

1938.
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, 1st July, 1938.

I have the honour to present herewith the report on survey operations for the year ended 31st March, 1938.

I have, &c.,

H. E. WALSH,

The Hon. Frank Langstone, Minister of Lands.

Surveyor-General.

REPORT.

THE work executed by the staff, both in the field and the office, during the year ended 31st March, 1938, is set out in tabular form below. A comparison with the previous year shows that very large increases are recorded in three particular classes of survey—housing, where the work has increased nearly eight times; roading, two and a half times; and rural surveys, twice that of last year. As may be expected with such a large increase in urgent work, a falling-off in the lesser urgent class of basic control surveys may be noted, this work having to remain in abeyance for the time being.

Brief reports of the more important aspects of the operations during the year are given below in their respective headings.

FIELD.

Geodetic Triangulation.—I have again to report excellent progress by the geodetic party, an area of 8,500 square miles being completed in the North Auckland peninsula and reconnaissance carried out over the northern end of the South Island, where five very high stations, averaging 6,600 ft., have also been occupied. In the North Auckland area forty-five stations were occupied, seven being on islands, on several of which delays were incurred in awaiting favourable weather for landing. The average closure of the 106 triangles is 0.66 second, the maximum closing error being 2.17 seconds. Latitude and azimuth were determined at nine stations. This area completes the observations for the North Island, except those required for the Laplace equations at several stations; these are being held over until the work in the South Island is sufficiently far advanced for the whole of the Laplace stations being determined and observed.

A new instrument is on order for this work, the present Wild primary triangulation theodolite No. 77 now having been several years in the field, although no difficulty is being experienced in obtaining the requisite accuracy for this work. The new theodolite, a Cooke, Troughton, and Simm's Geodetic Tavistock, is expected to be available for the opening of the season in spring, as for this coming year, owing to the height of the stations, it will not be possible to continue observations during the winter.

Triangulation.—No second order work was done during the year, owing to the necessity for completing the geodetic work as early as possible. The principal third order work was an area of 408 square miles, comprising twenty-nine stations, and covering the Poverty Bay flats and an area to the south-west joining up with the Hawke's Bay triangulation. The average triangular error of the ninety-four triangles observed was 2.8 seconds, the maximum being 8.0 seconds. An area of 12 square miles, comprising the whole of Raoul Island in the Kermadec Group, was covered by minor triangulation for the Public Works Department. This consisted of fourteen stations with measured base-line and with determination of latitude, longitude, and azimuth at one of the stations.

Topographical.—Scattered areas principally for development purposes (Native and Crown) were topographically surveyed by ground methods during the year. Besides these, the whole of Raoul Island, of 12 square miles, was also topographically sketched from fixings by the triangulation survey.

The aerial work in Hawke's Bay commenced last year was continued, but owing to the absence of the ground control surveyor in Raoul Island for some nine months, only 400 square miles were completed in the field.

Standard.—As mentioned before, this work shows a decided falling-off, only 45 miles of rural standard traverse being returned as completed during the year. While work in the Auckland City and suburban boroughs is being gone on with steadily by Mr. H. M. Kensington, that in Dunedin and elsewhere has had to be placed on one side by more urgent work. Present indications tend to show that it may be some considerable time before this important survey matter can be again actively prosecuted.

Precise Levelling.—This work also has been much delayed by having to place the surveyor (Mr. C. L. Cox) on urgent work from time to time. However, much preliminary work has been done in laying down bench marks and fixing their co-ordinate positions by survey. The bench marks are as follows:—

Fundamental cast in concrete <i>in situ</i>	..	..	..	..	..	14
New stones cast in concrete <i>in situ</i>	..	..	..	..	..	83
Old triangulation stations	..	..	..	..	..	3
Old survey stones	..	..	..	..	..	118
Existing B.M.'s of other organizations	..	..	..	..	..	20
New marks in piers, &c.	..	..	..	..	..	16

These total 254 in the 150 miles length of line to be levelled. The line of levels commences at Lyttelton, and after traversing the andesitic formation of Banks Peninsula passes over the gravels forming the Canterbury Plains. Consequently, only one fundamental mark is sited on rock, the balance being in gravel or other recent formation. These latter consist of a broad based slab of concrete 7 ft. square, cast *in situ* with one point well below ground-level, the other rising above ground-level and being suitably protected.

Rural Surveys.—128,167 acres of rural lands were surveyed during the year at the remarkably low figure of 1s. an acre. This is partly accounted for by the large area of runs subdivided in the Otago-Southland area (a total of some 66,000 acres). Were this excluded, however, the average cost of the balance would be only 1s. 6d. per acre.

Native Surveys.—The area returned under this heading is low, being only 7,924 acres, 55 per cent. of which is from the Auckland districts. This work, it is anticipated, will increase largely in the near future, as the need for titles, whether leasehold or Native freehold, of the consolidated and developed blocks arises.

Town and Suburban.—This heading does not include Government housing schemes, which are separately dealt with elsewhere. A slight falling-off is noted in this item, 264 town sections and 131 suburban sections being returned as against 275 and 151 last year. The costs this year remain at £2 12s. per town lot, while those of the suburban areas show an increase to £1 an acre, probably owing to the fact that the average area of these this year was smaller, being $8\frac{1}{2}$ acres as against 11 acres last year.

Housing.—The work for the Housing Construction Branch has increased enormously, and for the year under review has aggregated the full time of six surveyors and their parties. In all, preliminary surveys of 1,985 acres were made, and in addition, 584 acres were divided into 2,175 lots, the cost of the latter being £1 8s. per lot. As the preliminary surveys appear to be well in advance of annual requirements it is anticipated that there will be a reduction in the volume of housing survey work during the coming year.

Roads.—This item also shows a large increase, this year 204 miles as against 84 miles. The greater part of this is due to deviations consequent upon the improvements in alignments and gradients being effected on main highways. Where these surveys run through closely settled country a survey equal in accuracy to the rural standard surveys is laid down, and with similar permanent marks. These will be linked up with further standard or triangulation surveys when convenient and so form a part of the basic control of the survey system.

Inspections.—The inspections carried out during the year did not disclose any serious faults in the surveys, and no cases were submitted for inquiry by the Survey Board. Owing to pressure of urgent work, the number of inspections was low and inadequate for the purpose of ensuring a thorough check on each surveyor's work.

Accuracy.—Staff surveyors' reports show that a general high standard of accuracy is being maintained.

Other Work.—Under this heading a total of £3,532 is returned. This work is of such a nature that it cannot be shown under the classified headings in the tables. It may, however, be further subdivided as follows: Location of boundaries, pegs, and miscellaneous compass surveys, £1,149; investigational and inspection surveys, £763; maintenance of survey marks of basic control, £857; measurements and plans for Police Court cases, £254; and expenses of office routine, reports, transfers, and other work which cannot be allocated to any particular survey, £509.

OFFICE.

Plan Examination and Recording.—The number of plans submitted for examination and record remains practically the same as the previous year, and the staff has been kept fully occupied. No arrears have been allowed to accumulate as regards the examination of plans, although, in order to do this, some of the other phases of activity have had to suffer. In particular, map drawing for photolithography is in one district—Auckland—practically at a standstill. The dearth of trained junior draughtsmen due to the non-appointment of trainees during the depression years is now very apparent and, although cadets since appointed are making excellent progress generally, it will be a considerable time before the position is eased.

Uniform System of Recording.—During the year the Inspecting Draughtsman, Mr. R. C. Airey, visited each office, and thoroughly investigated the methods in use in each office. As a result of this inspection a uniform system has been tentatively drawn up and submitted for comment by each Chief Surveyor. The scheme and the comments are now being considered for final decision.

Computing Branch, Head Office.—Towards the end of the year, this branch was strengthened by the appointment of two cadets, and arrears of harmonic analysis of the tidal survey were put in hand. The adjustment of standard traverses in Hawke's Bay is now almost complete and, with these out of the way, it should be possible for the staff to cope with the adjustment of the triangulation now in hand and with that coming forward from the field.

The work of measuring the times and heights of high and low waters for the seven standard ports for the year 1939 was carried out as usual on the tide-predicting machine at the Tidal Institute, Liverpool University, from the harmonic constants computed in this branch. The seven ports for which tide-tables are published are Auckland, New Plymouth, Wellington, Lyttelton, Dunedin, Bluff, and Westport.

Provisional values of various points in and around Hauraki Gulf have been supplied to the Admiralty survey ship, H.M.S. "Endeavour," now carrying out a hydrographic survey in those waters.

Map Publications.—Full details of these are contained in the report of Mr. R. G. Dick, Assistant Surveyor-General, appended hereto. Your attention is drawn to the increasing use made of these publications both by the general public and Government Departments, the value disposed of being £5,050, which is £3,800 in excess of actual printing costs.

Aerial Survey Mapping.—The progress of this branch is more fully set out in the report of the Assistant Surveyor-General appended hereto. The branch has been unfortunate in losing the services of its Ground Control Officer, Mr. J. A. Henderson, who had to be placed on important work elsewhere, and also in the long delay in receiving its second precise stereoscope. An increased staff and equipment will be necessary before the programme of 3,000 square miles per annum can be put in operation.

The Centennial, 1940.—This Department is entrusted with the publication of an atlas for the Centennial year, and work was commenced midway through the year on the drawing of the plates. Briefly, the volume will be threefold: (a) historical, portraying the progress through the century; (b) physical and economic, showing the present position; and (c) consisting of a sectional modern map on a 10 miles to 1 in. scale. The National Historical Committee are providing the data for section (a), various Departments those for (b), and this Department for (c). A fuller description is given in the report appended.

Town Schemes.—An analysis of the 242 schemes approved during the year appears in the report of the Assistant Surveyor-General appended.

One point brought out by this analysis is worthy of attention—the very low ratio of the area of new roads to the total area. This is shown as slightly under 6 per cent. In a developed town this ratio would be about 33 per cent., while in suburban areas (to which these schemes approximate) the ratio would be about 25 per cent. It must be admitted that a number of these schemes are in fact re-subdivisions of previous schemes and therefore would not require new roading. Even after discounting for this, the figures show that at least two-thirds of the new lots front existing roads; in other words, “ribbon development,” which in the case of arterial roads constitutes a grave danger to traffic. At the present time when new and more direct highways are being laid out on the outskirts of the large cities the question of permitting their usefulness to be impaired by creating conditions likely to give rise to dangerous congestion should be considered.

Warrants for Title, &c.—The following summarises the number of Warrants and Proclamations issued for the year ended 31st March, 1938:—

Number of Warrants for issue of certificates of title	.. .. .	204
Number of Proclamations of road-lines under the Native Land Act, 1931	.. .. .	11

PROPOSED OPERATIONS, 1938–39.

Surveys.—The work in sight for the coming year is set out in Table 3. In addition to that shown, it is anticipated that much further work will be forthcoming during the year, especially as regards housing, roading, and probably Native surveys. The year promises to be a particularly busy one for the field and office staffs.

Geodetic Triangulation.—This work will be continued and observations in Marlborough, Nelson, and North Canterbury, including a base net, should be completed during the year. As already stated, a Geodetic Tavistock theodolite will be available in addition to the present Wild theodolite. It is hoped that a relieving officer can be placed on this work to allow much needed relief being given to the officer in charge, Mr. T. W. Preston, and his assistant, Mr. J. P. Arthurs.

Owing to the stations being high and remote from any means of communication, and the work being executed at night with small lights, there is a difficulty experienced in imparting instructions to the various light-keepers. To avoid the delays due to this, it is proposed to install a portable transmitting wireless set at the main camp and equip the light-keepers with appropriate receivers. This equipment is now under final test and should this prove satisfactory, as may be expected from the preliminary ones, the equipment should be in use this spring.

Triangulation.—Some years ago rural standard traverses were laid down in Taranaki, but it has been found impossible to make complete use of these owing to lack of control, the existing triangulation not being adequate for this purpose. It is proposed, therefore, to throw over the more settled areas a network of second and third order triangles based upon the geodetic work.

Precise Levelling.—It is anticipated that better progress will be made with this work during the year, although the increase in urgent current work may again interfere with continuous work upon it.

Aerial Survey Mapping.—This branch is to be increased both in staff and equipment, but it will probably be late in the year before sufficient accommodation is available to house the staff. The completion of the ground control in Hawke's Bay, work on which was interrupted last year, should be attained early this year.

Office Work.—The routine work for the coming year promises to be considerable, and present staffs will find difficulty in coping with it without dropping other essential, but not so urgent, services. In addition to this, the activities connected with the Centennial are calculated to make demands upon the draughting staff.

STAFF.

I regret to have to record the death of Mr. W. J. Johnson, Draughtsman, Native Branch, Auckland, Messrs A. J. Wicks, Assistant Surveyor-General, and C. H. Morison, Chief Surveyor, Hokitika, retired during the year. Mr. S. F. Baird, Surveyor, resigned to take up survey work overseas, and several draughtsmen have been transferred to other Departments. The numerical strength of the technical branch has, however, been maintained by further appointments both to the field and office.

APPRECIATION.

The Chief Surveyors in their reports speak highly in praise of their staffs both in the field and the office, and I would also add my appreciation of the manner in which they carry out the duties allotted to them.

H. E. WALSH, E.
Surveyor-General.

APPENDIX.

HEAD OFFICE, DRAUGHTING BRANCH.

(R. G. DICK, Assistant Surveyor-General.)

Map Publication.—The following tables summarize the map publications and sale credits in district and head offices.

TABLE 1A.—Summary of Printing Costs of Map Publication for the Year ended 31st March, 1938.

Class of Map.	Number of Issues.	Number of Maps Printed.	Total Cost.			Average Cost per Issue.			Average Cost per Map.		
			£	s.	d.	£	s.	d.	£	s.	d.
Survey districts, 40 ch. ..	16	867	121	17	5	7	12	4	2	9	
Survey districts, 80 ch. ..	16	3,850	136	3	6	8	10	0	0	8	
Counties	4	1,200	207	5	0	51	16	3	3	6	
Boroughs and specials ..	11	4,430	527	8	3	47	19	0	2	4	
Miscellaneous	25	4,377	230	6	10	9	4	0	1	0	
Totals	72	14,724	1,223	1	0	..	..	..	..	..

TABLE 1B.—Summary of Map Sales and Credits for the Year ended 31st March, 1938.

Item.	Credits.					
	£	s.	d.	£	s.	d.
Sale of lithographs to the public	1,594	3	2			
Sale of lithographs to other Departments ..	1,224	10	1			
Lithographs issued free to other Departments ..	1,227	19	9			
Lithographs for office use	1,006	8	3			
				5,053	1	3
Sale of publications and plan forms .. ..	..	..	..	415	19	0
Search fees .. ..	..	..	..	59	0	10
Royalty fees .. ..	..	..	..	653	0	3
Total .. ..	..	..	..	£6,181	1	4

TABLE 1C.—Summarized Statement of Sale and Disposal of Lithographs, Publications, Plan Forms, and Search Fees from 1st April, 1937, to 31st March, 1938.

District.	Survey Districts, 80 ch.	Survey Districts, 40 ch.	Counties.	Cities.	Boroughs.	Towns.	Four-mile Series.	General Maps of New Zealand.	Miscellaneous.	Topographical.	Publications.	Plan Forms.	Search Fees.	Totals.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Auckland and North Auckland	244 4 9	135 3 6	287 17 3	76 7 6	64 6 6	17 4 6	84 2 0	16 2 6	10 1 6	..	20 15 6	168 11 0	7 19 6	1,132 16 0
Gisborne	9 12 6	1 12 0	52 18 2	..	22 3 0	..	10 12 6	0 7 6	2 9 6	..	..	1 12 6	7 11 6	108 19 2
Hawke's Bay	20 1 8	6 14 10	49 2 7	..	16 11 10	0 3 6	17 15 10	3 5 0	1 15 3	..	4 18 3	25 12 0	3 6 0	149 6 9
Taranaki	53 11 6	28 2 2	42 17 6	18 4 0	22 19 6	2 2 0	13 19 6	0 7 6	2 8 0	0 8 6	2 9 8	9 6 4	..	196 16 2
Wellington	44 4 6	56 3 3	35 13 2	19 1 0	15 9 11	3 14 0	22 3 0	7 11 0	1 16 6	1 17 0	16 17 9	25 10 5	33 1 10	283 3 4
Marlborough	30 19 9	1 8 0	9 5 6	..	6 14 6	2 6 6	7 15 6	..	..	..	..	4 10 6	4 7 6	67 7 9
Nelson	40 5 0	7 15 0	43 7 8	11 3 6	6 9 6	0 6 6	30 5 0	1 7 0	1 16 0	..	5 3 0	19 9 6	0 1 0	167 8 8
Westland	4 2 0	0 19 0	55 8 3	..	6 11 0	1 13 0	14 1 6	2 7 0	0 16 0	2 7 0	0 15 6	15 3 6	0 13 6	104 17 3
Canterbury	71 1 9	44 10 0	73 4 6	10 19 6	11 7 0	..	65 9 0	3 8 0	8 11 3	2 7 9	5 17 6	35 19 6	1 6 0	334 1 9
Otago	214 17 6	8 15 0	36 3 6	36 5 0	24 10 6	11 13 0	47 12 0	5 14 6	5 14 6	2 3 6	2 15 6	33 13 3	0 3 0	430 0 9
Southland	70 17 9	3 2 0	9 13 3	17 0 3	11 10 0	8 13 0	10 15 0	3 13 8	0 12 0	0 5 0	2 12 4	14 5 6	0 11 0	232 19 2
Head Office	431 19 9	1 6 6	605 17 9	362 4 3	130 0 4	44 8 3	361 19 1	296 4 3	135 16 8	29 15 11	..	..	..	2,399 12 9
Totals	1,235 18 5	295 11 3	1,301 9 1	551 5 0	338 13 7	92 4 3	686 9 11	340 7 11	171 17 2	39 4 8	62 5 0	353 14 0	59 0 10	5,528 1 1

(1) PRINTING COSTS.

Departmental map publication is restricted by two factors—first, the preparation of cadastral maps by district offices has been limited by the large increase in urgent routine work for other Departments; and, second, the Printing Office, owing to the pressure of other work, cannot cope with any increased orders from the Department. Printing costs thus show a slight decrease on last year's figure of £1,234. The production of the Survey District map again shows a decrease, and, in this respect, owing to low stocks, it is essential that the production of this popular cadastral map be considerably increased. Taking into consideration the increased pressure of the work at the Printing Office, I wish to take this opportunity of thanking the Government Printer and his staff for their courtesy and assistance during the past year.

(2) MAP SALES AND CREDITS.

The sales and credits of lithographs as set out in Table 1B show an increase of £774 on last year's return which, set off against printing costs, gives a credit balance of £3,830. Royalty fees, which show an increase of £190, include the payment for the preparation of a special road map for a commercial firm.

Table 1C is an additional summarized return giving the details of the disposal of the various types of maps sold by the Department. Great use is made of the Survey District map as evidenced by the disposal of same. The handy size of the map makes it eminently suitable for illustration purposes. The 4-mile map series is becoming more popular, and with a revision, which is long overdue, could be adapted for other uses.

(3) LITHOGRAPHIC DRAUGHTING.

The map drawing in the Department has been practically at a standstill during the past year, due to the increase in land transactions of other Departments of State and the consequent need for increased staff, which has been recruited from the map-drawing staff. Each year the Department is falling behind in this branch, the staff increases during the year being required to cope with the increased routine activity of the Department.

Centennial Atlas.—In June, 1937, the Department was approached by the National Historic Committee in respect to the preparation of an historic atlas of New Zealand to commemorate the Centennial of New Zealand in 1940. Definite instructions were received in September necessitating an increase in the Head Office draughting staff. For this purpose additional quarters were required to house the computing and aerial-mapping staff so that the atlas-draughting staff could be closely supervised. Quarters were obtained in Aitken Street, and the Head Office draughting-room reorganized to accommodate eight additional draughtsmen.

The draughtsmen selected to undertake this work are as follows: Messrs. W. G. Harding (Head Office), C. T. Brown (Wellington), A. Jamieson (Auckland), J. R. Johansson (Dunedin), J. A. Hayward (Christchurch), C. R. Lyons (Christchurch), P. R. Malthus (Invercargill), C. R. Lane (Auckland), G. L. Redward (Napier).

The Department is aiming to produce an atlas at least of as high standard as those produced by other countries, and as no such atlas of New Zealand has yet been published it is appropriate that such a publication should be a feature of the forthcoming Centennial celebrations. The contents of the atlas have been divided into two series, one containing historic and progress maps and the other a modern series.

The historic section of the atlas will include maps showing South Pacific explorations, reproductions of Tasman's and Cook's charts, inland explorations, Antarctic explorations, and Maori maps. The progress of the Dominion will be illustrated in periods of approximately twenty-five years, depicting white settlement, population, changes in provincial and county divisions, communications, economic development, and vegetation.

The modern series will include a map of New Zealand on a scale of 10 miles to an inch, covering eight sheets. This map, it is hoped, will be the main feature of the atlas. Other maps comprised in the modern section depict orography, geology, climatology, with a map of the world with New Zealand in the centre, and maps of New Zealand Dependencies.

The whole work must be completed at as early a date as possible in order to allow the Printing Office time to complete the printing and binding before the opening of the Exhibition in November, 1939.

Special Feature Maps.—For the year ending 31st March, 1938, the following special feature maps have been completed or are in the course of preparation by the Department.

(1) Wellington City Street Map.—This map is almost completed, and will be useful to visitors to Wellington during the forthcoming Exhibition and celebrations.

(2) Wellington City Area Motorist Street and One-day Tour Maps.—It is proposed to publish this map in two series, one of which has been completed.

(3) Aviation Strip Maps.—The drawing of sheets 2 and 6 completed the series. Sheets 2 and 3 have been published, and it is anticipated that the complete series will be available for sale in the very near future. Pressure of work at the Printing Office has delayed the publication of the final sheets, which are now well in hand.

(4) Soil Maps (Hawke's Bay).—The Napier District Office has supplied draughting assistance to the Soil Survey Division of the Scientific and Industrial Research Department for the preparation of map illustrating the soil surveys recently carried out in Hawke's Bay.

(5) Pasture Maps (Hawke's Bay).—Maps illustrating the pasture surveys recently carried out by the Scientific and Industrial Research Department in Hawke's Bay are at present being prepared by Head Office. The symbols illustrating the various pasture types are to be shown by lines in various colours.

Aerial Survey Mapping (Mr. R. J. Crawford).—For the purpose of systematically locating topographical surveys, each island, by arrangement with the Defence Department, has been divided into rectangular sheets, each measuring 30,000 yds. by 45,000 yds. The area in Hawke's Bay on which the work of aerial survey has been proceeding is comprised in the North Island sheets 134, 141, and 146. Mapping operations have been confined to sheet 134, for which the detail plotting (including contouring) has been completed; this has entailed the plotting of 14 detail sheets (20 chains to an inch) on kodatrace. On these sheets the more important roads, fixed by survey, were first plotted, and served as a groundwork to tie in the strips of aerial photographs. On completion, these sheets are reduced half size by photography, and from these reductions the final drawings for publication are being made. These drawings will be reduced by photography, and published on the scale of one mile to an inch.

The work has been retarded by shortage of staff, Mr. W. F. Cree having been engaged on other work for a large proportion of the year, and Mr. J. A. Henderson being included in the expedition to Sunday Island in July last. Recently, however, the branch was fortunate in the acquisition of the services of Messrs. G. T. Railton and A. J. Reid, the latter being engaged on the finished drawings. The arrival of a new and improved stereoscope, followed by the removal of the staff into the more convenient office in Aitken Street, and the above-mentioned increase in staff, has speeded up the work considerably.

An index map of the North Island, showing the division into sheets, and the location of the Hawke's Bay area, is published and attached hereto.

Electoral Maps.—Consequent on the Electoral Boundary Commission held in 1937, the Head Office draughting staff have prepared sets of maps of each of the electorates in the Dominion. Four members of the staff have engaged continually in this work, mounting and colouring, for a period of six months. It is hoped to complete all the orders for these maps early in the coming year.

Draughtsmen and Computers' Examination.—At the annual examinations held in October, 1937, thirty-nine candidates presented themselves for examination. The results were as follows:—

First-grade Draughtsmen—
A. V. Brown (Christchurch).
J. Leather (Auckland).
W. S. Taylor (Christchurch).
Second-grade Draughtsmen—
S. Gibson (State Forest Service).
J. M. Gilbert (Invercargill).
L. A. Graham (Auckland).
Second-grade Computers—
A. W. Eden (Dunedin).
E. M. Flanagan (Wellington).
B. K. Ledger (Auckland).

Standard of Length.—The following is the number of chains tested at the standard of length station in the Parliament Buildings cellar: Number of bands, 34; number of chains, 179.

Stores.—During the year it has been possible to considerably augment the depleted stock of instruments and technical equipment. A recent large order placed with manufacturing firms in Great Britain should reach New Zealand within the next few months. With this addition to stocks, the annual equipment expenditure will be reduced in the future to a minimum. A complete overhaul of all equipment held by the technical officers of the Department is contemplated. This will entail a considerable writing-off of worn-out equipment and the repair of equipment that is suitable for recommission.

Scheme Plans.—The following table (1d) sets out in summary the number of plans dealt with under section 16 of the Land Act, 1924, by Head Office.

TABLE 1D.—Summary of Town Scheme Subdivisions dealt with under Section 16 of the Land Act, 1924, for the Year ended 31st March, 1938.

District.	Number of Plans.	New Roads.			Reserves.			Reserves (Percentage of Saleable Lots).	Saleable Lots.			Total Area.		
		A.	R.	P.	A.	R.	P.		A.	R.	P.	A.	R.	P.
Auckland and North Auckland	117	22	3	38.5	29	0	25.5	8	334	3	9.2	386	3	33.2
Gisborne	4	0	0	24.6	..	..	..	5	2	26.6	5	3	11.2	
Hawke's Bay	7	2	0	36.0	0	2	27.0	4	17	3	12.4	20	2	35.4
Taranaki	2	0	1	23.0	..	..	..	11	1	7.0	11	2	30.0	
Wellington	22	8	1	33.2	6	2	20.2	10	64	0	0.4	79	0	13.8
Marlborough	6	0	1	20.0	1	1	6.3	5	24	2	14.0	26	1	0.3
Nelson	9	7	1	27.9	19	2	10.4	46	42	3	10.8	69	3	9.1
Westland	8	1	0	38.7	4	1	3.3	17	25	0	37.6	30	2	39.6
Canterbury	41	3	2	27.5	5	1	28.6	3	148	1	39.9	157	2	16.0
Otago	23	1	0	16.1	0	1	0.0	1	34	1	36.9	35	3	13.0
Southland	3	..	..	..	..	..	..	..	2	2	32.0	2	2	32.0
Totals	242	48	0	5.5	67	1	1.3	9	711	3	26.8	827	0	33.6

These returns show a still further increase on last year's returns—namely, 25 per cent. increase in the number of plans received and 21 per cent. increase in the area of saleable lots dealt with.

The relative high percentage of area set aside for reserves in the Nelson District is due to the subdivision of an area of Crown land of which approximately 19 acres was reserved.

The area of new roads represents a length of approximately 6 miles of new roading for subdivisational purposes.

General.—(1) Inspecting Draughtsman: The Department was fortunate in having the services of one of its own officers to inspect the draughting staff in connection with the recent regrading proposals. This duty was very capably and efficiently handled by Mr. R. C. Airey, who is now attached to Head Office, and the results of his work are borne out by the recent increases in the draughting grades of the Department. The office of Inspecting Draughtsman supplies a want felt by the Department for many years, and it is hoped that his inspections will greatly assist in obtaining a uniformity of practice in the routine work of the Department.

As an outcome of the recent regrading, the office of senior draughtsman was added to each district. It is hoped that this appointment will tend to raise the standard and efficiency of the draughtsman of the Department.

(2) Draughting Staff: The draughting staff of the Department is to be commended for its keenness and hard work during the past busy year. Considerable increase in staff has been made, which is not yet sufficient to cope with the work of the Department. As trained draughtsmen are no longer available it has been necessary to appoint draughting cadets. These cadets, during the coming year, will, with the additional training and experience, be of greater service and assistance to the Department.

The work carried out for other Departments during the year has made it necessary to almost completely cease work on the preparation and revision of record and cadastral maps. It will be necessary, as soon as opportunity offers, to bring this work up to date for the longer the delay the greater the confusion and inconvenience in future years.

It has been the aim of the Department to deal as promptly as possible with the work required by other Departments and the general public, and the lack of delays in this respect is a tribute to the very fine spirit of co-operation and assistance given by both controlling officers and staff.

REPORT OF THE HONORARY GEOGRAPHIC BOARD FOR THE YEAR ENDED 31ST MARCH, 1938.

The thirteenth annual meeting of the Honorary Geographic Board was held in the Surveyor General's office on 26th May, 1937.

The following members were present: Right Rev. Bishop Williams of Waiapu (Chairman), Messrs. H. E. Walshe (Surveyor-General), Johannes C. Anderson, M. Crompton-Smith, A. P. Harper, and R. G. Dick (Hon. Secretary).

The meeting stood for a moment in silence as a tribute to the memory of the late Sir Frederick R. Chapman, a foundation member of the Board.

Mr. A. P. Harper was welcomed as a new member of the Board.

The following is a list of the names dealt with and confirmed by the Board at the meeting:—

Name.	Survey District.	Description.	Origin of Name.
WELLINGTON DISTRICT.			
Cathedral Rocks ..	Ruapehu ..	8,600 ft.—prominent rocks on Ruapehu Mountain	Survey Department maps.
Mangatoetoe nui Glacier	Ruapehu ..	To be substituted for "Waikato Glacier" on Ruapehu Mountain	As shown in Mr. R. Cowan's writings.
Ringatoto ..	Ruapehu ..	8,400 ft.—a peak on Ruapehu Mountain	Survey Department maps.
Rua Taranaki ..	Ruapehu ..	Topographical feature on Ruapehu	Wakefield.
Taranaki Stream ..	Ruapehu ..	Stream on northern slopes of Ruapehu	By E. Phillips-Turner.
Te Heuheu ..	Ruapehu ..	8,850 ft.—a peak on Ruapehu ..	Survey Department maps.
Waipuna Stream ..	Ruapehu ..	Stream on northern slopes of Ruapehu	By Rev. J. E. Ward.
Wairere Stream ..	Ruapehu ..	Stream on northern slopes of Ruapehu	By Rev. J. E. Ward.
CANTERBURY DISTRICT.			
Bryndwr ..	Christchurch ..	A suburb of Christchurch ..	Request for correct spelling.
Mt. Graham ..	Cook ..	A peak between Mounts Silberhorn and Teichelman	By Messrs. G. L. Clark and S. D. Thompson after famous Graham Guides.

REPORT OF THE HONORARY GEOGRAPHIC BOARD FOR THE YEAR ENDED
31st MARCH, 1938—*continued.*

Name.	Survey District.	Description.	Origin of Name.
OTAGO DISTRICT.			
Lake Agnes ..	Hollyford ..	At head of unnamed stream between Glacier Creek and Stick-up Creek	By Miss K. Gardiner.
Alice Peak ..	Hollyford ..	7,144 ft.—between Glacier Creek and Stick-up Creek near Mount Tutuko	By Miss K. Gardiner.
Boys Col. . .	Forbes ..	7,800 ft. — between Mounts Amundsen and Lydia on Barrier Range	By S. D. Divers.
Ferrier Glacier ..	Forbes ..	Glacier on east face of Mount Lydia	By S. D. Divers after Lieut. C. Ferrier.
Hamilton Glacier ..	Forbes ..	On east face of Mount Ian on Barrier Range	By S. D. Divers after Sir Ian Hamilton.
Key Dome ..	Forbes ..	A long snow dome leading to base of Mount Amundsen	By S. D. Divers.
McLean Falls ..	Tautuku ..	In State forest at Tautuku—2 miles from Chaslands—Invercargill Road	..
Osonzac Twins ..	Forbes ..	7,800 ft.—between Ellie Peak and Mount Clarke on Forbes Mountains	By S. D. Divers, being initial letters of Otago Section of New Zealand Alpine Club.
Paranui ..	Hollyford ..	7,300 ft.—A peak north-west of Mount Tutuko	Miss M. B. Byles, Sydney.
Parariki ..	Hollyford ..	7,000 ft.—A peak between Mounts Tutuko and Paranui	Miss M. B. Byles, Sydney.
SOUTHLAND DISTRICT.			
Pembroke Creek ..	Milford Sound	A stream rising on south slopes of Mount Pembroke	Miss M. B. Byles, Sydney.

The work of the Board, due to the recent activity of the Alpine Clubs and the discrepancies in nomenclature and orthography found while preparing the atlas list of place-names, has been considerably increased.

Obituary.—It is with deep regret that we report the death of the Right Rev. Bishop Williams, of Waiapu. His Lordship has been a member of the Board since its inception in 1924, and his valuable services will be greatly missed.

REPORT OF THE SURVEY BOARD FOR THE YEAR ENDED 31st MARCH, 1938.

Land Surveyors' Examinations.—The following candidates were successful in passing the examinations held in September, 1937, and March, 1938, set respectively by the Queensland Board and the New Zealand Board.

September, 1937.

W. H. Smart (Otago).
L. G. Westwood (Taranaki).

March, 1938.

F. C. Barningham (Auckland).
G. C. Osborn (Canterbury).

Articles of Indenture.—During the year the following cadets were registered under articles of indenture to registered surveyors: M. G. Easton (Auckland), S. H. Simmonds (Auckland), J. G. Francis (Gisborne), R. B. Lovell-Smith (Canterbury), R. H. Hayes (Fiji), N. S. Sutherland (Otago).

The following survey cadets were appointed to the Lands and Survey Department and are automatically eligible to sit for the Land Surveyors' Examination on completion of the necessary field service: G. L. Frank (Gisborne); C. W. Williams (Canterbury).

Registration of Surveyors.—The annual list of registered surveyors, as gazetted on the 3rd March, 1938, numbered 477.

Members of the Board.—The following are the members of the Board appointed in terms of the Surveyors' Registration Act, 1928: Mr. H. E. Walshe (Surveyor-General) *ex-officio* Chairman, Messrs. A. H. Bogle, G. H. Bullard, M. Crompton-Smith, and C. K. Grierson.

General.—The number of fully trained cadets presenting themselves for examination is falling off considerably. The number of candidates will increase as the cadets article since the depression period complete their period of training.

R. G. DICK, Secretary.

TABLE A.—Summary of Field Work.

Class of Work.	Area of Mileage.	Average Cost.	Total Cost.		
			£	s.	d.
Geodetic triangulation (1st Order)	8,500 square miles	10·1s. per sq. mile	4,280	10	7
Triangulation (3rd Order)	452 square miles	20·32s. per sq. mile	459	6	6
Standard traverses	45·25 miles	£18·05 per mile	817	1	1
Topographical survey for settlement	53,040 acres	2·18d. per acre	482	10	3
Rural survey	128,167 acres	1·01s. per acre	6,503	11	4
Suburban survey	1,121 acres	19·95s. per acre	1,118	8	2
Native land survey	5,642 acres	3·33s. per acre	940	17	7
Town surveys	53·7 acres	£2·68 per section	626	8	3
Housing surveys (sections)	584·2 acres	£1·42 per section	3,085	17	3
Housing surveys (preliminary)	1,985 acres	12·61s. per acre	1,251	9	9
Road and railway surveys	204 miles	£22·16 per mile	4,522	0	3
Other work .. ..	..	..	3,968	8	11
Total cost of completed work .. ..	..	..	28,056	9	11

TABLE B.—Areas of Rural and Native Lands Survey.

	Rural Survey.	Native Land Survey.
	Acres.	Acres.
Auckland and North Auckland	22,028	4,396
Gisborne	805	1,503
Hawke's Bay	27,136	623
Taranaki	82	625
Wellington	80	777
Marlborough	4,747	..
Nelson	298	..
Westland	2,939	..
Canterbury .. ..	..	..
Otago	67,538	..
Southland	2,514	..
Total	128,167	7,924

TABLE C.—Return of Field Work Executed by Head Office from 1st April, 1937, to 31st March, 1938.

District.	Geodetic Triangulation (1st Order).		Cost.
	Square Miles.	Number of Stations.	
Auckland	8,500	45	£ 4,280 s. 10 d. 7

Table 1.—RETURN OF FIELD-WORK EXECUTED BY THE STAFF AND CONTRACT SURVEYORS ON LANDS ADMINISTERED BY THE LANDS AND SURVEY DEPARTMENT FROM 1ST APRIL, 1937, TO 31ST MARCH, 1938.

District.	Minor Triangulation.				Topographical Survey for Settlement, &c.				Standard Survey.				Rural Survey.			
	Acres.	Cost per Acre.	Total Cost.		Acres.	Cost per Acre.	Miles.	Total Cost.	Miles.	Cost per Mile.	Total Cost.	Acres.	Cost per Acre.	Total Cost.		
			£	s. d.										£	s. d.	£
Auckland and North Auckland	9,928	3.23	£ 133	15 3	18,500	2.47	£ 190	0 0	..	..	22,028	2.29	£ 2,525	2 5
Gisborne	261,120	0.27	293	1 9	..	..	..	..	33.75	14.64	805	2.07	83	7 9
Hawkes Bay	10,000	0.48	20	0 0	..	..	..	..	11.50	28.06	27,136	0.97	1,314	13 7
Taranaki	8,440	0.35	12	9 6	2,540	5.53	58	10 3	..	..	80	6.67	26	13 7
Wellington	..	..	..	..	..	..	..	..	..	..	4,747	1.15	273	12 3
Marlborough	..	..	..	..	32,000	1.75	234	0 0	..	..	298	3.30	49	0 0
Nelson	..	..	..	..	..	..	..	..	..	..	2,859	2.06	293	18 9
Westland	..	..	..	..	..	..	..	..	..	..	28,707	0.61	875	8 6
Canterbury	..	..	..	..	..	..	..	..	..	..	520	2.22	57	14 0
Otago	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Southland	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Totals	289,488	0.38	£ 459	6 6	53,040	2.18	£ 482	10 3	45.25	18.05	817	1 1	5,499	10 10		

District.	Village and Suburban Sections.				Town Section Survey.				Road Survey.				Other Work (Cost).		Total Cost of Completed Work.		
	Acres.	Number of Sections.	Cost per Acre.	Total Cost.	Acres.	Number of Sections.	Cost per Section.	Total Cost.	Miles.	Total Cost.	Cost per Mile.	Total Cost.	£	s. d.			
																£	s. d.	£	s. d.
Auckland and North Auckland	148.31	30	22.63	£ 167	16 1	5.27	£ 39	10 0	10.75	29.29	314	18 9	£ 1,699	19 3	5,071	1 9	
Gisborne	..	..	..	..	..	..	..	..	..	..	..	..	64	9 4	935	4 1
Hawkes Bay	345.00	19	8.79	151	11 8	..	..	..	..	..	..	..	326	1 9	2,135	2 10
Taranaki	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Wellington	49.25	6	15.10	37	3 10	0.75	26	16 11	17.75	19.87	352	13 4	272	10 0	774	7 11	
Marlborough	8.50	9	3.48	194	16 1
Nelson	54.18	12	32.11	87	0 0	2.81	28	0 0	11.00	27.00	297	0 0	64	0 0	759	0 0	
Westland	12.66	9	71.67	45	7 4	1.18	58	15 9	3.43	27.10	92	18 8	58	6 0	549	6 6	
Canterbury	6.41	1	48.83	15	13 0	9.96	103	13 8	0.86	13.15	11	6 2	304	0 2	434	13 0	
Otago	417.59	20	15.85	330	19 3	9.92	98	5 10	0.56	26.87	15	1 0	252	2 0	1,571	16 7	
Southland	17.99	2	5.55	5	0 0	..	..	..	..	..	..	..	46	13 0	109	7 0
Totals	1,051.39	99	15.99	£ 840	11 2	38.39	386	9 4	74.75	17.11	1,728	14 0	3,195	1 0	12,959	4 2	

Table 2.—RETURN OF FIELD-WORK EXECUTED BY THE STAFF AND CONTRACT SURVEYORS ON LANDS ADMINISTERED BY OTHER DEPARTMENTS FROM 1ST APRIL, 1937, TO 31ST MARCH, 1938.

District.	Rural Survey.			Village and Suburban Survey.			Town Section Survey.			Housing Subdivision Survey.					
	Acres.	Cost per Acre.	Total Cost.	Acres.	Number of Sections.	Cost per Acre.	Total Cost.	Acres.	Number of Sections.	Cost per Section.	Total Cost.	Acres.	Number of Sections.	Cost per Section.	Total Cost.
Auckland and North Auckland	1.35	10	5.96	59 13 8	128.16	549	1.72	946 5 3
Gisborne
Hawke's Bay	2.50	1	34.0	4 5 0	..	..	..	..	31.00	38	3.83	145 15 4
Taranaki	24.09	10	84.76	102 2 11	8.59	30	2.35	70 12 0	90.50	336	0.70	233 18 6
Wellington	90.00	465	0.65	287 8 8
Marlborough	16.00	24	3.22	303 19 8
Nelson	3.99	21	2.14	77 6 0
Westland	1.82	11	3.33	36 13 10	3.01	16	2.29	45 0 0
Canterbury	21.41	11	105.72	113 3 5	3.52	10	7.30	72 19 5	97.59	410	1.80	36 15 6
Otago	7.95	5	59.12	23 10 0	..	..	..	..	33.68	84	2.56	737 11 6
Southland	14.10	5	49.34	34 15 8	..	..	..	..	23.29	115	0.49	215 8 11
Totals	70.05	32	79.33	277 17 0	15.28	61	3.93	239 18 11	584.22	2,175	1.42	56 7 11
	3,085 17 3

District.	Housing Schemes (Preliminary).			Native Land Survey.			Road and Railway Survey.			Total Cost of Completed Work.															
	Acres.	Cost per Acre.	Total Cost.	Acres.	Number of Sections.	Cost per Acre.	Miles.	Cost per Mile.	Total Cost.																
											£	s.	d.	£	s.	d.	£	s.	d.						
Auckland and North Auckland					
Gisborne				
Hawke's Bay			
Taranaki		
Wellington	
Marlborough	
Nelson	
Westland	
Canterbury	
Otago	
Southland	
Totals

* Does not include surveys paid for privately:—Auckland, 733 acres; Gisborne, 1,503 acres; Hawke's Bay, 46 acres.

Table 3.—RETURN SHOWING SURVEYORS EMPLOYED AND WORK ON HAND AT 1ST APRIL, 1938.

Chief Surveyors.	Surveyors employed.		District.	Work on Hand.					Standard Traverse.		Triangulation.
	Staff.	Contract.		Topographical.	Rural.	Native.	Roads, &c.	Towns.	City.	Rural.	
R. L. Innis ..	12	10	Auckland and North Auckland	Sq. Miles. ..	Acres. 21,866	Acres. 3,412	Miles. 134	Acres. 235	Miles. 27	Miles. 71	Sq. Miles. ..
J. S. Strawbridge ..	1	4	Gisborne ..	..	773	3	..	31	..	34	..
P. W. G. Barlow ..	2	..	Hawkes Bay ..	..	40,194	..	..	14	..	..	156
N. Clay ..	2	..	Taranaki ..	..	7,555	755	..	50	..	..	..
J. D. Clapperton ..	3	2	Wellington ..	..	..	1,396	22	46	..	6	..
D. M. Greig ..	1	..	Marlborough ..	..	4,000	..	70	..	10	13	..
A. W. Craig ..	1	..	Nelson ..	..	..	..	14	..	..	..	..
J. W. McIntyre ..	2	..	Westland ..	..	608	..	6	..	..	..	..
L. J. Poff ..	2	..	Canterbury ..	..	2,883	..	106	83	..	..	..
H. A. Adams ..	3	..	Otago ..	..	60,121	..	20	67	12	22	..
T. S. McMillan ..	1	..	Southland ..	..	20	..	1	..	..	..	..
Head Office ..	..	..	..	1,200	..	..	..	..	..	..	40,000
Totals ..	30	16	..	1,200	138,020	5,566	373	526	49	146	40,156

Table 4.—PRINCIPAL CLASSES OF OFFICE-WORK DONE FROM 31ST APRIL, 1937, TO 31ST MARCH, 1938.

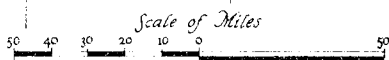
District.	Plans placed on Instruments of Title.				Deeds and other Instruments passed.	Plans examined and passed.				Maps drawn for Lithography.		
	Crown.		Native Land.	Land Transfer.		Crown.	Native.	Land Transfer.	Other Departments.	Standard Publications.		Sale Plans.
	Leases and Licenses.	Freehold.								Drawn.	Revised.	
Auckland and North Auckland ..	748	782	601	10,432	6,654	231	55	830	253	21	..	2
Gisborne ..	37	..	174	560	..	9	15	51	35	1	..	..
Hawkes Bay ..	48	56	45	708	701	24	14	200	47	2	2	..
Taranaki ..	267	38	52	657	578	9	20	63	32	3	..	..
Wellington ..	180	191	76	3,651	2,011	27	12	240	118	1	..	..
Marlborough ..	49	16	..	212	118	18	..	29	21	1	..	..
Nelson ..	292	30	..	736	..	37	..	91	39	..	..	..
Westland ..	277	44	..	546	72	35	..	27	26	..	..	..
Canterbury ..	373	88	..	2,808	1,498	30	..	268	60	1	..	1
Otago ..	366	108	2	3,319	1,976	48	..	205	49	..	3	..
Southland ..	226	50	..	945	781	3	1	80	36	..	1	1
Head Office ..	..	..	..	..	..	..	..	..	..	..	..	..
Totals ..	2,863	1,403	950	24,574	14,389	471	117	2,084	716	30	6	4

Approximate Cost of Paper.—Preparation, not given; printing (955 copies, including map), £32 10s.

By Authority: E. V. PAUL, Government Printer, Wellington.—1938.

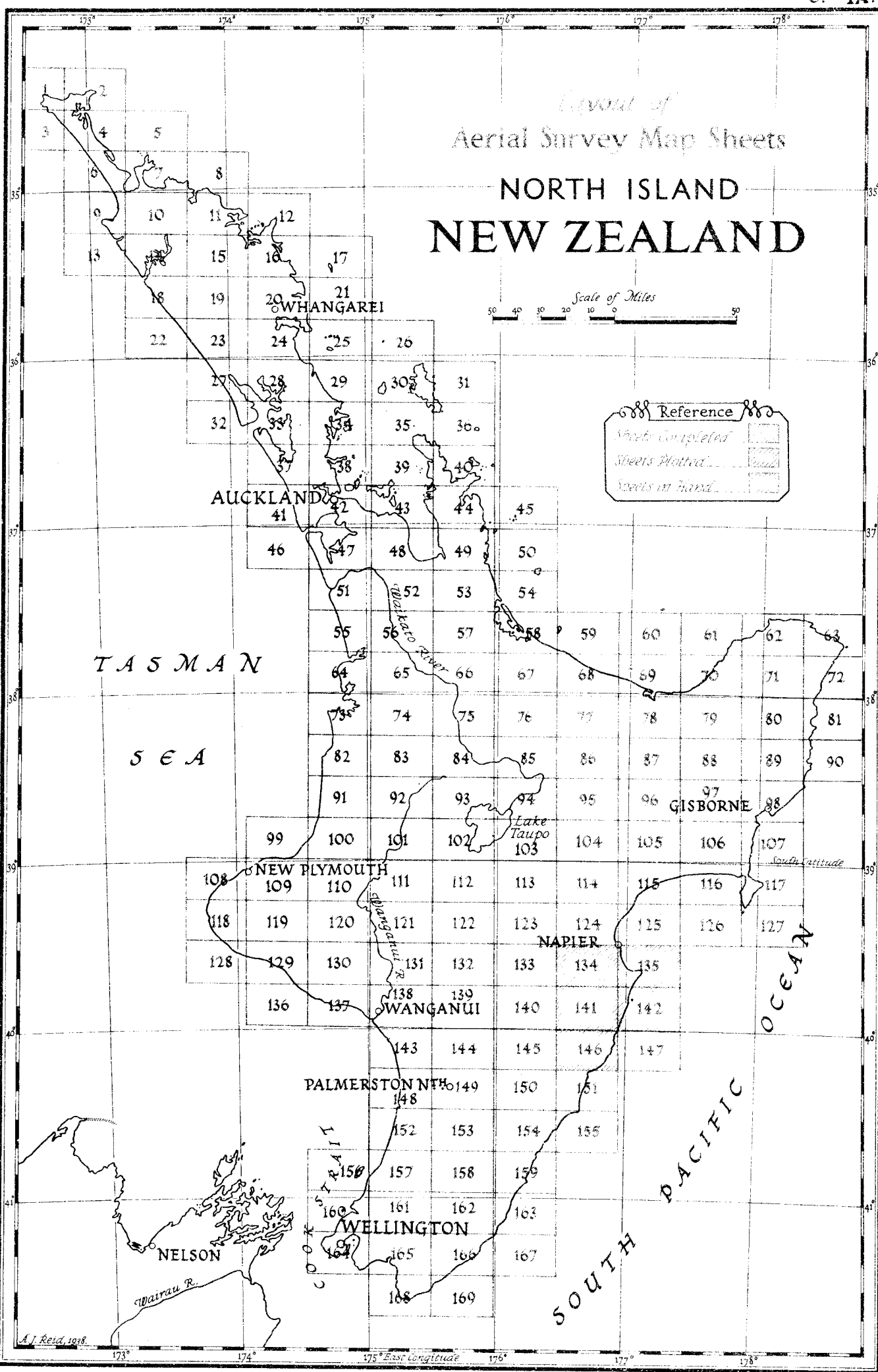
Price 9d.]

Layout of Aerial Survey Map Sheets NORTH ISLAND NEW ZEALAND



Reference

Sheets Completed	
Sheets Plotted	
Sheets in hand	



A. J. Reid, 1918.

