

1877.

## NEW ZEALAND.

NINTH ANNUAL REPORT OF THE NEW ZEALAND INSTITUTE,  
1876-77.*Presented to both Houses of the General Assembly by Command of His Excellency.*

SINCE the last annual report, meetings of the Board were held on the following dates:—19th September, and 19th December, 1876; 17th May, and 9th July, 1877.

The following members of the Board retired in conformity with the sixth clause of the Act, and were on the 11th January, 1877, reappointed by His Excellency the Governor—viz., the Hon. Mr. Waterhouse, the Hon. Mr. Stafford, and Dr. Hector.

The elected Governors by the incorporated societies, in accordance with clause 7, were Mr. J. C. Crawford, Mr. J. T. Thomson, and Mr. T. Kirk.

Under Statute IV. of the Rules of the Institute, the under-mentioned were elected honorary members of the New Zealand Institute: The Rev. W. B. Clarke, M.A., F.R.S.; Professor Etheridge, F.R.S.; and Dr. S. Berggren.

The roll of the Institute now numbers as follows:—

Honorary members	...	...	...	...	...	25
		<i>Ordinary Members.</i>				
Auckland Institute	...	...	...	...	...	285
Hawke Bay Philosophical Institute	...	...	...	...	...	69
Wellington Philosophical Society	...	...	...	...	...	224
Nelson Association	...	...	...	...	...	50
Westland Institute	...	...	...	...	...	76
Canterbury Philosophical Institute	...	...	...	...	...	95
Otago Institute	...	...	...	...	...	231
Total	...	...	...	...	...	1,055

Copies of Vol. IX. have been as usual distributed to the members and in accordance with the free list appended to the volume, the edition having been increased from 1,000 to 1,200 volumes to meet the increased demand.

The publication of the volume for 1876 (IX.) was commenced in December of that year, but owing to the large increase in the number of original articles, and also to the fact of an additional number of papers being sent in when the volume was considerably advanced, it was not completed until the end of May, 1877.

The late date at which some papers reached the Editor also prevented the thorough classification of the contents of the volume; and it would greatly facilitate publication if future communications to the different affiliated societies were forwarded to the Manager of the Institute immediately after they have been read before the society.

It may be stated, in illustration of the necessity for such a practice being adopted, that when the printing of Vol. IX. was begun the amount of manuscript in hand would not have made more than two hundred pages.

The ninth volume is the most voluminous of any hitherto issued, containing no less than 96 articles, 30 plates, and 724 pages letterpress.

As compared with last year's issue, the sections of the work are as under:—

	1877.	1876.
Miscellaneous	316 pages.	179 pages.
Zoology	173 "	131 "
Botany	61 "	31 "
Chemistry	7 "	20 "
Geology	42 "	39 "
Proceedings	62 "	50 "
Appendix	63 "	21 "
	<hr/> 724	<hr/> 471

The Transactions only were published in the first issue of bound volumes. A second part, containing the proceedings of the various incorporated societies, is now printed.

During the past year the Governors have had an analytical index prepared, embracing the first eight volumes of the Transactions, which will be issued to members at cost price.

The following volumes are now on hand:—Vol. I., second edition, 540; Vol. II., 3; Vol. III., 3; Vol. IV., 8; Vol. V., 75; Vol. VI., 60; Vol. VII., 200; Vol. VIII., 28; and of Vol. IX., after distribution to members of the Institute, 150 copies.

The Honorary Treasurer's statement of the accounts of the Institute is appended, and shows that there is a balance to the credit of the Institute of £123 9s. 4d.

The progress reports of the various departments under the Manager are also attached.

The library of the Institute has received upwards of 400 volumes by gift during the past year, a list of which is appended. §

Approved by the Board.

NORMANBY,  
President.

JAMES HECTOR,  
Manager.

29th August, 1877.

No. Copies.	FREE LIST FOR ISSUE OF THE TRANSACTIONS.
1	His Excellency the Governor, President of the Society.
11	Governors of the Institute.
25	Honorary Members.
1	The Prime Minister.
1	The Colonial Treasurer.
1	The Native Minister.
1	The Under Colonial Secretary.
2	For Parliament.
1	The Colonial Office, London.
1	The Agent-General, London.
1	Trübner and Co. (Agents), 57, 59, Ludgate Hill, London.
1	The British Museum, London.
1	The Royal Society, London.*
1	The Royal Geographical Society, London.*
1	Geological Society, London.*
1	Zoological Society, London.*
1	Geological Survey of the United Kingdom, London.*
1	Geological Magazine, London.
1	Anthropological Institute of Great Britain and Ireland, London.
1	Linnean Society *
1	Royal Asiatic Society, London.
1	The University Library, Edinburgh.*
1	Royal Society, Edinburgh.
1	Geological Society, Edinburgh.
1	The Philosophical Society of Leeds, England.*
1	Oxford University Library, England.
1	Cambridge University Library, England.
1	Literary and Philosophical Society, Liverpool.
1	School Library Committee, Harrow, England.
1	School Library Committee, Rugby, Warwickshire, England.
1	School Library Committee, Eton, Bucks., England.
1	Natural History Society, Marlborough College, Marlborough, Wilts.
1	Literary Institute, Norwich, England.*
1	The Royal Society, Dublin.*
1	Geological Survey of India.*
1	Smithsonian Institute, Washington.*
1	Academy of Natural Science Library, Philadelphia, U.S.*
1	Academy of Natural Science, San Francisco.*
1	American Geographical Society.
1	American Institute Mining Engineers.
1	Geological Survey of Canada, Montreal.
1	Geological Survey of U.S. Territory, Washington.
1	Tuscan Natural Science Society, Pisa.
1	Imperial German Academy of Naturalists, Dresden.*
1	Royal Imperial Institute for Meteorology and Earth Magnetism, Hohe-Warte, Vienna.
1	Dr. Wojeikof, of St. Petersburg.
1	The Public Library, Melbourne.
1	Royal Society of Victoria, Melbourne.*
1	University, Melbourne.
1	University Library, Sydney.
1	Public Library, Sydney.
1	Royal Society, New South Wales.*
1	Royal Society of Tasmania.*
1	Public Library of Tasmania.
1	His Excellency Governor Weld, Tasmania.
1	Legislative Library, Adelaide.
1	South Australian Institute.*

§ The lists referred to will be, as usual, printed in the 8vo. form of this report.

\*Exchanges.

*Libraries and Societies in New Zealand.*

- 1 Secretary, Auckland Institute.
- 1 Secretary, Wellington Philosophical Society.
- 1 Secretary, Philosophical Institute of Canterbury.
- 1 Secretary, Nelson Association.
- 1 Secretary, Otago Institute.
- 1 Hawke Bay Philosophical Institute.
- 1 Westland Institute.
- 1 General Assembly Library.
- 9 Public Libraries.
- 1 Secretary.

*Publishing Branch.*

- 1 Editor.
- 1 Assistant Editor.
- 2 Draftsman.
- 1 Lithographer.
- 1 Government Printer.

*Museum.*

From the 9th July, 1876, to the present date, 14,500 visitors have entered their names in the book kept in the Museum-hall for that purpose.

There have been 41,159 specimens received into the Museum during 1876-77, 12,159 of which are specimens collected by officers of the Geological Survey staff.

*Herbarium.*—The Herbarium has undergone little change since last report; specimens of several local plants have been added by the department, and a collection containing 40 specimens of South Island species have been presented by Captain Campbell Walker, of the Forest Department, through Mr. T. Kirk.

The presentation, referred to in last report, by the Trustees of the British Museum, arrived during the year in good condition, containing about 28,000 species of European and other plants, but, owing to the want of a suitable place where they can be conveniently referred to, they still remain unpacked.

In connection with the Herbarium Department, a collection of seeds and products, including a large number of pine cones, have been arranged in the north gallery of the Museum, classified in their natural orders and named.

During the year about 50 plates have been lithographed, including the illustrations for Vol. IX. of the Transactions New Zealand Institute. Sixty maps and sections have been prepared for the Geological Survey Reports; and the first part of a descriptive work on the Grasses of New Zealand, containing 10 folio plates and letterpress, has been prepared by Mr. John Buchanan, F.L.S., Botanist and Draughtsman to the N.Z. Geological Survey.

*Natural History Collections.*—The show-cases ordered in London, and those received from the Philadelphia Exhibition, have now been placed in the Museum, and additional accommodation for the display of specimens has been gained by the erection of wall cases round the whole extent of the gallery. The contents of the Museum are now set out on a general plan, although the minute arrangement and cataloguing of the specimens is far from complete. It is intended that the central part of the hall should be devoted to general typical and foreign collections; the north wing to the illustration of the natural history of New Zealand, zoology on the ground floor, and botany in the gallery; while the whole of the south wing is devoted to the collections made in the course of Geological Survey of the colony.

A new edition of the Catalogue of the Museum, which will be framed on the complete prospective arrangement, is in preparation.

*Mammalia.*—No important addition has been made to this section of the collections, only 34 new specimens having been received, from the Smithsonian Institute, U.S. America. A considerable number of skins and skeletons received from England, and included in last year's return, are still unmounted.

The preparations of the Cetacea have been examined and rearranged, and several large skeletons mounted, among them is that of the great Rorqual (*Sibbaldius*), the goose-beak whale (*Berardius*), the black-fish (*Globicephalus*), and the cow-fish (*Tursio*).

*Birds.*—235 skins have been received during the year, the largest addition being a collection of 84 species obtained from the Cambridge Museum as an exchange. The number of birds mounted and placed on exhibition during the year is 400. The extensive collection of birds-eggs has received an addition of 65 specimens, and a selection from it has been classified and arranged in the Museum cases.

*Fishes.*—Convenient shelves have been erected for receiving the alcoholic preparations and cases prepared for the stuffed specimens, but none of the recent additions to this class, which comprise a very extensive selection of European and American forms, have yet been removed from the tanks in which they were received.

The New Zealand collection has received several interesting additions, and now contains nearly all the known species.

The "Descriptive Catalogue of the New Zealand Fishes," of which an edition of 1,000 copies was published in 1872, is now out of print, and a new and revised edition is in preparation.

*Invertebrata.*—The publication by the department since last report of the "Descriptive Catalogue of the Crustacea," by J. E. Miers, F.L.S., has enabled the collection of this class to be classified and exhibited, but it is very imperfect compared with the number of specimens attributed to the New Zealand waters.

The Mollusca has been largely added to, chiefly by foreign collections and by alcoholic preparations of the New Zealand species, a series of which it is intended to collect for purposes of study.

The collection of insects, both New Zealand and exotic forms, is steadily increasing, and arrangements are being made for the publication of catalogues which will embody recent researches on this subject, as at present several eminent naturalists in England are engaged in classifying the different orders of New Zealand insects, and publishing the results in scientific periodicals.

*Ethnological.*—Under this heading there are 187 specimens entered, being chiefly a collection of Celt and other stone implements and weapons presented by the Trustees of the British Museum, and by the Copenhagen Museum through Captain Rowan.

*Minerals.*—620 specimens have been added, which number include a large series obtained in exchange from the British Museum, and selected by direction of Professor J. Storey Maskelyne, F.R.S., in order to make as complete as possible the typical collection, which now contains representatives of every important mineral species. A valuable series, comprising 109 species of ores and associated minerals from the Californian mining region, was received from Mr. H. G. Hanks, which, with the large collection of specimens brought by Dr. Hector from the Colorado and Utah regions, affords a very complete illustration of the metalliferous deposits of the Western States.

*Palæontology.*—Among the foreign collections in this section is a valuable donation from Mr. James Brogden, of a series of the Saurians from Lyme Regis, and the associated Triassic fossils.

For the purpose of comparison, casts of 300 of the best fossil specimens in the European and American Museums was obtained through Professor H. A. Ward.

*Geological Survey Collections.*—During the present year a special examination has been made of the fossiliferous beds of the Waikato Heads, with a view of determining their age and tracing their extent. A considerable collection of fossils was made from the locality, but the number of distinct forms obtained is small.

An important collection was made from certain blue clay marls occurring at the mouth of the Waihauau Creek, about fourteen miles south of the Waikato Heads, as an upper part of the grey marls not yet detected elsewhere, and which will be referred to as the "Cardita Beds," from the abundant occurrence in them of *Cardita planicostata*, a well-marked Lower Eocene fossil in Europe.

These beds had formerly been classified as the equivalents of the Waitemata beds as developed at Mercer, but the collections now obtained from each of these localities, in addition to stratigraphical evidence, make the separation of these two necessary, the Mercer beds belonging to the chalk marls.

In the Oamaru District six very important collections have been made, in addition to several smaller ones, and the evidence gained renders it necessary to readjust the classification of the beds adopted by Captain Hutton in his "Geology of Otago," his Trelissic group being in part the same as his Pareora group; while, on the other hand, many localities considered by him to belong to his Pareora formation, to his Trelissic formation, and the whole of his Orotara group, will, from the fossils, have to be distributed from the horizon of the greensands and saurian beds, immediately overlying the coal up to the grey marls, that closes the cretaceous-tertiary series in this district.

Collections have also been made from many localities in the interior of the Wellington Province, between the Manawatu Gorge and Napier, and much valuable information gained for the proper arrangement of the beds of tertiary age. The results obtained, which will be found in the Geological Survey Reports for the current year, show that the Scinde Island shell limestones and underlying fossiliferous sands and gravels belong to the horizon of the "tufaceous clays and lignitiferous deposits" of newer pliocene age (see Reference to Geological Map, 1873), while the Te Aute and Manawatu Gorge limestones represent the Wanganui series; the Taipos or Hawke's Bay series of the map being the equivalent of the Awamoa or Pareora beds, which form the base of the Kanieri series in the South Island. There is, therefore, no stratigraphical evidence of the existence of the Ahuriri formation proposed by Captain Hutton, so that his later views on the subject, as published in the Transactions New Zealand Institute (Vol. IX., page 590), are confirmed so far as to exclude this name from our future geological classifications.

From Whangarei, collections were also made from the beds overlying the coal, correlating these with the island sandstone horizon of the West Coast. The occurrence of a second or lower limestone was also traced here, replacing the coal in certain localities.

An examination of the country was made between Opotiki and the East Cape, but the impracticable character of the country precluded the forwarding of collections from there. The work has gone to connect the geological structure of this block of country with that previously surveyed between Poverty Bay and the East Cape.

At the present time all the collections of fossils have been worked out and the genera roughly determined, the further work of classifying these for comparison and description being now in progress.

The following general Reports have been printed during the past year, and will be shortly ready for issue:—

Progress Report 1873-74,	164 p.p.,	15 plates and maps	(partly published and distributed in 1874).
"	1874-76,	191 p.p.,	16 "
"	1876-77,	157 p.p.,	38 "

#### *Meteorology.*

The stations at which observations are made are fourteen in number—viz., at Mongonui, Auckland, Taranaki, Napier, Wanganui, Wellington, Nelson, Cape Campbell, Christchurch, Bealey, Hokitika, Dunedin, Queenstown, and Wallacetown.

The monthly returns from these stations are forwarded to the Head Office, and an abstract of the whole prepared each month for publication in the *New Zealand Gazette*. The biennial Report for 1873-74 has been issued in the pamphlet form, and the same Report for 1875-76 is being prepared. The Results of Meteorological Observations taken at all the Stations in New Zealand, for 1876, has been printed, and incorporated with the Registrar's Statistics for that year.

A monthly report is also furnished of the climate at six of the principal stations, for publication with the monthly vital statistics. A return, giving the daily meteorological readings, with averages

and remarks, for the Head Office at Wellington, is printed monthly in the newspapers. The usual abstract of the climate of New Zealand for 1876 has been supplied for Vol. IX. of the Transactions of the New Zealand Institute.

*Astronomical—Time Ball Observatory.*

The Observatory is in good order, the astronomical clock being now in an excellent state of adjustment, with a steady rate. All the other instruments are in good condition. Rating time is given to the shipping by the starting clock and time-ball at least once a week, at Wellington, due notice being given in the morning papers. Mean time is also transmitted to Lyttelton; but, as it is not by the automatic clock, the same accuracy cannot be obtained.

The observations are, as hitherto, chiefly taken by the Ven. Archdeacon Stock, B.A., assisted by Mr. J. Kebbell, who is a most skilful and enthusiastic amateur.

The only extra work at the Observatory during the past year was the search for the supposed intra-mercurial planet, which was made at the request of the Astronomer Royal, and in which I had the cordial assistance of Mr. W. T. L. Travers, F.L.S., and Mr. J. Newton Coleridge, C.E., whose experience, as amateur photographers, was of great service on such an occasion.

*Laboratory.*

The following is a summary of analyses performed in the Colonial Laboratory during the past year:—

	Analysis.
1. Coals	22
2. Rocks and Minerals	22
3. Metals and Ores	38
4. Examination for Gold and Silver	31
5. Waters	23
6. Miscellaneous	32
Total	168

A full account of these analyses will be found in the Annual Report on the work performed in the Laboratory, published as a separate report.

JAMES HECTOR,  
Manager.

ACCOUNTS OF THE NEW ZEALAND INSTITUTE FOR 1876-77.

RECEIPTS.			EXPENDITURE.		
	£	s. d.		£	s. d.
Balance in hand, 19th September, 1876	218	4 4	Expenses of Printing Volume IX	600	13 11
Vote for 1876-77	500	0 0	Expenses on account of Index	28	0 0
Contribution from Wellington Philosophical Society	31	10 0	Miscellaneous items	13	6 1
Sale of Volumes	15	15 0	Balance	123	9 4
	£765	9 4		£765	9 4

28th August, 1877.

ARTHUR STOCK,  
Hon. Treasurer.

By Authority: GEORGE DIBSBURY, Government Printer, Wellington.—1877.

