..	499	812	40	..	27	3	..	2	19 7 6
Canterbury ..	308	134	78	3,270	2,253	42	8	305	48	6	1	108 7 7
Otago ..	312	..	9	4,036	400	72	1	143	31	5	13	107 0 3
Southland ..	176	74	4	998	881	44	..	71	46	..	2	100 17 3
Head Office ..	..	..	..	..	..	..	..	..	..	66	..	1,155 15 8
Totals ..	3,620	1,766	1,965	36,277	17,445	635	281	2,095	793	109	324	2,072 17 2

APPENDIX.

HEAD OFFICE, DRAUGHTING BRANCH.

(A. J. WICKS, Chief Draughtsman.)

Map-publication.—The total maps published during the year were 67, and the cost of printing £2,077. The maps comprised survey districts ($\frac{1}{2}$ mile to 1 in.), 17; survey districts (1 mile to 1 in.), 30; counties (1 mile to 1 in.), 7; towns, 6; territorial (4 miles to 1 in.), 1; miscellaneous, 6. The total number of copies printed under all headings was 20,848.

Cash sales of litho maps from all districts amounted to £1,410. Maps sold to other Departments totalled £660, while maps to the value of £1,265 were issued free or used in the office. Good progress is being made with the 4-mile series of maps, and also with standard maps on 1 mile to 1 in. scale.

Town Schemes.—Town schemes approved show a considerable decrease in numbers, 169 being approved this year, as against 230 for the previous year. The percentages in the principal districts were—North Auckland, 22·4; Wellington, 21·3; Canterbury, 17·2; Auckland, 14·8.

Analysis of the schemes shows that 1,454 acres were subdivided into residential lots outside the boundaries of boroughs and town districts; and of this area new roads account for 159 acres, road access reserves 12 acres, recreation and other public reserves 107 acres, leaving a balance subdivided into lots available for sale of 1,176 acres.

Draughtsmen's and Computers' Examination.—The annual examination was held in September, 1930, sixty-nine candidates presenting themselves for examination. The results were as follows—Draughting: Thirty-eight candidates, of whom three obtained first-grade passes (Messrs. C. H. Baigent, W. A. Nicholson, and E. Pfankuch), and eight obtained second-grade passes (Messrs. E. N. Allan, R. Anderson, F. Coleman, H. C. Ellis, E. M. Flanagan, G. R. Galbreath, A. Rocard, and J. K. Woodley). Computing: First grade, two candidates, who failed to pass; second grade, twenty-nine candidates, of whom eight passed (Miss N. E. Styles, Messrs. H. Barnes, K. A. Bell, D. Blake, H. D. Henderson, T. A. McLeod, R. J. Owen, and C. A. Woodall).

The outside examiners for the special subject of photo-litho drawing were again Messrs. M. Crompton Smith and J. W. Sturtevant.

Standard of Length.—During the year seventy-three bands were compared with the standard, the total length being 6 miles 49 chains. Of these, seventy were ordinary field surveyors' steel bands, of a length of 515 chains, and three were invar bands, of a length of 14 chains.

Civic Survey Maps.—During the year a special printing for the City Council of the Wellington City map on a scale of 4 chains to 1 in. was undertaken. Maps were also prepared showing the regional boundaries as set out by the Town-planning Board; these maps were printed on the 10-mile scale and were distributed to the respective local authorities. A special printing for civic survey purposes of the Borough of Oamaru was made on a 6-chain scale.

Tourist Map.—For the Tourist Department a map was prepared of the Hot Lakes district.

Approximate Cost of Paper.—Preparation, not given; printing (925 copies), £13.

By Authority: W. A. G. SKINNER, Government Printer, Wellington.—1931.

Price 6d.]

