NEW ZEALAND.

Department of Mines.

NEW ZEALAND GEOLOGICAL SURVEY.

(P. G. MORGAN, Director.)

PALÆONTOLOGICAL BULLETIN No. 1.

MATERIALS

FOR THE

PALÆONTOLOGY OF NEW ZEALAND.

BY

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LETTER OF TRANSMITTAL.

GEOLOGICAL SURVEY OFFICE,

SIR,— Wellington, 31st July, 1913.

I have the honour to submit herewith Palæontological Bulletin No. 1, entitled "Materials for the Palæontology of New Zealand," and written by Dr. J. Allan Thomson, Palæontologist.

The work now being done in connection with the palæontology of New Zealand, of which the present publication is the firstfruits, marks a most important step in advance. The results of this work will be not merely of high scientific interest, but of great economic value in connection with the Dominion's coal, oil, and other mineral resources.

The present bulletin contains 104 pages of letterpress, and is illustrated by a map and six plates, these latter including a series of figures of Mesozoic *Brachiopoda* prepared many years ago under the direction of Sir James Hector, but hitherto unpublished.

I have the honour to be,
Sir,
Your obedient servant,

P. G. MORGAN,
Director, New Zealand Geological Survey.

The Hon. William Fraser, Minister of Mines, Wellington.

INTRODUCTION.

THE aims of this bulletin are threefold. In the first place, it is prepared for the use of officers of the New Zealand Geological Survey, to afford a ready means of reference to the literature and localities of New Zealand fossils. In the second place, it is designed to encourage and facilitate palæontological work amongst New Zealand geologists. For this purpose the rules of Linnean nomenclature, which are not readily accessible in the local libraries, have been included. Emphasis has been laid on the due preservation and classification of type specimens, and on the importance of forming collections of topotypes in all the principal museums of the Dominion. In the third place, it attempts to give to palæontologists abroad who are interested in the geology of the Dominion an account of the present position of New Zealand palæontology and of the material that is available for subsequent work. It will be many years before New Zealand can hope to possess a number of specialists adequate to cope with the gigantic task that lies before them. As the need arises in connection with the unravelling of the stratigraphy of given districts, the Geological Survey will no doubt obtain the services of foreign specialists in the manner employed by the Indian Geological Survey, but in the meantime, if the peculiar interest attaching to the palæontology of the country attracts volunteers abroad, the material in New Zealand will be freely made open to them.

To those ladies and gentlemen in New Zealand, Australia, and England who have already volunteered to examine collections of fossils the Geological Survey is under a deep debt of gratitude, which it is desired here to acknowledge publicly.

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ABBREVIATIONS USED IN THIS BULLETIN.

BESIDES the usual abbreviations for references to scientific journals (a list of which is issued by the Geological Society of London in their Annual List of Literature added to the Library of the Society), the following abbreviations are used in this bulletin :—

Ann. Rep. Col. Mus. Lab.	Annual Report on the Colonial Museum and Laboratory. Wellington. (The year refers to the date of publication.)
App. Off. Cat. S.E.	Appendix to Official Catalogue, New Zealand Court, International Exhibition, Sydney, 1879. Wellington, 1880.
B.M. ..	British Museum (Natural History), South Kensington, London.
C.M.	Canterbury Museum, Christchurch, N.Z.
Cat. Col. Mus. ..	Catalogue of the Colonial Museum, Wellington, New Zealand. Wellington, 1870.
Cat. Ind. Col. Exh.	Detailed Catalogue and Guide to the Geological Department's Exhibits at the Indian and Colonial Exhibition, and Outline of the Geology of New Zealand. Wellington, 1886.
Cat. Tert. Moll. Ech.	Catalogue of the Tertiary *Mollusca* and *Echinodermata* of New Zealand in the Collection of the Colonial Museum. Wellington, 1873.
Cor. Bry. N.Z.	Corals and *Bryozoa* of the Neozoic Period in New Zealand. Pt. IV: Palæontology of New Zealand. Wellington, 1880.
D.M. ..	Dominion Museum, Wellington, N.Z. (Formerly Colonial Museum. The fossils stored temporarily in this Museum are the property of the Mines Department.)
N.Z. Journ. Sci.	New Zealand Journal of Science. Dunedin.
Nov. Pal.	Paläontologie von Neu-Seeland. Reise der "Novara." Geol. Theil., bd. i, abth. ii. Vienna, 1864.
O.M. ..	Otago Museum.
Parl. Pap.	The Annual Reports of the Geological Survey since 1894 and various other papers before that date have been published as parliamentary papers, and are usually bound in "Papers and Reports relating to Minerals and Mining."
Prog. Rep.	Reports of the Geological Survey of New Zealand. Progress Report. (Forms the first part of Reports of Geological Explorations, *q.v.* for numbers of volumes)

R.G.E — Colonial Museum and Geological Survey of New Zealand. Sir James Hector, K.C.M.G., M.D., F.R.S., Director. Reports of Geological Explorations during 1886-1893, with maps and sections. Wellington. Roy. 8vo.

In accordance with a suggestion made by Mr. A. Hamilton, the earlier unnumbered reports are numbered to correspond with the numbers printed on the later reports, as follows :—

No.	During Years.	Date of Issue.
I	.. 1866	1866
II	.. 1867	1867
III	.. 1867	1867
IV	.. 1866–67	1868
V	.. 1868–69	1869
VI	.. 1870–71	1871
VII	.. 1871–72	1872
VIII	1873–74	1877
IX	1874–76	1877
X	1876–77	1877
XI	1877–78	1878
XII	1878–79	1879
XIII	1879–80	1881
XIV	1881	1882
XV	1882	1883
XVI	1883–84	1884
XVII	1885	1886
XVIII	1886–87	1887
XIX	1887–88	1888
XX	.. 1888–89	1890
XXI	.. 1890–91	1892
XXII	.. 1892–93	1894

T.N.Z.I. .. Transactions of the New Zealand Institute. Wellington. (The date following the reference refers to the date of publication.)

V.M. — (Vienna Museum.) Kaiserliches-königliches naturhistorisches Hofmuseum in Wien.

MATERIALS

FOR THE

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CHAPTER I.

HISTORY OF PALÆONTOLOGICAL RESEARCH ON NEW ZEALAND MATERIAL.*

THE outstanding events in the history of New Zealand geology and palæontology were the visit of Hochstetter in 1858–59 and the publication of the geological memoirs of the "Novara" Expedition in 1864. Before his visit all that was known of New Zealand geology was due to the short visits of scientific missions and the notes of well-informed travellers. A few collections had been sent to England and briefly described. After Hochstetter's visit the Provincial and Colonial Surveys were instituted, and the work of exploring every part of the country was vigorously prosecuted by trained geologists.

Although such celebrated geologists as Darwin and Dana had touched at New Zealand, they had added little to a knowledge of the rock formations and the fossils occurring there. Dieffenbach, who travelled through parts of the North Island and the Chatham Islands, was the first to collect and send Home fossils, which were noticed by J. E. Gray in 1843. No doubt the discovery of the moa, and the interest thereby aroused amongst naturalists, diverted attention from the less exciting invertebrate fossils, but, nevertheless, W. Mantell, who was one of the most enthusiastic collectors of moa relics, found time to remark the occurrence of invertebrate fossils in the Wanganui district in 1848, and to send Home collections from Ototara (Totara, near Oamaru) and Onekakara (Hampden), in Otago, in 1850. The latter were described by his father, G. A. Mantell, assisted by Gray, Reeve, Morris, and Rupert Jones. In the same paper E. Forbes published a short note on fossils from Banks River and Blind Bay, collected by F. Manse. In 1855 Charles Forbes, assistant surgeon to H.M.S. "Acheron," communicated a paper to the Geological Society on the geology of coast-lines of New Zealand, in which the New Zealand coal-measures were scientifically described for the first time. Numerous genera of fossils were mentioned as occurring at West Wanganui, Cape Campbell, and the River Kohai (Mount Grey). In 1858 J. T. Thomson, the observant surveyor by whom the first explorations in the interior of Otago were made, recorded the occurrence of coal and fossil ferns at Mataura Falls, and *Terebratula* and *Pecten* in the limestone gorge of the Waiau. In the following year a further paper on the material collected by Mantell appeared from the pen of T. H. Huxley, who described bones of a fossil penguin from Kakanui and a fossil cetacean from Awamoa.† In 1860 Rupert Jones

* Excluding the *Dinornithidæ*.

† "Parimoa," the locality quoted by Huxley, and later by Harris for Tertiary *Mollusca*, cannot be otherwise than that usually known as "Awamoa" by New Zealand geologists. Parimoa is stated to be about five miles north of Kakanui.

determined a few species of *Foraminifera* sent to England to illustrate an account of the geology of Auckland by C. Heaphy, who had already contributed geological papers on unfossiliferous districts. The last pre-"Novara" contribution to New Zealand palæontology was the description of saurians from the Waipara River by Owen, based on collections made by Cockburn Hood. Owen supposed the beds from which they came to be of Jurassic age, but they have since been shown to overlie a Cretaceous fauna.

Towards the end of 1858 the Austrian frigate "Novara" touched at Auckland, and, sailing a fortnight after, left behind Ferdinand von Hochstetter, Assistant Geologist of the Geological Survey of Austria and Director of the Section Bohemia, and already one of the foremost geologists of Central Europe. Hochstetter's residence in New Zealand was due to a fortunate accident. While the "Novara" was in Sydney the New Zealand Government had requested Sir William Denison, Governor-General of Australia, to lend a geologist to examine a newly discovered coalfield near Auckland. He in turn had asked the Commodore of the "Novara" to permit his geologist to carry out this examination, and owing to the friendly relations existing between the expedition and the Australian and New Zealand Governments this permission had been granted. The report, completed in nine days, led to further negotiations, with the result that Hochstetter, while still nominally a member of the expedition, remained for nine months in the colony carrying out geological explorations, first in Auckland and then in Nelson.

Hochstetter's work was valuable in two ways. Not only did he lay the foundations of New Zealand stratigraphy, and collect the materials that in the hands of his Austrian colleagues have given rise to the most important memoirs on New Zealand palæontology, but he also inspired the various Provincial Governments to institute geological surveys, with the result that in a very few years Haast in Canterbury, Hector in Otago, and Crawford in Wellington were officially engaged in exploratory work.

Hochstetter's most important discoveries were the fossiliferous *Pseudomonotis* (Triassic) beds of Richmond, near Nelson, the belemnite and fern beds of Waikato Heads, and the belemnite and ammonite beds of Kawhia; but he was able also to subdivide and to some extent to correlate the Tertiary rocks of various localities. Although subsequent workers have differed from him on minor points, the general body of his work has stood the test of time in a manner that proclaims him the first master of New Zealand geology.

The fossils collected by Hochstetter and transferred to Vienna were described and figured by Unger, Zittel, Suess, Hauer, Karrer, Stoliczka, Stache, and Jæger—names that of themselves convey the certainty of careful and valuable work. A few changes in nomenclature have since been found necessary, but the "Novara" palæontology still remains the prime source of information on the fossils of New Zealand. The wonder is that, with this example before them, New Zealand geologists have been satisfied with such a meagre standard of palæontology.

Dr. Julius Haast (later Sir Julius von Haast) had landed in Auckland the very day before the arrival of the "Novara." He had come to report on the suitability of the colony for German immigrants, and immediately attached himself to Hochstetter, and accompanied him in his journeys in Auckland and Nelson. In 1860 he made further explorations for the Provincial Government in Nelson, and in 1861 was appointed Provincial Geologist of Canterbury. Haast's name is particularly associated with the exploration of the Southern Alps, during the progress of which he discovered the fossiliferous localities of Mount Potts and the Clent Hills; but he also made important investigations in the Malvern Hills and in the Cretaceous and Tertiary beds of North Canterbury and Amuri Bluff. Haast did not attempt direct palæontological work, but he was fully alive to the importance of fossil collections, and published many determinations furnished in manuscript by McCoy. To him also was due the foundation of the Canterbury Museum, and the high standard it subsequently attained.

Dr. James Hector (later Sir James Hector) was, on Sir Roderick Murchison's recommendation, appointed Provincial Geologist of Otago in 1861, and at once commenced the study of the coal-measures of that province. In 1865 he was appointed Director of the Geological Survey of New Zealand and of the Colonial Museum. In 1867 he was also appointed Manager of the New Zealand Institute. The growth and progress of these three institutions under his management has been admirably told by A. Hamilton in the first bulletin of the Colonial Museum, 1906.

In estimating Hector's contribution to New Zealand palæontology it is always necessary to remember that he held three arduous appointments, and that he devoted much time to zoology, meteorology, and other branches of science, and was repeatedly engaged in making up collections for exhibitions. Had he been able to devote his undoubtedly high talents to geology and palæontology alone, it is safe to assert that New Zealand stratigraphy would be in a much more advanced state. As it was, Hector's geological work was very largely done by deputy. He soon gathered a staff of assistants, among whom the names of Hutton, McKay, Cox, and Park are most prominent. Until 1893, when the survey was practically suspended, these officers visited every part of the colony, and brought back large collections of rocks and fossils. The annual reports of the Survey contain accounts of these visits, with a running commentary by Hector as an introduction. Hector, Haast, and Hutton soon began to differ on many points of interpretation, and New Zealand geological literature became involved in polemics which must be very confusing to foreign readers, since they can only with difficulty be followed by residents in the country.

Hector insisted at a very early date on the importance of the Colonial Museum as an adjunct to the Geological Survey,* and devoted a large part of its space to the disposal and exhibition of the geological collections. In 1870 he published a catalogue of the Museum, in which lists of fossils from a great number of localities form a prominent part. Hutton wrote descriptive catalogues of the Recent shells, and of the Tertiary *Mollusca*, *Brachiopoda*, and *Echinodermata*, which were published without plates in 1873. Drawings were made for plates by Buchanan, the draughtsman of the Survey, and are still in the possession of the Survey; but the plates were never issued. Hector always had in view the publication of descriptive palæontological memoirs of the fossils collected, but, owing to the pressure of other work, these were never published. The following extracts speak for themselves:—

8th Ann. Rep. Col. Mus. Lab. (1873), p. 5.—"Very important and extensive additions have been made to the collection of fossils, both of New Zealand and foreign countries. Chief among the former is a large series of Upper Mesozoic remains found associated with the reptilian remains at the Amuri Bluff. It is proposed to place these in the hands of an experienced palæontologist in England for publication." Pp. 6–7.—"All the fossil plants found in New Zealand have been accurately drawn and printed by photo-lithography, fifty plates being now ready to illustrate a work on the fossil flora that is in progress. In addition, most of the other fossils, and especially those which are to be sent to England for description, have been figured, so that they may not be altogether lost in case of accident."

13th Ann. Rep. Col. Mus. Lab. (1878), p. 6.—"Publications: The volume of Geological Reports for the past year is now in the press, and will contain the progress reports of the Survey, and, in addition, descriptions and figures of the most important of the Lower Mesozoic fossils."

14th Ann. Rep. Col. Mus. Lab. (1879), p. 8.—"A large amount of the material, both letterpress and plates, is in readiness for the first of a series of publications illustrative of the palæontology of New Zealand. The earliest-issued parts of this work will comprise the fossil flora and the *Brachiopoda* of the Lower Mesozoic formations."

15th Ann. Rep. Col. Mus. Lab. (1880), p. 11.—The following works have been partly prepared for publication: 4. Contributions to New Zealand Palæontology—(1) "*Belemnitidæ*" and (2) "*Brachiopoda*," by Dr. Hector; (3) "Fossil Flora," by Dr. Hector; (4) "Fossil Corals," by the Rev. J. E. Tenison-Woods.

Of these proposed publications, only the last was issued, as "Palæontology of New Zealand, Part IV." Papers by Hector on the "Fossil *Brachiopoda*" and the "Fossil Flora" appeared in abstract, without plates, in the Transactions of the New Zealand

* *Cf.* 3rd Ann. Rep. Col. Mus. Lab., p. 3 (1868); 21st Ann. Rep. Col. Mus. Lab., pp. 3–4 (1886).

Institute (1879). A paper on the *Belemnitidæ*, accompanied by plates, had already appeared in 1878. Plates for the Memoir on the Flora were printed, but not issued, and are still in the possession of the Survey. Drawings for several plates of *Brachiopoda* were made, but only four plates were printed, and these also are stored away. An extra supply of the plates illustrating the paper in the Transactions on the *Belemnitidæ* were printed, and are now in stock. In 1886 a number of figures were included in the "Catalogue of the Indian and Colonial Exhibition." For the most part they are very poor, but on comparison it becomes evident that they were prepared from the plates and drawings mentioned above, including Buchanan's drawings of the Tertiary *Mollusca*.

Hector contributed other papers to the Transactions: "On the Fossil *Reptilia*," "On a New Trilolite," and "On the Recent and Fossil *Cetacea*." He also published numerous identifications of foreign species occurring in New Zealand in the Progress Reports of the Geological Survey, most often without author's name and reference; and he is responsible for many manuscript names. His positive contributions to New Zealand palæontology are most valuable, but in the work he left half-done he has but increased the difficulties of subsequent workers.

Captain Frederick Wollaston Hutton joined the Geological Survey in 1871, and left in 1873 to become Provincial Geologist of Otago and Curator of the Otago Museum. He subsequently held the positions of Professor of Natural Science in the University of Otago and Professor of Biology in Canterbury College, and, on Haast's death, Curator of the Canterbury Museum. Like Hector, he also spread his energies over a variety of subjects, but he returned again and again to the palæontology of the Tertiary invertebrates, and made himself easily the chief authority on this subject. His task was rendered difficult by the poverty in colonial libraries of the early post-Linnean works, in which so many of the Recent *Mollusca* were first described, and hence very many of his early names have had to be revised. His work was marred chiefly by his extreme brevity and terseness of description and reference, and by the poverty of illustrations accompanying his papers; but it is only in the groups in which he specialized that our knowledge of New Zealand palæontology has any approach to completeness. Hutton was not always very definite about the localities from which his fossils were derived, but he was very conscientious in his care of type specimens, and has left behind him a striking monument in the exhibit of Tertiary fossils at the Canterbury Museum.

Alexander McKay joined the Provincial Survey of Canterbury under Haast in 1871 as field assistant, and at once distinguished himself as a fossil-collector by the splendid suite of saurian remains he obtained from the Waipara River.* Towards the end of 1872 he was transferred to the Colonial Survey, under Hector, and until 1893 was the officer most closely associated with the collection of fossils and the description of the localities from which they came. Hector's classification of the formations occurring in New Zealand was based very largely on McKay's investigations, and on most points they stand so closely together that it is difficult to assign the authorship of any particular point of view to one or the other. After 1893 McKay acted first as Mining Geologist and subsequently as Government Geologist to the Mines Department until his retirement in 1908. The collections of the Survey have been his particular care in recent years, and it is due to his great enthusiasm and keen memory that they are now so well labelled.†

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* Now in the Canterbury Museum.

† The writer has frequently had occasion to put to the test Mr. McKay's memory of the localities from which given specimens were collected, and with most satisfactory results. It could hardly be expected that over 100,000 specimens would be labelled without some mistakes, and already a few have been detected in cases where differences of matrix led to suspicions as to the correctness of the labels; but the percentage of errors is wonderfully small, and should not give rise to any serious confusion.

With the exception of Hector and Hutton, New Zealand geologists have made very small contributions to palæontology. Short papers on Tertiary fossils have been contributed by Kirk, Murdoch, Suter, Benham, Clarke, Park, and Thomson, while descriptions or figures of fossils have accompanied papers by Maclaren, Andrew, and Boult. Marshall has written a very terse paper on Secondary *Cephalopoda*, which has been amplified by Bœhm and Diener. The study of the Recent *Mollusca*, however, with which the Tertiary palæontology is so intimately bound, has made great advances in the hands of Hedley, Suter, and Murdoch, and it has been found that many of the species first described as fossil are still living in the deeper waters off the New Zealand coast. Suter's forthcoming "Mollusca of New Zealand" (now in the press) will be a great boon to students of the Tertiary fauna, and may be confidently expected to exercise a great influence on the future development of our knowledge of this group.

In 1904, at the Dunedin meeting of the Australasian Association for the Advancement of Science, the state of New Zealand palæontology was thoroughly discussed by Section C, and it was resolved to urge the New Zealand Government to take steps to have the fossil collections of the Survey described. The recommendation adopted by the Association, and communicated by the President, Professor David, to the Minister of Mines and the Colonial Secretary, was as follows:—

"*New Zealand Fossils.*—On the recommendation of Section C, it was agreed, That the following resolution be forwarded to the New Zealand Government: That whereas this Association considers that the description of the large collection of fossils now at the Wellington Museum is one of the most important services which the New Zealand Government could at the present time render to science, and that it is one which would be for the advancement of science throughout the world; that whereas the work would be of economic as well as of scientific interest, as it is only by its means that the coalfields of New Zealand can be properly correlated, and the broad relations and modes of origin of its metalliferous deposits understood; that, whereas, according to the annual reports, there are more than thirty thousand fossil-specimens in the exhibition-cases at Wellington Museum, by far the larger part of which are unnamed and undescribed, and besides about five hundred boxes of fossils still unpacked in the same Museum; and that whereas these collections, made at considerable expense to New Zealand, are obviously useless in their present state—this Council recommends: (1.) That the description of these fossils should be commenced immediately, and that if this recommendation is adopted by the New Zealand Government the undermentioned groups of fossils be sent for description to the following workers at once: The graptolites to T. S. Hall, M.A.; the *Foraminifera* and ostracods to F. W. Chapman; the echinoids to Professor Gregory; Palæozoic fossils, other than those in the above groups, to R. Etheridge, jun. (Curator, Australian Museum, Sydney) and W. S. Dun (Palæontologist, Geological Survey, New South Wales). (2.) That, with regard to the large and important collections of Mesozoic and Cainozoic fossils (other than echinoids, *Foraminifera*, and ostracods) in the Wellington Museum, the Council recommends that advice as to their description be delegated, so far as this Association is concerned, to a committee consisting of the following: Captain F. W. Hutton (retiring President), Professor Baldwin Spencer (President-elect), and A. Hamilton, Esq. (Director of the Colonial Museum, Wellington)."

At the request of the Colonial Secretary, Mr. A. Hamilton made further recommendations,* with the result that the repacking of the collections into boxes of similar size in such a way as to bring all fossils from one locality together was commenced by Mr. A. McKay and an assistant. This repacking was an essential preliminary to the sorting-out of special collections for description.

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* See T.N.Z.I., vol. 42, pp. 52–54 (1909).

The reorganized Geological Survey, under the Directorship of Dr. J. M. Bell (1905–11), made no attempt to inaugurate the description of the old collections, but dealt briefly, in various bulletins, with the new fossils discovered in the areas under survey. Only one new species was described, but a number of identifications were made by Morgan, Clarke, Thomas, and Marshall, and the age of the beds was discussed. On the resignation of Dr. Bell and the appointment of Mr. P. G. Morgan as Director the writer was appointed Palæontologist (June, 1911), his first duties being defined as "the description of the fossils now stored in Wellington." On the recommendation of various scientific gentlemen throughout the Dominion, the services of Mr. H. Suter were obtained for six months to work at the Tertiary *Mollusca*.

Meanwhile the various collections of New Zealand fossils that found their way abroad received some attention from specialists. H. Woodward, described a fossil crab, and P. M. Duncan some Tertiary corals, in 1875. E. T. Newton contributed a paper on two Cretaceous fish in 1876. Von Ettingshausen obtained collections of plants from Professors Parker, of Dunedin, and Haast, of Christchurch, and published a series of papers in Vienna, which were subsequently translated into English (1884–87). So far at least as the Tertiary and Cretaceous leaf fossils are concerned, Ettingshausen's generic identifications and general conclusions have been looked at askance by New Zealand botanists. J. W. Davis described a large collection of Cretaceous and Tertiary fish-teeth lent by Hutton, Enys, Parker, Haast, and Hector, and also investigated the specimens in the British Museum (1886–88). A. W. Waters, in 1887, described a large series of *Bryozoa* lent by Miss Jelly and by Hutton and Hamilton, and added greatly to the list of new species, although the absence of identifications of species established by Stoliczka and Tenison-Woods suggests that the synonymy may require revision. Hinde and Holmes, in 1891–92, described and figured a large number of sponge-spicules from the diatomaceous earth of Oamaru. Tate, in 1894, supplied critical notes on the Tertiary *Echinodermata* based on an examination of some of Hutton's type specimens and other "authentic specimens." G. Bœhm, who visited New Zealand in 1900, described Tertiary *Brachiopoda* of his own collecting in 1904, and has since revised the Triassic and Jurassic *Cephalopoda* after a re-examination of Hochstetter's and Marshall's material, coupled with a suite of specimens collected for him by Suter. F. A. Bather, in 1905, established a new genus of annelid, and a new species of *Dentalium* on material collected by Ferrar. Kidston and Gwynne-Vaughan described fossil ferns collected by Dunlop and Gibb near Gore (1907). Dr. Ethel M. R. Shakespear, in 1908, examined a collection of graptolites brought to England by Isaacson, and showed the probability of the occurrence of two zones at Collingwood.

The most important foreign contributions, however, since the "Novara" palæontology have been the British Museum catalogues of fossil *Reptilia* and *Amphibia* by R. Lydekker (Part 2, 1889), and of Tertiary Australasian *Mollusca* by G. F. Harris (1897). In each of these a large number of New Zealand fossils have been described and figured, and compared with those of other countries.

Principal Results obtained.

There is not as yet any general accord amongst New Zealand geologists as to the number of formations represented amongst the rocks, nor as to the relationship and absolute age of the formations that are well recognized (*pace* Park). This is due to the absence of fossils over large extents of country, the lack of critical study of the fossil faunas known to exist, and the lack of detailed stratigraphical studies in critical localities, and, as pointed out by Marshall, to the prevailing philosophical creed of the earlier geologists that all the formations recognizable in Europe should be found represented in New Zealand. McKay, Park, and Marshall hold opinions to-day as much at variance as those formerly held by Haast, Hector, and Hutton. It is possible, however,

to distinguish three groups of formations on structural grounds about which there can be little dispute. These groups correspond in a broad way to the Caledonian, Armorican, and post-Armorican elements in Great Britain.

The oldest group of formations, characterized by graptolite and trilobite faunas, is found only in the South Island, and on the western side of the main axis of the Island. The rocks strike to the west of north in Nelson, and, according to Morgan, are overthrust farther south by the rocks of the next group along their line of junction.* Graptolites of Ordovician age are found at Collingwood, and others of undetermined age at Preservation Inlet (Otago). Brachiopods and trilobites, referred by Hector to the Upper Silurian, are fairly abundant on the slopes of Mount Arthur, in the Baton River Valley. An apparently younger fauna, containing in addition a large number of corals, occurs at Reefton, and is placed by Hector in the Lower Devonian. Hector and Hutton have each described a trilobite from the last locality.

The middle group of formations constitutes the rocks of the Southern Alps, the central mountains of Otago, the Hokanui and Kaihiku Ranges, the Kaikoura Ranges, and the high ground between Nelson and the Wairau Valley. It also forms the axis of the North Island, and occurs as well at Kawhia and Waikato Heads, on the west coast of that Island, and in various parts of Auckland Peninsula. Over the greater part of the country these rocks are unfossiliferous, but there are several localities with a fairly rich marine fauna, and others with an abundance of plant-impressions. The most important localities are Waikato Heads, Kawhia, the Wairoa Gorge, Eighty-eight and Aniseed Valleys at Nelson, the Malvern Hills (plants), the Clent Hills (plants), Mount Potts ("*Spirifer*" and plant beds), Mount St. Mary, Nugget Point, Owaka (plants), Waikawa (plants), Mataura Falls (plants), Kaihiku, and the Hokanui Hills.

The highly metamorphic unfossiliferous mica-schists of Otago have been referred to various ages from Archæan to Triassic, but we are not concerned with them here. The *Brachiopoda* of Mount Potts were claimed by Haast as Devonian or Carboniferous on the authority of McCoy. Hutton, however, pointed out that a saurian was found at Mount Potts, and Hector stated that the *Brachiopoda* were similar to those of the Kaihiku beds (Permian). With the exception of some fossils determined as Carboniferous in the Maitai Series near the Wairoa Gorge, and various beds elsewhere referred to the Carboniferous on the occurrence of an annelid, Hector and McKay referred the other fossiliferous rocks of the group to various horizons between Permian and Middle Oolite. Park has oscillated between a Jurassic and Carboniferous age for the Maitai Series of Nelson, but agrees with Hector and McKay in referring the other fossiliferous beds to various horizons between Permian and Jurassic. Marshall classes all the rocks of the group, including the Otago mica-schists and the Maitai Series of Nelson, as Trias-Jura.

Exact knowledge is, however, practically confined to two horizons—viz., the *Pseudomonotis* beds, first discovered by Hochstetter at Richmond, and ascribed to the Trias, and the ammonite beds of Kawhia, also discovered by Hochstetter, and referred both by him and Bœhm to the uppermost Jurassic. The *Cephalopoda* described by Marshall, Bœhm, and Diener, from the Hokanui Hills have not been collected with sufficient exactness of detail to throw much light on the age of the different series established by Cox and McKay in that locality.† It seems certain, however, that a lower fossiliferous horizon than the *Pseudomonotis* beds occurs in the Hokanui Hills, and it is possible, from McKay's description, that a higher fauna than that of the ammonite beds of Kawhia

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* Morgan, P. G.: "A Note on the Structure of the Southern Alps." T.N.Z.I., vol. 43, pp. 275–78 (1911).

† Professor Marshall has informed me since the above was written that the *Cephalopoda* in question were all derived from "a single bed 10 ft. thick just on the Otapiri side of Cox's 1877–78 junction of the Otapiri and Wairoa Series, two miles from Boundary Creek, in the bed of the Otamita River." This makes it clear that the base at least of Hector's Otapiri Series is Upper Trias.

occurs near the mouth of the Catlin's River. The localities where the clearest superposition of faunas is to be found are the Hokanui Hills, Wairoa Gorge, Kawhia, and Nugget Point. The correlation of the plant-beds with marine horizons may be worked out at Mataura Falls, Catlin's River, Mount Potts, and Waikato Heads.

The marine fossils of most of the localities consist preponderatingly of *Brachiopoda*, which in the lower groups have, according to Hector, strikingly Palæozoic affinities. Ammonites are found chiefly at Nugget Point, the Hokanui Hills, and Kawhia, but are seldom well preserved except in the last locality. Belemnites are also found in the above-mentioned localities and at Waikato Heads and Catlin's River. Other *Mollusca* are moderately represented. Saurian remains are reported from Nugget Point, Mount Potts, Kawhia, and Mount St. Mary.

The third group of formations may be described as marginal. It is found on each side of the main axis both in the North and the South Islands, and is usually very little folded. The succession of beds varies greatly in different localities, and correlation is difficult, although it has been attempted by all the leading geologists. The presence or absence of unconformities has given rise to much discussion, and there is still no agreement as to how many formations should be established, and where the dividing-lines should be drawn.* Hector divided the rocks into Lower Greensand, Cretaceo-Tertiary, Upper Eocene, Lower Miocene, Upper Miocene, and Pliocene formations; Hutton distinguished the Waipara (Cretaceous), Oamaru (Oligocene), Pareora (Miocene), and Wanganui (Pliocene) systems. McKay still upholds Hector's divisions; Park has a classification similar to that of Hutton; while Marshall, Speight, and Cotton prefer to consider the whole group as one "rock-series." There are, however, at least three distinct faunas represented. Saurians of Cretaceous or even Jurassic facies are found at Amuri Bluff, the Waipara Gorge, and the Malvern Hills; and in the underlying beds at Amuri Bluff there is a rich fauna of pelecypods and gasteropods, with numerous belemnites and rare ammonites, the whole having a distinctly Cretaceous aspect. In the overlying beds as developed in North Canterbury there is a scarcity of fossils until a series of rubbly limestones and calcareous sandstones is reached, with a rich fauna of *Brachiopoda*, *Bryozoa*, corals, *Echinodermata*, and *Mollusca*, all belonging to Recent genera, with a fair percentage of Recent species. Finally, in the North Island, at Wanganui and Napier, there is a still younger fauna, which contains so many Recent species that no one has placed it earlier than Pliocene. It is quite possible that by careful work it will be possible to subdivide these three faunas, or to discover intermediate faunas elsewhere. The first essential is to work them out in North Canterbury, where the succession (but not the question of unconformities) is undoubted.

The saurians are now well known, through the researches of Owen, Hector, Haast, Hutton, and Lydekker. Fish remains have been studied by Newton and Davis. The basal fauna at Amuri Bluff is, however, almost untouched. The two highest faunas are now fairly well known, thanks to Zittel, Hutton, Harris, and others, but there is much work still to be done in all groups.

Policy of the Present Geological Survey.

Undoubtedly the most satisfactory and the quickest method of placing New Zealand palæontology on a firm footing would be to adopt the policy of the Geological Survey of India—viz., to secure for adequate remuneration the services of the most eminent specialists in each group of organisms, and to send carefully selected collections to them. In the case at least of the *Cephalopoda* there is no other possible method,

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* *Cf.* Marshall, P.; Speight, R.; and Cotton, C. A.: "The Younger Rock-series of New Zealand." T.N.Z.I., vol. 43, pp. 378–407 (1911).

but the present vote for "special services" at the disposal of the Geological Survey will not permit of the general adoption of such a policy.

The most pressing economic problems in New Zealand geology are associated with the age and correlations of the coal-measures, which all belong to the marginal group of formations. After consultation with the Director, the writer has commenced the study of these. As marine fossils are not plentiful in the actual coalfields, the succession in North Canterbury and East Marlborough has been selected in the first place. Further work on the fossils of the Trelissic Basin, South Canterbury, and the Oamaru – Shag Point district, may be necessary to establish thoroughly the succession of marine faunas in the marginal group. Meanwhile the services of Mr. Henry Suter have been secured to revise the descriptions of the type specimens of Tertiary *Mollusca* and to examine the undescribed Pliocene collections. Other collections from "Cretaceo-Tertiary" or Tertiary localities will be placed at the disposal of private workers who are willing to examine them.*

Once the marine succession is established it will become possible to assign to their correct horizon various plant-beds at Amuri Bluff, the Malvern Hills, the Clarence Valley, and Shag Point. The plant fossils consist very largely of leaf-impressions, and in order to determine these satisfactorily Mr. G. M. Thomson has commenced the formation of a series of nature prints of the leaves of the older elements of the New Zealand flora. When the plant fossils of the above localities have been described it will be possible to correlate the plant-fossil beds of the main coalfields.†

To place our knowledge of the fossils of the central group of formations on a proper footing, the first essential will be to have the *Cephalopoda* (particularly the ammonites) described by an expert of standing in Great Britain or Europe. No one in New Zealand is competent to undertake this work. After this has been done a selected collection of *Brachiopoda* (including the genotypes of *Rastelligera*, *Psioidea*, and *Clavigera* referred to in Chapter VI) should also be described by an expert abroad. It will then be possible for New Zealand geologists to attempt stratigraphical investigations with some hope of doing valuable work, and the correlation of the plant-fossil beds may be then undertaken.‡

In accordance with the recommendation of the Australasian Association, Mr. W. S. Dun, of Sydney, has offered to undertake the description of the fossils of the western group of formations from the Baton River and Reefton, and is now engaged on the examination of the former. Dr. E. M. R. Shakespear, of Birmingham, has undertaken to examine the graptolites of Slaty Creek, Collingwood, and a collection is now on its way to her. The fossils of the oldest group are thus all in the hands of experts.

Literature referring to the History of New Zealand Geology.

1863. Hochstetter, F. von: "Neu-Seeland." Stuttgart, 1863. (English translation by E. Sauter, 1867, pp. 46-51.)

1879. Haast, J. von: "Geology of the Provinces of Canterbury and Westland, New Zealand." Christchurch, 1879. Part 1.

1884. B[ickerton], A. W.: "Biographical Notice: Julius von Haast, Ph.D., F.R.S., C.M.G., &c." N.Z. Journ. Sci., vol. 2, pp. 112–16 (with photo).

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* Mr. C. A. Cotton, Lecturer in Geology at Victoria College, Wellington, has commenced the examination of the fossils of the Curiosity Shop, remarkable for the abundance and variety of *Terebratulacea*. Mr. E. de C. Clarke, Demonstrator in Geology at Auckland College, and Mr. G. Uttley, Waitaki Boys' High School have undertaken to describe collections from Auckland and Oamaru respectively.

† Professor Marshall, of Otago University, has intimated his willingness to commence the study of the leaf fossils.

‡ Mr. E. A. Newell Arber, University Demonstrator in Palæobotany, Cambridge, has kindly volunteered to undertake an examination of the plant fossils from Mount Potts and other localities, and the collections both from the Geological Survey and from the Canterbury Museum have been sent to him.

1885. Haast, J.: "In Memoriam: Ferdinand Ritter von Hochstetter." N.Z. Journ. Sci., vol. 2, pp. 202–20 (with photos).
1885. T[homson], G. M.: "Biographical Notice: Frederick Wollaston Hutton." N.Z. Journ. Sci., vol. 2, pp. 301–6 (with photo).
1887. W[oodward], H.: "Obituary: Sir J. F. Julius von Haast." Geol. Mag., Dec. 3, vol. 4, p. 432.
1888. Judd, J. W.: Obituary Notice of Sir Julius von Haast in the Anniversary Address of the President. Q.J.G.S., vol. 44, Proc., pp. xlv–xlvii.
1905. Anon.: "Obituary: Capt. Frederick Wollaston Hutton, F.R.S., F.G.S." Geol. Mag., Dec. 5, vol. 2, pp. 575–76.
1905. Woodward, H. B.: Captain F. W. Hutton, F.R.S. (Obit. Notice). Nature, vol. 73, pp. 32, 33.
1906. H[erries], S. H.: Obituary Notice of Frederick Wollaston Hutton in Anniversary Address of the President. Q.J.G.S., vol. 42, Proc., pp. lxii–lxiii.
1906. Hamilton, A.: "Colonial Museum Bulletin No. 1," pp. 1–14.
1907. Bell, J. M.: First Ann. Rep. (n.s.) N.Z. Geol. Surv. Dept., Parl. Paper C.–9, pp. 1–3.
1907. Anon.: "Obituary: Sir James Hector, K.C.M.G., M.D., F.R.S., F.L.S., F.G.S." Geol. Mag., Dec. 5, vol. 4, p. 576.
1908. Geikie, A.: Obituary Notice of Sir James Hector in Anniversary Address of the President. Q.J.G.S., vol. 44, Proc., pp. lxi–lxii.
1910. Hamilton, A.: "The Present Position of New Zealand Palæontology," &c. T.N.Z.I., vol. 42, pp. 46–63.
1910. Park, J.: "The Geology of New Zealand," pp. 1–3. Dunedin, 1910.

CHAPTER II.

COLLECTIONS OF NEW ZEALAND FOSSILS.

I. Collections of the New Zealand Geological Survey.*

The largest but hitherto the least accessible and least known collection of New Zealand fossils is that in the possession of the Geological Survey, accumulated by Hector and his assistants, particularly by A. McKay. It includes older collections received from the Provincial Surveys and from private individuals, amongst whom the names of Travers, Traill, Enys, Westbrooke, and Esdaile deserve special mention. There are also a few boxes of fossils collected by the officers of the Geological Survey under the Directorship of Dr. Bell.†

In the early days of the Geological Survey the Colonial Museum was used for exhibiting the fossils, and they were separated into various series according to age, geographical distribution, zoological relationships, &c. The "Catalogue of the Colonial Museum," published in 1870, mentions 950 invertebrates from seventy-five localities, plant fossils from twenty-three localities, as well as a special collection of vertebrates. This, however, did not compose the whole collection in the possession of the Survey, for 3,542 specimens were mentioned in the annual report of the Museum for 1866–67. The Cretaceous and Tertiary *Mollusca*, *Brachiopoda*, and *Echinodermata* were studied by Hutton in 1872, and his "Catalogue" of the Tertiary species was issued in 1873. The collections grew rapidly year by year till 1893, and many determinations were made and published by Hector, but little systematic work was attempted. Hector's papers on the fossil *Reptilia*, *Belemnites*, and *Brachiopoda*, a paper by Kirk on Pliocene *Mollusca*, Tenison-Woods's monograph of the Tertiary corals and *Bryozoa*, Tate's criticism of Hutton's "Catalogue of the *Echinodermata*," and Davis's work on fossil fish practically exhaust the references in systematic literature to the collection. For many years it has been mostly packed away in cases, and has been inaccessible to New Zealand students.

After the retirement of Sir James Hector, in 1903, the association of the Geological Survey and the Colonial Museum came to an end, and the fossil collections remained in the possession of the Geological Survey.‡ They were still stored for convenience, however, in the Colonial Museum, but it became necessary to repack parts of the collection still on exhibition in the Museum. When the writer joined the Geological Survey (in June, 1911) the type collections of *Reptilia*, *Cetacea*, Tertiary *Mollusca*, *Brachiopoda*, and *Echinodermata*, and teeth of fishes were still on exhibition in show-cases in the Museum, as was also a collection of *Cephalopoda* and *Brachiopoda* zoologically arranged. The rest of the collection was stored away in boxes, into which it had recently been repacked in such a way as to bring specimens from each locality together as far as possible.

The type collections are at present in an unsatisfactory condition. The *Reptilia* are partly unlabelled, the fish-teeth are lying loose in card trays, while the Tertiary corals and *Bryozoa* were found packed away in boxes, though mounted on cards. With the exception of a few *Reptilia*, none of the types of Hector's species were

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* *Cf.* Hamilton, A.: "The Present Position of New Zealand Palæontology." T.N.Z.I., vol. 42, pp. 46–63 (1910).

† The cost of making the collections has been estimated by Mr. A. Hamilton at £50,000.

‡ See Hamilton, *loc. cit.*, and Col. Mus. Bull. No. 1 (1905).

to be found labelled, although a few have since been identified by comparison with figures, and others have been found packed away with the general collection in the boxes, but with labels attached. Until the whole collections have been unpacked and examined it will be impossible to state what types are lost. It is urgently desirable that suitable and permanent accommodation should be found for the existing type collections, as well as for others that will doubtless be constituted as the collection is worked out. The specimens packed away in the boxes, with few exceptions, bear locality numbers referring to the list of fossil localities published in R.G.E., vol. 21, pp. 120–78 (localities 1–764). No collections are extant from sixty-two of these. There are, in addition, eighty-four additional localities with numbers in the manuscript register, of which five are unrepresented by collections.*

There are in all 778 numbered localities from which collections are extant, and a few other localities not numbered, but represented by labelled fossils (67) in the old collection. The total number of fossils packed away is 112,698, making the average from one locality 145. The largest number from a single locality is 16,568, from Awamoa Beach and Creek. The collection from Amuri Bluff (under several numbers) is next in size, with over 4,000 specimens. If the grouping of formations used in the preceding section be adopted, the collection may be divided as follows:—

	Localities.	Specimens.
Western (oldest) group ..	.. 13	5,282
Central group—		
Animals ..	126	14,487
Plants ..	24	1,076
Marginal group—		
Animals ..	595	91,238
Plants	20	615

These figures represent in some measure the abundance of fossils in the rocks of the different groups. The oldest group is perhaps over-represented by specimens, while the localities for plant fossils are certainly under-represented; but the proportions between the figures for the central and marginal groups correspond sufficiently nearly to the relative abundance of fossils in the rocks of the country.

The locality labels have been all carefully checked by Mr. A. McKay, to whom is due great credit for the present state of the collections. Although further collecting will be necessary to establish more closely the horizons of some of the specimens, the collection in its present state forms the most important material yet collected for working out the palæontology of New Zealand. It is possible, however, that many of the best specimens of the early period of collecting have been exchanged with other museums.† A record of the collections sent away (extracted from annual reports of the Colonial Museum and Laboratory) may prove of service to palæontologists abroad who are interested in New Zealand fossils:—

1867. "160 rocks and fossils to the National Museum in Melbourne."

1868. "Collections of birds, shells, Recent and fossil moa-bones, coals and associated rocks and fossils have been sent to the Adelaide Museum, in exchange for most liberal gifts from that institution. Collections of Tertiary fossils have also been sent to the Melbourne Museum, and to the Christchurch Museum in Canterbury."

1869. "Collections of . . . fossil shells, per Dr. Haast, for transmission to Norway."
"A collection of Recent and Tertiary fossil shells sent to the Geological Society, London."
"The collections of Recent and fossil shells which have been sent to England for the purpose of receiving correct names, and being compared with the collections from South America and Australia at the Geological Society's Museum, have not yet been reported on."
"Sixty specimens of Wanganui fossils to Mr. C. Traill, as exchange."

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* For list of localities, see Chapter VIII.

† *E.g.*, Mr. McKay informs the writer that the best specimens from Reefton and the Baton River were exchanged with the British Museum Trustees in the hope that they would be described by experts in England.

1871. "115 species of fossils to the Canterbury Museum."
"Collection . . . of New Zealand fossils . to the Museum at Florence, per the Consul-General of Italy."
"Collections . . . of fossils . . . to the Auckland Museum."
1873. "105 specimens of Amuri fossils and thirty-one Waikato fern-impressions to the Christchurch Museum."
"A large collection . . . of New Zealand fossils to the Vienna Exhibition, most of which have been handed over to a colonial museum in London."
1874. "Collections of fossils . . . to Professor Wyville Thomson, H.M.S. 'Challenger.'"
1875. "Large collections from the various localities at present represented in the Museum have been sent Home for identification by competent authorities, with a view of establishing a distinct basis for the classification of the formations appearing in this country."
1878. "250 specimens fossil *Reptilia* of New Zealand
"1,688 ,, *Mollusca* ,, } Exchanged with Trustees, British Museum."
"68 ,, plants ,,
"Collection of New Zealand saurians to Professor Cope, Philadelphia."
"Collection of Tertiary fossils of New Zealand to Professor Tate, Adelaide."
"Collection of New Zealand *Belemnites* to the Otago Museum."
1880. "Collection of diatomaceous earths to Dr. Ralph, Melbourne."
1882. "Collection of fossils to the Hon. W. B. D. Mantell, Wellington."
"Collection of fossils to Professor Tate, Adelaide."
1883. "Collection of diatomaceous earths to Herr R. Jordan, Bohemia."
"100 specimens of fossils and rocks to the Oamaru Museum."
1885. "A very large collection of rocks, minerals, and fossils, comprising 511 specimens, illustrative of the geology of New Zealand, has been presented to Mr. S. H. Cox, of Sydney, formerly of this Department."
1889. "Large collection of fossil teeth (250 specimens) sent to J. W. Davis, F.R.S., England." (Since returned.)

II. Other Collections in New Zealand.

The collection in the Canterbury Museum, acquired under the Curatorships of Haast and Hutton, ranks next in importance.* Although small compared to the Wellington collection, it is much more select, and is well cared for and well exhibited. The special feature is the exhibit of Tertiary *Mollusca* and *Brachiopoda*, which has been labelled by Hutton, and contains a very large number of type specimens. The older fossiliferous localities of Canterbury—Mount Potts, the Clent Hills, the Malvern Hills—as well as the saurian localities of Amuri Bluff, the Waipara River, and the Malvern Hills, are also well represented by specimens.

The collection in the Otago Museum has also considerable historical importance, in that the Tertiary *Mollusca* and *Brachiopoda* were labelled by Hutton, but there are few primary types. Tertiary *Cetacea* from Otago localities are well represented, and there are large collections of plant fossils from Shag Point, Mataura Falls, and Waikawa. There is also in Dunedin a small collection in the Otago School of Mines, which includes the types of *Cephalopoda* described by Marshall and re-examined by Bœhm, and the fossils described in "The Subantarctic Islands of New Zealand."

The collections in the Auckland Museums are relatively small, and contain only a few types of Tertiary species established by Benham and Clarke. Of the museums in the smaller towns, many of which contain interesting fossils, that of Wanganui perhaps contains the most important collections.

Two private collections deserve special mention. Professor J. Park, of Dunedin, has a very complete collection of Tertiary fossils, which were named in association with Hutton, and therefore have some value as type specimens.† Mr. A. Hamilton, of Wellington, has also a select collection of Tertiary fossils, many of which are paratypes of Hutton's species, while others are new.

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* *Cf.* Haast, Geol. Cant. Westland, 1879, chap. iii.
† Now in the Otago School of Mines.

III. Collections outside New Zealand.

The two most important collections outside New Zealand are those of the British Museum and of the Imperial Museum of Natural History, Vienna. To the former have been transferred the old collections formerly in the possession of the Museum of Practical Geology and the Museum of the Geological Society of London, which probably include the collections of Dieffenbach, Heaphy, and Mantell. The most important part, however, consists of the exchanges made with Hector. There are, in addition, smaller collections presented by various travellers or purchased. The Tertiary *Mollusca* and the Cretaceous *Reptilia* have been described in the Museum Catalogues by Harris and Lydekker respectively. A few other specimens have furnished the basis of separate papers—viz., a fossil crab (Tertiary) described by H. Woodward, two fish-mandibles (Cretaceous) described by Newton, an annelid and scaphopod (? Trias - Jura) described by Bather, and a collection of graptolites determined by Shakespear. The rest of the collection remains unexamined, and is the most important undescribed material outside New Zealand.

The collections made by Hochstetter and described by Unger, Zittel, Hauer, Suess, Karrer, Stoliczka, Stache, and Jæger are deposited in the Imperial Museum of Natural History, Vienna. They include type specimens of Tertiary, Jurassic, and Triassic species. The Jurassic specimens from Kawhia have recently been re-examined by Bœhm.

The most important private collection in Europe is that made by Professor G. Bœhm, of Freiburg, during a visit to New Zealand, supplemented by specimens from Kawhia collected and bought for him by Suter. The Tertiary *Brachiopoda* of Kakanui and the collections from Kawhia have recently formed the basis of papers.

The most important collection in Australia is that in Adelaide, acquired by Tate. It not only includes specimens presented and exchanged by Hector and Hutton, but a certain number of type specimens which were lent to Professor Tate and not returned at his death. It is to be hoped that these specimens will soon be restored to New Zealand.*

* *Cf.* Hamilton, T.N.Z.I., vol. 42, p. 49 (1910).

CHAPTER III.

THE CLASSIFICATION OF TYPE SPECIMENS.

NEW ZEALAND palæontology has already suffered so much from the neglect of type material that too great stress cannot be laid on the importance of the preservation in museums of all material described in the future. Type specimens include not only the original material used in the description of new species, but also any material on which subsequent descriptions or figures are based, and also certain labelled specimens which are used for the comparison and identification of new material. There should be a record attached to each specimen stating by whom and at what date it has been named, and in the event of changes of name the earlier name should also be preserved. This record may be kept either on the back of the card or block to which the specimens are attached, or in a catalogue if the specimens are numbered.

The classification here adopted is that proposed by Buckman and Schuchert.* TYPE SPECIMENS may be divided into two groups—TYPE MATERIAL, on which descriptions and figures have been based; TYPICAL SPECIMENS, which have not been used in literature.

TYPE MATERIAL is again divided into two groups—PRIMARY TYPES, on which the first published descriptions or figures have been based; SUPPLEMENTARY TYPES, on which subsequent descriptions or figures have been based.

PRIMARY TYPES.—All the specimens examined at the time of description by the author of a species and considered by him to belong to it are PRIMARY TYPES. If one specimen was specially selected and marked by the author to become the type, or if only one specimen was figured, or if only one specimen was available at the time of description, that specimen becomes the HOLOTYPE. If there were other specimens, they become PARATYPES. If, however, no one specimen was specially selected by the author, either by marking or by being the only specimen figured, all the primary types become SYNTYPES. A subsequent author may select one of the syntypes to take the place of the holotype, and this specimen then becomes the LECTOTYPE. The material on which a published manuscript name (CHIRONYM) is based is termed a CHIROTYPE until such time as it is adequately described. It is hardly necessary to point out how desirable it is for authors to found holotypes.

SUPPLEMENTARY TYPES.—If the primary types are lost, or are too imperfect for determination, a new specimen from the same locality and horizon may be selected as the NEOTYPE. A specimen, not a primary type, that is selected by an author to illustrate his own species is termed an HEAUTOTYPE. A similar specimen that is selected by one not the author is termed a PLESIOTYPE.

TYPICAL SPECIMENS comprise specimens from the original locality, specimens identified by the author of a species, or specimens compared with the primary types.

A specimen from the same locality and horizon as the primary type is termed a TOPOTYPE. A topotype named by the author of a species becomes a METATYPE. A specimen from other than the original locality named by the author becomes an IDEOTYPE. A specimen compared and identified with the primary types by a specialist is termed a HOMŒOTYPE.

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* C. Schuchert and S. S. Buckman: "The Nomenclature of Types in Natural History," Ann. and Mag. Nat. Hist., vol. 91, pp. 102–4 (1905). C. Schuchert: "Classification of Type Specimens," Bull. U.S. Nat. Mus. No. 53, pt. 1, pp. 9–18 (1905).

The importance placed in this classification on specimens from the same locality and horizon as the primary types of any given species should be laid to heart by workers in New Zealand. Hutton, who has labelled the majority of the specimens in the Canterbury and Otago Museums, appeared to lay very little stress on the identification of localities, for in some of his stratigraphical lists of fossils he omits to mention the type locality from which the species was originally described. In figuring his species, too, he sometimes selected specimens from other than the type localities, although the primary types were unfigured. In his museum collections he appeared to be indifferent from what locality the specimen selected to illustrate his species came.* It is impossible for each museum to have complete collections of primary types, but it is quite possible and practicable for them to have nearly complete collections of topotypes or the other categories of typical specimens. Without such collections the task of identification is more difficult, and the identifications cannot possess the same weight.

* Due credit must be paid to Hutton for his care to preserve holotypes. Had Hector exhibited the same care the task of subsequent workers would be much easier.

CHAPTER IV.

PRIORITY, NOMENCLATURE, AND CITATION IN PALÆONTOLOGICAL WORK.

THE following information, derived principally from the International Rules for Zoological Nomenclature adopted by the International Zoological Congress of 1904,* may be found useful by New Zealand students approaching systematic work in palæontology and by geologists wishing to cite lists of fossils. For fuller information the publication in question should be consulted.

PRIORITY OF NOMENCLATURE.

Binary nomenclature in zoology commenced with the publication of the 10th edition of Linné's "Systema Naturæ" in 1758. Pre-Linnean authorities are not accepted. By the law of priority the oldest available name of a genus or species is retained, provided that it was published and accompanied by an indication, or a definition, or a description, and that the author has applied the principles of binary nomenclature. It is recommended, however, that a specific name accompanied by both description and figure should stand in preference to one accompanied only by a diagnosis or only by a figure.

Example: *Corbula dubia* Hutton (1873) was accompanied by a description only. It may therefore be replaced by *Mactra chrydœa* Suter (1911), which was accompanied by both description and figure.

Other things being equal, that name is to be preferred which stands first in the publication (page precedence).

Example: *Lima paleata* Hutton (1873) and *Lima multiradiata* Hutton (1873) are probably synonyms. If this proves to be the case, *Lima paleata*, standing first on the page (Cat. Tert. Moll. Ech., p. 33), will take priority.

A generic or specific name once established cannot be rejected even by its author because of inappropriateness.

Example: Hutton in 1873 described *Struthiolaria tuberculata* and var. B (Cat. Tert. Moll. Ech., p. 11). In 1886 he proposed to elevate the variety to a species under the name *tuberculata*, and to rename the original species *spinosa*. This is inadmissible.

The International Conference gave no ruling on manuscript names, except in so far as they are included above. In the case of most New Zealand manuscript names the only indication supplied is the locality and horizon of the fossil. From the spirit of the International Rules, it follows that a specific name accompanied by a description, or by a figure, stands in preference to a manuscript name accompanied only by an indication. It is, of course, valid for subsequent workers to accept both available manuscript names, and names accompanied only by a description, or only by a figure, and establish them by adequate description and illustration. Hutton followed this plan in the case of some of Hector's and McCoy's manuscript names, and it will simplify our future synonymy if this course is adopted by other workers.

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* *Cf.* "Journal of Conchology," vol. 11, pp. 179–185, 201–211 (1904–6).

A HOMONYM is one and the same name for two or more different things. SYNONYMS are different names for one and the same thing. A generic name is to be rejected as a homonym when it has previously been used for some other genus of animals. A specific name is to be rejected as a homonym when it has previously been used for some other species or subspecies of the same genus.

Example: *Natica solida* Sowerby, 1846, is rejected as a homonym of *Natica solida* Blainville, 1825. It has therefore been renamed *N. darwini* by Hutton.

Rejected homonyms can never again be used; this applies to specific homonyms even when the species is placed in another genus. Rejected synonyms can again be used in case of the restoration of erroneously suppressed groups.

Example: *Neothyris* has been rejected as a synonym of *Magellania*, but it may be again used if an author considers that *M. lenticularis*, the genotype of *Neothyris*, is not congeneric with *M. flavescens*, the genotype of *Magellania*.

NOMENCLATURE.

The names that may be chosen to designate genera and species are limited by definite rules and recommendations. Of these only the more important can be given here.

A GENERIC NAME must consist of a single word, simple or compound, written with a capital initial letter, and employed as a substantive in the nominative singular. With Greek names the rules of Latin transcription recommended by the Congress should be followed. Modern patronymics are modified according to definite rules (as, *e.g.*, in *Waldheimia*). Barbarous names (*i.e.*, words of non-classic origin) are admitted if they can be treated as Latin substantives, otherwise they are given a Latin termination (*e.g.*, *Torlessia*).

A SPECIFIC NAME may be an adjective agreeing grammatically with the generic name (*e.g.*, *Waldheimia gravida*), a substantive in the nominative in apposition with the generic name (*e.g.*, *Turritella pagoda*), or a substantive in the genitive (*e.g.*, *Toredo heaphyi*). Specific substantive names derived from names of persons may be written with a capital initial letter (*e.g.*, *Terebratulina Suessi* or *T. suessi*). All other specific names are to be written with a small initial letter. If the name is derived from a modern patronymic, the genitive is always formed by adding to the exact and complete name an *i* if the person is a man, and an *æ* if the person is a woman (*e.g.*, *Zitteli*, not *Zittelli*). Geographical names are to be given as substantives in the genitive or are to be placed in an adjectival form (*e.g.*, *novæ-zealandiæ*, *neozelanica*). Barbarous words are to be latinized (*e.g.*, *kakanuiensis*, *oamarutica*). The original orthography of a name is to be preserved unless an error of transcription, a *lapsus calami*, or a typographical error is evident.

Care must be taken with the orthography of the following specific names, all of which have been applied to New Zealand *Mollusca*: *novæ-zealandiæ*, *novæ-zelandiæ*, *zealandiæ*, *zelandiæ*, *neozelanica*, *neozealanica*, *novoseelandica*, *novozealandica*, *zelandica*, *zealandica*, &c. Hutton's versions of these names are unreliable (*fide* Suter, T.N.Z.I., vol. 34, pp. 207–24).

CITING OF NAMES.

For scientific names it is advisable to use some other type than that used in the text.

Example: *Conchothyra parasitica* occurs in the Malvern Hills.

When it is desired to cite the name of a subgenus, this name is to be placed in parentheses between the generic and the specific names—*e.g.*, *Lima* (*Limatula*) *bullata*.

If it is desired to cite the subspecific name, such name is written immediately following the specific name without the interposition of any mark of punctuation—*e.g.*, *Magellania lenticularis ovalis*.

If it is desired to cite the author's name, this should follow the scientific name without interposition of any mark of punctuation; if other citations are desirable (date, sp. nov., emend., *sensu stricto*, &c.), these follow after the author's name, but are separated from it by a comma or are placed in parentheses.*

Example: *Flabellum radians* Tenison-Woods (1886), or *Flabellum radians* Tenison-Woods, 1886. *Conchothyra parasitica* McCoy (MS.), or *Conchothyra parasitica* McCoy, MS.

When a species is transferred to another than the original genus, or the specific name is combined with any other generic name than that with which it was originally published, the name of the author of the specific name is retained in the notation, but placed in parentheses.

Example: *Waldheimia gravida* Suess, 1865, and *Terebratula gravida* (Suess, 1865).†

If it is desired to cite the author of the new combination, his name follows the parenthesis.

Example: *Terebratula gravida* (Suess, 1865) Hutton, 1905.

No ruling was given by the Congress for the citation of the author who establishes an earlier manuscript name, but the principles involved are similar to those in the last case.

Example: *Conchothyra parasitica* (McCoy, MS.) Hutton, 1894.

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* Many modern authors—*e.g.*, Buckman—insert a comma before the author's name.

† Many modern authors would write *Terebratula gravida*, Suess sp.

New Zealand systematists are urged, however, to follow the International Rules, if only for the sake of uniformity in Government publications.

CHAPTER V.

CENSUS OF THE PRE-CRETACEOUS FOSSIL SPECIES OF NEW ZEALAND.

WITH a view to facilitating reference to previous determinations of fossils, a census of all specific determinations hitherto recorded has been made. No opinions are here expressed as to the value of the determinations. Where the location of the specimens identified is known it is specified. Those parts only of the census dealing with the pre-Cretaceous species are published here, as the Cretaceous and Tertiary species would occupy so much space, and it is hoped that their synonymy will shortly undergo such a revision as would make a census published at the present time obsolete. It is hoped to conclude the publication of the census in future bulletins.

I. GRAPTOLITES FROM SLATY CREEK, NEAR COLLINGWOOD.

The specimens figured by Hector, and those identified and figured by Bell, Webb, and Clarke, are in the Dominion Museum. Those identified by Shakespear are in the British Museum.

References.

(*a*) = Hector, J.: Cat. Ind. Col. Mus., p. 82, f. 57; 1886.
(*b*) = Hutton, F. W.: "On the Foliated Rocks of Otago," T.N.Z.I., vol. 24, p. 362; 1892.
(*c*) = Bell, J. M.; Webb, E. J. H.; and Clarke, E. de C.: "Palæontology of the Aorere Series," Bull. No. 3 (n.s.), N.Z. Geol. Surv., pp. 34–37, pl. 8; 1907.
(*d*) = Shakespear, E. M. R.: "On Some New Zealand Graptolites," Geol. Mag., dec. 5, vol. 5, pp. 145–48; 1908.

Shakespear distinguished two bands from the hand-specimens, and suggested that probably two zones are present.

	Horizon.
Bryograptus lapworthi Ruedemann.	
1908. *Bryograptus lapworthi.* Shakespear, (*d*)	Bands 1 and 2.
Climacograptus sp. (See **Diplograptus,** *cf. inutilis.*)	
Dichograptus octobrachiatus (Hall).	
1908. *Dichograptus octobrachiatus.* Shakespear, (*d*)	Band 1.
Didymograptus affinis Nicholson	Band 2.
Didymograptus affinis (?) Shakespear, (*d*).	
Didymograptus caduceus. (See **D. gibberulus.**)	
Didymograptus extensus Hall.	
1907. *Didymograptus extensus.* Bell, Webb, and Clarke, (*c*), f. 2–5.	
1908. ,, Shakespear, (*d*)	Band 1.
Didymograptus gibberulus Nicholson.	
1886. *Graptolites* sp. Hector, (*a*), Nos. 6 and 13.	
1907. *Didymograptus caduceus.* Bell, Webb, and Clarke, (*c*), f. 6–12.	
1908. ,, *gibberulus* Shakespear, (*d*)..	Band 1.

Didymograptus nanus Lapworth. — Horizon.
1908. *Didymograptus nanus.* Shakespear, (*d*) — Band 2.

Didymograptus nitidus Hall.
1908. *Didymograptus nitidus.* Shakespear, (*d*) — Band 1.

Didymograptus octobrachiatus Hall.
1892. *Didymograptus octobrachiatus.* Hutton, (*b*).

Didymograptus quadribrachiatus Hall.
1892. *Didymograptus quadribrachiatus.* Hutton, (*b*).

Didymograptus similis Ruedemann.
1908. *Didymograptus similis.* (?) Shakespear, (*d*) — Band 2.

Diplograptus sp. *cf. Dinutilis* Hall.
1907. *Climacograptus* sp. Bell, Webb, and Clarke, (*c*), f. 17.
1907. *Diplograptus* sp. Bell, Webb, and Clarke, (*c*), f. 18.
1908. ,, sp. *cf. inutilis.* Shakespear, (*d*) — Band 1.

Goniograptus geometricus Ruedemann.
1908. *Goniograptus geometricus.* Shakespear, (*d*) — Band 2.

Goniograptus perflexilis Ruedemann.
1907. *Rastrites* sp. Bell, Webb, and Clarke, (*c*), f. 1.
1908. *Goniograptus perflexilis.* Shakespear, (*d*) .. — Band 1.

Loganograptus logani Hall.
1908. *Loganograptus logani.* Shakespear, (*d*) — Band 1.

Loganograptus octobrachiatus Hall.
1886. *Graptolites* sp. Hector, (*a*), No. 4.
1907. *Loganograptus octobrachiatus.* Bell, Webb, and Clarke, (*c*), f. 15 (probably = *L. logani, apud* Shakespear).

Phyllograptus angustifolius Hall.
1908. *Phyllograptus angustifolius.* Shakespear, (*d*).

Phyllograptus anna Hall.
1908. *Phyllograptus anna.* Shakespear, (*d*) — Bands 1 and 2

Phyllograptus folium.
1892. *Phyllograptus folium.* Hutton, (*b*).

Phyllograptus ilicifolius Hall.
1908. *Phyllograptus ilicifolius.* Shakespear, (*d*) .. — Band 1.

Phyllograptus typus Hall.
1907. *Phyllograptus typus.* Bell, Webb, and Clarke, (*c*), f. 19–20.
1908. ,, Shakespear, (*d*) .. .. .. — Band 2.

Rastrites sp. (See **Goniograptus perflexilis.**)

Strophograptus trichomanes Ruedemann.
1908. *Strophograptus trichomanes* (?) Shakespear, (*d*) — Band 2.

Tetragraptus amii Elles and Wood.
Tetragraptus amii. Shakespear, (*d*) .. — Band 1.

Tetragraptus bigsbyi (Hall).
1908. *Tetragraptus bigsbyi.* Shakespear, (*d*) .. — Band 2.

Tetragraptus pendens Elles.
1908. *Tetragraptus cf. pendens.* Shakespear, (*d*) — Band 2.

Tetragraptus quadribrachiatus (Hall).
1886. *Graptolites* sp. Hector, (*a*), No. 3.
1907. *Tetragraptus quadribrachiatus.* Bell, Webb, and Clarke, (*c*), f. 13.
1908. ,, Shakespear, (*d*) .. — Band 2.

II. Fossils of the Baton River Series, Baton River, Nelson (Upper Silurian of Hector).

No descriptions or figures of any fossils from the Baton River have been published, but a large number of identifications have been made. The letters (*a*), (*b*), &c., after the author's name indicate the following references:—

(*a*.) 1879. Hector, J.: Prog. Rep., vol. 12, p. 39; and McKay, A.: R.G.E., vol. 12, p. 126.
(*b*.) 1879. Hector, J.: 14th Ann. Rep. Col. Mus. Lab., p. 7.
(*c*.) 1880. Hector, J.: App. Off. Cat. S.E., pp. 2–3.
(*d*.) 1880. Hector, J.: Journ. Roy. Soc., N.S.W., vol. 13, p. 79.
(*e*.) 1880. Hector, J.: Handbook of N.Z., 2nd ed., p. 29, and 3rd ed. (1883).
(*f*.) 1883. Hector, J.: Prog. Rep., vol. 14, p. xxv.
(*g*.) 1886. Park, J.: R.G.E., vol. 17, pp. 179–80.
(*h*.) 1886. Hector, J.: Cat. Ind. Col. Exh., pp. 18–21, 81.

	Specimens so labelled in Dominion Museum.
Astrocerium venustum Hall, (*c*).	
Athyris longiformis, (*g*)	1
Atrypa reticularis Linn., (*a*), (*b*)	4
Avicula anisota Phillips, (*c*), (*h*)	1
,, *cancellata* Phillips, (*b*), (*c*), (*h*)	1
,, *echinus* (?), (*g*).	
,, *damnoniensis* J. de C. Sow., (*a*).	
,, *subplana* Hall, (*b*).	
Callopora elegantula Hall, (*c*).	
Calymene blumenbachii Brogniart, (*a*), (*b*), (*c*), (*d*), (*e*), (*g*), (*h*)	5
Chonetes striatella Dalman, (*a*).	
Homalonotus harrisoni, (*h*).	
,, *knightii* König, (*a*), (*b*), (*c*), (*d*), (*h*)	1
Leptæna planoconvexa Hall, (*f*)	2
,, *profunda* Hall, (*f*)	3
Modiolopsis modiolaris Conrad, (*a*), (*b*), (*c*), (*h*).	
Murchisonia terebralis Hall, (*a*), (*b*), (*c*), (*e*), (*h*) ..	2
,, *uniangulata abbreviata* Hall, (*c*), (*d*), (*h*).	
Nucleospira ventricosa Hall, (*g*)	8
Nucula levata, (*b*).	
Orthis basalis Dalman, (*c*), (*d*), (*g*), (*h*)	5
,, *canaliculata* Lindstrom, (*g*) ..	6
,, *circula* Hall, (*c*), (*g*), (*h*).	
,, *crassa* Lindström, (*c*), (*d*), (*g*), (*h*) ..	12
,, *fissicostata* Hall, (*b*), (*c*), (*g*), (*h*) ..	12
,, ,, var. A Hector (MS.), (*h*).	
,, *patera* Salter, (*c*), (*g*), (*h*) ..	4
,, *plicatella* Hall, (*g*).	
,, *protensa* J. de C. Sow., (*b*) ..	3
,, *reversa* Davidson, (*g*), (*h*) ..	4
,, *testudinaria* Dalman, (*g*).	
,, *unguis* J. de C. Sow., (*c*), (*d*), (*g*), (*h*)	6
Orthoceras junceum Hall, (*c*).	
Orthonota solenoides J. de C. Sow., (*b*).	
Pterinea spinosa Phillips, (*a*), (*e*), (*h*).	
Rhynconella (*atrypa*), (*g*).	

	Specimens so labelled in Dominion Museum.
Rhynconella nucula J. de C. Sow., (*g*)	5
,, *plena* Hall, (*g*)	6
,, *wilsoni* J. de C. Sow., (*a*), (*b*), (*c*), (*d*), (*g*), (*h*) ..	8
Spirifer radians, (*f*).	
,, *radiatus* J. de C. Sow., (*a*), (*b*), (*c*), (*d*), (*e*), (*f*), (*h*).	
,, *speciosus* Schlotheim, (*c*), (*g*)	8
,, *sulcatus* Hisinger, (*b*).	
Spiriferina grata Hector (MS.), (*g*) ..	3 chirotypes.
Streptelasma calicula Hall, (*c*).	
Stricklandia lirata J. de C. Sow., (*a*), (*c*), (*d*), (*e*), (*g*), (*h*)	1
Strophomena corrugata, (*h*).	
,, *corrugatella* Davidson, (*a*), (*b*), (*c*), (*h*) ..	1
,, ,, var. A, (*h*).	
,, *orbignyi* Davidson, (*c*), (*h*)	1
,, *profunda* (*h*).	

III. Fossils of the Reefton Series. (Lower Devonian of Hector.)

Two species of trilobites (*Homalonotus*) have been described by Hector and Hutton respectively, and Hector has also figured one species each of *Avicula* and *Strophomena*. Besides these a few identifications have been made.

Avicula sp. ind. Hector, Cat. Ind. Col. Exh., p. 80, f. 52, No. 1; 1886.

Chonetes striatella Dalman.

1880. *Chonetes striatella*. Hector, Journ. Roy. Soc. N.S.W., vol. 13, p. 79.
1880. ,, Hector, App. Off. Cat. S.E., p. 4.

Homalonotus expansus Hector.

1877. *Homalonotus expansus*. Hector, T.N.Z.I., vol. 9, p. 602, pl. 27, f. 2. (D.M., 4 syntypes, 3 figured.)
1880. ,, *expansa*. Hector, Journ. Roy. Soc. N.S.W., vol. 13, p. 79.
1880. ,, *expansus*. Hector, Handbook of N.Z. (2nd ed.), p. 29.
1886. ,, ,, Hector, Cat. Ind. Col. Exh., p. 19.

Homalonotus sp. ind. Hutton, Proc. Linn. Soc. N.S.W., ser. 2, vol. 12, p. 257; 1888.

Leptæna bipartita Salter.

1880. *Leptæna bipartita*. Hector, Journ. Roy. Soc. N.S.W., vol. 13, p. 79.
1886. ,, Hector, Cat. Ind. Col. Exh., p. 20.

Orthis crassa Lindström.

1880. *Orthis crassa*. Hector, App. Off. Cat. S.E., p. 4.

Orthis grandis.

1877. *Orthis grandis*. McKay, R.G.E., vol. 8, p. 95.

Orthis interlineata J. de C. Sowerby.

1880. *Orthis interlineata*. Hector, App. Off. Cat. S.E., p. 4.
1880. ,, Hector, Journ. Roy. Soc. N.S.W., vol. 13, p. 79.

Spirifer cultrijugatus Römer.

1880. *Spirifera cultrijugata*. Hector, App. Off. Cat. S.E., p. 3.
1880. ,, Hector, Journ. Roy. Soc. N.S.W., vol. 13, p. 79.

Spirifer speciosus Schlotheim.

1880. *Spirifera speciosa* Hector, App. Off. Cat. S.E., p. 4. (D.M., 3 specimens.)
1880. ,, Hector, Journ. Roy. Soc. N.S.W., vol. 13, p. 79.
1886. ,, Hector, Cat. Ind. Col. Exh., p. 19.

Spirifer vespertilio G. B. Sowerby.

1880. *Spirifera vespertilio.* Hector, Handbook of N.Z. (2nd ed.), p. 29.
1886. ,, Hector, Cat. Ind. Col. Exh., p. 80.

Stricklandia lirata J. de C. Sowerby.

1880. *Stricklandia lirata.* Hector, App. Off. Cat. S.E., p. 3.

Strophomena sp. ind. Hector, Cat. Ind. Col. Exh., p. 80, f. 52, No. 2; 1886. (D.M., 1 figured specimen.)

There are also in the Geological Survey collections six labelled specimens belonging to four species not included above.

IV. Fossils of the Maitai Series, Nelson District. (Carboniferous of Hector.)

Annelid.* Hector, Cat. Ind. Col. Exh., p. 78, f. 48, No. 1.

Cyathocrinus sp. ind.

1878. *Cyathocrinus* sp. ind. Hector, Prog. Rep., vol. 11, p. xii.
1879. ,, Hector, Handbook of N.Z., p. 26, and Prog. Rep., vol. 12, p. 12.
1880. ,, Hector, Handbook of N.Z. (2nd ed.), p. 28, and Jour. Roy. Soc. N.S.W., vol. 13, p. 78.
1886. ,, Hector, Prog. Rep., vol. 17, p. xx.

Cyathophyllum sp. ind.

1878. *Cyathophyllum* sp. ind. Hector, Prog. Rep., vol. 11, p. xii.
1879. ,, Hector, Handbook of N.Z., p. 26, and Prog. Rep., vol. 12, p. 12.
1880. ,, Hector, Handbook of N.Z. (2nd ed.), p. 28; Jour. Roy. Soc. N.S.W., vol. 13, p. 78; App. Off. Cat. S.E., p. 4.
1886. ,, Hector, Prog. Rep., vol. 17, p. xx.

Productus brachythærus G. Sowerby.

1878. *Productus branchythærus.* Hector, Prog. Rep., vol. 11, p. xii.
1879. ,, Hector, Prog. Rep., vol. 12, p. 12, and Handbook of N.Z., p. 26.
1879. ,, McKay, R.G.E., vol. 12, p. 117.
1880. *Productus brachythærus.* Hector, Handbook of N.Z. (2nd ed.), p. 28; Jour. Roy. Soc. N.S.W., vol. 13, p. 78; App. Off. Cat. S.E., p. 4.
1886. ,, Hector, Prog. Rep., vol. 17, p. xx.

Productus punctatus Martin.

1878. *Productus punctatus.* Hector, 13th Ann. Rep. Col. Mus. Lab., p. 6.

Spirifer bisulcatus J. de C. Sowerby.

1878. *Spirifer bisulcatus.* Hector, 13th Ann. Rep. Col. Mus. Lab., p. 6.
1879. *Spirifera bisulcata.* Hector, Prog. Rep., vol. 12, p. 12; Handbook of N.Z., p. 26; App. Off. Cat. S.E., p. 4.
1880. ,, Hector, Handbook of N.Z. (2nd ed.), p. 28, and Jour. Roy. Soc. N.S.W., vol. 13, p. 78.
1886. ,, Hector, Prog. Rep., vol. 17, p. xx, and Cat. Ind. Col. Exh., p. 78, f. 46, No. 2.

Spirifer glaber (Martin).

1880. *Spirifer glaber.* Hector, Handbook of N.Z. (2nd ed.), p. 28.
1886. ,, Hector, Prog. Rep., vol. 17, p. xx.

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* This fossil, known as the "Mount Torlesse Annelid" has been described by Bather, and named *Torlessia mackayi*, and under the latter name is also included in the list of Permo-Jurassic invertebrata, in deference to the views of Park and Marshall.

—	Locality or Horizon.	Location of Specimens.
Ægoceras brownei. (See **Perisphinctes brownei.**)		
Ammonites debilis.		
1878. *Ammonites debilis.* Hector, Prog. Rep., vol. 11, p. xi ..	Oreti Series, Hokanui Hills	
Ammonites discus d'Orbigny.		
1878. *Ammonites discus.* Hector, Prog. Rep., vol. 11, p. ix	Lower Flag Hill Series, Hokanui Hills ..	
Ammonites of group **falciformi.** Hector, Prog. Rep., vol. 11, p. ix; 1878 ..	Bastion Series, Hokanui Hills	
Ammonites galeatus.		
1878. *Ammonites galeatus.* Hector, Prog. Rep., vol. 11, p. x ..	Otapiri Series, Hokanui Hills ..	
Ammonites metternichii.		
1878. *Ammonites metternichii.* Hector, Prog. Rep., vol. 11, p. x ..	Otapiri Series, Hokanui Hills ..	
Ammonites novoseelandicus. } (See **Hoplites novoseelandicus.**) **Ammonites novozelandicus.** }		
Ammonites of group **planati.** Hector, Prog. Rep., vol. 11, p. ix; 1878	Bastion Series, Hokanui Hills ..	
Ammonites sisyphi Hector.		
1886. *Ammonites sisyphi.* Hector, Cat. Ind. Col. Exh., p. 68, f. 33, No. 1 ..	Jurassic	} D.M.; chirotype.
1886. ,, Hector, 21st Ann. Rep. Col. Mus. Lab., p. 6	Putataka Series, Kawhia	
Ammonites sp. ind. Hector, Cat. Ind. Col. Exh., p. 68, f. 33, No. 2; 1886	Jurassic	..
Arca pulchra.		
1878. *Arca pulchra* var. Hector, Prog. Rep., vol. 11, p. vii	Putataka Series, Hokanui Hills ..	
Arcestes hokanui Marshall.		
1909. *Arcestes hokanui.* Marshall, T.N.Z.I., vol. 41, p. 143 and text fig.	} Mandeville, Hokanui Hills	Marshall coll.; holotype.
1910. *Proarcestes* sp. or *Arcestes* sp. Diener in Bœhm. Cb. f. Min., 1910, p. 634 ..		
Astarte elegans Sowerby.		
1878. *Astarte elegans.* Hector, Prog. Rep., vol. 11, p. viii ..	Putataka Series, Hokanui Hills	
1880. ,, Hector, App. Off. Cat. S.E., pp. 10, 11 ..	Flag Hill and Putataka Series, Hokanui Hills..	
1886. ,, Hector, Cat. Ind. Col. Exh., p. 17 ..	Flag Hill	
Astarte fimbriata (Walton, MS.) Lycett.		
1878. *Astarte fimbriata.* Hector, Prog. Rep., vol. 11, p. ix ..	Lower Flag Hill Series, Hokanui Hills ..	
Astarte minima (Phillips).		
1878. *Astarte minima.* Hector, Prog. Rep., vol. 11, p. ix ..	Bastion Series, Hokanui Hills ..	
1880. ,, Hector, App. Off. Cat. S.E., p. 7 ..	Wairoa Series, Nugget Point ..	
1881. ,, McKay, R.G.E., vol. 13, p. 45	Bastion Series, Wyndham River ..	
Astarte vallisneriana.		
1878. *Astarte vallisneriana.* Hector, Prog. Rep., vol. 11, p. x	Otapiri Series, Hokanui Hills ..	
Astarte wollumbillaensis Moore.		
1872. *Astarte wollumbillaensis.* Hutton, Prog. Rep., vol. 8, p. 105	Otapiri	
Atractites otapiriensis (Hector).		
1878. *Belemnites otapiriensis.* Hector, T.N.Z.I., vol. 10, pp. 485, 486, pl. xxii, f. 1 ..	Otapiri to Wairoa Series ..	D.M.; 2 syntypes, Oreti railway-cutting, Dipton.
1878. ,, Hector, Prog. Rep., vol. 11, p. x	Otapiri Series, Hokanui Hills	..
1878. ,, McKay, R.G.E., vol. 11, pp. 72, 89, ...	Oreti railway-cutting	..
1879. ,, Hector, Prog. Rep., vol. 12, p. iv, and McKay, R.G.E., vol. 12, p. 120	Otapiri Series, Wairoa Gorge, and Eighty-eight Valley, Nelson	..
1880. ,, Hector, Journ. Roy. Soc., N.S.W., vol. 13, p. 75 ..	Otapiri Series	
1880. ,, Hector, App. Off. Cat. S.E., p. 8	Otapiri Series, Wairoa Gorge	
1881. ,, McKay, R.G.E., vol. 13, pp. 44, 47	Otapiri Series, Mataura River, 1½ miles below Gore; Flag Hill Series, 1 mile below Mataura Falls ..	
1885. *Belemnites* aut *Aulocerας* sp. Denkschr. k. Akad. Wissensch. Wien, bd. 50, p. 120		
1909. *Orthoceras otapiriensis.* Marshall, T.N.Z.I., vol. 41, p. 144	} (?) Mandeville, Hokanui Hills ..	
1910. *Atractites* (?) sp. Diener in Bœhm, Cb. f. Min., 1910, pp. 635, 636.. ..		

	Locality or Horizon.	Location of Specimens.
Athyris sp. ind.		
1886. *Spirigera* sp. ind. Hector, Cat. Ind. Col. Exh., p. 73, f. 41, No. 4	Triassic	
Athyris wreyi (Suess).		
1864. *Spirigera wreyi.* Suess, Nov. Pal., pp. 28, 29, taf. 8, f. 3, *a, b, c, d*	Wairoa Gorge and Aniseed Valley ..	V.M.; syntypes.
1886. ,, Hector, Cat. Ind. Col. Exh., p. 73, f. 41, No. 4	Triassic	..
(Numerous other references in New Zealand literature.)		
Aucella plicata Zittel.		
1864. *Aucella plicata.* Zittel, Nov. Pal., pp. 32, 33, taf. 8, f. 4, *a, b, c*	Waikato South Head	V.M.; syntypes.
1870. ,, Hector, Cat. Col. Mus., pp. 194, 195	Kawhia and Wairoa Valley ..	..
1886. ,, Hector, Cat. Ind. Col. Exh., p. 68, f. 33, No. 5	Waikato Heads	..
1911. ,, Bœhm, N.J. f. Min., 1911, bd. 1, pp. 7–14, taf. 2, f. 1, 2, *a, b, c*; 3, *a, b*; 4	Kawhia	Bœhm coll.; 9 plesiotypes.
(Also identified by Hector in Amuri Series, "Lower Greensand.")		
Aucella sp. ind. Hector, Cat. Ind. Col. Exh., p. 68, f. 33, No. 3; 1886	Kawhia	
Avicula burumburiensis. (? **A. braamburiensis** Sow.)		
1878. *Avicula burumburiensis.* Hector, Prog. Rep., vol. 11, p. ix ..	Bastion Series, Hokanui Hills ..	
Avicula costata Sowerby.		
1878. *Avicula costata.* Hector, Prog. Rep., vol. 11, pp. viii, ix	Putataka and Lower Flag Hill Series, Hokanui Hills	
1880. ,, Hector, App. Off. Cat. S.E., p. 11 ..	Putataka Series, Hokanui Hills ..	
1886. ,, Hector, Cat. Ind. Col. Exh., p. 16 ..	Hokanui Range	
Avicula cygnipes.		
1878. *Avicula cygnipes.* Hector, Prog. Rep., vol. 11, p. ix	Bastion Series, Hokanui Hills ..	
1884. ,, Hector, Prog. Rep., vol. 16, p. xxxviii	Flag Hill Series, Kawhia	
1886. *Avicula cygnipes* var. Hector, Cat. Ind. Col. Exh., p. 69, f. 34, No. 2 ..	Jurassic	
Avicula mima.		
1878. *Avicula mima.* Hector, Prog. Rep., vol. 11, p. ix ..	Lower Flag Hill Series, Hokanui Hills ..	
Belemnites aucklandicus. (See **B. canaliculatus aucklandicus.**)		
Belemnites bessinus d'Orbigny.		
1878. *Belemnites bessinus.* Hector, Prog. Rep., vol. 11, p. ix		
Belemnites canaliculatus aucklandicus (Blainville) Hauer.		
1859. *Canaliculati.* Hochstetter, N.Z. Govt. Gazette, Prov. of Auckland, vol. 8, July 8, 1859	Waikato South Head ..	V.M.; 9 specimens.
1859. ,, Hochstetter, Sitz. k. Akad. Wissensch. Wien, bd. 37, p. 124 ..	,, ..	..
1863. *Belemnites aucklandicus.* Hauer in Hochstetter, "Neu-Seeland," p. 129, and text fig.	Mouth of Waikato River ..	V.M.; 1 holotype, 2 paratypes.
1863. *Belemnites aucklandicus* var. Hauer in Hochstetter, "Neu-Seeland," p. 190, and text fig.	Kawhia	V.M.; 1 holotype, 5 paratypes.
1864. *Belemnites aucklandicus.* Hauer, Nov. Pal., pp. 29, 30, taf. 8, f. 2, *a–d* ..	Waikato South Head	
1864. *Belemnites aucklandicus minor.* Hauer, Nov. Pal., pp. 29, 30, taf. 8, f. 3, *a–d*	Ahuahu Point, Kawhia	
1878. *Belemnites aucklandicus.* Hector, Prog. Rep., vol. 11, p. viii, and Cox, R.G., vol. 11, pp. 37, 40	Putataka Series, Hokanui Hills	
1878. ,, Hector, T.N.Z.I., vol. 10, p. 486, pl. 22, f. 2, *a, b* ..	Putataka Series, Waikato Head and Hokanui Hills	

1878. *Belemnites hochstetteri.* Hector. T.N.Z.I., vol. 10, pp. 486, 487, pl. 22, f. 4, *a, b*	Kawhia and East Cape District	
1884. *Belemnites aucklandicus minor.* Hector, Prog. Rep., vol. 16, p. xxxvi ..	Old Wesleyan Mission Station, Kawhia ..	
1884. *Belemnites minor.* Hector, Prog. Rep., vol. 16, p. xxxviii..	Mataura Series, Kawhia	
1886. *Belemnites aucklandicus.* Hector, Cat. Ind. Col. Exh., p. 68, f. 33, No. 4 ..	Kawhia	
1909. *Orthoceras brownei.* Marshall, T.N.Z.I., vol. 41, p. 144		Marshall coll.
1911. *Belemnites canaliculatus aucklandicus.* Bœhm, N.J. f. Min., 1911, bd. 1, pp. 16, 17		Bœhm coll.; 20 plesiotypes.
Belemnites catlinensis Hector.		
1878. *Belemnites catlinensis.* Hector, T.N.Z.I., vol. 10, p. 486, pl. 22, f. 3, *a, b* ..	South of Catlin's River and Hokanui Hills ..	D.M.; holotype.
1878. ,, Hector, Prog. Rep., vol. 11, p. ix, and Cox, R.G.E., vol. 11, p. 40	East Face, Flag Hill	..
1880. ,, Hector, App. Off. Cat. S.E., p. 10	Flag Hill Series, Hokanui Hills ..	
1881. ,, McKay, R.G.E., vol. xiii, p. 47	1 mile below Mataura Falls ..	
1886. ,, Hector, Cat. Ind. Col. Exh., p. 70, f. 36, No. 3 ..	Jurassic	
Belemnites hochstetteri. } (See **B. canaliculatus aucklandicus.**)		
Belemnites minor. }		
Belemnites otapiriensis. (See **Atractites otapiriensis.**)		
Belemnites sp. ind. Thomas, Bull. No. 4 (n.s.), N.Z. Geol. Surv., pp. 48–50, pl. 9; 1907	Manaia Hill, Coromandel ..	
Brancoceras mandevillei. (See **Proclydonautilus mandevillei.**)		
Calamopora mackrothii Geinitz.		
1880. *Calamopora mackrothii.* Hector, App. Off. Cat. S.E., p. 5 ..	Permian, Eighty-eight Valley ..	
Cardium conicum.		
1878. *Cardium conicum* var. Hector, Prog. Rep., vol. 11, p. viii	Putataka Series, Hokanui Hills ..	
Clavigera spp. ind. Hector, Cat. Ind. Col. Exh., p. 72, f. 4, Nos. 2, 3; 1886	Triassic	
Clavigera tumida Hector (MS.).		
1881. *Clavigera tumida.* McKay, R.G.E., vol. 13, p. 44 ..	Mataura River, 1½ miles below Gore ..	
Clydonautilus goniatites (Hauer).		
1879. *Nautilus goniatites.* Hector, Handbook of N.Z., p. 24	Otapiri Series ..	
1880. ,, Hector, Journ. Roy. Soc. N.S.W., vol. 13, p. 75 ..	,, ..	
1886. ,, Hector, Cat. Ind. Col. Exh., p. 72	Triassic	
1910. *Clydonautilus goniatites.* Bœhm, Cb. f. Min., 1910, p. 633	..	
Conularia grata Hector.		
1878. *Conularia gratus.* McKay, R.G.E., vol. 11, p. 126	Cowan's Wash, Oreti River ..	
1886. *Conularia grata.* Hector, Cat. Ind. Col. Exh., p. 74, f. 43, No. 2	Triassic, Kaihiku Ranges	
Cypricardia cordata.		
1878. *Cypricardia cordata.* Hector, Prog. Rep., vol. 11, p. x	Otapiri Series, Hokanui Hills ..	
Cucullæa sp. ind. Hector, Cat. Ind. Col. Exh, p 68 f. 33, No. 6; 1886 ..	Jurassic	
Dentalium huttoni Bather.		
1905. *Dentalium huttoni.* Bather, Geol. Mag., dec. 5, vol. 2, pp. 532–41, f. 4–7 ..	Kowai River and Wilberforce River	B.M.; holotype and 1 paratype.
Discina kawhiana Bœhm.		
1911. *Discina kawhiana.* Bœhm, N.J. f. Min., 1911, bd. 1, pp. 6, 7, taf. 1, f. 1 ..	Puti Point, Kawhia	Bœhm coll.; holotype.
Edmondia mackayi Hector.		
1886. *Edmondia mackayi.* Hector, Cat. Ind. Col. Exh., p. 74, f. 43, No. 1.. ..	Triassic	
Epithyris elongata Schlotheim.*		
1878. *Epithyris elongata.* Hector, Prog. Rep., vol. 11, p. xi	Kaihiku Series, Hokanui Hills	
1880. ,, Hector, App. Off. Cat. S.E., p. 5	Hokanui Range	
1886. ,, Hector, Cat. Ind. Col. Exh., pp. 20, 76, f. 45, No. 5 ..	,, (Permian)	

* Hector in other places speaks of "*Terebratula* of the type of *Epithyris elongata*"—*e.g.*, in T.N.Z.I., vol. 9, p. 537; 1879.

—	Locality or Horizon.	Location of Specimens.
Estheria minuta Alberti.		
1904. *Estheria minuta.* Park, T.N.Z.I., vol. 36, p. 397 ..	Trigonia beds ("most places") ..	
Gervillia acuta Sowerby.		
1878. *Gervillia acuta.* Hector, Prog. Rep., vol. 11, p. ix ..	Lower Flag Hill Series, Hokanui Hills ..	
Gryphæa erana.		
1878. *Gryphæa erana.* Hector, Prog. Rep., vol. 11, p. viii	Putataka Series, Hokanui Hills ..	
Grypoceras mesodiscum (Hauer).		
1878. *Nautilus mesodiscus.* Hector, Prog. Rep., vol. 11, p. x	Otapiri Series, Hokanui Hills ..	..
1879. ,, Hector, Prog. Rep., vol. 12, p. 10	Otapiri Series	..
1879. ,, Hector, Handbook of N.Z., p. 24	,, ...	..
1880. ,, Hector, Journ. Roy. Soc. N.S.W., vol. 13, p. 75 ..	,, ...	..
1886. ,, Hector, Cat. Ind. Col. Exh., p. 72	Triassic	..
1910. *Grypoceras mesodiscum.* Diener in Bœhm, Cb. f. Min., 1910, p. 635 ..	Mandeville, Hokanui Hills	Marshall coll.; plesiotype.
Halobia hochstetteri Mojsisovics.		
1864. *Halobia lomelli.* Zittel, Nov. Pal., pp. 27, 28, taf. 6, f. 2, *a–c* (non Wissman)	Richmond ..	V.M.
1874. *Halobia hochstetteri.* Mojsisovics, Abhandl. d. k.-k. geol. Reichsanst., bd. vii. heft 2, p. 32	,, ..	,,
1908. *Halobia hochstetteri.* Arthaber, Lethæa geognostica, teil 2, 1, p. 241.		
1910. ,, Bœhm, Cb. f. Min., 1910, p. 633.		
Halobia lomelli. (See **Halobia hochstetteri.**)		
Hoplites novoseelandicus (Hochstetter).		
1863. *Ammonites Novoseelandicus.* Hochstetter, "Neu-Seeland," p. 190, and text fig.	Kawhia	V.M.; holotype and 1 paratype.
1863. *Ammonites Novo-Zelandicus.* Hauer, in Hochstetter, "Reise der Novara," Geol. Th., bd. 1, abth. 1, p. 33	,, ..	
1864. *Ammonites Novo Zelandicus.* Hauer, Nov. Pal., p. 31, taf. 8, f. 1, *a–c* .	,, ..	
1865. *Ammonites Novo-Zelandicus.* Oppel, Zeitschr. deutsch. geol. Gesellsch., vol. 17, p. 555	,, ..	
1885. *Ammonites novozelandicus.* Neumayr, Denkr. k. Akad. Wien, bd. 50, p. 120	,, ..	
1911. *Hoplites novoseelandicus.* Bœhm, N.J. f. Min., 1911, bd. 1, pp. 21, 22 .. (Numerous references in New Zealand literature, mostly quoting from Hochstetter and Hauer.)	,, ..	
Inoceramus haasti Hochstetter.		
1863. *Inoceramus haasti.* Hochstetter, "Neu-Seeland," pp. 130, 190	..	..
1864. ,, Zittel, Nov. Pal., p. 33, taf. 7, f. 5, *a–c*	Takatahi, Kawhia	V.M.; 2 figured syntypes,
1907. ,, Thomas, Bull. No. 4 (n.s.), N.Z. Geol. Surv., pp. 48–50, pl. 12	Manaia Hill, Coromandel	..
1911. ,, Bœhm, N.J. f. Min., pp. 14, 15 .. .. .. (Numerous references in New Zealand literature; also determined by Hector in the Amuri Series, "Lower Greensand.")	Kawhia	
Inoceramus labiatus Schlotheim.		
1904. *Inoceramus labiatus.* Park, T.N.Z.I., vol. 36, p. 385	Tuck's Bay, Catlin's River	

Inoceramus obliquus.		
1878. *Inoceramus obliquus.* Hector, Prog. Rep., vol. 11, p. ix	Bastion Series, Hokanui Hills ..	
Inoceramus tumidus Hector (MS.).		
1870. *Inoceramus tumidus.* Hector, Cat. Col. Mus., p. 195 ..	Wairoa Valley, Nelson	
Lima cordiformis.		
1878. *Lima cordiformis.* Hector, Prog. Rep., vol. 11, p. ix ..	Lower Flag Hill Series, Hokanui Hills ..	
Lima (Plagiostoma) gigantea Sowerby.		
1878. *Plagiostoma gigantea.* Hector, Prog. Rep., vol. 11, p. ix	Bastion Series, Hokanui Hills	..
1911. *Lima* aff. *gigantea.* Bœhm, N.J. f. Min., 1911, bd. 1, pp. 15, 16	Puti Point and Motutara, Kawhia	Bœhm coll.; 2 plesiotypes.
Lima (Plagiostoma) grandis.		
1886. *Plagiostoma grandis.* Hector, Cat. Ind. Col. Exh., p. 70, f. 36, No. 1 ..	Liassic	
Lima rigidula.		
1878. *Lima rigidula.* Hector, Prog. Rep., vol. 11, p. x ..	Otapiri Series, Hokanui Hills	
Lima semicircularis Goldfuss.		
1878. *Lima semicircularis.* Hector, Prog. Rep., vol. 11, p. ix	Lower Flag Hill Series, Hokanui Hills ..	
Monotis decipiens.		
1863. *Monotis decipiens.* Zittel, Q.J.G.S., vol. 19, pt. 2, p. 20	Richmond	
Monotis dissimilis Hector (MS.).		
1878. *Monotis dissimilis.* Hector, Prog. Rep., vol. 11, p. x ..	Otapiri Series, Hokanui Hills	
1878. ,, Cox, R.G.E., vol. 11, p. 45	Taylor's Crossing grit, Hokanui Hills ..	
Monotis radialis Phillip.		
1880. *Monotis radialis.* Hector, App. Off. Cat. S.E., p. 6	Wairoa Gorge ..	
Monotis salinaria. } (See **Pseudomonotis richmondiana.**)		
Monotis salinaria richmondiana. }		
Monotis sp. ind. Hector, Cat. Ind. Col. Exh., p. 73, f. 41, No. 6; 1886 ..	Triassic	
Monotis sepuncularia Munster.		
1880. *Monotis spelunearia.* Hector, App. Off. Cat. S.E., p. 10..	Bastion Series, Hokanui Range	
1886. *Monotis sepuncularia.* Hector, Cat. Ind. Col. Exh., p. 17 and Errata ..	Hokanui Range	
Myacites recurvum Phillips.		
1878. *Myacites recurvum.* Hector, Prog. Rep., vol. 11, p. ix ..	Lower Flag Hill Series, Hokanui Hills ..	
Mytilus binfeldi Morris and Lycett.		
1878. *Mytilus binfeldi.* Hector, Prog. Rep., vol. 11, p. ix ..	Lower Flag Hill Series, Hokanui Hills ..	
Mytilus cuneatus Sowerby.		
1878. *Mytilus cuneata.* Hector, Prog. Rep., vol. 11, p. ix ..	Lower Flag Hill Series, Hokanui Hills ..	
Mytilus problematicus Zittel.		
1864. *Mytilus problematicus.* Zittel, Nov. Pal., p. 28, taf. 8, f. *a*, *b*	Near Spring Grove, Wairoa Gorge	V.M.
1880. ,, Hector, App. Off. Cat. S.E., p. 7	Wairoa Series, Wairoa Gorge and Nugget Point	
(Many other references in New Zealand literature, mostly quotations of Zittel.)		
Mytilus squamosus Sowerby.		
1880. *Mytilus squamosus.* Hector, App. Off. Cat. S.E., p. 6 ..	Wairoa Series, Wairoa Gorge ..	
Nautilus baberi Morris and Lycett.		
1878. *Nautilus baberi.* Hector, Prog. Rep., vol. 11, p. ix ..	Bastion Series, Hokanui Hills ..	
Nautilus freieslebeni Geinitz.		
1878. *Nautilus frieslebendi.* Hector, Prog. Rep., vol. 11, p. ix	Otapiri Series, Hokanui Hills ..	
1880. ,, (?) Hector, App. Off. Cat. S.E., p. 7 ..	Wairoa Series, Nugget Point ..	
Nautilus goniatites. (See **Clydonautilus goniatites.**)		
Nautilus mesodiscus. (See **Grypoceras mesodiscum.**)		

	Locality or Horizon.	Location of Specimens.
Nautilus reticulatus Hauer.		
1878. *Nautilus reticulatus.* Hector, Prog. Rep., vol. 11, p. v .. .	Mount Potts	
1878. *Nautilus reticularis.* Hector, Prog. Rep., vol. 11, p. x	Otapiri Series, Hokanui Hills	
1878. *Nautilus reticulatus.* Hector, Prog. Rep., vol. 11, pp. x, xi ..	Oreti and Wairoa Series, Hokanui Hills ..	
1878. *Palæaturia* sp. McKay, R.G.E., vol. 11, pp. 89, 126	Wairoa Series, Hokanui Hills, and Shaw's Bay, Nugget Point	
1879. *Nautilus reticularis.* Hector, Prog. Rep., vol. 12, p. 10	Otapiri Series, Wairoa Gorge and Nugget Point	
1879. ,, Hector, Prog. Rep., vol. 12, p. 32	Oreti Series, Nelson	
1879. ,, Hector, 14th Ann. Rep. Col. Mus. Lab., p. 7 ..	Lowest beds, Middle Wairoa Series, Nelson ..	
1880. ,, Hector, App. Off. Cat. S.E., pp. 6, 7 ..	Wairoa Series, Wairoa Gorge and Nugget Point	
Nautilus simplex.		
1879. *Nautilus simplex.* Hector, Prog. Rep., vol. 12, p. 32	Oreti Series, Nelson	
Orthis spirigera M'Coy.		
1877. *Orthis spinigera.** Haast, R.G.E., vol. 8, p. 6	Fossil Gully, Mount Potts	
1879. ,, Haast, "Geology of the Provinces Canterbury and Westland," p. 272	,, ,, ...	
Orthoceras alviolare.		
1878. *Orthoceras alviolare.* Hector, Prog. Rep., vol. 11, p. v	Mount Potts ..	
Orthoceras brownei. (See **Belemnites canaliculatus aucklandicus.**)		
Orthoceras otapiriensis. (See **Atractites otapiriensis.**)		
Patella inornata Morris and Lycett.		
1878. *Patella inornata.* Hector, Prog. Rep., vol. 11, p. iv	Lower Flag Hill Series, Hokanui Hills ..	
Patella sp. ind. Hector, Cat. Ind. Col. Exh., p. 69, f. 34, No. 1	Jurassic	
Patella sp. ind. Hector, Cat. Ind. Col. Exh., p. 76, f. 45, No. 1	Permian	
Pecten arcuatus Sowerby.		
1878. *Pecten arcuatus.* Hector, Prog. Rep., vol. 11, p. ix	Bastion Series, Hokanui Hills ..	
Pecten griesbachi.		
1878. *Pecten griesbachi.* Hector, Prog. Rep., vol. 11, p. ix	Lower Flag Hill Series, Hokanui Hills ..	
Pecten projectus.		
1878. *Pecten projectus.* Hector, Prog. Rep., vol. 11, p. ix	Lower Flag Hill Series, Hokanui Hills ..	
Pecten valoniscus.		
1878. *Pecten valoniscus.* Hector, Prog. Rep., vol. 11, p. x	Otapiri Series, Hokanui Hills ..	
Perisphinctes brownei (Marshall).		
1909. *Ægoceras brownei.* Marshall, T.N.Z.I., vol. 41, p. 144 and text fig. ..	Kawhia	Marshall coll.; holotype.
1911. *Perisphinctes brownei.* Bœhm, N.J. f. Min., 1911, bd. 1, p. 19 and text fig., pl. 1, f. 2	,, ...	,, ,,
Perisphinctes sp. ind. Bœhm, N.J. f. Min., 1911, bd. 1, pp. 19–21, text figs. 3, *a*, *b*, taf. 1, f. 3	Motutara Bluff, Kawhia	Bœhm coll.; 1 specimen.
Perna engossa.		
1878. *Perna engossa.* Hector, Prog. Rep., vol. 11, p. viii	Putataka Series, Hokanui Hills ..	
Pholadomya sp. ind. Hector, Cat. Ind. Col. Exh., p. 69, f. 34, No. 4; 1886	Jurassic	
Pholadomya tumida.		
1886. *Pholadomya tumida.* Hector, Cat. Ind. Col. Exh., p. 70, f. 34, No. 2 ..	Jurassic	

* In the Errata, *spinigera* is corrected to *spirigera.*

Phylloceras kawhiæ Marshall.			
1909. *Phylloceras kawhiæ.*	Marshall, T.N.Z.I., vol. 41, p. 144 and text fig.	Kawhia	Marshall coll. ; holotype.
1911. ,,	Bœhm, N.J. f. Min., 1911, bd. 1, p. 17	Kohai Point and Totara Point, Kawhia	Bœhm coll. ; 2 plesiotypes.
Placunopsis striatula Zittel.			
1864. *Placunopsis striatula.*	Zittel, Nov. Pal., pp. 33, 34, taf. 8, f. 6	Waikato South Head	V.M.
1870. ,,	Hector, Cat. Col. Mus., p. 194	Kawhia	
Plagiostoma sp. (See **Lima (Plagiostoma)** sp.)			
Pleurophorus angulatus.			
1878. *Pleurophorus angulatus.*	Hector, Prog. Rep., vol. 11, p. x	Otapiri Series, Hokanui Hills	
Pleurophorus costatus Brown. (? King.)			
1878. *Pleurophorus costatus.*	Hector, Prog. Rep., vol. 11, pp. x, xi	Wairoa and Oreti Series, Hokanui Hills	
1880. ,,	Hector, App. Off. Cat. S.E., p. 8	Otapiri Series, Nugget Point	
1886. ,,	Hector, Cat. Ind. Col. Exh., pp. 17, 76, f. 45, No. 7	Nugget Point	
Pleurotomaria linkiana.			
1878. *Pleurotomaria linkiana.*	Hector, Prog. Rep., vol. 11, p. x	Otapiri Series, Hokanui Hills	
Pleurotomaria ornata.			
1878. *Pleurotomaria ornata.*	Hector, Prog. Rep., vol. 11, p. x	Otapiri Series, Hokanui Hills	
1879. ,,	Hector, Prog. Rep., vol. 12, p. 10	Otapiri Series	
1879. ,,	Hector, Handbook of N.Z., p. 24	,,	
1880. ,,	Hector, Journ. Roy. Soc. N.S.W., vol. 13, p. 75	Otapiri	
1886. ,,	Hector, Cat. Ind. Col. Exh., p. 71	Triassic	
Pleurotomaria tunstallensis.			
1878. *Pleurotomaria tunstallensis.*	Hector, Prog. Rep., vol. 11, p. xi	Oreti Series, Hokanui Hills	
Proclydonautilus mandevillei (Marshall).			
1909. *Broncoceras mandevillei.*	Marshall, T.N.Z.I., vol. 41, pp. 143, 144, and text fig.	Mandeville, Hokanui Hills	Marshall coll. ; holotype.
1910. *Proclydonautilus* sp. *cf. spirolobus.*	Diener in Bœhm, Cb. f. Min., 1910, pp. 634, 635	,, ,,	,, ,,
Pseudomonotis sp. ind.	Diener in Bœhm, Cb. f. Min., 1910, pp. 635, 636	Mandeville	,,
Pseudomonotis richmondiana (Zittel) Teller and Mojsisovics.			
1863. *Monotis richmondiana.*	Zittel, Q.J.G.S., vol. 19, pt. 2, p. 20	Richmond, near Nelson	V.M.
1864. *Monotis salinaria richmondiana.*	Zittel, Nov. Pal., pp. 26, 27, taf. 6, f. 1, *a–e*	,, ,,	,,
1886. *Pseudomonotis richmondiana.*	Teller and Mojsisovics, Mém. Acad. Imp. Sci. St. Pétersb., sér. 7, tom. 33, pp. 107, 111, 113, 115, 123, 124, 151–53 (*fide* Bœhm)	,, ,,	
1908. ,,	Frech, Lethæa geognostica, teil 2, 1, pp. 506–9, taf. 68, f. 4, *a*, *b* (*fide* Bœhm)	,, ,,	
1909. ,,	Borissjak, Bull. Com. géol. Russie, vol. 28, p. 100 (*fide* Bœhm)		
1910. ,,	Bœhm, Cb. f. Min., 1910, pp. 632, 633		
(Numerous other references in New Zealand literature.)			
Pseudomonotis richmondiana truncata (Zittel) Frech.			
1908. *Pseudomonotis richmondiana truncata.*	Frech, "Lethæa geognostica," teil 2, 1, taf. 68, f. *c*, *d* (*fide* Bœhm)	Richmond, near Nelson	V.M.
1910. ,,	Bœhm, Cb. f. Min., 1910, p. 633		
Psioidea sp. ind.	Hector, Cat. Ind. Col. Exh., p. 73, f. 41, No. 1 ; 1886	Triassic	
Rastelligera sp. ind.	Hector, Cat. Ind. Col. Exh., p. 72, f. 40, No. 1 ; 1886	Triassic	
Rastelligera taylori Hector (MS.).			
1881. *Rastelligera taylori.*	McKay, R.G.E., vol. 13, p. 44	Otapiri Series, Mataura River, 1½ miles below Gore	

	Locality or Horizon.	Location of Specimens.
Retzia sp. ind. Hector, Cat. Ind. Col. Exh., p. 73, f. 41, No. 8; 1886 ..	Triassic	
Rhynconella sp. *cf.* **tabulata.**		
1911. *Rhynconella* sp. *cf. tabulata.* Bœhm, N.J. f. Min., 1911, bd. 1, p. 7 ..	South of Totara Point, Kawhia ..	Boehm coll.; 3 specimens.
Schizodus obscurus Sowerby.		
1878. *Schizodus obscurus.* Hector, Prog. Rep., vol. 11, p. xi ..	Oreti Series, Hokanui Hills ..	
Schizodus oblongus.		
1878. *Schizodus oblonga.* Hector, Prog. Rep., vol. 11, p. x ..	Otapiri Series, Hokanui Hills ..	
Schizodus schlotheimi Geinitz.		
1880. *Schizodus schlotheimi.* Hector, App. Off. Cat. S.E., p. 6	Wairoa Series, Wairoa Gorge ..	
Solarium bathonicum.		
1878. *Solarium bathonicum.* Hector, Prog. Rep., vol. 11, p. viii.. ..	Putataka Series, Hokanui Hills ..	
Solarium polygonium d'Archaic.		
1878. *Solarium polygonium.* Hector, Prog. Rep., vol. 11, p. ix	Lower Flag Hill Series, Hokanui Hills ..	
Spirifer duodecimocostatus McCoy.		
1877. *Spirifera duodecimocostata.* Haast, R.G.E., vol. 8, p. 6	Fossil Gully, Mount Potts	
1879. ,, Haast, "Geology of the Provinces Canterbury and Westland," p. 272	,, ,, ...	
Spirifer latus Brown.		
1877. *Spirifera lata.* Haast, R.G.E., vol. 8, p. 6	Fossil Gully, Mount Potts	
1879. ,, Haast, "Geology of the Provinces Canterbury and Westland," p. 272	,, ,, ...	
Spirifer lineatus (Martin).		
1877. *Spirifera lineata.* Haast, R.G.E., vol. 8, p. 6	Fossil Gully, Mount Potts	
1879. ,, Haast, "Geology of the Provinces Canterbury and Westland," p. 272	,, ,, ...	
Spirifer oviformis McCoy.		
1877. *Spirifera oviformis.* Haast, R.G.E., vol. 8, p. 6	..	
1879. ,, Haast, "Geology of the Provinces Canterbury and Westland," p. 272	Fossil Gully, Mount Potts	
Spirifer subradiatus Sowerby.		
1904. *Spirifer subradiata.* Park, T.N.Z.I., vol. 26, p. 450	Mount St. Mary	
Spirifer undulatus Sowerby.		
1878. *Spiriferina undulatus.* Hector, Prog. Rep., vol. 11, p. xi..	Kaihiku Series, Hokanui Hills	
1880. *Trigonotreta undulata.* Hector, App. Off. Cat. S.E., pp. 4, 5	Mount Potts; Kaihiku Series, Hokanui Hills ..	
1886. ,, Hector, Cat. Ind. Col. Exh., p. 72, f. 45, No. 3 ..	Permian	
Spirifer vespertilio G. Sowerby.		
1904. *Spirifer vespertilio.* Park, T.N.Z.I., vol. 26, p. 450 ..	Mount St. Mary	
Spiriferina conjuncta.		
1878. *Spiriferina conjuncta.* Hector, Prog. Rep., vol. 11, p. xi	Oreti Series, Hokanui Hills ..	
Spiriferina cristata Schlotheim.		
1878. *Spiriferina cristatus.* Hector, Prog. Rep., vol. 11, p. xi	Kaihiku Series, Hokanui Hills ..	
1886. *Spiriferina* (*cristata* ?). Hector, Cat. Ind. Col. Exh., p. 76, f. 45, No. 6 ..	Permian	

Spiriferina radiata.			
1886. *Spiriferina radiata.* Hector, Cat. Ind. Col. Exh., p. 70, f. 30, No. 4 ..	Liassic		
Spiriferina rostrata (Sowerby).*			
1878. *Spiriferina rostratus.* Hector, Prog. Rep., vol. 11, p. ix	Lower Flag Hill Series, Hokanui Hills ..		
1879. ,, Hector, Handbook of N.Z., p. 23	Flag Hill Series		
1880. ,, Hector, Journ. Roy. Soc. N.S.W., vol. 13, p. 74 ..	,, ...		
1880. ,, Hector, Handbook of N.Z. (2nd ed.), p. 25	,, ...		
1884. *Spiriferina rostrata.* Hector, Prog. Rep., vol. 16, p. xxxviii	Bastion Series, Kawhia		
1884. ,, McKay, R.G.E., vol. 16, pp. 145, 146	Opposite Opunga, Kawhia County		
1886. ,, Hector, Cat. Ind. Col. Exh., p. 68	Jurassic		
Spiriferina spatulata Hector (MS.).			
1881. *Spiriferina spatulata.* McKay, R.G.E., vol. 13, p. 44	Otapiri Series, Mataura River, 1½ miles from Gore		
1884. ,, Hector, Prog. Rep., vol. 16, p. xxxvii ..	Otapiri Series, Kawhia		
Spiriferina undulata. (See **Spirifer undulatus.**)			
Spirigera sp. (See **Athyris** sp.)			
Streblites motutaranus Bœhm.			
1911. *Streblites motutaranus.* Bœhm, N.J. f. Min., 1911, bd. 1, pp. 17, 18, text fig. 1, taf. 2, f. 5, *a*, *b*	Motutara Bluff, Kawhia ..	Bœhm coll.; holotype.	
Tancredia curtansata (Phillips).			
1878. *Tancredia curtanstata.* Hector, Prog. Rep., vol. 11, p. ix	Lower Flag Hill Series, Hokanui Hills ..		
Tancredia mactraoides.			
1878. *Tancredia mactraoides.* Hector, Prog. Rep., vol. 11, p. viii ..	Putataka Series, Hokanui Hills ..		
Tancredia similis.			
1878. *Tancredia similis.* Hector, Prog. Rep., vol. 11, p. viii	Putataka Series, Hokanui Hills		
Tancredia truncata Lycett.			
1878. *Tancredia truncata.* Hector, Prog. Rep., vol. 11, pp. ix, x	Bastion and Otapiri Series, Hokanui Hills ..	..	
1879. ,, Hector, Handbook of N.Z., p. 24	Otapiri Series	..	
1879. ,, Hector, Prog. Rep., vol. 12, p. 10	,, ...	..	
1880. ,, Hector, Journ. Roy. Soc. N.S.W., vol. 13, p. 75 ..	,, ...	..	
1886. ,, Hector, Cat. Ind. Col. Exh., p. 71	Triassic	..	
Torlessia mackayi Bather.†			
1905. *Torlessia mackayi.* Bather, Geol. Mag., dec. 5, vol. 2, pp. 532–41, f. 1–3 ..	Gorge of the Ashley; Mount Torlesse; Mueller Glacier	B.M.; holotype, 4 syntypes.	
1906. ,, Bather, Geol. Mag., dec. 5, vol. 3, pp. 36, 37			
Trigonia navis Lamarck.			
1886. *Trigonia navis* var. Hector, Cat. Ind. Col. Exh., p. 69, f. 34, No. 3 ..	Jurassic		
Trigonia costata Sowerby.			
1878. *Trigonia costata.* Hector, Prog. Rep., vol. 11, p. ix	Lower Flag Hill Series, Hokanui Hills ..		
1880. ,, Hector, App. Off. Cat. S.E., p. 11	Flag Hill Series, Hokanui Hills		
1886. *Trigonia costata* var. Hector, Cat. Ind. Col. Exh., p. 68, f. 33, No. 8 ..	Jurassic		
Trigonia vulgaris.			
1878. *Trigonia vulgaris.* Hector, Prog. Rep., vol. 11, p. x ..	Otapiri Series, Hokanui Hills ..		
Trigonotreta undulata. (See **Spirifer undulatus.**)			
Trochus nudus.			
1878. *Trochus nudus.* Hector, Prog. Rep., vol. 11, p. x	Otapiri Series, Hokanui Hills	..	

* Hector sometimes speaks of "*Spiriferina* of the *rostrata* group"—*e.g.*, 14th Ann. Rep. Col. Mus. Lab., p. 7.

† See p. 32.

VI. Permo-Jurassic Plant Fossils.

A few Cretaceo-Tertiary species are included in the list (in brackets) because they have also been found in the older rocks. To the reference to von Ettingshausen's species should be added in each case "Geol. Mag., dec. 3, vol. 4, p. 367 (1887)," and "T.N.Z.I., vol. 23, p. 242 (1891)," where his statements are repeated.*

Hector appears to have altered the genera of some of his manuscript names between 1870 and 1886, but there is no definite evidence in the literature to indicate the synonymy, and they have therefore been quoted as separate species. The majority of the plant fossils in the Geological Survey collections have been unpacked, and most of the types of the species figured by Hector in the "Catalogue of the Indian and Colonial Exhibition" have been found with labels attached. The chirotypes of his earlier manuscript species have not been found, and this strengthens the assumption that he subsequently assigned them to different genera. The chirotypes of von Ettingshausen's manuscript species are preserved in the Canterbury and Otago Museums.

	Locality or Horizon.	Location of Specimens.
Alethopteris hochstetteri. (? *Polypodum hochstetteri* Unger.)		
1878. *Alethopteris hochstetteri.* Hector, Prog. Rep., vol. 11, p. viii	Waikato Heads and Mataura, and Flag Hill Series, Hokanui Hills	
Alethopteris insignis Hector (MS.).		
1878. *Alethopteris insignis.* Hector, Prog. Rep., vol. 11, p. viii ..	Waikato Heads and Mataura, and Flag Hill Series, Hokanui Hills	
Araucarioxylon australe Crié (MS.).		
1888. *Araucarioxylon australe.* Crié, C.R. Acad. Sci., Paris, vol. 107, p. 1014	Clent Hills, Wairoa Gorge, Mataura	
Asplenites cuneata Hector (MS.).		
1880. *Asplenites cuneata.* Hector, App. Off. Cat. S.E., p. 48 ..	Jurassic ..	
1886. ,, Hector, Cat. Ind. Col. Exh., p. 31 ..	Clent Hills	
Asplenites distans Hector (MS.).		
1880. *Asplenites distans.* Hector, App. Off. Cat. S.E., p. 48	Jurassic ..	
Asplenites oblonga Hector (MS.).	..	
1880. *Asplenites oblonga.* Hector, App. Off. Cat. S.E., p. 48	Jurassic ..	
Asplenites palæopteris. (See **Asplenium palæopteris.**)	..	
Asplenites rhomboides Hector.		
1880. *Asplenites thornboides.* Hector, App. Off. Cat. S.E., p. 48	Jurassic	
1886. *Asplenites rhomboides.* Hector, Cat. Ind. Col. Exh., pp. 13, 65, f. 30, No. 1 ..	Clent Hills, Catlin's River	D.M.; holotype.
Asplenium hochstetteri. (See **Polypodium hochstetteri.**)		
Asplenium palæo-darea Ettingshausen (MS.).		
1887. *Asplenium palæo-darea.* Ett. in Haast, T.N.Z.I., vol. 19, p. 450	Clent Hills	
1887. ,, Ett., Denkschr. d. math-wiss cl. d. k. Akad., vol. 53, p. 7	Malvern Hills ..	
Asplenium palæopteris Unger.		
1864. *Asplenium palæopteris.* Unger, Nov. Pal., pp. 3–5, taf. 1, f. 4–8	Coast between Waikato mouth and Whaingaroa Harbour	V.M.; syntypes.
1878. *Asplenites palæopteris.* Hector, Prog. Rep., vol. 11, p. viii	Mataura Series and Waikato Head	
1880. ,, Hector, App. Off. Cat. S.E., p. 48	Jurassic	..
1886. ,, Hector, Cat. Ind. Col. Exh., p. 66, f. 30A, No. 10 ..	Waikawa	D.M.; plesiotype, Waikawa.
1886. *Asplenium palæopteris.* Hector, Cat. Ind. Col. Exh., p. 32, f. 30A, No. 10 ..	Waikato Heads	C.M.; 1 specimen (? Ett.), Port Waikato.

* The abbreviation "Denkschr. d. math-wiss. cl. d. k. Akad." should be changed to "Denkschr. k. Akad. Wissensch. Wien" in all cases, in accordance with the list of the Geological Society (see page 7).

Asplenium ungeri Ettingshausen (MS.).		
1887. *Asplenium ungeri.* Ett. in Haast, T.N.Z.I., vol. 19, p. 451 ..	Mataura and Waikawa ..	
Asterophylites clentii Hector (MS.).		
1880. *Asterophylites clentii.* Hector, App. Off. Cat. S.E., p. 47	Permian	
1886. ,, Hector, Cat. Ind. Col. Exh., p. 32	Clent Hills ..	
Baiera australis Ettingshausen (MS.).		
1887. *Baiera australis.* Ett., Denkschr. d. math-wiss. cl. d. k. Akad., vol. 53, p. 7	Clent Hills ..	
Camptopteris haasti Ettingshausen (MS.).		
1887. *Camptopteris haastii.* Ett., Denkschr. math-wiss. cl. d. k. Akad., vol. 53, p. 7	Clent Hills ..	C.M. ; 4 chirotypes.
Camptopteris incisa Hector.		
1880. *Camptopteris incisa.* Hector, App. Off. Cat. S.E., p. 48	Jurassic	
1886. ,, Hector, Cat. Ind. Col. Exh., pp. 31, 66, f. 30A, No. 8 ..	Clent Hills, Mataura ..	D.M. ; holotype, Clent Hills.
Camptopteris novæ-zealandiæ Hector (MS.).		
1878. *Camptopteris novæ zealandiæ.* Hector, Prog. Rep., vol. xi, p. viii.. ..	Flag Hill Series, Hokanui Hills	
1879. *Camptopteris novæ-zealandiæ.* Hector, T.N.Z.I., vol. 11, p. 536	Flag Hill Series	
Camptoteris novæ-zealandiæ McCoy (MS.).		
1886. *Camptopteris novæ-zealandiæ.* McCoy in Hector, Prog. Rep., vol. 17, p. 21..	Fern Gully, Mount Rowley, Upper Ashburton..	
Cladophebis denticulata (Brogniart).		
1907. *Cladophebis denticulata.* Kidston and Gwynne-Vaughan, Trans. Roy. Soc. Edin., vol. 45, p. 759	Jurassic rocks, near Gore ..	Plesiotype, Edinburgh.
Cyperites wiwi Hector (MS.).		
1880. *Cyperites wiwi.* Hector, App. Off. Cat. S.E., p. 49 ..	Jurassic	
Damnara fossilis Unger.		
1864. *Damnara fossilis.* Unger, Nov. Pal., pp. 12, 13 ..	Richmond (Trias.)..	V.M. ; syntypes.
1880. *Damnarites fossilis.* Hector, App. Off. Cat. S.E., p. 48	Triassic	..
Damnarites fossilis. (See **Damnara fossilis.**)		
Dictyophyllum huttonianum Crié (MS.).		
1888. *Dictyophyllum huttonianum.* Crié, C.R. Acad. Sci. Paris, vol. 107, p. 1014 ..	Clent Hills, Wairoa Gorge, Mataura ..	
Equisetum microdon Ettingshausen (MS.).		
1887. *Equisetum microdon.* Ett., Denkschr. d. math-wiss. cl. d. k. Akad., vol. 53, p. 7	Mount Potts, Clent Hills	Chirotypes: C.M.—Mount Potts, 1; Clent Hills, 2; Malvern Hills, 2. O.M.—Waikawa. 1.
Gleichenia waitia Hector (MS.).		
1886. *Gleichenia waitia.* Hector, Cat. Ind. Col. Exh., p. 31	Eighty-eight Valley, Nelson	
Glossopteris angustifolia (McCoy).		
1878. *Glossopteris augustifolia.* Hector, Prog. Rep., vol. 11, p. iv	Mount Potts	
Glossopteris haastii Hector (MS.).		
1880. *Glossopteris haastii.* Hector, App. Off. Cat. S.E., p. 47 ..	Triassic ; Permian	
1886. ,, Hector, Cat. Ind. Col. Exh., p. 31 ..	Mount Potts ..	
Hymenophyllites australis Ettingshausen (MS.).		
1887. *Hymenophyllites australis.* Ett., Denkschr. d. math-wiss. cl. d. k. Akad., vol. 53, p. 7	Mataura and Waikawa	
Lomarites pectinata Hector.		
1878. *Lomarites pectinata.* Hector, Prog. Rep., vol. 11, p. viii.. ..	Mataura Series, Hokanui Hills, and Waikato Head	
1880. ,, Hector, App. Off. Cat. S.E., p. 48	Jurassic	..
1886. ,, Hector, Cat. Ind. Col. Exh., pp. 32, 66, f. 30A, No. 5 ..	Mataura Falls, Clent Hills, Waikato Heads	D.M. ; holotype, Mataura Falls.

—	Locality or Horizon.	Location of Specimens.
Lycopodites palæo-selaginella Ettingshausen (MS.).		
1887. *Lycopodites palæo-selaginella.* Ett., Denkschr. d. math-wiss. cl. d. k. Akad., vol. 53, p. 7	Mataura and Waikawa ..	
Macrotæniopteris affinis Ettingshausen (MS.).		
1887. *Macrotæniopteris affinis.* Ett., Denkschr. d. math-wiss. cl. d. k. Akad., vol. 53, p. 7	Mataura and Waikawa ..	Chirotypes: C.M. — Mataura, 3. O.M.—Mataura, 1; Waikawa, 1.
Macrotæniopteris lata Morris and Oldham.		
1878. *Macrotæniopteris lata.* Hector, Prog. Rep., vol. 11, p. viii	Waikawa, Mataura Falls, Flag Hill Series, Hokanui Hills	
1879. ,, Hector, Handbook of N.Z., p. 23	Flag Hill Series	..
1879. ,, Hector, T.N.Z.I., vol. 11, p. 536	,, ...	..
1880. ,, Hector, Journ. Roy. Soc. N.S.W., vol. 13, p. 74 ..	(?) Putataka Series	..
1880. ,, Hector, App. Off. Cat. S.E., p. 48	Jurassic	..
1880. ,, Hector, Handbook of N.Z. (2nd ed.), p. 24	Mataura Series, Waikawa, and Mataura Falls ..	..
1881. ,, Hector, Prog. Rep., vol. 13, p. xv	Mataura River	..
1886. ,, Hector, Cat. Ind. Col. Exh., p. 66, f. 30A, No. 4 ..	Mataura Falls	D.M.; plesiotype.
1887. ,, Park, R.G.E., vol. 18, pp. 150, 153	Waikawa	C.M.; 1 specimen, Mataura.
Macrotæniopteris zeelandica Crié (MS.).		
1888. *Macrotæniopteris zeelandica.* Crié, C.R. Acad. Sci. Paris, vol. 107, p. 1014 ..	Clent Hills, Wairoa Gorge, Mataura	
Neuropteris stricta Hector (MS.).		
1878. *Neuropteris stricta.* Hector, Prog. Rep., vol. 11, p. viii	Flag Hill Series, Hokanui Hills ..	
1879. ,, Hector, T.N.Z.I., vol. 11, p. 536	Flag Hill Series	
1880. ,, Hector, App. Off. Cat. S.E., p. 48	Jurassic	
Nicolia zelandica Unger.		
1864. *Nicolia zelandica.* Unger, Nov. Pal., p. 13, taf. 5, f. 2, *a*, *b*	(Tertiary) ..	..
1880. *Nicolia zealandica.* Hector, App. Off. Cat. S.E., p. 48	Jurassic	..
Nillsonia zealandica Ettingshausen (MS.).		
1887. *Nillsonia zealandica.* Ett., Denkschr. d. math-wiss. cl. d. k. Akad., vol. 53, p. 7	Mataura and Waikawa ..	Chirotypes: O.M.—Mataura, 1.
Noeggerathia valida Hector (MS.).		
1886. *Noeggerathia valida.* Hector, Cat. Ind. Col. Exh., p. 31	Eighty-eight Valley, Nelson ..	
Oleandridum distans Hector (MS.).		
1880. *Oleandridum distans.* Hector, App. Off. Cat. S.E., p. 48	Jurassic	
Oleandridum huttoni Hector (MS.).		
1878. *Oleandridum huttoni.* Hector, Prog. Rep., vol. 11, p. viii	Mataura Series and Waikato Head	
1880. ,, Hector, App. Off. Cat. S.E., p. 48	Jurassic	
Oleandridum matauriense Hector (MS.).		
1880. *Oleandridum matauriense.* Hector, App. Off. Cat. S.E., p. 48 ..	Jurassic	
Oleandridum obtusatum Hector (MS.).		
1880. *Oleandridum obtusatum.* Hector, App. Off. Cat. S.E., p. 48 ..	Jurassic	
Oleandridum stipulatum Hector (MS.).		
1880. *Oleandridum stipulatum.* Hector, App. Off. Cat. S.E., p. 48 ..	Jurassic	

Oleandridum tæniopteroide Hector (MS.).			
1880. *Oleandridum tæniopteroide.* Hector, App. Off. Cat. S.E., p. 48 ..	Jurassic		
Oleandridum tetranerve Hector (MS.).			
1880. *Oleandridum tetranerve.* Hector, App. Off. Cat. S.E., p. 48 ..	Jurassic		
Oleandridum vittatum.			
1878. *Oleandridum vittatum* var. Hector, Prog. Rep., vol. 11, p. viii ..	Flag Hill Series, Hokanui Hills, Mataura, Waikawa, and Clent Hills		
1879. ,, Hector, T.N.Z.I., vol. 11, p. 536	Flag Hill Series	..	
Osmundites dunlopi Kidston and Gwynne-Vaughan.			
1907. *Osmundites dunlopi.* Kidston and Gwynne-Vaughan, Trans. Roy. Soc. Edin., vol. 45, pp. 759–63, 766–68, pls. 1–3, f. 1–16	Jurassic rocks, near Gore	Holotype, Edinburgh; paratype, B.M.	
Osmundites gibbiana Kidston and Gwynne-Vaughan.			
1907. *Osmundites gibbiana.* Kidston and Gwynne-Vaughan, Trans. Roy. Soc. Edin., vol. 45, pp. 763–68, pl. 3, f. 17–19, and pl. 4, f. 20	Jurassic rocks, near Gore	Holotype, Edinburgh.	
Palæozamia matauriensis Hector (MS.).			
1878. *Palæozamia matauriensis.* Hector, Prog. Rep., vol. 11, p. viii ..	Flag Hill Series, Hokanui Hills, Waikawa, Mataura, Clent Hills		
1879. ,, Hector, T.N.Z.I., vol. 11, p. 536 ..	Flag Hill Series		
1880. ,, Hector, App. Off. Cat. S.E., p. 49 ..	Jurassic		
1886. ,, Hector, Cat. Ind. Col. Exh., p. 32 ..	Mataura		
Palissya australis Crié (MS.).			
1888. *Palissya australis.* Crié, C.R. Acad. Sci. Paris, vol. 107, p. 1014	Clent Hills, Wairoa Gorge, Mataura	..	
Palissya podocarpioides Ettingshausen (MS.).			
1887. *Palissya podocarpioides.* Ett., Denkschr. math-wiss. cl. d. k. Akad., vol. 53, p. 7	Mount Potts, Clent Hills ..	Chirotypes: C.M.—Mount Potts, 4; Clent Hills, 4; (?), 2.	
Pecopteris acuta Hector.			
1880. *Pecopteris acuta.* Hector, App. Off. Cat. S.E., p. 48	Jurassic	..	
1886. ,, Hector, Cat. Ind. Col. Exh., p. 65, f. 30, No. 2	Clent Hills ..	D.M.; holotype.	
Pecopteris distans Hector (MS.).			
1870. *Pecopteris distans.* Hector, Cat. Col. Mus., pp. 199, 200	Mataura Falls, Waikawa ..		
Pecopteris gracilis Hector (MS.).			
1870. *Pecopteris gracilis.* Hector, Cat. Col. Mus., p. 200	Waikawa ..		
1880. ,, Hector, App. Off. Cat. S.E., p. 48	Jurassic		
Pecopteris grandis Hector.			
1870. *Pecopteris grandis.* Hector, Cat. Col. Mus., p. 200	Waikawa	..	
1880. ,, Hector, App. Off. Cat. S.E., p. 48	Jurassic	..	
1886. ,, Hector, Cat. Ind. Col. Exh., pp. 31, 66, f. 30A, No. 3 ..	Waikawa, Waikato Heads, Mataura	D.M.; holotype, Waikawa; paratype, Waikato South Head.	
1887. ,, Park, R.G.E., vol. 18, pp. 143, 145, 150, 153	Coal Creek, McRae's, Lora, Hokanui Hills; Mataura River, 1½ miles below Gore; Waikawa	..	
Pecopteris haastii Hector (MS.).			
1880. *Pecopteris haastii.* Hector, App. Off. Cat. S.E., p. 48	Jurassic		
1886. ,, Hector, Cat. Ind. Col. Exh., p. 31	Clent Hills, Mataura ..		
Pecopteris hochstetteri. (See **Polypodum hochstetteri.**)			
Pecopteris linearis Hector.			
1878. *Pecopteris linearis.* Hector, Prog. Rep., vol. 11, p. viii	Flag Hill Series, Hokanui Hills ..	..	
1880. ,, Hector, App. Off. Cat. S.E., p. 48	Jurassic	..	
1886. ,, Hector, Cat. Ind. Col. Exh., pp. 31, 65, f. 30, No. 3 ..	Clent Hills, Waikawa	D.M.; holotype, Clent Hills.	

—	Locality or Horizon.	Location of Specimens.
Pecopteris lingulatus Hector (MS.).		
1870. *Pecopteris lingulatus.* Hector, Cat. Col. Mus., pp. 199, 200 ..	Mataura, Waikawa ..	
Pecopteris obliqua Hector (MS.).		
1880. *Pecopteris obliqua.* Hector, App. Off. Cat. S.E., p. 48 ..	Jurassic	
1886. ,, Hector, Cat. Ind. Col. Exh., p. 31 ..	Waikato Heads ..	
Pecopteris oblongis Hector (MS.).		
1880. *Pecopteris oblongis.* Hector, App. Off. Cat. S.E., p. 48 ..	Jurassic	
Pecopteris obtusata Hector.		
1886. *Pecopteris obtusata.* Hector, Cat. Ind. Col. Mus., p. 66, f. 30A, No. 1 ..	Clent Hills	D.M.; holotype.
1887. *Pecopteris* cf. *obtusata.* Park, R.G.E., vol. 18, p. 143	Coal Creek, Otapiri ..	..
Pecopteris ovata Hector.		
1878. *Pecopteris ovatus.* Hector, Prog. Rep., vol. 11, p. viii	Flag Hill Series, Hokanui Hills	..
1880. *Pecopteris ovata.* Hector, App. Off. Cat. S.E., p. 48	Jurassic	..
1886. ,, Hector, Cat. Ind. Col. Exh., pp. 31, 65, f. 30, No. 6 ..	Clent Hills, (Trelissic basin), Mataura, Waikato Heads	D.M.; holotype, Clent Hills, and paratype, Waikato South Head.
Pecopteris proxima Ettingshausen (MS.).		
1887. *Pecopteris proxima.* Ett., Denkschr. d. math-wiss. cl. d. k. Akad., vol. 53, p. 7	Clent Hills and Malvern Hills ..	
Pecopteris serrata Hector (MS.).		
1870. *Pecopteris serratus.* Hector, Cat. Col. Mus., p. 199 ..	Mataura	
Pecopteris stricta Hector (MS.).		
1880. *Pecopteris stricta.* Hector, App. Off. Cat. S.E., p. 48 ..	Jurassic	
Pisoniaphyllites novæ-zealandiæ Hector (MS.).		
1880. *Pisoniaphyllites novæ zealandiæ.* Hector, App. Off. Cat. S.E., p. 49 ..	Cretaceo-Tertiary to Jurassic ..	
Podozamites malvernicus Ettingshausen (MS.).		
1887. *Podozamites malvernicus.* Ett., Denkschr. d. math-wiss. cl. d. k. Akad., vol. 53, p. 7	Malvern Hills ..	C.M.; 3 chirotypes.
1888. *Podozamites malverianus.* Crié, C.R. Acad. Sci. Paris, vol. 107, p. 1014 ..	Mataura	
Polypodum hochstetteri Unger.		
1864. *Polypodum hochstetteri.* Unger, Nov. Pal., pp. 5, 6, taf. 2, f. 1, 2	South of mouth of River Waikato	V.M.
1870. *Polypodum* (*Pecopteris*) *hochstetteri.* Hector, Cat. Col. Mus., pp. 199–201 ..	Mataura, Waikawa, (Pakawau), Waikato South Head, Malvern Hills	D.M.; 1 plesiotype, Waikato South Head.
1877. *Polypodum hochstetteri.* Hutton, R.G.E., vol. 8, p. 36	Cairn Range and Flagpole Hill, Malvern Hills ..	..
1880. *Pecopteris hochstetteri.* Hector, App. Off. Cat. S.E., p. 48..	Lower Greensand, Jurassic	..
1886. ,, Hector, Cat. Ind. Col. Exh., p. 31..	Waikawa, Mataura, Waikato Heads	..
1887. *Asplenium hochstetteri.* Ett., Denkschr. d. math-wiss. cl. d. k. Akad., vol. 53, p. 7	Mount Potts, Clent Hills, Malvern Hills, Mataura, Waikawa	Plesiotypes: C.M.—Clent Hills, 10; Malvern Hills, 4; Mataura, 2. O.M.—Waikawa, 30; Mataura, 5.
(*Cf.* also *Alethopteris hochstetteri.*)		
Protocladus lingua Ettingshausen (MS.).		
1887. *Protocladus lingua.* Ett., Denkschr. d. math-wiss. cl. d. k. Akad., vol. 53, p. 7	Malvern Hills ..	
Psaronius mataurensis Crié (MS.).		
1888. *Psaronius mataurensis.* Crié, C.R. Acad. Sci. Paris, vol. 107, p. 1014 ..	Clent Hills, Wairoa Gorge, Mataura ..	

Pterophyllum dieffenbachi Ettingshausen (MS.).		
1887. *Pterophyllum dieffenbachi.* Ett., Denkschr. d. math-wiss. cl. d. k. Akad., vol. 53, p. 7	Mataura, Waikawa ..	
1888. ,, Crié, C.R. Acad. Sci. Paris, vol. 107, p. 1014 ..	Mataura	
Pterophyllum grandis Hector (MS.).		
1886. *Pterophyllum grandis.* Hector, Cat. Ind. Col. Exh., p. 32..	Clent Hills ..	
Pterophyllum matauriensis Hector.		
1886. *Pterophyllum matauriensis.* Hector, Cat. Ind. Col. Exh., p. 66, f. 30A, No. 7	Mataura Falls ..	D.M.; holotype and paratypes. C.M.; 1 specimen, Mataura (paratype of Hector).
Sphenopteris amissa Ettingshausen (MS.).		
1887. *Sphenopteris amissa.* Ett., Denkschr. d. math-wiss. cl. d. k. Akad., vol. 53, p. 7	Clent Hills ..	
Sphenopteris asplenoides Hector.		
1880. *Sphenopteris asplenoides.* Hector, App. Off. Cat. S.E., p. 48	Jurassic	..
1886. ,, Hector, Cat. Ind. Col. Exh., pp. 32, 66, f. 30A, No. 9	Mataura Falls, Waikawa ..	C.M.; 2 specimens (? paratypes of Hector).
Sphenopteris clentiana Ettingshausen (MS.).		
1887. *Sphenopteris clentiana.* Ett., Denkschr. d. math-wiss. cl. d. k. Akad., vol. 53, p. 7	Clent Hills ..	
Sphenopteris lomaroides Hector (MS.).		
1880. *Sphenopteris lomaroides.* Hector, App. Off. Cat. S.E., p. 48	Jurassic	
Tæniopteris daintreei McCoy.		
1875. *Tæniopteris daintreei.* McCoy, Prodr. Palæ. Vict., dec. 2, pp. 15, 16, pl. 14, f. 1, 1*a*, 2	Cape Patterson, Victoria ..	
1886. ,, McCoy in Hector, Prog. Rep., vol. 17, p. xxi ..	Fern Gully, Mount Rowley ..	
Tæniopteris graminea Hector (MS.).		
1870. *Tæniopteris gramineus.* Hector, Cat. Col. Mus., pp. 199, 200 ..	Mataura Falls, Waikawa ..	D.M.; chirotype, Waikato South Head.
1886. *Tæniopteris graminea.* Hector, Cat. Ind. Col. Exh., p. 31 ..	Waikato Heads	
Tæniopteris huttoni Hector (MS.).		
1886. *Tæniopteris huttoni.* Hector, Cat. Ind. Col. Exh., p. 31	Waikawa, Waikato Heads	D.M.; chirotype, Waikato South Head.
Tæniopteris linearis Hector (MS.).		
1870. *Tæniopteris linearis.* Hector, Cat. Col. Mus., pp. 199–201 ..	Mataura, Waikawa, Waikato South Head ..	..
Tæniopteris lomariopsis Ettingshausen (MS.).		
1887. *Tæniopteris lomariopsis.* Ett., Denkschr. d. math-wiss. cl. d. k. Akad., vol. 53, p. 7	Malvern Hills, Mataura, Waikawa ..	Chirotypes: C.M.—Malvern Hills, 3; Mataura, 1; Clent Hills, 1. O.M.—Waikawa, 3.
Tæniopteris matauriensis Hector (MS.).		
1886. *Tæniopteris matauriensis.* Hector, Cat. Ind. Col. Exh., p. 31 ..	Mataura	
Tæniopteris obtusatus Hector (MS.).		
1870. *Tæniopteris obtusatus.* Hector, Cat. Col. Mus., p. 199	Mataura Falls	
1886. ,, Hector, Cat. Ind. Col. Exh., p. 31 ..	Mataura, Clent Hills, Waikato Heads ..	
Tæniopteris pseudo-simplex Ettingshausen (MS.).		
1887. *Tæniopteris pseudo-simplex.* Ett., Denkschr. d. math-wiss. cl. d. k. Akad., vol. 53, p. 7	Clent Hills, Mataura, Waikawa ..	C.M.; chirotypes, Clent Hills, 4.
Tæniopteris pseudo-vittata Ettingshausen (MS.).		
1887. *Tæniopteris pseudo-vittata.* Ett., Denkschr. d. math-wiss. cl. d. k. Akad., vol. 53, p. 7	Mount Potts ..	Chirotypes: C.M.—Mount Potts, 2; Clent Hills, 5. O.M.—Waikawa, 1.

	Locality or Horizon.	Location of Specimens.
Tæniopteris robustus Hector (MS.).		
1870. *Tæniopteris robustus.* Hector, Cat. Col. Mus., p. 199	Mataura Falls ..	
Tæniopteris stipulata Hector.		
1886. *Tæniopteris stipulata.* Hector, Cat. Ind. Col. Exh., pp. 31, 61, f. 24A, No. 3	Waikawa, (Pakawau) ..	
1887. „ Park, R.G.E., vol. 18, pp. 149, 150	Waikawa	
Tæniopteris tetranervis Hector (MS.).		
1886. *Tæniopteris tetranervis.* Hector, Cat. Ind. Col. Exh., p. 31 ..	Waikato Heads	
Taxites kahikatea Hector.		
1880. *Taxites kahikatea.* Hector, App. Off. Cat. S.E., p. 48	Cretaceo-Tertiary to Jurassic ..	..
1886. „ Hector, Cat. Ind. Col. Exh., pp. 31, 66, f. 30A, No. 11	Mataura Falls	D.M.; holotype.
Taxites manawao Hector.		
1880. *Taxites manoao.* Hector, App. Off. Cat. S.E., p. 48	Jurassic	..
1886. *Taxites manawao.* Hector, Cat. Ind. Col. Exh., pp. 31, 66, f. 30A, Nos. 2, 6 ..	Waikawa, Mataura Falls ..	D.M.; 2 syntypes.
Taxites matai Hector.		
1880. *Taxites matai.* Hector, App. Off. Cat. S.E., p. 48	Cretaceo-Tertiary	..
1886. *Taxites maitai.* Hector, Cat. Ind. Col. Exh., p. 61, f. 24A, No. 12.. ..	Shag Point	..
1886. „ Hector, Cat. Ind. Col. Exh., p. 65, f. 30, No. 5 ..	Clent Hills	D.M.; syntype.
Taxites miro Hector (MS.).		
1880. *Taxites miro.* Hector, App. Off. Cat. S.E., p. 48.. ..	Cretaceo-Tertiary to Jurassic ..	
1886. „ Hector, Cat. Ind. Col. Exh., p. 31 ..	Clent Hills	
Taxites totara Hector (MS.).		
1880. *Taxites totara.* Hector, App. Off. Cat. S.E., p. 48 ..	Jurassic	
1886. „ Hector, Cat. Ind. Col. Exh., p. 31 ..	Waikato Heads ..	
Taxites totaranui Hector (MS.).		
1886. *Taxites totaranui.* Hector, Cat. Ind. Col. Exh., p. 31 ..	Waikato Heads ..	
Thinnfeldia australis Ettingshausen (MS.).		
1887. *Thinnfeldia australis.* Ett., Denkschr. d. math-wiss, cl. d. k. Akad., vol. 53, p. 7	Mount Potts ..	C.M.; chirotypes—Mount Potts, 3; Clent Hills, 3.
Tympanorphora paradoxus Brogan.		
1880. *Zympanophora paradoxus.* Hector, App. Off. Cat. S.E., p. 47	Jurassic	..
1886. *Tympanophora paradoxus.* Hector, Cat. Ind. Col. Exh., p. 32	Waikato Heads ..	..
Vertebraria novæ-zealandiæ Hector.		
1886. *Vertebraria novæ-zealandiæ.* Hector, Cat. Ind. Col. Exh., p. 65, f. 30, No. 4..	Clent Hills ..	D.M.; holotype.
Zamites etheridgei Crié (MS.).		
1888. *Zamites etheridgei.* Crié, C.R. Acad. Sci. Paris, vol. 107, p. 1014.. ..	Clent Hills, Wairoa Gorge, Mataura	
Zamites mataurensis Ettingshausen (MS.).		
1887. *Zamites mataurensis.* Ett., Denkschr. d. math-wiss. cl. d. k. Akad., vol. 53, p. 7	Mataura, Waikawa ..	C.M.; chirotypes, Mataura, 1.
Zympanophora paradoxus. (See **Tympanophora.**)		

CHAPTER VI.

THE GENOTYPES OF RASTELLIGERA, PSIOIDEA, AND CLAVIGERA.

In a paper read before the Wellington Philosophical Society in 1878 Hector proposed three new genera of *Brachiopoda—Rastelligera*, *Psioidea*, and *Clavigera*. This paper was published the following year in abstract, with the remark that it would appear in the reports of the Geological Survey Department.* Under the title of "Contributions to New Zealand Palæontology: 2—*Brachiopoda*," the full paper was again referred to in 1880,† with the statement that it was partly prepared for publication. Unfortunately, it never appeared. Hector's genera have not been accepted outside New Zealand, nor by New Zealand workers with the exception of Hector's assistants on the Survey—viz., Cox, McKay, and Park.

It is, of course, quite possible and probable that the fossils on which the new genera were based will be found to belong to genera already established. The writer has not had time to study this point fully, nor would it be an easy matter to decide in the present state of New Zealand libraries. In case it is found that new genera are needed, it is desirable to know exactly where Hector's proposals stand.

So far as the definition of the characters of the proposed genera is concerned, Hector's work is fairly satisfactory. It is true that the genera of the *Spiriferacea* are based mainly on the characters of the spiralia, while Hector relied mainly on the characters of the hinge and the external form; but on the principle of correlation of parts his *differentia* may be found to be sufficient. His failure lay in neglecting to name, describe, and figure any species, without which it is, of course, impossible to constitute a genus. It is, however, possible to supply this deficiency from the manuscript material at our disposal.

Hector was at all times ready to apply manuscript names to new species, and there is evidence that he did so in this case. *Clavigera* and *Rastelligera* appear to be based on specimens from the Hokanui Hills,‡ for the first notices of them appear in remarks on the collections made by Cox and McKay in 1878.§ Cox speaks of "the comb-toothed Spirifers" (*Rastelligera*) in Bed 41, "grits," Otapiri Series. Hector mentions "an *Athyris*-like shell belonging to a new subgenus *Clavigera*" in the Bastion Series, "*Clavigera* with seven species" and "*Rastelligera* with five species" in the Otapiri Series, and "the earliest appearance of *Clavigera* and *Rastelligera*" in the Wairoa Series. The first locality mentioned for *Psioidea* is in Beds 33 and 34 (*Psioidea* Beds), Oreti Series, Nelson, in which two species are stated to occur, while *Clavigera*, *Rastelligera*, and *Psioidea* are mentioned in the overlying Otapiri Series.‖

Two manuscript names were published in 1881, when McKay cited *Rastelligera taylori* Hector and *Clavigera tumida* Hector in beds of the Otapiri Series, south slope of hill, east bank of the Mataura River, one mile and a half from Gore. It does not appear clearly whether these are new names applied to fossils from this locality, or identifications of earlier-named species.¶ It is only in the latter case, which seems most probable, that these species can be of value as genosyntypes. There seems, however, to be no collection preserved from this locality, although it should be easy to collect topotypes.

* "On the Fossil *Brachiopoda* of New Zealand." T.N.Z.I., vol. 11, pp. 537–39 (1879).

† 15th Ann. Rep. Col. Mus. and Lab., p. 11.

‡ Mr. McKay, however, informs me that he has always considered a specimen from Nugget Point as the "type" of *Rastelligera*.

§ Cox, S. H.: "Report on the Geology of the Hokanui Ranges, Southland," R.G.E., vol. 11, pp. 25–48 (1878). McKay, A.: "Notes on the Sections and Collections of Fossils obtained in the Hokanui District," R.G.E., vol. 11, pp. 49–90. Hector, J.: Prog. Rep., vol. 11, pp. vi–xii (1878.)

‖ Hector, J.: Prog. Rep., vol. 12, p. 11 (1879).

¶ The name *taylori* suggests Taylor's Creek or Crossing, in the Hokanui Hills.

In 1886 Hector published figures of two species of *Clavigera*, and of one species each of *Rastelligera* and *Psioidea*, but without giving specific names.* This is as far as the published evidence will take us.

The manuscript material consists of the printed but unpublished plates of *Brachiopoda* already referred to in the historical section (*ante*, p. 12). These plates are now issued in this bulletin. Plate I is labelled *Clavigera*, and contains ten figures; Plate II is labelled—1-4 *Spiriferina*, 5-9 *Rastelligera;* Plate III is labelled—1-5 *Spiriferina*, 6-7 *Epithyris;* Plate IV is labelled—8-11 *Athyris*, 12 *Spiriferina*, but 13 is not labelled. That fig. 13, Plate IV, should be referred to *Psioidea* is evident from a comparison with the figure published in 1876. Some years ago Messrs. A. Hamilton and A. McKay worked through these plates, and labelled such figures as Mr. McKay was sure of. Thus we have,—

Clavigera bisulcata Hector (MS.) (*fide* McKay). Fig. 1, Plate I.

Clavigera cuneiformis Hector (MS.) (*fide* McKay). Figs. 2, 2*a*, Plate I; and fig. 40, No. 3, Cat. Ind. Col. Exh.

Clavigera gracilis Hector (MS.) (*fide* McKay). Fig. 3, Plate I; and fig. 40, No. 2, Cat. Ind. Col. Exh.

Clavigera tumida Hector (MS.) (*fide* McKay). Fig. 5, Plate I.

Clavigera spp. innom. Figs. 4, 7, Plate I.

Rastelligera elongata Hector (MS.) (*fide* McKay). Fig. 8, Plate II.

Rastelligera sp. innom. Fig. 6, Plate II (perhaps the same as fig. 40, No. 1, Cat. Ind. Col. Exh.).

Rastelligera spp. innom. Figs. 5, 7, 9, Plate II.

Psioidea sp. innom. Figs. 13, *a-d*, Plate IV (probably the original of fig. 41, No. 1, Cat. Col. Ind. Exh.).

There is, further, in the Geological Survey collections a series of *Brachiopoda* in trays arranged according to species. Amongst them are the following:—

Clavigera: 9 species, 69 specimens, from 15 localities.

Rastelligera: 5 species, 54 specimens, from 9 localities.

Psioidea: 10 species,† 54 specimens, from 10 localities.

The species are labelled "No. 1," "No. 2," &c., without specific names, with the exception of 10 specimens from the Baton River, labelled "*Psioidea cuspidatus*." It is possible to identify the specimens from which some of the figures were made, and, by means of the locality numbers, to fix their locality.

The chirotype of *C. bisulcata* comes from loc. 371, "Benmore sandstone, Benmore railway-cutting, Southland (Rhætic)," and was collected by McKay in 1878. The chirotype of *C. cuneiformis* comes from loc. 366, "Blue sandstone and chert, main branch of Taylor's Creek, Hokanui Hills, Southland (Rhætic)," and was also collected by McKay in 1878. The chirotype of *C. gracilis* comes from loc. 371, "Benmore sandstone, Benmore railway-cutting, Southland (Rhætic)": it consists not only of the figured internal cast, but also of part of an external cast. The chirotype of *C. tumida* also comes from loc. 371. It is quite probable that *C. bisulcata*, *C. gracilis*, and *C. tumida* are synonyms, in which case the last should take precedence as being the only previously published name. The chirotype of *R. elongata* cannot be so certainly identified. It is probably a specimen from loc. 368, "*Trigonia* Beds, slopes of southern peak of Benmore, Hokanui Hills, Southland (Rhætic)," collected by McKay in 1878. The chirotype of the unnamed species of *Psioidea* has not been identified with certainty.

Should it be found that the proposed genera are really new, genolectotypes may be chosen from the above species. Preference should, perhaps, be given to the species figured in the "Catalogue of the Indian and Colonial Exhibition" (1886). These are *Clavigera cuneiformis*, *Clavigera gracilis*, *Rastelligera* sp. innom., and *Psioidea* sp. innom.

* Cat. Ind. Col. Exh., p. 70, f. 40, Nos. 1, 2, and 3; p. 73, f. 41, No. 1.

† Numbered sp. 1 to 11, but No. 6 is missing.

CHAPTER VII.

BIBLIOGRAPHY.

THE following list of papers includes not only those in which fossils are named, described, or figured, but also those that deal with the geology of districts from which fossils have been collected. By a reference to the indexes it is possible to find easily all papers written by a given author and the most important papers dealing with any given locality. Several references not given in the bibliographies of Hamilton, Wilckens, and Park are included, but it cannot be claimed that the list is complete. There are no doubt many Continental references to New Zealand fossils, particularly to those in the Vienna Museum, that have not yet been found by bibliographers of New Zealand geology.

Papers in which descriptions, figures, or new names of fossils are included are marked with an asterisk.

1841.

DIEFFENBACH, E. "An Account of the Chatham Islands." Journ. Roy. Geog. Soc., vol. 11, pp. 195–215. (Records the occurrence of fossiliferous strata.)

1843.

GRAY, J. E. "On the Fossil Shells from New Zealand." In Dieffenbach, E.: "Travels in New Zealand." Vol. 2, pp. 258 and 296. London, 1843. (Genera only, East Cape, Chatham Islands, Parengarenga, Kawia, Waingaroa.)

1845.

DIEFFENBACH, E. "On the Geology of New Zealand." Rep. Brit. Assoc. Trans., p. 50. (Tertiary. Genera only.)

1848.

MANTELL, G. A. "On the Fossil Remains of Birds collected in various Parts of New Zealand by Mr. Walter Mantell, of Wellington." Q.J.G.S., vol. 4, pp. 225–38.

——— "Additional Remarks on the Geological Position of the Deposits in New Zealand which contain Bones of Birds." *Ibid.*, pp. 238–41. (First mention of beds of the Wanganui System.)

1850.

FORBES, E. "Note on Fossiliferous Deposits in the Middle Island of New Zealand." Q.J.G.S., vol. 6, p. 343. (Genera only. Banks River and Blind Bay; collected by Mr. F. Manse; presented to Museum of Practical Geology, London.)

* MANTELL, G. A. "Notice of the Remains of the *Dinornis* and other Birds, and of Fossils and Rock-specimens, recently collected by Mr. Walter Mantell in the Middle Island of New Zealand, with Additional Notes on the Northern Island." *Ibid.*, pp. 319–42, pl. 28, figs. 1–21, and pl. 29, figs. 1–12. (Fossils of Ototara limestone, Onekakara clay, infusorial earth of Taranaki, and Lower Waihora.)

1851.

MANTELL, G. A. "Petrifactions and their Teachings; or, A Handbook to the Gallery of Organic Remains of the British Museum." London, 1851. ("The Geology of New Zealand," pp. 96–98, from the observations of W. Mantell. Refers to fossiliferous rocks at Kakanui, Onekakara, and the western side of the North Island.)

1855.

FORBES, C. "On the Geology of New Zealand; with Notes on its Carboniferous Deposits." Q.J.G.S., vol. 11, pp. 521–30. (Numerous references to fossiliferous beds associated with the coal-measures at Nelson and elsewhere.)

1858.

THOMSON, J. T. "Extracts from a Journal kept during the Performance of a Reconnoissance Survey of the Southern Districts of the Province of Otago, New Zealand." Journ. Roy. Geog. Soc., 1858, pp. 298–332. (Mataura Falls, Waiau Gorge.)

1859.

HAAST, J. "Letter to His Honour the Superintendent, Nelson, N.Z." *New Zealand Government Gazette* (Province of Nelson), vol. 8, No. 20, p. 90. (Gives an account of his itinerary. Awatere, &c.)

HOCHSTETTER, F. "Report of a Geological Exploration of the Coalfield in the Drury and Hunua District, in the Province of Auckland." *Auckland Provincial Government Gazette*, vol. 8, No. 2, 29th Jan., 1859, pp. 14–17. (Tertiary.)

——— "Lecture on the Geology of the Province of Auckland, New Zealand." *Ibid.*, No. 14, 8th July, 1859, pp. 87–100. (Jurassic, Upper and Lower Tertiary.)

——— "Lecture on the Geology of the Province of Nelson." *New Zealand Government Gazette* (Province of Nelson), vol. 8, No. 20, pp. 90–103.

——— "Bericht über geologische Untersuchungen in der Provinz Auckland." Sitz. k. Akad. Wissensch. Wien, bd. 27, pp. 123–27. (*Fide* Park.)

* HUXLEY, T. H. "On a Fossil Bird and a Fossil Cetacean from New Zealand." Q.J.G.S., vol. 15, pp. 670–77; figs. 1, 2, 3, 4, p. 672 (*Palœudyptes antarcticus* and *Phocœnopsis mantelli*. Tertiary.)

1860.

* HEAPHY, C. "On the Volcanic Country of Auckland, New Zealand; with Notes on Fossils by the Editor (T. R[upert] J[ones])." Q.J.G.S., vol. 17, pp. 242–52. (Specific determinations of *Foraminifera*, Orakei Creek.)

1861.

HAAST, J. "Report of a Topographical and Geological Exploration of the Western Districts of the Nelson Province, New Zealand." By authority: Nelson, 1861. Pp. viii, 150. Chap. iii, Geology, pp. 89–124. (Appeared earlier in Zeitsch. deutsch. geol. Gesellsch.) (Fossils in the beds of the West Coast coalfields.)

* OWEN, R. "On the Remains of a Plesiosaurian Reptile (*Plesiosaurus australis*) from the Oolitic Formation in the Middle Island of New Zealand." Rep. Brit. Assoc. Trans., pp. 122, 123. (Specimen supplied by J. H. Hood, from the Waipara River.)

1862.

CARPENTER, W. B. "Introduction to the Study of the *Foraminifera*." Ray Society. (*Cassidulina*, p. 198; *Amphistegina*, p. 247: in the "Tertiary of New Zealand.")

HAAST, J. "Notes on the Geology of the Province of Canterbury." *New Zealand Government Gazette* (Province of Canterbury), vol. 9, No. 18, pp. 121–31. (Fern Gully, Mount Rawley (Clent Hills); Fossil Gully, Rangitata River (Mount Potts); Kowai River, Malvern Hills.)

LINDSAY, W. L. "The Place and Power of Natural History in Colonization. Being Portions of a Lecture prepared for and at the Request of the Young Men's Christian Association." Dunedin, 1862. Pp. 29. Also reprinted in the *Edinburgh New Philosophical Journal*, April and July, 1863, and as a separate, Edinburgh, 1863, entitled "The Place and Power of Natural History in Colonization; with Special Reference to Otago (New Zealand)." (A strong plea for the foundation of a museum of natural history and the inauguration of palæontological work.)

TAYLOR, R. "The Geology of New Zealand." *Chapman's New Zealand Monthly Magazine*, vol. 1, pp. 176–83. Auckland. (Fossils in volcanic grit at Hicks Bay and Whangaroa, and at Wanganui.)

——— "The Geological Age of New Zealand." *Ibid.*, pp. 216–25. ("*Carcharius Megalodon, Annularia australis*," and *Terebratula* fossil in New Zealand. Deals mainly with distribution of plants and animals and age of the land-surface.) (For book form, see 1867.)

1863.

*COUNT M. "'On the Palæontology of New Zealand.' By Dr. Zittel, Proc. Imp. Geol. Inst., Vienna, 20th January, 1863." Q.J.G.S., vol. 19, 1863, pt. 2 (misc.), p. 20.

HAAST, J. "Reports of the Provincial Geologist on the Coal-measures and Lignitiferous Beds of the River Kowai, Tributary of the River Waimakariri." *New Zealand Government Gazette* (Province of Canterbury), vol. 10, No. 15, 23rd September, 1863, pp. 149–56. (Malvern Hills.)

* HOCHSTETTER, F. VON. "Neu-Seeland." Stuttgart, 1863. 4to. Pp. xx, 555. Also translation by Sauter, E.: "New Zealand"; Stuttgart, 1867; pp. vii, 515. (Contains an historical sketch of New Zealand geology, as well as results of Hochstetter's investigations.)

ZITTEL, K. A. "Beiträge zur Paläntologie von Neuseeland." N.J. f. Min., 1863, pp. 146–59. (*Fide* Wilckens.)

——— "Mitteilung über die von Hochstetter auf Neuseeland gesammelten Versteinerungen." Verh. k.-k. geol. Reichsanst., bd. 13, heft i, pp. 2–3.

1864.

HOCHSTETTER, F. VON, and PETERMANN, A. "The Geology of New Zealand: in Explanation of the Geographical and Topographical Atlas of New Zealand, by Dr. F. von Hochstetter and Dr. A. Petermann, from the Scientific Publications of the Novara Expedition; translated by Dr. C. F. Fischer. Also lectures by Dr. F. Hochstetter delivered in New Zealand." Auckland, 1864. (*Cf.* Hochstetter, 1859; also reprint by the Geological Society of London.)

HAAST, J. "Report on the Geological Survey of the Province of Canterbury." Proc. Prov. Council of Canterbury, session 22, 1864. Christchurch, 1864. Pp. 31. (P. 4: Mount Potts and Clent Hills.)

* Hochstetter, F. von. "Reise der österreichen Fregatte 'Novara' um die Erde." Geol. Th., 1 bd. Wien. 4vo.

Abth. 1. Hochstetter, F. von: "Geologie von Neu-Seeland: Beiträge zur Geologie der Provinzen Auckland und Nelson." Pp. xlvii, 274. Maps and plates.

Abth. 2. Hochstetter, F. von: "Paläontologie von Neu-Seeland: Beiträge zur Kentniss der Fossilen Flora und Fauna der Provinzen Auckland und Nelson." Pp. xxvi, 318; 26 plates.

I. Unger, F.: "Fossile Pflanzenreste." Pp. 1–13, taf. 1–4.

II. Zittel, K. A.: "Fossile Mollusken und Echinodermen." Pp. 15–68, taf. 6–15.

III. Karrer, F.: "Die Foraminiferen-Fauna des tertiären Grünsandsteines der Orakei-Bay bei Auckland." Pp. 69–86, taf. 16.

IV. Stolickza, F.: "Fossile Bryozoen aus dem tertiären Gründsandsteine der Orakei-Bay bei Auckland." Pp. 87–158, taf. 17–20.

V. Stache, G.: "Die Foraminiferen der tertiären Mergel des Whaingaroa-Hafens (Prov. Auckland)." Pp. 159–304, taf. 21–23.

VI. Jaeger, G.: "Bericht über einen fast vollständigen Schädel von *Palapteryx*." Pp. 305–18, taf. 25–26.

1865.

Crawford, J. C. "Essay on the Geology of the North Island of New Zealand." N.Z. Exh., 1865. Dunedin, 1865. Pp. 27.

Hector, J. "On the Geology of Otago, New Zealand." Q.J.G.S., vol. 21, pp. 124–28.

Lindsay, W. L. "On the Tertiary Coals of New Zealand." Proc. Roy. Soc. Edin., pp. 374–80. (Flora of the coal-measures.)

1867.

Hutton, F. W. "Geological Report on the Lower Waikato District." R.G.E., vol. 2, pp. 1–8, with map and sections. (Jurassic and Tertiary.)

Taylor, R. "The Age of New Zealand." Auckland. (Amplified from paper of same name in 1862. Describes a living representative of *Plesiosaurus*!)

1868.

Buchanan, J. "Kaikoura District." R.G.E., vol. 4, pp. 34–41. (Cretaceous and Tertiary. Discovery of Amuri Bluff beds.)

Hector, J. "Taranaki District." Prog. Rep., vol. 4, pp. 2–13. (Older and newer Tertiary. White Cliffs.)

——— "Marlborough and Eastern Nelson." *Ibid.*, pp. 17, 18. (Classification of formations described by Buchanan in same volume.)

——— "Pakawau Coalfield." *Ibid.*, pp. 18–22. (Plant fossils.)

1869.

Hacket, T. R. "Geology of the Okarita District." R.G.E., vol. 5, pp. 8–15. (Annelid in slate near mouth of Omoeroa River, determined as Triassic (Maitai) by Hector.)

Haast, J. "Saurier in der Tertiarformation in Neuseeland." Verh. k.-k. geol. Reichsanst., pp. 350, 351. (*Fide* Wilckens.)

Hector, J. "Mataura District, Otago, and Southland." Prog. Rep., vol. 5, pp. ii–vi. (Mesozoic and Cretaceo-Tertiary. Hokanui Hills; Otapiri Gorge; Morley Creek.)

——— "Waipara District, Canterbury." *Ibid.*, pp. x–xiii.

Hutton, F. W. "Notes to accompany the Map of the East Cape District." *Ibid.*, pp. 7, 8. (Cretaceo-Tertiary and Tertiary.)

1870.

BUCHANAN, J. "On the Wanganui Beds (Upper Tertiary)." T.N.Z.I., vol. 2, pp. 163–66. (Genera only.)

COCKBURN HOOD, J. H. "Geological Observations on the Waipara River, New Zealand." Q.J.G.S., vol. 26, pp. 409–13. (Relates the collection of crocodile and other saurian remains, which were sent to England, but were lost in the wreck of the "Matoako.")

HAAST, J. "Notes on a Collection of Saurian Remains from the Waipara River, Canterbury, in the Possession of J. H. Cockburn Hood, Esq." T.N.Z.I., vol. 2, pp. 186–89.

——— "On the Geology and Palæontology of the Waipara District." *Ibid.*, p. 420 (abstract). (Printed in full, R.G.E., vol. 6, 1871.)

* HECTOR, J. "Catalogue of the Colonial Museum, Wellington, New Zealand." Wellington. P. 8vo. Pp. 237. (Fossils, 171–202. Several chironyms.)

——— "On Mining in New Zealand." T.N.Z.I., vol. 2, pp. 360–84. (Buller Coalfield; Cobden limestone.)

* OWEN, R. "Notice of some Saurian Fossils discovered by J. H. Hood, Esq., at Waipara, Middle Island, New Zealand." Geol. Mag., vol. 7, pp. 49–53, pl. 3, figs. 1–5. (*Plesiosaurus hoodi* and *P. crassicostatus*. Based on sketches by Hector of specimens in the Colonial Museum.)

TRAILL, C. "On the Tertiary Series of Oamaru and Moeraki." T.N.Z.I., vol. 2, pp. 166–69. (Genera only.)

1871.

HAAST, J. "On the Geology of the Waipara District, Canterbury; with Geological Maps and Sections." R.G.E., vol. 6, pp. 5–19. (Cretaceous and Tertiary.)

——— "Notes on the Geology of the Central Portion of the Southern Alps, including Mount Cook." *Ibid.*, pp. 19–24. (Annelid in moraine of Hochstetter Glacier. References to Clent Hills.)

——— "On the Geology of the Amuri District, in the Provinces of Nelson and Marlborough." *Ibid.*, pp. 25–46. (Culverden beds (Jurassic), Cretaceous and Tertiary.)

HECTOR, J. "Notes on the Geology of the Hawke's Bay District." *Ibid.*, pp. 158–64. (Tertiary.)

HUTTON, F. W. "On the Relative Ages of the Waitemata Series and the Brown Coal Series of Drury and Waikato." T.N.Z.I., vol. 3, pp. 244–49, pl. 27.

1872.

HAAST, J. "Report on the Geology of the Malvern Hills, Canterbury." R.G.E., vol. 7, pp. 1–88. (Mesozoic plant fossils and Cretaceous of Malvern Hills; also reference to Mount Potts, Clent Hills, and Curiosity Shop.)

——— "Report on the Coal Deposits of the Ashburton District, Province of Canterbury." *Ibid.*, pp. 141–46. (Tertiary. References to Mount Potts and Clent Hills.)

HECTOR, J. "Palæontology." 7th Ann. Rep. Col. Mus. Lab., p. 5. (Canterbury, Haast; Chatham Islands and Amuri, Travers.)

* ——— "On the Remains of a Gigantic Penguin (*Palæudyptes antarcticus* Huxley) from the Tertiary Rocks of the West Coast of Nelson." T.N.Z.I., vol. 4, pp. 341–46, pls. 17, 18. (Also lists of Tertiary *Mollusca*.)

HUTTON, F. W. "On the Geology of the District of Southland, in the Province of Otago." R.G.E., vol. 7, pp. 96–112. (Map and sections.) (Mesozoic and Tertiary.)

——— "Synopsis of the Younger Formations of New Zealand." *Ibid.*, pp. 182–84 (Gives numbers of Tertiary fossils determined and described in "Catalogue of Tertiary *Mollusca*" and Cretaceous fossils not there enumerated. See also 1873.)

——— "On the Alluvial Deposit of the Lower Waikato and the Formation of Islands by the River." T.N.Z.I., vol. 4, pp. 333–36. (Diatoms.)

1873

HECTOR, J. "Geological Survey." 8th Ann. Rep. Col. Mus. Lab., pp. 6–7. (Fifty plates prepared to illustrate the "Fossil Flora.")

* HUTTON, F. W. "Catalogue of the Tertiary *Mollusca* and *Echinodermata* of New Zealand in the Collection of the Colonial Museum." Wellington, 1873. Roy. 8vo. Pp. xvi, 48.

——— "List of Shells." In Crawford, J. C.: "Notes on Miramar Peninsula." T.N.Z.I., vol. 5, pp. 396–400.

——— "On the Geographical Relations of the New Zealand Fauna." *Ibid.*, pp. 227–56. (Reprinted in Ann. Mag. Nat. Hist., ser. 4, vol. 13, 1874.)

——— "Synopsis of the Younger Formations of New Zealand." Q.J.G.S., vol. 19, pp. 373–79. (See also 1872.)

1874.

HECTOR, J. "Palæontology." 9th Ann. Rep. Col. Mus. Lab., pp. 5, 6. (Reefton, Nugget Point, Catlin's River, East Cape District.)

* ——— "On the Fossil *Reptilia* of New Zealand." T.N.Z.I., vol. 6, pp. 353–58, pls. 27–31.

HUTTON, F. W. "Geology of New Zealand: Table of Sedimentary Rocks of New Zealand." Geol. Mag., dec. 2, vol. 1, p. 515.

* KNIGHT, C. "On the Teeth of the *Leiodon*." T.N.Z.I., vol. 6, pp. 358–63, pls. 24–26.

* MOJSISOVICS VON MOJSVÁR, E. "Über die triadischen Pelecypoden-Gattungen *Daonella* und *Halobia*." Abh. k.-k. geol. Reichsanst., bd. vii, heft 2, p. 32–33, taf. iii, f. 7, 8, 9. (*Halobia hochstetteri*.)

1875.

DUNCAN, P. M. "On some Fossil *Alcyonaria* from the Tertiary Deposits of New Zealand." Q.J.G.S., vol. 31, pp. 675, 676, pl. 38B. (From Oamaru.)

HECTOR, J. "Palæontology." 10th Ann. Rep. Col. Mus. Lab., pp. 4, 5. (Waipara, Weka Pass, Culverden, Rakaia, Trelissic, Cape Kidnappers, Castle Point, Taipos, Tairua (? Taueru) River, Raglan district, Wangaroa North.)

* HUTTON, F. W. "Description of Three New Tertiary Shells in the Otago Museum." T.N.Z.I., vol. 7, p. 458, pl. 21. (*Cominella striata* and *Zizyphinus hodgei*, Wanganui; *Venus* (?) *sulcata*, Napier.)

HUTTON, F. W., and ULRICH, G. H. F. "Report on the Geology and Goldfields of Otago." Dunedin, 1875. 8vo. Pp. 244. (Fossil lists: pp. 38–40, 43–44, 45, 51–54, 58–61, 66, 70.)

PURNELL, C. W. "On the Wanganui Tertiaries." T.N.Z.I., vol. 7, pp. 453–57. (Genera only.)

1876.

HECTOR, J. "Palæontology." 11th Ann. Rep. Col. Mus. Lab., pp. 4, 5. (Reefton, Callaghan's Hill, Waimea, Redman's Creek, Abbey Rocks, Napier, Buller, Amuri.)

HUTTON, F. W. "On the Cause of the Former Great Extension of the Glaciers in New Zealand." T.N.Z.I., vol. 8, pp. 383–87.

——— "Age of the Ototara Formation." (Letter to Editor.) Geol. Mag., dec. 2, vol. 3, p. 381. (In reference to the beds from which *Harpactocarcinus tumidus* was derived.)

* NEWTON, E. T. "On Two Chimæroid Jaws from the Lower Greensand of New Zealand." Q.J.G.S., vol. 32, pp. 326–31, pl. 21, figs. 1–9. (*Ischyodus brevirostris* and *Callorhynchus hectori*, Amuri Bluff.)

* WOODWARD, H. "On a New Fossil Crab from the Tertiary of New Zealand, collected by Dr. Hector, F.R.S., F.G.S., Director of the Geological Survey of New Zealand; with a note by Dr. Hector." *Ibid.*, pp. 51–56, pl. 7, figs. 1, 2. (*Harpactocarcinus tumidus*.)

1877.

Cox, S. H. "Report on Raglan and Waikato District." R.G.E., vol. 9, pp. 9–16. (Triassic, Cretaceo-Tertiary, and Tertiary.)

——— "Report on Westland District." *Ibid.*, pp. 63–95. (Reefton Series—Devonian.)

——— "Report on Country between Poverty Bay and Napier." *Ibid.*, pp. 96–105. (Cretaceo-Tertiary and Tertiary.)

——— "Report on the Geology of the Mount Somers District." R.G.E., vol. 10, pp. 1–10. (Cretaceo-Tertiary.)

——— "Report on Waikato District." *Ibid.*, pp. 11–26. (Jurassic, Cretaceo-Tertiary, and Tertiary.)

——— "Report on the Geology of the Wangarei District." *Ibid.*, pp. 95–106. (Cretaceo-Tertiary. Whangarei.)

——— "Report on Country between Opotiki and East Cape." *Ibid.*, pp. 107–13. (? Jurassic and Tertiary.)

Crawford, J. C. "On Probable Reasons why Few Fossils are found in the Upper Palæozoic and Possible Triassic Rocks of New Zealand." T.N.Z.I., vol. 9, pp. 561–64.

Haast, J. "Notes on the Geology of the Clent Hills and Mount Somers Districts, in the Province of Canterbury." R.G.E., vol. 8, pp. 1–19. (Clent Hills plants and Mount Potts *Spirifer* beds.)

——— "Notes to accompany a Geological Map and Sections of the Shag Point District, Province of Otago." *Ibid.*, pp. 19–26. (Cretaceo-Tertiary and Tertiary.)

Hector, J. "Clent Hills and Mount Somers." Prog. Rep., vol. 8, pp. v, vi. (Criticism of Haast's remarks in same volume on age of Mount Potts and Clent Hills fossils.)

——— "North-east Portion of South Island." *Ibid.*, pp. vi–xiii. (Criticism of Hutton's paper in same volume, and list of fossils from Amuri Bluff.)

* ——— "South-east District of Otago." *Ibid.*, pp. xiii, xiv. (Note on *Belemnites lindsayi*.)

——— "East Cape District." *Ibid.*, pp. xvi–xx. (Post-Tertiary to Lower Cretaceous.)

* ——— "Kaipara District." Prog. Rep., vol. 9, pp. v, vi. (Contains three new chironyms.)

——— "Coal-measures." *Ibid.*, pp. ix, x. (Palæontological evidence for conformity of Amuri Group, Amuri Limestone and *Leda* Marls.)

——— "Geological Survey Collections." 12th Ann. Rep. Col. Mus. Lab., pp. 6, 7. (Waikato Heads, Waikawau Creek, Oamaru District, Manawatu Gorge to Napier, Whangarei.)

* ——— "On a New Trilobite (*Homalonotus expansus*)." T.N.Z.I., vol. 9, p. 682, pl. 27, fig. 2. (From Reefton.)

Hutton, F. W. "Report on the Geology of the North-east Portion of the South Island, from Cook Straits to the Rakaia." R.G.E., vol. 8, pp. 27–58. (Map and sections.) (Primary, Secondary, Cretaceous, and Tertiary.)

——— "On the Relation between the Pareora and Ahuriri Formations." T.N.Z.I., vol. 9, pp. 590–93. (Middle Tertiary.)

* ——— "Descriptions of some New Tertiary *Mollusca* from Canterbury." *Ibid.*, pp. 593–98, pl. 16, figs. 1–13. (Lower or Middle Tertiary. Twenty new species.)

McKay, A. "Reports relative to Collections of Fossils in S.E. District of the Province of Otago." R.G.E., vol. 8, pp. 59–73. (Secondary.)

——— "Reports relative to Collections of Fossils made in the West Coast District, South Island." *Ibid.*, pp. 74–115. (Cretaceo-Tertiary and Reefton Series—Devonian.)

McKay, A. "Reports relative to Collections of Fossils made in the East Cape District, North Island." *Ibid.*, pp. 116–64. (Cretaceo-Tertiary and Tertiary.)

——— "Report on Weka Pass and Buller District." *Ibid.*, pp. 36–42. (Cretaceo-Tertiary.)

——— "Report on Country between Cape Kidnappers and Cape Turnagain." *Ibid.*, pp. 43–53. (Cretaceous, Cretaceo-Tertiary, and Tertiary.)

——— "Report on Kaikoura Peninsula and Amuri Bluff." *Ibid.*, pp. 172–84. (Cretaceous and Cretaceo-Tertiary)

——— "Report on Cape Campbell District." *Ibid.*, pp. 185–91. (Cretaceous and Cretaceo-Tertiary.)

——— "Oamaru and Waitaki Districts." R.G.E., vol. 10, pp. 41–66. (Cretaceo-Tertiary. Deals with the country between the Waipara and Oamaru.)

——— "Report on the Country between Masterton and Napier." *Ibid.*, pp. 67–94. (Cretaceo-Tertiary and Tertiary.)

——— "On the Reptilian Beds of New Zealand." T.N.Z.I., vol. 9, pp. 581–90.

Smith, S. P. "Sketch of the Geology of the Northern Portion of Hawke's Bay." T.N.Z.I., vol. 9, pp. 565–76. (See discussion, Hector, Prog. Rep., vol. 9, p. 8; 1877.)

1878.

Anon. "Fossil Localities arranged according to Age." R.G.E., vol. 11, Appendix I, pp. 189–98.

——— "Index to Geographical Distribution [of Fossil Localities]." *Ibid.*, Appendix II, pp. 199–204.

——— "Index to Locality Numbers (1–431)." *Ibid.*, Appendix III, pp. 205–15.

Cox, S. H. "Report on the Geology of the Hokanui Ranges, Southland." *Ibid.*, pp. 25–48 (map and sections). (Permo-Carboniferous to Jurassic, Cretaceo-Tertiary, and Tertiary.)

——— "Report on the Geology of the Te Anau District." *Ibid.*, pp. 110–18. (Cretaceous, Cretaceo-Tertiary, and Tertiary.)

Hector, J. "Wairarapa." Prog. Rep., vol. 11, pp. iii, iv. (Cretaceous to Tertiary.)

* ——— "Mount Potts." *Ibid.*, pp. v, vi. (Mount Potts Saurian, *Glossopteris*, and invertebrates.)

——— "Southland District." *Ibid.*, pp. vi–xii. (List of Mesozoic fossils.)

——— "Geological Survey Collections." 13th Ann. Rep. Col. Mus. Lab., pp. 5, 6. (Hokanui Hills, Mount Potts, discovery of Carboniferous fossils in the Maitai calcareous slates, Nelson, and of graptolites at Collingwood.)

* ——— "On the Belemnites found in New Zealand." T.N.Z.I., vol. 10, pp. 484–89, pls. 22, 23, figs. 1–4. (Cretaceous, Triassic.)

——— "On the Relative Ages of the Australian, Tasmanian, and New Zealand Coal-fields." *Ibid.*, pp. 532, 533 (abstract only). (Records the discovery of *Glossopteris* by McKay at Mount Potts.)

McKay, A. "Report on East Wairarapa District." R.G.E., vol. 11, pp. 14–24. (Cretaceous and Tertiary.)

——— "Notes on the Sections and Collections of Fossils obtained in the Hokanui District." *Ibid.*, pp. 49–90. (Permo-Jurassic.)

——— "Report relative to the Collection of Fossils from the Mount Potts *Spirifer* Beds." *Ibid.*, pp. 91–109 (map). (Permo-Carboniferous to Older Secondary, and Cretaceo-Tertiary. Records the discovery of the *Glossopteris* beds of Mount Potts. Also reference to Clent Hills.)

——— "Report on the Wairoa and Dun Mountain Districts." *Ibid.*, pp. 119–59. (Carboniferous, Triassic, Cretaceo-Tertiary, and Tertiary.)

1879.

HAAST, J. VON. "Geology of the Provinces of Canterbury and Westland, New Zealand." Christchurch, 1879. Pp. 486.

HECTOR, J. "Palæontology: Geological Survey Collections." 14th Ann. Rep. Col. Mus. Lab., pp. 6–8. (A list of fossils from the Baton River Beds; ammonite in the limestone of Waipawa Gorge; collections from Nelson, &c.)

——— "Geology." Prog. Rep., vol. 12, pp. 1–17. (Classification adopted in construction of map for Sydney Exhibition. Repeated in a slightly different form in Journ. and Proc. Roy. Soc. N.S.W., vol. 13, pp. 69–80.)

——— "Mokau District." *Ibid.*, pp. 20–22 (map). (Jurassic, Cretaceo-Tertiary, and Tertiary.)

——— "Napier District." *Ibid.*, pp. 26–27. (Cretaceous and Tertiary.)

——— "East Wairarapa District." *Ibid.*, pp. 27–29. (Cretaceo-Tertiary and Tertiary.)

——— "District around Wellington." *Ibid.*, pp. 29–30. (Mount Torlesse Annelid—Carboniferous.)

——— "North-west District of South Island." *Ibid.*, pp. 30–41. (Silurian, Trias, Permian, Cretaceo-Tertiary, and Tertiary.)

*——— "On the Fossil *Flora* of New Zealand." T.N.Z.I., vol. 11, pp. 536, 537.

*——— "On the Fossil *Brachiopoda* of New Zealand." *Ibid.*, pp. 537–39. 1879.

——— "Handbook of New Zealand." Sydney International Exhibition, 1879. Wellington, 1879. Geology, pp. 17–30. (Contains lists of fossils in each formation. Later editions, 1880, 1883, 1886.)

MCKAY, A. "The Geology of the District between Waipukurau and Napier." R.G.E., vol. 12, pp. 69–75. (Cretaceo-Tertiary and Tertiary; ammonite in Waipawa chalk marls.)

——— "The Southern Part of the East Wairarapa District." *Ibid.*, pp. 75–86. (Cretaceo-Tertiary and Tertiary.)

——— "The District between the Kaituna Valley and Queen Charlotte Sound." *Ibid.*, pp. 86–97. (Cretaceo-Tertiary. Picton.)

——— "The District between the Wairau and Motueka Valleys." *Ibid.*, pp. 97–121. (Carboniferous, Permian, Trias, Cretaceo-Tertiary, and Tertiary.)

——— "The Baton River and Wangapeka Districts, and Mount Arthur Range." *Ibid.*, pp. 121–31. (Silurian, Cretaceo-Tertiary, and Tertiary.)

——— "The Geology of the Neighbourhood of Wellington." *Ibid.*, pp. 131–35. (Carboniferous and Pliocene.)

1880.

HECTOR, J. "Palæontology." 15th Ann. Rep. Col. Mus. Lab., pp. 8–10. (Kaipara, Komiti Point, Mataura Falls, Curiosity Shop, Trelissick Basin, Cairn Range, Okuku River, Motunau, Lake Wakatipu.)

——— "Handbook of New Zealand." Wellington, 1880. (Second edition, revised.) Geology, pp. 19–32. (The lists of fossils are somewhat different from those of the first edition, 1879. Later editions, 1883, 1886.)

*——— "Appendix to Official Catalogue, New Zealand Court, International Exhibition, Sydney, 1879." Wellington, 1880. Pp. 67. (Fossil lists, pp. 2–31, 33–43, 47–50. Many manuscript names of plants.)

——— "On the Geological Formations of New Zealand compared with those of Australia." Journ. and Proc. Roy. Soc. N.S.W., vol. 13, pp. 65–80. (The introduction to the above is repeated in Prog. Rep., vol. 13, pp. ii–iv; 1881. The rest of the paper is slightly altered from "Geology," Prog. Rep., vol. 12, pp. 1–14; 1879.)

* TATE, R. "On the Australian Tertiary Palliobranchs." Trans. Roy. Soc. S. Austral., vol. 3, pp. 140–70, pls. 7–11. (*Waldheimia* (?) *insolita* in New Zealand, p. 152; *Rhynconella squamosa*, pp. 166, 167, pl. 9, fig. 9, *a–b*.)

* TENSION-WOODS, J. E. "Corals and *Bryozoa* of the Neozoic Period in New Zealand. Palæontology of New Zealand, Pt. IV." Wellington, 1880. Pp. 34; 3 plates and frontispiece.

1881.

COX, S. H. "Geology of the Rodney and Marsden Counties." R.G.E., vol. 13, pp. 13–39. (Cretaceous, Cretaceo-Tertiary, and Tertiary.)

HECTOR, J. "Auckland District." Prog. Rep., vol. 13, pp. xi–xiv. (Cretaceous, Cretaceo-Tertiary, and Tertiary.)

——— "Mataura River." *Ibid.*, pp. xv, xvi. (Jurassic.)

——— "Curiosity Shop." *Ibid.*, pp. xvi–xix. (Cretaceo-Tertiary and Tertiary.)

——— "The Trelissick Basin." *Ibid.*, pp. xx–xxii. (Cretaceo-Tertiary and Tertiary.)

——— "The Older Secondary and Palæozoic Rocks of the North Canterbury and Amuri Districts." *Ibid.*, pp. xxii–xxx.

* ——— "Notes on New Zealand *Cetacea*, Recent and Fossil" (abstract). T.N.Z.I., vol. 13, pp. 334–36, pl. 18, figs. 1–10.

MCKAY, A. "Mataura Plant Beds, Southland County." R.G.E., vol. 13, pp. 39–48. (Permian-Jurassic and Tertiary.)

——— "Discovery of Chalk near Oxford, Ashley County." *Ibid.*, pp. 49–53. (Cretaceo-Tertiary.)

——— "Of the Trelissick Basin, Selwyn County." *Ibid.*, pp. 53–74 (with map). (Cretaceo-Tertiary and Tertiary.)

——— "Curiosity Shop, Rakaia River, Canterbury." *Ibid.*, pp. 75–82. (Cretaceo-Tertiary and Tertiary.)

——— "On the Older Sedimentary Rocks of Ashley and Amuri Counties." *Ibid.*, pp. 83–107. (Carboniferous (Annelid beds), Triassic, and Jurassic. Description of the Mount Torlesse Annelid.)

——— "On the Motunau District, Ashley County." *Ibid.*, pp. 108–18. (Cretaceo-Tertiary and Tertiary.)

——— "District West and North of Lake Wakatipu." *Ibid.*, pp. 118–47. (Cretaceo-Tertiary. Bob's Cove, Lake Wakatipu.)

——— "On the Genus *Rhynconella*." T.N.Z.I., vol. 13, pp. 396–98.

* VINE, G. R. In Hamilton, A.: "On the *Foraminifera* of the Tertiary Beds at Petane, near Napier." *Ibid.*, p. 393–96, pl. 16, figs. 1–16.

1882.

ANON. "Index to Fossiliferous Localities in New Zealand." R.G.E., vol. 14, pp. 118–28. (Localities 1–486. Includes table of fossiliferous formations in New Zealand.)

COX, S. H. "North Auckland District, including Thames, Coromandel, Island of Kawau, and Drury Coalfield." *Ibid.*, pp. 17–41 (with map). Cretaceous, Cretaceo-Tertiary, and Tertiary.)

——— "District between the Aorere and Takaka Valleys, Collingwood." *Ibid.*, pp. 42–56 (with map). (Cretaceo-Tertiary.)

ETTINGSHAUSEN, C. VON. "Über de Genetische Gliederung der Flora von Neuseeland." Sitz. k. Akad. Wissensch. Wien, bd. 58, abth. 1, pp. 953–77. (*Fide* Ett., 1887.)

HECTOR, J. Auckland District. Prog. Rep., vol. 14, pp. xvi–xix. (Cretaceous, Cretaceo-Tertiary, and Tertiary.)

——— "Waitaki Valley and Alps of North Otago." *Ibid.*, pp. xxi–xxxii. (Outlines the general argument for the Cretaceo-Tertiary formation.)

McKay, A. "Geology of the Waitaki Valley and Parts of Vincent and Lake Counties." R.G.E., vol. 14, pp. 56–92 (with map). (Permian, Triassic, Cretaceo-Tertiary, and Tertiary.)

——— "On the Younger Deposits of the Wharekauri Basin and the Lower Waitaki Valley." *Ibid.*, pp. 98–106. (Cretaceo-Tertiary and Tertiary.)

* Kirk, T. W. "Description of New Tertiary Fossils." T.N.Z.I., vol. 14, p. 409. (Three new species—viz., *Trivia zealandica, Marginella hectori, Pleurotoma tuberculata* —and three identifications. Petane.)

1883.

Hector, J. "Reefton District." Prog. Rep., vol. 15, p. xxv. (Comparison of Baton River and Reefton fossils.)

——— "Handbook of New Zealand." Wellington, 1883. (Third edition, revised.) Geology, pp. 24–41. (The geological chapter is identical with that in the second edition, 1880. See 1879, 1880, 1886.)

* Hutton, F. W. "Descriptions of some New Tertiary Shells from Wanganui." T.N.Z.I., vol. 15, pp. 410, 411. (Five new species.)

McKay, A. "On the Geology of the Reefton District, Inangahua County." R.G.E., vol. 15, pp. 91–153. (Reefton (Devonian) Formation, Cretaceous and Cretaceo-Tertiary.)

Montgomery, A. "Some Fossil Plants." (Letter to Editor.) N.Z. Journ. Sci., vol. 1, pp. 141, 142. (A find of dicotyledons at Pukerau, including *Griselinia lucida*.)

1884.

Cox, S. H. "On the District between the Maruia and Buller Rivers." R.G.E., vol. 16, pp. 1–10 (with map). (Cretaceo-Tertiary and Tertiary.)

——— "On the Springfield Colliery." *Ibid.*, pp. 19–22. (Jurassic fern-beds of Malvern Hills.)

——— "On Mount Somers and Malvern Hills District." *Ibid.*, pp. 22–43. (Carboniferous (Annelid beds), Jurassic (fern-beds), Cretaceo-Tertiary, and Tertiary.)

Hector, J. "Table of Sedimentary Beds (in New Zealand)." Prog. Rep., vol. 16, pp. xii–xv.

——— "Maruia and Buller Rivers." *Ibid.*, pp. xv–xviii. (Cretaceo-Tertiary and Tertiary.)

——— "Mount Somers and Malvern Hills." *Ibid.*, pp. xx–xxii. (Carboniferous (Annelid beds), Cretaceo-Tertiary, and Tertiary.)

——— "North-east Otago." *Ibid.*, pp. xxii–xxv. (Cretaceo-Tertiary and Tertiary.)

——— "Kawhia." *Ibid.*, pp. xxxiv–xxxviii. (Trias-Jurassic. Comparison with Hokanui section.)

Hutton, F. W. "On the Origin of the Fauna and Flora of New Zealand." N.Z. Jour. Sci., vol. 2, pp. 1–20. (Reprinted in Ann. Mag. Nat. Hist., ser. 5, vol. 13, 1884, pp. 425–48, and vol. 15, 1885, pp. 77–107.)

McKay, A. "On the North-eastern District of Otago." R.G.E., vol. 16, pp. 45–66 (with map). (Cretaceo-Tertiary and Tertiary.)

——— "On the Relations of the Tertiary and Cretaceo-Tertiary Strata on the Coast-line between Auckland and Mahurangi." *Ibid.*, pp. 101–6.

——— "On the Geology of the Coal-bearing Area between Whangarei and Hokianga." *Ibid.*, pp. 110–34 (with map). (Cretaceo-Tertiary. Extensive correlations with beds in the South Island.)

——— "On the Geology of the Kawhia District." *Ibid.*, pp. 140–48 (with map). (Triassic, Jurassic, and Cretaceo-Tertiary.)

1885.

* FILHOL, H. "Mission de l'île Campbell. Recueil de mémoires, rapports et documents relatifs à l'observation du passage de Vénus sur le soleil du 9 Décembre, 1874." Institut de France: Académie des Sciences. Paris, 1885. 4to. III, 2e part., No. 3, Geologie, Chap. II, pp. 141–80. (Tertiary. Describes *Waldheimia campbellica* n. sp., and figures *Pentacrinus* sp. ind.)

HAAST, J. VON. "On the Geological Structure of the Southern Alps of New Zealand, in the Provincial Districts of Canterbury and Westland." T.N.Z.I., vol. 17, pp. 332–37. (A criticism of the geological map published by the Survey so far as it applies to Canterbury, and a re-statement of his views as to the age of the Mount Potts and Clent Hills beds.)

HECTOR, J. "Note on the Geological Structure of the Canterbury Mountains." *Ibid.*, pp. 337–40. (A reply to Haast's paper in same volume. A more detailed reply appears in Prog. Rep., vol. 17, 1886, pp. xx–xxxi.)

——— "Geology, &c." 19th Ann. Rep. Col. Mus. Lab., pp. 5, 6. (Fossils of the lake-basins of Otago; Kawhia to Mokau.)

HUTTON, F. W. "On the Age of the Orakei Beds, near Auckland." T.N.Z.I., vol. 17, pp. 307–13.

* ——— "Description of New Tertiary Shells." *Ibid.*, pp. 313–32, pl. 18, figs. 1–22. (Seventy-seven new species from Wanganui and Petane.)

——— "Sketch of the Geology of New Zealand." Q.J.G.S., vol. 41, pp. 191–220.

——— "On the Geological Position of the 'Weka-Pass Stone' of New Zealand." *Ibid.*, pp. 266–78. (An unconformity between Cretaceous and Tertiary.)

——— "On the Correlations of the 'Curiosity-Shop Beds' in Canterbury, New Zealand." *Ibid.*, pp. 547–64.

NEUMAYR, G. "Die geographische Verbreitung der Juraformation," &c. Denkschr. k. Akad. Wissensch. Wien, bd. 1, p. 120 (*fide* Bœhm).

1886.

DAVIS, J. W., "On some Fish-Remains from the Tertiary Strata of New Zealand." Q.J.G.S., vol. 42, Proc., pp. 4, 5.

* GROVE, E., and STURT, G. "On a Fossil Marine Diatomaceous Deposit from Oamaru, Otago, New Zealand." Journ. Quecket Micr. Club, ser. 2, vol. 2, p. 321 (1886), and vol. 3, pp. 7, 63, 131 (1887).

HAAST, J. "On the Character and Age of the New Zealand Coalfields." Rep. Brit. Assoc., p. 643.

HECTOR, J. "Geological Collections." 20th Ann. Rep. Col. Mus. Lab., pp. 4–7. (Marlborough and Amuri Districts, Waipa River to Pirongia, Huntly to Raglan, Pahi, Komiti Point.)

—— "Exhibits at the Indian and Colonial Exhibition." 21st Ann. Rep. Col. Mus. Lab., pp. 4–8. "Geological." *Ibid.*, pp. 10, 11; "Geological Survey Branch." *Ibid.*, pp. 11–13. (Kai Iwi, Okehu, Nukumaru, Waitotara, Whenuakura, Masterton, Kaimanawas, Mokau, Moeraki District, Malvern Hills, Waihola Lake, Waihao River, Weka Pass, Shag Point.)

——— "Kaikoura District." Prog. Rep., vol. 17, pp. xii–xxxvii. (Cretaceous and Cretaceo-Tertiary. Contains also a discussion of the fossils and age of the central group of formations in all parts of the Dominion.)

——— "Auckland District." *Ibid.*, pp. xxxvii–xl. (Cretaceo-Tertiary and Tertiary.)

——— "Handbook of New Zealand." Wellington, 1886. (Fourth edition, revised.) Geology, pp. 28–35. (The geological chapter has been greatly abbreviated as compared with earlier editions—1879, 1880, and 1883—and the lists of fossils omitted.)

* HECTOR, J. "Detailed Catalogue and Guide to the Geological Department's Exhibits at the Indian and Colonial Exhibition, and Outline of the Geology of New Zealand." Wellington, 1886. Roy. 8vo. Pp. 101. "Outline of the Geology of New Zealand" also published as a separate; pp. 37–101. (Contains lists and numerous figures of New Zealand fossils, including some new species.)

HUTTON, F. W. "On the Geology of Scinde Island." T.N.Z.I., vol. 18, pp. 327–32. (Tertiary.)

* ——— "New Species of Tertiary Shells." *Ibid.*, pp. 333–35. (Eleven species.)

* ——— "The Wanganui System." *Ibid.*, pp. 336–67. (Map and sections.) (Upper Tertiary. Short citation and synonymy of 280 species of *Invertebrata*.)

McCOY, F. (Memorandum on Fossils from Mount Potts and the Clent Hills.) Prog. Rep., vol. 17, p. xxi, footnote.

McKAY, A. "On the Geology of the Eastern Part of Marlborough Provincial District." R.G.E., vol. 17, pp. 27–136 (with map). (Cretaceous, Cretaceo-Tertiary, and Tertiary.)

——— "Notes on the Geology of Scinde Island and some Parts of the Northern District of Hawke's Bay." *Ibid.*, pp. 185–92. (Tertiary.)

——— "On the Geology of Cabbage Bay District, Cape Colville Peninsula." *Ibid.*, pp. 192–202 (with map). (Cretaceo-Tertiary.)

——— "On the Age of the Napier Limestones." T.N.Z.I., vol. 18, pp. 367–74 (Miocene and Pliocene.)

PARK, J. "Auckland Provincial District." R.G.E., vol. 17, pp. 136–70 (with map). (Cretaceo - Tertiary and Tertiary. Waipa – Kawhia District, Huntly – Raglan District, Waitemata, Eden, and Manakau Counties, Kaipara District.)

——— "On the Kakahu District, Canterbury." *Ibid.*, pp. 170–78 (with map). (Cretaceo-Tertiary and Tertiary.)

——— "On the Older Fossiliferous Rocks in Nelson." *Ibid.*, pp. 178–81.

TATE, R. "Supplemental Notes on the Palliobranchs of the Older Tertiary of Australia, and a Description of a New Species of *Rhynconella*." Trans. Roy. Soc. S. Austral., vol. 8, pp. 94, 95, pl. 6, fig. 3, *a–c*. (List of species common to the older Tertiaries of Australia and New Zealand.)

——— "The Lamellibranchs of the Older Tertiary of Australia (Part I)." *Ibid.*, pp. 96–158, pls. 2–12. (Several identifications of New Zealand species.)

* TELLER, F. "Die Pelecypodenfauna von Werchojansk in Ostsibirien." in Mojsisovics, L. "Arktische Triasfaunen." Mém. Acad. Imp. Sci. St. Pétersb., sér. 7, tom. 33, pp. 107, 111, 113, 115, 123, 124, 151–53. (*Fide* Bœhm.) (*Pseudomonotis richmondiana*.)

1887.

ANON. "Index to Fossiliferous Localities in New Zealand." R.G.E., vol. 18, pp. 255–70. (Including table of fossiliferous formations in New Zealand localities, 1–703.)

* ETTINGSHAUSEN, C. VON. "Beiträge zur Kenntniss der fossilen Flora Neuseelands." Denkschr. k. Akad. Wissensch. Wien, bd. 53, pp. 143–94, 9 taf. (Descriptions and figures of Tertiary and Cretaceous leaf fossils; names only of Triassic specimens.)

* ——— "On the Fossil Flora of New Zealand." Geol. Mag., dec. 3, vol. 4, pp. 363–67.

HAAST, J. VON. "Notes on the Age and Subdivisions of the Sedimentary Rocks in the Canterbury Mountains, based upon the Palæontological Researches of Professor Dr. C. Baron von Ettingshausen in Gratz (Austria)." T.N.Z.I., vol. 19, pp. 449–51.

HECTOR, J. "Geological Collections." 22nd Ann. Rep. Col. Mus. Lab., p. 3. "Geological Survey Branch." *Ibid.*, pp. 5–14. (Mokihinui, Nelson, Buller District, East Cape District, Hawke's Bay District, Oamaru District, Hokanui Hills, Mataura, Waikawa, King-country, Kaipara District.)

——— "Southern Amuri District." Prog. Rep., vol. 18, pp. ix–xiv. (Kaikoura, Weka Pass, and Amuri Bluff. Cretaceo-Tertiary.)

——— "Malvern Hills." *Ibid.*, pp. xiv, xv. (Cretaceous.)

*——— "Moeraki and Hawksbury Survey District." *Ibid.*, pp. xv–xxvi. (Shag Point, Brighton, and Waihola. Cretaceous and Cretaceo-Tertiary. Description of the Brighton *Belemnitella*.)

——— "The Lower Greensand and Cretaceo-Tertiary Formations." *Ibid.*, pp. xxii–xxiv.

——— "Hawke's Bay District." *Ibid.*, pp. xxiv–xxxix. (Passage-formation between the Mataura (Upper Jurassic) and the Amuri (Lower Greensand) Series, and Tertiary.)

——— "Western Wellington and Taranaki." *Ibid.*, pp. xl–xlii. (Cretaceo-Tertiary and Tertiary.)

——— "Oamaru District." *Ibid.*, pp. xliv, xlv. (Cretaceous and Cretaceo-Tertiary. Esdaile collection.)

——— "Hokanui Hills." *Ibid.*, p. xlv. (Mesozoic.)

——— "Kaipara District." *Ibid.*, pp. l, li. (Cretaceo-Tertiary and Tertiary.)

* HILL, H. "A Description of a *Scaphites* found near Cape Turnagain." T.N.Z.I., vol. 19, pp. 387, 388. (Some doubt exists as to whether the fossil described was found in New Zealand.)

HUTTON, F. W. "On the Geology of the Trelissick or Broken River Basin, Selwyn County." *Ibid.*, pp. 392–412. (See McKay, 1887; Hutton, 1888.)

——— "On the Geology of the Country between Oamaru and Moeraki." *Ibid.*, pp. 415–30.

——— "Note on the Geology of the Valley of the Waihao, in South Canterbury." *Ibid.*, pp. 430–33.

——— "The *Mollusca* of the Parcora and Oamaru Systems of New Zealand." Proc. Linn. Soc. N.S.W., ser. 2, vol. 1, pp. 205–37. (Citation and references of 268 species.)

MCKAY, A. "The Waihao Greensands, and their Relation to the Ototara Limestone." T.N.Z.I., vol. 19, pp. 434–40. (Reply to Hutton in same volume.)

——— "On the Younger Secondary and Tertiary Formations of Eastern Otago, Moeraki to Waikouaiti." R.G.E., vol. 18, pp. 1–23 (with map). (Cretaceous, Cretaceo-Tertiary, and Tertiary.)

——— "On the Grey-marls and Weka Pass Stone in Kaikoura Peninsula and Amuri Bluff." *Ibid.*, pp. 74–78. (Cretaceo-Tertiary.)

——— "On the Junction of the Amuri Limestone and Weka Pass Stone, Weka Pass, North Canterbury." *Ibid.*, pp. 78–91. (Cretaceo-Tertiary.)

——— "On the Identity and Geological Position of the Greensands of the Waihao Forks, Waihao Valley, South Canterbury." *Ibid.*, pp. 91–119. (Reply to Hutton, 1887.)

——— "On the Geology of East Auckland and the Northern Part of Hawke's Bay." *Ibid.*, pp. 182–219. (Cretaceous, Cretaceo-Tertiary, and Tertiary.)

——— "On the Geology of the Malvern Hills." *Ibid.*, pp. 230–33. (Cretaceous.)

——— "On the Geology of the Coast-line, Moeraki Peninsula to Kakanui; and Further Notes on the Geology of North-east Otago." *Ibid.*, pp. 233–40. (Cretaceous, Cretaceo-Tertiary, and Tertiary.)

PARK, J. "On the Geology of the Western Part of Wellington Provincial District, and Part of Taranaki." *Ibid.*, pp. 24–73 (with map). (Cretaceo-Tertiary and Tertiary.)

PARK, J. "On the Age of the Waireka Tuffs, Quartz-grits, and Coal at Teaneraki and Ngapara, Oamaru." *Ibid.*, pp. 137–41. (Cretaceo-Tertiary.)

——— "On the Jurassic Rocks of the Hokanui Hills, Mataura, and Waikawa." *Ibid.*, pp. 141–55 (with map of Waikawa).

——— "On the Upper Wanganui and King-country." *Ibid.*, pp. 167–82. (Cretaceo-Tertiary and Tertiary.)

——— Kaipara and Wade Districts, Auckland. *Ibid.*, pp. 219–29. (Cretaceo-Tertiary and Tertiary.)

* TATE, R. "The Lamellibranchs of the Older Tertiary of Australia (Part II)." Trans. Roy. Soc. S. Austral., vol. 9, pp. 142–89 and 196–200, pls. 14–20. (*Dosinia grayi*, p. 179; *Panopæa orbita*, pp. 183–84, pl. 18, fig. 3; *Toredo heaphyi*, pp. 183–84.)

——— "The Scaphopods of the Older Tertiary of Australia." *Ibid.*, pp. 190–94, pl. 20. (*Entalis mantelli*, pp. 190, 191.)

* WATERS, A. W. "On Tertiary Chilostomatous *Bryozoa* from New Zealand." Q.J.G.S., vol. 43, pp. 40–72, text figs. 1, 2, pls. 6–8.

* ——— "On Tertiary Cyclostomatous *Bryozoa* from New Zealand." *Ibid.*, pp. 337–50, text fig. p. 346, pl. 18. (Napier, Petane, Waipukurau, Whakaati (not Waikato), Shakespeare Cliff, Wanganui, Tanner's Run, Trig. Station.)

1888.

* CRIÉ, L. "Sur les affinités des flores jurassiques et triassiques de l'Australie et de la Nouvelle-Zélande." C.R. Ac. Sc., cvii, pp. 1014–17.

* DAVIS, J. W. "Report on the Fossil Fish-remains of the Tertiary and Cretaceo-Tertiary Formation of New Zealand." Trans. Roy. Dub. Soc., ser. 2, vol. 4, pp. 1–50; plates.

* ——— "Note on a Species of *Scymnus* from the Upper Tertiary of New Zealand." Geol. Mag., dec. 3, vol. 5, pp. 315–16. (*Scymus acutus*, Napier Series, Esk River.)

* ETTINGSHAUSEN, C. VON. "Contributions to the Tertiary Flora of Australia." Mem. Geol. Sur. N.S.W., Palæontology, No. 2. Sydney, 1888. (Translated by the author from the original memoirs in the Denkschr. d. math-naturw. Cl. d. k. Akad. Wien, bd. 103, 1887. Pp. 82–85 and 90–91 refer to New Zealand, and are same as T.N.Z.I., vol. 23 (1891), pp. 237–41 and 243–46.)

HECTOR, J. "Whangarei and Hobson Counties." Prog. Rep., vol. 19, pp. xxxvi, xxxvii. (Cretaceous.)

——— "Waipara and Weka Pass." *Ibid.*, p. xxxviii. (Discusses the relation of the Grey-marls to the Weka Pass Stone and the Mount Brown beds.)

HUTTON, F. W. "On some Railway Cuttings in the Weka Pass." T.N.Z.I., vol. 20, pp. 257–63. (Cretaceous, Lower and Upper Tertiary.)

——— "On the Greensands of the Waihao Forks." *Ibid.*, pp. 264–67. (Reply to McKay, 1887.)

——— "On some Fossils lately obtained from the Cobden Limestone at Greymouth." *Ibid.*, pp. 267–69.

* ——— "On a Trilobite from Reefton, New Zealand, new to Australasia." Proc. Linn. Soc. N.S.W., ser. 2, vol. 2 (1887), pp. 257, 258.

——— "On the Rocks of the Hauraki Goldfields." Trans. Austr. Assoc. Adv. Sci., vol. 1, pp. 245–74. (Tertiary. Cabbage Bay.)

MCKAY, A. "On the Geology of the Northern District of Auckland." R.G.E., vol. 19, pp. 37–57 (with map). (Cretaceous, Cretaceo-Tertiary, and Tertiary.)

PARK, J. "On the Probable Discovery of Oil and Coal in Wairarapa North County." *Ibid.*, pp. 20–24 (with map). (Cretaceous and Tertiary.)

——— "On the Geology of Waipara and Weka Pass Districts." *Ibid.*, pp. 25–35 (with map). (Cretaceo-Tertiary and Tertiary.)

PARK, J. "On the Geology of the Owen and Wangapeka Goldfields." *Ibid.*, pp. 74–88 (with map). (Silurian and Cretaceo-Tertiary.)

* TATE, R. "The Gastropods of the Older Tertiary of Australia (Part I)." Trans. Roy. Soc. S. Austral., vol. 10, pp. 91–176, pls. 1–13. (*Typhis hebetatus* Hutton = *T. McCoyi* Ten.-Woods, p. 91.)

WILSON, H. "On the Oxford Chalk Deposit, Canterbury, New Zealand." T.N.Z.I., vol. 20, pp. 274–76.

1889

HECTOR, J. "Geological Survey Branch." 23rd Ann. Rep. Col. Mus. Lab., pp. 14–16. (Hokianga Harbour, Weka Pass.)

* DE LATOUR, H. A. "On the Fossil Marine Diatomaceous Deposit near Oamaru." T.N.Z.I., vol. 21, pp. 293–311, pls. 18–22. (280 species.)

HOWCHIN, W. "The *Foraminifera* of the Older Tertiary of Australia (No. 1, Muddy Creek, Victoria)." Trans. Roy. Soc. S. Austral., vol. 12, pp. 1–20, pl. 1. (*Polymorphina dispar.*)

* LYDEKKER, R. "Catalogue of the Fossil *Reptilia* and *Amphibia* in the British Museum (Natural History): Part II."

TATE, R. "The Gastropods of the Older Tertiary of Australia (Part II)." Trans. Roy. Soc. S. Austral., vol. 11, pp. 116–74, pls. 2–10. (*Ancillaria hebera*, p. 147.)

1890.

* CASTRACANE. "Sul depositi di Jackson's Paddock, Oamaru, Nella Nouva Zelandia." Roma, 1890. Pp. 4. (*Fide* Hamilton).

GREGORY, J. W. "Some Additions to the Australian Tertiary *Echinoidea*." Geol. Mag., dec. 3, vol. 7, pp. 481–92, pls. 13 and 14.

HECTOR, J. "Geological Survey Branch." 24th Ann. Rep. Col. Mus. Lab., pp. 4–6. (Awatere and Amuri districts.)

——— "Amuri District." Prog. Rep., vol. 20, pp. xxxi–liv. (Deals particularly with the Upper Awatere Valley. Cretaceous and Cretaceo-Tertiary.)

HUTTON, F. W. "On the Relative Ages of the New Zealand Coalfields." T.N.Z.I., vol. 22, pp. 377–87. (Cretaceous and Tertiary. *Cf.* Hector, 1892, Buller Coalfield.)

MCKAY, A. "On the Geology of Marlborough and the Amuri District of Nelson." R.G.E., vol. 20, pp. 85–185. (Mainly a recapitulation; the part referring to the Cretaceous beds of the Awatere River is new.)

PARK, J. "Coal in the Upper Rangitikei Valley." *Ibid.*, pp. 64–67. (Tertiary.)

—— "On the Geology of Collingwood County, Nelson." *Ibid.*, pp. 186–243 (and map). (Palæozoic and Cretaceo-Tertiary.)

—— "On the Conformable Relations of the Different Members of the Waitemata Series." T.N.Z.I., vol. 22, pp. 391–99. (Lower Tertiary.)

1891.

* ETTINGSHAUSEN, C. VON. "Contributions to the Knowledge of the Fossil Flora of New Zealand." T.N.Z.I., vol. 23, pp. 237–310, pls. 24–32. (Translated from the German by C. Juhl. In the main, identical with the original paper in German, 1887. The figures are copied from the original figures.)

HILL, H. "On the Relations of the Kidnappers and Pohui Conglomerates to the Napier Limestones and Petane Marls." *Ibid.*, pp. 340–53. (Traverses McKay's classification of 1886.)

MCKAY, A. "On a Deposit of Diatomaceous Earth at Pakaraka, Bay of Islands." T.N.Z.I., vol. 23, pp. 375–79.

1892.

ANON. "Index to Fossiliferous Localities in New Zealand." R.G.E., vol. 21, appendix, pp. 120–45. (Including table of fossiliferous formations in New Zealand. Localities 1–764.)

——— "Index to Fossiliferous Localities according to the Counties in which they occur." *Ibid.*, Appendix, pp. 146–78. (Contains a short account of the geology of each county. Anonymous, but written by A. McKay. An uncollected saurian occurring at Mount Potts is described on p. 147.)

HECTOR, J. "Geological Survey Collections." 26th Ann. Rep. Col. Mus. Lab., pp. 1–3. (Cobden limestone (Westbrooke coll.), Waipara, Waikaka, Kaitangata.)

——— "Buller Coalfield." Prog. Rep., vol. 21, pp. xxxv–xli. (Reply to Hutton on "Age of the Coalfields," 1890.)

——— "Waipara." *Ibid.*, pp. l–liii. (Discusses Cretaceo-Tertiary question.)

——— "Henley Breccias." *Ibid.*, pp. lv–lix. (Waihola and Kaitangata.)

——— "Auckland District." *Ibid.*, pp. lxii–lxxxiv. (Pakaraka and Kaeo. Cretaceo-Tertiary and Tertiary.)

* HINDE, G. J., and HOLMES, W. M. "On the Sponge Remains in the Lower Tertiary Strata near Oamaru, Otago, New Zealand." Journ. Linn. Soc. Zool., vol. 24, pp. 177–262, pls. 7–15.

HUTTON, F. W. "On the Foliated Rocks of Otago." T.N.Z.I., vol. 24, pp. 359–65. (Graptolites of Collingwood, p. 362.)

MCKAY, A. "On the Geology of Marlborough and South-east Nelson: Part II." R.G.E., vol. 21, pp. 1–28. (Cretaceous, Cretaceo-Tertiary and Tertiary.)

——— "On the Prospects of Coal at Pakaraka, Bay of Islands, Auckland." *Ibid.*, pp. 59–63. (Cretaceo-Tertiary.)

——— "On the Geology of the District surrounding Whangaroa Harbour, Mongonui County, Auckland." *Ibid.*, pp. 63–72 (and map). (Cretaceous, Cretaceo-Tertiary and Tertiary.)

——— "On the Lignites of Cooper's Beach, Mongonui, Auckland." *Ibid.*, pp. 72–76. (Fossil fruit. Tertiary.)

——— "On the Geology of the Middle Waipara and Weka Pass Districts, North Canterbury." *Ibid.*, pp. 97–103. (Cretaceo-Tertiary and Tertiary; an unconformity between the Grey-marls and Mount Brown beds.)

1893.

HECTOR, J. "Geological Survey Collections." 27th Ann. Rep. Col. Mus. Lab., pp. 1, 2. (North Auckland district, Kawakawa and Hikurangi.)

HUTTON, F. W. "On a New Plesiosaur from the Waipara River, New Zealand." Q.J.G.S., vol. 49, Proc., p. 151 (abstract). (*Cimoliosaurus caudalis* n. sp.; description not given: see Hutton, 1894.)

* ——— "The Pliocene *Mollusca* of New Zealand." Macleay Memor. Vol., Lin. Soc. N.S.W., 1893, pp. 35–92, pls. 6–9. (Plates by H. Suter.)

MCKAY, A. "Geological Explorations of the Northern Part of Westland." Parl. paper C.–3, pp. 132–86 (map).

——— "On a Diatom Deposit near Pakaraka, Bay of Islands, Auckland." T.N.Z.I. vol. 25, pp. 375–77.

1894.

* DAVIS, J. W. "Report on the Fossil-fish Remains of New Zealand." R.G.E., vol. 22, pp. 93–120, and table. (Abstract from Trans. Roy. Dub. Soc., 14th Dec., 1887. Critical notes as to localities appended by Hector.)

HECTOR, J. "Northern Auckland." Prog. Rep., vol. 22, pp. ix–xxv (with map of Kawakawa Coalfield). (Cretaceo-Tertiary and Tertiary.)

HILL, H. "Notes on the Geology of the Country between Dannevirke and Wainui, Hawke's Bay." T.N.Z.I,. vol. 26, pp. 392–96. (Cretaceo-Tertiary and Pliocene.)

* HUTTON, F. W. "On a New Pleisosaur from the Waipara River." T.N.Z.I., vol. 26, pp. 354–58, pl. 42. (*Cimoliosaurus caudalis:* see Hutton, 1893.)

* ——— "On *Conchothyra parasitica*." *Ibid.*, pp. 358, 359, pl. 43, figs. 1–5.

MCKAY, A. "On the Prospects of finding Coal near Shannon, on the Wellington and Manawatu Railway Line." R.G.E., vol. 22, pp. 1, 2. (Upper Tertiary. Crustacean fossils numerous.)

——— "On the Geology of the Northern Part of Westland and the Gold-bearing Drifts between the Teremakau and Mikonui Rivers." *Ibid.*, pp. 11–50 (with map). (Discusses distribution of land and sea in Tertiary.)

——— "On the Hikurangi Coalfield." *Ibid.*, pp. 55–69. (Cretaceo-Tertiary.)

——— "On the Geology of Hokianga and Mongonui Counties, Northern Auckland." *Ibid.*, pp. 70–90 (with map). (Cretaceo-Tertiary and Tertiary.)

——— "Geological Reports on Older Auriferous Drifts of Central Otago." Parl. paper C.–4. Pp. 48 (map and sections). (Cretaceo-Tertiary. Bob's Cove, Lake Wakatipu. Kyeburn, Swinburn, Livingstone.)

* TATE, R. "Critical List of the Tertiary *Mollusca* and *Echinodermata* of New Zealand in the Collection of the Colonial Museum." R.G.E., vol. 22, pp. 121–27. (Refers only to the *Echinodermata*.)

1895.

GORDON, H. A. "Explorations in the Urewera Country." Parl. paper C.–3, pp. 157–65 (with map). (Accompanied by A. McKay. Cretaceous and Tertiary. District south of Opotiki.)

MCKAY, A. "Report on the Geology of the South-west Part of Nelson and the Northern Part of the Westland District." Parl. paper C.–13. Pp. 28 (and map). Also reprinted in 1896 and 1897. (A general account of the stratigraphy, without specific references to fossils.)

1896.

MCKAY, A. "The Geology of the Aorere Valley, Collingwood County, Nelson." Parl. paper C.–11, pp. 4–26 (with map). (Cretaceo-Tertiary and Tertiary.)

——— "The Enner Glynn Coal-mine, and the Coal-bearing Area within Brook Street Valley, near the Town of Nelson." *Ibid.*, pp. 28–30. (Tertiary.)

——— "Wilson River and Preservation Inlet Goldfield, Fiord County, Otago." *Ibid.*, pp. 31–43 (with map). (Silurian—graptolite beds—and Cretaceo-Tertiary.)

——— "Prospect of finding Coal on the Tiraumea Estate, Upper Tiraumea Valley." *Ibid.*, pp. 49–51 (with map). (Tertiary.)

PRITCHARD, G. B. "A Revision of the Fossil Fauna of the Table Cape Beds, Tasmania, with Descriptions of the New Species." Proc. Roy. Soc. Vict., vol. 8 (n.s.), pp. 74–150, pls. 2–4. (Several references to New Zealand species.)

1897.

HARRIS, G. F. "Catalogue of Tertiary *Mollusca* in the Department of Geology, British Museum (Nat. Hist.). Part I: The Australasian Tertiary *Mollusca*." Pp. xxvi, 407; 8 plates.

MCKAY, A. "Report on the Geology of the Cape Colville Peninsula, Auckland." Parl. paper C.–9, pp. 1–75 (with map). (Cabbage Bay. Cretaceo-Tertiary.)

1898.

GRIFFITHS, A. P. "Notes on a Fossil Punga found in the Silverton Mine." Trans. N.Z. Inst. M.E., vol. 2, pp. 35, 36, and plate. (Not a fossil.)

HAMILTON, A. "A List of Recent and Fossil *Bryozoa* collected in various Parts of New Zealand." T.N.Z.I., vol. 30, pp. 192–99.

* TATE, R. "On Some Recent and Fossil Australasian Species of *Philobryæ*." Trans. Roy. Soc. S. Austral., vol. 22, pp. 86–89, pl. 4. (*Mytilicardia trigonopsis* Hutt. = *Philobrya trigonopsis*.)

1899.

MCKAY, A. "Report on Petroleum at New Plymouth, Taranaki." Parl. paper C.–9, pp. 3–10. (Tertiary.)

——— "Report on the District between Stratford and the Tangarakau River." *Ibid.*, pp. 28–30. (Tertiary.)

MCKAY, W. A. "Report on the Geology of the Trooper Range, Castle Point District, Wellington." *Ibid.*, pp. 33–36. (Cretaceous and Tertiary.)

——— "Report on Geology of East Coast from the Kaiwhata River to Glenburn, East Coast of Wellington." *Ibid.*, pp. 36–43. (Cretaceous and Tertiary.)

* MURDOCH, R. "Description of *Sigaretus* (?) *drewi* and *Cirsonella* (?) *neozelanica*, with Notes on New Zealand Land *Mollusca*." Proc. Malac. Soc., vol. 3, pp. 320–25, pl. 16.

TATE, R. "On some Older Tertiary Fossils of Uncertain Age from the Murray Desert." Trans. Roy. Soc. S. Austral., vol. 13, pt. 1, pp. 102–11, pl. 1. (*Ancilla hebera*, p. 108.)

——— "A Revision of the Older Tertiary *Mollusca* of Australia: Part I." *Ibid.*, pp. 249–77, pl. 8. (Numerous references to New Zealand species.)

1900.

BŒHM, G. "Reisenotizen aus Neu-Seeland." Zeitsch. deutsch. geol. Gesellsch., bd. 51, pp. 169–77. (Discusses the Cretaceo-Tertiary of Kaikoura Peninsula and Oamaru.)

HILL, H. On the Geology of the District between Napier and Puketitiri." T.N.Z.I., vol. 32, pp. 183–88. (Miocene and Pliocene.)

HUTTON, F. W. "The Geological History of New Zealand." *Ibid.*, vol. 32, pp. 159–83.

* MACLAREN, J. M. "Geology of the Coromandel Goldfields." Parl. paper C.–9 (maps and sections). (? Cretaceous (plants) and Lower Eocene (marine). Figures *Blechnum priscum, Flabellaria sub-longirachis, Bambusites australis*.)

* MURDOCH, R. "Description of some New Species of Pliocene *Mollusca* from the Wanganui District, with Notes on other Described Species." T.N.Z.I., vol. 32, pp. 216–21, pl. 20, figs. 1–10. (Seven new species.)

PARK, J. "Notes on the Coalfields of New Zealand." Trans. Inst. Mining and Metall., vol. 8, pp. 148–55. (Also N.Z. Mines Record, vol. 3, 349 ff.)

1901.

DIESELDORFF, A. "Beiträge zur Kenntniss der Gesteine und Fossilen der Chathaminseln sowie einiger Gesteine und neuer Nephritfundorte Neu-Seelands." Inaug. Diss. Marburg, 1901. 8vo. Pp. 58; 4 plates; maps. (*Fide* Wilckens.)

MCKAY, A. "Report on Supposed Coal-seams in Kaiata Range, Greymouth." Parl. paper C.–10, pp. 7, 8. (Cretaceo-Tertiary and Tertiary.)

——— "Report on the Kaimanawa Ranges, Hawke's Bay." *Ibid.*, pp. 12–21 (with map). (Pliocene.)

McKay. A. "Report on the Petroleum-bearing Rocks of Poverty Bay and East Cape Districts, Auckland, New Zealand." *Ibid.*, pp. 21–25 (with map and sections). (Cretaceous and Tertiary.)

Ortmann, A. E. "The Theories of the Origin of the Antarctic Faunas and Floras." Am. Nat., vol. 25, pp. 139–42. (Contains references to all theories of older land connections with New Zealand.)

1902.

Fox, C. E. "The Volcanic Beds of the Waitemata Series." T.N.Z.I., vol. 34, pp. 452–93. (Lower Tertiary.)

* Frech, L. "Lethæa geognostica." 1ter Th.: Lethæa palæozoica; II, pp. 89, 102, 115 (Unter-Silur), 585 (Triad. Eiszeit), 602–4 (Dyas, Trias.), 687 (Graptolithen). Stuttgart, 1897–1902. (*Fide* Wilckens.)

Hamilton, A. "On the Septarian Boulders of Moeraki, Otago." T.N.Z.I., vol. 34, pp. 447–51, pls. 29–35. (Suggests that the bone-fragment described by Mantell as avian may be reptilian.)

Hutton, F. W. "On a New Fossil *Pecten* from the Chatham Islands." *Ibid.*, p. 196, pl. 8. (Miocene.)

* Ortmann, A. E. "Tertiary Invertebrates: Reports of the Princeton University Expeditions of Patagonia, 1896–99," pp. 45–332, pls. 11–34. Princeton, 1901–6. 4to. (Numerous references to, and comparisons with, New Zealand fossils.)

1903.

* Benham, W. B. "On some Remains of a Gigantic Fossil Cirripede from the Tertiary Rocks of New Zealand." Geol. Mag., dec. 4, vol. 10, pp. 110–19, pl. 9, figs. 1, 2, and pl. 10, figs. 3–11. (*Pollicipes* (?) *aucklandicus*, Motutapu, Auckland Harbour.)

Dennant, J., and Kitson, A. E. "Catalogue of the Described Species of Fossils (except *Bryozoa* and *Foraminifera*) in the Cainozoic Fauna of Victoria, South Australia, and Tasmania." Rec. Geol. Surv. Vict., vol. 1, pt. 2, pp. 89–147 (with map). (Numerous references to New Zealand species. A full bibliography of the Tertiary palæontology of Australia.)

Hamilton, A. "List of Papers on the Geology of New Zealand." T.N.Z.I., vol. 35, pp. 489–546.

* Ihering, H. von. "Les brachiopodes tertiare de Patagonie." An. Mus. Nac. Buenos Aires, tomo 9 (ser. 3a, t. 2), pp. 321–49, and plates. (Concludes that there are no species common to New Zealand and Patagonia. Names *Magellania norara*, *Terebratella neozelandica*, *Terebratulina suessi*.)

Park, J. "On the Geology of the Rock-phosphate Deposits of Clarendon, Otago." T.N.Z.I., vol. 35, pp. 391–402. (Upper Eocene.)

1904.

*Bœhm, J. "Über tertiäre Brachiopoden von Oamaru, Südinsel, Neu-Seeland." Zeitsch. deutsch. geol. Gesell., bd, 56, Briefl. Mittl., pp. 146–50, taf. 15. (*Terebratula oamarutica*, *Terebratella oamarutica*, *Terebratulina oamarutica*. Everett's Quarry, Kakanui.)

Chapman, F. "Fossil Fish Remains from the Tertiaries of Australia: Part I." Proc. Roy. Soc. Vict., vol. 17 (n.s.), pp. 267–97, pls. 11, 12. (Numerous references to New Zealand species.)

* Hamilton, A. "Notes on a Small Collection of Fossils from Wharekauri, on the Waitaki River, North Otago." T.N.Z.I., vol. 36, pp. 465–67, pls. 37, 38. (*Aturia ziczac.*)

HUTTON, F. W. "Index Faunæ Novæ Zealandiæ." London, 1904. (Discusses the origin of the New Zealand fauna, pp. 4–20.)

* LEMOINE, P., and DOUVILLÉ, R. "Sur le Genre *Lepidocyclina* Gümbel." Mem. Soc. géol. France (Paléont.), tom. 13, fasc. 1. Pp. 40. [P. 32, *Miogypsina orakeiensis* (Karrer).]

PARK, J. "On the Subdivision of the Lower Mesozoic Rocks of New Zealand." T.N.Z.I., vol. 36, pp. 373–404. (Nugget Point district, Catlin's River district, Nelson, Mount Potts district.)

——— "On the Age and Relations of the New Zealand Coalfields." *Ibid.*, pp. 405–18. (Abandons Cretaceo-Tertiary theory and suppresses Hutton's Pareora system.)

——— "On the Geology of North Head, Waikouaiti, and its Relation to the Geological History of Dunedin." *Ibid.*, pp. 418–30, pl. 32. (Tertiary.)

——— "On the Jurassic Age of the Maitai Series." *Ibid.*, pp. 431–46. (Subsequently referred by Park to the Carboniferous.)

——— "On the Discovery of Permo-Carboniferous Rocks at Mount Mary, North Otago." *Ibid.*, pp. 447–53. (Subsequently referred by Park to Permo-Triassic.)

* WILCKENS, O. "Revision der Fauna der Quiriquina-Schichten." N.J. f. Min. Beilage band 18, pp. 181–284, and plates. (Comparison of *Conchothyra parasitica* (N.Z.) with *Pugnellus tumidus* (Chili), p. 207, and figure of *C. parasitica*, taf. 18, f. 3, *a*, *b*.)

1905.

ARBER, E. A. N. "Catalogue of the Fossil Plants of the *Glossopteris* Flora in the Department of Geology." Brit. Mus. (Nat. Hist.), p. lxi.

* BATHER, F. A. "The Mount Torlesse Annelid." Geol. Mag., dec. 5, vol. 11, pp. 532–41, figs. 1–7, p. 537. (*Torlessia McKayi*; *Dentalium huttoni*.)

* CLARKE, E. DE C. "The Fossils of the Waitemata and Papakura Series." T.N.Z.I., vol. 37, pp. 413–21, pl. 32, figs. 1–5. (Describes *Flabellum papakurense*, *Amussium papakurense*, *Vaginella aucklandica*; notes on other species. Lower Tertiary.)

FUCHS, T. "Einige Bemerkungen zu der jüngst erscheinenen Mittheilung des Herrn G. Bœhm. Über tertiäre Brachiopoda von Oamaru, Südinsel, Neu-Seeland." Monatsb. deutsch. geol. Gesellsch., bd. 57, pp. 170–72.

* HUTTON, F. W. "Three New Tertiary Shells." T.N.Z.I., vol. 37, pp. 472–73, pl. 44, figs. 1–3. (*Pleurotoma hamiltoni*, *Mitra hectori*, *Pecten hilli*. Lower Tertiary.)

* ——— "Revision of the Tertiary *Brachiopoda* of New Zealand." *Ibid.*, pp. 474–81, pl. 45, figs. 1–5, pl. 46, figs. 1–7. (Describes as new—*Magellania parki*, *Terebratella kakanuiensis*, *Bouchardia rhizoida*.)

IHERING, H. VON. "Les mollusques fossiles du tertiare et du crétacé supérieur de l'Argentine." An. Mus. Nac. Buenos Aires, ser. 3, vol. 7, pp. 611, pl. 18. (*Fide* Wilckens.)

* PARK, J. "Description of a New Species of *Pecten* from the Oamaru Series." *Ibid.*, p. 485. (*Pseudamussium* (*Pecten*) *huttoni*.)

——— "On the Marine Tertiaries of Otago and Canterbury, with Special Reference to the Relations existing between the Pareora and Oamaru Series." *Ibid.*, pp. 489–551.

KILIEN, W., and PIROUTET, M. "Sur les fossiles éocrétaciques de la Nouvelle Calédonie." Bull. Soc. géol. France, ser. 4, tom. 5, p. 114. (*Fide* Wilckens.)

* SUTER, H. "Notes on some New Zealand *Pleurotomidæ*." Proc. Malac. Soc., vol. 6, pp. 200, 201.

* ——— "Notes on some Species of *Chione* from New Zealand." *Ibid.*, pp. 202–5.

1906.

* Andrew, A. R. "On the Geology of the Clarendón Phosphate Deposits, Otago, New Zealand." T.N.Z.I., vol. 37, pp. 447–82, pls. 4, 5. (Describes and figures *Magellania marshalli* n. sp.; figures *Squalodon grateloupi* (?) Pedroni. (Lower Tertiary.)

Bather, F. A. "The Age of the Mount Torlesse Annelid." (Letter to Editor.) Geol. Mag., dec. 5, vol. 3, pp. 46, 47. (Refers horizon to "not below Trias and not above Jurassic, and probably Liassic.")

* Boult, C. N. "The Occurrence of Gold at Harbour Cone." T.N.Z.I., vol. 38, pp. 425–46. (Note on *Pseudamussium huttoni* Park, p. 432, pl. 9, fig. 1, *a*, *b*, *c*. Lower Tertiary.)

* Hutton, F. W. "On *Crassatellites trailli*." *Ibid.*, pp. 65, 66. (*Mactropsis trailli*. Lower Tertiary.)

Lemoine, P. "Études géologiques dans le Nord de Madagascar," pp. 410–14. Paris, 1906. (Discusses Cretaceo-Tertiary question and quotes lists of fossils.)

Thomson, J. A. "The Gem Gravels of Kakanui, with Remarks on the Geology of the District." T.N.Z.I., vol. 37, pp. 482–95. (Lower Tertiary.)

1907.

* Bell, J. M.; Webb, E. J. H.; and Clarke, E. de C. "The Geology of the Parapara Subdivision." Bull. No. 3 (n.s.), N.Z. Geol. Surv. (Palæontology of the Aorere Series (graptolites), Slaty Creek, pp. 34–37, pl. 8.)

Fraser, C., and Adams, J. H. "The Geology of the Coromandel Subdivision." Bull. No. 4 (n.s.), N.Z. Geol. Surv. (Palæontology of the Torehine Series, pp. 54, 55: "not later than Lower Eocene.") (See also Thomas, A. P. W., 1907.)

* Kidston, R., and Gwynne-Vaughan, D. T. "On the Fossil *Osmundaceæ*." Trans. Roy. Soc. Edin., vol. 45, pt. 3, pp. 759–80, pls. 1–6. (*Osmundites dunlopi* and *O. gibbiana* from Jurassic rocks near Gore.)

* Suter, H. "Descriptions of some Tertiary Shells from New Zealand." Proc. Malac. Soc., vol. 7, pp. 207–10, pl. 18.

——— "Review of the New Zealand *Acmæidae*, with Descriptions of New Species and Subspecies." *Ibid.*, pp. 315–26. (*Acmæa rubiginosa*, p. 315.)

* Thomas, A. P. W. "Report on the Fossils of the Manaia Hill Beds (Coromandel)." Bull. No. 4 (n.s.), N.Z. Geol. Surv., pp. 48–50, pl. 9. (*Inoceramus* and *Belemnites*. (?) Upper Jurassic.)

Wilckens, O. "Die Lamellibranchiaten, Gastropoden, &c., der oberen kreide Sud-patagoniens." Ber. naturf. Gesellsch., Freiburg, i, B., bd. 15, pp. 91–155, pls. 2–9. (*Conchothyra parasitica*.)

1908.

* Arthaber, G. von. "Lethæa geognostica." II Th., Das Mesozoicum, bd. 1, Trias., p. 241. (*Fide* Bœhm.) (Refers to *Halobia hochstetteri*.)

* Frech, F. "Marine Trias in New Caledonien und Neuseeland." *Ibid.*, pp. 506, 509, taf. 48, f. 4, *a–d*. (*Fide* Bœhm.) (*Pseudomonotis richmondiana* and *P. richmondiana truncata*.)

Merriam, J. C. "Triassic *Ichthyosauria*, with Special Reference to the American Forms." Mem. Univ. California, vol. 1, No. 1. Pp. 196, pls. 18. (*Fide* Wilckens.)

Morgan, P. G. "The Geology of the Mikonui Subdivision, North Westland." Bull. No. 6 (n.s.), N.Z. Geol. Surv. (Palæontology of the Koiterangi Series (? Cretaceo-Tertiary), p. 104; palæontology of the Upper Miocene Beds, pp. 108, 109.)

SHAKESPEAR, E. M. R. "On some New Zealand Graptolites." Geol. Mag., dec. 5, vol. 5, pp. 145–48. (Collingwood.)

* STROMER VON REICHENBACH, E. "Die *Archæoceti* des ägyptischen Eocäns." Beitr. Paläont. Œsterr.-Ung., bd. 21, pp. 106–78, plates. (Refers to *Kekenodon onamata* Hector.)

* THOMSON, J. A. "Fossils from Kakanui." T.N.Z.I., vol. 40, pp. 98–103, pl. 14, figs. 1–6. (Describes as new *Isis hamiltoni*, *Cardita benhami*, and *Turbo marshalli*, and notes on other species.)

1909.

BELL, J. M. "Reconnaissance of North Cape Peninsula." 3rd Ann. Rep. (n.s.), N.Z. Geol. Surv. Dept., Parl. paper C.–9, pp. 5, 6. (Miocene. Parengarenga, Tom Bowline Bay.)

——— "Work in the Dun Mountain Subdivision." *Ibid.*, pp. 6–9.

* BELL, J. M., and CLARKE, E. DE C. "The Geology of the Whangaroa Subdivision." Bull. No. 8 (n.s.), N.Z. Geol. Surv. (Palæontology of the Kaeo Series, pp. 55–58, pl. 12. Cretaceous and Tertiary.)

BORISSJAK, A. "*Pseudomonotis ochotica* der krym-kaukasischen Trias." Bull. Com. géol. Russie, tom. 28, p. 100. (*Fide* Bœhm). (Refers to *Pseudomonotis richmondiana.*)

ISAACSON, E. D. "Notes on the Graptolite-bearing Rocks of New Zealand." Geol. Mag., dec. 5, vol. 6, pp. 74, 75. (Discusses the question of whether one or two zones are present.)

* MARSHALL, P. "Some New Zealand Fossil Cephalopods." T.N.Z.I., vol. 41, pp. 143–45, pl. 14A. (Trias-Jura. Five new species. No reference to plate.)

* MARSHALL, P., and BROWNE, R. "The Geology of Campbell Island and the Snares." In "Subantarctic Islands of New Zealand," vol. 2, pp. 700–3. Wellington, 1909. (Tertiary.)

PARK, J. "The Geology of the Queenstown Subdivision." Bull. No. 7 (n.s.), N.Z. Geol. Surv., pp. 66, 67. (Bob's Cove, Lake Wakatipu. Lower Miocene.)

WILCKENS, O. "Die Geologische, Paläontologische und Petrographische Literatur uber Neuseeland bis zum Jahr 1907." N.J. f. Min., bd. 2, pp. R. 265–301, 433–64.

1910.

BELL, J. M. "Geological Reconnaissance of the Mokau Country." 4th Ann. Rep. (n.s.), N.Z. Geol. Surv. Dept., Parl. paper C.–9, pp. 5–9. (Tertiary ?)

CLARKE, E. DE C. In Webb, E. J. H.: "The Geology of the Mount Radiant Subdivision." Bull. No. 11 (n.s.), N.Z. Geol. Surv., p. 18. (Fossils of the Kongahu Series. Tertiary.)

CLARKE, E. DE C. "Geological Survey of Part of New Plymouth Subdivision." 4th Ann. Rep. (n.s.), N.Z. Geol. Surv. Dept., Parl. paper C.–9, pp. 19–24. (A further summary appeared in the 5th Ann. Rep., 1911. The full bulletin was issued in 1912.)

* HAMILTON, A. In Webb, E. J. H.: "The Geology of the Mount Radiant Subdivision." Bull. No. 11 (n.s.), N.Z. Geol. Surv., p. 18. (*Magellania magna* sp. nov. Tertiary.)

HAMILTON, A. "The Present Position of New Zealand Palæontology; with a List of Papers on the Palæontology of New Zealand, including the Titles of those Stratigraphical Papers containing Important Lists of Fossils." T.N.Z.I., vol. 42, pp. 46–63.

MARSHALL, P. In Adams, J. H.: "The Geology of the Whatatutu Subdivision." Bull. No. 9 (n.s.), N.Z. Geol. Surv., pp. 21–23. (Fossils of Whatatutu Series. Upper Miocene.)

MORGAN, P. G. "Report on Probable Occurrence of Petroleum and other Minerals in Eastern Wairarapa District." Parl. paper C.–16; pp. 6. (Tertiary. East side of Wairarapa Plain; "Taipos," &c.)

PARK, J. "The Geology of New Zealand." Dunedin, 1910. 8vo. Pp. 488. (Numerous figures and lists of fossils reproduced from various sources. A very complete bibliography.)

SUTER, H. "List of Recent Shells found Fossil in New Zealand." T.N.Z.I., vol. 42, pp. 8–13.

1911.

CHAPMAN, F. "A Revision of the Species of *Limopsis* in the Tertiary Beds of Southern Australia." Proc. Roy. Soc. Vict., vol. 23 (n.s.), pt. 2, pp. 419–32, pls. 33–35. (*L. insolita:* pp. 425–29; pl. 84, fig. 5; pl. 85, fig. 11.)

HALL, T. S. "On the Systematic Position of the Species of *Squalodon* and *Zeuglodon* described from Australia and New Zealand." Proc. Roy. Soc. Vict., vol. 23 (n.s.), pt. 2, pp. 257-65, pl. 36.

MARSHALL, P. "New Zealand and Adjacent Islands." Handbuch der Regionalen Geologie, vii band, 1 abth. Heidelberg, 1911.

MARSHALL, P., SPEIGHT, R., and COTTON, C. A. "The Younger Rock-series of New Zealand." T.N.Z.I., vol. 43, pp. 378-407. (An argument for the existence of one rock-series only, embracing the Cretaceous, Cretaceo-Tertiary, Lower and Middle Tertiary of older classifications. See reply by Park, 1911.)

MORGAN, P. G. "Field-work in the Buller–Mohikinui Subdivision." 5th Ann. Rep. (n.s.), N.Z. Geol. Surv. Dept., Parl. paper C.–9, pp. 3–9.

PARK, J. "The Unconformable Relationship of the Lower Tertiaries and Upper Cretaceous of New Zealand." Geol. Mag., dec. 5, vol. 8, pp. 539–49. (A reply to Marshall, Speight, and Cotton, 1911.)

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——— (Otapiri Creek to Benmore.) *Ibid.*, pp. v–vi.

——— "Mount Somers District." *Ibid.*, pp. vi–vii.

——— "Waikato District" *Ibid.*, pp. vii–viii.

——— "Oamaru and Waitaki Districts." *Ibid.*, pp. ix–x.

——— "Masterton and Napier Districts." *Ibid.*, pp. x–xi.

——— "Wangarei." *Ibid.*, pp. xii–xiii.

CHAPTER VIII.

LIST AND INDEX OF FOSSIL LOCALITIES.

BESIDES serving as an index to the localities mentioned in this bulletin, the list given below states the collections from each locality in the possession of the Geological Survey.† The age ascribed to each collection is that assigned to it by its collector, or by Sir James Hector and Mr. A. McKay. Sufficient details are given about each locality to allow of its location with ease on the map, and it is hoped that the list will thus serve to make New Zealand geological literature more easy of comprehension by those unacquainted with the place-names. The literature dealing with any given collection and locality may be found by one of two methods—either by consulting the other pages of this bulletin to which a reference is indicated, or by searching through the list of papers in Chapter VII for the few years succeeding the date of the collection, keeping in mind that the titles of the papers generally deal with the district in which the locality occurs, and seldom with the actual locality.

The old provincial boundaries are used in this list, because many old papers refer to them. They differ in some respects from the modern land-district boundaries, especially in that part of Nelson (the Amuri district) lying between Marlborough and North Canterbury.

The localities from which new species have been described are marked with an asterisk. The following abbreviations are used :—

Carb. = Carboniferous.	J. = Jurassic.	Perm. = Permian.
Cret. = Cretaceous.	L. = Liassic.	Rh. = Rhætic.
C.-T. = Cretaceo-Tertiary.	L.G. = Lower Greensand.	S. = Silurian.
D. = Devonian.	M. = Miocene.	T. = Triassic.
E. = Eocene.	P. = Pliocene.	

—	Collector and Date.	Locality Number.	Number of Specimens.	Page in this Bulletin.
Abbey Rocks, Paringa District, south Westland. *C.-T.* ..	McKay, 1875	156	21	
,, ,, ,, *C.-T.* ..	Cox, 1875 ..	428	1	
Addison's Flat. (See Westport.)				
Ahuahu Point, Kawhia		..	..	34.
Ahuriri Harbour, Napier, Hawke's Bay.				
*Akiteo (Akitio) River, east coast of Wellington.				
Akiteo River. *Cret.*	Hector, 1873; Enys, 1874; McKay, 1875	118	63	
Recent deposits with subfossil *Mollusca*, Akiteo River ..	Hector, 1873	119	4	
*Aohanga Falls, Akiteo River. *M.*	,, ,,	250	46	
Akuaku, Waipiro Bay, East Cape district.				
Akuaku, *Venus* beds. *Up. M.* (?)	McKay, 1874	68	1718	
,, Lower Tertiary beds. *M.* (?) ..	,, ,,	69	66	
,, Upper Tertiary beds	,, ,,	70	81	
,, *M.* (?)	,, 1877	684	24	
,, *Venus* beds	,, ,,	685	121	
(See also Waipiro.)				
Albatross Point. (See Kawhia.)				
All Day Bay. (See Kakanui.)				

† Excluding those collections made by the reorganized Survey, which have not yet, with one exception, been given locality numbers.

—	Collector and Date.	Locality Number.	Number of Specimens.	Page in this Bulletin.
*Amuri Bluff, Marlborough	..	..	..	10, 11, 16,
Fern-beds, Kai's Hill, Amuri Bluff. *J.*	McKay, 1876	1	2	17, 20, 21,
Calcareous conglomerate, east wing, Amuri Bluff. *L.G.*	,, ,,	2	32	54, 56, 58,
Belemnite beds, east wing, Amuri Bluff. *L.G.*	,, ,,	3	15	64.
Trigonia beds, east wing, Amuri Bluff. *L.G.*	,, ,,	4	14	
,, ,, ,, *L.G.*	,, ,,	5	194	
Aporrhais beds, east wing, Amuri Bluff. *L.G.*	McKay, 1873, 1876	6	52	
Greensands below Black grit, east wing, Amuri Bluff. *L.G.*	Ditto	7	4	
Black grit, east wing, Amuri Bluff. *C.-T.*	,,	8	380	
Boulder sands (Saurian beds), east wing, Amuri Bluff. *C.-T.*	,,	9	96	
Concretionary greensands, east wing, Amuri Bluff. *C.-T.*	,,	10	87	
Teredo limestone, east wing, Amuri Bluff. *C.-T.*	,,	11	75	
Amuri limestone, Amuri Bluff	,,	12	153	
Amuri group, west wing, Amuri Bluff. *L.G.* and *C.-T.*	,,	13	4089	
Oaro Creek, west wing, Amuri Bluff. *L.G.* and *C.-T.*	,,	14	55	
Amuri Bluff, old collections	H. H. Travers and J. Buchanan	24	2	
,, ,,	Haast, 1869	25	..	
Raised beach (450 ft.), Amuri Bluff	McKay, 1876	158	2121	
Grey marls, Weka Pass stone, and greensand conglomerate, Amuri Bluff. *C.-T.*	,, ,,	275	61	
Recent, Amuri Bluff Hill	,, ,,	767	70	
Amuri district. (See Amuri Bluff and Nelson.) The Amuri district of Nelson is a block of land between Canterbury and Marlborough, reaching the sea on the east coast. It is now included in the Canterbury Land District.	..	..	..	55, 60, 62 64, 66.
Anakaka. (See Onakaka.)				
Anatori, Collingwood County, Nelson.				
Greensands on coast between Anatori and Big River. *C.-T.*	Park, 1889	739	63	
*Aniseed Valley, Nelson. *T.*	Hector, 1866	142	41	15, 34.
Aohanga Falls. (See Akiteo River.)				
Aorere River, Collingwood County, north-west Nelson	..	..	..	60, 68.
The Castles, Slate River, Aorere River. *C.-T.*	Cox, 1881	47	145	
Greensands, junction of Boulder Creek with Aorere River. *C.-T.*	Park, 1889	738	26	
*Aotea, west coast of Auckland, between Whangaroa and Kawhia Harbours. *C.-T.* (See also Raglan: Loc. 268)	Hector, 1866	51	4	
Arthur, Mount, Nelson. (See Baton River)	..	..	..	15, 59.
Ashburton River, Canterbury	..	..	..	55.
Fossil Point, Ashburton River. *Oamaru Formation*	Haast, 1872	104	31	
Limestone Bluff, Ashburton River. *Up. E.*	Cox, 1876	474	203	
*Ashley County, Canterbury	..	..	..	41, 60.
Otapiri beds, Wharfdale, Ashley County. *Rh.*	McKay, 1879	460	2	
Annelid beds, Ashley Gorge. *Carb.*	McKay, 1871, 1907	807	17	
AUCKLAND PROVINCE	..	..	..	10, 17, 52,
CENTRAL. (See Auckland town, Eden, Te Karaka.)				54, 60, 62, 63, 67.
EAST. (See Bay of Plenty, Coromandel, East Cape district, Poverty Bay, Urewera, Waihou, Waikare-moana.)				
NORTH. (See Aotea, Hokianga, Kaco, Kaipara, Kawakawa, Kawhia, Mangonui, Marsden, North Cape, Pakaraka, Rodney, Tom Bowline Bay, Waitangi, Whangarei, Whangaroa.)		..	..	60, 65, 67, 68.
SOUTH-WEST. (See Awakino, King-country, Kupakupa, Mercer, Miranda Redoubt, Mokau, Ongaruhe, Papakura, Raglan, Waikato, Waingaro, Wanganui River.)				
Auckland town. (See Cheltenham, Howick, Onehunga, Orakei Bay, Manukau, Parnell, Takapuna.)		..		9, 61.
Awakino River, south Auckland.				
Secondary rocks. *J.*	Park, 1887	661	9	
Limestone. *C.-T.*	,, ,,	663	1	
*Awamoa, on coast between Oamaru and Kakanui, north-east Otago	..	..	..	9, 20.
Awamoa beach and creek. *M.*	McKay, 1876	170	16568	
Awamoa. *M.*	Traill, 1865	213	..	
,, *M.*	,, 1874	254	27	
Awamoa bridge, Dunedin–Oamaru Road. *Up. E.*	McKay, 1876	327	67	
Marls under Ototara limestone, Cape Hills, at northern end of Awamoa beach. *C.-T.* (See also Parimoa).	,, 1883	499	25	

—	Collector and Date.	Locality Number.	Number of Specimens.	Page in this Bulletin.
*Callaghan's Hill, Westland	..	..	..	56.
Callaghan's Hill. *M.*	Hector, 1866	26	1	
,, *M.*	McKay, 1875	153	478	
,, *M.*	Hector, 1869	225	24	
Campbell, Cape, Marlborough	..	..	..	9, 53.
Eastern shore of Lake Grassmere, near Cape Campbell. *C.-T.*	McKay, 1876	314	18	
(See also Flaxbourne.)				
*Campbell Island		..		62, 73.
CANTERBURY PROVINCE		..		10, 53, 55, 59, 71.
CENTRAL. (See Ashburton, Clent Hills, Curiosity Shop, Fern Gully, Lyndon, Malvern Hills, Oxford, Rakaia River, Mount Somers, Mount Torlesse, Trelissick.)				
NORTH. (See Ashley, Hurunui, Kohai, Kowai, Motunau, Okuku, Waikare, Waipara, Weka Pass, and *cf.* Amuri district of Nelson)				17, 57, 60.
SOUTH. (See Kakahu, Mueller Glacier, Ohau, Pareora, Mount Potts, Waihao)		..		58, 62.
Cape Hills. (See Oamaru.)				
Castle Hill. (See Trelissick Basin.)				
Castle Hill Mine. (See Kaitangata.)				
* Castlepoint, east coast of Wellington	..	..	..	56, 69.
Castlepoint. *Lower P.*	McKay, 1874–5	37	9	
,, *Up. M.*	,, 1875	81	814	
Nummulitic limestone, Whareharua, near Castlepoint	Hector, 1874	844	..	
Castle Range. (See Pourerere.)				
Castle Rock. (See Oreti River.)				
Castles, The. (See Aorere River.)				
*Catlin's River, south of Nugget Point, Otago	..	..	..	16, 35, 36, 42, 56, 71.
Mouth of Catlin's River. *J.*	McKay, 1873	10	80	
Pholadomya Point, Catlin's River. *J.*	,, ,,	21	67	
Nugget Point to Catlin's River	,, ,,	801	14	
(See also Bloody Jack's Island, Nugget Point, Owaka Creek, Tautuku.)				
Cave Hill. (See Collingwood.)				
Cave Valley. (See Oamaru.)				
*Caverhill, Mount, Nelson. (Exact locality uncertain.)				
Mount Caverhill. *M.*	Haast, 1869 ..	216	20	
*Caversham, Dunedin, Otago.				
Caversham. Old collections from Otago Provincial Survey. *C.-T.*		53	17	
Caversham. *C.-T.* ..	McKay, 1873	53		
,, *C.-T.* ..	,, 1876	309	32	
(See also Green Island.)				
Chain Hills, near Dunedin, Otago.				
Chain Hills. Plants. Old collections. *C.-T.*		797	3	
Chasm Creek. (See Mokihinui.)				
*Chatham Islands	..	..	..	9, 51, 55, 69, 70.
Chatham Islands. *Up. E.* ..	Travers	792	134	
Cheltenham, North Shore, Auckland.				
Volcanic grit, Cheltenham Beach. *M.*	Park, 1887 ..	697	..	
North end of Cheltenham Beach. *M.* ..	McKay, 1887	731	4	
Cheviot Hills, Nelson.				
West slope of Cheviot Hills, Coast Range. *C.-T.* ..	1882	502	6	
Upper Pareora beds, Cheviot Hills. *M.*	,,	505	35	
Clarence River, Marlborough	..	..	..	17.
Coverham, Middle Clarence Valley. *Cret.*	McKay, 1884	518	16	
Waipapa Boat-harbour, mouth of Clarence River. *C.-T.*	,, 1885	555	84	
Quail Flat, Middle Clarence Valley. Plants. *C.-T.* ..	,, ,,	560	61	
,, ,, *C.-T.*	,, ,,	568	174	
,, ,, Fresh-water shells. *C.-T.*	,, ,,	571 572	31 74	
Amuri limestone, Seymour River, Middle Clarence Valley. *C.-T.*	,,	570	51	
Grey marls, mouth of Seymour River, Middle Clarence Valley. *C.-T.*		610	12	
Weka Pass stone, Seymour River, Middle Clarence Valley. *C.-T.*	,, ,,	569	41	
Grey marls, Muzzle River, Middle Clarence Valley. *C.-T.*	,, 1886	611	22	
,, Dart River, Middle Clarence Valley. *C.-T.* ..	,, ,,	612	9	
Great Post-Miocene conglomera e, Bluff River, Middle Clarence Valley. *P.*	,, 1885	613	15	

—	Collector and Date.	Locality Number.	Number of Specimens.	Page in this Bulletin.
Clarence River, Marlborough—*continued.*				
Black grit, Coverham, Middle Clarence Valley. *C.-T.* ..	McKay, 1885	614	..	
Bluff River, at junction with Clarence, Middle Clarence Valley. *C.-T.*	,, ,,	615	38	
Red Hill Creek, Bluff River, Middle Clarence Valley. *C.-T.*	,, ,,	616	..	
Grey marls, Bluff River, Middle Clarence Valley. *C.-T.* ..	,, ,,	617	40	
Weka Pass stone, Bluff River, Middle Clarence Valley. *C.-T.*	,, ,,	618	2	
Clarendon, thirty miles south-west of Dunedin		..	..	70, 72.
Clark River. (See Baton River and Motueka River.)				
*Clent Hills, Ashburton County, Canterbury	..	..	..	10, 15, 21,
Smyth River, Lake Heron. *C.-T.*	Haast, 1872 ..	102	14	42–48, 53,
Potato Gully, Clent Hills. Plants. *J.* (?)	,, ,, ..	405	194	55, 57, 58,
Plant-beds, Potato Gully, Clent Hills. *J.*	McKay, 1877	546	..	62, 63.
Coal-beds, Lake Heron, Clent Hills. *C.-T.*	Haast, 1872 ..	788	7	
Clifton, Nelson. *M.*	Hector, 1868..	303	..	
Clyde, Wairoa River, Hawke's Bay. *P.*	McKay, 1887	706	42	
Coal Creek, McRae's, Lora, Hokanui Hills	..	..	..	45, 46.
Coal Creek, Otapiri River. (See Otapiri.)				
*Cobden, near Greymouth, West Coast, Nelson. (See Greymouth)		..	..	65, 67, 75.
Collingwood, Nelson, north-west corner of South Island ..	..	..	..	14, 15, 17,
Graptolite beds, Golden Ridge, Collingwood. *Low. S.* ..	Cox, 1882 ..	547	533	28, 29, 58,
Graptolites from Golden Ridge Claim, Taitapu, Collingwood	Park, 1889 ..	740	125	60, 66–68,
Dirty greensands, Puponga Point, Collingwood County. *C.-T.*	,, ,, ..	742	28	72, 73.
Ferruginous sandstone, Puponga Point, Collingwood County. *Up. E.*	,, ,, ..	743	34	
Blue clays on coast near Onakaka, Collingwood County. *C.-T.*	,, ,, ..	745	..	
Cave limestone, Cave Hill, Collingwood County. *C.-T.* ..	,, ,, ..	746	45	
Collingwood Coal-mine, Collingwood County. Plants ..	Hector ..	796	10	
Slaty Creek, Collingwood. *Ordovician*	Clarke, 1907..	848	22	
(See also Anatori, Pakawau.)				
Conical Hill. (See Otapiri.)				
*Conway River, between Marlborough and south-east Nelson.				
Conway River. *Cret.*	Buchanan, 1868	36	25	
Cook's Cove. (See Tolago Bay.)				
Cooper's Beach, Mangonui, north Auckland		..	..	67.
Coromandel, east of Auckland. (See also Cabbage Bay, Manaia Hill, Moehau)		..	..	35, 36, 60, 69, 72.
Coverham. (See Clarence River.)				
*Cowan's. (See Oreti River)		..	..	35.
Cromwell, Central Otago. Plants. *C.-T.* (See also Bannockburn)		419	..	
*Culverden, south-east Nelson	..	..	..	55, 56.
Culverden. *Oamaru formation*	Haast, 1869 ..	110	134	
,, ,, ...	McKay, 1874	303	..	
*Curiosity Shop, Rakaia River, Canterbury	..	..	..	17, 55, 59
Curiosity Shop. *Oamaru formation*	McKay, 1879	311	2699	60, 62.
,, *Up. E.* and *C.-T.*	,, ,,	549	598	
Dannevirke, seventy-nine miles south-west of Napier, Hawke's Bay	..	..	..	68.
Dart River, Marlborough. (See Clarence River.)				
Dart River, Nelson. (See Motueka.)				
*Deans, The. (See Waipara River.)				
Devil's Bridge. (See Oamaru.)				
Doctor's Gorge. (See Waipara.)				
Donald, Mount. (See Weka Pass.)				
*Dorset's, Forty-mile Bush, Wellington. *M.* or *Old. P.* ..	McKay, 1877	180	41	
Drury, south of Auckland	..	..	..	52, 55, 60.
Dun Mountain, east of Nelson	..	..	..	58, 73.
Dun Mountain. *Carb., Maitai Series*	Hector, 1866; McKay, 1878	143	25	
Fossiliferous slates, Dun Mountain tramway. *Carb.* ..	McKay, 1878	399	..	
Dunback, Shag Valley, Waihemo County, Otago.				
Dunback and "The Grange" (Kitchener's). *C.-T.* ..	McKay, 1886	598	..	
(See also Shag Valley.)				
Duncan's. (See Tokomaru.)				
Dunedin, Otago		..	..	71.
Otago Harbour. *Recent*		331	4	
(See also Caversham, Chain Hills, Green Island.)				

—	Collector and Date.	Locality Number.	Number of Specimens.	Page in this Bulletin.
Dunsdale, Hokanui Hills, Southland.				
Lower plant-beds, Dunsdale. *J.*	Park, 1887	667	1	
*Dunstan, Central Otago. Fresh-water shells		824	12	
East Cape district, Auckland. (See also Akuaku, Awanui, Hicks Bay, Roparua, Tokomaru, Tolago, Tuparoa, Waiapu, Waipiro)				35, 51, 54, 56, 57, 64, 70.
Eden County, central Auckland				63.
Eighty-eight Valley, Waimea County, Nelson				15, 33, 35,
Plant-beds, Eighty-eight Valley. *L.* or *Rh.*	McKay, 1878	195	89	43, 44.
Trigonia beds, Eighty-eight Valley. *L.* or *Rh.*	,, ,,	196	550	
Spiriferina beds, Eighty-eight Valley. *L.* or *Rh.*	,, ,,	197	107	
Monotis beds, Eighty-eight Valley. *T.*	,, ,,	432	50	
Halobia beds, Eighty-eight Valley. *T.*	,, ,,	433	88	
Mytilus beds, Eighty-eight Valley. *T.*	,, ,,	434	100	
Psioidea beds, Eighty-eight Valley. *T.*	,, ,,	435	115	
Kaihiku beds, Eighty-eight Valley. *Perm.*	,, ,,	436	639	
Sellen's, Eighty-eight Valley. *Carb.*	,, 1879	473	2	
Elizabeth, Point. (See Greymouth.)				
*Esk River, Hawke's Bay				65.
Pumice sands, Kawaka Station, Esk River. *P.*	McKay, 1886	681	52	
Esk River. *P.*	,, ,,	683	369	
Beds between bands of Petane limestone, Esk River. *P.*	,, ,,	717	25	
Upper band of Petane limestone, Lower Esk to Petane Hotel. *P.*	,, ,,	720	466	
Plant-beds, pumice sands, Kawaka Station, Esk River. *P.*	,, ,,	721	3	
Kawaka Hill (inland of Patea Road) (See also Petane.)	(?)	793	1	
Evans Bay. (See Wellington.)				
*Farewell, Cape, Nelson (north-east corner of South Island).				
Kaipuki Cliffs, Cape Farewell district. *Up. E.* (?)	Hector, 1867	230	13	
Fossil Point, Cape Farewell. *Oamaru formation.*	,, 1868	296	50	
Fern Gully, Mount Rowley, Upper Ashburton River, Canterbury. (See Clent Hills.)				43, 47, 53.
Flag Hill, Hokanui Hills, Southland				33, 35.
Avicula beds, Flag Hill. *J.*	McKay, 1877	333	58	
Astarte beds, top of Flag Hill. *J.*	,, ,,	336	36	
Highest *Spirifer* bed, north face of Flag Hill. *J.*	,, 1878	339	242	
Lower belemnite beds, north face of Flag Hill. *J.*	,, ,,	341	32	
Little *Spirifer* grit, north face of Flag Hill. *J.*	,, ,,	342	33	
Upper *Plagiostoma* bed, west face of Flag Hill. *L.*	,, ,,	343	29	
,, north face of Flag Hill. *L.*	,, ,,	344	133	
Upper ammonite bed, west face of Flag Hill. *L.*	,, ,,	347	8	
Overlying Cannon-ball sandstone, Flag Hill to North Peak section. *L.*	,, ,,	351	24	
Lower part of lower ammonite beds, Flag Hill to North Peak section. *L.*	,, ,,	357	63	
Plant-beds, top of Flag Hill. *J.*	Park, 1887	671	30	
Flaxbourne, Cape Campbell district, Marlborough. (Flaxbourne is now called Ward.)				
Flaxbourne. *C.-T.* or *Cret.*	McKay, 1876	265	1	
Flaxbourne River. *M.*	McKay, 1876, 1884	563	6	
(See also Cape Campbell.)				
Forest Hill Range, Southland. *Up. E.*	McKay, 1878	247	..	
Forty-mile Bush. (See Dorset's.)				
Fossil Gully, Mount Potts (= Rocky Gully *apud* McKay.) (See Mount Potts.)				40, 53.
Fossil Point, Canterbury. (See Ashburton River.)				
,, Nelson. (See Cape Farewell.)				
*Foulwind, Cape. (See Westport.)				
Fox River. (See Brighton, Nelson.)				
Gisborne district, Poverty Bay, east Auckland.				
Bryant's Farm, near Gisborne. *C.-T.* or *T.*	McKay, 1874	65	8	
Ormond. *P.*	,, ,,	212	39	
Limestone, twelve miles north of Ormond, Gisborne–Opotiki Road. *P.*	,, 1887	710	9	
Pumice sands, Gisborne–Opotiki Road. *P.*	,, ,,	711	2	
Whakamarumaru, Matapiro, Gisborne	Fulton	846	1	
Gladstone. (See Ruamahanga River.)				
Glenburn, east coast, Wellington.				69.
Golden Ridge. (See Collingwood.)				
Goodwood, near Palmerston South, Otago.				
Anderson's Farm, Goodwood Estate. *C.-T.* (See also Pleasant River.)	McKay, 1886	607	3	

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Hokanui Hills, Southland—*continued.*				
Hokanui Hills. Old mixed collections		837	21	
(See also Bastion Hill, Benmore, Dunsdale, Flag Hill, Hedgehope, Makarewa, Mandeville, Morley Creek, North Peak, Otamita River, Otapiri, Mount Peel, Taylor's.)				
Hokianga, west side, north Auckland	..	..	..	61, 66, 68.
Hokianga Harbour. *Tertiary beds*	Hector, 1874	198	..	
The Narrows, Hokianga Harbour. *C.-T.*	McKay, 1888	730	8	
Orbitolite limestone, Hokianga South Head. *M.* ..	,, ,,	733	67	
Howick, fifteen miles south-east of Auckland.				
Slate-grit bed, beach near Howick, *M.* (?)	Park, 1885 ..	533	37	
Teredo bed, beach near Howick. *M.*	,, ,, ..	534	23	
Maungamaungaroa Bridge, Howick. *C.-T.* (?)	,, ,, ..	541	693	
Hughie's old diggings, Lower Buller Gorge. *C.-T.*	McKay, 1874	15	12	
Huntly, sixty-five miles south of Auckland. (See Raglan) ..	..	..	..	62, 63.
Hunua, near Drury, Auckland	..	..	..	52.
*Hurunui River, between north Canterbury and south-east Nelson.				
Hurunui Mound. *M.* ..	Haast, 1869 ..	232	27	
*Hutchinson's Quarry. (See Oamaru.)				
*Inangahua River, Buller River, west Nelson.				
Junction Inangahua and Buller Rivers. *C.-T.*.. ..	McKay, 1874	48	94	
Ferry, Westport–Reefton Road, Inangahua River. *C.-T.*	,, ,,	49	36	
*Christie's, Inangahua Valley. *C.-T.*	,, ,,	50	29	
Isolated Hills, near Waiau, south-east Nelson.				
Isolated Hills. *Up. E.* or *M.* ..	McKay, 1885	558	18	
Central part of Isolated Hills. *M.* ..	,, ,,	565	47	
Ivitai, Mount = Puke ivitai or Puke iwi tahi.				
*Jackson's Paddock, near Oamaru.				
Janet's Peak. (See Shag Valley.)				
Jebson's Coal-mine. (See Malvern Hills.)				
Jenkin's Hill, Bishopdale, Nelson. Railway-cutting. *C.-T.* or *Low. Tert.*	McKay, 1874	62	30	
Johnston's. (See Ruataniwha Plain.)				
Judge's Bay. (See Parnell.)				
Kaeo, Whangaroa County, north Auckland	..	..	..	67, 73.
Kaeo River. *C.-T.* (?)	McKay, 1875	107	281	
Shepherd's Farm, Kaeo Run. *M.*	,, 1890	755	144	
Kaiata, north Westland	..	..	..	69.
Kaihiku, between Clinton and Balclutha, south Otago ..	..	..	..	15, 35.
Lower Kaihiku Gorge. Plants. *Perm.*	McKay, 1873	16	37	
Wairoa Series, Kaihiku Gorge. *T.*	,, ,,	75	..	
Kaihiku Series, lower part of Kaihiku Gorge. *Perm.* ..	,, ,,	131	62	
Kaihiku Gorge	Buchanan	841	19	
Kai-iwi. (See Wanganui)	..	..	..	62.
*Kaikoura, east coast, Marlborough	..	..	..	15, 54, 58.
Dark marls, extremity of Kaikoura Peninsula. *C.-T.* ..	McKay, 1876	157	1	62, 69.
Below Amuri limestone, Kaikoura Peninsula. *C.-T.* ..	,, ,,	294	5	
Grey marls, Kaikoura Peninsula. *C.-T.*	,, 1886	619	3	
Limestone quarry, Kaikoura	Captain Fraser	825	..	
Kaimanawa Range, north Wellington	..	..	..	62, 69.
Greensands under *Balanus* limestone, Birch's, Kaimanawa Range. *P.*	Park, 1886	585	255	
Plant sandstones under *Balanus* limestone, Birch's, Kaimanawa Range. *P.*	,,	586	13	
Balanus limestone, Kaimanawa Range. *P.*	,,	587	76	
*Kaipara district, north Auckland..	..	..	..	57, 59, 62-65.
Komiti Point, Kaipara. *M.*	Cox, 1880 ..	451	617	
Opposite Captain Colbeck's, Kaipara River. *C.-T.* (?) ..	,, ,, ..	465	5	
Tangiteroria, Wairoa River. *Cret.*	,, 1879 ..	467	5	
Beach, Hargreave's Run, opposite Komiti. *Up. E.* ..	Park, 1885 ..	530	25	
Strawberry Bay, Wairoa side of Komiti Peninsula. *Up. E.*	,, ,, ..	531	25	
Lower Komiti Point beds, Kaipara Harbour. *C.-T.* (?) ..	,, ,, ..	542	194	
Upper Komiti Point beds (dirt-bed). *M.*	,, ,,	543	247	
Greensands, Pahi, Kaipara Harbour. *C.-T.*	..	544	408	
Gibson's, Te Ope Creek, Pahi. *C.-T.*	Park, 1887	696	..	
Greensands below limestone, Colbeck's Landing, Pahi. *C.-T.*	,, ,,	698	104	
Limestone, Colbeck's Landing, Pahi. *C.-T.* ..	..	699	4	
Beds below hydraulic limestone, Batley. *C.-T.*	Park, 1887 ..	700	4	
Pahi greensands, Pahi Township. *C.-T.* ..	McKay, 1887	732	24	
Amuri Series, Paparoa River. *C.-T.*	,, 1888	734	8	

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*Kaipuki Cliffs. (See Cape Farewell.)				
*Kaitangata, south-east Otago	..	..	..	67, 74.
Measley Beach, near Kaitangata. *C.-T.* (?)	Hector, 1869	280	14	
Castle Hill Shaft, Kaitangata. *C.-T.*	,, 1891	759	366	
Measley Beach. *M.*	,, ,,	760	373	
Kaituna Valley, Marlborough	..	..	..	59.
Kaiwaiki. (See Wanganui River.)				
Kaiwhata River, east coast, Wellington	..	..	..	69.
*Kakahu River, south Canterbury	..	..	..	63.
Coal-beds, Kakahu River. *C.-T.*	Monro, 1869	56	..	
Weka Pass stone, Kakahu River. *C.-T.*	McKay, 1876	162	14	
Greensands overlying coal-beds, Kakahu River. *C.-T.*	,, ,,	163	21	
Coal-beds, Kakahu River. *C.-T.*	,, ,,	164	377	
Pareora beds, Kakahu River. *M.*	Park, 1885 ..	577	172	
Greensands under Weka Pass stone, Kakahu River. *C.-T.*	,, ,, ..	578	35	
Weka Pass stone, Kakahu River. *C.-T.*	,, ,, ..	579	5	
*Kakanui, south of Oamaru, north-east Otago	..	..	..	52, 70, 72
Kakanui limestone, mouth of Kakanui River. *C.-T.*	McKay, 1876	169	18	73.
Ototara limestone, Isolated Hill, north side of mouth of Kakanui River. *C.-T.*	,, 1882	489	142	
Volcanic breccia or tuff, underlying Ototara limestone, Isolated Hill. *C.-T.*	,,	490	161	
Chalk marls, left bank, Kakanui River, opposite Maheno. *C.T.*	,, ,,	498	2028	
Ototara limestone, south side of mouth of Kakanui River. *C.-T.*	,, 1886	600	87	
Maheno marls, left bank, Kakanui River, a little below Maheno. *C.-T.*	,, ,,	606	931	
Hutchinson's Quarry beds, All Day Bay, one mile south of Kakanui. *Up. E.*	,, ,,	624	41	
Pareora beds, All Day Bay. *M.*	,, ,,	625	112	
Junction between Ototara limestone and dirty greensands representing Hutchinson's Quarry beds, All Day Bay, one mile south of Kakanui. *Up. E.*	,, ,,	626	500	
Isolated Hill, Limekiln Hill, Kakanui. *C.-T.*	,, ,,	627	28	
*Kanieri River, Westland.				
Kanieri River. *M.*	McKay, 1875	154	162	
Kanieri. *M.*	Hector, 1869	227	117	
Karori. (See Wellington.)				
Kartigi Beach. (See Shag Point.)				
Katigi = Kartigi.				
Kawaka. (See Esk River.)				
Kawakawa, Bay of Islands, north Auckland	..	..	..	67, 68.
Whangarei and Kawakawa. *C.-T.*	Hector, 1866	279	5	
Kawakawa. Plants. *C.-T.*	,, ,,	417	..	
Kawakawa. *C.-T.*	Cox, 1879 ..	454	151	
Kawakawa Coal-mine. *C.-T.*	McKay, 1888	735	2	
Limestone above shell-bed, Kawakawa Coal-mine. *C.-T.*	,, 1884	748	69	
Waiomio limestone, Waiomio Creek, Kawakawa. *C.-T.*	,, 1892	777	8	
Kawakawa (roof of coal) and Whangarei (shells)	Old collections	783	14	
*Kawau Island, Hauraki Gulf, Auckland	..	..	..	60.
Kawau Island. *M.*	Hector, 1866..	257	84	
Kawau Island. *M.*	Cox, 1880 ..	548	1	
*Kawhia Harbour and district, west coast, south Auckland	..	..	..	10, 15, 16,
Kawhia Harbour. *J.*	Hector, 1866..	276	336	22, 33–41,
Motutara Bluff, north side, Kawhia Harbour. *C.-T.*	McKay, 1884	513	12	51, 61–63.
Below limestone, near Totara Point, north side Kawhia Harbour. *C.-T.*	,, ,,	515	16	
Waiherike River, south side, Kawhia Harbour. *J.*	,, ,,	516	761	
Motutara Bluff, north shore, Kawhia Harbour. *C.-T.*	,, ,,	517	18	
Flag Hill Series, south shore, Kawhia Harbour. *J.*	,, ,,	520	863	
Takatahi, south shore, Kawhia Harbour. *J.*	,, ,,	521	63	
Putataka beds, north shore, Kawhia Harbour. *J.*	,, ,,	522	117	
Bastion Series, coast between Kawhia Harbour and Albatross Point. *L.*	,, ,,	523	65	
Otapiri Series, coast between Kawhia Harbour and Albatross Point. *Rh.*	,, ,,	524	9	
Wairoa Series, coast between Kawhia Harbour and Albatross Point. *T.*	,, ,,	525	2	
Okoko, Waipa–Kawhia Road. *C.-T.*	Park, 1885 ..	526	317	
Shelly limestone, Hauturu, Waipa	,, ,, ..	527	8	
Ammonite beds, north shore, Kawhia Harbour	(?) ..	826	47	

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Kawia. (See Kawhia.)				
Kekerangu, east coast, Marlborough.				
Grey marls, Kekerangu. *C.-T.*	McKay, 1884	514	24	
Kekerangu Creek. *C.-T.*	,, ,,	519	..	
Heaver's Creek, Kekerangu. *C.-T.*	,, 1885	554	583	
Grey marls, Shades Creek, Kekerangu. *C.-T.*	,, ,,	561	8	
Kereru, forty-three miles south-west of Napier, Hawke's Bay.				
Rotella beds, Kereru. *P.*	McKay, 1877	188	973	
Limestone, Kereru. *P.*	,, ,,	189	2	
Lower beds, Kereru. *P.*	,, ,,	190	327	
*Kidnappers, Cape, south end Hawke's Bay	..	..	..	56, 58, 66.
Scinde Island limestone, Cape Kidnappers. *P.*	Hector, 1866; McKay, 1875	77	1	
,, ,, *P.*	McKay, 1875	78	99	
Marly strata, Cape Kidnappers to outlying stacks. *P.* (?)	,, ,,	79	..	
Maraetotara River, Kidnappers district. *Pleistocene*	,, ,,	120	7	
Cape Kidnappers and Te Aute Hills. *P.*	Hector, 1867..	217	60	
Under Te Aute limestone, Kidnappers section. *P.*	Hill, 1887 ..	709	2	
Fossiliferous clays, Cape Kidnappers section. *Recent*	McKay, 1886	718	11	
King-country. (See Mokau and Wanganui River)	..	..	..	64, 65.
Kiwi Creek and Range. (See Mohaka River.)				
Knight's Hut. (See Malvern Hills.)				
Kohai Point. (See Kawhia)		..		39.
Kohai River, north Canterbury. (See Kowhai River)		..		9.
Kohururu. (See Waingaro.)				
Koiterangi, fifteen miles south-east of Hokitika, north Westland	..	..	..	72.
*Komiti Point. (See Kaipara)	..	..	..	59, 62.
Kongahu, north-west Nelson	..	..	..	73.
*Korakonui, east coast, Wellington. *M.*	Hector, 1866..	121	2	
*Kowai River, Waimakariri River, Canterbury	..	..	..	35, 53.
Kowhai River, north Canterbury	..	..	..	9.
Kupakupa, Waikato, Auckland.				
Kupakupa Coal-mine. Plants. *C.-T.*	McKay, 1875	123	2	
Aotea sandstone (calcareous), between Ragan and Kupakupa. *C.-T.*	Cox, 1876 ..	268	10	
Limestone between Raglan and Kupakupa. *C.-T.*	,, ,, ..	269	3	
Kyeburn, east Central Otago	..	..	..	68.
Pareora beds, Upper Kyeburn. *M.*	McKay, 1883	493	86	
Hutchinson's Quarry beds, Upper Kyeburn. *Up. E.*	,, ,,	494	25	
Calcareous sandstones, Swinburn. *C.-T.*	,, ,,	506	11	
Lake County, western Otago	..	..	..	61.
*Landslip Hill, Clutha County, south-east Otago.				
,, Plants. *C.-T.*	Hector, 1869..	420	6	
,, Plant cherts. *C.-T.*	Park, 1886 ..	678	26	
*Limekiln Gully. (See Oamaru.)				
,, Hill. (See Kakanui.)				
Limestone Bluff. (See Ashburton River.)				
,, Island. (See Whangarei.)				
Linton. (See Morley Creek.)				
Little Ben Nevis. (See Wairoa Gorge.)				
Livingstone, thirty miles west of Oamaru	..	..		68.
Coal greensands, Livingstone line, Oamaru	Park, 1886 ..	676		
Lora Creek. (See Coal Creek and Taylor's)	..	..		45.
Lottery Creek, Waiau-ua River, south-east Nelson.				
Lottery Creek, Sherwood, Amuri district. *M.*	McKay, 1885	551	175	
Lottery Creek, Sherwood Forest, Amuri district. *M.*	,, ,,	556	288	
West branch of Lottery Creek, Amuri district. *Up. E.*	,, ,,	557	108	
Lower Gorge of Lottery Creek, Amuri district. *M.*	,, ,,	562	2	
(See also Waiau-ua River.)				
Lyell, Buller River, south-west Nelson.				
One mile below Lyell, Buller River	(?) Hector, 1869	274	15	
Lyndon, Waiau-ua River, south-east Nelson.				
Bluff Paddock, Dog Creek, Lyndon Station, Amuri district, Nelson. *M.*	McKay, 1885	564	3	
*Lyndon Lake, West Coast Road, Canterbury. *M.*	Hector, 1872..	234	25	
*Maerewhenua. (See Waitaki River.)				
Maharahara. (See Woodville.)				
Maheno. (See Kakanui.)				
Mahia Peninsula, north end, Hawke's Bay.				
Raised beach, Mahia Peninsula. *Recent*	McKay, 1887	689	1420	
Mahia township, Mahia Peninsula. *C.-T.*	,, ,,	704	16	
Mahurangi (Warkworth), thirty-two miles north of Auckland..	..	..	..	61.

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Maungakuri River, Hawke's Bay.				
Mouth of Maungakuri River. *Cret.* ..	McKay, 1875	85	18	
Maungatawa. (See Mokau River.)				
McLean's. (See Ngarururo River.)				
McRae's. (See Coal Creek and Makarewa)				45.
Measley Beach. (See Kaitangata.)				
Mercer, Waikato, forty-three miles south of Auckland.				
Mercer marls. *C.-T.*	McKay, 1875	101	65	
Mikonui River, south Westland	..	..	..	68, 72.
Miramar Peninsula, Wellington	..	..	..	56.
Miranda, Firth of Thames, Auckland.				
Leda marls, Miranda Redoubt. *C.-T.*	McKay, 1875	100	2	
Moehau, Coromandel. Coal-beds	..	829	14	
Moeraki. (See Hampden)	..	..	..	55, 62, 64, 70.
*Mohaka River, Hawke's Bay.				
Mohaka River. *M.*	Hector, 1871	453	218	
Kiwi Range, north side of Mohaka Valley	McKay, 1885	573	160	
Napier–Taupo Road. *M.*	,, ,,	575	39	
Mohaka Crossing, Te Purutu Creek. *M.*	,, 1887	680	842	
Pumice sands, mouth of the Mohaka River. *P.* ..	,, ,,	687	210	
New diggings below Mohaka Crossing, Mohaka River. *M.*	..	832	44	
Kiwi Creek, above crossing of Mohaka River	..	838	..	
Mokau River and district, west coast, south Auckland ..	..	..	..	59, 62, 73.
Greensands under Mokau limestone, Mokau Valley. *C.-T.*	Park, 1886 ..	584	61	
Coal greensands, Mokau River. *C.-T.*	,, ,, ..	646	21	
Limestone near Totoro, Mokau River. *C.-T.*	,, 1887 ..	655	1	
Yellowish clays, Mokau Gorge, near Totoro. *C.-T.* ..	,, ,, ..	656	5	
Limestone, Te Ruangaruhe, near Totoro. *C.-T.* ..	,, ,, ..	657	5	
,, Wairere Falls, Upper Mokau. *C.-T.* ..	,, ,, ..	658	2	
,, on range, head of Mangatawa, Mokau River. *C.-T.*	,, ,, ..	664	..	
(See also King-country, Awakino River.)				
*Mokihinui River, west coast, Nelson	..	..	..	64, 74.
Inland of White Rock Point, four miles north of Mokihinui River. *Cret.*	McKay, 1874	34	45	
Brewery Creek, Mokihinui River. *Tertiary* ..	,, ,,	44	199	
*White Rock Point, north of Mokihinui. *C.-T.* or *M.*	,, ,,	55	6	
Source of Mokihinui River. *C.-T.*	Hector, 1867	278	9	
Between Ngakawau and Mokihinui Rivers. *C.-T.*	,, 1871	281	3	
Between West Wanganui and Mokihinui. *C.-T.*	,, 1866	637	33	
Mongonui. (See Mangonui)	..	..	..	67, 68.
Moonlight Range. (See Oreti River.)				
*Morley Creek, Southland	..	..	..	54.
Tertiary beds of coal series, Morley Creek ..	Hector, (?) 1869	30	5	
Morley Creek. *L.*	,, 1869	144	26	
Morley Creek and Linton. Plants	,, ,,	427	2	
Morrison's. (See Whangarei.)				
Morrison's Taipo. (See Taipos.)				
Motanau. (See Motunau.)				
*Motueka River, Nelson	..	..	..	59.
*Sherry River, Wangapeka River. *C.-T.*	Hector, 1867	215	6	
*Wangapeka. Plants. *Cret.*	,, 1868	413	181	
Graham River, Motueka Valley. *Up. S.*	McKay, 1879	444	4	
Dart River, Wangapeka Valley. *Up. S.*	,, ,,	445	59	
Rolling River, Wangapeka Valley. *Up. S.*	,, ,,	446	..	
,, ,, *Up. S.*	,, ,,	447	2	
Source of the Clarke River, Wangapeka Valley. *Up. S.* ..	,, ,,	448	17	
Coal shales, Upper Wangapeka, four miles from saddle. Plants. *C.-T.*	Park, 1888 ..	726	87	
Wangapeka River. Plants. *C.-T.* ..	Hector, 1868	789	7	
(See also Baton River.)				
*Motunau, north Canterbury (also spelt "Motanau") ..	..	..	..	59, 60.
Motunau. *M.*	Buchanan, 1867	218	202	
Motunau. *Recent*	,, ,,	219	71	
Chalk marls, Happy Valley Creek, Motunau Flat. *C.-T.* ..	McKay, 1882	503	32	
Pareora beds, Motunau Flats. *M.*	,, ,,	504	35	
*Motutapu Island, Hauraki Gulf, Auckland	..	..	..	70.
Tertiary beds, Motutapu Island. *M.*	Park, 1887	695	43	
*Motutara. (See Kawhia)	..	..	..	37, 38.
*Mueller Glacier, near Mount Cook, Canterbury	..	..	..	41.
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Watchman's Island, Napier Harbour ..	Williams, 1878	222	81	63, 65, 66
Western side of Napier Harbour ..	Hamilton, 1886	713	11	69, 75.
(See also Petane, Scinde Island.)				
Naseby, Central Otago.				
Limonitic sandstone, Government dam, Mount Ida Water-race, Naseby. *C.-T.*	McKay, 1883	488	159	
Greensands from prospecting-shaft, Naseby	Hector, 1890	753	44	
NELSON (town and province)	..	..	..	10, 15, 30–
CENTRAL. (See Aniseed, Baton, Cheviot, Dun, Eighty-eight, Jenkin's, Maitai, Motueka, Richmond, Wairoa)				32, 38, 49, 52, 54, 55,
NORTH-WEST. (See Anatori, Aorere, Collingwood, Farewell, Kongahu, Pakawau, Takaka, Tata Island, West Wanganui.)				58, 59, 63, 64, 68, 71.
SOUTH-EAST (Amuri district). (See Black Birch Creek, Conway, Culverden, Isolated Hills, Lottery Creek, Lyndon, Mason River, Waiau-ua River)		..		55, 62, 62, 64, 66, 67.
SOUTH-WEST. (See Brighton, Buller, Greymouth, Inangahua, Lyell, Mokihinui, Westport)				68.
New Plymouth, Taranaki		..		69, 73, 74.
*New River, Westland.				
Mount Reilly, New River. *M.* ..	McKay, 1874	210	..	
New River. *M.*	Hector, 1869	211	16	
Ngakawau. (See Mokihinui)				
Ngapara, west of Oamaru, north-east Otago	..	..	..	
Concretions with fossils, overlying coal-beds, Ngapara. *C.-T.*	McKay, 1882	487	147	65.
Maorewhenua limestone at crossing of Awamoko Creek, north of Ngapara. *C.-T.*	,, ,,	496	25	
(See also Oamaru.)				
*Ngaruroro River, Hawke's Bay.				
McLean's, Ngaruroro. *P.*	Hector, 1871	231	40	
(See also Shrimpton's.)				
Nine-mile Bluff. (See Greymouth.)				
Norsewood, north Wellington.				
Two to three miles south of Norsewood, Woodville Road. *P.*	McKay, 1877	183	..	
North Cape, north Auckland	..	..	..	
Corallino limestone, Tom Bowline Bay, North Cape. *M.*	McKay, 1892	787	6	73.
(See also Parengarenga.)				
North Peak, Hokanui Hills, Southland.				
Overlying Cannon-ball sandstone, Flag Hill to North Peak section. *L.*	McKay, 1878	351	24	
Lower part of lower ammonite beds, Flag Hill to North Peak section. *L.*	,, ,,	357	63	
Ash-beds, North Peak section. *Perm.*	,, ,,	377	7	
Spirifer and Crinoid beds, North Peak. *Perm.*	,, ,,	381	318	
Nugget Point, south-east Otago	..	..	..	15, 16, 33,
Nugget Point. *T.*	Hector(?), 1869; McKay, 1873	133	1081	37–39, 56, 71.
Wiltshire Beach, Molyneux Bay. *Perm.*	McKay, 1873	134	87	
Between Nugget Point and Cannibal Bay. *L.*	,, ,,	147	34	
Nugget Point. *T.*	Buchanan, 1866	161	122	
Nugget Point to Catlin's River. *T.*	McKay, 1873	801	14	
Nukumaru. (See Waitotara.)	..	..	..	62.
*Oamaru, north-east Otago	..	..	..	14, 17, 51,
Cape Wanbrow and coast to Oamaru Breakwater. *Up. E.*	McKay, 1876	171	..	55–58, 64,
Hutchinson's Quarry, Oamaru. *Up. E.*	,, ,,	172	1593	66, 67, 69,
Limekiln Gully, Oamaru. *Up. E.*	,, ,,	173	58	70, 71.
Devil's Bridge, Oamaru Creek. *C.-T.*	,, ,,	174	77	
One mile south of Devil's Bridge, Oamaru Creek. *M.* (?)..	,, ,,	175	293	
Cape Hills, Oamaru	Traill, 1874 ..	255	5	
Waireka Valley, Oamaru. *C.-T.*	McKay, 1876	288	..	
Cape Hills at breakwater, Oamaru. *Recent*	,, ,,	299	..	
Oamaru. *Oamaru formation*	Hector, 1876	308	109	
Interbedded with volcanic rocks, Oamaru Creek. *Up. E.*..	McKay, 1876	310	43	
South-west side of Cape Hills, Oamaru. *Oamaru formation*	,, ,,	312	54	
Hutchinson's Quarry beds, Oamaru Creek. *Up. E.* ..	,, 1882	491	166	
Hutchinson's Quarry beds, Cape Wanbrow Hills, at northern end of Awamoa Beach. *Up. E.*	,, ,,	492	72	
Oamaru limestone, Cape Valley, Oamaru. *C.-T.* ..	,, ,,	495	118	
Marls under Ototara limestone, Cape Hills, at northern end of Awamoa Beach. *C.-T.*	,, ,,	499	25	
Under Ototara limestone, Cave Valley, Oamaru. *C.-T.* ..	,, 1883	500	..	
Teaneraki (Enfield), Oamaru	Esdaile ..	630	48	

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*Oamaru, north-east Otago—*continued.*				
Tachylite breccias, Oamaru Breakwater. *Up. E.* ..	Park, 1886 ..	674	1	
Waireka tufas, Teaneraki, Waireka Valley. *C.-T.* ..	„ „ ..	675	7	
Radiolarian and diatomaceous ooze, Cave Valley. *C.-T.*...	McKay ..	785	510	
Ototara stone, Oamaru	..	827	1	
Cave Valley and Upper Waireka Valley, from chalk ooze and tufaceous greensands	Esdaile ..	831	157	
South-west of Cape Hills, Oamaru. *Pleistocene.* ..		839	41	
(See also Kakanui, Livingstone, Ngapara, Pukeuri, Waitaki River.)				
Ohau, Lake, Canterbury. Annelid beds. *Carb.* ..	McKay, 1879	808	..	
Okarita (Okarito) district, Westland	..	..	..	54.
Okehu, north-west Wellington	..	..	..	62.
Okoko. (See Kawhia.)				
Okuku River, Ashley River, north Canterbury	..	..	..	59.
Okuku. *T.*	McKay, 1874	151	7	
Monotis beds, The Brothers, Okuku Range. *T.*... ..	„ 1879	455	134	
White Rock Quarries, Okuku River	..	816	22	
Omoeroa River, south Westland	..	..	..	54.
Onairo. (See Waitara.)	..	..	..	74.
Onakaka. (See Collingwood.)				
Onehunga, Manukau Harbour, eight miles south-east of Auckland.				
Calcareous greensands, Onehunga. *M.*	Park, 1885 ..	535	14	
Teredo bed, Onehunga. *M.*	„ „	536	..	
Onekakara Beach = Hampden, *q.v.*	..	..	..	9, 51, 52.
Ongaruhe River, Wanganui River, west of Lake Taupo, Auckland.				
Yellow sandy clays, Ongaruhe Valley. *C.-T.*	Park, 1887 ..	651	27	
Greensands, Ongaruhe Valley. *C.-T.*	..	652	23	
(See also Wanganui River.)				
*Opotiki, Bay of Plenty, Auckland ..	..	..	..	57, 68.
Tertiary beds, Opotiki. *Up. E.* (?) ..	Cox (?), 1876	812	9	
(See also Gisborne.)				
Opunga, Kawhia County, Auckland ..	..	..	..	41.
*Orakei Bay, near Auckland	..	..	..	52, 54, 62.
Orakei Bay. *C.-T.*	Hector, 1866..	297	..	
„ *C.-T.* (?)	Park, 1885 ..	540	326	
Orepuki Stream. (See Hokanui Hills.)				
Orepuki, Tewaewae Bay, Southland. *M.*	Hector, 1891..	756	2	
Oreti River, Southland	..	..	..	33, 35.
Moonlight Range, Oreti watershed. *T.*	Hutton, 1872	138	79	
Castle Rock, Oreti Valley. *Oamaru formation*	McKay, 1878	245	3	
Oreti railway-cutting, Dipton, Oreti Valley. *Rh.* ..	„ „	372	32	
Monotis sandstone, Oreti Railway-station. *T.*... ..	„ „	373	162	
Railway-cutting, north of Oreti Railway-station. *T.* ..	„ „	376	82	
Spirigera beds overlying big conglomerate, Oreti Valley. *Perm.*	„ „	379	39	
Spirifer and Crinoid beds, near Cowan's Railway-station, Oreti Valley. *Perm.*	„ „	380	974	
Ormond. (See Gisborne.)				
Ormondville, sixty-six miles south of Napier, Hawke's Bay.				
West slope of Puketoi Range, opposite Ormondville. *M*...	Hamilton, 1906	800	47	
OTAGO PROVINCE ..				10, 54, 56, 71.
CENTRAL OTAGO. (See Bannockburn, Cromwell, Dunstan, Kyeburn, Manuherikia, Naseby)				62, 68.
EAST OTAGO. (See Bobby's Head, Brighton, Caversham, Chain Hills, Dunback, Dunedin, Goodwood, Green Island, Green Valley, Hawksbury, Palmerston, Pleasant River.)				
NORTH-EAST OTAGO. (See Awamoa, Hampden, Kakanui, Livingstone, Mount St. Mary, Ngapara, Oamaru, Otepopo, Ototara, Pukeuri)		..		60, 61.
SOUTH-EAST OTAGO. (See Bloody Jack's Island, Catlin's River, Kaihiku, Kaitangata, Landslip Hill, Nugget Point, Owaka, Pomahaka, Popotunoa, Puerua)		..		57.
WEST OTAGO. (See Wakatipu.)				
Otamita River, Hokanui Hills	..	..	..	15.
Otapiri Creek, Hokanui Hills, Southland	..	..	..	46, 54, 75.
Otapiri Creek. *L.*	Hector, 1869..	145	34	
Grey marls, Otapiri Creek. *C.-T.* (?)	McKay, 1878	256	69	
Astarte beds, lower end of Otapiri Gorge. *J.* ..	„ 1877	334	8	

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Otapiri Creek, Hokanui, Hills, Southland—*continued.*				
Highest *Spirifer* beds, Conical Hill, Otapiri Gorge. *J.* ..	McKay, 1878	337	103	
Highest *Spirifer* beds, tableland above Tree Bluff, Otapiri Gorge. *J.*	,, ,,	338	361	
Middle ammonite beds, Otapiri Creek. *L.*	,, ,,	352	440	
Lower ammonite beds, junction of Taylor and Otapiri Creeks. *L.*	,, ,,	355	101	
Below lower ammonite beds, junction of Taylor and Otapiri Creeks. *L.*	,, ,,	356	9	
Taylor's Crossing, Otapiri Creek. *Rh.*	,, ,,	362	75	
Banks of Otapiri, one mile above Taylor's Crossing. *Rh.* ..	,, ,,	367	73	
Otapiri Creek. *J.*	Hector, 1869..	407	..	
Plant-beds, Coal Creek, Otapiri Gorge. *J.*	Park, 1887 ..	670	21	
,, Otapiri Gorge, near Conical Hill. *J.* ..	,, ,, ..	672	20	
Highest *Spirifer* grit, Otapiri Gorge. *J.*	,, ,, ..	673	4	
Otapokiore. (See Wanganui, Upper.)				
*Ototara. (Probably same as Totara, near Oamaru) ..	..	..		9, 51.
Otekaike. (See Waitaki River.)				
Otepopo River, north-east Otago. *C.-T.*	McKay, 1878	168	10	
Owaka (Owake) Creek, Catlin's River, south-east Otago ..	..	..	..	15.
Old Mill, Owaka Creek. *J.*	McKay, 1873	19	183	
Owaka Creek. Plants. *J.*	Hector, 1865	408	99	
Owen River, Upper Buller River, Nelson	..	..	..	66.
Coal shales, Owen River	Park, 1888 ..	727	13	
Oxford, central Canterbury	..	..	..	60, 66.
Pahi. (See Kaipara)	..	..	..	62.
Pahua (Pahaoa) River, east coast, Wellington.				
Mouth of Pahua River. *Cret.*	..	842	..	
Pakaraka, north Auckland	..	..	..	66, 67.
Greensands, east of Pakaraka. *C.-T.*	McKay, 1890	751	11	
Diatomaceous deposit, Pakaraka	,, 1892	819	4	
*Pakawau, Collingwood County, north-west Nelson	..	..	..	46, 48, 54.
Pakawau Coalfield. Plants. *Cret.*	Hector, 1868..	410	26	
Greensand, Riley's Creek, Pakawau. *C.-T.*	Park, 1889 ..	747	32	
Palliser Bay. (See Ruamahanga River.)				
Palliser Cape, south-east Wellington. *Oamaru formation* ..		840	5	
Palmerston, Otago. (See Bobby's Head, Goodwood, Pleasant River, and Shag Valley.)				
Paonui Point. (See Pourerere.)				
*Papakura, nineteen miles south of Auckland ..	..	..	..	71.
Papakura limestone, Slippery Creek. *C.-T.* ..	Park, 1885 ..	537	97	
Papakura limestone, Waikohu Creek. *C.-T.* ..	,, ,, ..	538	23	
*Paparoa. (See Wanganui River.)				
Parapara, north-west Nelson	..	..		72.
Pararoa. (See Kaipara.)				
Parengarenga, North Cape district, north Auckland	McKay, 1892	766	12	51, 73.
*Pareora River, south Canterbury.				
White Rock River, Upper Pareora Valley. *M.*.. ..	McKay, 1876	165	1258	
Clays, lower gorge of the Pareora River. *M.*	,, ,,	166	92	
Coal-beds, lower gorge of the Pareora River. *C.-T.* ..	McKay, 1876; Enys, 1879	167	15	
Lower gorge of the Pareora River. *M.* ..	Enys, 1879 ..	458	228	
Coal rocks, Pareora River	McKay ..	784	25	
Parikino. (See Wanganui River.)				
Parimoa = Awamoa, *q.v.*				
Parnell, suburb of Auckland.				
Parnell grit, Judges Bay. *M.* ..	Park, 1887 ..	701	..	
Parua Bay. (See Whangarei.)				
*Patea, north-west coast, Wellington.				
Blue clays, Patea. *P.*	Park, 1886 ..	644	11	
Patea and Waitotara	Old collections	794	2	
Peel, Mount, Hokanui Hills, Southland.				
Astarte beds, road-cutting, north side, Mount Peel. *J.* ..	McKay, 1877	335	1	
*Petane, seven miles north-west of Napier (on Esk River), Hawke's Bay	..	..	..	60–62, 65, 66.
Shelly limestone, Petane. *P.*	Cox, 1876 ..	220	76	
Sandy clays below limestone, Petane. *P.*	,, ,, ..	221	549	
Clays under limestone, Petane. *P.*	McKay, 1887	690	..	
Limestone, Petane. *P.*	,, ,,	691	180	
First limestone bluff on beach north of Petane. *P.* ..	,, ,,	719	5	
Upper band of Petane limestone, Lower Esk to Petane Hotel. *P.*	,, 1886	720	466	
Collection of Petane and Scinde Island fossils	Hamilton, 1884	736	335	

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Picton, Queen Charlotte Sound, Marlborough	..	..	..	59.
Shakespeare Bay and Elevation, near Picton. *C.-T.* ..	Hector, 1865; Hutton, 1873; McKay, 1874	57	71	
Conglomerates, west side Picton Bay. *C.-T.* ..	McKay ..	790	1	
Pigeon Rock. (See Waitaki.)				
Pipiriki. (See Wanganui River.)				
Pirongia, 108 miles south of Auckland ..		..		62.
Pleasant River, east Otago.				
Seaward Ridge, south of Pleasant River mouth. *Up. E.*	McKay, 1886	602	4	
Middle mountain, source of Pleasant River. *C.-T.* ..	,, ,,	603	1	
Calcareous sandstone, Tumai. *C.-T.*	,, ,,	605	44	
Coast between Pleasant River and Waikouaiti Bay. *C.-T.*	Hector, 1891	764	2	
(See also Bobby's Head, Goodwood, Hawksbury.)				
Plenty. (See Bay of Plenty.)				
Pohangina River. (See Manawatu River.)				
Pohui, twenty-six miles north-west of Napier, Hawke's Bay ..	..	..	..	66.
Pohui limestone, Napier–Taupo Road. *M.*	McKay, 1885	575	39	
Te Waka Range, north-west of Pohui. *M.*	,, 1887	703	118	
*Pomahaka River, Clutha River, south-east Otago. *M.* ..	Hector, 1869	329	140	
Popotunoa Gorge, south-east Otago.				
East end, Popotunoa Gorge. *L.*	McKay, 1879	472	..	
Porangahau Creek. (See Ruataniwha Plain.)				
Porirua. (See Wellington.)				
*Port Hills, near town of Nelson. *M.* ..	McKay, 1874	319	167	
Porter River. (See Trelissick Basin.)				
Potato Gully. (See Mount Potts.)				
*Potts, Mount, Rangitata River, south Canterbury	..	..	..	10, 15–17,
Spirifer beds, Mount Potts. *T.*	Haast, 1872; McKay, 1872	136	84	21, 38, 40, 44–48, 53.
Spiriferina and Reptilian beds, Mount Potts. *T.* ..	McKay, 1877	401	226	55, 57, 58.
Glossopteris beds, head of Tank Gully, Mount Potts. *T.*	,, ,,	402	8	62, 63, 67, 71.
Pourerere River, south of Cape Kidnappers, Hawke's Bay.				
Paonui Point, Pourerere. *Cret.*	McKay, 1875	84	9	
Mouth of the Pourerere River. *Up. E.*	,, ,,	86	7	
Nummulitic limestone, Paonui Point. *Up. E.*	,, ,,	87	12	
Pourerere River. *M.*	,, ,,	113	124	
,, *Cret.*	,, ,,	114	41	
Flanks of Castle Range, west of Pourerere	..	115	4	
Poverty Bay, east Auckland	..	..	..	57, 70.
*Poverty Bay	Prior to 1874	60	182	
McDonald's section, north side of Poverty Bay. *Cret.* ..	McKay, 1874	90	4	
Grey marls, Cuff's, oil-spring district, Poverty Bay. *C.-T.*	,, ,,	307	11	
(See also Gisborne, Turanganui, Whangara.)				
Preservation Inlet, south-west corner, Otago	..	..	..	15, 68.
Sailor's Creek, No. 2. Graptolite beds..	McKay, 1895–6	804	21	
Puerua River, Clutha River, south-east Otago (also referred to as Purerua River).				
Lower gorge of the Puerua River, *Halobia* beds. *T.* ..	McKay, 1873	17	88	
,, ,, *Spirigera* beds. *T.* ..	,, ,,	18	217	
Upper gorge of the Puerua River. *T.*	,, ,,	135	272	
Puke Ivatai = Puke iwi tahi.				
Puke iwi tahi. (See Shag Point.)				
Pukerau, forty-nine miles north of Invercargill, Southland ..		..		61.
Puketapu. (See Shag Valley.)				
Puketitiri, twenty-five miles north-west of Napier, Hawke's Bay		..		69.
Puketoi. (See Ormondville.)				
Pukeuri, six miles north of Oamaru. *Oamaru formation* ..	Traill, 1874 ..	253	47	
Puponga Point. (See Collingwood.)				
Purerua River. (See Puerua River.)				
Putataka, Maori name for Waikato Heads.				
*Puti Point, Kawhia. (See Kawhia.)				35, 37.
Quail Flat. (See Clarence River.)				
Queen Charlotte Sound, Marlborough	..	..	..	59.
Queenstown, Lake Wakatipu, Otago	..	..	..	73.
*Radiant, Mount, west coast, Nelson	..	..	..	73.
*Raglan, Whaingaroa Harbour, south-west coast, Auckland ..	..	..	..	51, 56, 57,
Raglan. *C.-T.*	Hector, 1866; McKay, 1875	43	8	62, 63.
Hakarimata Range, Raglan County. *T.* ..	Cox & McKay, 1875	82	32	
Plastic clays, Raglan. *P.* or *Pleistocene*	Ditto ..	96	6	
Limestone on coast, five miles north of Raglan. *Up. E.* ..	,, ..	97	80	

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*Raglan, Whaingaroa Harbour, south-west coast, Auckland—*continued.*				
Brown sandstone and flaggy limestone, north side of Whaingaroa Harbour, opposite Raglan. *C.-T.*	Cox & McKay, 1875	98	564	
Leda marls, north side of harbour, Raglan. *C.-T.*	Ditto	99	134	
*Coralline limestone, Raglan. *C.-T.*	,,	112	61	
(See also Mercer.)		528	154	
Rainy Creek. (See Nelson).				
*Rakaia River, central Canterbury	..	..	..	56, 57, 60.
Redcliff, Rakaia River. Upper part	McKay, 1874	325	7	
,, ,, Lower part. *Up. E.*	,, ,,	326	24	
(See also Curiosity Shop.)				
Rangitauma Hill. (See Masterton.)				
*Rangitikei River, north Wellington	..	..	..	66.
Hautapu Falls, Rangitikei River. *M.*	Hector, 1870	260	1	
Raukokore, Bay of Plenty, east Auckland, shelly limestone. *M.*	McKay, 1887	682	9	
*Redcliff. (See Rakaia River.)				
Redman's Creek, near Ross, north Westland	..	..	..	56.
*Reefton, Inangahua River, south-west Nelson	..	..	..	15, 17, 31,
Beds overlying coal, Rainy Creek, Reefton. *Cret.* ..	McKay, 1874	38	6	32, 56–58,
Rainy Creek, Reefton. *Dev.*	,, ,,	129	71	61, 65.
Lankie's Gully, Reefton. *Dev.* ..	,, ,,	130	1272	
Coal-beds, Reefton. Plants. *C.-T.* ..	,, 1882	508	19	
Reilly, Mount. (See New River.)				
*Richmond, south-west of Nelson town	..	..	..	10, 15, 36,
Richmond Hill. *T.*	Old collections	139	23	37, 39, 43.
Rochfort, Mount. (See Westport.)				
Roding River. (See Wairoa Gorge.)				
*Rodney, Cape, north Auckland	..	..	..	60.
Cape Rodney. *M.*	Hector, 1866; Cox, 1879	246	50	
,, *M.*	Cox, 1880 ..	450	266	
Rolling River. (See Motueka River.)				
Roparua, East Cape district, Auckland.				
Roparua and Tuparoa. *Cret.* ..	McKay, 1874	88	33	
Ross, Westland.				
Rocks in gold-workings, three miles south of Ross. *M.* ..	McKay, 1875	155	133	
Royal, Mount. (See Bobby's Head.)				
Rowley, Mount. (See Clent Hills)				43, 47, 53.
Ruamahanga River, Wairarapa, Wellington.				
Taueru River, Wairarapa. *Up. M.*	McKay, 1875	94	478	
Ruamahanga River. *Up. P.*	Buchanan, 1872	108	31	
Ferry at Gladstone, Ruamahanga River. *P.*	McKay, 1883	545	354	
Cliffs at mouth of Ruamahanga River, Palliser Bay. *P.*..	,, 1882	749	75	
Ruataniwha Plain, Upper Tukituki River, Hawke's Bay.				
Porangahau Creek, Ruataniwha Plain. *P.*	McKay, 1877	184	47	
*Johnston's, Ruataniwha Plain. *P.*	,, ,,	185	25	
Under Te Aute limestone, south-east corner, Ruataniwha Plain. *P.*	,, 1886	693	15	
Limestone, east of Takapau, Ruataniwha Plain. *P.* ..	,, 1887	708	13	
Tukipo beds, Tukipo River, Ruataniwha Plain. *P.* ..	Hill ..	773	22	
Tertiary beds, south-east corner, Ruataniwha Plain, above Porangahau Creek	McKay ..	795	1	
(See also Tukituki River.)				
Sailor's Creek. (See Preservation Inlet.)				
Scinde Island, Napier, Hawke's Bay. (Not an island.) ..	..	..	..	63.
Scinde Island limestone, Scinde Island. *P.*	Hector, 1866	80	8	
Scinde Island. *P.*	McKay, 1877	194	305	
Upper shelly limestone, Scinde Island. *P.*	,, 1885	574	34	
Lowest beds, Scinde Island. *P.*	,, ,,	576	15	
Lower limestone, Scinde Island. *P.*	,, 1887	702	191	
Collection of Petane and Scinde Island fossils. *P.* ..	Hamilton, 1884	736	335	
Scinde Island beds. *P.*	Hill ..	774	22	
Upper limestone, Scinde Island	Old collection	781	9	
Between limestones, Scinde Island	Hamilton ..	834	87	
(See also Napier.)				
Scrogg's Hill, near Saddle Hill, Dunedin.				
Scrogg's Hill. *C.-T.*	McKay, 1886	609	4	
Seaward Downs, Southland. *J.*	Hector, 1868	403	..	
Sellen's. (See Eighty-eight Valley and Wairoa River.)				
Selwyn County. (See Trelissick Basin.)		..	..	60.
Selwyn River. (See Malvern Hills.)				

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(See New Plymouth, Stratford, Tangarakau, Urenui, Waitara, Wanganui River, Whenuakura.)				
Tata Island, north-west Nelson.				
Tata Island. *Up. E.*	Hector, 1868 (?)	302	45	
Limestone, Tata Island. *C.-T.*	,, 1887	662	26	
Tauern River. (See Ruamahanga River)	..	..	..	56.
Taupiri. (See Waikato.)				
Tautuku, south-west of Catlin's River, Otago. *L.*	Hector, 1869	146	16	
*Taylor's Creek, Hokanui Hills, Southland	..	..	..	37, 50.
Highest *Spirifer* bed, Upper Lora Stream, near Taylor's. *J.*	McKay, 1878	340	8	
Saddle between Taylor's Creek and Lora Station. *L.* ..	,, ,,	346	8	
Middle ammonite beds, slopes of Bare Hill, behind Taylor's, Lora Stream. *L.*	,, ,,	353	46	
Lower ammonite beds, Taylor's Creek, at junction of south branch, Flag Hill to North Peak section. *L.*	,, ,,	354	45	
Lower ammonite beds, junction of Taylor's Creek with the Otapiri. *L.*	,, ,,	355	101	
Lowest part of lower ammonite bed, Taylor's Creek, below the woolshed. *L.*	,,	358	224	
Lower Cannon-ball sandstone, Taylor's Creek. *Rh.* ..	,, ,,	359	125	
Below Cannon-ball sandstone, Taylor's Creek. *Rh.* ..	,, ,,	360	51	
North-west branch of Taylor's Creek, higher up than outcrop of *Trigonia* beds. *Rh.*	,, ,,	361	66	
Trigonia beds, north-west branch of Taylor's Creek. *Rh.*	,, ,,	364	24	
Blue sandstone, north-west branch of Taylor's Creek. *Rh.*	,, ,,	365	2	
Blue sandstone and chert, main branch of Taylor's Creek. *Rh.*	,, ,,	366	66	50.
Lowest bed, Otapiri Series, south-west branch of Taylor's Creek. *Rh.*	,,	370	38	
Monotis sandstone, north-west branch of Taylor's Creek. *T.*	,, ,,	375	5	
Taylor's Creek. Plants. *L.*	,, ,,	404	..	
Plant-beds below upper conglomerate, at waterfall, Lora Creek. *J.*	Park, 1887 ..	666	6	
Te Anau, Lake, Southland	..	..	..	58.
Lake Te Anau. *M.*	Cox, 1878 ..	553	7	
,, *M.*	McKay, 1878	805	29	
,, *Up. E.* or *C.-T.* ..	,, ,,	806	6	
Teaneraki. (See Oamaru)	..	..	..	65.
*Te Aute, Hawke's Bay.				
Shell limestone, Stokes's Run, Te Aute. *P.* ..	McKay, 1877	187	36	
Cape Kidnappers and Te Aute Hills. *P.* ..	Hector, 1867	217	60	
Ostrea ingens limestone, Te Aute. *P.*	Park, 1888 ..	737	1	
Te Aute limestone. *P.*	Old collection	770	5	
Te Aute. *P.*	Hamilton ..	833	24	
(See also Cape Kidnappers, Waipawa.)				
*Te Awaiti, east coast of Wellington. *M.*	Old collections	813	3	
Te Kahu, Bay of Plenty. *Recent.*	McKay, 1887	705	14	
Te Karaka, south side of Manukau Harbour, Auckland.				
Brown sands and gravels, Te Karaka. *P.*	Park, 1885 ..	532	105	
Te Kopanga, Patangata County, Hawke's Bay	..	830	12	
Ten-mile Creek. (See Greymouth.)				
Te Raungaruhe. (See Mokau.)				
Terawhiti. (See Wellington.)				
Teremakau (Taramakau) River, North Westland ..		..		68.
Te Waka. (See Pohui.)				
Te Whareponga, East Cape district, Auckland. *Tertiary.* ..	McKay, 1874	72	63	
Thames River, east Auckland	..	..	..	60.
Thomas River. (See Trelissick Basin.)				
Tiraumea, east Wellington		..	..	68.
Tokomairiro (Milton), thirty-five miles south-west of Dunedin, Otago.				
Tokomairiro limestone, Waihola Gorge. *C.-T.*	McKay, 1873	40	73	
Black limestone, Tokomairiro. *C.-T.*	Rayer, 1863 ..	41	5	
Tokomaru, East Cape district, Wellington.				
North side, Tokomaru Bay. *M.*	McKay, 1874	223	..	
Duncan's, between Tolago and Tokomaru Bays. *Up. M.* (?)	,, ,,	249	1417	
Tokomaru Bay. *C.-T.*	,, ,,	287	21	
Tolago Bay, East Cape district, Wellington.				
Cook's Cove, Tolago Bay. *M.*	McKay, 1874	328	41	
(See also Tokomaru.)				
Tom Bowline Bay, North Cape district, north Auckland ..	..	..	..	73.
Coralline limestone, Tom Bowline Bay. *M.*	McKay, 1892	787	6	

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Torehine, Coromandel	..	..	..	72.
*Torlesse, Mount, central Canterbury	..	..	..	41, 71, 72.
Annelid beds, Mount Torlesse. *Carb.*	Hector, 1869	429	2	
Totara (Ototara). (See Oamaru)	..	..	..	9.
Totara Point, Auckland. (See Kawhia.)	..	..	..	40.
,, north Auckland. (See Whangaroa.)				
Totoro. (See Mokau.)				
*Trelissick Basin, Castle Hill, sixty-four miles north-west of Christchurch, Canterbury. (Also spelt "Tressilac," "Trelissic")		..		17, 46, 56, 59, 60, 64.
Saurian beds, Trelissick Basin. *Cret.*	Enys and Hector, 1872; McKay, 1874	67	42	
Upper Trelissick. *M.*	Enys and Hector, 1872	226	94	
Plant-beds, Christchurch – West Coast Road, at crossing of the Thomas River, Trelissick Basin. *M.* (?)	McKay, 1874	235	..	
Pareora beds, Thomas and Porter Rivers. *M.*	,, ,,	236	1	
Upper part of Mount Brown limestone, Trelissick Basin. *Up. E.*	,, 1879	237	59	
Mount Brown limestone, Coleridge Creek, Trelissick Basin. *Up. E.*	Enys 1866, 1879	238	13	
Fan coral beds, Porter and Thomas Rivers, Trelissick Basin. *C.-T.* or *T.*	McKay, 1879	239	240	
Below Weka Pass stone, Porter River, Trelissick Basin. *C.-T.*	,, ,,	240	23	
Tufaceous greensands, Whitewater Creek, Trelissick Basin. *C.-T.*	,, ,,	241	196	
Weka Pass stone, Trelissick Basin. *C.-T.*	Enys, 1866–79	242	10	
Fan coral bed, Trelissick Basin. *C.-T.* or *T.*	,, ,,	243	208	
Pareora beds, Trelissick Basin. *M.*	,, ,,	244	..	
Coal-beds, Broken River, Trelissick Basin. Plants. *C.-T.*	Hector, 1872..	425	2	
Lower beds, Trelissick Basin. *C.-T.*	Enys, 1880 ..	449	87	
Mount Brown beds, Coleridge Creek, Trelissick Basin. *Up. E.*	Enys ..	450A	..	
Pareora beds, Thomas and Porter Rivers, Trelissick Basin. *M.*	,, ..	451A	43	
Plant and shell beds, road-cutting, Thomas River, Trelissick Basin. *M.*	..	452A	..	
Upper surface of Mount Brown limestone, Trelissick Basin. *Up. E.*	Hector and Enys	453A	6	
Chalk marls, Trelissick Basin	Hector	836	2	
Trooper's Range, east coast, Wellington ..	..	..	..	69.
Tukipo River. (See Ruataniwha Plain.)				
Tukituki River, south of Hawke's Bay.				
Tukituki River, near Kyber Pass, eastern base of the Ruahine Range. *P.*	Hill	772	20	
(See also Ruataniwha Plain.)				
Tumai. (See Pleasant River.)				
Tuparoa. (See Roparua.)				
Turanga-a-rere. (See Mataroa.)				
Turanganui River, Poverty Bay, east Auckland.				
Turanganui River. *Recent*	McKay, 1871	202	93	
Hill east of Turanganui River. *Recent*	,, ,,	203	104	
Turnagain, Cape, south coast, Hawke's Bay. *P.*	McKay, 1874	54	1	58, 64.
Urenui, twenty miles north-east of New Plymouth, Taranaki..	..	..	..	54.
White Cliffs, Urenui. *M.*	Hector, 1874	52	23	
Blue clays, Urenui. *P.*	Park, 1886 ..	582	36	
Urewera (Uriwera) country, east Auckland	..	..	..	68.
Utapu. (See Wanganui River.)				
*Vernon, Mount. (See Waipukurau.)				
Vincent County, Central Otago				61.
(See Bannockburn, Manuherikia.)				
Wade, twenty-four miles north of Auckland ..				65.
Waiapu River, East Cape district, Auckland.				
Upper Mata River, Waiapu Valley. *M.*	McKay, 1887	714	5	
Under Amuri limestone, Mata River. *C.-T.*	,, ,,	715	6	
Creek between Taitai and Aorangi, Mata River. *C.-T.* ..	,, ,,	716	1	
Waiau River, Southland	..	..	..	9, 52.
Waiau-ua River, south-east Nelson (Amuri district).				
Marble Point, Waiau-ua Gorge. *Up. E.*	Haast, 1869 ..	306	34	
Waiau-ua River. *C.-T.*	Buchanan, 1867	321	4	
Highfield Ridge, east of Waiau Township. *M.*	..	566	89	
(See also Isolated Hills, Lottery Creek, Lyndon, Mason River.)				

—	Collector and Date.	Locality Number.	Number of Specimens.	Page in this Bulletin.
*Waihao River, south Canterbury	..	..	..	62, 64, 65.
Mount Harris, Waihao River. *M.*	McKay, 1880	475	638	
Marly greensands, Waihao River. *C.-T.* ..	„ „	479	256	
Island sandstone or Saurian beds, Waihao River. *C.-T.*..	„ „	480	646	
Waihao limestone, Waihao River. *C.-T.*	„ „	482	174	
Grey marls, Waihao River. *C.-T.*	„ „	485	284	
Waihao Bridge, one mile and a half below Waihao Forks. *C.-T.*	„ „	642	70	
Waiherike. (See Kawhia.)				
*Waihola (Waihora), lake and gorge, east Otago	..	..	..	62, 64.
Tokomairiro limestone, Waihola Gorge. *C.-T.*	McKay, 1873	40	73	
Waihola township, marls below glacial breccia. *M.* ..	„ 1886	629	6	
Waihora, Lake (Maori name for Lake Ellesmere), west of Banks Peninsula, Canterbury. (There is another lake of the same name, south-west of Dunedin)	..	..	..	51.
Waihou, Thames Valley, Auckland. *P.*	McKay, 1887	679	7	
Waihou River, Bay of Islands, north Auckland.				
East branch, Waihou River, near Okaihau. *C.-T.* ..	McKay, 1888	729	79	
Waikaka, Southland	..	..	..	67.
Waikaremoana, Lake, east Auckland.				
Outlet of Waikaremoana Lake. *Up. E.*	McKay, 1887	707	3	
Waikare Taheki River, six miles from Waikaremoana Lake. *M.*	Hamilton, 1885	722	..	
*Waikari, north Canterbury.				
Waikari Valley. *M.* ..	Hector, 1872..	233	54	
(See also Weka Pass.)				
Waikato district, south Auckland	..	..	..	54, 55, 57.
Leda marls, Whangape Lake, Lower Waikato (strata overlying brown coal of Taupiri). *C.-T.* (?)	Hector, 1867	39	33	
Whangape Lake. *C.-T.*	Hutton, 1866	273	8	
Taupiri Mine, Waikato River. *C.-T.*	Park, 1885 ..	529	18	
(See also Kupakupa, Mercer, Miranda.)				
*Waikato Heads, Waikato River, south-west Auckland ..	..	..	..	10, 15, 16,
Marine beds, Waikato South Head. *J.*	Cox, 1876 ..	267	354	21, 34, 39,
Waikawau Creek, south of Waikato Head. *Up. E.* ..	„ „ ..	272	43	42–48, 57.
Port Waikato, marine beds. *J.*	Old collections	289	142	
Coal-beds, Waikawau Creek. *Up. E.*	Cox, 1876 ..	301	444	
Below flaggy limestone, Waikato Heads. *C.-T.* ..	„ 1877 ..	322	..	
Cardita beds, Waikawau. *Up. E.*	„ „ ..	323	126	
Waikato Heads. Plants. *J.*	Hector, 1866	409	14	
*Waikawa, Southland	..	..	..	15, 21, 42–
Waikawa. Plants	Hector, 1878	426	21	48, 64, 65.
Plant-beds, South Head, Waikawa. *J.*	Park, 1886 ..	677	211	
Waikawa. *J.*	Old collections	798	13	
Waikawau. (See Waikato Heads)	..	..	..	57.
Waikohu. (See Papakura.)				
Waikouaiti, thirty-two miles north of Dunedin. (See Pleasant River)		..		71.
Waimate. (See Waitangi.)				
Waimea Creek, Westland	..	..	..	56.
Waimea Plains, Southland. *Up. E.*	Hector, 1869	258	7	
Waimea River, Nelson. (See Wairoa River.)				
Waimirima, coast south of Cape Kidnappers, Hawke's Bay.				
Waimirima. *Cret.*	McKay, 1875	83	48	
Chalk marls, Waimirima. *C.-T.*	Enys, 1874; McKay, 1875	116	40	
Shell-beds, Waimirima. *Pl.*	McKay, 1875	122	4	
Waingaro, south-west Auckland.				
Putataka beds, Kohururu, Waingaro. *J.* ..	Park, 1885 ..	528	154	
Waingaroa. (See Whaingaroa.)				
Wainui, near Cape Turnagain, Hawke's Bay ..		..		68.
Waiomio. (See Kawakawa.)				
Waipa. (See Kawhia)		..		62, 63.
Waipahi. (See Landslip Hill.)				
Waipapa Boat-harbour. (See Clarence River.)				
*Waipara River, north Canterbury	..	..	..	10, 12, 16,
Mount Brown, Waipara River. *Up. E.* ..	Hector, 1867; McKay, 1874	66	2	21, 52, 54–56, 58, 65,
McKay's Creek, Middle Waipara. *C.-T.*	McKay, 1874	149	54	67, 68, 74.
Grey marls, Heathstock, Upper Waipara	„ „	150	18	
Lower gorge of the Waipara. *M.*	Hector, 1867	228	283	
Boby's Creek, Waipara. *C.-T.*	„ „	277	200	
Saurian beds, Heathstock, Upper Waipara. *C.-T.* ..	McKay, 1874	295	1	

—	Collector and Date.	Locality Number.	Number of Specimens.	Page in this Bulletin.
*Waipara River, north Canterbury—*continued.*				
The Deans, Waipara Valley. *Up. E.*	Hector, 1872	313	9	
Upper calcareous band, Mount Brown. *Up. E.*	Park, 1887	723	112	
Lower calcareous band, Mount Brown. *Up. E.*	,, ,,	724	14	
Middle Waipara. *C.-T.*	McKay, 1891	761	520	
Junction between Weka Pass stone and Amuri limestone, Middle Waipara	McKay	821	2	
Saurian greensands, Upper Waipara	Haast	835	5	
(See also Weka Pass.)				
Waipawa River, south Hawke's Bay				59.
Waipawa River. *Cret.*	McKay, 1877	186		
Fossiliferous rocks, Waipawa Gorge. *C.-T.*	,, 1886	692	58	
Waipiro, East Cape district, Auckland.				
Limestone, Waipiro Bay. *Cret.*	McKay, 1874	73	7	
Waipiro Creek. *M.*	,, 1887	686	15	
(See also Akuaku.)				
*Waipukurau, south Hawke's Bay				59, 65.
South slopes of Mount Vernon, Waipukurau. *P.*	McKay, 1886	694	27	
Mount Vernon	Hill	769	53	
Wairarapa district, east Wellington				58, 59, 65,
East Wairarapa	Charlton	847	1	74.
(See also Masterton, Ruamahanga, Woodville.)				
Wairau River, Marlborough				15, 59.
Waireka River, Kakanui River. (See Oamaru.)				
*Wairoa River, Waimea River, central Nelson				15, 16, 33,
Wairoa Gorge. *T.*	Hector, 1866	140	48	34, 37, 40,
,, *T.*	McKay, 1874	141	44	42–46, 48,
Wairoa River, below gorge. *M.*	,, 1878	318	181	58.
Wairoa Gorge. *J.*	,, 1875	382	2	
Mytilus problematicus beds, west side of Mount Heslington, Wairoa Gorge. *T.*	,, 1878–9	383	32	
Halobia beds, east side of Mount Heslington, Wairoa Gorge. *T.*	,, ,,	384		
Nautilus beds, east side of Mount Heslington, Wairoa Gorge. *Rh.*	,, ,,	385	41	
Monotis beds, east slopes of Mount Heslington. *T.*	,, ,,	386	3	
Mytilus problematicus beds, east slopes of Mount Heslington. *J.*	,, ,,	387	4	
Limestone, Martin's Sawmill, upper end of Wairoa Gorge. *Carb.*	,,	388	18	
Limestone, upper end of Wairoa Gorge, at junction of Roding River. *Carb.*	,,	389	3	
Spirifer beds, upper part of Spring Grove Creek. *J.*	,, 1878	390	140	
Monotis beds, Spring Grove Creek. *J.*	,, ,,	391	3	
Top of the range at source of Spring Grove Creek. *J.*	,, ,,	392	14	
Lowest beds, Sellen's section, Wairoa Gorge, to Eighty-eight Valley. *J.*	,, ,,	393	125	
Spirigera beds, Sellen's section, Wairoa Gorge, to Eighty-eight Valley. *J.*	,,	394	348	
Mytilus problematicus beds, Sellen's section, Wairoa Gorge, to Eighty-eight Valley. *T.*	,, ,,	395	11	
Great limestone, Sellen's section, Wairoa Gorge, to Eighty-eight Valley. *Carb.*	,, ,,	396	1	
Productus limestone, Sellen's section, Wairoa Gorge, to Eighty-eight Valley. *Carb.*	,, ,,	397	25	
Fossiliferous slates, Little Ben Nevis, Wairoa River. *Carb.*	,, ,,	398	7	
Monotis beds, Mount Heslington, Wairoa Gorge. *T.*	,, ,,	438	101	
Mytilus beds, Mount Heslington, Wairoa Gorge. *T.*	,, ,,	439	28	
Psioidea beds, Mount Heslington, Wairoa Gorge. *T.*	,, ,,	440	286	
Limestone, Martin's Mill, Wairoa Valley. *Carb.*	,, ,,	441	182	
Mytilus beds, north side, Wairoa Gorge. *T.*	,, ,,	442	13	
Psioidea beds, north side, Wairoa Gorge. *T.*	,, ,,	443	8	
Pareora beds, Wairoa Gorge. *M.*	,, ,,	468	123	
Wairoa Gorge, Nelson	Yule	775A	21	
Plant-beds, Mount Heslington, Wairoa Gorge. *Rh.*	McKay, 1878–9	803	13	
*Waitaki River, between north-east Otago and south Canterbury				58, 60, 61,
Black Point, Waitaki River. *C.-T.*	McKay, 1876	176	338	70, 75
Maerewhenua gold-workings, Waitaki River. *C.-T.*	,, ,,	177	50	
**Phorus* beds, Maerewhenua. *C.-T.*	,, ,,	178	159	
Maerewhenua limestone. *C.-T.*	,, ,,	179	175	
Waitaki River. *Up. E.*	Hector, 1865	242	10	
Otekaike, Waitahi Valley. *Up. E.*	Traill, 1874	252	70	
Kekenodon beds, Waitaki River. *Up. E.*	McKay, 1880	476	827	
Otekaike limestone, Station Peak, Waitaki Valley. *Up. E.*	,, ,,	477	467	
Otekaike limestone, Otekaike. *Up. E.*	,, ,,	481	38	

EXPLANATION OF PLATES.

(The plates are enclosed in an envelope on the inside of the under cover of the bulletin.)

THE plates issued with this bulletin were printed many years ago, and were designed to illustrate "Memoirs on the Palæontology of New Zealand," as has been explained above. Since they can serve no further purpose by remaining in stock, and may, moreover, be found useful in illustrating the species to which they refer, they are now issued.* Plates V and VI are reprints of pls. 22 and 23, T.N.Z.I., vol. 10, 1878, and, being printed on better paper, will be found clearer than the original plates. Plates I–IV are new. The figures, particularly in the case of the *Belemnites* from Amuri Bluff, are somewhat idealized, and some may be synthetographs,† but in those cases where the originals have been identified the figures are sufficiently true to serve as satisfactory illustrations. The names given by Hector are supplied on the authority of Mr. A. McKay, and the locality of the specimens is also supplied where it is known.

		Locality.	Specimens in Dominion Museum.
	PLATE I.		
For explanation, see p. 50.			
	PLATE II.		
Fig. 1.	*Spiriferina* (*Trigonotreta alata*; *fide* McKay).	Loc. 380. *Spirifer* and Crinoid beds near Cowan's, Oreti Valley	1 plesiotype.
Figs. 2, 3, 4.	,, ,, ,,		
Figs. 5–9.	(See p. 50.)		
	PLATE III.		
Fig. 1, *a–c*.	*Spiriferina* sp. ind. ..	Loc. 300. As above	A specimen of same species, (?) the original of the figure.
Fig. 2, *a–c*.	*Spiriferina* sp. ind. (Fig. 40, No. 4, p. 72, Cat. Ind. Col. Exh.)	Loc. 359. Lower Cannon-ball sandstone, Taylor's Creek, Hokanui Hills.	1 figured specimen.
Fig. 3*a*.	*Spiriferina* sp. ind.	Loc. 380. As above ..	,,
Fig. 3*b*.	,,		
Fig. 4, *a–b*.	,,	*Cf. S. radiata*, fig. 36, No. 4, p. 70, Cat. Ind. Col. Exh.	
Fig. 5.	,,		
Fig. 6, *a–c*.	*Epithyris elongata*. (No. 6*b* is fig. 45, No. 5, p. 76, Cat. Ind. Col. Exh.)		
Fig. 7, *a*, *b*.	*Epithyris* sp. ind.		

* Duplicates of the plates illustrating Tenison-Woods's "Corals and *Bryozoa*, &c.," and Ettingshausen's "Contribution to the Knowledge of the Fossil Flora of New Zealand" (T.N.Z.I., vol. 23, p. 237), and the unpublished plates prepared to illustrate Hector's "Fossil Flora of New Zealand," are still in stock.

† A synthetograph is a figure based on more than one specimen.

		Locality.	Specimens in Dominion Museum.
	PLATE IV.		
Fig. 8, *a–c.*	*Athyris* sp. ind. ..	? Loc. 380. As above.	A specimen possibly the original of the figure 8*a*.
Fig. 9*a*.	„ ..	Loc. 434. *Mytilus* beds, Eighty-eight Valley, Nelson	A specimen with the beak broken.
Fig. 9*b*.		Loc. 380. As above ..	2 specimens, from either of which the figure may have been made.
Fig. 10, *a. b.*	..	Loc. 379. *Spirigera* beds overlying the big conglomerate, Oreti Valley	1 figured internal cast and also part of the external cast of the same specimen.
Fig. 11*a*.	„ ..	Loc. 378. *Inoceramus* beds overlying the big conglomerate, Benmore Run, Hokanui Hills	1 specimen, probably the original of the figure.
Fig. 11*b*.	„		
Fig. 12, *a–c.*	*Spiriferina* (*cristata ?*). (Fig. 45, No. 6, p. 76, Cat. Ind. Col. Exh.)	Loc. 401. Mount Potts *Spiriferina* beds	1 specimen, from which the figures appear to have been idealized.
Fig. 13.	(See p. 50. Fig. 12*b* in the centre of the plate should be 13*b*.)		
	PLATE V. (Reprint of pl. 22, T.N.Z.I., vol. 10, facing p. 486 ; 1878.)		
Fig. 1.	*Belemnites otapiriensis* Hector. (*Cf.* fig. 40, No. 5, p. 72, Cat. Ind. Col. Exh.)	Loc. 372. Oreti railway-cutting, Dipton	2 syntypes. (Figure probably a synthetograph.)
Fig. 2.	*Belemnites canaliculatus aucklandicus* Hauer : (*a*) ventral, (*b*) lateral aspect. (*Cf.* fig. 36, No. 3, p. 70, Cat. Ind. Col. Exh.)		
Fig. 3.	*Belemnites catlinensis* Hector : (*a*) lateral, (*b*) ventral aspect	Loc. 21. Pholadomya Point, Catlin's River	Holotype.
Fig. 4.	*Belemnites hochstetteri* Hector : (*a*) lateral, (*b*) ventral aspect. (*Cf.* fig. 33, No. 4, p. 68, Cat. Ind. Col. Exh., as *B. aucklandica*, Kawhia.)		
	PLATE VI. (Reprint of pl. 23, T.N.Z.I., vol. 10, facing p. 488 ; 1878.)		
	Belemnites australis Phillips. (*Cf.* fig. 28, Nos. 1, 2, 3, p. 64, Cat. Ind. Col. Exh.)	Amuri Bluff	Numerous plesiotypes difficult to connect with given figures.
Var. *α*.	*a′* dorsal, *a″* lateral aspect, *a‴* longitudinal section, *s′* transverse section of phragmacone, *s″* transverse section of guard.		
Var. *β*.	*b′* lateral aspect, *b″* longitudinal section, *s′* transverse section of phragmacone, *s″* transverse section of guard.		
Var. *γ*.	*c′* ventral, *c″* lateral aspect, *c‴* longitudinal section of alveolus.		
Var. *δ*.	*d′* ventral aspect, *d″* longitudinal section, showing exfoliation of the central core, *d‴* lateral aspect, *s′* transverse section of guard, *s″* transverse section of phragmacone.		
Var. *ε*.	*e′* dorsal, *e″* lateral aspect ; *e‴* dorsal, *e⁗* lateral aspect (*juv.*) ; *s′* transverse section of guard, *s″* transverse section of phragmacone (*juv.*)		

INDEXES.

INDEX TO NAMES OF PERSONS.

GENERAL INDEX.

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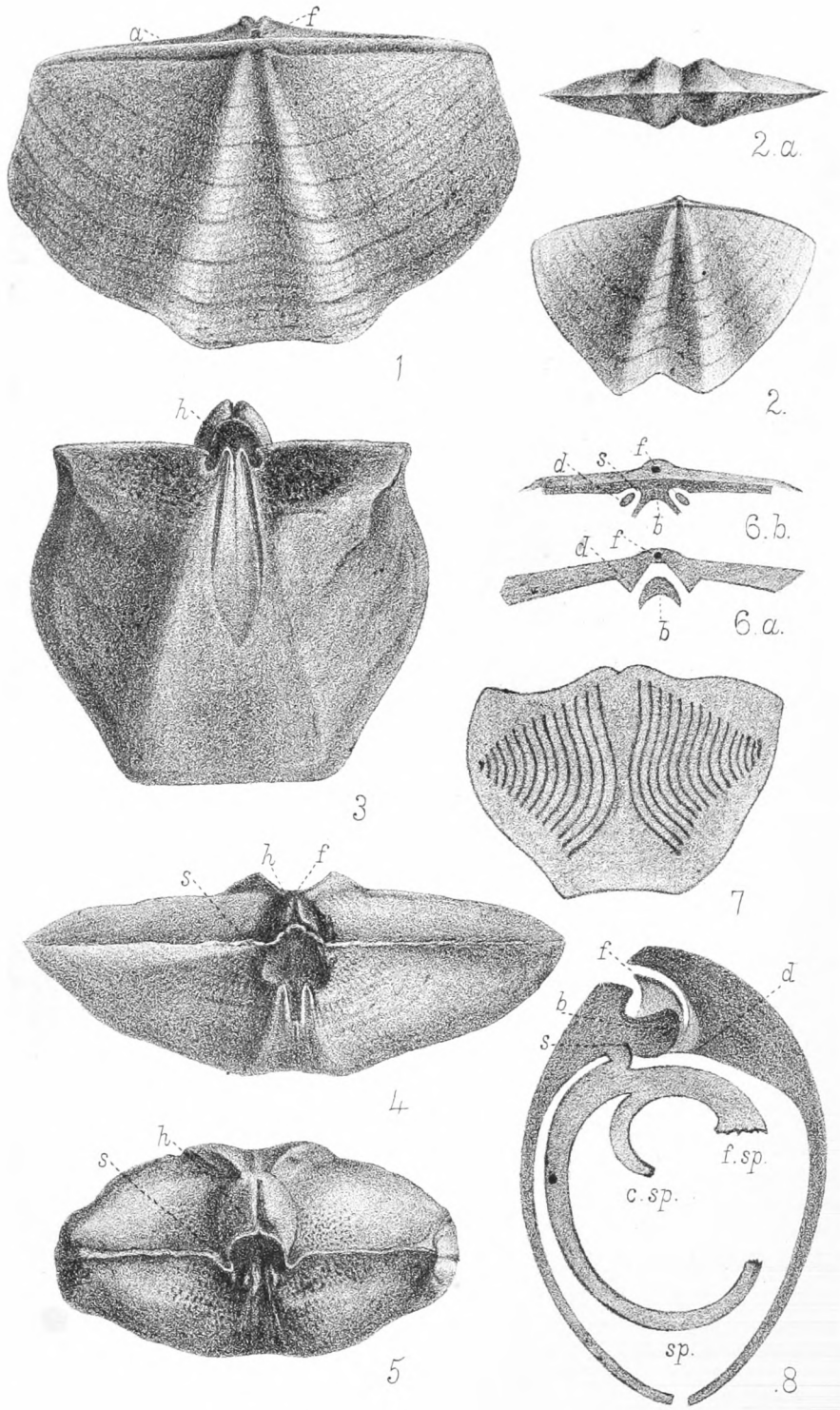
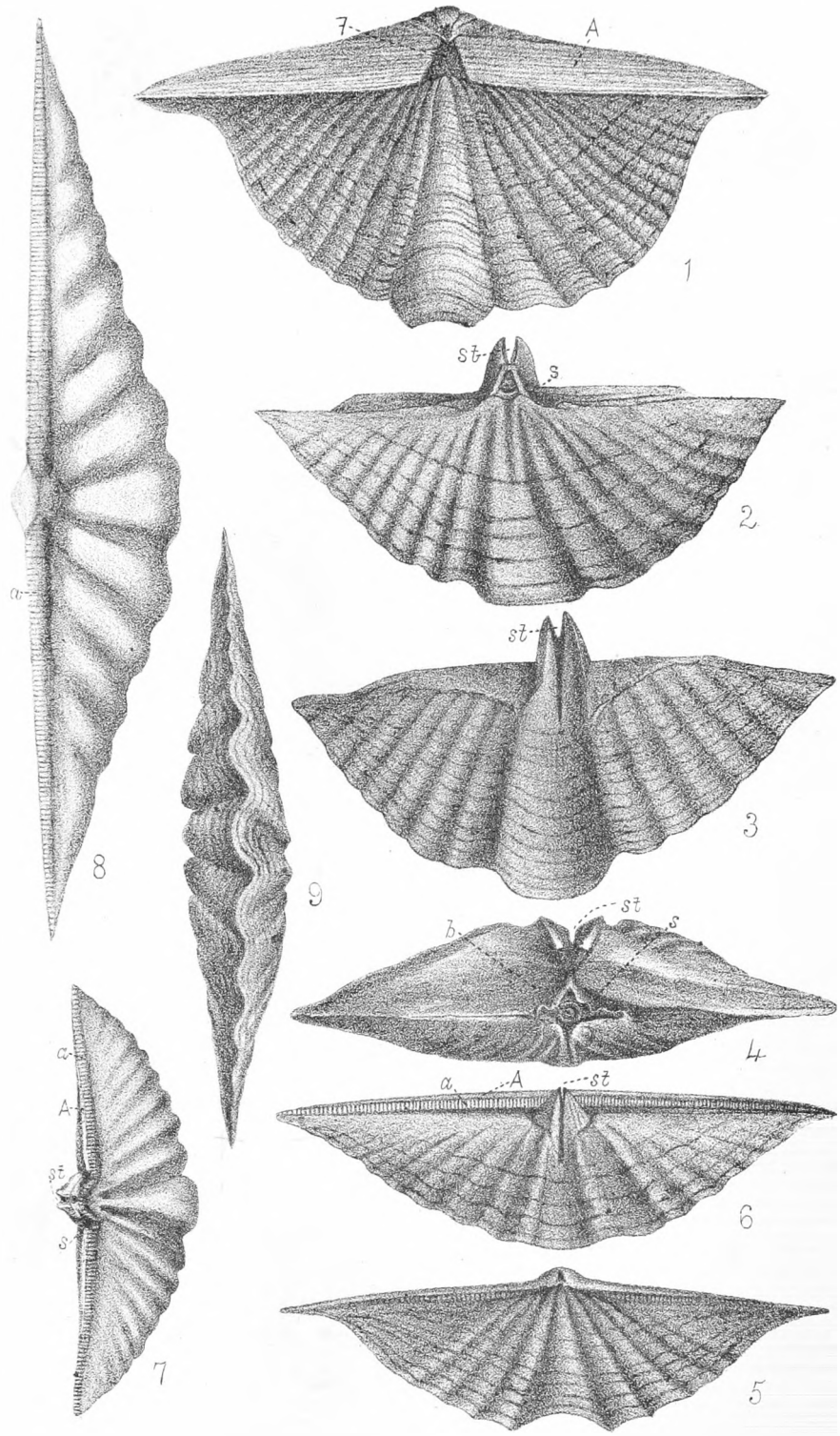


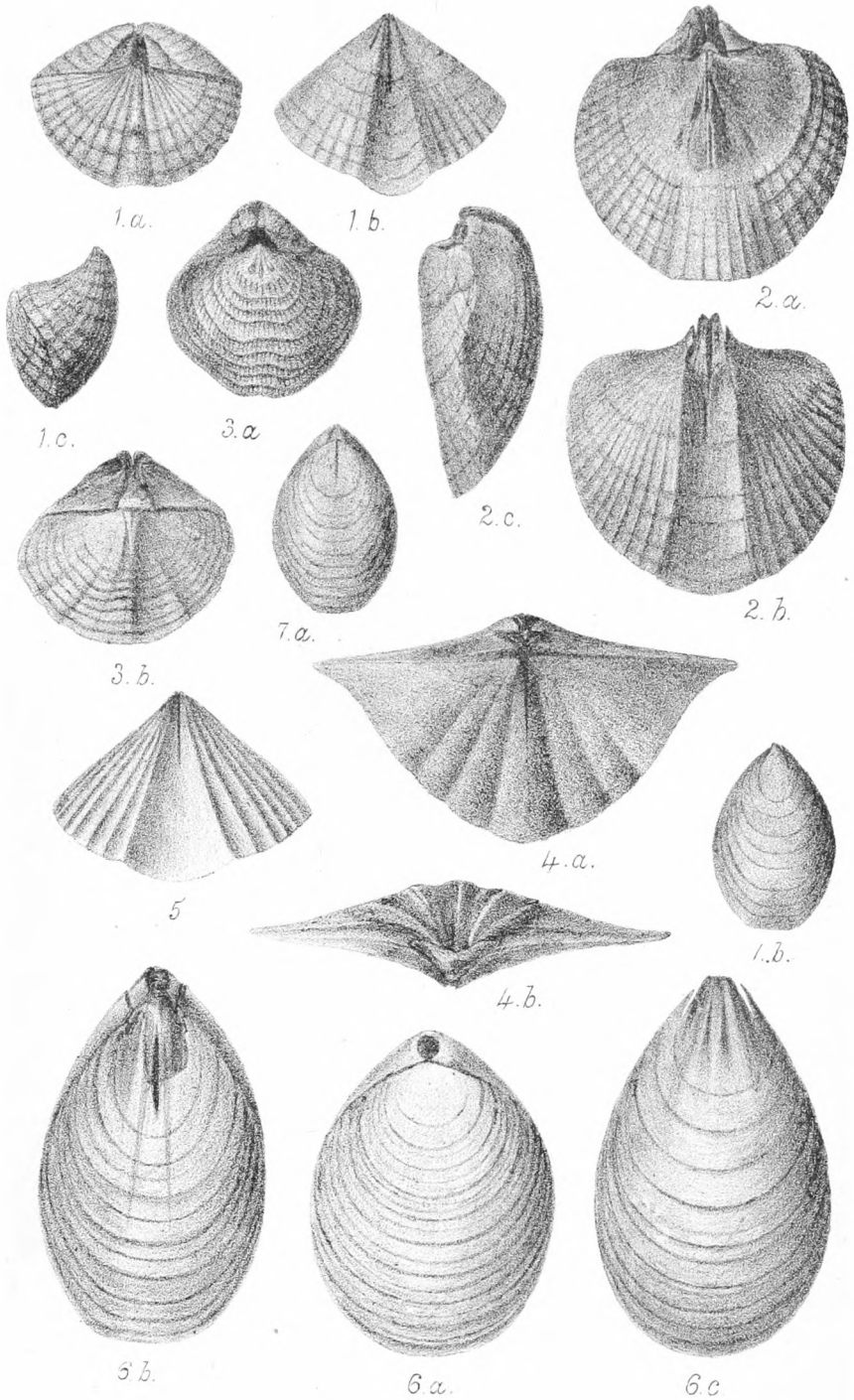
CLAVICERA.

[*To accompany Palæontological Bulletin No. 1, New Zealand Geological Survey.*]



1-4. *SPIRIFERINA*. 5-9. *RASTELLIGERA*.

[*To accompany Palæontological Bulletin No. 1, New Zealand Geological Survey.*]



1-5. SPIRIFERINA. 6-7. EPITHYRIS.

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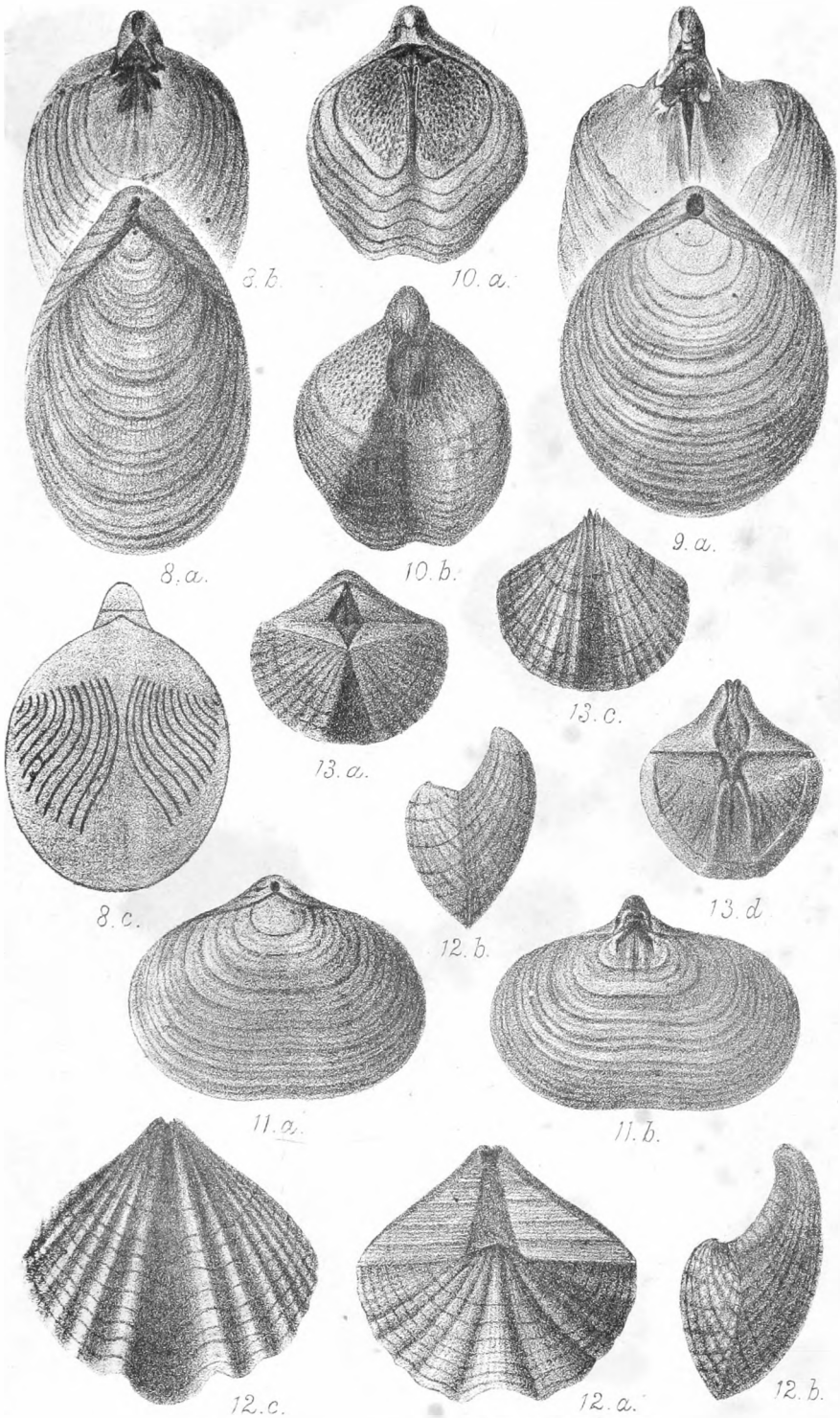

8-11. ATHYRIS 12 SPIRIFERINA

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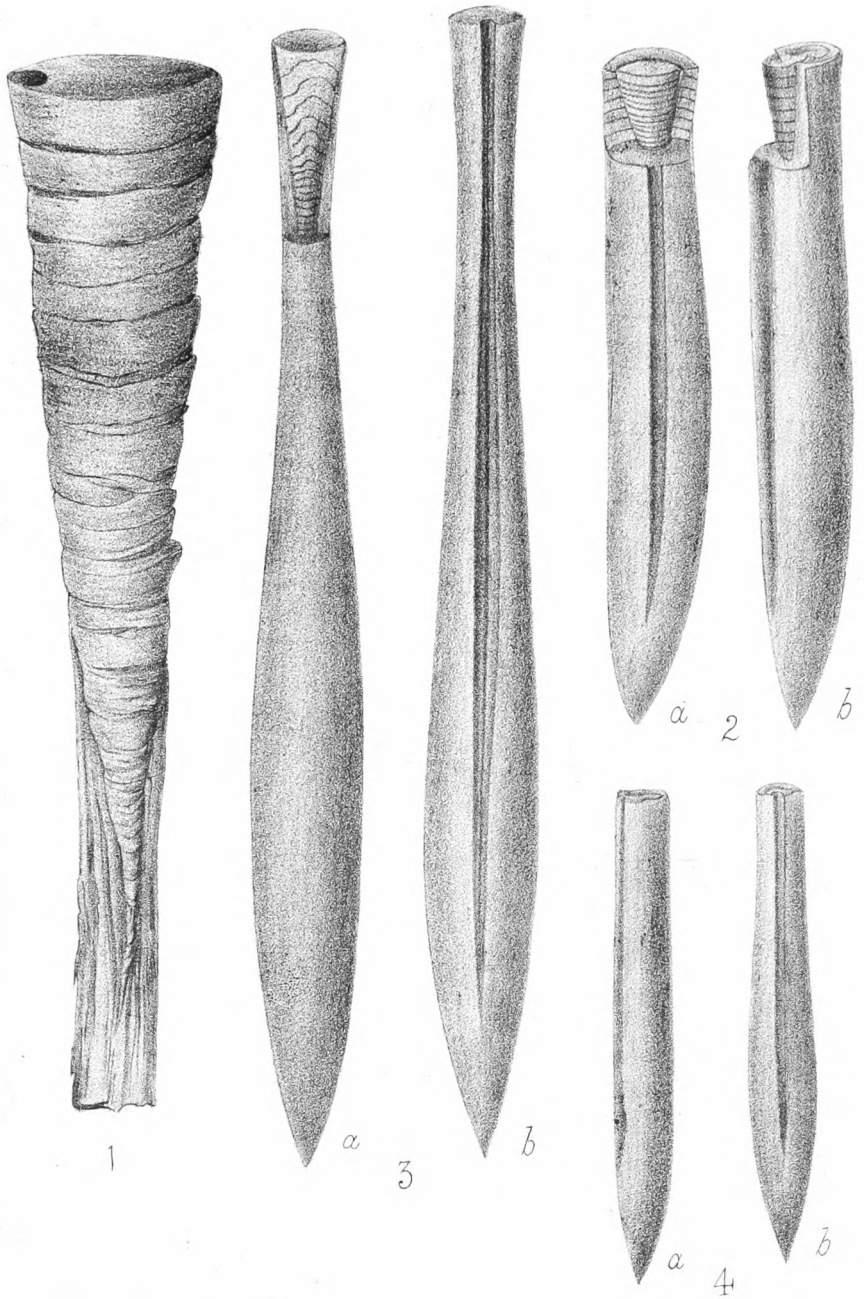
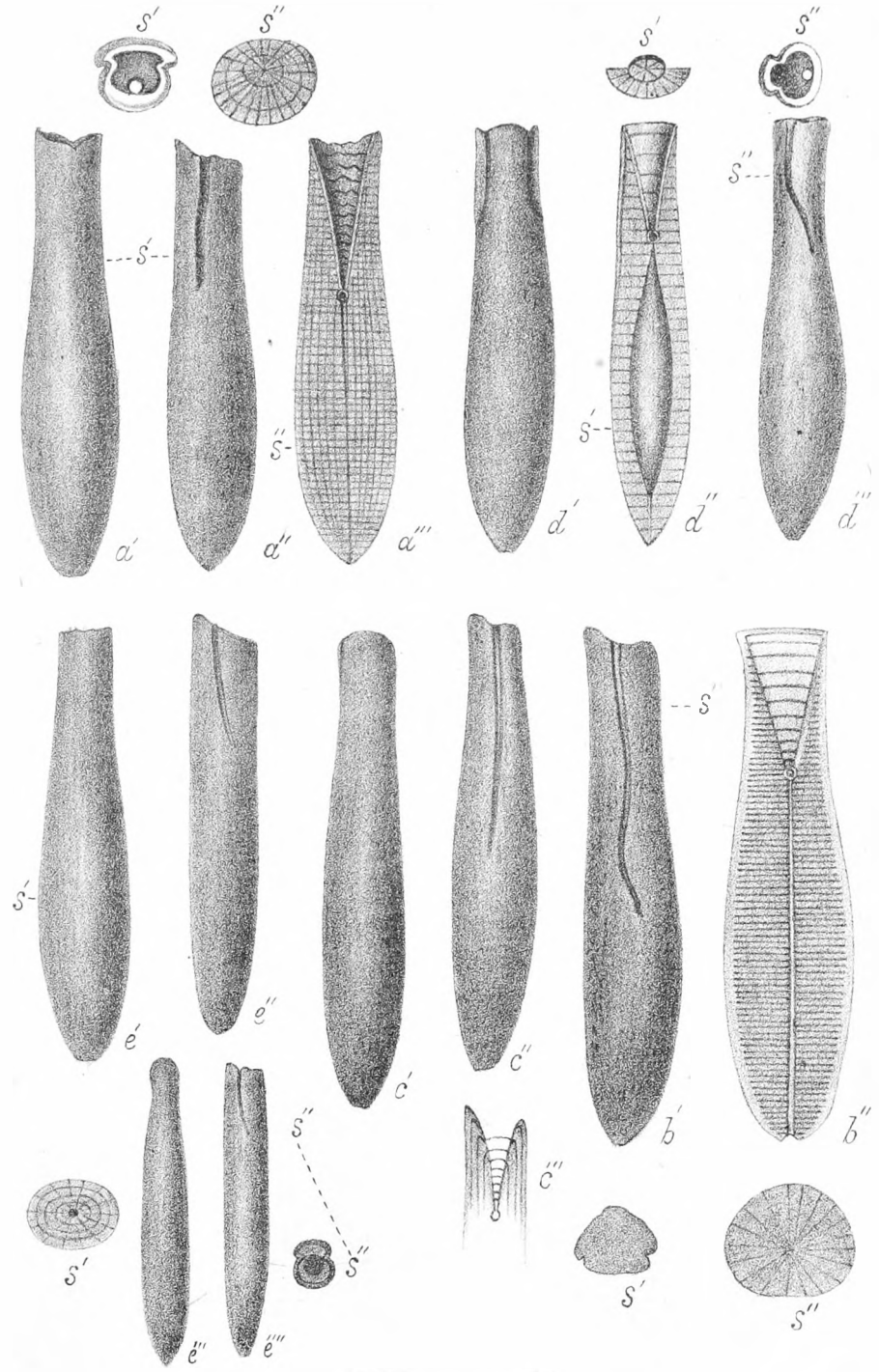


N. Z. BELEMNITES.

J. Hector. del. *J.B. lith.*

[*To accompany Palæontological Bulletin No. 1, New Zealand Geological Survey.*]



N.Z. BELEMNITES.

J.Hector, del

J.B. lith.

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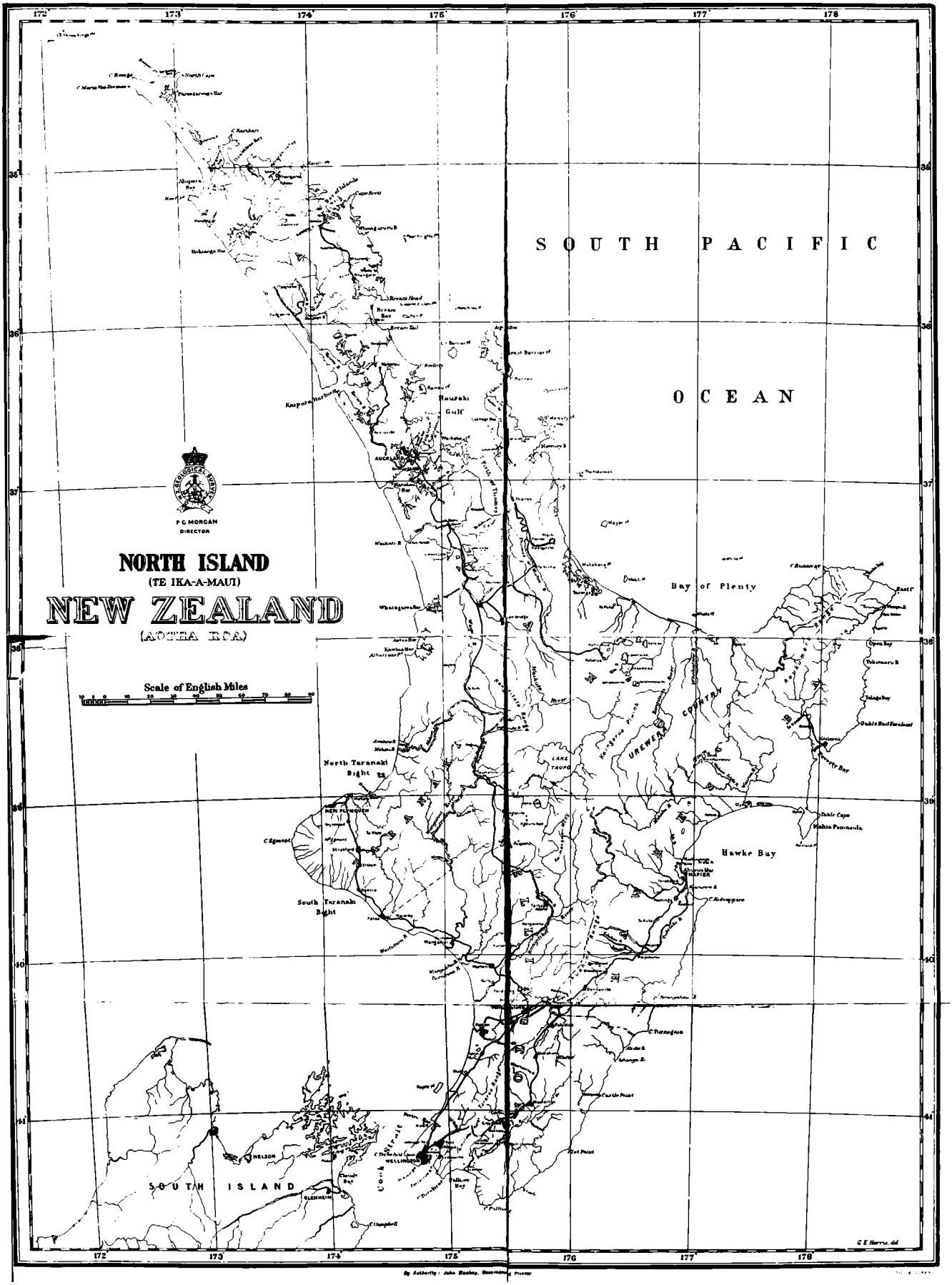
SOUTH PACIFIC
OCEAN
NORTH ISLAND
(TE IKA-A-MAUI)
NEW ZEALAND
(AOTEA ROA)
P G MORGAN
DIRECTOR
Scale of English Miles
Hauraki Gulf
Bay of Plenty
North Taranaki Bight
South Taranaki Bight
Hawke Bay
SOUTH ISLAND
Cook Strait
AUCKLAND
WELLINGTON
NELSON
BLENHEIM
NEW PLYMOUTH
HASTINGS
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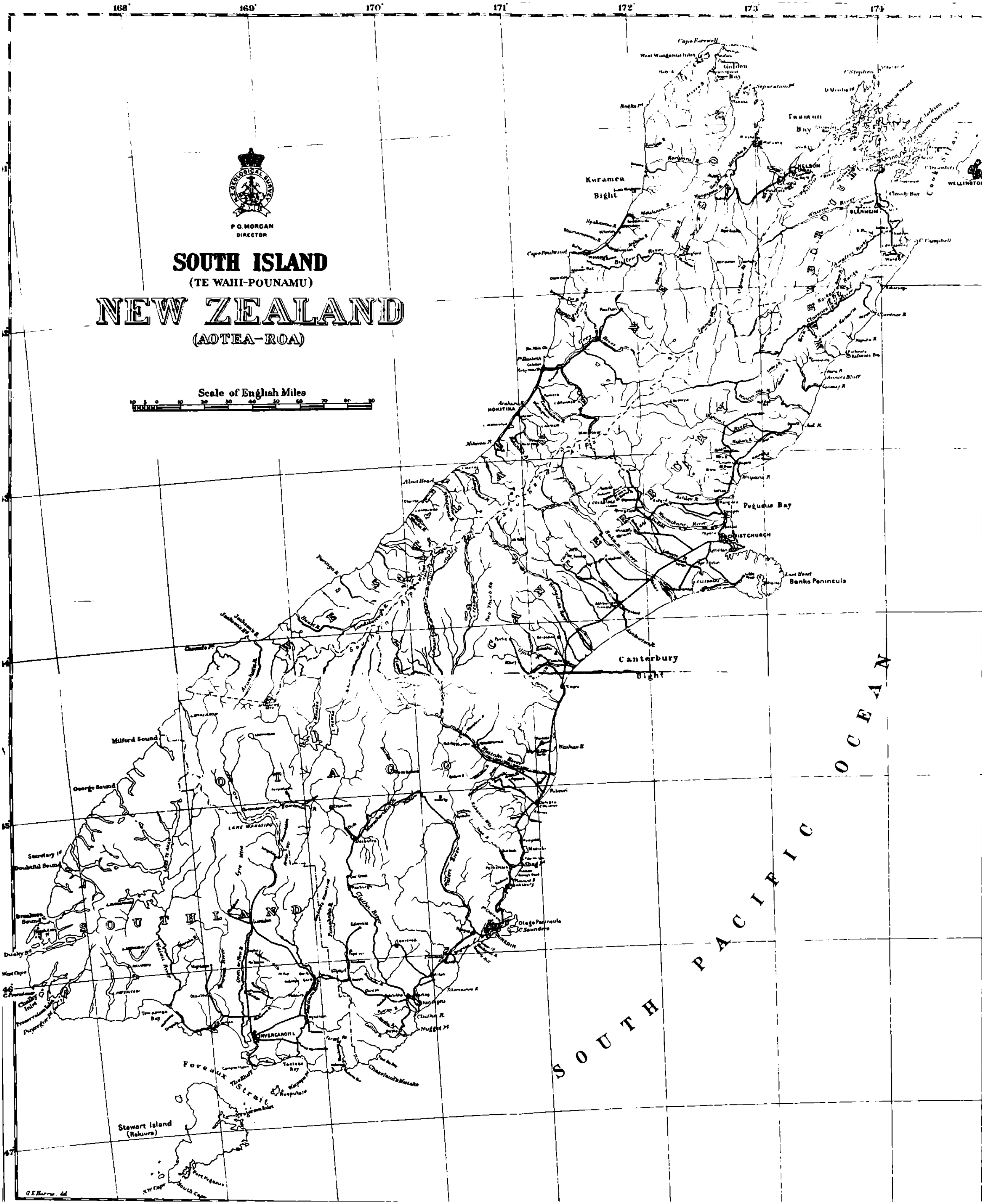
P. G. MORGAN
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SOUTH ISLAND
(TE WAHI-POUNAMU)
NEW ZEALAND
(AOTEA-ROA)
Scale of English Miles
Karamea Bight
Tasman Bay
Pegasus Bay
Banks Peninsula
Canterbury Bight
Milford Sound
George Sound
Doubtful Sound
Otago Peninsula
Foveaux Strait
Stewart Island
(Rakiura)
SOUTH PACIFIC OCEAN
NELSON
WELLINGTON
BLENHEIM
HOKITIKA
CHRISTCHURCH
DUNEDIN
INVERCARGILL
LAKE WAKATIPU
OTAGO
SOUTHLAND
168°
169°
170°
171°
172°
173°
174°