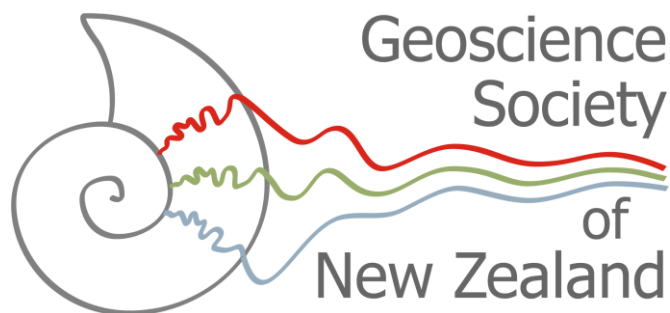


Transcriptions of selected letters from Frederick Wollaston Hutton to James Hector and Julius Haast

Esme Mildenhall, Rowan Burns & Simon Nathan



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Preface to the Second Edition

The first edition of this collection of letters was published in 2012. Since then we have located and transcribed a further 35 letters (from 1871 onwards) and made some minor amendments to the text



Figure 1. Frederick Wollaston Hutton, photographed about 1866-67.
The photographer is unknown
Alexander Turnbull Library, MNZ-0474-1/4-F

Introduction

Frederick Wollaston Hutton (1836-1905) was one of the most versatile and productive natural scientists in late 19th century New Zealand, publishing over 200 papers on geological and biological topics. He described a large number of living and fossil animals, and many of his names are still in use today. Hutton was an active letter writer, and his letters provide an interesting insight into debates and changing ideas within the small New Zealand scientific community. These letters track the changing relationships between Hutton and the other two leading scientists in the colony – James Hector (1834-1907) and Julius Haast (1822-87).

The letters fall into two groups:

Part 1: Letters from Hutton to Hector from 1866-1871. When Hutton arrived in New Zealand in 1866 he was looking for work, and had an introduction to Hector. Over the next five years Hector employed him intermittently on contract to investigate coal and gold prospects in the Waikato, Coromandel and Northland regions. The letters provide a commentary on Hutton's fieldwork, his involvement with the Auckland Institute, and his attempt to make a living from a flax mill. In 1871 he sold his mill and moved to Wellington to work under Hector at the Geological Survey.

Part 2: Letters from Hutton to Haast from 1871-1887. Haast and Hutton had been acquainted since soon after Hutton arrived in Auckland. These letters provide a commentary on Hutton's time in Wellington working at the Colonial Museum (1873-75) and his subsequent move to Dunedin (1875-80). Hutton moved to Christchurch in 1880, and the final group of letters were written when Haast was overseas in 1886-87.

By 1872 Hutton had fallen out with Hector, and his comments about him are invariably critical, contrasting with the tone of the letters in Part 1. After Hutton moved to the South Island in 1873, he maintained correspondence with Hector about professional matters, and his letters are polite though cool.

In reading Part 2, it is important to remember that Hutton was argumentative by nature, and had regular disagreements with most of his colleagues and employers, including both Haast and Hector. For example, in a letter of 2 July 1883, Haast wrote to Hector, explaining that he would not present a paper at the Canterbury Philosophical Institute because “..... as long as Hutton is President I will not have anything to do with it, as I want peace”.

Appendix 1 is an undated letter from Hutton to Haast describing the stratigraphy of a section near Oamaru that cannot be easily related to the remaining correspondence.

Appendix 2 contains three letters about a controversy in 1875 regarding the description of birds involving Hutton, Haast, Hector and Walter Buller. They are pinned together in the archives of the Royal Society of New Zealand in a collection assembled by the late Charles Fleming.

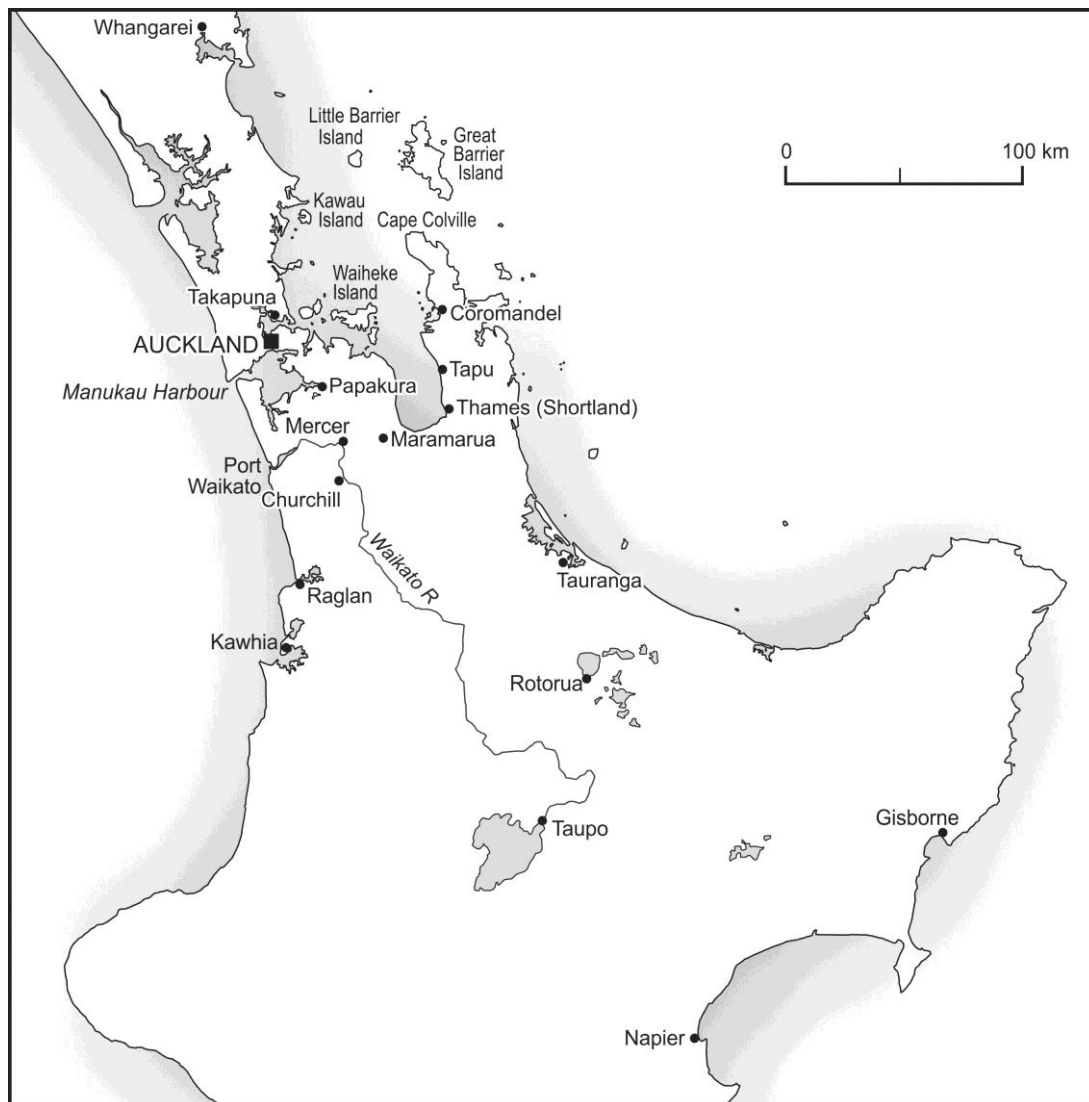


Figure 2. Locality map, showing the main places in the central North Island mentioned in Hutton's letters. For the first three years after his arrival, Hutton and his family lived in different parts of Auckland, mainly in the inner-city suburbs of Parnell and Epsom, but also on the north shore at Takapuna.

In September 1869 Hutton moved his family to the little settlement of Churchill, on the edge of a flax swamp in the Waikato, where he operated a flax mill. In different letters he uses the addresses Mercer, Whangape or Churchill, but during this period he appears to have lived near the flax mill in Churchill.

Biographical notes on F.W.Hutton¹

F.W. Hutton was born in Lincolnshire, England, in November 1836, the second son of a clergyman. He was educated at a local grammar school, and later studied geology and natural science at Kings College, London from 1854-55. He was commissioned as an ensign in the Royal Welsh Fusiliers, serving in the Crimean War and in India. He rose to the rank of Captain, a title that he retained and used in New Zealand. Hutton had a long-standing interest in geology, and published *The use of geology to military officers*. He was elected a Fellow of the Geological Society in 1860.

Hutton resigned his army commission in 1866, and emigrated to New Zealand with his wife and two young children. He initially lived in Auckland, and later moved to the Waikato where he purchased a flax mill. Hector was pleased to hear from a qualified geologist, and employed him on contract to investigate a number of mineral prospects. Hutton's interests were broad, and he undertook a number of biological investigations in his spare time. As the flax mill was never very successful, Hutton finally sold it and moved to Wellington to work under Hector.

Although he was employed primarily as a geologist, Hector made use of Hutton's biological knowledge to get him to compile catalogues of birds, fishes, echinoderms, land molluscs, and Tertiary fossils that were published by the Colonial Museum between 1871-73.

In late 1873 Hutton was appointed Provincial Geologist for Otago, which included working as Curator of the Otago Museum, and in 1877 he was appointed Professor of Natural Science at Otago University. There were disagreements with members of the university council over a number of matters including his teaching about evolution. In 1880 Hutton became Professor of Biology at Canterbury College in Christchurch, responsible for teaching zoology, paleontology and later geology. His scientific standing was recognised when he was elected a Fellow of the Royal Society [London] in 1892. In 1893 he resigned from the university to become Curator of the Canterbury Museum, and he held this position until his death in 1905.

Wherever he worked, Hutton was an active member of the local scientific societies. He helped establish the Auckland Institute and supported its affiliation with the New Zealand Institute. As he moved, he was involved with similar groups in Wellington, Dunedin and Christchurch. While he was initially supportive of Hector as Manager of the New Zealand Institute, he soon began to resent Hector's dominance of scientific organisations. Although Hutton became critical of Hector (at least behind his back) it is noteworthy that he continued to publish papers in the *Transaction of the New Zealand Institute* under Hector's editorship. From 1868 onwards for the next 37 years, he published 149 papers in the *Transactions* – an average of four papers every year – possibly the largest number published by any individual author.

¹ This account is summarised from an article in the Dictionary of New Zealand Biography by H.N.Parton which can be viewed online at <http://www.teara.govt.nz/en/biographies/2h59/1>. A full biography of F.W. Hutton has never been written, and is long overdue. As there is apparently no bibliography of his varied publications, we do not know exactly how many papers he published.

The Hutton correspondence

For reasons that are not clear, Hector retained almost all the letters that Hutton wrote to him between 1866-71 in his personal papers rather than the Colonial Museum files², and they subsequently passed to the Hocken Collection at the University of Otago where they are now held in the Hector collection (MS-0443-3). Letters from Hutton to Hector from 1871 onwards were filed in the Colonial Museum, and are now held in the archives of the Museum of New Zealand Te Papa Tongarewa. None of the letters from Hector appear to have survived with the exception of a single letter, here included as no. 3a.

Letters from Hutton to Haast were retained by Haast, and are now held in the Haast family collection in the Alexander Turnbull Library (MS-Papers-0037).

Esme Mildenhall is responsible for the primary transcription of most of the letters, with some in Part 2 transcribed by Rowan Burns. All were then checked and discussed with Simon Nathan. Rowan Burns scanned the diagrams and assembled the final manuscript. We have consulted a number of colleagues about technical terms, especially the spelling of biological names. Generally, however, Hutton's handwriting is easy to read, and there were few problems understanding and transcribing his letters. We have retained the spelling, punctuation and abbreviations in the original letters although a few full stops have been added where they were obviously intended. The underlining in the original letters has been retained except for biological names³ and for ships, both of which are given in italics. Words that cannot be read but for which a reasonable guess is suggested by the context are shown by [?]. The few words that cannot be deciphered are shown by dashes: -----

Acknowledgements

The letters in these collections have been reproduced with permission from the Hocken Collections, University of Otago, the archives of the Museum of New Zealand Te Papa Tongarewa, the Royal Society of New Zealand, and the Alexander Turnbull Library.

Many colleagues have helped us during the compilation of this collection of letters, and we would specially like to thank:

- Anna Blackman (Hocken Collections), Jennifer Twist (Te Papa archives) and David Colquhoun (Alexander Turnbull Library) for assistance in locating letters written by F.W. Hutton;
- Steve Edbrooke, Bruce Hayward and David Skinner for reviewing an early draft of the manuscript, and advising us from their local knowledge of the areas that Hutton visited;

² In contrast, all of Haast's letters written during the same period were filed in the Colonial Museum, and are now held in the archives of the Museum of New Zealand Te Papa Tongarewa.

³ For biological names we have used the convention of capitalizing the name of a genus, but putting the species name in lower case.

- Alan Beu, Dallas Mildenhall and Alan Tennyson for advice on biological nomenclature used by Hutton;
- Carolyn Hume for drafting the locality map;
- Kat Holt and Hugh Grenfell for assistance in publishing this volume.;
- Sascha Nolden for assistance in deciphering Haast's handwriting.

Financial assistance was provided by the Brian Mason Scientific & Technical Trust, and we are most grateful for the continuing support of the Trust for the transcription of letters that are being published as parts of *GSNZ Miscellaneous Publication 133*.

Part One: Letters from F.W. Hutton to James Hector between 1866 and 1871

The letters start soon after Hutton arrived in Auckland in June 1866. Hector had taken up his position as Director of the New Zealand Geological Survey the previous year, and had recently returned to Wellington from summer fieldwork, having carried out a reconnaissance survey of Northland. He was looking for a qualified and experienced assistant geologist, and Hutton's first letter arrived at just the right time.

1. Hutton to Hector, 2-7-1866

Hocken MS-0443-3/4/22

Rosebank Cottage
Parnell
2 July 1866

Sir

Prof. Ramsay having told me, just before leaving England, that he had written a letter to you, in which he had mentioned my name, I take the liberty now of writing to you myself to announce my safe arrival in the colony.

I have come out here as a Land Surveyor, in which I have had some practice in England, and from a conversation that I have had with Mr. Warner I think that I shall get some employment; still as things seem very slack here just now, and surveyors pretty numerous, I am afraid that I shall have a good deal of time on my hands, and if by chance it should be in your power to give me any employment on geological surveying I should feel extremely obliged to you. I have had some practice in it having accompanied the officers of the Geological Survey of England in Hampshire Surrey & Berkshire, and since then having made a geological map of the Island of Malta which is now at the Survey office at Southampton. I have studied geology for the last twelve years, and have been a member of the Geological Society of London for about five. I can also sketch tolerably in water colors.

Of course I cannot tell what powers you have or what assistants you may want but if you could give me anything to do in this province (the survey of the Bay of Islands and Wangarei coal district for instance) I should be very much obliged to you.

I remain
Your obedient servant
F. W. Hutton

Dr. Hector F.G.S.

2. Hutton to Hector, 9-8-1866

Hocken MS-0443-3/4/23

Parnell
9th August. 1866

My dear Sir

I must apologise for not acknowledging your very kind letter before, but I have been away at Tauranga.

I called a few days ago on Major Heaphy, and with very satisfactory results. He informs me that for several years the question has been mooted in the Provincial Council of appointing a Provincial Geologist for Auckland, but it has always hitherto fallen through, owing chiefly to their not knowing a competent person to fill the office, and he says that when the Council meet again the same matter will be again brought before it, and if this should be the case I should be much obliged if you would recommend me for it. I write by this mail to Ramsay, Jukes, Houghton, Sir H. James, Godwin-Austen and a few other geological friends in England for letters of competency that I might show to the Provincial Councillors but I shall not be able to get answers before December, and the question may come on in October or November. I am so fond of geology and natural history, and am so anxious to get employment in the scientific line, that I would willingly take the place for a very small salary, say £100 or £200 a year, and travelling expenses paid, and I am so interested in the volcanic phenomena of this province that I would sooner geologise here than anywhere else for twice the money. Of course if it is so arranged I would willingly be subordinate to you, but in this case I suppose that the General Government would pay some of the expenses.

I could also look after, and arrange, the Auckland Museum, which is sadly in want of somebody to look after it, as its contents are fast going to ruin.

I had intended going to Wellington to see you, but Major Heaphy thought it a needless expense, and suggested that I should ask you to speak to Mr Whitaker (our Superintendent) about the matter. If you wish you can show him this letter.

Yours truly
F. W. Hutton

Dr. Hector

3. Hutton to Hector, 15-10-1866

Hocken MS-0443-3/4/24

Auckland
Oct 15th 1866

My dear Sir

Many thanks for mentioning my name to Mr Whitaker. I hope that something will come of it.

I shall be very glad to get your synopsis of the rocks of New Zealand, as it will be most useful to me. Hochstetter does not seem to have made out the succession of the Tertiary beds in this island at all. I have not been able to do much as yet in the geological way, for having a family to feed I cannot undertake distant expeditions unless my expenses are paid. However I have been to Whangarei, for Messrs Brown & Campbell to inspect some coal reported as having been found on their property at Whangarei Heads; you will see by the sections I send you that it was not coal. [*Sections not attached to letter*]

I have been also sent by Mr Kennedy of the Bank of N.Z. to look for coal on his property about 20 miles east of this near the Wairoa. Hochstetter told him that he should sink for it, and a miner having actually found some, but here again I had to report that he had none worth working, it being in a Mesozoic? Rock and only 1 or 2 inches thick. However I found him plenty of road metal in the primary hills which they were much in want of.

Sec. I is doubtful as I was only there 3 days; there can be no doubt as to the faulting of the coal measures. I should be much obliged if you could tell me the section of the coal at Hikurangi Mountain to see how far it tallies with this. A green sandstone found by the stream on the west side of the valley is, I think, the same as 4 Sec III. I should also like a list of any fossils you may have from 5 Sec I.

I enclose a small specimen of the mineral found at one-tree-point in 7.b Sec III. I cannot make it out, it is evidently derived from the carbonaceous matter in the rock, but what the solvent could have been I cannot imagine. It appears to be nearly pure carbon, but I have no apparatus for analyzing it. It is found in more or less perpendicular veins traversing the nearly horizontal strata.

No 2 Sec V may probably be the same as the plant bearing bed south of the Waikato Heads, and possibly the Whangarei coal fields may be an extension of it. It rests on a denuded surface of the Paleozoic rocks, and has itself undergone much denudation before the Waitemata beds were deposited on it. The foraminifera are found near the base, and indicate deep water. I should be much obliged for any information about the structure and geol position of the Bay of Islands coal.

Yours sincerely
F. W. Hutton

I congratulate you on your FRS.

3a. Hector to Hutton, 24/10/1866

Hocken MS-0443-3/4/25

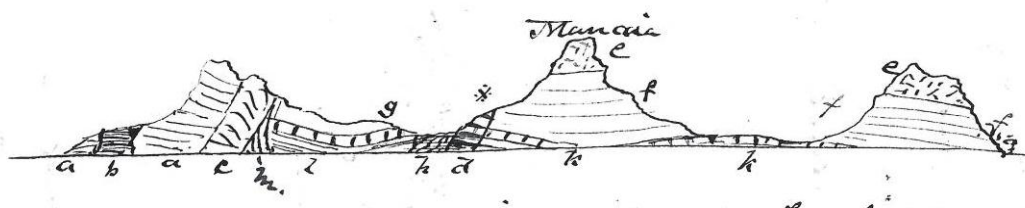
S.S. Wellington

24.10.66

My dear Sir,

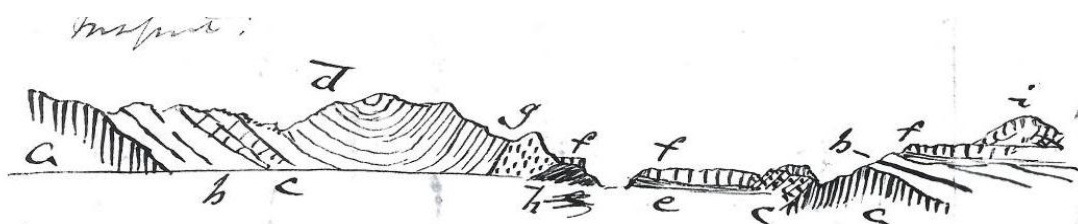
Many thanks for your note of 15th inst. with the notes & sections of the Whangarei District. I have seen most of the sections you describe & on the whole agree with you – except as regards the granites & gneissic rocks of which there are none so far as I know in any part of the N. Island. However some of the Sanadine porphyries of the Early Mesozoic period simulate crystalline rocks very closely, but of course you never have the Silica as Matrix.

The Coal at the heads is a mixture of Palagonite tuffa & Pyritous shale, with a small amount of Bituminous matter. Old Aubrey[?] would not believe what I said & I did not bother arguing much about it. The following is the section of Mania as I made it out.



a. Trachyte Tuffa. b. Dolerite Dyke. c. Trachytic Dyke. d. Dyke of Trachyte Porphyries with h. Trachyte Tuffas with Mica & also Andesite. e. Trachyte Breccia. f. Waitemata series (Tuffaceous). g. Clay shales. k. Limestones. l. Greensands. m. Palagonite Tuffas.

I did not observe any palaeozoic rocks, but it is not improbable that they exist as you suggest in your little map as along the W. face of the slope from the Mania range the bright red soil looked very like that which in other parts of N.Z. is characteristic of the Maitai slates & Serpentine Dykes. The section at the Coal Mine is very interesting, but if you visited the Abbey[?]⁴ you must have seen the Crystalline Limestone & grit dipping right under your so called white fine grained granite at 33°. The hill is composed of Andesite & Trachyte Tuffas, & belongs to the Upper Waitemata series I suspect.



⁴ Probably a reference to the Abbey Caves, NE of Whangarei.

a. Slates &c. b. Greensands with Coal. c. Limestones. d. Waitemata series? e. Pliocene Tuffas. f. Pliocene Trachytes. g. Andesite dyke & h. Trachyte Tuffa. i. Trachydolerite Cone (Manaia).

The first[?] lignite which you send is often seen in thin veins in the ferruginous sands. In the same quaternary formation on the N. & West Coast there are massive[?] seams of it 8 & 12 ft thick. I doubt by the way if they should be considered quaternary as they are the remains of a great interior continental system of Basin Deposits, now broached by the sea consequent on the submergence of the land & coated over by true Quaternary deposits. The same basin Deposits are ----- developed in the South Is. & constitute the Older Gold Drift.

The section at Hikurangi is my sample (see over).



a. Aphanite & Greywacke slates, with Siliceous & Haematite veins. b. Brown Sandstone, Siliceous cherts & nodules with Fossil wood Slates & Grey ----- with coal seam. 5ft 2ft 2.6 3ft & 2.6. c. Quartzose conglomerate. d. C--- Hard S----- & Tuffaceous clays. Waitemata series ? unconformable on c. e. Trachyte dolerite rising into wooded cone f.

The Geol. sketch of the whole district and details of the Kawa kawa block went to Auckland some weeks ago & I am sure Mr Whitaker will be glad to shew them to you. If you go in for Northern Geology what I would warn you against is the protean[?] form of the tertiary Trachytes & Metamorphosed Sandstones that occur among the slates. Hand specimens are often mistaken for granitic rocks – even W. M. Clarke of Sydney made this mistake with regard to a Wellington Metamorphic Sandstone.

The fact is we require another name for the crystalline Trachyte Porphyries very badly. There is no doubt that they do fulfil the place of granites among the Volcanic as opposed to Plutonic rocks. I am sorry the Synopsis is not printed yet, but by next mail I shall send you something about coals. I am going to land at Taranaki & wait till this steamer returns, looking at the oil wells.

Ever Yours Sincerely
James Hector.

4. Hutton to Hector, 15-3-1867

Hocken MS-0443-3/5/1

Auckland
15th March 1867

My dear Sir

I am very sorry to read in the papers that you have returned from your expedition in such a disabled state. How did it happen?

I have to thank you for your last letter containing the Synopsis of the N.Z. rocks and other information. I quite agree with you that I was in error about the granite. I had only seen hand specimens, and on closer inspection there can be no doubt of its tufaceous origin.

Since I last wrote to you I have seen a good deal of the geology of the lower Waikato and around here and I am sure that you will not object to my criticising your arrangements of the tertiary rocks, and proposing another, which I hope you will criticise and object to as much as you can, our ----- object being to arrive at t---

My arrangement of the Tertiary rocks in Province of Auckland.

Quaternary ----- same as yours
Pleistocene----- same as yours
Pliocene Newer ----- same as yours (omitting Drury & Whaingaroa
Limestones)
“ Older ----- Waitemata Series
Miocene Upper ----- Aotea Series
(a) Kawhia Limestone
(b) Aotea Sandstone
(c) Whaingaroa clay
“ Lower ----- Whangarei Series
(a) Septaria clays & marls
(b) Limestones – Papakura Limestone
(c) Green sandstone with coal
Eocene – Brown coal formation of Drury and Waikato

It is impossible in a letter to give you all the proofs I have got together, but I will tell you what seems to me certain and what uncertain.

At Papakura the Limestone & Greensand are seen resting unconformably on the Brown Coal. The Greensand has thin seams of coal, and a few fossils. I think the same as at Whangarei, but I am not sure. At Turanga Creek it contains Foraminifera similar to those described by Stache as coming from the lower horizon at Whaingaroa.

A few miles south of Waikato Heads a limestone is seen between the “Aotea-Sandstone” and the Mesozoic rocks petrologically like the one at Papakura, but there is no other proof of their identity.

The Foraminifera from the Whaingaroa clay indicate an older formation than those from Orakei (Waitemata series).

At Turanga the Waitemata series are seen to rest unconformably on the green sandstone (Whangarei series).

Near the coal mines Waikato the Aotea series is seen to rest unconformably on the Brown Coal Series.

There seems therefore to be a break and unconformability between the “Waitemata Series” and the “Aotea Series” and another between the “Whangarei Series” and the “Brown coal series”.

The doubtful points in this are:

- 1st Are the Papakura limestone & green sandstone the same age as the Whangarei green sandstone with coal?
- 2nd Is the limestone south of Waikato Heads the same as the Papakura Limestone?
- 3rd Are some beds of sand & clay, on the west coast etc which lie above the Aotea series, and are older than the extinct volcanoes in that district, the same as the Waitemata Series?

When these questions can be answered in the affirmative my arrangement will I think be settled beyond dispute. I consider that the following points are settled now

- 1st The Waitemata Series is much younger than the Brown Coal – The Papakura Series and two unconformabilities intervening
- 2nd The Brown Coal is older than the Aotea & Papakura Series.

I have a few questions that I should like to ask you.⁵

- 1st Have you made out any sequence of the Palaeozoic Rocks in this province, and have you found any fossils.
- 2nd You put down *Turbo superbis* and *Crassatella ampla* as fossils from the green sandstone. Zittel refers them to quite a young formation – are they associated with *Terebratella dorsata*, *Rhynchonella nigricans*, *Purpurea textiliosa* and *Turritella rosea* at Cape Rodney as reported?
- 3rd *Cucullaea alta* and *Dentalium giganteum* are new names to me, where are they described?

If you will answer these questions I should be much obliged.

⁵ MS-443-3/5/1 ends, MS-433-3/4/27 inserted.

I have had letters from Ramsay, Jukes, Haughton, Godwin, Austen and others, but the Provincial Council here never mentioned appointing a Geologist. Not that they would not like to have one, but they have no money, and not seeing my way to a living by Geology I am going to try Sheep-farming in the Waikato.

Believe me
Yours very truly
F.W. Hutton

I have sent a good many fossils home to Dr. Hochstetter, to be named by the same people that named the others.

I enclose a letter from Prof. A. Newton as you are in a better position than I am to assist him. I have told him that I should refer it to you.

5. Hutton to Hector, 26-5-1867

Hocken MS-0443-3/5/2

Epsom, Auckland
26th May 1867

Dear Sir

Do you think that there would be any chance of the Government putting a sum of money in the next estimates for the purpose of having a Fauna of New Zealand published, uniform with the "Hand Book of the New Zealand Flora".

If they would do it it would be very much valuable to naturalist out here as it is impossible to obtain the numerous books & periodicals in which the New Zealand animals have been described. I wish you would use your influence in this matter and if you see any chance of it being done Dr G. Gray of the British Museum might be written to, who would I am sure be glad to edit it.

I have found a curious fossil vegetable in the lava of Mount Eden. It appears to be the pod of a leguminous plant but one not now found in N.Z. I send you photographs of it. I have also sent them to Dr Hochstetter to show Prof Unger.

I have undertaken to arrange the small museum here which has been removed to a very good room opposite Government House.

Can I do any thing for you in the way of exchanges. I should be glad of specimens of the commoner metamorphic rocks, granite, mica schist, clay & slate etc from the Southern Island, if you can send me any.

I might perhaps be able to send you shells or fossils not found south. I should be very glad of fossils and minerals from any part of New Zealand.

I was told that there was a franked letter for me at the post-office some little time ago but I have never received it. Was it from you?

Yours very truly
F.W. Hutton

Dr Hector
Wellington

Could you get for me, or put me in the way of getting Part II of Hookers Flora of NZ? I have ordered one through a bookseller but cant get it.

6. Hutton to Hector, 10-6-1867

Hocken MS-0443-3/5/3

Epsom, Auckland
10th June 1867

My dear Sir,

I was delighted to read your letter and to find most of my difficulties cleared up by the fact that *Teredo heaphii* & c do not occur in the same bed as *R. nigricans* & c. I see that we shall quite agree as to the arrangement of the tertiary rocks, Hochstetters mistake of putting the Waitemata beds below the Papakura limestone and Aotea series having mislead you. How he managed to make the mistake I don't know as in the lecture he gave here before he left he put them in their right place. The Papakura & Wairoa district gives the clue to the whole arrangement and I should much like to go over this part of the country with you.

The Waitemata beds can be traced continuously from Auckland to beyond Howick on the east, and are then seen to rest on the denuded surface of what I call the "Papakura series" which again rests on the Paleozoic rocks. At Papakura however the "Papakura series" are seen to rest upon and overlap the Drury coal, series which in its turn lies on the Primary rocks. There can be no mistake in these sections. The "Papakura series" consist at Papakura of

- a) soft fine grained fine sandstone 50ft or more thick with *Waldheimia gravida* and a *Turbinolid* identical with one I found at Whangarei Heads, and Hochstetter found the same at Raglan in what I call the "Whaingaroa clay"
- b) Crystalline limestone (impure), calcareous grit and conglomerate with numerous fossils. Brachyopods, Pectens, *Cidaris* spines &c &c. 5 to 12 or more feet

- c) green sandstone, in places 200 feet thick. Near the upper part of this sandstone are thin beds of coal, fossil wood & leaves, also *Teredo heaphii* and lower down casts of a large *Cardium*, and other shells.

From specimens that I have seen I have very little doubt but that this series is the same as that at Matakana and Whangarei. If so the Drury coal will be older than the Bay of Islands coal, and the Waikato coal is the same age as that at Drury as it contains the same plants.

You will see by my sections of the Waikato coal district that this coal is older than the "Aotea or West coast series", so that it only remains to fix the position of this latter with regard to the Papakura series. As I do not think that any direct stratigraphical evidence will be found we must depend only upon the fossils, when the occurrence of the *Turbinolid* in the upper part of the Papakura series and in the Whaingaroa clay seems to say that the Aotea series is above the Papakura series, and perhaps the occurrence of *Waldheimia lenticularis* in the former and *W. gravida* in the latter may be also further evidence.

With regard to the details of the "Aotea series" (I do not think it a good name but it must do for the time), the two upper beds viz Kawhia limestone and Aotea sandstone are closely connected, but the limestone is the upper part, and is characterised by *Pecten athleta* and *P. burnetti*, both of which I found north of Raglan. The Aotea sandstone is characterised by *Scalaria lyrata* and *Pecten williamsoni*; -*Schizaster rotundatus*, *W. lenticularis*, *Pecten hochstetteri* & *Ostrea wullerstorfi* are found in both.

The Whaingaroa clay has little if any connection with these and seems nearer the Papakura series. It contains two species of *Turbinolid*, a pecten, *Cucullaea singularis*, a small *Dentalium* and other bivalves that I do not know.

The limestone on the north of Whaingaroa Harbour, is Kawhia limestone, but I do not think it is in place; it seems to have slipped down from a higher level



Boulder formation

- a) Kawhia limestone
 b) A yellow sandy clay with *P. hochstetteri*, a large *Dentalium* & casts of bivalves, and many foraminifera.

This sketch will illustrate what I mean on the east the limestone is in close contact with a sandy clay, and I do not think there is a fault. It is I think merely a slip as a little further north the limestone is at a much higher level.

I am not quite sure where to place (c) whether with the Aotea sandstone or Whaingaroa clay. I think the former but it is between the two and just north of Te Kaha Point it contains beautiful impressions of leaves of dicotyledonous plants, and on top of it is a stratum about 3 feet thick of tough blue clay with leaves and plants.

I did not know that you had been to Raglan.

Now to other matters.

I will send you all the fossils I can. I can send duplicates of nearly all that I sent to Hochstetter and will trust to Providence for getting more for the Museum here.

Next about Mr Tate.

About 10 months ago an Auckland colonist in England (Dr Stratford) wrote to the Superintendent and pointed out the advantages of a Geo Survey of the Province & forwarded a letter from Mr Ralph Tate, of the Geological Societies Museum, saying that he would be happy to be appointed Geological Surveyor for the Province. These letters Mr Whitaker laid before the Provincial Council last year but that august body did not deign to take any notice of them, and they did not even trouble themselves to answer Dr Stratford's letter, so that Mr Tate was rather premature in announcing his appointment.

Major Heaphy had told me that something would be said about a geologist and advised me to write home for letters which I did and have now the highest testimonials from Ramsay, Jukes, Godwin-Austen, G Houghton, Rupert Jones & R Scott, as geologists & from Wollaston, Carte and Percival Wright as naturalists. If I had thought it necessary I could have got many more from naturalists, so that if the very unlikely event should occur of a geologist being appointed for this province I think I have as good a chance as Mr Ralph Tate, especially as I know that Ramsay would not recommend him in preference to me.

Mr Williamson our present Superintendent is much more likely to advance science than Mr Whitaker, and would I think do all that was wanted if he only had the money.

At present I am spending all my time in arranging the Museum for nothing. I have joined a working partner for the run I bought, and am so at liberty to follow science as far as my means will allow. I saw a report in the papers that Haast had resigned so I wrote off to Canterbury to apply, but found that unfortunately it was a mistake.

I will send you soon a box of fossils and rocks of the "Papakura series".

Of course I have no objection to my report on the Lower Waikato District being published, only I wish now that I had made it a little more scientific. It was

written simply for Mr Whitaker's information and not for a scientific public. If possible I should like the coalfield taken from my record map which I made myself from trigonometrical survey and which is correct, which the other is not.

Also please put in more hot springs about 2 miles from the mouth on the Waikorea River at the inland head of the swamp. I have not seen these but they have been described to me by a native.

Also put in another extinct volcano near Mercer. I send a sketch to show its place. I believe that a large number of extinct volcanoes exist between Raglan and the Manukau, there are 3 or 4 near Drury.

I should like you to see the section of the volcano on the West coast it is really beautiful.

The more the map is reduced the better it will look. I am not very proud of it, but the one they gave me to work on was little better than a blank sheet of paper.

Believe me
Yours very truly
F. W. Hutton

Many thanks for the paper on the moa bones it is just what I wanted to see what we have got here. They consist of leg bones, one vertebra and a skull.

Mr Buller would perhaps like to know that within the last two months *Zosterops dorsalis* (Gould) has become very numerous here although before that time it had scarcely, if ever, been seen. It has been common in the Waikato for the last two years.

Could you put me in the way of getting Part Two [?] of Hookers Hand Book to N.Z. Flora? The booksellers here don't seem able to get it.

[*Marginal note:* I send a box by Lord Ashley with no letter, containing a few fossils]

7. Hutton to Hector, 27-6-1867

Hocken MS-0443-3/5/4

Epsom, Auckland

27th June 1867

My dear Sir

As you say that you are describing the New Zealand plants I send you by Mr James Farmer, one of our members, a few that I have here, including the legume from Mount Eden. I hope that the leaves in the sandstone from near Raglan will reach you safely, they are very friable. I have sent you all I have got, you will find an undescribed Mesozoic fern amongst them from near Waikato Heads, and on one of the pieces you will see the lower portion and stipes of the frond. I am sorry to say that the letter you mention as having sent me from Greymouth has never turned up.

Can you give me any information about a mineral called "Taranakite"? Has it been analysed in your Museum?

Can you tell me if any Museum, besides this one, possesses a specimen of the Maori Rat? Has this rat ever been described? Has it ever been found in the middle island? We have a skin here, given in 1853, and I am thinking of describing it, as I cannot hear that it has ever been done. It is supposed to be extinct now in this island.

I have sent Mr Buller descriptions of 3 birds in the Museum that are not mentioned in the Zoology of Sir J. Ross's voyage. Two of them came from Nelson and therefore Mr Buller probably knows them, the third is a quail, perhaps new – we have all the reptiles mentioned in Dieffenbach and two other species of lizard.

The other day I had brought to me a beautiful little mantis not larger than a good sized mosquito with antennae composed of only 3 long joints which look exactly like an extra pair of legs, but I cannot begin a collection of insects yet as we have no cabinet to put them in, and no money to buy one.

I quite agree with you about the "Fauna" One embracing all that has been done, including the large collections taken home by the *Novara*, would be very useful, but more than that is not perhaps desirable at present.

I find the greatest difficulty with the shells, not having any of the books in which they are described. We have in the Museum here Linneus' *Systema Natura*, and I have just presented them with Cuviers *Histoire Naturelle des Poissons* – 22 vols-

As I see no prospect of our meeting for some time I enclose my photograph and shall be much obliged for yours in exchange.

I wrote to Haast the other day about getting a Moa's skeleton for this Museum and received in reply "when I shall get a box from you containing Maori skulls, frogs shells & fossils I will then send you some Moa bones"; but as I do not like bargaining in science I shall say no more about it.

Believe me
Yours very truly
F. W. Hutton

Dr. Hector.

[*Marginal note:* I went to the top of Rangitoto last Saturday with Mr Kinder and he took two photographs of the crater.]

8. Hutton to Hector, 1-7-1867

Hocken MS-0443-3/5/5

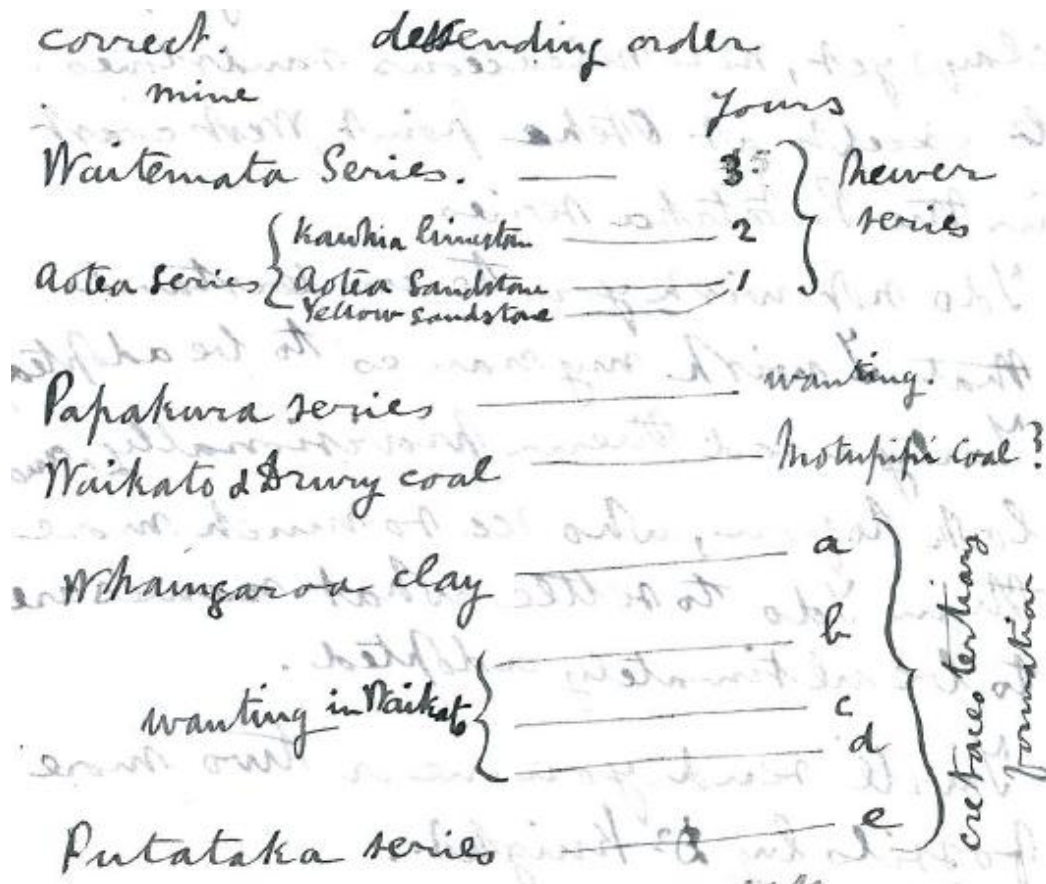
Auckland
1st July/67

Dear Sir

I must write to you again to thank you for your most interesting & long letter.

There can be no doubt but that my Putataka beds are the same as your Cretaceo-Tertiary formation (e) to which the Grey-river & c coal belongs. Near the mouth of the Waikato River they consist of shale, green sandstone and very coarse grits. There are two thin seams of coal with under-clays, with erect stools of trees and prostrate stems.

It is I think very probable that my Whaingaroa clay is your bed (a) of this series; (b) (c) and (d) being absent, and (a) being unconformable on (e). This would agree with what I have seen but the Waikato & Drury coal would then be between my Aotea sandstone and Whaingaroa clay. This will make no difference in the coal field as at Whangape Lake the Aotea sandstone rests directly on the clay. My Papakura Series cannot I think belong to your Cretaceo-Tertiary formation but to your newer formation, and its position with regard to my Aotea Series must remain as yet doubtful. Hochstetters sections of Waikato S Head, and further down the coast are quite correct; as also his account of the Papakura Series at Smith & Coopers (now Cruickshanks) quarry. As soon as the dry weather begins again I will reexamine the shell grit at Papakura, but it would be impossible to do it now as it is seen only in the bed of a creek (Slippery Creek) which even in the summer took me sometimes up to the waist. Omitting that for the present and calling the Papakura Series only those seen in the quarry & described by Hochstetter, I think the following will be perhaps correct



What made me say that I thought that the Bay of Islands coal was younger than the Drury coal was that I understood from you that it belonged to the same series as at Matakana, and I think that the Matakana Series is the same as my Papakura Series. I have not been to Matakana.

In your letter you do not mention the position of the Motupipi coal at Nelson. I have not seen any septaria clays yet, nor micaceous sandstones except at Oteha Point, West coast in the Putataka Series.

I do not wish you to understand that I wish my names to be adopted. I only used them provisionally, and look to you, who see so much more than I do to settle what names are to be ultimately adopted.

I will send you one or two more fossils by Dr Knight.

With regard to the Boulder formation, I believe it to be all "my eye" but have not seen enough yet to justify me contradicting Hochstetter. At Raglan and one or two places up the coast it is no doubt a lava decomposing; at Drury & on to the Waikato it is a totally different thing being there a pleistocene clay with large rolled boulders of basalt, and a few smaller ones of diorite & aphanite from the Palaeozoic rocks of the Hunua Range. I have not examined it more to the west, and by far the greater part of the country between the Waikato & the coast is totally unknown, and quite uninhabited, it will take a long time before this can be properly done as no surveyor even has been there yet. I believe that a considerable number of extinct volcanoes will

be found about here and that the boulder formation is local about there and consists of water worn boulders from there – and lava decomposing in situ. I did not think myself justified in doing away with Hochstetters basaltic plateau at such short notice and so simply limited it as much as I could and called it “Basaltic boulder formation and Lava streams”.

Major Heaphy M H R. VC &c &c will bring you down some copies of your map of the north part of the province.

Dr Knight agrees with me that the Rev. J. Kinder’s photographs of the hot lakes are better than Bartletts, so I shall get you some of them, but as you mention Whangarei Coal mines I will send one of Bartletts of that place.

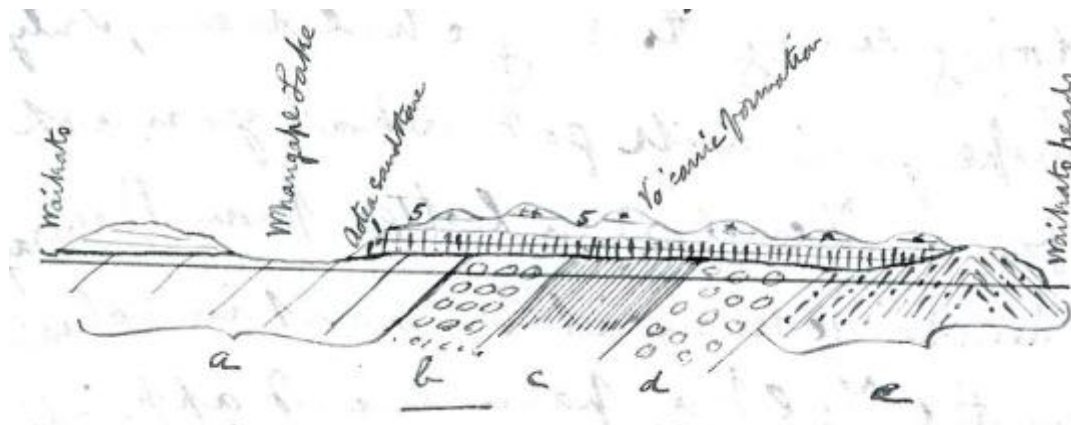
Mr Kinder has a very fine photograph of a kauri tree at Coromandel, would you like this too.

I must now thank you for saying that you will try to get me on your staff this session, it would really be too delightful to be in a position to give my whole attention to science without thinking that I was doing wrong to my children. I only hope you will get what you ask for. I enclose a letter from Ramsay; please return it me as it is valuable until I get a permanent appointment.

I am not certain that my Whaingaroa clay is conformable within the Aotea Series but I think it is in Waikato.

If I find that the shell grit from Papakura is really interstratified with the other beds, I should then perhaps be inclined to put the lot above the Aotea Series and, as you say, make them the base of the Pleistocene. How they will go with the Whangarei coal beds I must then leave till the summer, when, if I am on your staff it will probably be the first thing that I shall have to trace out.

It is quite possible that your b, c & d may be hidden in Waikato by the younger series this way



After my first report & map I went again to the coal field and made a correct trigonometrical survey of it with a 5 inch theodolite & level.

I sent in a map of the coal field showing all the features of the ground on a scale of 2 inches to a mile, and then of part of the field proposed to be sold on 8 in to the mile & a survey of the present mine on 2 chains to an inch.

Yrs F. W. Hutton

9. Hutton to Hector, 12-7-1867

Hocken MS-0443-3/5/6

Epsom, Auckland
12th July 1867

Dear Sir

Mr Brown & Campbell of Auckland have just commissioned me to go to Poverty Bay for them to report on the Petroleum springs. I shall start in a day or two.

I return the proofs. They are excellently printed better than anything we can do here.

I suppose that I shall be away 3 weeks.

Yours very truly

F. W. Hutton

Dr Hector

10. Hutton to Hector, 15-7-1867

Hocken MS-0443-3/5/7

Epsom, Auckland
15th July 1867

Dear Sir

I send you some more letters that you can do as you like with. I hope you will be successful in getting me on your staff, and am very much obliged for the trouble that you are taking about it; but I am afraid that it is too good to be true and that you will be told that there is no money.

I ought perhaps to tell you that I know a little chemistry and underwent a six months course of inorganic analysis with Prof. Leiving of Cambridge when he was professor at the Staff College.

I am expecting a balance; chemicals &c out by the *Siam* in a few months, so that I might perhaps make myself useful during the winter months by analysing the ores & volcanic rocks & c of this province. I have also geologised, more or less, in the British Isles, parts of Germany, France, Italy, Sicily, Crimea, Gibraltar, and Switzerland in Europe; Madeira, St. Vincent (one of the C de Verde Isls) and Cape Colony in Africa; and in some parts of the Province of Bengal as far north as Lucknow and Futteghur.

I start by the next boat for Turanga-nui, Poverty Bay, my instructions are to see the springs there, and then, if an opportunity occurs to see those at Waiapu. I should much like to go from Poverty Bay to East Cape and Hick's Bay, but am afraid that it will be too expensive.

I wish you were going too.

The district about there is certainly one of the most important in this island.

Dr Pollen says that he will send you the original maps of the Waikato coal fields as soon as the sale is over, (15th August). I should not have time to copy them before I go, and the sale will take place very soon after I return. I have bought four photographs for you from Bartlett; coal mines Whangarei; Manaia; Caves; and Waterfall; I will pick out the rest from Mr Kinders collection, and get him to send them all to you while I am away. Bartletts photos are 5/d each (unmounted). He has none of the Hot lakes. I hear that Dr Haast is to get £1700!!! for arranging the Canterbury Museum, and that his services are then to be dispensed with. I suppose you don't know of any more museums to be arranged on similar terms?

Yours truly,
F. W. Hutton

[*Marginal note:* You must take some of these letters, especially the first ones, with a grain or two of salt, but you need not say so to ignorant statesmen. F.W.H.]

11. Hutton to Hector, 16-7-1867

Hocken MS-0443-3/5/8

Epsom
16 July, 1867

Dear Sir

As no boat has sailed yet for Poverty Bay I take the opportunity of telling you more about what I have done about your photographs.

Besides the 4 I got from Bartlett I shall get one today of Mullers of the Te Tarata spring Rotomahana which is probably the one that you have seen. I have also chosen 14 from Mr Kinder, all of the Hot lake country. One of these is a double one, which will make 20 in all at 5/d each.

Some of Mr Kinders are not first rate as photographs but are very interesting in a geological point of view. One of them is of the empty crater of Te Tarata. According to him the natives have only twice seen this crater empty, the last time he happened to be there and photographed it, so that it is not likely that another photograph of it will be taken for a long time.

He also has several good photos of Forest scenery and one in particular (a double one) of a kauri tree at Coromandel.

Bartlett also has some good ones from Whangarei, including one of the lake above the coal mines, which is I presume a crater. I do not know if you would like any of these.

Mr Kinder proposes this next summer to take a series of the volcanoes around Auckland, from points that I think of most interest.

I hope Major Heaphy brought you the maps.

I will send you a copy of Hochstetters lectures on the Geology of Auckland and Nelson as I do not think that you have got them.

In your list of reports on the coal deposits of New Zealand you omit a report on the Drury coal by Dr Hochstetter published in the Provincial Gazette somewhere about 1859. I have not a copy of it, although I have read it, and I do not know if a copy can be got now.

There is nothing much in it.

I should much like to have a talk with you about the tuffaceous beds, with mica, at Whangarei. I have never before seen mica in tuffaceous rocks; can it be owing to metamorphism? At Whangarei Heads some of the beds, possibly tuffaceous, contain fine crystals of garnet. If I am lucky enough to get on your staff I think I must run down to Wellington and see you and your collections before making any explorations.

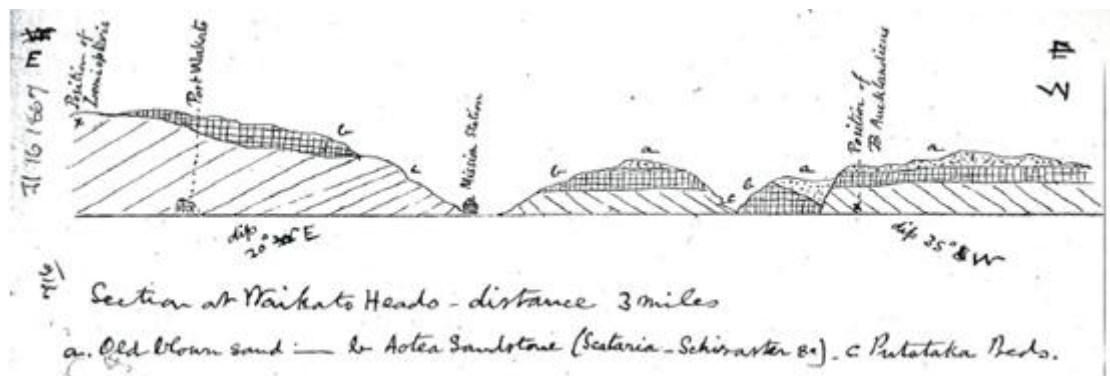
Believe me
Yours very truly
F. W. Hutton

I sent you two letters by the mail that left here on the 27th June. One contained my photograph (and asked for yours in exchange) and some sketches of leaves from the Waikato coal mine. The other was unstamped, as I only just caught the post, and contained sketches of leaves from Kawa-kawa.

I also sent you two small parcels of fossils, one by Mr T. Farmer, and the other by Dr Knight. F. W. Hutton

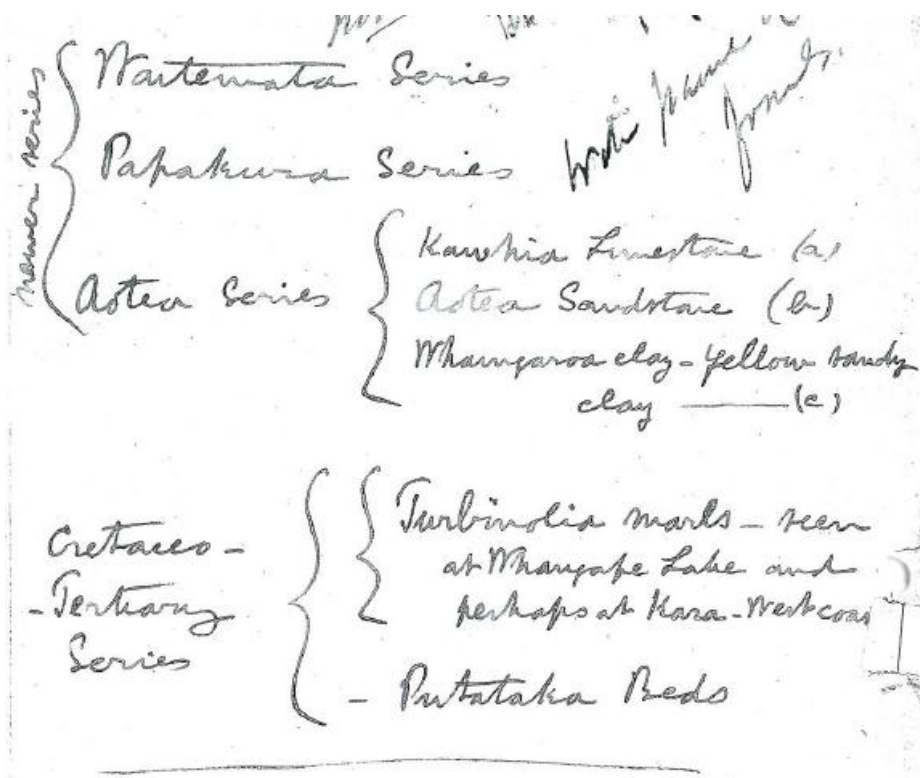
There is in the Museum here a specimen of *Polypodium hochstetteri*, evidently from the "Putataka beds" and left here probably by Dr. Hochstetter. I can see the differences that you point out between it and the one I found. The Belemnite was the only one that I found. I was at a lower level in the series than the ferns, but I could see no mark of a division in the series which is composed of thin beds of shale mudstone.

F. W. H.



[Sequence on following page]

My latest



I think it will be best to limit my Whangaroa⁶ clay to the soft yellow sandy clay with the large *Dentalium* & many foraminifera. It is seen well at Whangaroa Harbour. The fossil leaf I sent you in sandy clay will then belong to my Whangaroa clay.

[Marginal note: Mr Kinder will look out for an opportunity of sending the photos by hand as he thinks they would be spoilt in the post.]

⁶ This is probably a misprint for Whangaroa

12. Hutton to Hector, 2-8-1867

Hocken MS-0443-3/5/10

Auckland
2nd Aug 1867

My dear Hector

Many thanks for the "job". I shall start for the Thames tomorrow. I shall take about 10 or 12 days as I suppose that my object is not only to see how the gold occurs but also where it is likely to be found in the district opened up from the natives.

I got the £5 note all right. I will be as economical as possible, and feel sure that it will not cost £50.

I think Mr Stafford's answer as satisfactory as could be expected. As he did not at once say no I really begin to have hopes.

Yours in great haste
F. W. Hutton

13. Hutton to Hector, 10-8-1867

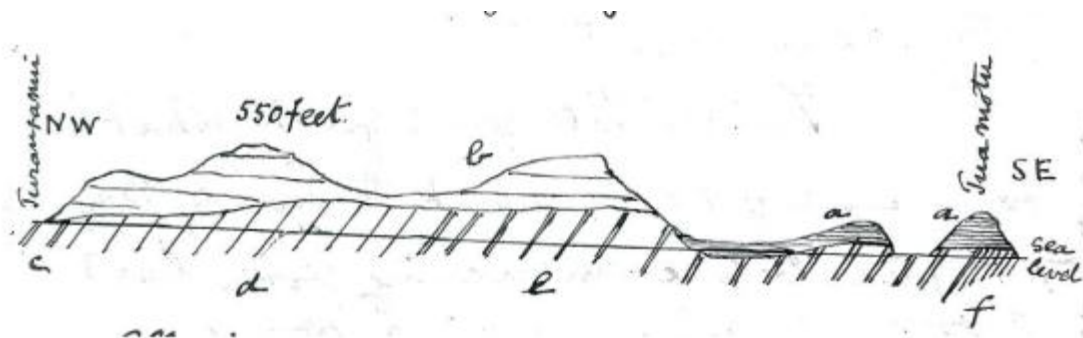
Hocken MS-0443-3/5/12

Epsom, Auckland
Aug 10th 1867

My dear Hector

I will tell you first what I saw in my short visit to Poverty Bay & Napier before answering your last letter; but I must first thank you for the Jurors Report on the New Zealand Exhibition, which I had not seen and which contains an immense amount of valuable information.

I was unable to see the Petroleum springs at Poverty Bay as unfortunately Mr Preece had left Turanganui and there was no European there who knew where they were, and I could not induce any natives to go with me as they said that the weather was too bad and that there were a lot of Hau-haus about. I learnt from them that more water than oil comes from the springs at this time of the year and that it will be October before the oil can be got anything like pure. I give you a section along the north side of Poverty Bay, distance 21/2 miles



- a- Alluvium and yellow & green sandy clays with lignite
- b- Hawkes Bay series? Upper part very fine soft white sandstone, looks very like chalk, lower part yellow gritty sand – 450 ft – no fossils
- c- Gray sandstone and laminated clays
- d- Marlstone
- e- Same as c. The clays are absent in the lower part
- f- Laminated clay

These beds have a SW & NE strike and the dip varies from 30 degrees to 80 degrees NW. I calculate that they must be collectively 7500 feet thick. The junction between e and f is obscure, the others pass into one another. Fossils are few, but I got some that I will send to you, most of them are from d. One of them I was surprised to see is the *Pecten*, figured by Hochstetter as coming from the Papakura beds, belonging to the group *P. pleuronectes*. There are a few fragments of *Echini* too much broken to be of any value, and 2 or 3 species of shells. I have seen none of them before. I shall reserve what I have to say about Napier until a future letter as I am expecting samples of the strata bored through by the artesian wells to be sent me. I may however say th[at] I believe Hochstetters section to be wrong. The clays & lignite are alluvial and younger than the limestone of the Hawkes Bay series, and the whole rest on Paleozoic rocks about 50 feet below the sea level at Napier. The artesian wells are only in the alluvial flats.

I forgot to say that the specimens that Mr Preece brought from the Waiapu springs belong to e in my section.

You forgot to put your photograph in your last letter.

I adopt your classification because you have seen so much more than I have; and I have seen nothing against it. But I confess that from all that can be seen in Waikato I should never have thought that the Turbinolid marls at Wangape had any connection with the Pututaka Beds, however it is quite possible, and having now seen some of your sections, and you having seen my fossils, I am quite ready to agree with you. From all I have myself seen I should have put the Pututaka Beds as Neocomian, and the Turbinolid marls as Eocene resting unconformably on the older ones, but I think I should have been wrong.

The Belemnite I sent you was from an indurated shale bed, about half way between the Mission Station and the point (west of the slip of Miocene rocks as shewn on Hochstetters section). I believe it to be below the plant beds found some 6 to 7 miles further down the coast.

The leaves in the yellow sandy clay I sent you were got in boulders lying at the foot of cliffs that I could not get up. These cliffs were my new Whaingaroa clay at the base, and the boulders were very similar in appearance, but it is quite possible that they may be only in an old blown sand; a little further north I found the Whaingaroa clay to have a tough bed of clay with vegetable remains on the top and then coarse grained blown sand. It is probable that both the clay and the sand with leaves are of very late date.

My wife suggested to me that my so called pod was the tail of a bomb, but it looked too organic to my eye: it certainly has much the appearance of having been articulated on to something else, but I have no doubt but that you are right.

Parts of the Waitemata series contain much clay iron stone. There is plenty of it in Hobsons Bay and it is just like the oolitic ores that they are now smelting in the Midland counties of England. Some of the clays of this series also contain crystals of selenite. A man is sinking now for coal a few miles west of Auckland, he will not stop for me, as he has got "indications".

I have not been to the Bay of Islands. I suppose you know that a Mr J. McLeod has commenced to open the mine.

Waltons Mine is nearly stopped, and he has spent no end of money in boring through Paleozoic rocks to find another seam. I believe that three seams exist in the opposite way to the one he is trying, but Mr Bedlington seems too proud to ask for advice.

I shall certainly take the first opportunity of reexamining the Papakura district, as it is very perplexing the different fossils found there and its position with regard to the Drury coal. I am perfectly satisfied that it is older than the Waitemata series, but its relation to the Drury coal is only seen in a small ravine thickly covered with bush. I do not know what value you put on the foraminifera as evidence, but I recognised several species that I found in it as those figured in Hochstetters book as coming from the clay in Whaingaroa harbour, which would be my new Whaingaroa clay.

Sir G. Grey told me that he had sent a Maori rat to Dr Gray, British Museum, who said that he could see no difference between it and the rat of the Pacific Isles, what the name of this rat is I do not know. I will send you a sketch of the one I have with your photographs, so that you may see if it is like yours.

The last photograph I got only cost 2/d as it is a small one so that makes £4.17 in all. I must see Mr Kinder about sending them off. I have got Hookers Flora Part II, so you need not send another copy. I return you all your letters that have sections in them, please let me have them again, for although I have copied the sections to prevent accidents, there is much information in them that I do not want to lose.

I am getting disgruntled with the Museum here they wont even buy bottles to put things in, or turpentine for the birds, in fact I have to keep it clean myself. I have spent about £10 already on it, and don't mean to spend any more.

I am only waiting until the Pro Council sits again when I shall give it up unless they vote £100 for it. They have not spent a single sixpence on it since 1858, except just before Mr Williamson went to Wellington. He gave me leave to have more books bound. A gentleman here has offered to make an herbarium if I can get a cabinet, but there is no money.

Yours very truly
F. W. Hutton.

I hear from Jukes that some of the Fellows of the Geological Society, returned him his paper on the Devonian Rocks with the cover torn, in some cases so torn that he could not make out who sent it him back. Jukes is not the sort of man to take that sort of thing easily, and I hope that he will compel the Society to alter their rule about publishing papers.

I should be much obliged for copies of any reports, papers, essays, and maps, sections & c that you have published on the Geology of New Zealand.

F. W. Hutton

Your Kawhia section interests me much as it proves I was so right in the Waikato, but I did not see there so complete a section of what I called the Aotea series. From what part does the Ammonite come from?

Fragments of a large fresh water bivalve are very common in the shale of the Drury coal field. I got one quite perfect, but it all fell to pieces on drying before I got it home. I put it together as well as I could and sent it to Hochstetter. I do not quite understand what you mean by the quality of the coal having some connection with the underlay of the fault, and that the anhydrous coals are generally on the west side of dislocations? Do you mean that the faults generally hade or dip to the east and that the easterly or down thrown portion has not undergone so much change as the westerly?

I should much like to make a trip from Napier round the coast to East Cape Opotiki & Tauranga, but it would want a regular expedition with horses, tents & c.

F. W. Hutton

14. Hutton to Hector, 17-9-1867

Hocken MS-0443-3/5/15

Auckland
17 Sep [1867]

My dear Hector

I have hurried to get off my report today. I have had no time to examine (nor indeed have the means) the rocks minutely. I send specimens of all and if you find that they are not rightly named please tell me & alter my report.

I send an ore from the Gt. Barrier that I wish to know what it is. It seems to be Blende or it might be a sulphide of tin.

I am anxious to hear how you succeed about my appointment. I hope salary wont stand in the way, as I will take anything they offer.

I have not drawn for the money & shall not until I hear that it is passed.

Yours in great haste

To ----the mail

F. W. Hutton

I have only had 24 hours to prepare map & report but I wanted to send it by this mail.

There are about 400 men on the ground – 200 miners rights had been taken out on the 11th.

I will send you your analyses soon but want to copy them.

Would not the decomposing white felspathic tufa make kaolin.

[Geological sketch map of the Thames Goldfield on the next page]



Figure 3. The first geological map of the Thames Goldfield, compiled by F.W. Hutton (15 September 1867).
Hocken collections, part of MS-0443-3/5/14

15. Hutton to Hector, 3-10-1867

Hocken MS-0443-3/5/18

Epsom, Auckland

3d Oct 1867

My dear Hector

Many thanks for the Photograph and cheque.

I am not quite sure what you mean by the "Pyrites speckled rock labeled tufa", as pyrites is found both in the tufa and in the dykes cutting it. I may perhaps have put tufa by mistake on a compact felspathic rock studded throughout with rather larger crystals of pyrites than usual from a little north of Tararu. If so it is a mistake. I know that in my hurry I put aphanite on some compact rocks weathering red, but which now seem to me acidic although they feel heavy. I had no means of taking even their SG. but I have just heard that my balance & chemical have been sent by the last Panama mail so I hope to get them in a day or two.

This felstone rock with pyrites occurs on both sides of the point near the Waiohanga marked Felstone in my map which felstone is the compact white one without pyrites. If there are any Paleozoic rocks in the district they must be here, this portion is rather obscure, but I will run down to the Thames again and have another look at them, and shall be much obliged to you if you will delay publishing anything until you hear again from me. The compact light green rocks that I have labelled (wrongly) aphanite are undoubtedly dykes in the tufa. The basic rocks are also dykes (except the boulders) but I cannot state which are the oldest. In fact the only doubtful part is just the point north of Tararu and which I mean to go and look at again. None of the reefs have been followed down far enough to see whether they penetrate through the tufa. No slate rocks or boulders of slate are found in the district, in the streams or on the beach as far as I saw.

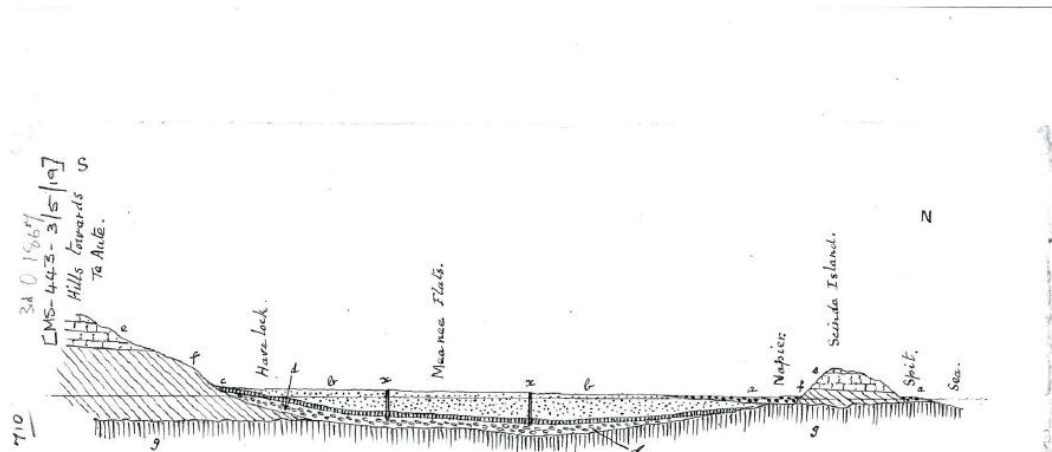
I am very much obliged to you for the trouble that you are taking about me. I think that I could do a good deal this summer for very little money; for instance Mr Allan of Gt. Barrier Copper mine has promised me the use of his cutter, and to go with me over the Gt. Barrier Island. Sir G. Grey also promised me his whale boat to visit the islands in the Hauraki Gulf. I don't think anything could be more instructive as I should get so many sea sections. My only fear is that I shall not be able to afford the time, for I must really be doing something to bring in a little money, and unless I get good news from you before long, I am thinking of trying to get mathematical tutor to some of the schools here. If however you could manage to screw £100 cash out of Mr. Stafford for my salary for a year, I would do all I could in geology for you without any further expense to the Government. I should very much enjoy a trip with you, but that I suppose is impossible.

I suppose you have seen good sections of the Tufa at Coromandel, and so can say decidedly that it is Tertiary.

It looks much older than any of the volcanic rocks that I have yet seen in the country. I was half inclined to call it a Felsite tufa. You will see by the section I send of Pakihi, and the note attached [2 diagrams on separate page], that the Paleozoic

slates and sandstones at Taupo on the opposite side of the Thames dip only 20 degrees W.

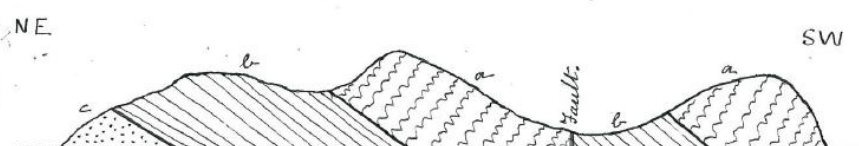
Believe me
Yours very truly
F. W. Hutton



- a Recent Shingle beach (pebbles from g)
- b Alluvial sand and silt. (100-150 feet)
- c Blue clay and peat with trunks of Totara, Matai &c (1 to 40 feet)
- d Old shingle bed in which the water ~~is~~ found.
- e Shelly limestone with *Pecten Giffordii*, *M. lenticularis* &c (400) } dip gently N N W
- f Soft sandstone with fossils (300?)
- g Hard blue sandstone, jasperoid in places. (dip unknown)

x. Artesian wells 117 to 203 feet. It is supposed that at Mearns the water would ascend 20 feet above the surface, but no experiments have been made. It rises sufficiently high to supply Napier.

Section at Napier, distance about 15 miles.



Section through the Island of Pakihi, Kauraki Gulf. distance 1 1/2 miles

- a. Jasperoid slates with large quantities of Manganese and Van ores.
 - b. Soft blue slates and sandstones, weathering yellow. The sandstones contain rounded boulders from c. (1500 feet)
 - c. Hard blue and green sandstones. The blue crystalline, the green granular.
- This series dips from 25° to 35° W.

At Taupo (Kauraki), on the main land just opposite; the formation c. extends from Oreni point nearly to the settlement dipping 20° W. At the settlement and for some distance to the west the formation b. occurs.

All three (a, b, c) are roughly cleaved both at Taupo and Pakihi, the plane of cleavage dips 80° W.

16. Hutton to Hector, 17-10-1867

Hocken MS-0443-3/5/21

Epsom, Auckland
17th Oct 1867

My dear Hector

I have just returned from the Thames. I found near Waiohanga below high water mark, buried in sand a small quantity of arenaceous primary slates. The bedding was quite distinct and I had no doubt about the dip. 35° SW. I now think that the white rock I marked Felstone is an old tufa, and nothing to do with the one in which gold is now found. I sent you a specimen marked "Felstone" – it is certainly stratified. I am also convinced that the sandstones I saw in the creek north of Tararu, are not Tertiary, but the same as the slates on the beach, lying as they do just in the line of strike. This alters my section considerably, but it is better to put it right than to let it be published incorrect.

The "Pyrites speckled rock" at Waiohanga from the old drive for copper, although nearly compact, is undoubtedly part of the trachytic tufa, as I found a round stone of diorite in it. To make sure that we both mean the same, I send a scrap of what I mean by the "Pyrites speckled rock".

Some very pretty crystals of sulphide of antimony (I suppose your Stibnite) have been found in the tufa in the Waiotahi creek. I send a small piece so that you may see if it is Stibnite.

The rock, forming dykes, that I labelled Aphanite, and afterwards said in my last letter I believed to be acidic, must I think be called "compact trachyte" as I find that its specific gravity is 2.68 and that it contains 58.28 per cent of silica.

I am very badly in want of a book on Mineralogy as they forgot to send me one with my chemicals. I have however written for Dana, and Bristow.

The Thames gold field is certainly very rich. I do not know in how many places gold has been now found but suppose between 15 and 20. Most of them are very rich and as soon as machinery is up a considerable quantity of gold will be sent up.

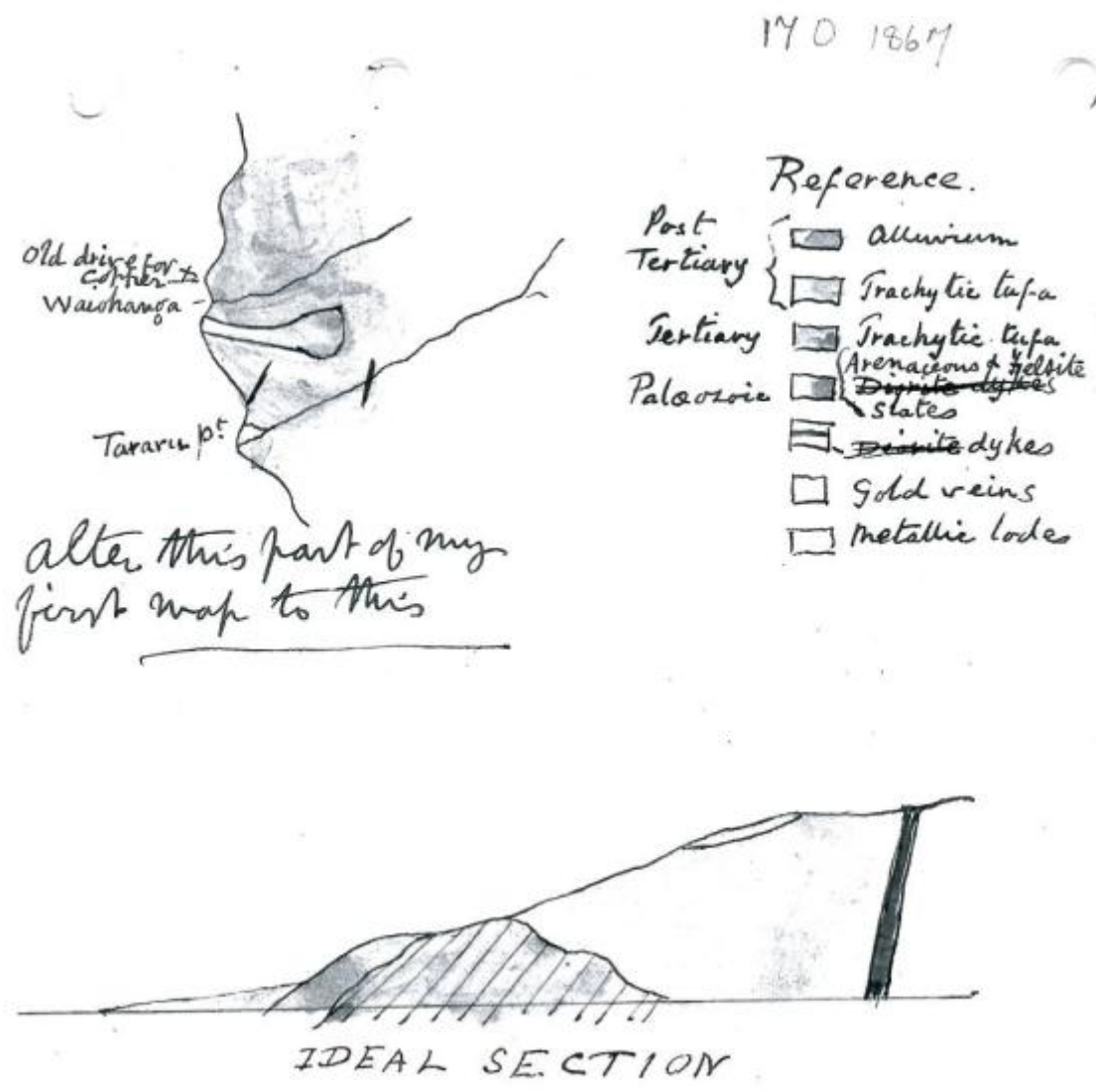
No gold has as yet been found north of the Opitomoko, nor more than two miles from the sea.

Is it not possible that by the decomposition of the iron pyrites and the tufa, which according to your analyses contains potash, a sulphide of potash might be formed which would dissolve the gold and redeposit it in veins along with the quartz.

Should you have any objection to my sending a paper about these gold fields to the Geo. Soc? If you would send one at the same time about Coromandel it would make it much more complete and interesting. If also Mr Skey would send me an appendix on the rocks of the district it would be an improvement, and I would send it

along with mine. As the information was got at the Government expense I shall of course do nothing without your leave.

Believe me
Yours very truly
F. W. Hutton



Omit the dyke just North of Waiohanga at x, and the word Felstone just South of it.

After the reference – for “mineral veins” read “metallic lodes”.

Mr Buchanan will change the map & sect.

17. Hutton to Hector, 9-11-1867

Hocken MS-0443-3/5/24

Auckland
9th Nov 1867

Dear Sir

I am much obliged to you for sending me a proof of the Report on the gold fields. If you have plenty of them (in the pamphlet form) I should be much obliged for two or even three copies. I should also like two or three copies of my Waikato report, which I have not got, and also a copy of the Museum report.

Yours very truly
F. W. Hutton

R. B. Gore Esq

For Mr Skey

Hector sent me from Mr Skey the following analysis of "Dufreynosite" from the Great Barrier

S	22
As	20
Pb	55
Ag	20
Cu	3
Fe	3
	<hr/>
	123

Would you please ask him if this is right and if it really contains 15.3 p.c. of silver

F. W. Hutton

On referring to my book I find the mineral here alluded to contain but trace of silver. Had it contained 20 p cent I should not have named it Dufreynosite. That has been made in the copying of my Report in beside evident from the sum total which is more how ever I make analyses up to.

The analysis Cap^t Hutton quotes is only given by Dr Hector to show or to remind Cap Hutton of the general composition of Dufreynosite – and in giving without – due report to his decomposition this it should –

S	22
As	20
Pb	55
Ag	.20
Cu	.30
Fe	.30
	<hr/>
	97.80

Nov 8th 67
William Skey

18. Hutton to Hector, 10-11-1867

Hocken MS-0443-3/5/25

Auckland
Sunday 10th Nov 1867

My dear Hector

I am much obliged to you for the liberal way in which you have provided me with funds. I will do the best and the most that I can for you. I start with Mr Allan for the Great Barrier tomorrow. I have to take this first as there seems a chance of the cutter not belonging to the Company in a months time as the Company is on its last legs. I have therefore to take the cutter while I can get it. Of course going "on charity" I cant go just where & when I please, but I think that before I come back I shall have done both the Barrier Islands and the Mercury Is. Mr Allan wants me particularly to go to Tairua with him to see & report on some land belonging to him & others as to whether or no it may contain metals etc. As Tairua is in the district I have to do of course I am glad to get taken there, and as we shall have to pass the Mercury's on our way, we shall of course stop at these. Have I leave to make a private report to them? Of course it would contain nothing that I did not report to you. I suppose that I shall be back about Xmas, and then propose starting for Shortland, crossing over to Mercury Bay & doing the peninsula, I shall then return again to Auckland and try to get a boat lent me to do Waiheke and the other Islands near here. I have made arrangements with Mr Kirk, whose name as a Botanist you will know, to accompany me on the first part of my expedition, and he starts with me tomorrow. As we are very poor he has agreed to take 5/- a day for every day that we are out. Of course I don't put him down as extra labour but shall pay him out of my share. He will be a great acquisition to me and I hope by his aid to send you many new plants. I shall get him to write a report on the botany of the districts visited which I shall send to you with my report.

I hope that you will get to Auckland and that I shall be there at the time to meet you. I very much want a good long talk with you. Let me know as early as possible when you will be here. As Gillies lives close to me, if you were to write to him, he could write on to me, as he could always find from my wife whereabouts I was. We have had a most successful meeting in getting up a Branch Society here to be incorporated with the New Zealand Institute. I send you a copy of the meeting.

My prediction as to gold in the Karaka flat has turned out true. I am told that the subscription shaft has been bottomed and not a speck of gold found. Nothing however has been said about it the papers. The Superintendent failed to get the Ohinemuri country opened, but I believe it is all open now for the prospectors from Hikutaia to Cape Colville. I am not sure about it as it is impossible to find out what ground is really open without going to Shortland.

We have to thank Gillies principally for making the meeting so successful. If you go to Poverty Bay, look at the white sandstone cliffs. I can compare it only to a Siliceous sinter. It is not diatomaceous.

Yours truly
F.W. Hutton.

19. Hutton to Hector, 9-1-1868

Hocken MS-0443-3/6/1

Auckland
9th Jan 1868

My dear Hector

I have just returned from the Great Barrier and found your letter of the 16th Dec. By next mail I will send my report and a box of specimens. The island is trachytic tufa on Paleozoic slates, no other tertiary rocks, no gold. I shall then start as soon as I can for the Colville Peninsula. I should get through my work much quicker but you must remember that I have to look a good deal to friends for taking me about.

I was four days at the Little Barrier and was much disappointed, as I saw no lizards nor kiwis, but we were on the wrong side, and I mean to go up there again. It is a trachyte cone, but I shall not make any report on it until I see whether I can manage to get there again.

My supposed new bird is, I am convinced, only the young of *Petroica layrpes* – Kirk got nothing new on the Little Barrier but a fern (*Lomaria*). I think he will have at least a dozen new plants from the Great Barrier but he is very cautious and will not commit himself. The following are some of the new ones – a fine pine (*Dacrydium*) as tall as the White Pine, two or three *Pittosporums*, a *Senecio*, a fine tree called by the natives “Pau”, flowers not got, an *Olearia*, a *Fuchsia*, an orchid, an *Utricularia* and some grasses and sedges.

Kirk will make a most interesting report to you on the Botany of the Gt. Barrier as he has worked out a very complete flora. I never was out with a better Botanist. We shall be able to send you a large parcel of northern plants, good specimens, and as they will be more than you bargained for I hope you will send us in exchange some Southern ones.

The great mistakes in my map of the Thames Gold-field was putting the gold bearing formation down as “Paleozoic Aphanite & Breccia Rock:”, instead of “Tertiary Trachytic Tufa”, and in not altering the section. They have also made me say that the tufa is not older than the Waitemata veins, instead of “series”.

I saw the article you send from the Cross but did not think it worthy of notice. I have not enquired but feel quite sure that it was written by Heaphy. The “black boulder formation” is one of his pet expressions; and the knowledge of geology shown by it is about equal to his, e.g. “no lavas are visible” when three lines before he states that Trachyte and columnar basalt are found there; - “bringing up in a melted state the quartz and the gold” – “crystallic” is another of Heaphys words – Heaphy had just returned from Ohinimuri.

There has been no disagreement between you and me, at Coromandel, where you were, as also in many other places e.g. Gt. Barrier, no gold is found in the Tufa, but at Shortland all the gold yet found has come out of the tufa. Whether auriferous rocks underlie the tufa at Shortland I cannot yet say, as they have not been reached,

some of the gold veins certainly do not reach down into Paleozoic rocks as they have been exhausted already. The Shortland tufa differs from that of the Gt. Barrier by its being strongly charged with pyrites, and cut by dykes of Diorite. Until I have traced the formation from one place to the other I cannot say if they are identical in age or not.

I cannot quite subscribe to your thermal spring theory, the gold, and auriferous pyrites is too widely spread at Shortland, to be accounted for by local causes.

I saw no bird on the Little Barrier with yellow & crimson on the wings. I saw however a night flying bird that I am convinced must be new, the noise it made was most extraordinary and ridiculous. It is rather smaller than a kaka, apparently light colored, and probably an owl or a parrot. I was unlucky, for having lit a fire and waited for it until the fire was nearly out and shot a few petrels, I got tired and took the cartridges out of my gun to go to bed, when of course it flew screaming close over my head, of course I loaded again, and waited until the fire was quite out and of course it never came again. I mean to try to get it yet.

If you would send me a list of the birds you have in your Museum I might be able to send you some. Do you want any gannets eggs. I shall send Buller some notes on the birds. The most interesting part of the ornithology of the Great Barrier is the entire absence of the *Ballide* and the kiwi.

I must have been unfortunate in the specimens of copper ore I sent you from the Thames, all mine give a decided copper reaction with borax before the blowpipe.

I am not quite satisfied with your Palagonite tufa from Whangarei Heads. It makes a first rate fire clay, and so cannot have much lime in it.

If I send you specimens of recent & fossil kauri gum would Mr Skey have time to analyse them? The kauri gum question is very interesting and I don't understand it yet. I am surprised to hear that Tongariro and Ruapehu are altogether younger than the Hawks Bay series.

I have seen a group of crystals of "Stibnite" (is this Skey's name?) from the Thames as large as a mans head.

The Botany of the Little Barrier was very monotonous, it is bush from the top to the sea. The Maories tell me that there are lots of lizards on one of the Fanal Is. I shall go & get some.

Yours truly
F. W. Hutton

I forgot to say that Kirk has not only made a very complete flora of the Great Barrier (considering the short time he had and only one season of the year) but has lists of all he saw from various localities on the island for comparison.

He is a wonderful hand at making a list of plants nothing escapes him from the biggest tree to the smallest lichen, and he knows all the flowering plants & ferns, young or old, in however imperfect a state they may be, and he writes them all down in his book most industriously. It is no small labour writing down in full 100 or 200 scientific names, but is very useful. He is a most valuable man, and you ought not to lose sight of him. His father was a well known landscape gardener in Warwickshire, I think, and Kirk understands gardening as well. Kirk himself was a partner in a saw mill at Coventry, and was obliged to come out here for his health. He has been here about 5 years, and has a farm up the Kaipara, but his wife lives in Auckland. He is 38 years of age but looks much older, he has been very ill most of the time he has been here and it is wonderful how he has found time to do as much as he has. His trip with me has put him in much better spirits & health, but he is still wheezy about the chest, but walks & climbs well, and does not mind roughing it in the least in the cause of science.

I am trying hard to get him appointed paid assistant secretary & curator to our branch of the N.Z. Institute. Poor fellow he is badly off and only gets 5/- a day from me.

He is certainly the best botanist in New Zealand and just fitted for Curator of a Botanical Gardens. I am enchanted with him.

20. Hutton to Hector, 23-1-1868

Hocken MS-0443-3/6/2

Auckland
15 Jan 1868

My Dear Hector

Kirk, who was delayed on the Great Barrier a week after I left, has returned. He has got several more additions, including another Pittosporum, and a new (probably? only leaf) *Metrosideros*. He has also got *Dacrydium colensoi* on the mountains. He says he expects to name 20 additions to the New Zealand Flora. He also thinks that the new pine I mentioned in my last, will not be *Dacrydium* but will have to form a new genus. One of the Veronicas is quite a tree perhaps 30 feet high and is splendid when in blossom, looking just as if it had been covered by a heavy fall of snow.

Besides the boxes of rocks, I send a box of miscellaneous specimens for the Museum and two bird skins for Mr. Buller.

The frog was caught lately at Coromandel. The shells are all from the Great Barrier except the *Bulimus* sponge. The sponges are from the Great Barrier and the East Cape, I don't know that any are rare or confined to any locality. I put them in more to fill up.

I also send a log of wood of the "Pau" one of Kirks new trees. If you could try its strength etc with the machine we should feel obliged.

Sir G. Grey has asked me to go to the Kawau and I mean to do so and take Kirk, and we hope to get his whale boat to visit some more of the Islands. If I had my own way I would sooner go to Coromandel first but I must take things as I get them in order to save expense.

I think you will like the size of the specimens I send, but you must not take them as a precedent for I shall not always be able to have a cutter to carry them. I should like to know your opinion of the rock from Maunga-piko. I believe it to be a sedimentary rock, metamorphosed, but I do not know quite what to call it.

I think we have cuttings or seeds of most of the new things that we have not found in flower. Kirk has found all the plants reported as from the Great Barrier except *Caloroplus elongata*.

Yours very truly
F. W. Hutton

I hope to be able to send you a wood section of the new pine before long.

21. Hutton to Hector, [5-4-1868?]

Hocken MS-0443-3/6/3

Sunday morning
[5th April? 1868]

[*Marginal note-*
I return your aneroid.]

My Dear Hector

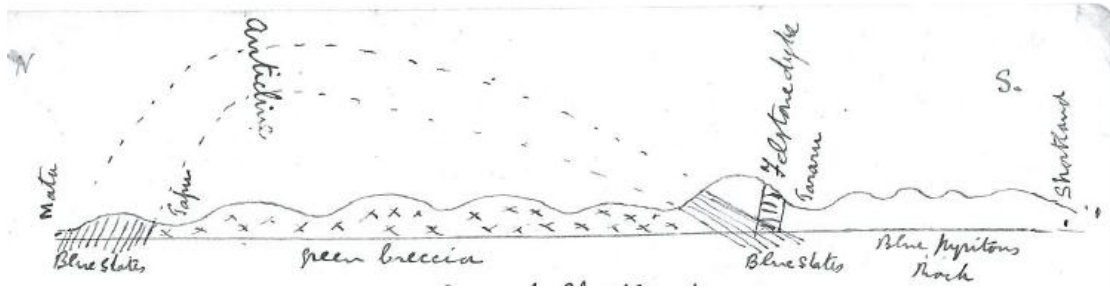
I returned from the Thames yesterday, as you did not come down in the week as you said you would.

You will see by these notes that I leave that I am now satisfied that you were quite correct as to the age of the blue pyritous rock.

I have made up my mind not to go to the Bay of Islands, but up the Waikato next week as it is very important for me to be there now.

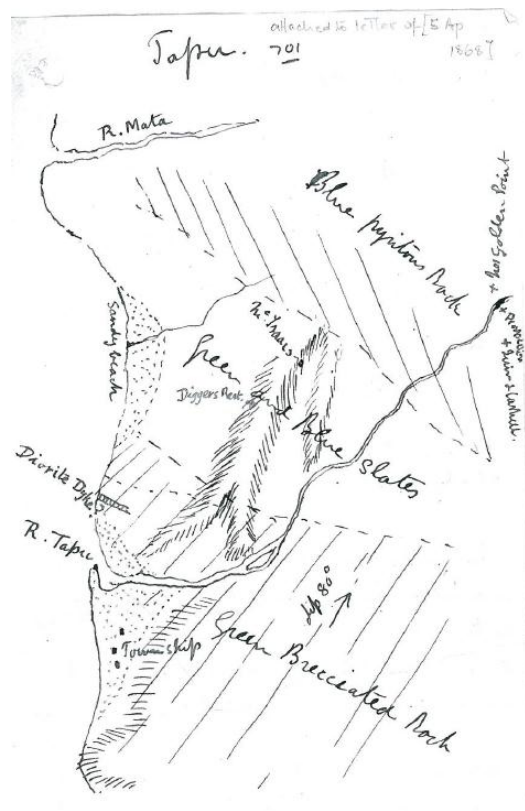
Yours truly
F. W. Hutton.

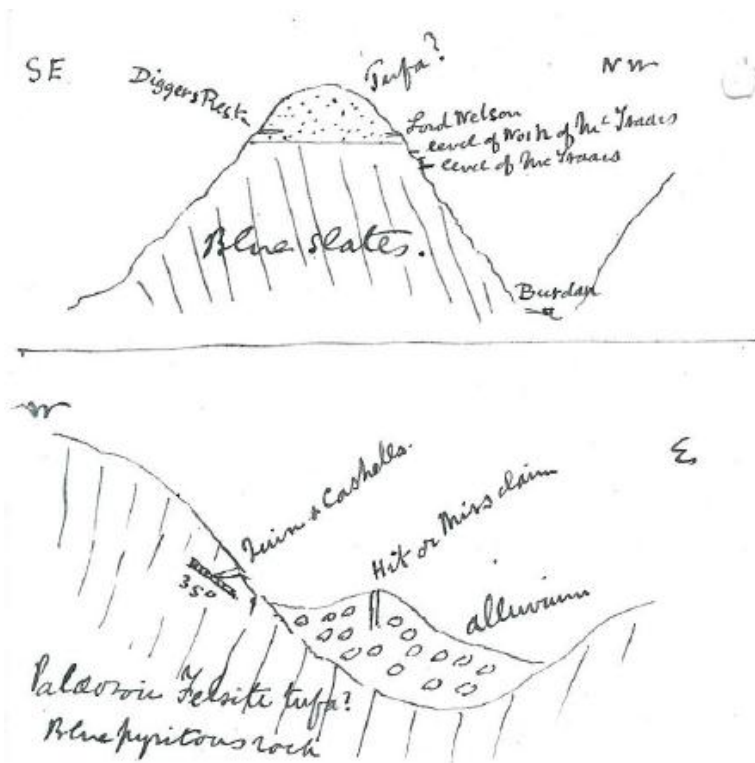
[Attached to letter of 5 April 1868]
 Tapu 701



Supposed section from Tapu to Shortland—

Strike about ESE. – gold has been found in the blue pyritous rock at Shortland etc. Tapu (Cashells) and Coromandel, and in the slates at Tapu (Mt Isaacs), but none yet in the green brecciated rock-. The copper? Lode at Waiomu is in the latter. Tufa with blocks of basalt? overlays the rocks in various places between Tapu and Tararu -. This is probably the Trachytic breccia of Castle Rock-. The blue pyritous rock is cut by dykes of diorite; two of which can be seen up the Moanatauri[sic] Creek.

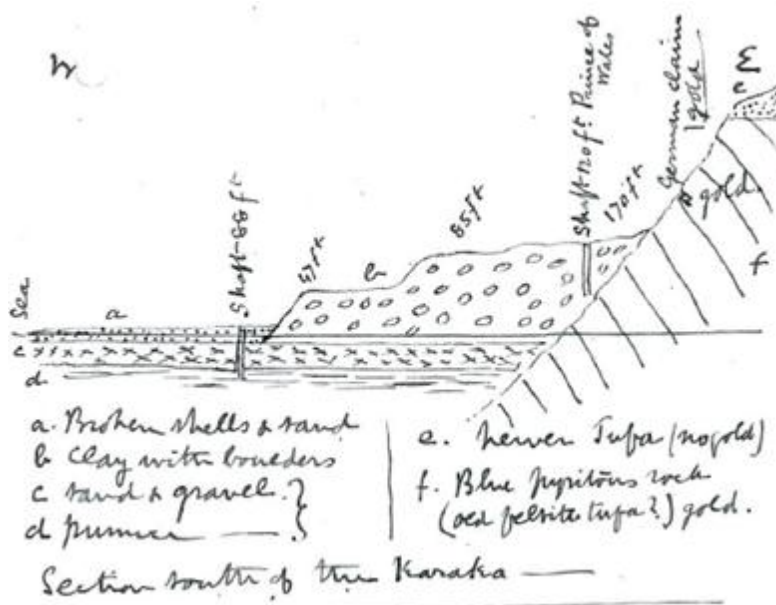


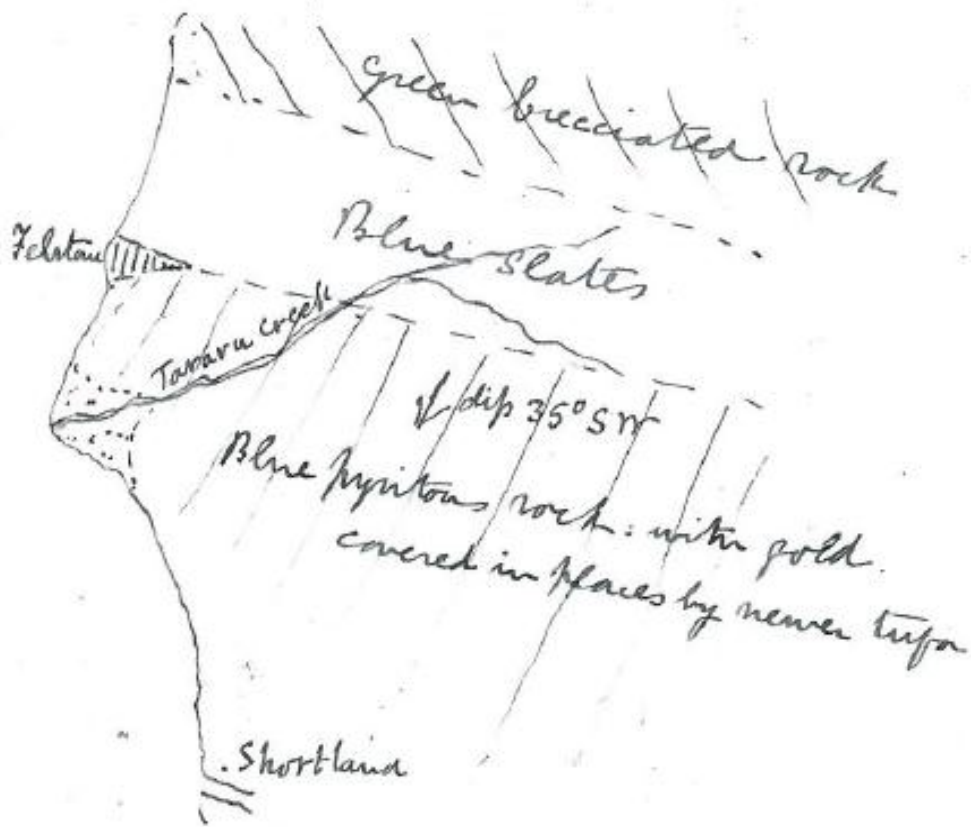


What is the rock of the Diggers Rest and Lord Nelson claim? Does it rest unconformably on the slates?

About 20 feet below the lower drive in the Diggers Rest, decomposing blue slates are seen in the creek-

If you consider that the Diggers claim is in Paleozoic rock, I will give up all my so-called tufa as Tertiary-





[Journal of Thames trip on next page]

Journal 702

Friday 27th March 1868

Went in *S.S. Tauranga* to Shortland

Saturday 28th

Examined the alluvial terraces of the Karaka.

The flat from the sea to a distance of about 300 yards is composed of sand with broken shells, rising gradually from the sea to a height of 9 feet.

The first terrace upon which Mackay's & Baillie's houses stand is 47 feet above the sea level, and is composed of yellow clay with fragments of decomposing tuffaceous rock, angular fragments of quartz, some of which are auriferous, and rounded boulders of a dark colored basalt or trachy-dolerite.

The next well marked terrace is 85 feet above the sea, and rises with several undulations until it rests upon the older rocks at a height of 170 feet above the sea. At this higher level, at about 50 yards from the base of the older rocks, a shaft, called the "Prince of Wales claim" has been sunk for 120 feet through yellow clay, and then pale blue fine tenacious clay (probably a good kaolin) without reaching the rock. There do not appear to be any basalt boulders here, so that probably the boulders are only at the base of the formation, or more likely only about the mouths of the creeks that descend from the hills. This formation is evidently derived from the decay of the adjacent hills. The boulders probably came from a higher level, further back, most likely from an agglomerate or Breccia like the one forming the top of Castle rock.

This alluvium rests upon sand and gravel and pumice, as proved by the bore (88ft) below Baillie's House. This gravel contains stones of the older tuffaceous rock, trachy-dolerite, quartz and occasionally obsidian and Rhyolite, these latter I think prove that this deposit must have been formed by the River Thames.

The older rock, upon which these alluvial deposits rest is a felspathic ash or tufa, gray with pyrites but easily decomposing into a white gritty soft rock stained with iron. There is nothing here to give slightest clue as to its age. The decomposed parts closely resemble an undoubted trachytic tufa of very late age found at Kaiarara and other places on the Great Barrier.

The rock contains veins of quartz with gold. The principal veins run N & S and E & W, both contain gold, small branches are given off towards all points of the compass and these also occasionally contain gold. These veins are regular and persistent over long distances, although not more than a few inches thick, showing that the whole face of the hill is not broken up, although there are a few places where fragments are half detached.

Sunday 29th March [No entry]

Monday 30th. Raining hard could do nothing. Great flood.

Tuesday 31st

Examined the country about Kuranui.

Height above the sea

Barry's Claim _____ 221 ft

Hunts _____ 163 ft

Difference ___ 58

The rock at Hunts is hard blue and pyritous and looks decidedly like a Paleozoic rock. It decomposes into the same white tuffaceous rock with red stains as on the Karaka and Hope. I do not see any great change in the formation below Hunts, it is certainly softer but that is nothing, the whole looks very Paleozoic but one must not lay too much stress on appearance only.

Very wet.

Wednesday 1st April

Went up the Hape [stream].

Royal Standard Flagstaff _____ 764 feet

Portuguese Claim _____ 700 "

Smiths Claim _____ 649 "

Portuguese Claim – Drive and cross drives in the same soft decomposed tuffaceous rock. Leaders highly ferruginous dipping 25°SE but variable from 5 to 14 inches thick – quartz crystalline – leaf gold.

Smiths Claim – Same bed rock but the leader is a fissure filled with brecciated fragments of the same rock cemented together by quartz – about 2 feet thick – dip 55° WNW – small leaders with gold come in from the hanging wall on west.

Dan O'Connell Claim – same rock with quartz veins – no gold has yet been seen in this claim but it is reported to crush well.

In the middle of the day went to Tapu Creek.

"Diggers Rest Claim" – about 650 feet above the sea two drives in the same rock apparently as on the Hope and both the bed rock and the leaders appear almost identical with those of the Portuguese Claim. Main leader dips 50° W but various others occur at various angles and dipping both E and W [*Inserted text* - about 20 feet below this claim fine grained blue slates come to the surface but a little lower down in the?]

Lord Nelson Claim is on the opposite side of the ridge to the Diggers Rest and at about the same level. Here the rock is the same tufa?

No 1 Claim North of McIsaacs, the same decomposed blue slates are seen – Does not this look as if the tuffaceous rock rested unconformably on the slates? Fold is found both in the Diggers Best and the Lord Nelson.

McIsaacs Claim in decomposing blue argillaceous slates – you have seen this and I have nothing further to add.

Thursday 2nd April

Before breakfast went to the Mata Creek north of Tapu.

After leaving the alluvial deposits at the mouth of the Tapu you come to a hard dark-colored basalt? Only a few feet thick, probably a dyke – then follows a green brecciated rock, probably an old Felspathic ash, a sandy beach then extends for 400 yards but the hills are composed of hard blue slates, then come hard green siliceous slates full of small quartz veins which extend to the Mata.

The strike of these rocks appears to be E b S and the dip 80° N b E.

South of Tapu the cliffs are composed of the green brecciated rock. This would give the following in descending order

- 1 Green hard slates
 - 2 Blue slates
- Green brecciated rock

After breakfast went up the Tapu to Quinn and Cashells Claim.

Up the Tapu Creek –

Green brecciated rock fine grained in places

This only goes a short distance and is followed by blue slates which go up beyond McIsaacs, then the blue pyritous rock like round Shortland. It is evident that they are all Paleozoic rocks and conformable in the same series.

Prospectors Claim, about 1 ½ miles from Tapu township, blue felsite tufa? leaders dipping 65° E.

Montezuma Claim, same rock.

Quinn & Cashells Claim, same bed rock, very short drive. Leader dips 35° E b N.

Hit or Miss Claim. Shaft in alluvial deposit with the intention of hitting Quinn and Cashells leader, but as the leader dips at 35° and the slope of the hill is nearly 50° it seems probable that the leader has been denuded out (see section)-----

No 1 Golden Point Claim. Same rock as the opposite side, much decomposed and soft very rich apparently----

Went back to Shortland.

Afternoon went up the Moanatauri[sic] Creek.
The Carpenters claim _____ 946feet
Clarks Hill at Junction _____ 174feet

The numerous drives and cuttings up this creek expose it well and show the bed rock to be the same Paleozoic Felsite Tufa? as at Quinn & Cashells at Tapu. This satisfies me that the greater part, if not the whole, of this district is of Paleozoic age, notwithstanding its great resemblance to Tertiary tufa's on the Great Barrier. Two dykes of dark diorite? Are seen up this valley.

Friday 3rd April

Went up the Waiotahi.

Same as the Monatauri[sic], added nothing to my knowledge of the structure of the country.

Saturday 4th April

Returned to Auckland.

Answers to questions in Memo

- 1 The terraces round the Karaka are alluvial deposits brought down by the lateral streams and overlie an older deposit from the Thames.
 - 2 I do not think that the newer tufa surrounds the terraces. It is more at the top of the hills. Some of the abandoned holes are in the alluvium (b in section).
 - 3 I have not seen Mariners Claim. I have not been able to find out where it is.
 - 4 I do not see any difference in the rocks at and below Hunts Claim, other than at Hunts it is harder (perhaps from proximity to a dyke). I acknowledge[sic] it all to be a Paleozoic rock, probably an old Felsite tufa – The gold from the base of the waterfall was only detached pieces-
 - 4[sic] Barrys is like Hunts – a Paleozoic rock. The newer tufa occurs on the top of this hill
 - 5 I think that the hard basalt like blocks in the Waiotahi and other places came from a Trachytic? breccia higher up.
 - 6 Tooheys.
 - 7 I cannot say where the large blocks of quartz came from as I have seen nothing like them.
Can they come also from the Trachytic breccia?
-

I consider the age of the blue pyritous rock to be upper Paleozoic – see sections.

The green brecciated rock is in places fine grained and undistinguishable from the blue pyritous rock, especially when both are decomposed. I look upon them both as old Felspathic ashes or tufas.

At two or three points between Shortland and Tapu – e.g. Hongikore and the point north of the Pohue creek, a white tufa similar in appearance to the decomposed Felsite tufa? but containing rounded boulders of Trachy-dolerite? Sometimes, encased in Jasper, is seen- this must be a newer rock probably the same as Castle Rock. I have no doubt but that the Boulders of the Waiotahi, Karaka and other creeks are derived from this formation.

22. Hutton to Hector, 13-4-1868

Hocken MS-0443-3/6/4

Auckland
Monday 13 April/68

My dear Hector

I start for the Waikato by the coach tomorrow morning at 8.00am.

If you want the frog (or toad) for Sir G. Grey, or for anyone you know, who would take charge of it to the Zoological Societies Gardens London, you are welcome to it. Mrs Hutton will give it to you, or anyone that you send for it. It is I think now hybernating, as it eats nothing and has not moved for two or three days. Before it was very lively at night time. It seems to prefer a perpendicular position, head up & tail down. The only thing I have known it to eat is very small pieces of underdone meat.

It came from the Huia on the north side of the Manukau Harbour. It does not like much water. I give it only damp moss.

I hope you will write me a long letter about what you think of the goldfields.

If you would pay my money to my account with the Bank of New Zealand I should be obliged, or Mrs Hutton would take charge of the cheque.

Yours truly
F.W. Hutton.

23. Hutton to Hector, 1-6-1868

Hocken MS-0443-3/6/5

Auckland
1st June 1868

My dear Hector

I send you a paper parcel for Buller containing the skin of a new Cormorant. I would not have troubled you about it but the *Taranaki* is not expected to go to Whanganui. Would you either forward it on to him, or keep it for him.

I have written to him about it.

I am employing my spare time now in working out a new classification of rocks, from a geological point of view, and not from a chemical or mineralogical one. Could you send me any analyses, if you have them, of what we call Diorite sandstone, Diabase slate, Aphanite slate etc. These rocks puzzle me more than any others.

I hope that by the steamer now due I shall receive some money from you, as I am hard up, my partner having just come down with a bill of £70, which he had forgot.

Last Saturday we appointed Kirk Asst Sec of our Institute salary £50 a year. We have a meeting tonight. The papers will be 1 Gillies on his shells, 2 Stewart C. E. on the mortars & cements of Auckland, 3 A paper has been promised to be read on the Thames Gold by some Melbourne chemist. 4 If more time or if 2 & 3 are not forthcoming I am to read a paper on the mechanical principles involved in the flight of the albatross.

I do not know what to say about the gold from the Wade. The stone is micaceous sandstone of older tertiary or newer Mesozoic age, & the gold is supposed to be in the body of the stone. There is certainly none to be seen in all the specimens brought to me, nothing but mica. But Smith of the Bank of N.Z. has tried it 4 times, and each time got some gold out of it, but less on each trial. He declares that his mercury etc were quite pure.

I cannot yet believe it myself.

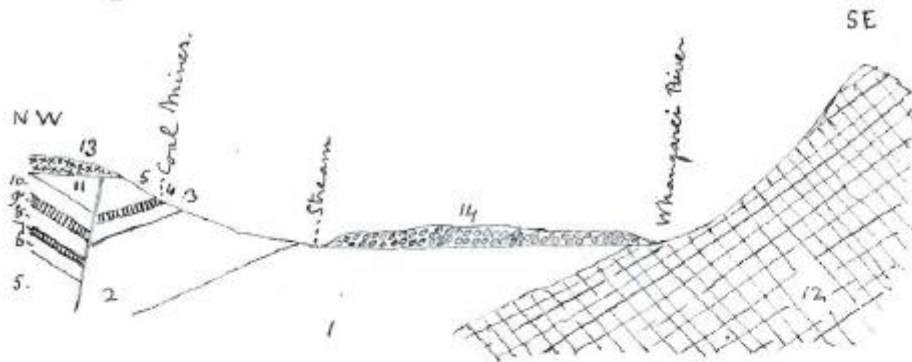
Yours very truly
F. W. Hutton

[*Five Sections attached*]

Section. I.

761

Je 1. 1865



Section across the Whangarei Valley.

- 14. Alluvium - boulders of Trachyte in red clay.
- 13. Trachyte Lava.
- 12. White fine grained granite.

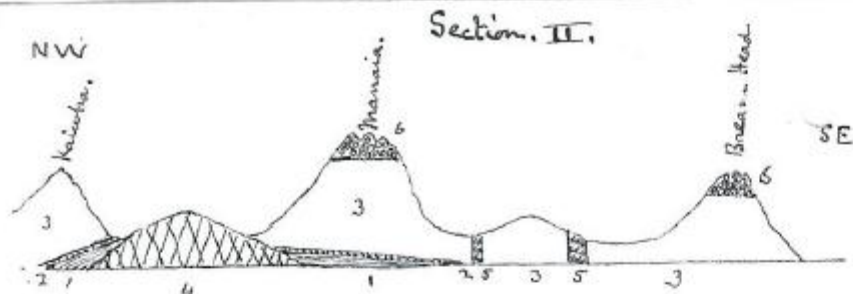
- 11. Unknown.
- 10. Coarse gritstone. 5ft+
- 9. Upper coal seam. 3ft.
- 8. Light gray clay. 12ft+
- 7. Middle coal seam. 5ft.
- 6. Gray and Brown clay. 12ft+
- 5. Green fossiliferous soft sandstone. 50ft+
- 4. Lower coal seam 4 ft.
- 3. Blue indurated shale. 12 ft
- 2. Variegated (red yellow & white) claystone. 200 ft+
- 1. Hard blue claystone with quartz veins.

Mesozoic ?

Paleozoic

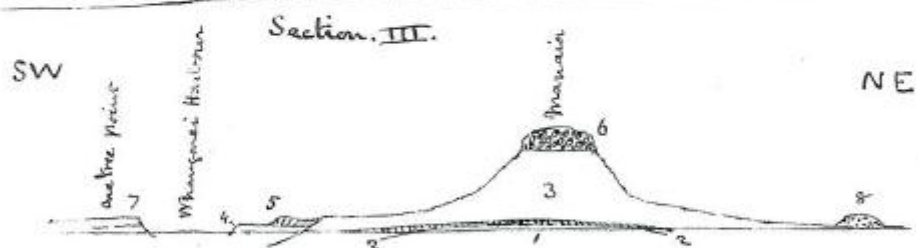


* contains casts of Pecten, Cardium, Pholadomya or ocella, and Fasciolaria. &c.



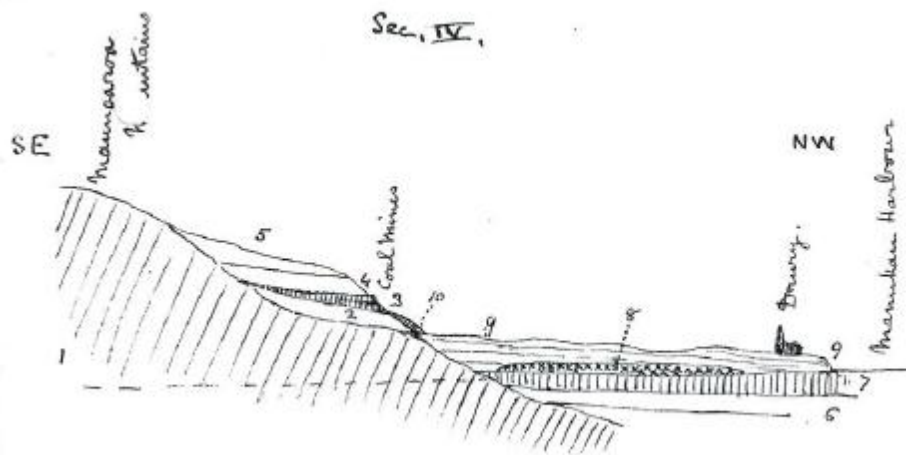
Section through Whangarei Heads.

6. Hard volcanic Breccia.
 5. Dykes of Diorite and Felsite, with garnets etc.
 4. White gneissic granite.
 3. Variegated claystone, 800 or 1000 ft.
 2. Carbonaceous shale, 6 ft.
 1. Hard Blue claystone with gasper and veins of quartz.
- Paleozoic*



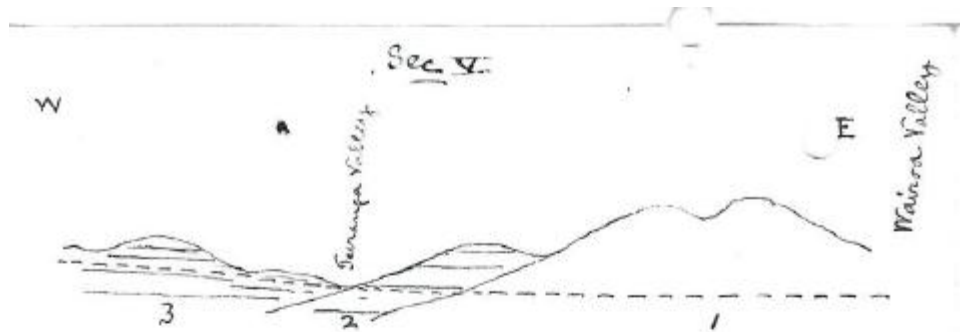
Section through Whangarei Heads

8. Blown sand hills.
 7. a. Soft yellow sandstone with bands of iron sand.
 b. Soft dark carbonaceous sandstone with a black carbonaceous mineral in veins.
 6. Same as Sec II.
 5. Light gray limestone sometimes crystalline, sometimes argillaceous with quartz veins and nodules of peroxide of iron.
 4. Green calcareous sandstone containing fragments of shells Echini and corals etc.
 3. } Same as Sec II.
 2. }
 1. }
- Quaternary*
Tertiary



Section from Drury to the coal mines

10. Alluvium containing boulders of dark basalt rich in olivine, and a light colored trachyte with small black crystals of iron? also pieces of brick red claystone, probably the upper portion of the Palaeozoic rocks.
9. Quaternary clays, yellow, red and white. 50 to 60 ft.
8. Vesicular basaltic lava stream, the cavities containing botryoidal chalcidony.
7. Dark green ^{volcanic} ~~trapp~~ sandstone, belongs probably to the Waitemata beds.
6. } Unknown
5. }
4. Light gray clay.
3. Brown coal. Towards the N.W. the seam splits up into three, it is evidently the edge of a basin.
2. Light gray clay 20 ft
1. Hard dark blue siliceous claystone. Palaeozoic



Section from the Wairoa Valley towards Howick

3 Yellow, white and red clay, and light yellow sandstones (Waitemata beds) 500 ft + horizontal

2 Dark green sandstone with thin seams of coal and traces of plants, containing also the following foraminifera

Globigerina bulloides - abundant

Bulimina sp - very rare

Australina sp common

Lapina tenuistriata not common

Cristellaria sp - rather common

Senthalina verticalis } fragments not common

Nodosaria sp

Orbulina universa - fragments - common

Stratification - horizontal - 200 + ft

1 Hard blue siliceous claystone, with bands of yellow ~~clay~~^{chert} : 800 + ft - Palaeozoic

In some places this blue rock is capped with the variegated claystone no 3. See II and III.

24. Hutton to Hector, 20-6-1868

Hocken MS-0443-3/6/6

Epsom
20th June/68

My dear Hector

Many thanks for the copy of Hochstetters book. I am rather disappointed with it, as it does not contain much that we did not all know, and is very badly translated. A good deal appears to have been done among the reptiles but I suppose that Buller knows all about it as he has taken the subject up.

I have got my money alright. I paid Kirk £30 for his Barrier trip. It is one of the items in the £110 voucher. He has not yet returned from the Kaipara where he has gone to settle up his farm concerns before commencing his work here. I and a party of 3 men have found an auriferous quartz reef on the eastern side of the Waikare Lake near Rangiriri. The reef is about 20 feet broad apparently in the blue slates. Quartz hard and subcrystalline or compact. Specks of gold are visible here and there with a lens. I brought about 50lbs of the stuff to Auckland, and the bank assay gave only 6 dwt 18 grains to the ton, but as this was only knocked off the outcrop indiscriminately we hope that the average will be higher, and we mean to test it further. It is on land given back by the Government to natives; and it will be some time before we can arrange with them for the working of it.

A good many new diggers are coming up here and the diggings are prospering satisfactorily. The price of shares is rising both at Shortland & Tapu.

I will present the frog to the Colonial Museum.

I heard from Newton the other day. He is very anxious for Moa bones. He says that the cock kiwi at the Regents Park Gardens is now sitting on two eggs, laid by the female, now 18 years old. The cock sits crossways on the two eggs.

I saw several white winged ducks on the Whangape lake the other day but could not get near them.

Yours truly
F.W. Hutton

25. Hutton to Hector, 23-6-1868

Hocken MS-0443-3/6/7

Epsom
23 June/68

My dear Hector

I got your last letter yesterday with "too late" marked on it.

I am preparing a map of this province showing as far as at present known the distribution of the primary rocks, so as to assist prospectors in their search for gold. Some quartz received a few days ago by the N.Z. bank from the Wairoa, Kaipara, yielded over 8oz of gold to the ton.

A rush has set in to Shortland from Nelson, I am sorry that so many are coming at once.

Yours truly
F.W. Hutton

I saw several more white winged ducks on Whangape Lake but could not get a shot at them.

26. Hutton to Hector, 2-7-1868

Hocken MS-0443-3/6/8

Epsom, Auckland
2 July, 1868

My dear Hector

I have just got your letter of the 27th from it I gather that one or two that I have written to you have not turned up.

I have got all my money some time ago – many thanks.

In my last I sent you my classification of rocks & asked for your opinion on it, if it has not turned up let me know and I will send you another copy as I want particularly to know what you think about it. At present we have no recognised classification.

About 50 diggers have gone up to Rangiriri. I hear that they are satisfied with what they have seen but I do not know that they have discovered any more golden reefs yet.

I believe we shall have another goldfield in the north. I told you that some stuff sent down crushed more than 8oz to the ton. I was shown a small piece of the bed rock, it was the very same felspathic tufa of Shortland if anything more highly impregnated with pyrites. The locality is said to be between the Wairoa and Whangarei.

The Superintendent sent up Allbright the Inspector of roads to report & he sent down some stuff which was assayed and yielded nil, but he made a mistake and sent down some tertiary green sandstone with carbonate of lime instead of quartz.

People are crowding in here and everything is looking up wonderfully. The weather is delightful, more like summer than winter. Shortland is at last turning out some gold, the Manukau claim in the Monatauri got over 1200oz out of 2 tons. Machines are much wanted, there is not one yet at Tapu. A Melbourne firm has started an agency and we hope soon to be well supplied.

Auckland cannot turn them out fast enough. Things have taken such a turn here, that I hesitate to go up the Waikato, thinking I might do better in Auckland. If there was any chance I should be delighted to get on your staff for this district. But I could not leave now and go to Wellington. But if your funds can afford it I am open to an offer, but I am afraid that it would not be worth my while to take less than £350 a year and I am also afraid that it is out of the question that you could get me that.

I had no idea that Haast's time was up. Mrs Hutton had a daughter last Sunday, both are well.

Very truly yours
F.W. Hutton.

27. Hutton to Hector, 6-7-1868
Hocken MS-0443-3/6/9

Auckland
6th July/68

My dear Hector

If not too late will you please add the accompanying note to my report on the Great Barrier.

A gentleman here named Clark is getting up a pamphlet to be called "The Miners guide & Pocket Companion". He showed me the geological portion which as you may suppose was rather absurd, and so at his urgent request I have undertaken to revise this portion of it for him.

I shall say nothing but the most general statement about the geology of the Thames, as I do not know what you are doing on the matter and I do know how little we know about it.

If you could give me the latest statistics as to the return of gold from the South Island I should be much obliged.

Poor Kirk never got his last money. He did not know it was waiting for him and when I told him of it, it was just too late, the accounts for the year having been closed that day.

Yours very truly
F.W. Hutton

28. Hutton to Hector, 23-7-1868

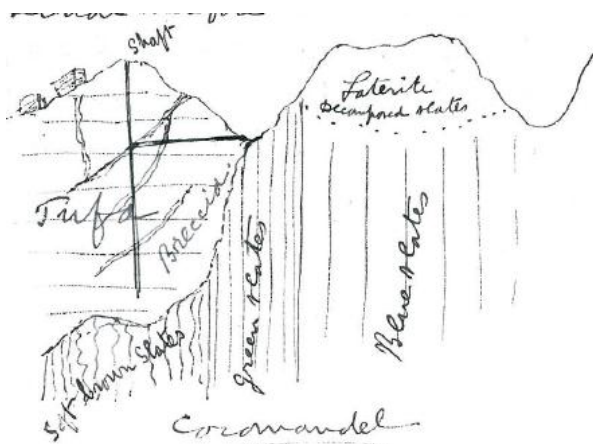
Hocken MS-0443-3/6/10

Auckland
23 July 1868

My dear Hector

I have been to the Thames once or twice since you were here and every time I go there I come more and more to the opinion that the whole of the claims about Shortland (including Hunts) are in a volcanic tufa that lies unconformably on the Paleozoic slates. Whether this tufa is the same as the one containing the rounded blocks of trachyte, and the breccia of Castle Hill or of a much older date, I am not certain, but I confess that I think that it is all Miocene, and I do not think that I should have had any doubts on the subject, if you had not seen it and thought it Paleozoic, and you have had so much more experience than I have had that I do not like to differ from you. I now consider the tufa and brecciated rock all as one, and not with the slates between them as suggested in a section attached to the last notes that I gave you (I should not like this section to be published), and if they are one there can be no doubt but that they are unconformable on the blue slates, both north of Tararu Point, and at Tapu. Of this I have not the slightest doubt.

The question is, are they the same thing as the tufa with "black boulders". If so they must be Miocene or younger; but if not they may be lower Mesozoic. In your Kapanga section, might not the "pyritous aphanite breccia" be the same as the breccia between Tararu & Tapu? And might not the section therefore be thus?



The tufa being unconformable, a loss of brown slates might be found at a higher level, and the "grey breccia" might be a portion of the tufa filling up a hollow, but I have omitted this in my sketch. I only suggest this as I have not been to Coromandel, but it seems to me probable, as I am convinced that the rock at Shortland (identical I believe with that at Coromandel) is not interbedded amongst the slates, and a granular rock like that of the Kapanga claim could hardly have been formed by a dyke.

We have got two live *Hatteria* in the Museum from Clarke of Tauranga.
Very truly yours
F.W. Hutton

29. Hutton to Hector, 26-8-1868

Hocken MS-0443-3/6/11

Auckland
26 August 1868

My dear Hector

I only received your kind letter yesterday or I should have answered it sooner. Of course I shall be very glad to accept the appointment if you should be able to get it for me. Your letter arrived just in time to prevent me sending off my first installment of luggage to the Waikato, but I shall have to go there myself once more for a few days to settle up matters as I had arranged for us all to move up at the end of next month. I suppose that I had better at first see Puriri and the newer claims at Tararu and other places and in October go over the whole peninsula. Or if you like I could first map the Shortland district in detail as I think I can get pretty good maps now. I think that the country just north of Tararu where the slates and felstone are seen will be important, but no doubt you will send me instructions as to what you want done, and whether I am to visit Kaipara, Hokianga, Bay of Islands and Waitakere where gold is reported to have been found. About 15 cwt of quartz from Rangiriri crushed at the Kuranui one stamper battery gave only 2dwt 3gr of gold. Some more has gone to be tested and when I know the results I will report to you. I am afraid that nothing payable has been found there as yet.

The speculation in shares here is very great and I fancy that many people will burn their fingers. Shares go up to fabulous prices when a small rich pocket is struck, but my opinion is that the veins are extremely irregular and uncertain.

I ought perhaps to tell you that I have no private means for prepaying a survey as all my money has gone to the Waikato, but the districts around Shortland, Tapu etc can be done very cheaply as I should not require any assistance.

Yours very truly
F.W. Hutton

I was delighted to read about the opening of the Institute.

30. Hutton to Hector, 2-9-1868

Hocken MS-0443-3/6/12

Epsom
2 Sept 1868

My dear Hector

As far as the geology of the Thames is concerned, perhaps a detailed survey of Tapu, the country north of Tararu, and Coromandel would yield the best results, although there are no doubt many other places where the two formations join, but those places where I can live without a tent can be done the cheapest as I shall want no help. There is also a patch of what appears to be tertiary rocks on the north east side of the firth of Thames that ought to be looked up. With regard to the mining part Shortland would be the best to start with as I can get the best maps of it, none having yet been made of Tapu. If the Government were to order good surveys to be made they would well repay themselves by the sale of the maps, but the Provincial Government have not sufficient capital to prepay the costs and I don't suppose that anyone would be found fool enough to trust them.

With regard to the Thames Gold Fields the prospects do not look at all cheering to me. I am afraid that a crash will come before long owing, partly to over speculation and partly to the regulations requiring the ground to be fully manned. There is no doubt but that there is plenty of gold in the hills but it will never be got out on the present system. With few exceptions the claims are too small and the holders too poor to form a company, lease the land, and erect machinery, and the claims that will pay without this must be very rich and consequently are very few. At present the rabbit-burrows all over the hills are a burlesque on mining, and no claims can pay their way, in the desultory and unsatisfactory manner in which they are worked, unless the yield from crushing a few tons is sufficient to pay wages for three months: indeed many of the claims cannot get a crushing at all on account of bad roads, no machinery, and no money to keep carts and horses. There is no money and no combination among the miners to make the roads, and there is not nearly enough water to work the machinery that will be required. Expensive works will have to be erected to bring water from the head of the Kawaeranga[sic], and this will take a long time. Meanwhile wages are at £2 a week and the people in Auckland are paying more than £5000 weekly in this way, while most of the gold that comes in return from the Thames (say £3000 a week) is the produce of a few claims that happen to be very rich and very advantageously placed for getting their stuff crushed, consequently people who have invested all their spare money in shares cannot afford to pay wages, and have to abandon them, while those who have borrowed money for the purpose are in a still worse plight. Shares in consequence are now getting all but unsaleable, and as the diggers have hitherto subsisted almost entirely on the sale of shares I do not see how they will live, and a collapse must be the result. In my opinion the only way to avoid this is to alter the regulations that compel all ground to be fully manned from the first taking up. No large extent of quartz mining ground is likely to pay £2 a week for every 50 by 300 feet, at any rate for some time, and wages have swamped many a claim before it has been fairly tried. I think that every facility should be given for amalgamating claims and forming companies on a sufficiently large scale, and with sufficient real capital to erect machinery, and companies when formed should be

allowed to employ as many or as few men as they think proper. Companies properly worked will I think pay well for many years, and there is room at the Thames for a large number of them; but I cannot see how small claims without capital can possibly get along, nor how diggers can subsist except by working for wages, or by prospecting and selling new claims to companies. Claims must indeed be good ones to be able to lie half their time idle waiting for their turn to crush, and then paying another man, or company, a large profit for crushing their quartz. Poor ores of which large quantities have to be passed through the machine before cleaning up could not possibly be treated in this way.

The exceedingly cheap rate of living, and the fact that a few men with money have invested largely in shares lately are the only things that have prevented a collapse taking place before now

No fossils are to be had now at the Waikato coal-mines as they are not working the upper part of the coal seam. In November last Mr W. Rowe, the manager showed me a large slab full of leaves of dicotyledonous plants, and I send you sketches of those species that I observed on it.

This slab is now in the possession of Mr Thomas Russell of Auckland.
Yours truly
F.W. Hutton.

31. Richmond to Hector, 11-9-1868

Hocken MS-0443-3/6/13

Sep 11/68

My dear Hector

I return Huttons letter. I thought it best not to make it official as it was not written for publication and might make Hutton unpopular. So I sent it without head and tail to "Tiser". Swan confirms it.

Yours faithfully
J. T. Richmond



Figure 4. Illustration of *Nyroca australis* Gould, drawn by F.W. Hutton [Hocken collections, University of Otago, MS-0443-3/06]

32. Hutton to Hector, 11-9-1868

Hocken MS-0443-3/6/14

Auckland Club
11th September 1868

My dear Hector

I send you by the "*Lord Ashley*" a box containing leaf impressions from the Waikato coal mines, a small specimen of Waikato coal and a specimen of Stibnite. The last is from the Thames, the former from Tom Russell; after examining and drawing them we should like some of the specimens returned but I have sent them all on to you for Buchanan to see. I cannot go and settle up my affairs at the Waikato until I hear from you for certain that I have got the appointment. We hope soon to get rooms for the Institute and I hope to be able to get a room there for our office, and take my books etc there before starting for work.

The brick block house in the domain is now to let. It could be got very cheap and I think that the Government ought to take it for a Meteorological station. If Auckland is to be a first class station the observer will have to live near the instruments, and it seems very probable that the present place of the establishment will have to be moved as the man who has leased the Domain from the board has refused to pay his rent, on account of the station being put up there.

I see there is some chance of a University & School of Mines being established. If so I would urge upon you the claims of Auckland as the seat of the School of Mines. You will not find another place of the size with gold, coal and copper mines so very accessible for students.

The last crushing of quartz from Rangiriri at the Thames gave 15dwt for 1400lbs of stone. The gold is worth about £2.15 an ounce.

I hope to hear from you tomorrow by the *Phoebe*.
Very truly yours
F.W. Hutton

The next meeting of the Auckland Institute (1st Monday in October) is the last for the season.

33. Hutton to Hector, 16-9-1868

Hocken MS-0443-3/6/15

Auckland
16 Sept 1868

My dear Hector

I have got your last letter. Of course Mr. Stafford cannot promise anything before the estimates are passed, but from what Farmer says there seems to be no doubt but that you will get it for me. Reader Wood has just shown me a copy of the estimates. I see no provision for it in them but your salary too seems to have been taken out, so I do not understand what is meant to be done.

There is not much change here, the more I see and talk with people, the more I feel sure that an easy method of leasing the land for mining from Government, and without any restrictions as to working is the only way to make the Thames prosper. If each company is obliged to have actual capital invested, this will be quite enough to make the shareholders work it the best they can, as they will not let their money lie idle. I think all companies should send returns to the government of stuff crushed, gold obtained etc. etc.

I send you some seeds of the whau for yourself, Mantell, or any one who wishes to grow them.

Yours truly
F.W. Hutton

I am hard at work now on the mosses. We shall have over 50 new species. I shall send Knight a parcel of them shortly.

34. Hutton to Hector, 4-10-1868

Hocken MS-0443-3/6/17

Auckland
4 Oct 1868

My dear Hector

I have been a good deal amused by reading in Hansard the debate on the uniform time question, what Heaphy meant I cant make out, and I don't expect he knew himself, I suppose that the idea of his being supposed to go by the time of a place on the south island riled him, forgetting that the time at Christchurch was also the time of a part of the North Island too near the north cape. I also do not understand quite what Mr Hall means by New Zealand mean time nor how he means to find it. If you look at the map you will find that Christchurch is the best placed of all the large towns for giving the time to New Zealand. You will see that the following would be about the differences, if Christchurch mean time was kept throughout the country.

Dunedin	9 minutes	too fast
Nelson	2	too slow
Picton	6	do
New Plymouth	6	do
Wellington	7	do
Auckland	7	do
Napier	17	do
Invercargill	17	too fast
Dusky Bay	25	too fast
East Cape	23	too slow

I don't think any body could complain of this, and not only would it be a great advantage to have a uniform time throughout the Islands, but the time should certainly be taken from some one point, and not estimated for each place from some supposed mean time of New Zealand. The place ought either to be Christchurch or Nelson.

If I get a regular appointment on the staff of the Geological Survey I think that I shall move into Auckland so as to be nearer the Museum, but of course it would not be worth my while to do so unless I thought that the appointment was permanent for two or three years at least. If not I shall have to go up the Waikato, as I cannot afford to lose so much time doing nothing down here, however I hope now that it will not come to that.

There are some very nice rooms, a hall 25x38 and 2 good sized rooms, in the new Supreme Court House that would make a first rate museum & Geo Survey office. If you see Sir G. Grey in Wellington perhaps you could sound him out as to whether he would have any objection to our applying for them. Fenton tells me that they will not be wanted. Gillies (who has not seen them) objects that they are too much out of the way, but I cant see it. He wants to get rooms in the Post Office. They would be much smaller.

T. Russell does not like my having sent the Waikato leaf impressions to you and hopes that you will return them when you have examined and drawn them.

I shall try to send the skin of the new duck down to you by the Bishop of Wellington.

You never said anything about the fossil *Mactra* I sent you by Dr Knight from the alluvium of the Kawaeranga[sic]. It is not found here recent, have you it in the south?

Yours truly
F.W. Hutton

35. Hutton to Hector, 8-10-1868

Hocken MS-0443-3/6/18

Auckland
8th Oct/68

My dear Hector

In answer to your questions

1 – the present yield of gold is about 7000oz a month but fluctuates. At page 49 of the Thames Miners Guide you will see the returns (furnished by the custom authorities) up to 1st Aug/68, no more gold was exported that month but in September 3149 oz—3 dwt—00 gr and in October, up to today, 10604 oz—1 dwt—14 gr The gold is generally sent to Wellington by the *Panama* mail on the 1st or 2nd of the month, so that no more will go this month unless the *Hero* takes some to Sydney.

2 – Area of country occupied

At Shortland about 5 square miles

- Tapu _____ 1 ½ _____
 - Puriri _____ ½ _____
- Total 7 square miles

Of course the whole of this is not taken up, especially at Tapu & Puriri, but at Tapu a new rush about 4 miles up the creek has lately taken place and a good many claims pegged out & this I have not included in the forgoing.

3 – Number of claims, Probably 1800 or 2000, but no one knows, and the number is constantly changing, some claims being given up & others pegged out.

4 – Number yielding gold. Quite impossible to say without a long investigation. My own impression is that more than half – say 1000 – have got gold in greater or less quantities. Some yield gold when none is visible and without testing it is impossible

to say whether some have got gold or not. But if you want to know how many are paying wages I should say under 50.

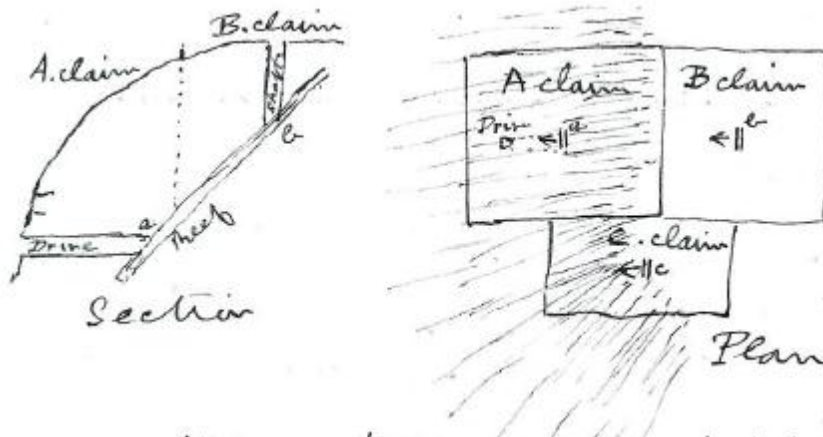
5 – Population.

Digging	8000)
Loafing	6000) about (only a guess)
Women & Children	<u>2000</u>)
Total	<u>16000</u>)

6 – No of machines.

Erected	22) Shortland
In course of erection	9) “
Erected	1) Tapu
In course of erection	<u>2</u>) “
Total	<u>34</u>)

Several of the machines that are erected, are not at work, as diggers will not send stuff to them, partly because the machines are so bad that much of the gold is lost, and partly because the charge is too high, and the ores too poor, to pay when raising and cartage is added to the crushing. I suppose Beere is keeping back your map until he has traversed the Tararu and Tapu creeks. What would please the people here best would be for me to make a map, or maps, of the Karaka block showing as far as possible the directions of the auriferous veins. I could do so if you liked. There would not be much geology in it, it would refer more to mineral veins. If I have to do it I should like to know how to shew the same reef in different claims at different levels in plan for instance like this



a & b & c being the same reef at different levels. I have no plans or books to show me how this difficulty is got over in other places.

Not many of these cases would occur here but I should like to know how to meet it. Should reefs be shown 1. In the claim where they occur and their height above sea level be put on them, or 2. Should they be shown where their outcrop would be, or 3. Should a datum line be taken through the claims in the direction of the strike of the reef and each portion struck in a claim be referred to it? I am rather in favour of the 3rd way, and like the 2nd least.

The coal plants are puzzling. I feel sure that the beds with ferns & belemnites at Waikato Heads are much older than the Waikato & Drury coal fields; and that these two are part of the same basin. The Whangarei & Bay of Islands coal may be the same age as the Waikato & Drury.

No other fossils have yet been got from the Waikato but those I sent you. They are found in the shale above the coal, and as the seam is over 16 feet thick they do not work the upper part, but will have to do so before long when I hope we can get some more.

I send you a letter that I sent to the Southern Cross about the earthquake wave. You will at once see what an important bearing the shallowness of the South Pacific has upon the similarity of the New Zealand & South American Miocene fauna, and on the recent distribution of plants, and possibly on the connection between the Moa, Emu, and Rhea.

I think a good paper, although very speculative might be made out of it.

Our season of the Institute is over. We found it difficult to get papers and I had to do the greater part in order to keep it going. However I hope we shall do better next year as members will have 6 months to think over their subjects.

It is no use trying to get rooms in the Supreme Court House, both Whitaker & Gillies are dead against it, but Whitaker says that he can get the old Native Lands Office, next to the old Post Office, as soon as the Superintendent returns. This will do very well and if we can only get some money from you to buy cases for the rocks & birds we shall do very well.

I am very much obliged to you about the vote £250 will be ample for the Thames this year. I mean to move to Auckland, and establish an office at the Museum where I shall remove my maps, books, balance, chemicals etc.

I should much like to exhibit the rocks I got at the Gt. Barrier etc, and shall vote for the first money the Institute gets from you being expended in cases for them.

I am going up the Waikato tomorrow to settle up there and shall return here on Tuesday & shall then be ready for anything. My books, balance etc were packed up for the Waikato and I have not unpacked them yet, hoping to have to send them to an office in Auckland.

Yours truly
F.W. Hutton

One thing is much wanted at the Thames viz. Security of tenure by leasing the land. Applications for leases made 9 months ago have not been answered yet.

36. Hutton to Hector, 22-10-1868

Hocken MS-0443-3/6/19

Auckland
22 Oct. 1868

My dear Hector

I must congratulate you on the coming happy event, but I hope it will be a long time before you have as many children as I have. It is impossible to buy books when you have many mouths to feed, but with all that it is much jollier to be married and have a comfortable home to come back to after wandering in the bush. Last Monday at about 0.7 m am we had a slight earthquake shock here. I did not feel it myself but most people did. The *John Penn* at about the same time was 12 miles off Cape Egmont and seems to have felt it more severely as the Captain thought he had struck on a rock and have the lead. I hope you have not had anything serious at Wellington, but I am rather anxious about the Museum. If you could depend on the times being accurate the fact of its being felt almost simultaneously at Taranaki and Auckland would suggest that the centre was somewhere in the Taupo district, in which case Napier would probably suffer more than Wellington.

I send you 4 copies of the Thames guide, and two of a very good map, just out, of Tapu. I could have sent you the Map of Shortland separate but as they are 5/- each and the book complete is 7/6 I thought it better to send the lot.

The description of claims in the guide (which part I had nothing to with) is miserably deficient and incorrect. I hope by next autumn to have amassed a large quantity of information about the claims, and to be in a position to send you a good report & map. If at that time you could manage to come up I would be much obliged to you. I should like to keep back my first report as long as possible, so as to improve it, but if you will give me a date on which you wish it to be at Wellington you shall have it. The later the better for me, but probably you will want to have it printed, and out of hand before next session, so as to have something to them for money voted.

After that I suppose quarterly reports on the progress of the mines will be the best.

The Tapu Company (late Mr Isaacs) lately crushed about 100 tons with a yield of over 6oz to the ton, still they cant pay any dividends.

The starlings are doing well here, we often see a flock of from 12 to 20 about our house.

I think it would be a very good thing to send a collection of our Thames Rocks to Vienna, and get a set from the Hungarian gold fields in exchange. Hochstetter might manage it for you.

I have given the duck skin to young Selwyn who has promised to give it to one of the members of the Synod to take down to you. Acland I believe will take it.

We have now a regular steamer (the *Go-Ahead*) running to the Bay of Islands. When Williamson returns I hope we shall get some for the Museum, and cases to exhibit our rocks if we get money from the Institute.

Yours truly
F. W. Hutton

37. Hutton to Hector, 29-10-1868

Hocken MS-0443-3/6/20

Auckland
29th October 1868

My dear Hector

I am very glad indeed to hear that the vote has passed. I mean to start for the Thames next Tuesday. I shall go to Shortland first (unless I receive other instructions from you) and afterwards to Tapu and Puriri. And if I have time shall make excursions to some of the localities in the north where[sic] gold has been reported to be found.

I have got a room for an office in the same building as the Museum so please direct to me at the Museum now.

I send you a voucher signed but I have not filled it up as I don't know when the Government wish my salary to date from. I would suggest the earliest date possible.

Buller in his last letter says "I notice that you are becoming largely interested in mining shares". I don't know where he noticed this but it is not true. I once had interests in 3 different claims, but since I heard from you that I might probably have to visit the Thames officially I have got rid of two of them, and the third Reader Wood will probably buy in a day or two, if he does not I shall give it up, or away, before going down to the Thames for I have no intention of allowing people to say that I am not quite impartial. I should not have mentioned this to you but from Buller's letter it occurred to me that you might have heard that I had interests at the Thames and might not like it.

Can you manage to get me gazetted as your assistant, it would give it a more permanent look.

I am afraid that the times given for the last earthquake are not accurate enough to be able to work it up. A clock belonging to Mr G. B. Owen of Mount Eden was stopped at 12.11, the pendulum swung N & S.

Yours truly
F.W. Hutton

38. Hutton to Hector, 9-11-1868

Hocken MS-0443-3/6/21

Auckland
9th Nov 1868

My dear Hector

I quite agree with you that the earthquake was deep-seated, the fact of its occurring all over the islands so nearly at the same time proves that, and if we had but the exact times it happened at three or more places, we could calculate very nearly its position. The fact of its being felt with greater force on the west coast is perhaps owing to the vibrations emerging there at an angle further from the perpendicular than on the east coast.

I shall be glad to know your theory of earthquakes when you have worked it out. For my own part, at present, I am inclined to connect it with elevation & subsidence of land, and not with any meteorological phenomena, although I am aware that they have been ascribed to the attraction of the moon & sun.

An eruption of Tongariro is reported here, I don't know with what truth.

I mean to start for the Thames tomorrow, if I can borrow £10 to take me there, as I cant stand being here doing nothing any longer. The fact is that my account is overdrawn at the bank and if you don't send me some money soon you had better address your letters to me to the Mount Eden Jail!!!

I propose commencing at Shortland and working north to Tararu, and then going to Tapu and Puriri.

If I get a chance during the summer of visiting any reported gold finds in the Kaipara, Bay of Islands etc without much expense I suppose that I had better take them, as it would only interrupt my work for a week or so.

I send you a copy of the new Regulations for obtaining mining leases. I consider them very bad, and think they will be a failure, and that none but the very rich claims (already proved) will take out leases under them. The great thing wanted is to be able to prove a piece of ground as cheaply as possible, and this the act does not do, as ground once taken up must be held until the lease is out whether it pays or not. However as I was not asked my opinion I don't think that I ought to give it to the Superintendent, & shall not do so.

Things are looking more healthy here now, as many of the surplus miners are clearing out, and people are slowly coming to see that the Thames is a mining district, to be worked by mines only, and that it is not a gold-field in the ordinary meaning of the term. The yield of gold is increasing steadily, and building in the town has stopped, all these things look healthy to me.

It would be very important to have assays of the pyrites from various parts of the field; but there is only one assayer here – at the Bank of New Zealand -; Farmer has bought a ¼ share in the Golden Crown for £2500; the largest price yet given.

Farmer says that you have promised to stay with him when you come here, I hope it is true, he told me to say that he should have plenty of room for Mrs Hector as well.

Yours very truly
F. W. Hutton

[*Note to first page:* Direct to me at the Museum and not to Shortland as the Post Office there is so bad that they might be lost.]

39. Hutton to Hector, 11-11-1868

Hocken MS-0443-3/6/22

Shortland
11th November 1868

My dear Hector

I came here yesterday. I have seen the map Beere is making. It will be a very good one, far better than the one in the Thames Guide and on a large scale – 4 chains to the inch. He has done nothing to it lately as he did not understand whether you wanted it now or not, but as it will be very useful I have asked him to go on with it, and if you cant get the money, I could let him have it out of my £250 travelling expenses, if you do not want me to make any expensive expedition this summer.

A great number of people are out of work here but are hanging on hoping for the Upper Thames to be opened. If this is a failure there will be a great exodus.

More than 800 claims are registered (protected), but the place is steadily improving.

Yours truly
F.W. Hutton.

40. Hutton to Hector, 17-11-1868

Hocken MS-0443-3/6/23

Auckland
17 Nov 1868

My dear Hector

Dr Pollen has kindly let me have the money on the last voucher on my representing to him that I could not proceed with the survey without it, & that I was drawing my salary all the time. But he told me to write to you and ask you to get authority for him to pay me here, & this of course would be much the most convenient plan.

I am quite satisfied with the look of that end of the mines that I have commenced on (the Hape), the "duffer end" as it is called. There are some very good claims there eg. The Lord Ashley & Tweedside. Altogether the mines are flourishing, the town declining, both good signs I think.

The map that Beere is making is not absolutely necessary. The one in the Miners Guide will be quite large enough for a general map. The other in fact could only be kept as an office map and not published.

If the Tararu creek is put properly on the Guide Map it will I think do very well. The creeks & hills are good but the claims very wrongly placed.

I shall be of again tomorrow,
Yours truly
F.W. Hutton

41. Hutton to Hector, 28-11-1868

Hocken MS-0443-3/6/24

Graham's Town
Thames
28th Nov 1868

My dear Hector

I have seen Puriri and examined the country from the Hape Creek to the Karaka and have I think already got ample evidence that the ordinary gray tufa passes imperceptibly into the trachytic breccia on the one hand and into the felspar porphyry (metamorphosed tufa) on the other, and that gold is found above the breccia and in the close neighbourhood of jasper & chert veins. I have been all round the head of the Karaka and the tufa formation covers the whole of it, no signs of slate anywhere. I have found two dykes in the Hope, one Dolerite the other Diorite? and three in the Karaka. There may be more yet as I have not finished the Karaka yet. The claims are innumerable and I shall not get finished here by Christmas. At Puriri the gold is found in tufa containing boulders of Dolerite and a green Diorite?

Altogether the mines are progressing better than could be expected considering the small amount of capital invested. The yield of some of the claims is wonderful. The machines, crushing for the public, or rather the system, is very bad you could collect a pannikin full of mercury from the tailings of any of them in a short time. There are 13 machines either up or going up in the Karaka Creek alone.

Yours truly
F.W. Hutton

42. Hutton to Hector, 1-1-1869

Hocken MS-0443-3/7/1

Auckland
1st Jan 1869

My dear Hector

I have been here for the last week as the Superintendent has proclaimed a holiday, at the Thames until the 5th of this month & consequently very little is going on there. I have been preparing my map and taking advantage of Christmas excursions to see one or two places in the neighbourhood. I have visited the north head of the Manukau; and Mangere to see the relation between these Basaltic cones and the Pleistocene clays. The former are the newer. Manukau Head is Trachytic conglomerate but differs from the Thames in the dykes being Trachyte, Andesite etc instead of Diorite & Dolerite, and in not being charged with pyrites. Tomorrow I propose going to Motutapu to see the junction of the Waitemata beds and the older (Triassic?) rocks. In doing this I fancy I am doing what you would like as I am seeing the country at a very small expense. I return to Shortland on Tuesday. I propose preparing a report on the geology of the district, and mining operations down to the close of 1868. Then next April I will send in another for the quarter and so on in future. Do you approve of this? I am preparing a map on 6 inches to the mile. It will be quite large enough, and not being a regular survey any unnecessary enlargement of the map would only enlarge the inaccuracies. Beere has sent me the map and I have sent to Gore a written receipt for it. I don't know if anything else is necessary to get him his money. I should have forwarded a box of specimens by this steamer but they have gone astray between here and the Thames and have not turned up yet. I shall not write my report until you have seen the place with me, but I am pretty sure that at any rate you will agree with me as to the tufas unconformability on the older series. At present I fancy the gold was contemporaneous (or subsequent to) the newer volcanic rocks, but Tapu will be a far better place to study this point than Shortland. I expect to go there about the middle of January. At present we know of no auriferous tertiary rocks that do not lie directly on Paleozoic? ones.

Your Dun Mountain section is very interesting. From your description I am inclined to think that the rocks of the Great Barrier, and perhaps those of the Thames, belong to your Maitai Series. Some of the rocks on the east coast of the Barrier correspond closely with your No 3 & 4, and our blue & green slates may be your No 2. Have you seen any pink & white thin bedded slates among them. We have them at the Great Barrier and I saw boulders of them in Puriri creek, but did not go far enough up to find the rock in situ. I should much like to see the Dun Mountain with you, perhaps I may get a chance some day. By your section the Triassic beds are unconformable on the Devonian ones, this might have been expected, and if we have both series here they will probably be unconformable also; but want of sections will make it difficult to make out.

The mines improve regularly. Roughly I should say that 1/16 of the ground taken up, or 6 p.c. of the claims, have good chances of being payable. I think that only about 40 claims have proved* themselves payable as yet. I omit all that have not crushed at least 10 tons. Only 10 claims have as yet crushed over 100 tons, yields

ranging from 3 to 38 oz to the ton. The average yield of the whole field is probably a little over 3.5 oz to the ton. Machinery is rapidly increasing and will be more than doubled in two or three months. Yield steadily increasing. Young Travers is here he told me that you were to have been married last Tuesday. I hope the event came off all right. When shall we see you here? I should like very much to take my wife & children for a weeks holiday up the Waikato. I propose going on Feb 3 about. By that time I shall have finished Tapu, and I do not expect you up before Feb 15th. If you are coming before please let me know so that I can alter my time. Peaches are ripe during first fortnight in Feb.

It will be impossible to map the so called reefs here. I know of none that go through 3 claims (except some barren ones) although you will hear of a well known reef, like the Golden Crown or Dixons, being struck at the other end of the field. The dolerite dykes, seem to be confined to one part of the field, between the Karaka and the Waiotahi. Greenstone dykes are more numerous but my survey is not complete enough yet to say whether or not they influence the auriferous deposits.

Our reefs, or veins, run in all directions, but NNE to NE b E is the most common. The same may be said of the dykes.

I sent vouchers to Gore directed to "Director of Geological Survey" supposing that he will open all letters thus directed. I hear that the Canterbury Government have voted £1200 to build a museum, and made Haast curator. I wish I could get the semi-educated drunkards, who govern up here, to do the same, but every thing connected with education & science is ignored while they can vote 5 or £6000 "for the purchase of native land".

I have had a letter from Newton at Cambridge. He says he has some sets of Dodo's bones & perhaps a solitaire leg to give away. He thinks of sending them to Haast but has forgotten which Museum is his; send him off at once a box of moa bones and you will get them.

Yours truly
F.W. Hutton.

*by this I mean that there are 40 claims that have crushed over 10 tons & averaged over 2 oz to the ton.

The trachytic rocks at Manukau N. Head are the upper portion of the Waitemata beds. Interstratified with them.

43. Hutton to Hector, 20-1-1869

Hocken MS-0443-3/7/2

Museum, Auckland
20 Jan 1869

My dear Hector

I send you, by *Rangatira* a box of rocks from the Thames. Among them you will find two specimens of "Zinc.blende" from Tararu creek, the first time I think that zinc has been found in New Zealand. If there is time to analyse any of the rocks, to be added as an appendix to the report. I would suggest the following as most important.

- 1 Dyke from "Heart & Hand" claim Wisemans Gully. I have spoken of this rock as Diorite, but more properly it should I think be called Timasite
- 2 Dyke from Ballymore claim. Diorite
- 3 Dyke from Freemans Bay claim. Dolerite
- 4 Some of the tufas – 5th pyrites

Also perhaps the white felspar, from the point north of Tararu creek. This belongs to the older series of rocks either Devonian or Triassic. There is also a white mineral from the El Dorado claim that I cannot make out.

I have finished Shortland (up to a certain point, for of course anytime could be spent there) and go to Tapu tomorrow. I expect to return from there by the end of the month, and then take my wife up the Waikato for a week, returning here before 15th Feb. I shall then write my report and be all ready for you.

There are at Shortland about 1200 claims, of which from 350 to 400 are protected. I estimate that about 150 of them have every chance of being payable. There are 39 machines up and going up and 7 or 8 more ordered from Melbourne. The population is about 18,000. The gold export from Shortland during December was 17,826 ounces, the highest yet reached.

I think we shall get the old Post Office for the Institute & Museum. The building is very dilapidated but the site is excellent.

I hope you will bring Mrs Hector up with you when you come here.

Yours truly
F.W. Hutton

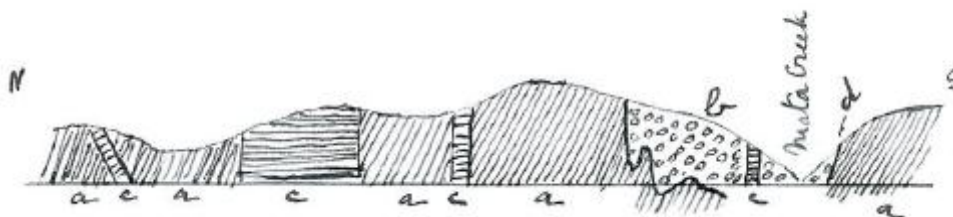
44. Hutton to Hector, 30-1-1869

Hocken MS-0443-3/7/3

Auckland
30th Jan 1869

My dear Hector

I have just returned from Tapu. I send you a section of part of the coast between Waikawhau and the Mata, a few miles north of Tapu and where the junction of the two formations is seen



- a. blue slates nearly vertical dip 80° to 90° sometimes N b E and at other times S b W – strike E b S.
- b. conglomerate & breccia same as gold found at Tapu & Shortland – nearly horizontal
- c. dykes of diorite cutting both slates & breccia
- d. probably a fault

I have no doubt myself that the brecciated rock is unconformable on the slates. I do not like laying too much stress on the resemblance of rocks from different districts, any body who had examined Switzerland and North Wales and seen the almost exactly similar rocks in both, although one Paleozoic & the other Tertiary, will always after be very cautious in judging from appearances.

You have not yet told me by what date you want my report to be in. I think of going to the Coromandel when I return from the Waikato.

Will you please send me up some envelopes, two sizes. I have plenty of labels yet.

My wife hopes much that she will be able to make Mrs Hector acquaintance before the winter.

What series do the Jasperoid slates belong to.

Yours truly

F. W. Hutton

[*Hector's handwriting* – Brecciated rock gives a clue to retake --- from the f--- which they contain which cannot[?] be greensand.]

45. Hutton to Hector, 16-2-1869

Hocken MS-0443-3/7/4

Auckland Museum
16 Feb 1869

My dear Hector

Thanks for the photograph. Mrs Hutton unfortunately has not one to send in exchange, but as soon as she gets some more done she will send one to Mrs Hector. We returned from the Waikato on Friday last.

Your annual report is very good. So also the proceedings of the Institute, but there are several corrections wanted in the latter, for instance Gillies name is J. B. throughout, instead of T. B. – on page 45 you are said to have exhibited specimens from the “Golden Claims” Thames – there is no such claim, no doubt it ought to have been the “Golden Crown Claim”.

Pages 60 line 1 from bottom and

---- 61 line 7 from top for Whangarei read Whangaruru

page 71 line 7 from bottom for carbonate read chloride.

Also in the Geological sketch map of the East Cape district a patch of Upper Paleozoic rocks is put in the bed of the Waiapu river – I know nothing of it – also the north side of Poverty Bay should be colored “cretaceo-tertiary-3” but not the south side.

I hope your papers on the Mineralogy of Gold in New Zealand will be published, as they will be very valuable to people up here. Also your lectures on the Geology of the Colony – I begin to suspect from your silence that you do not mean to come up here this autumn, and so I will get on with my report & send it to you.

I am very glad you mean to publish a small geological map of the islands. It is much wanted. If you do not come here I think, as soon as I get my report off, of doing the Kaipara, so far as to complete your map of the north part of the province. It wont cost much as I can walk over the greater part of it. I quite agree with you that our older rocks here are probably triassic, although we may have both – I consider the brecciated rock as ejected, a drive of the Moanatairi Gold Mining Company is entirely in it and passes through a large boulder of Dolerite, a rich lode occurs in it a few yards further on. The breccia is decomposing into parti[?]-colored clays but is quite recognisable.

The Barrier map did not come.

Yours truly

F. W. Hutton

46. Hutton to Hector, 22-2-1869

Hocken MS-0443-3/7/5

Auckland
22 Feb 1869

My dear Hector

My report & maps of the Thames will be sent to you in a few days. I very much wish I had had your advice & opinion on several points but that cant be helped now.

I divide the dykes in the tufa into the following

Examples

Group 1 -Dolerites – Freemans Bay claim

Group 2 -Greenstones

(a) Melaphyres – Tararu Creek

(b) Timarites - Heart in Hand and Ballymore

I should like to know what you think of it and if the names are correct, as I have no means of analysing them here, and have to trust to outward appearance only. The dykes that traverse the slate rocks only are different and are Diorites, or Syenites of cotta, as the felspar is probably Orthoclase.

Would you send me the measurements of the middle toe, with & without claw, of the large black petrel (*P. parkinsoni*) that I sent you down, the only skin I have has lost a foot & the end of the middle toe off the other one.

Don't forget to send a box of Moa bones to Newton, as it would be very valuable if you could get some Dodo & Solitaire bones in exchange.

If there had been time I would have kept my report back & seen Coromandel, Kenedys Bay & Mercury Bay & Wangapoua, but I think it important for the good of the gold-field that it should be published at once, so that other colonies may have some information published by the Government and therefore to be trusted, and I am afraid that if I do not send it at once it may have to wait until next year, when all the mining part will be out of date.

There will be maps of Shortland, Tapu and Puriri, and a sheet of sections, besides sections of mines etc in the body of the report.

All three maps are on 6 inch to the mile. I have not sent a general map of the district as I thought it would not be worth the expense of publishing but can send you one if you wish it, scale 2 miles to an inch.

Yours truly
F.W. Hutton

Shall you be here when the Prince comes.

47. Hutton to Hector, 13-3-1869

Hocken MS-0443-3/7/6

Auckland Museum
13 March 1869

My dear Hector

I sent you my report on the Thames Goldfields with 3 maps and 2 sheets of sections by the *Airedale*. I hope you have got them safe and think them satisfactory. I have since heard that slate has been struck in Nolans Claim near the head of the Waiotahi and on a ridge thus proving, if further proof where necessary, that the tufa is unconformable on the slates.

In my own mind I am quite certain that the whole of the mines, except a few at Tapu are in a late tertiary volcanic tufa and breccia. But I have not thought it right to state it so dogmatically in my report.

I am very sorry about the mistakes that have somehow got into my list of birds of the Great Barrier. Especially with regards to the Riro-riro. Since I have been in the country I have taken a good deal of pains to determine to which species it belonged and hoped in this list to have put the thing right but I see that it has been placed to *Certhiporus nova zealandia* while *Gerygone flaviventris*, the true riro-riro, has been called "*Titiriponamu*", the old mistake of the list in the Ibis, which I had vainly hoped to put right. Again I say in my paper that the native names attached are those of the natives of the Great Barrier. Now these men don't know the name "*Titiriponamu*" nor "*Patarakino*", which has been put in to *Platycercus auriceps*, this will only create fresh confusion. As the printer when he made these unauthorised corrections must have had a copy of the list of birds published in the Ibis before him. I wish you would blow him up as it is no part of his duty to alter the authors manuscript. I certainly shall write no more for the Institute unless I am assured of seeing proofs before it is too late to alter them. Errata are no good nobody looks at them, and the error will go on and it will be thought that I did not know one bird from another.

We have got a new petrel in the Museum here, a species of *Ostrelata* (common on the coasts), I have named it *O. gouldii* and sent the description to Newton for the Ibis --also a description of *Pro. parkinsoni* (properly *Majaqueous parkinsoni*) which although named by Gray has never before been described, and Ornithologists were in doubt whether it was an *Ostrelata* or a *Majaqueous*.

I am off to look at Manaia again, the association of the Breccia & tufa with limestones & greensandstones ought to give us some information.

Yours truly
F. W. Hutton

48. Hutton to Hector, 3-4-1869

Hocken MS-0443-3/7/8

Auckland Museum

3 April 1869

My dear Hector

I have just returned from the Hen & Chickens and Whangarei Heads – the Hen & Sail rocks are entirely Trachytic breccia, conglomerate & dykes – but the Chickens are the triassic slates with dykes of diorite. At Whangarei there is a tufa under the Breccia at Manaia, almost exactly similar to that of the Thames, so much so that I can hardly distinguish hand specimens. This rests upon limestone and green sandstone.

My visit to Whangarei Heads was partly for this and partly to corelate the tertiary strata north and south of Auckland. I believe the Whangarei and Bay of Islands coal to represent the Papakura beds south of Auckland. Lithologically they are very similar and contain several identical fossils. This would make the series

A handwritten diagram classifying geological series. On the left, 'Tertiary' is written vertically next to a large bracket that encompasses four series: 'Waitemata Series', 'Aotea Series (West coast of Auckland)', 'Whangarei Series = Papakura Series', and 'Coal Series of Waikato & Drury'. Below this, 'Mesozoic' is written vertically next to a smaller bracket that encompasses one series: 'Pictataba Series with fossil ferns at Waikato heads'.

Whether the Aotea & Whangarei Series are equivalent or which is the oldest I have as yet no evidence, but should like to examine the country between the Manukau and the Waikato to see if a section exists showing them both. I should also like to examine the spot where Heaphy found *Turbo superbis* etc. My want is money, although I feel ashamed to mention it so often. I know there is plenty to repay me, but the fact is that my account is a good deal overdrawn at the bank and I can not get any to start on, especially as I have to wait several months before I get it back, for my expenses of December are not paid yet. Could you not send me up some to work upon and account for afterwards as you did for Kirk.

I have examined the beautiful series of rocks you sent up, but I think them very different from those of the Thames (except the slates which are like ours). No 20 is like our igneous rocks found in dykes in the tufa, but is not like the tufa itself. No 17 is more like our altered tufa than any of the others, but it is more metamorphosed than any of ours except when close to a dyke, and is more foliated in structure. I should say that it was certainly a metamorphosed tufa but much older than those at Thames.

I should very much like to see the rocks in the south but there are several reasons why I could not be away for a long time. I must be in Auckland on 11 June or I shall lose my 600 acres of land got by land order. My partner in the Waikato is going to expand and I shall have to dissolve partnership and make some other arrangements about the land; and my wife could never stand being left alone for 6 months even if I wished it. There is a very nice young fellow at the Thames now named Brown, who was on the Victoria Geological Survey. I think he knows his work, and am quite sure you would like him much. He says that the people of Victoria have no idea of the richness of the Thames, and that he has seen no rocks like them in Victoria. When you come I think that I can convince you of two things

1st that the gold field of Shortland is entirely in one formation

2nd that this formation lies unconformably on the slate

and when you see that the formation contains dykes, and boulders of Dolerite and passes into coarse breccia like Manaia I think you will feel little doubt as to its age.

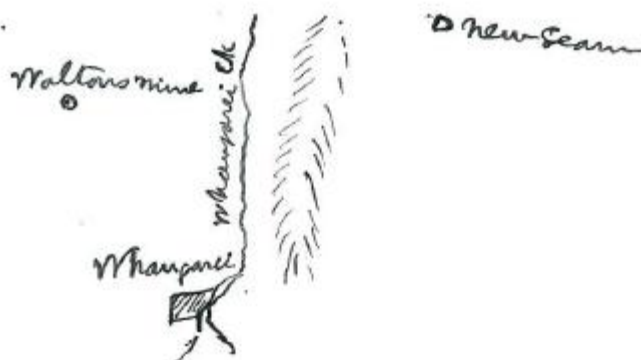
About the coals again I see nothing against the Northern coal being younger than the Waikato & Drury (although not perhaps separated very widely) in this province, but if I remember right you have found in the South Island the dicotyledons of these mixed with the ferns that we find only in the secondary rocks at Waikato Heads. Perhaps they may be intermediate.

I should like to settle this question & survey the Kaipara this winter as I don't suppose that there will be much spare money flying about next session.

Yours truly

F. W. Hutton

By the bye a very promising seam of coal has been found near Whangarei. I have not seen the place but I have the coal



It is reported as in a swamp with slates below. The coal I saw was shining, jet black, and seemed very good, green sand was lying in the cracks, no doubt from a bed above. The coal fell to pieces very easily but it was taken only from the outcrop in the swamp, it was very pure and reported to be 8 feet thick.

F. W. H.

49. Hutton to Hector, 29-4-1869

Hocken MS-0443-3/7/9

Auckland
29 April 1869

My dear Hector

Please tell Mr Holmes that the mistakes are of no importance. I am sorry I said anything about them, for great care had evidently been taken in getting the scientific names correct. With regard to the albatross paper no blame can be attached to anyone, unless it is myself, but I had no idea that the newspapers reports of the lecture would be sent down to you to be published, as I would have corrected it myself first.

I attach some importance to the Maori names of birds as it enables unscientific observers in the bush to record their observations. The riro-riro is known throughout New Zealand by the Maori, but it had previously been always put to the wrong scientific name in published lists, with the exception of Bullers Birds in the Dunedin Exhibition.

I sent my last letter to you to Invercargill and I am afraid it has missed you.

I am glad that you like the report on the Thames. I intentionally omitted referring in it to the previous one as I had somehow an idea that you wanted it smothered. However I am glad that you mean to refer to it again as it would be a pity to lose sight of the analyses.

The rocks analysed for this first report were all from Coromandel, and nothing is said in the report on how they resemble those at Shortland.

The yield is increasing steadily and now exceeds I believe 20,000 oz per month, but I have not been down for some time, as I am waiting for you.

I hope you will bring Mrs Hector for the balls to the Duke.

Yours truly

F. W. Hutton

50. Hutton to Hector, 15-5-1869

Hocken MS-0443-3/7/10

Auckland
15th May 1869

My dear Hector

The Barrier maps look first rate, and the Thames ones also are very good considering how quickly you have got them out. The letter press is first class also. I have found gypsum in small crystals of peculiar form in the Tufa. I have not got No 65 of the Quarterly Journal, & should be much obliged if you could bring it up with you when you come for me to read. You must remember that the South American rocks where[sic] pronounced many years ago by Humbolt & others as identical with those of Hungary which latter have within the last year or so been shewn by the Austrian survey to be volcanic and of post Miocene date.

Your Otapiri coal section interests me very much. I think I can corelate it with our coals, but it is too long for this letter and I will keep it to talk over with you if you come up. If you don't come I am preparing notes for a report on the corelation of the Tertiary strata of Auckland to send to you.

If a steamer goes, as I expect, in a few days to Coromandel I will take a run down & try to be back before you come up.

Coal is reported between the Queens Redoubt and the Thames I should like to go and see it after you have been up here, as its proximity to the Thames makes it important.

Yours very truly
F. W. Hutton

51. Hutton to Hector, 26-5-1869

Hocken MS-0443-3/7/11

Auckland
26th May 1869

My dear Hector

I will take Beeres Map to Dr Pollen and ask him to send it to you, it is rather large for the post. Beeres hills are only sketched in and are not so correct as mine. I do not think that any more detail could be put in with advantage until we get a really correct map.

I am sorry that any confusion has arisen about the names of the rocks I sent. When I was in Wellington & looking over the Great Barrier specimens I understood you to say that you did not care for names as you could name them there better, and that all you wanted was localities: those specimens that have wide localities on them such as "Waiotahi" are rocks that might be got almost from any part of the field. I will send you some more with my names per *Wellington* if possible, but in these holiday times it is difficult to get into my office, or to get any thing done. It would take specimens of at least a cubic yard to exhibit the breccia near the Mata at its junction with the slates, it is so coarse. I sent 2 or 3 specimens of breccia from Karaka & Alabama creeks – gold is found in or close to the breccia, see section of drive in Moanatairi Co claim.

As you have not come up I propose going now to see the reported coal between the Thames & Waikato. Then I will go to the Thames and send a report for last six months and if possible a large map of the ground between the Kuranui Creek & the Golden Crown, showing all the veins. After that in August I propose sending you a report on the correlation of the tertiary strata, north & south of Auckland & the various coal beds in the province. After that on the 31 August, when my year is up, I am sorry to say that I must leave the Survey, as I mean to put up a Flax mill in the Waikato. My reasons for leaving are the uncertainty of my present position, never having received an appointment, and the great improbability of any extra money being voted this year, and also that I can make a great deal more by flax (£500 or 600 a year), and I am bound to think of my wife & family. Still I hope occasionally to be able to do something for you if you entrust me with anything in the province.

I do not now expect you up in the least as the session will so soon commence.

Mrs Hutton is sorry that she has not been able to make Mrs Hectors acquaintance. I have not yet the Transactions from Vogel.

Yours truly
F. W. Hutton

[*Enclosure*]

Please tell Gore that the £13 for Nov & Dec has been paid to me all right.

Yours truly,
F. W. H.

52. Hutton to Hector, 11-6-1869

Hocken MS-0443-3/7/12

Auckland
11th June 1869

My dear Hector

I am afraid that it would be quite out of the question for me to have a flax mill in the Waikato and live in Auckland. I must live in the Waikato, but after I had got the mill well started and all the hands well in at their work I could leave it for a month or so at a time. At present prices I expect to make a profit by it of not less than £1000 a year, so you will see, that as far as money goes it would be foolish of me not to start it. Don't however strike out the vote as I shall in a few months be able to work for you just as well from Waikato, as from Auckland; only instead of paying me a salary pay me by the job; as I think it would hardly do to be receiving a salary and not living in Auckland. As you are coming up to go over the gold fields with me, it will perhaps hardly be necessary for me to make a report; perhaps one for the year next January would be better, but just as you like. I should very much like to go up the Waikato on 1st August, the sooner I begin the sooner I shall be able to leave it. Small quantities of gold have been found at Waitakere (the range between Manukau & Kaipara), but nothing to pay; the gold is in very minute ramifying veins of compact flinty quartz, in hard dark gray submetamorphosed sandstone of Triassic? age. The locality is up the creek on which Henderson & Macfarlanes mill is situated, at the head of the Waitemata. And about 18 miles from Auckland. I have been to see it but there is nothing as yet worth reporting on.

The gold fields are improving fast there have been some very good finds lately in the Whau, Homeward bound, and Moanataiaui companies claims, and people here are in high spirits about them.

Everybody is very pleased with the Transactions of the Institute. I am sure it will get us many more members. Our Institute is flourishing and many are joining. I expect to have 30 or 40 new members this year, we sadly want a building, and I have been promised the old Post Office, but Williamson is awfully slow about it.

Pheasants here are 2/apiece.

Yours truly
F. W. Hutton

I should like a few copies of the 2nd Report on the Thames, if you can spare them.

Buchanan spells dolerite "Dolorite" all through.

53. Hector to Gisborne,⁷ 17-6-1869

Hocken MS-0443-3/7/13

Wellington

17/6/69

Mr Gisborne

The enclosed Report by Capt. Hutton is forwarded for Mr Staffords' information as it announces the discovery of a coal field in a situation favourable for supplying the Thames Mining District.

J. Hector

17.6.69

Auckland

8th June 1869

Sir

Report on a Coal seam discovered on the Maramarua Creek, Waikato.

By Capt. Hutton F.G.S.

Coal has been recently found in a new locality between the Waikato and the Firth of the Thames. The position of the seam is between the Maramarua and Whangamarino creeks (tributaries of the Waikato) and is distant, direct, about 6 miles from the Waikato and 10 from the Firth of the Thames.

The coal was found on land belonging to Mr Foote, but I have not the slightest doubt extends beyond it into land belonging to the Government. The seam is not yet sufficiently opened up to say much about it, but it appears to be at least 10 feet thick and nearly horizontal. The coal is an hydrous coal with retinite apparently just similar to that already mined at Kupa-kupa on the Waikato.

The Maramarua Creek is navigable for large boats or small steamers to within half a mile from the coal, and an almost straight road could be made with very little trouble, and only one small bridge, to the Firth of the Thames. This road would be almost level only going over two rivers neither of them more than 200 feet above the sea.

The height of the coal above sea level I estimate at 200 feet; no pumping would be required for working it.

At a rough guess I should say that the coal might cover an area of 400 acres.

⁷ William Gisborne (1825-98), Colonial Secretary (1869-72).

A correct survey of the block would take about 3 weeks or a month, as the country is very broken, and this survey it would better to defer until the seam has been opened up and its thickness and dip can be correctly ascertained. As Mr Foote has put up a flax-mill and proposes to work the coal for the mill, a few months will probably see the seam well opened.

Immediately on my return I reported the circumstance to the Agent for the General Government and pointed out the position of the coal to him; and the land has been withdrawn from sale.

I have the honor to be
Your most obedient servant
Assistant Geological Surveyor.



54. Hutton to Hector, 5-7-1869

Hocken MS-0443-3/7/14

Auckland
5 July 1869

My dear Hector

There is some mistake about the specimen Dr Pollen gave you as I never gave him one, but from your description I have very little doubt but that it came from Waitakerei[sic] near the head of the Waitemata.

I see by the abstract of accounts, that you sent up to the Paymaster here, that after deducting my salary & expenses up to 30 June from the £350 vote that a balance of under £20 remains, which I am told goes to the Government as the year is at an end. I therefore suppose that I am off pay now, and shall go up to the Waikato tomorrow to start my flax mill. I shall however be back in about 10 days, as I cannot take my wife and children up while the country is in so unsettled a state, for while the rebels hold the Thames valley neither Tauranga nor Waikato are safe unless well protected.

About the profits; we can make the flax fibre for £12-15 per ton and sell it in Auckland for £20-25 and a mill ought to turn out 3 tons a week.

We have 26 additional members of the Institute & shall get more no doubt, we shall also have some good papers. I shall prepare one on the Tertiary rocks north & south of Auckland, and I think it will be better adapted for the Institute than for the Survey reports, as of course it will be more or less problematical.

You will be astonished to hear that an F.R.S. has been discovered in Auckland who corresponds with Prof Airy and is engaged on a catalogue of stars of the Southern hemisphere working with a reflecting telescope of his own manufacture. His name is Lambert and he is a plasterer by trade. He has just been elected F.R.S. – Peacock is my authority but I shall know more about him soon. The Duke of E when here invested £1250 in Long Drive shares he is getting £100 per week dividends and his shares are worth nearly £4000 – the Thames never looked so well. The Kuranui hill is certainly the most extraordinary place in the world. House property and everything else is rising in Auckland.

The people here are horrified at the idea of Williamson being Resident Minister. If the report is true I think it likely that there will be a public demonstration about it; we all want Pollen to continue as he is.

I was at the Bay of Islands lately & showed H. Williams how to read his instruments. I have also sent him one of Kirks note books as he had none to begin with. Mr Ireland of Waimate is going to send you down a keg of water from the hot springs there for analysis. These waters differ from others that I have seen.

Yours truly
F. W. Hutton.

55. Hutton to Hector, 21-7-1869

Hocken MS-0443-3/7/16

Auckland
21st July 1869

My dear Hector

When I wrote to you saying that, as it was necessary for me to go and live in the Waikato to look after my Flax mill there, I thought it would be preferable for me to work for you by the job and not on a salary. I did so thinking that you would like that better and not because I did not wish to be on your staff, but yesterday Gillies explained to me that that arrangement would give you a good deal of unnecessary trouble and delay when you wanted me to do anything and that it would be much better if I was to be kept on regularly as you suggest by a kind of retaining fee. To this of course I shall be very happy to agree, provided I am allowed to live in the Waikato, where I can write my reports just as well as in Auckland and of course shall not expect my travelling expenses between Waikato and Auckland.

If you keep me on as before I shall make it a point to have a good man at a good salary as engineer to my mill, one whom I can trust to carry it out when I am away, and as soon as the mill is well started and I have got the men into their work and the whole thing properly arranged I shall have plenty of time to do anything that you want. This will perhaps be two months after starting (I hope to start 1st Sept) perhaps less.

As Gillies has spoken to you about the mercury at the Hot springs at the Bay of Islands I may tell you that there is no doubt but that native mercury and cinnabar exist there. In my opinion this has only a scientific interest and no pecuniary value, but as my employers (and I should not have known any thing about it if they had not asked me to go) think otherwise I am bound to say nothing about it at present, and hope you will not either. When the time comes I have some very pretty specimens of the native mercury in the rocks both for you and the Auckland Institute. The keg of water has not come down yet, as it was to be sent by the "*Tauranga*", and she has not been running to the Bay lately. Thanks for the analyses they are very interesting, the water from these springs seems to be the most remarkable in the whole Island.

The rage for shares here is tremendous just now, nothing else is talked about and losses and a reaction must follow before long, but meantime lots of people are making fortunes. It is quite common to hear that so & so cleared 1 or 2 or 5000 pounds last week. If there are many places in the colony (and why not?) equal to the Kuranui Hill I don't know what people will do with their money.

Affairs in Waikato are very threatening, but I wish they would attack us, we are quite ready for them. My only fear is for Raglan which seems to have been forgotten.

Yours truly
F. W. Hutton

56. Hutton to Hector, 2-8-1869

Hocken MS-0443-3/7/17

Auckland
2nd August 1869

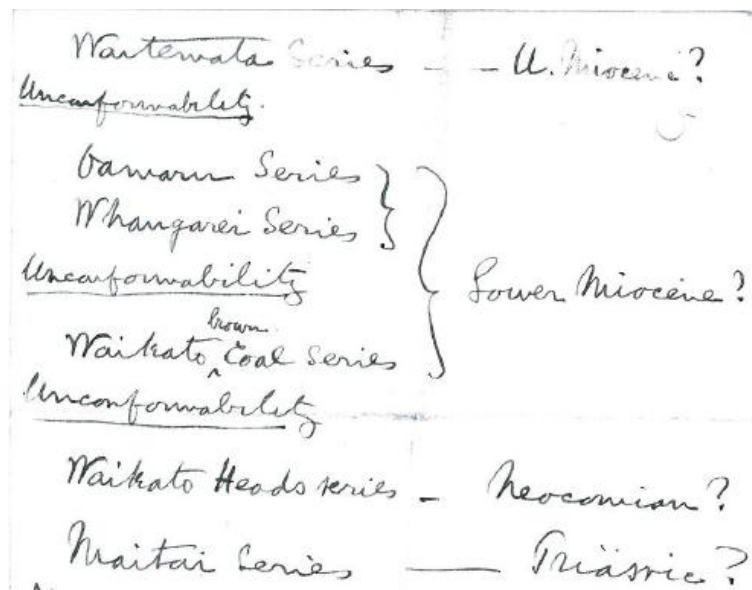
My dear Hector

Please give me as much notice as you can before you come up, as I very much wish to go to the Thames with you. My plans at present are to go to the Waikato tomorrow and return about the 9th August, when I expect my boiler and engine to be finished. I shall then again go up for a fortnight and return here to take my wife and family up about 1st Sept, as I have sold my house in Epsom.

I agree pretty well with your section. Near Puriri the slate rocks must come to the surface, as the creeks are full of boulders of them but I have not seen them in situ. I think you make too much of the slate rocks between Shortland and Tapu, and not enough of them between Tapu and Coromandel. Slates are only seen close to Tararu, between that and Tapu should be your grey pyritiferous tufa (c) which as you know I consider as identical with (d) undoubted trachytic tufa. I do not know that there is evidence that Shortland lies in a syncline although no doubt it is in an old valley, the same of the old valley in the slates further north. Mount Wynyard, near Tapu (2600 ft) is Tufa and breccia to its very top.

I shall wait for more evidence before I publish anything about the northern tertiaries. I think I have good evidence to shew that the green sandstones etc with coal in the north form the base of the Oamaru (Raglan) series that they thin out towards the south and are replaced by the Oamaru series. That they lie unconformably upon the Brown Coal series of Drury & Waikato. These latter again are much younger than the Waikato Heads coal.

The Waitemata series also lies unconformably on the Oamaru series, so that we have here three different tertiary series divided by break and unconformability.



I dont know how the fossil plants will fall in with this, but the great difference in age between the Waikato Brown coal, and the Waikato Head series is clear by stratigraphical evidence.

I found the Hg in two distinct springs several hundred yards distant, and have no doubt but that it occurs in many more, but had not time to search for fear of arousing suspicion.

Yours truly
F. W. Hutton

57. Hutton to Hector, 18-8-1869

Hocken MS-0443-3/7/19

Auckland
18 August 1869

My dear Hector

Thanks for the analysis of the Mata dyke I thought that it would have been less silica, it does not seem very different from the others, but I cannot compare now as I am in the agonies of packing & most of my things have gone up the Waikato. We all move up next Friday week, and we shall be very glad when it is over.

I would recommend you to delay your visit to the Thames as long as possible, until finer weather sets in. The roads now are abominable and you wont be able to get over a fourth of the distance in a day that you will in dry weather.

Coromandel is looking up again and there are a good many miners there now. The Kapanga claim is I believe to be resuscitated, half Auckland & half Victorian capital.

Even the gold cannot stop the flax mills which are increasing on all sides. I should much like to be on the commission you speak of, but suppose it will consist only of men who have votes in the house. I propose this summer working up the microscopical structure of the leaf for a paper for the Institute.

I have now before me a bill of sale of Auckland made flax sold last June in London, prices from £28 to £40.15 per ton according to quality; the former was I believe hand packed, our common machine dressed will fetch £37-£40, and the price will probably rise as the best manilla is £80. Our object now ought to be to try to make it resemble manilla as closely as possible, as it is used as yet only for adulteration.

Yours truly
F. W. Hutton

58. Hutton to Hector, 6-9-1869

Hocken MS-0443-3/7/20

Church, Mercer
Waikato
6 Sept 1869

My dear Hector

We have all migrated up here, where we hope to see you some day. I cannot get my engine yet as the foundries are so busy so have not yet been able to make a start but hope to do so in about a fortnight.

I agree with most of what you say about flax so far as we are only just commencing the manufacturing and shall no doubt improve much as we go on but I disagree with you about its not paying now. Flax here can be made at about £15 to £16 a ton, sells in Auckland at about £20 to £26, and in England at from £37 to £41 and the market is practically unlimited. The profits are very large if you can keep your mill constantly going, but that is the difficulty at commencing. A difficulty that will soon disappear.

I am very glad to hear that the estimates have passed. I never expected it, and I do not value myself so highly as Stafford & you seem to do.

I suppose you will write and let me know what you want me to do. I should like a little time here first to start things properly.

I am not unpacked yet and cannot get to my books & cannot remember quite what I said about the Whangape Springs, but since then I have taken the temperature and find it not so hot as I expected. I think about 160⁰F or 170⁰F but my note book is not unpacked. I have hardly had time to do anything yet but unpack, but another week or two will see me straight.

Yours truly
F. W. Hutton

Kirk will forward letters etc for me from the Museum at Auckland.

59. Hutton to Hector, 15-9-1869

Hocken MS-0443-3/7/21

Mercer, Waikato

15 Sept 1869

My dear Hector

Your bird with a bent bill (scissors-bill) is, according to Newton Anarhynchus frontalis Quoy & Gaimard.

Finsch has made another onslaught on to Buller; he says he can now positively determine that *Nestor occidentalis* = *N. meridionalis*, *Platycercus alpinus* = *P. auriceps*, *Gerygone assimilis* = *G. flaviventris*, *Turnagra hectori* = *Otagon tarragon schlegel*, *Anas gracilis* = *A. gibberifrons* S. Muller from Timor, Celebes, N. Caledonia, and North Australia, *Podiceps hectori* = *P. australis* Gould, *Larus melanorhynchina* is new unless it is what is intended by *L. andersoni* (Bruck Jour of Orn 1853 p 102).

I have written to Buller to tell him of this.

My engine & boiler come up next Saturday but it will be a month before I am well under weigh[sic], it takes longer than one thinks to start anything here.

I have nothing to report geologically.

The Victorians just over think very highly of the Thames but complain that prices of scrip are too high, most of them have taken up new ground. They have also bought up the Kawaeranga water scheme.

Coromandel is looking up, splendid specimens from the dividing ridge between it and Kenedys bay.

I will be ready in November to go with you.

Yours truly

F. W. Hutton

60. Hutton to Hector, 12-10-1869

Hocken MS-0443-3/7/22

Mercer, Waikato

12 October 1869

My dear Hector

Many thanks for the two specimens of rocks from Hungary. They are exceedingly like those from the Thames. The "Timazite" is just like that from the "Ballymore" Claim Waiotahi in appearance although it differs in composition; but I think we ought not to lay too much stress upon that. Rocks are not homogeneous substances but must be described and named from the various minerals they contain, and a different proportion of minerals will not alter the name of the rock although it will its chemical composition.

My mill progresses very slowly, it is impossible to get things from Auckland in time, and it takes 6 months here to do one months work. I am afraid that I shall not be able to start for a month yet, for it is no use beginning until everything is ready. I agree with you that setting will be necessary in order to obtain pure fibre, and that it must be done after it has passed through the machine. But the fibres of *Phormium* are very delicate much more so than those of *Linum*, and the retting must be done very carefully or we shall spoil the whole. For this reason it must be done in vats at regulated temperatures, so that the time required may be calculated; even then it will vary with the age of the leaves etc. Altogether it will be a ticklish operation, and as the previous cost will have been considerable, any failure of the retting will entail heavy loss; and as the process is only required for making the fibre fit for textile fabrics, it is questionable whether we had not better stick for some time yet to our present process which turns out the fibre well adapted for ropes. When my mill is going I shall be able to experiment on it.

Thanks for the abstract of Mr Nottidge's paper. I also had one in progress, and have now finished it up and mean to read it at the next meeting of the Institute so that it may appear in the same volume as Mr Nottidge's. Mine is only on the structure of the leaf, I have not yet had time to apply it practically by examining the prepared fibre as dressed by different processes; this I mean to do for the Commission. Mr Nottidge and I appear to be agreed upon all essential points, I do not however think that any passages exist in the bundles of fibres; they might have been caused by the knife tearing the bundles apart when making transverse sections. As to his opinion that the ruptured cells discharge their contents into the fibres and so color them, I will say nothing at present until I have had an opportunity of examining the fibre fresh from the machine, but even if so the only colouring matter is chlorophyll, which drying would whiten. The fibre is much more likely to be discolored by retting. Any how the cellular tissue must be torn in order to get out the fibres whether it be done by beaters or combs.

I have found some very curious animals to inhabit the semi-solid gum in the sheaths of the leaves, unfortunately I know nothing about them. It would however be a good thing to direct the attention to of any body who is interested in the lower orders of microscopical animals.

That flax will pay I look upon as certain, but it takes large profits to get over first difficulties of starting.

Mail before last Kirk had a letter from Hooker. He had just returned from Russia and was looking over his Great Barrier plants. So far as he had gone he quite agreed with Kirk upon every point, and was particularly pleased with the *Pittosporums*, and the *Astelias*. I do not know yet if he has heard again by this mail.

The only real fishing here is that of the mullet. We will do what we can for the commission, but that will be little more than a list of fish commonly brought to the market.

Yours truly
F. W. Hutton

I will exhibit the Hungarian rocks to the Institute next Monday.

Don't hurry yourself to come up, nothing is going on particularly

61. Hutton to Hector, 30-10-1869

Hocken MS-0443-3/7/23

Oct 30th 1869

Waikato

My dear Hector

I have been delayed far longer than I expected from the impossibility of getting machinery and castings from Auckland, but at last I have got, I think, everything necessary and hope to start the week after next, as I have engaged two more carpenters to push on. After I have been at work for 10 days or a fortnight I will be off to the Thames, and you shall have a good long report in March. I am very sorry for the delay but you may be sure I could not help it, as it has cost me a good lot of money.

With respect to the birds: it is very likely that Haast has led Finsch into a mistake with respect to Nestor occidentalis.

As to Turnagra hectori, there is no question but that it is distinct from T. crassirostris. Otagon, seems to be a genus of Pz. Bon, and a synonym of Turnagra, a genus peculiar to N.Z. Turnagra hectori may have been sent home before, either since the list in the Ibis, or unknown to Gray, and may have been named Otagon turnagra from a specimen in some German museum. Of course no blame can be attached to Buller in this case, or in that of Anas gracilis, both being new to us here, it only shews that new species must be referred to Europe before it is safe to name them. Your "scissors-bill" I always thought to be Charadrius frontalis Ellman, and have said so to Buller more than once. The same with Podiceps hectori and P. australis. As for Gerygone assimilis I have certainly seen the spotted eggs, said by Buller to be characteristic of G. flaviventris, in the nest without a porch, said to be characteristic of G. assimilis. In fact I have never yet seen a nest with a porch.

I send you my two papers as you say that they are to be printed. I had to rewrite the albatross as I had written another paper on the backs of the sheets, and I have slightly altered and shortened it.

Coromandel seems improving and I shall have to spend some time there. I suppose my report must be chiefly on the lodes & veins this time.

Yours truly
F. W. Hutton

62. Hutton to Hector, 22-11-1869

Hocken MS-0443-3/7/24

Waikato
22 November/69

My dear Hector

I started my mill but unfortunately met with an accident, some of the tubes of the boiler leaking. I have got a man coming up tomorrow to put it to rights again, and I hope to be able to start by the end of the week; but I also find that my engine is not quite powerful enough. It will just drive 2 machines and a scratch with plenty of steam, but will do no more, so I have ordered a 10H.P portable engine to arrive in the *John Branfield* now about 75 days out. These accidents and delays will prevent me leaving for the Thames as soon as I hoped, but I hope that it will make no difference to you. I suppose that if my report is sent in by the end of March, that it will be in plenty of time, and if so the later the intelligence the better.

The fact is that I have now spent so much money in this flax mill, that to leave it before it was well started and in working order would simply ruin me, while when once in full swing it will bring me in large profits. I do not think I over estimated it when I told you that I could make £1000 a year by it.

I am anxiously waiting to hear the results of the superintendency election. I shall be delighted if Gillies turns that drunken Fenian Williamson out.

Kirks paper on the introduced plants is I think by far the best the Institute has yet produced. It is fortunate for science that we have in New Zealand a botanist so thoroughly acquainted with European plants as Kirk. I consider the correctly chronicling of the introduction & spread of naturalized plants and animals as of far more importance than naming new species; for if we now miss the opportunity we can never recall it.

The spread of plants in the Waikato in the last 3 years is something extraordinary. The pair of white swans that Sir G. Gray[sic] gave me have just hatched off 9 young ones, this making 13 now on the lake. They had been for many years on the North Shore Lake near Auckland but never succeeded in rearing a single young one.

Yours truly
F. W. Hutton

63. Hutton to Hector, 5-12-1869

Hocken MS-0443-3/7/25

Club, Auckland

Dec 5th 1869

My dear Hector

I have left my mill to get on as well as it can and start for the Thames tomorrow. I mean to go to Coromandel first, as that offers newest ground for geology.

The 'granite' you mention as coming from Mine Bay, Great Barrier, is found in a broad dyke crossing the bed of a small creek, and is the one marked "Quartz-porphry" in the enlarged plan of the Mine Bay district in my report. It certainly has the ingredients of granite, and might perhaps be more properly called a "granitic-porphry" than a 'quartz-porphry'. I did not call it a "granite" for two reasons – First, the quartz is generally in grains in a perlite matrix, although not so decidedly so as in the quartz-porphry from Whangapoa, Great Barrier (see your collection) where the quartz is well crystallised, the second reason I perhaps laid too much stress on, which is that I consider "granite" as a rock metamorphosed in situ, and not injected into fissures. My reason for this is that the geological structure is so different in the two cases that we ought not to confuse them under the same name even if their mineralogical structure is identical. A granite dyke does not prove the existence of subjacent granite, any more than a quartz-porphry or Felstone dyke, at least I think not. However I think that the rock in question may legitimately be called a granite if you like it, although on geological grounds I prefer some other term.

<p>Have you ever examined two minerals from the cave at the Three Kings that I sent you about the same time as the Great Barrier specimens. One white the other red – silicates of alumina etc, but what to call them I do not know.</p>
--

I suppose that you don't want any more specimens of the common Thames rocks already sent; only anything new that I may come across.

Yours truly

F. W. Hutton

64. Hutton to Hector, 27-12-1869

Te Papa MU000147/003/0014

Whangape
Waikato
27 Dec 1869

My dear Hector

I have returned from Coromandel quite satisfied in my own mind that all the gold is in the tufa formation. The prospectors claim is on the top of the dividing range in one of the large quartz reefs, blocks of which are seen lying on the slopes of the hills opposite the Kapanga. I can find no trace of slates or paleozoic rocks in the Kapanga creek or its branches, only in the Waiau & its branches.

The central range between Hauraki and the East Coast, appears to be entirely trachytic tufa, and the base of the mountains of the peninsula only to be made of slates, which are only occasionally exposed on the surface. I strongly suspect that Whakairi, or table-mountain, between Shortland and Mercury bay is an extinct volcano.

I do not feel at all inclined to go to the Thames again. The main points of its geology I consider decided, and I dont like reporting upon the mines, as I have no special knowledge or experience in the matter. I like sticking to geology and not going into mining. I would propose that extending your map of the North over the Kaipara district would be more in my line.

Do you remember me mentioning to you a young fellow named Brown who was formerly on the Geo Survey of Victoria? He is surveying now at the Thames. He has a letter from Selwyn either to you, or in which your name is mentioned, and I should much like to get him some employment. In fact I see that I cannot leave my flax mill as much as I had hoped, and I am undecided whether I ought to resign my appointment, or employ Brown in the field, (say Kaipara), and then go and inspect his work, I of course paying Brown when he is working. One of these courses must I am afraid be adopted as I cannot leave my mill for more than a week at a time without things going wrong. The men fall-out and want to leave, and very little flax is turned out.

I have just made a discovery that promises to be of importance to flax-manufacturers using steam power, which is that the refuse from the machines, when mixed with ashes makes splendid fuel: however I cannot say much about it yet, as I only tried it last Friday afternoon for the first time, when I burnt ashes that had twice passed through my fire by mixing them with about equal quantities of flax refuse, just as it comes from the machines.

Frogs are not uncommon at Coromandel on the tops of the ranges and not in the creeks.

Yours truly
F.W. Hutton.

My report on Coromandel will follow presently.

65. Hutton to Hector, 1-1-1870

Te Papa MU000147/003/0030

Churchill, Mercer
Waikato
1st January 1870

Sir

I find that the business connected with my flax mill will absorb so much of my time that I shall be unable to attend to other duties, and therefore I feel compelled, with much regret, to resign my appointment of Assistant Geologist.

I have the honor to be
Your most obedient servant
F. W. Hutton

Dr Hector F.R.S.
Director of the Geological Survey of New Zealand

66. Hutton to Hector, 4-1-1870

Te Papa MU000147/003/0022

Churchill, Waikato
4-1-1870

My dear Hector

I am sorry to say that I find it will be impossible for me to give up sufficient time from my mill to do geology for you. Things do not go on when I am away as well as when I am here, and a very few bales of flax a week will make up for my pay. Besides I am very nervous about a fire and suppose one was to take place while I was say in the Kaipara district I might not hear of it for a month, and all that time would be lost, which at present prices would represent at least £240 worth of flax.

I hope that it will make no difference to you, if you employ Brown you will I am sure find him a very nice fellow, and far more useful to you than I am as he is a bachelor and would not mind where you sent him to, or for how long.

If you really do come to Auckland I hope we shall see you here, you have never seen the Waikato coal field, and I can shew you at my mill, what is allowed to be the best flax yet produced.

Yours very truly
F.W. Hutton.

67. Hutton to Hector, 16-5-1870

Hocken MS-0443-3/8/1

Churchill, Waikato

16 May 1870

My dear Hector

I was sorry that you could not come up here, but hope to see you some day.

I am afraid that I cannot as yet agree with you about the Thames auriferous rocks, but then I have not seen your evidence. When you print your report and I can read it at leisure and think over it I shall be better able to form an opinion. I hope you will not forget to send me the Geological Survey and Museum reports when published. Don't think that I shall feel the least hurt or offended if you do not publish my Coromandel report. As you are responsible for the Survey you are quite right to suppress it if you wish.

The Vol II of Transactions is a great improvement upon Vol I.

Kirks naturalised plants stands pre-eminent I don't think that anything of the kind has been done for the other colonies. It is a pity he cant continue it for the whole islands, but that would take too long. Could you not get friends in different parts of the colony to send him collections of naturalised plants to work up.

Pott's paper is also very good but would be improved by shortening. He must have had his eyes open. I see that Mr Webb of Dunedin has attacked my Albatross paper. I don't think that he knows very well what he is doing as his Appendix is full of blunders from beginning to end. I would have taken no notice of it but it is written in such an offensive, and school-master-teaching-a-small-boy style that I must in self defence shew him up a little. I must however wait until I get my own copy as I have as yet only glanced at Kirks. Did I ever tell you that Newton was much obliged to you for Vol I that you sent him.

I think Gillies paper might just as well have been classed among the miscellaneous as Geological. Your lecture is first rate I wish you would give us some more of them. You are very sparing of your pen.

Yours truly
F. W. Hutton

68. Hutton to Hector, 20 June 1870

Hocken MS-0443-3/8/2

Churchill, Waikato

20 June 1870

My dear Hector

There can be no possible objection to altering Miocene into Tertiary in my Coromandel report. Of course we must not expect to be able to correlate our strata with the European ones for a long time to come, and we shall probably always want a classification of our own, but it is one object of Geology to try to correlate strata all over the world, and I think we ought to try to compare ours with the European ones as much as we can always assuming wide limits of error which will get less and less as the intermediate countries are worked up. I am anxious to see your map of N. Z., and Haasts paper on the Waipara beds.

I see no other mistake in my Sinking funds paper except the – sign left out. It is correct if the data are correct. I have taken the sinking fund to be put by immediately the loan is obtained; as that seems to me to be the correct system. If the first instalment of sinking fund is not put by until the second year it would make a slight difference, but I cannot think that this is the custom. If it is it ought to be altered. I have not seen Mr. Fitzgerald but should be good if he would write to me and tell me of the faults he finds with it.

I think there is plenty of evidence to show that the wings & tail of albatross, condor etc do not move. Any movement sufficient to propel so heavy a body must be large enough to be visible when the birds come so near as they do (even without the total absence of any muscles to produce such a movement). Any movement however slight would be perceptible in the wings of a bird like the condor, the primaries of which are separated at the tips. It would necessarily produce a blur instead of a sharp outline to each feather, which has been closely watched for but never seen.

The Waikato coal mines have been taken by a new company who propose to work them more extensively, and I believe send coal to Whanganui etc.

Are you going to send a copy of the Transactions to Newton? If not I think Mr Potts ought to send him a copy of his paper. I think it would be a good thing to send copies to some of the scientific mags such as “Nat Hist Review”, “Quar Jou of Science” etc. It might get the Institute some English members.

Flax is I think looking up for the very best qualities. I wish you could find out why salt water acts so injuriously upon it, and whether it destroys the gum, on the fibre itself, or whether the cause is in any nitrogenous or albuminous sap that the fibre contains. People are talking a good deal now about retting it, but I am not very sanguine myself that it will succeed.

Yours truly
F. W. Hutton

69. Hutton to Hector, 20-7-1870

Hocken MS-0443-3/8/3

Auckland
20 July 1870

My dear Hector

I have given Kirk a small bottle of Waikato fishes to take down to you. It contains I think 4 species (calling the whitebait the young of the smelt?). I could get you plenty in a month or two when the Maoris commence fishing. The only other fishes I know in the Waikato are – Upper Waikato – grayling sometimes 18 inches or more in length, -Lower Waikato – mullet and Flat fish which go as high as Rangiriri – the whitebait don't go higher than Rangiriri. In the small creeks one or two other kinds are found but I have never yet got specimens.

Curiously enough I have been giving a lecture on Flax just about the same time as you did in Wellington.

I will send you some copies of mine in a few days, as soon as it is printed. Please send me a copy of yours.

You ask for the length of the ultimate fibres of *Phormium*. The following are my observations

Number measured	23
Longest	0.80 inch
Shortest	0.13 “
Average of whole	0.39 “

There is no difference in different parts of the leaf. I have just bought a 14 HP. Engine and am going to enlarge my mill. It is going to be a first rate thing.

Can you tell me of any locality, or localities, where Septaria for Portland cement, can be obtained in large quantities and handy for shipment? North preferred, if not South Island.

I have a paper on the relative ages of the Waitemata series and the Brown coal of Waikato & Drury for the Institute.

Yours truly
F. W. Hutton.

[*Marginal notes:* Please send me copies of any papers connected with science in the colony – Fish, Flax, meteorology etc. F.W.H.]

Kirk leaves as soon as he can after 8th prox.]

70. Hutton to Hector, 15-8-1870

Hocken MS-0443-3/8/4

Churchill, Waikato

15 Aug 1870

My dear Hector

I have read your report on the strength of N.Z. flax with much interest, and I hope that you will continue it. I do not however agree with all you have said.

1st I do not think that it is the separation of the ultimate fibres that gives the brush like appearance to the broken ends of bundles, except where the fibres have been very much weakened by alkali. It is owing to the bundles being broken up into smaller bundles, each of which have many ultimate fibres bound together. If the ultimate fibres pulled out, the bundles must necessarily be weaker than those that broke off short.

2nd I do not think that the ultimate fibres are held together by atmospheric pressure, not only because this appears to be impossible when the fibres are soft hollow tubes of cellulose, which would allow the air to pass through, but also because the cement can be easily extracted and examined.

I wish you would set Skey to work on this cement, it is the most important part of the flax plant to us manufacturers, as to the gum & mucilage they are of secondary interest only.

I see that your experiments give the following results

Soaked	173.5
Machined only	149.5
Steamed	137.0
Retted	111.0

[*Marginal note:* It is a pity that you were not able to distinguish between the varieties]

but as soaked cannot be stronger than machined when fresh the two first ought to be taken together or

Ordinary process	151.5
Steamed	137.0
Retted	111.0

The chemically prepared ones cannot be taken into account.

The experiments I made (referred to in my lecture), when reduced to the same weight per length as yours, give for swamp flax soaked 3 hours – 155.0 lbs which is nearly the same as yours.

If you mean to continue your experiments, and I think that they will be very important, I will send you some samples as soon as my new scutch is at work.

From your description of the Maori dressed Sample No 3, there can be no doubt but that it is a "Tihore", for the "Haro" is always yellowish white like our machine dressed. The Maori prepared tihore, where the fibre has been torn out of the leaf is the best for extracting the cement.

You can get very good samples of N.Z. rope for testing, both white and tarred, from Williams & Co – Queen Street, Auckland, Reddish yellow, or reddish white fibre will not sell in England.

Yours truly,
F. W. Hutton

[Undated fragment, attached to letter of 15/8/1870]

[Ag 15 1870]

What do you think of Dr. Florance's "double cohesion", and "double elective affinity" principles? He seems to have very little doubt about it himself. And having, during the course of 12 years, tested "every other re-agent" he ought to know something about it, but he has failed to find out that the gum and cement are very different things, and that the "dry process" does not "effectively fix the gum into the fibre".

I put him down as an unmitigated quack.

Price of N.Z. Flax, last two sales in London

	Highest	Lowest	Average	
Auckland	31	22	26 3/4	Good dressed
Wellington	30	18	25 3/4	Fair dressed
Canterbury	26	15	21 3/4	Inferior in color

71. Hutton to Hector, 18-8-1870

Hocken MS-0443-3/8/5

Churchill, Waikato

18 Aug 1870

My dear Hector

I sent off a letter to you a few hours before I got yours but as postage between us is not expensive I will write again. First

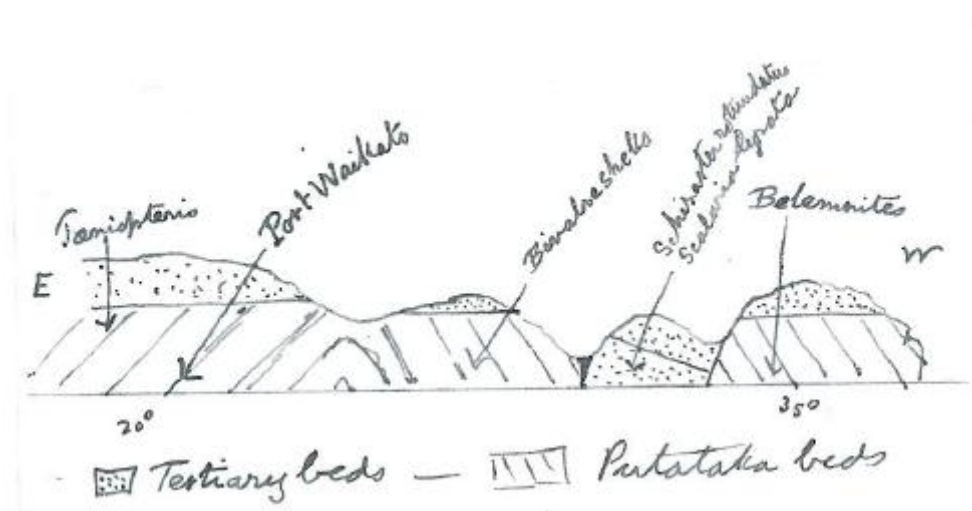
Many thanks about the cement stones. Some merchants in Auckland are importing some apparatus for building concrete houses, and Mackelvie asked me about them & I told him that I would ask you.

I am very glad that you are working up the fishes, and have done so well amongst them. I hope you will publish short descriptions of them, so that others, who cannot get at the Colonial Museum, may have something to work upon. Same with the shells.

The B. Coal nowhere approaches (as far as I know) the *Pecopteris* beds, and I do not think that a connecting section can be found. The B. coal beds are horizontal and soft sands and clays, softer than the Waitemata beds, while the Putataka beds are more like the triassic rocks in appearance.

I see that I have called them the "*Pecopteris*" beds, as you have done so in your letter, but I am not aware that "*Pecopteris*" has ever been found in them. Hochstetter mentions *Asplenium* & *Polypodium*, and in a letter to Dr. Fisher about some specimens that I had sent him he mentions one of *Taeniopteris* and one of *Alethopteris*. These are all I know except the new ones that Kirk has got.

The belemnites are found at Waikato South head, and the ferns some 6 miles further south and the cliffs are so steep that it is impossible to go from one to the other, although in very fine weather it might be done with a boat. However I found in red marl at Waikato heads a specimen of the *Taeniopteris* in the following position



They are all in one formation, but I could not say at present whether the fern or belemnite beds were on the higher level. I think that you are wrong in thinking that a gray color would not depreciate the price of flax, as N.Z. flax, a white fibre will always fetch a higher price than a dark or colored one, even for rope.

I object to retting as weakening the cement which we want to keep intact, as it is that alone that gives it the strength. I don't believe in its rotting so quickly in fresh water. I have now in use clothes lines that have been exposed for more than a year, and although so small they are still quite good.

I ought to have told you that my experiments that gave a result of 155 lbs, were made on the fibres from the butt. I had intended to continue them to other parts of the leaf and to different varieties, but I did not as mentioned in my lecture. Sweating is Macffarlanes word, I don't believe in it. My process is soaking in running water for 3 hours, and then bleaching as quickly as the weather will allow on grass. It is not dew-retting, and in summer the fibre is exposed only for a few days. I wish to preserve the cement as much as possible but to get rid of everything else.

Does flax rot faster in salt water than in fresh? I cannot try that here.

Yours truly,
F. W. Hutton.

72. Hutton to Hector, 23-9-1870

Hocken MS-0443-3/8/6

Churchill, Waikato
Sept. 23rd [1870]

Dear Dr Hector

Captain Hutton is suffering from a severe cold in his eyes & is unable to see to read or write, he therefore desires me to write & thank you for your letter of the 11th & also for the box of moa egg-shells which arrived by the same post.

As soon as he can he will write and answer your letter, in the meantime he desires me to say that he is glad you do not intend to publish his statements as to the strength of Flax Fibre, he never meant them to be considered as anything decisive.

I trust both you & Ms Hector are well. I am sorry that I have only a photographic acquaintance with Mrs Hector but I hope that some day in the course of your travels you may both come up the Waikato & pay us a visit.

Believe me
Yrs truly
Annie J Hutton

73. Hutton to Hector, 2-10-1870

Hocken MS-0443-3/8/7

Churchill, Waikato

2 Oct 1870

My dear Hector

It seems an age since I wrote to you but I have been suffering from a severe cold in the eyes for the last three weeks and am only now getting better.

Thanks for the moa egg shells, I will work them up during the summer,
[*Corner torn off page*]

was so weakened that the ultimate fibres could be easily separated by needles under a microscope, and so measured. I cannot use a microscope yet and so cannot examine the breakage more minutely than I had done previously to my lecture.

The gummy substance extracted by boiling pure colorless fibre, is no doubt different from the state it exists in when cementing the fibres together, as it is of a brown color and absorbs water [*Corner torn off page*]

I do not think that the mode of manufacture (provided no chemicals that act on the cement are used) alters the breakage I should expect when the bundles are mechanically divided by rubbing, pulling them out of the leaf by hand etc.; it is the variety of plant.

The Maories use the best kinds, while we use the worst for they are commonest.

I send you a corrected copy of my lecture for printing from. I do not know whether you mean to print it as a paper or a lecture. It was read to the Auckland Institute in the ordinary way as a paper, but was called a lecture.

Yours truly,
F. W. Hutton

[*Fragment attached to letter of 2/10/1870*]

0-2-1870

I should be much obliged if you would send me, either by letter or by Kirk, 3 or 4 small bits of the egg shell of the Moa, also kiwi, ostrich, emu, or anything in that line that you may have broken, and of no value for anything else, as I want to make a paper for the Institute on the structure of the shell.

We are having shocking bad weather here, nothing but wind and rain. The river is higher than it has ever been since Europeans have been in the Waikato. My drying ground is flooded over the greater part and the water is just up to the rick.

F.W.H.

74. Hutton to Hector, 19-10-1870

Hocken MS-0443-3/8/8

Churchill, Waikato
19th Oct 1870

My dear Hector

I send you some samples of the carbonaceous mineral found in veins at One-tree-point, Whangarei harbour. I read a paper about it at the Auckland Institute meeting last September. It is not coal, in the usual acceptance of the term, although it looks very like it, as it is found in veins, more or less vertical, like minerals, and not in beds or layers parallel with the stratification. I send the sample in case you care to analyse it.

I shall be glad of your criticism on my Waitemata series paper.

I cannot distinguish the Nesonetta aucklandica that Kirk brought up from Wellington from Anas chlorotis. Is there some mistake? I see you have marked in your catalogue Pelecanoides urinatrix and Graculus melanoleucus amongst your desiderata. Did I not send you specimens of both?

Have you ever compared the frog I gave you from The Huia, in the Manukau, with those from Coromandel? Judging from memory I fancy they are different.

Fishes

Our snapper is I think Papus micropterus C & V, and our yellow tail is certainly not a Latris but a species of Caranx, as also is our king fish – both grow to a large size but the king-fish is compressed or flattened while the yellow tail is much rounder in section.

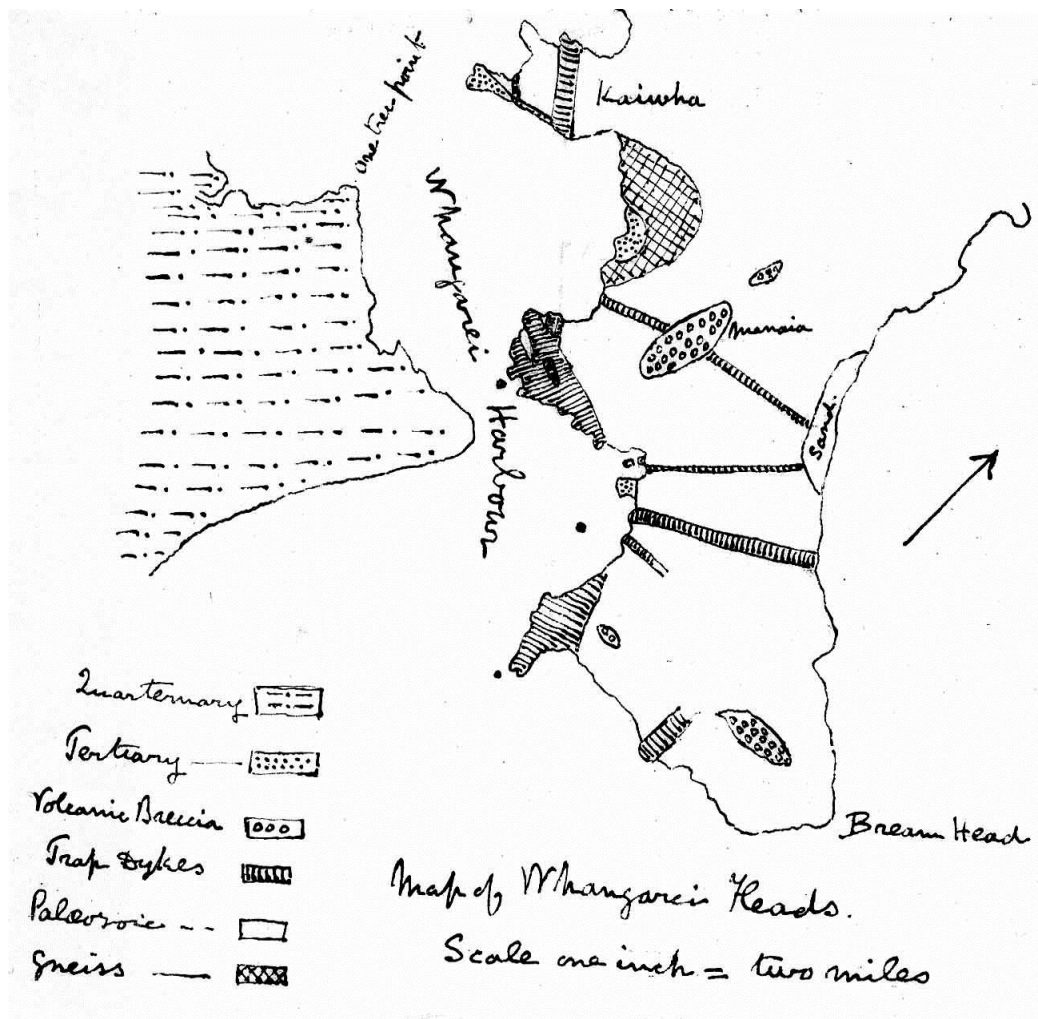
Heavy spar is a new mineral to me from Auckland. Where was it obtained?

Flax

I fancy we shall soon see a great alteration in the flax manufacture, by passing the leaves, after they have been through the ordinary machines, through another machine which entirely removes the remaining tissue and leaves the fibre as white as the best Maori tihore and gets rid of all washing and bleaching. I have seen some samples which look very promising but I do not yet know the process.

Nelson Brothers of Napier has patented one process & a man in the Kaipara has invented another. This I expect will reduce the cost & improve the quality.

Yours truly,
F. W. Hutton



Hocken collections, MS-0443-3/08

75. Hutton to Hector, 31-10-1870

Hocken MS-0443-3/8/9

Churchill, Waikato
31 Oct 1870

My dear Hector

In looking over your catalogue of the Colonial Museum I observed that you had no egg of *Rallus pectoralis* and on turning to Mr Potts paper I see that he also does not describe it. As it is a common egg here I never thought of Potts not having seen it and therefore did not describe it in my paper. I therefore send you an addition to it if it is not too late to add it.

I have also detected an important misprint, and a very stupid error of my own in my paper on Sinking funds published in Vol II.

Erratum

p237 – line 1 for brought read bought

p237 – line 26

$$\text{for } t = \frac{\log\{a(v-1) + pv\} \log pv}{\log v} \quad (7)$$

$$\text{for } t = \frac{\log\{a(v-1) + pv\} - \log pv}{\log v} \quad (7)$$

This last is important as it occurs in the formula given for calculating t.

The mistake I mentioned is at the end where I have simplified the first proportion before combining it with the second, which is incorrect.

The line

“or $2t : T-1 : \dots\dots$ ” ought to be omitted.

The next four lines may stand and then after that should come "and combining the two we get

$$2t - \{a(v-1) + p\} : T\{a(v-1) + 2p\} - a(v-1)::$$

{whole amount paid by first method} : {whole amount paid by second method}"

then all should be omitted until “The actual amount et & etc”.

However the omission of the – sign in Formula (7) is the only one of much importance.

You will be interested to hear that a specimen of *Gallinago pusilla* Buller has been taken on the Little Barrier. The specimen is now in the Auckland Museum.

We have between 60 and 70 rooks here now in fine condition.

What is *Strepsilas interpres* no 69 of your catalogue of N.Z. birds? I have not before heard of it so far as I can remember.

I see that you have omitted *Petroica toi-toi* in your list. It is very common in the bush in this province, and, notwithstanding Mr Pott's remarks, is easily distinguished from *P. macrocephala*. *P. macrocephala* is larger & has a yellow abdomen, while *P. toi-toi* is smaller and is pure white on its under surface.

P. dieffenbachii I have never seen it is probably the same as *P. macrocephala*, being identical in colors but half an inch smaller in length.

I have never seen *P. macrocephala* from this Island.

I regard *Anthochaera bulleri* Finsch as a strayed specimen of *A. carunculata* Lath.

I am strongly of opinion that *Gerygone assimilis* will have to be erased.
Yours truly,
F.W. Hutton

76. Hutton to Hector, 21-11-1870

Hocken MS-0443-3/8/10

Churchill, Waikato
21 Nov 1870

My dear Hector

As you ask me for any remarks on your Museum Catalogue I will make one or two which occur to me on the N.Z. Collections.

Mammals

Are not *Scotophilus tuberculatus* and *Mystacina tuberculata* one and the same?

Birds

I have nothing more to add but that *Gallinago pusilla* is out of its place; it should follow *Scolopax aucklandica*.

I think *Nesonetta aucklandica* a good species, but I have doubts whether either it or *Thinornis rossi* have been found in New Zealand.

Shells

I do not like the arrangement of the shells. As with the birds I think it would have been better to have omitted the names of those not represented, and to have adhered to the ordinary form of nomenclature without putting letters before the specific names. The numbers and letters are not explained. There are also many things that I cannot make out for instance

- 1 *Buccinum L.*
C (42) *B lineolatum Reeve*

Does this mean that the species C is *B lineolatum* Reeve? If so why did you not put the name in its proper place? and what does (42) refer to?

Again

Purpura Lam
P (Gray)

What does (Gray) refer to as no specific name is given?

Many of the specific names have no authority after them so that it is often impossible to feel certain what shell is meant. This remark also applies to the fishes which have no authorities at all.

Succinea Draparnaud
a (?) Auckland Kirk no 23

This query would show that you were not sure about the specific name; but as no specific name is given I suppose that it is meant to refer to the generic name. This occurs in several cases.

Terebratula sanguinea is referred to *Terebratellea cruenta* in a most unscientific way. More like a glossary than a scientific catalogue. *Waldheimia lenticularis* figures twice one under the name of *Terebratula lenticularis*.

Altogether I think the shells are by far the least satisfactory part of the catalogue.

Rocks

Page 134

3 “Outcrop of Duke’s Motto claim” What does this mean?

Rocks continued

P 110 Porphyry from Tongariro and the Taranaki Sugar Loaves should hardly be placed among plutonic rocks; especially vesicular felspar porphyry.

P 141

16 Quartz showing a slikenside[sic] and

P 129

42 Auriferous quartz showing slikenside. I was not aware that quartz ever shewed slikensides, and can hardly conceive the possibility of it.

P 161-162 in the rocks from the Lyttellton[sic] Tunnel Dolerite with Sanadine[sic] is often mentioned. I was not aware that Sanidine had ever been found in Dolerite. It is most usual in acidic rocks.

Fossils

There are many things in the stratigraphic arrangement that I cannot agree to.

I cannot understand why you put the Cape Rodney beds with *Scalaria lyrata* and *Ostrea wullerstorfi* as post tertiary.

Nor why you separate the Upper & Lower Tressilac so widely, except from stratigraphic reasons. But the Lower Tressilac ought, it appears to me, to rank with the Napier Series, and not with the Oamaru Series.

I consider the Aotea Series as identical with the Oamaru Series, and not to have the slightest claim to Mesozoic. The Wangape[sic] beds are the lower parts of the Series.

I suppose that this is one of the points on which you differ from me in my paper about the Waitemata Series.

I do not see why you call the Cobden beds Mesozoic. The presence of *Inoceramus* is by no means so important as *Brissus brevipetalata*.

The same with the Culverden beds in which *Pecten hutchinsoni* is found; and I do not think that the Whangarei and Kawa Kawa beds have any claim to the title. [Mesozoic *in pencil*]

Waikato fishes

Our white bait are the young of at least 3 different fishes, (*Retropinna* sp *Galaxias* sp and another). They commence to come up the river in the beginning of October and continue almost to Christmas but they get larger towards the end of the season. They go into the lakes Waikari and Wangape and I have never heard of any been seen above Rangiriri. The old fish are caught in large numbers full of spawn in April and May as they come out of the lakes to go down to the sea to spawn.

Large shoals of young eels come up the river towards the end of November.

Mullet (*Mugil arfentens* of Catalogue) are taken in the lakes in March and November. I have often seen them over two feet in length, but never a young one.

Kahawai (*Centropristes trutta* C & V) sometimes come up as far as Rangiriri – 40 miles from mouth – they are not uncommon at Mercer 25 miles from mouth.

A small flatfish is also found in the lakes. The Maories call it Patiki but I am not sure whether it is identical with any of the saltwater flat fishes. I have seen two, each about 6 inches long, they had red markings on the upper side.

The Grayling of the Upper Waikato is I think different from our silver fish; but I have only seen a dried skin.

Lampreys are said by the natives to inhabit the river but I have never seen one.

The four species that I sent you specimens of are all I know, but I believe another or two are found in the small tributary creeks.

I wish you would publish short descriptions of the genera & species of the NZ fishes. If you think that your information is not yet complete enough for any thing large, you might just publish something for private circulation to help the other Museums.

I don't know what to say about your kind offer to go to Tongariro. I should like it very much but in the present depressed state of flax I can barely manage to struggle along and unless prices rise I could not leave my mill as I could not afford to pay a manager; and as I have put all my money in it I must look after it myself to try to keep my head above water until better times. On the other hand if prices fall lower I shall be ruined and have to come to you to try to get some employment to keep my wife and children from starving.

I often wish now that I had never left you, but to give up my mill now would be to lose £2000 and leave me a beggar.

I am sure I don't know how it will end but must try to keep it going for a little longer.

My idea now is that it has been proved that our flax is not a first class article for any one thing, and all we can try to do is to make it as cheaply as possible to undersell other superior fibres. It is inferior to Manila & hemp for rope, and to Jute & China grass for spinning purposes. A cheap rope is all it is fit for.

My eye is nearly well now.

Yours truly,
F. W. Hutton

77. Hutton to Hector, 15-12-1870

Hocken MS-0443-3/8/11

Churchill, Waikato

15 Dec 1870

My dear Hector

I am sending down today 12 bales of flax to Repts. Combes & Daldy, Auckland to ship to you. The particulars of the bales you will find on the next page. The higher nos are rather better flax than the lower ones. I believe I could get £20 a ton for it in Auckland but as you say that it must be under £20 I will charge you £19 $\frac{3}{4}$. Flax is rising now and looks considerably better. I am making a new combing & scutching machine (in water) which I think will improve the quality a good deal.

Many thanks for saying you would do what you could to get me employment, but do not do anything yet. There is plenty of time before the session and there is no knowing what may turn up: at present the prospect of flax looks much better. If flax keeps at £20 a ton in Auckland I shall be all right.

I will answer your letter soon meantime thanks for the map which is a great addition to our knowledge.

Yours truly,
F. W. Hutton.

78. Hutton to Hector, 25-12-1870

Hocken MS-0443-3/8/12

Churchill, Waikato

25 Dec 1870

My dear Hector

In the remarks I made on your arrangement of the tertiary fossils I did not mean to lay down the law, only to discuss with you what seemed doubtful to me. Of course you with the fossils and personal knowledge of the localities are far more able than I am to come to a true opinion. As for the fossils, I am no paleontologist and examination of them would not do me much good. Simply go by those specific names that you have given, and almost ignore the genera.

Heretical as you are on most points, I presume that you allow that species have a more or less limited existence in time (especially in one local region like N.Z.) and that therefore those beds that contain the same species should be grouped together.

This is why I think that the Cobden beds should be classed with those of Oamaru, because they both contain *P. hochstetteri* and *Brissus brevipetalata*. The genus *Inoceramus* might be found recent as *Trigonia*. The Culverden beds also containing *P. hochstetteri* and *Brissus greyi*, must I think be kept with those at Cobden.

This is my idea for a first arrangement.

Upper Tertiary

Characteristic fossils. *Voluta gracili-costata*. *V. striata*. *Struthiolaria canaliculata*. *S. cingulata*. *S. straminea*. *M. magellanicus*. *Dosinia greyi*. *Lutraria solida*. *Limopsis insolita*
Whanganui; Patea; Awatere; Lower Gorge of Waipara; Kanieri River.

Middle Tertiary

Characteristic fossils. *Pecten Triphooki*. *P. aucklandicus*. *Crassatella panderosa*. *Cyprina solida*. *Ostrea ingens?*
Waitemata. Napier. East Coast Wellington. Upper and lower Tressilac.

Lower Tertiary

Characteristic fossils. *P. hochstetteri*. *P. polymorphoides*. *P. Hutchinsoni*. *Ostrea wullerstorfi?* *Cucullaea singularis*. *Crassatella ampla*.
Raglan & Aotea; Motupipi; Green sandstones near Cape Farewell; Sherry River and Wangapeka; Lyngdon; Weka Pass; Pareora series of Haast; Rakaia River; Oamaru; Caversham; Tokomariro; Cobden.

Of course these, especially the characteristic fossils, are liable to considerable alteration as we get more knowledge.

You ask how do I distinguish our recent *Scalaria* from *S. lyrata*. I have no specimens here, but speaking from memory I should say that *S. lyrata* was larger, fewer whorls, and a more obtuse spine.

If *Pecten triphooki* is found in the Lower Tressilac, they can hardly be as old as you make them.

Pecten athleta appears to go through all the divisions, while *P. Burnetti* belongs both to the Middle and Lower. *Pectunculus laticostatus* also goes through the whole series.

You also ask what I gain by introducing Oligocene into my paper on the Waitemata Series? It is simply to account for the unconformity on each side of the series. It hardly does to include two series in the same period when stratigraphical evidence shows a long lapse of time, including large movements, has taken place between them, and this can be proved between the Raglan or Aotea Series and the Brown Coal on the one hand and the Waitemata Series on the other. It seems to me

that there[sic] position will have to be somewhere between the Miocene & Eocene periods of Europe.

I think the map is very good for its scale, but the sections do not quite correspond with the map; some of them appear to have been colored wrongly.

I am afraid your trip to the centre of the Island is likely to be put off this year, on account of the bungling way in which the Government have managed the Todd murderer business. There is no doubt it was done as a challenge, and if we do nothing others will soon follow. If the Gov had had a spark of honor or pluck nothing would have come of it for most of the natives were so frightened at the bold act of a few that I believe the murderers would have been given up if demanded promptly & sharply; but it is too late now, and I feel almost sure that we shall have another war before long. The King natives think us frightened, and the friendlies are quite disgusted at our own want of pluck.

Fancy when Todds brother asked for money to pay the men for the work they had done, and for compensation for loss of theodolite (he was on a government survey) he was told that no money would be given as Todd had not sent in a plan.

Really New Zealanders have quickly degenerated from their forefathers.
Yours truly,
F. W. Hutton.

79. Hutton to Hector, 23-1-1871

Hocken MS-0443-3/9/1

Churchill, Waikato
23 Jan 1871

My dear Hector

If you are not satisfied with the determination of the fossils, of course we cannot do much yet towards correlating the strata. I very much wish that I was at Wellington to help & consult you.

This flax is too much for me, it requires more money than I have got to carry it through its difficulties. If you can only give me a berth on your staff I will give it up at once. You must have more than you can do, and yet your duties will increase. I have long thought that New Zealand ought to undertake the ocean meteorology of the Pacific, but this alone in a few years would fully employ one person.

The commencement of the American steamers would be a good time to begin.

The moa egg shell shews the so called "prismatic structure" well, but it is not found in that of *Apteryx*.

Dr Finsch has sent me a copy of his two papers on the Birds of New Zealand. It is very useful and will I should think save Buller from the necessity of going to England. If he would only send Finsch specimens of all new and doubtful species it would be much more satisfactory than any cursory comparison he could make in Europe. Finsch has made several alterations, most of them I think improvements. He refers the small bittern of Haast, Buller etc to *Ardea pusilla* of Australia.

I think you have done right in printing my lecture in the flax commissioners report with Skeys notes. Skey is so much better a chemist than I am that I must defer to his opinion, still I cannot say that I feel convinced I am wrong. I will write to him presently about it.

I have just had a very heavy loss in a large quantity of flax being burnt on its way down to Auckland, and I am afraid that I shall not be able to recover any of it. Hard up as I am it is almost a death blow to me, and I don't see yet how I am to pay my way; I should be delighted to give it up; these bills & money matters worry me immensely. I feel that my true element is "science with a fixed salary".

The interleaved catalogue has not turned up yet.
Yours truly,
F. W. Hutton.

80. Hutton to Hector, 29-1-1871

Hocken MS-0443-3/9/2

29 Jan 1871

My dear Hector

I have made up my mind to take advantage of the coming rise in flax to sell out of it, if you can manage to take me on. I have had enough of it and nothing will induce me to desert science again if I get a chance to get to work at it once more. I am no palaeontologist, and could not describe new fossils but I have a tolerably educated eye for determining species, and should not be afraid of either naming species from descriptions, or recognizing the same species in different rocks.

I should very much like the work of working out the arrangements of our rocks in both islands, as it is what I am best at, and in the winter I could help in the Museum – provided you have room for me.

As for salary, my only ambition now is to keep my wife & family in food & clothes, but I am afraid Wellington is a much dearer place to live than Auckland.

Thanks for the catalogue which has arrived. I should like to go carefully over your specimens with plenty of time.

Yours truly
F. W. Hutton

81. Hutton to Hector, [30-1-1871]

Hocken MS-0443-3/9/3

[Fragment: no introduction]

The interleaved catalogue will be very useful as it enables one to make notes etc in a very handy way.

With regard to the coal beds I should feel inclined, from the catalogue, to arrange them thus

- 1 Wellington
- 2 Amsuri
- 3 { Matamua - Waikawa
Waikato Heads
Malvern hills?
- 4 { Moley Creek - Sharp Point
Green Island - Cromwell
Brunner and Grey rivers
Waikato - Drury
Bay of Islands - Whangarei

Pakawau is uncertain and wants more examination but I should feel more inclined to place it with 4 than with 3.

I should very much like to have the winter in the museum with the fossils.

I send you some letters about the beetles of New Zealand. Do you think that anything could be done. My idea is to get subscribers for a hand book of the insects & spiders, and get the Government to subscribe for copies, and then get descriptions of all known ones published like the flora. Mean time we might get the various branches of the Institute to collect.

If you mean to publish a new list of birds I should like to see it first, for between ourselves I have not much faith in Bullers determinations since I have seen Charadrius obscurus called C. xanthocheulus and also C. frontalis- and A. frontalis labelled J. bossii, - and a species of Puffinus called Procellaria atlantica.

Yours truly
F. W. Hutton.

82. Hutton to Hector, 4-2-1871

Hocken MS-0443-3/9/4

Churchill
Feb 4th 1871

My dear Hector

Having broken a piston of my engine and having therefore a few days without much to do I have gone carefully over all the information I possess about the rocks of N.Z. and have drawn up the arrangement on the next page, which will I think be satisfactory to you, as it seems to me to agree quite with your views. The details will doubtless want more consideration and a close study of the fossils. Perhaps the foraminifera might assist us, not because of restricted range in time, but because the same species might shew similar conditions existing.

The upper parts of F & G I have not seen, unless in Poverty Bay, but you will remove my scruples about the Cretaceo-Tertiary period, if you remove the Aotea & Whangape rocks out of it, and unite them with the Raglan limestone. I don't see that you will have any difficulty in doing that.

Hochstetter's decided opinion, that the coals of Motupipi and Pakawau are of very different age, puzzles me; the section from one to the other is certainly one of the most important in N.Z.

I have got quite excited over these rocks, and long to be among them, having first studied the fossils. Haasts report on the Waipara beds ought to give us a good deal more information. I am anxious to see it.

	Post Tertiary	A		Lignite Beds
	Pliocene-	B		Commencement of volcanic disturbances in North Island
I				Lignite beds
	Upper Miocene	C		
			-----	Break
	Upper Eocene	D		Break
	Cretaceo-Tertiary	F&G		Chief coal formation
			-----	Break in North Island
II	Cretaceous or Neocomian	H		Coal in small seams
				Break
	Lias	I		
	Trias	K & M		
		L		
III				
	Upper Paleozoic	N	-----	Break?

The letters A &c refer to those in the Museum Catalogue. F.W.H.

Alterations in Catalogue suggested

- C. I should be inclined to put the beds at Brighton, Kaipuki, Fossil Point, Caversham; Tokomarino; Kawau? Hurunui? Kokohu? And Waitaki? Into D.
- D. Put Lower Trelissic into C
- E. Aotea and Whangape should certainly be put into D; and I think White Cliffs and Hicks Bay also. (Possibly Conway River; Waiiau-ua; & Batten River might go into D or F, and E be omitted altogether). I don't see that the marl stone of Whangape and Taranaki has anything to do with that at Cobden and Mohikinui
- F & G Should I think be put together; they are all one series down to the coal. I Consider that the upper parts of this series is wanting in the north, but that the coals of Waikato, Drury, or Bay of Islands are the base of it.
Amuri I cant understand from Buchanans description
- I. In Europe one would have no hesitation in classing a formation that contained both Inoceramus and Spirifera as Liassic, and it does not fit in badly here.
- K. Should not Wairoa Valley, Nelson be placed in H? It looks out of place here.
- M. Should not the Kaihiki Series be placed in K. Orthis is certainly Paleozoic, but Ammonites, Inoceramus, Monotis, Spirifera, Halobia, Astarte, and Pholadomya would take it higher.
- N. In Europe Spirifera is not found below the Upper Silurian, and Orthis not above the Permian, so that this had better be called Upper Paleozoic.

Where are the Brown Coals of Otago, in C?

F.W.H.

83. Hutton to Hector, 13-3-1871

Hocken MS-0443-3/9/5

Auckland, N.Z.

13 March 1871

My dear Hector

Acting on Donald McLean's advice I have sent to you the enclosed formal application. He told me this was the proper way of doing the business or I should have left it to you.

Coal is reported in Kaipara. I hear that "fossil oysters" are to be found above the coal at the Esk Redoubt opposite Shortland. I think both places should be seen.

Yours truly,
F. W. Hutton

84. Hutton to Hector, 10/4/1871

Te Papa MU000094/001/0444

Churchill
Waikato
10 April 1871

My dear Hector,

I have read the Geological Reports carefully. Haast's are certainly not very clearly written, but I can understand what he means, and he gives good details. He never seems to have noticed that according to his own map of the Booby Creek district, he shews the Weka pass beds, resting unconformably on the Saurian beds.

Having had occasion to write to him the other day to thank him for some papers he sent me I pointed this out to him, and have no doubt but that he will now change back again to your views, which are undoubtedly the right ones. Either his map or his reasoning must be wrong. I think that the rocks from the trias of Nelson to the Whanganui beds, can be divided into 6 formations, well characterised by fossils and stratigraphical breaks but there are a few points obscure to me yet.

I have stopped my mill and am finishing up packing &c. I have not yet found a purchaser.

Could not you give me instructions to go to the Thames for a week or two, and perhaps to see the coal on the other side of the Gulf. It would be giving me work and yet I should not be far off if a purchaser should turn up. I shall bring some rocks & minerals from my own collection, some more fishes from the Waikato, and a few eggs for the museum, also a box of specimens of different parts of the Golden Crown claim from Mackelvie. The Caledonian gold is from the continuation of the Golden Crown leader, and is taken out through the Golden Crown drive. The shaft has struck nothing yet.

Yours truly
F.W. Hutton.

85. Hector to Hutton, 18-4-1871

Copy in RSNZ Archives

Geological Survey Dept.
Wellington
18th April 1871

Sir,

In reply to your letter of the 13th ultimo applying for the appointment of Assistant Geologist in this Department, I am authorised to inform you that the Government have agreed to your appointment on the same terms as that under which it was held by the late Mr Davis. These terms were: Salary at the rate of £300 per annum and allowances when in the field at the rate of 10/- per day and extra expenses such as labour, boat and coach fares, horse hire and carriage of specimens.

In the event of your accepting the appointment on these terms I have to request that you will proceed to this place as soon as you conveniently can, and that the appointment will date from the date you start for Wellington.

I have the honour to be Sir
Your obedient servant
James Hector

86. Hutton to Hector, 23-4-1871

Te Papa MU000094/001/0433

Churchill
Waikato
23 April 1871

My dear Hector,

I was waiting to hear from you whether it was settled that I was to come down to Wellington when I met Col Haultain in Auckland and he told me that he understood from you that you were expecting me down. I mean therefore to leave this at once, go to the Thames for a few days (as I believe you want me to do) to see the Caledonian and the cuttings along the new tramways, and then to go to Wellington.

I must however pick out a steamer that stops at Nelson, as Mr McLean has instructed me to make a report on the defence of the Nelson Harbour. He also wishes, if opportunities occur, me to make reports also on Lyttleton & Port Chalmers Harbours.

I should like very much, if you can manage it, to return here to help my wife to pack up, and bring her to Wellington, for with 5 children it is more than she could manage by herself.

Col Haultain spoke to me about the "utu", and I am very much obliged to you for the consideration you shew for me. You need not be afraid about that I shall take

what you can give me and be thankful and trust to luck for the future. The transactions seem very well corrected, there was no mistake in the egg paper and only one small one in these last, which is immaterial but I enclose it on a slip in case you wish to alter it.

I will not write geology now as we shall be able to talk it soon, which is better.

I shall send down 5 boxes directed to you at the Museum, and as they will contain chiefly specimens, books &c. for the Museum, perhaps you could get the freight paid on them. Some of the specimens are not labeled so perhaps it would be better not to open them until I come.

I have not sold my mill yet but have a good chance I think. Dont write to me here any more, and dont send my copy of Transactions to Auckland.

I suppose you have heard of the find of Moa footprints in the alluvial deposits of the Turanga-nui at Poverty Bay; they are all right, no hoax. Gillies has four slabs coming up here. I have only seen casts at present.

Yours truly
F.W. Hutton.

Part Two: Letters from F.W. Hutton to Julius Haast, 1872-1887

The correspondence starts just before Hutton left Waikato in early 1871 to move to Wellington, and from then on he gives Haast a commentary on work at the Colonial Museum, geological fieldwork, his move to Dunedin in 1873, and his experiences with the University and Otago Museum. None of the letters from Haast to Hutton appear to have survived.

A few of Hutton's letters in the Haast family collection have comments on them in Haast's handwriting. We infer that these are drafts or copies of responses that Haast sent to Hutton.

87. Hutton to Haast, 08-04-1871

ATL MS-Papers-0037, folder 108-07

Churchill, Waikato
8 April 71

My dear Haast

Many thanks for your interesting paper on the Moa. I am inclined to agree with you, but have not sufficient evidence to form an opinion. Was not a genuine Maori skeleton discovered with an egg in its hands? What is the origin of the word Moa? and what does it mean?

Hector has kindly sent me the first copy of the Geological Reports. I need hardly say that I have read yours on the Waipara & Amuri beds with great interest, especially as you have given so much detail.

You do not seem to notice that in your map of the Booby Creek district (not the section) you shew the "Weka Pass series" lying unconformably on the Greensands (d) and Saurian beds (c). It would therefore follow that the Weka Pass series lies unconformably on both the Waipara and the Amuri Series.

This quite agrees with my own ideas on the matter. I believe the Saurian beds to be Upper Cretaceous (Pisolitic limestone of France) or perhaps younger; while the Weka Pass & Oamaru series are probably Eocene.

You are right to separate both from my Putataka series. These latter are much older probably Jurassic, and come nearer your Marlstone group (2 in Sec I etc).

I do not think that the Culverden beds are Jurassic. If I might hazard an opinion without seeing them I should say that they were Eocene. I do not attach much weight to the opinion of McCoy.

I hope to have a chance of seeing you and your Museum this winter.

Yours truly
F.W. Hutton

88. Hutton to Haast, 15-11-1871
ATL MS-Papers-0037, folder 108-04

Colonial Museum
15 Nov 1871

My dear Haast

Many thanks for the trouble you have put yourself to in copying out the descriptions of shells for me, they are very useful.

The shells I sent were not meant as a good collection but only to assist you in naming your collection as you have not got some of the books that we have here. Please let me have any criticisms on them that occur to you, also on the birds, as my only object is to get the nomenclature of our animals as correct as possible, so as to stop these endless changes in names which all arise from want of sufficient information. I am sorry that Potts seems so offended at me, I think that he can hardly understand the rules that naturalists act upon in naming species. I cannot quote what I have not seen, and I have not seen either in print or manuscript any of his descriptions, no more has Hector; *A maxima* is not my name, and it is a rule not to encumber science unnecessarily with names; if you or Potts can prove that your kiwis are not *A. maxima*, by procuring a specimen of that species, I shall be delighted, meanwhile it is no use confusing the subject more by adding new names. As regards *L. bulleri* the bird that Potts called by that name is not a new bird but has already received 3 or 4 names. I told him so when I was with you, and of course I thought he would withdraw it; if not it will only sink to another synonym. I thought that he wanted a bird to be called after Buller, so I did it (not to the one Potts thought was new) but to the one that Buller had first described; for you must know that it is a rule to call animals only after their discoverer or describer.

I am very busy at the fishes now, and shall soon bring out a catalogue of them, one comfort to me is that I do not see how it can possibly offend Potts or anybody else.

I hope Mrs Haast & the bairns are all right. I see no chance of coming your way for the present.

Yours truly
F.W. Hutton.

Note at top of 1st page

Description of *A. haasti* although read last year has never been received here yet.
F.W.H.

89. Hutton to Haast, late 1871
ATL MS-Papers-0037, folder 108-05

Colonial Museum
Wednesday 1871

My dear Haast

I could not get the Wanganui fossils for you but have sent about 90 species of named recent N.Z. shells, which will I think be more useful. I have also put in some of the bread made by the Maoris from Raupo pollen.

Will you kindly send me descriptions of -

Purpura tristes. Dunker

Risella kielmannsegi. Zelebor

Unio zelebori Dunker

Mytilus ater Dunker

And also the N.Z. frog *L. hochstetteri*. You will find them described in the Voyage of the *Novara*. Also please mention the localities in which they were found.

My bird catalogue will be out now in a day or two. You will see that I have got over the difficulty with regard to *A. haastii*, by not mentioning Potts name at all, and referring the bird to *A. maxima*. As Potts paper is not yet published I could not well refer to it, and it is now left an open question, and if I am then to be wrong in referring it to *A. maxima*, Potts name will be the one for it. However I confess that I should not have liked to call it a new species myself.

Ask Potts when his paper is coming up for the W.P.S. - we shall only have 3 or 4 more meetings.

Please remember me to Mrs Haast.

Yours truly
F.W. Hutton

Note added in Haast's writing

Potts asked me where you got the eggs which you described as he should like to visit the ----- where they are to be seen.

I have looked through your list of birds with great interest but think that some additions can be made to it. Concerning Potts you have to fight it out with him. Of course *Apteris maxima* is an excellent name especially as the species is not bigger if even as big as *Australis*. I also miss Potts *Buchananii bulleri* & was rather startled at seeing that you have also named a Gull Bulleri; although it has already appeared on the list of N.Z. birds as *L. melanorhyncha* - Trans. Vol. II 390. I suppose Potts will hold you over the coals for it & as for sending another paper he is much obliged for your enquiry but he says is not in the humor at present - N.Z. Institute.

Wellington
3 March, 1871⁸

My dear Haast

I am sorry that I did not see you as I returned from my trip, as I wanted to compare notes.

Southland is a most interesting country, and the sequence of rocks easily made out. The following is what I make it

- A. Tertiary limestones with *P. hochstetteri* etc etc same as Raglan beds. Oamaru etc.
_____ Slight unconformity
- B. Brown coal. Same as Waikato & Drury – Age Eocene
_____ Peat break
- C. Coal of Mount Hamilton, black, with leaves of dicotyledons different from those from Drury. Same as Grey River etc
_____ Peat break
- D. Hokanui Coal. *Taeniopteris* & *Pecopteris* beds. Same as my Putataka Series at Port Waikato. Jurassic – Cairn Range!
_____ Unconformity
- E. Richmond or Triassic Series with *Monotis* etc etc.
_____ Unconformity
- F. Upper Paleozoic beds with dykes of diorite etc – few fossils – probably more than one formation included
_____ Unconformity
- G. Lower Paleozoic beds – schists & mica slate etc.

C. I expect will prove to be upper Cretaceous.

Not much light is thrown on the position of the Reptilian beds, but, without expressing an opinion, on a place I have not seen, I may say that I suspect that the Waipara & Malvern Hills beds will turn out to belong to B, which I consider to be Eocene.

Of the Amuri beds I can form no opinion for, judging from the list of fossils published by Hector, there must be at least two different formations there.

I am inclined also to think that the old “Ototara Series” includes two formations – viz the Oamaru limestone and another older. This you will probably make out when you go down to Shag Point.

⁸ Although the original letter is dated 1871, this appears to be a misprint for 1872. Hutton was in Southland in January and February 1872, returning to Wellington at the beginning of March

Your black and white petrel caught off the Cape of Good Hope, which Fuller showed me is *Procellaria antarctica* Gray.

Yours truly
F.W. Hutton

I expect to start for the Bay of Islands in a few days.

You will see that this agrees closely with Hochstetter, but not at all with Hector. Hectors map of Southland is very incorrect.

[Note at top of 1st page]

I ought to mention that a fern is found with the Brown Coal (B) much resembling *P. hochstetteri*, but it will no doubt prove to be quite distinct.

91. Hutton to Haast, 07-06-1872

ATL MS-Papers-0037, folder 108-08

Wellington
7 June 1872

My dear Haast

I enclose a letter from Finch which please return. I am quite satisfied as to *Tringa camutus* and *Hydrochelidon leucoptera*, but I do not like to alter his paper. I have written and told him so and said that there will be plenty of time for him to alter and add to it, before it is printed. I should like very much to read it if you could lend it to me.

As to *Leotus parasiticus* being *L. Carpicantatus*, I have always thought that all ornithologists considered them as the same species, but if Finch has separated them it will be impossible to tell to which our bird ought to be referred as it is only in immature plumage. Consequently the safest way will be to refer it to the commoner of the two (*L. parasiticus*). In future publications I shall use the name *Apteryx haastii*.

I am convinced that Finch is right about the gulls and that my *L. jameroni* is the young and *L. bulleri* mihi the adult of *L. pomare*. *L. bulleri* Potts will of course be also the young of *L. pomare*.

I will ask Hector to send Finch some of our Chatham Island birds, but you know that his answer will be that we don't want any more birds in this Museum.

I am not at all surprised at your finding brown coal under trachyte porphyry. At Coromandel this time I saw nearly horizontal coal underlying the gold bearing rocks, proving completely that Hector is wrong in regarding them as triassic and more or less vertical. What puzzles me is that the coal at Malvern Hills is younger than the volcanic formations. It is the only case I know of in New Zealand.

The Longwood range in Southland is not volcanic. Hector mistook paleozoic sandstones for basalt, and the same rocks decomposed for trachytic tufa.

Please remember me to Mrs Haast.

Yours truly

F.W. Hutton

Bye the bye. I hope you will name your new fishes. I saw one at any rate in your case labelled *Trypsterygium medium* but belonging apparently to the family "*Trachinidae*". I have 11 additions, 4 of which are new to science.

92. Hutton to Haast: 16-6-1872

ATL MS-Papers-0037, folder 108-10

Wellington
16 June

My dear Haast,

I am very glad to hear that you are at work at the fishes. I hope others, in other localities will take it up to. One of the principal objects of the catalogues that I am bringing out is to supply in a cheap form the names of our animals so as to enable others to supply papers to the N.Z. Institute, otherwise it might die out as similar institutions have done in other colonies.

It would always be well to supply each other with the names of species that we propose to describe as that will prevent two from describing the same under different names. My additions to the list up to the present are

1. *Ditrema ?violacea* sp.nov.
2. *Eleotris radiata* Quoy & Gaim
3. *Cristiceps australis* C & V
4. *Trachypterus altivelis* Kner?
5. *Labrus knoxi* sp.nov.
6. *Labrichthys fucicola* Richardson
7. *Calloptilum davisii* gen et sp. nov.
8. *Rhombosolia leporina* Gunth
9. *Rhombosolia retiaria* sp. nov.
10. *Galaxias olidus*, var. *novae zealandia* var nov
11. *Aracana aurita* Shaw

besides descriptions of one or two species that I had not before seen. I shall always be glad of corrections to my catalogues.

By the bye is not the large *Galaxias* from the lakes new. I saw two specimens in your museum but could not examine them, and *Galaxias* is rather a difficult genus, subject to much variation. But I have never seen anything like the size before. Perhaps

you will look into it. I agree that it [is] not advisable to publish papers in the newspapers, but I should like to see Finsch's very much. At any rate you can bring it with you when you come here.

I am delighted to hear of your additions to your museum, we get very little here. I am almost in despair about it.

I have worked up the Echinodermata (33 species) and shall read the paper at an early meeting. I am hard at work at the shells. I cannot complete the list as we have not the books out here, but shall probably publish a "Fragmenta" to let others get on with it also.

I expect to begin on the fossils next month, but dont let that hinder you describing any also. I should only be too glad to have them all named as it would save me at any rate from innumerable mistakes. But it must be done unless we are to stick fast just w[h]ere we are, so I have made up my mind to fire away and to bear calmly all the abuse I shall get from European naturalists who dont understand our reasons for pushing ahead.

Yours truly,
F.W. Hutton.

I did not know that any Chatham Island birds were to be sent to you; but I dare say it is so as Gore is curator of the Museum & Hector seldom speaks to me.

[*Marginal note to the first page:*]

I always get Hector to publish his instructions to me with my report, he has no idea what a fool it makes him look.

93. Hutton to Haast, 20-7-1872

ATL MS-Papers-0037, folder 108-11 & 9

Wellington
20 July 1872

My dear Haast,

Dont take the trouble to send me descriptions of your new flat-fish unless you think any of them are likely to be the same as my new species *Rhombosolea retiardia*. This species is like *R. tapirina* Günth, but differs from it by having the interorbital space as broad as the eye, and in not having the cutaneous fold on the upper lip more produced than in *R. monopus*. It is distinguished from other N.Z. flat fish by its broad tail, and by the scales on the coloured side being very deeply imbedded, giving it a reticulated appearance, whence its name. My other addition is *R. leporina*, which you will find described in Gunther.

I will take your advice and not write to Potts. He shews his animus against me in his article on *Apteryx haasti*, in which he speaks of me as the compiler of a catalogue of N.Z. birds. He probably is not aware that of the 46 birds that have been added to the avifauna of N.Z. and the Chatham Islands within the last 10 years, 25, or more than half, have been added by me within the last 5 years. I think therefore that I hardly deserve the name of compiler, as one sixth of our birds have been first determined by me. I am hard at work at the fossils and should be very much obliged if you could lend me any descriptions of Australian tertiary fossil shells or echinodermata, for positively we have not a single one here. I will take great care of them and return them safely.

You dont seem to be aware that Hector is “the Governors” of the N.Z. Institute, but in the present case I think he has done his best, and I dont think that he had the slightest intention of doing you any injustice in the arrangement of the Moa papers. I am delighted to hear of your successful find of Moa bones. I should very much like to get a good skeleton of a large species for Auckland, and if you have any to dispose of and will let me know the price, I will try to get the needful raised.

My catalogue of fossils will of course only include those in this Museum, and will leave you no doubt lots of room for more work on your own collection. I am quite up to the difference between you and Hector as to the Malvern Hills, and I have lots of amusing stories to tell you⁹ about our differences when you come up. Because I differed from him in some professional points he has been giving out in Nelson that I am very insubordinate and ungrateful to him for getting me my present appointment, and that he would send me away but that he does not wish to see my wife and children starving. If you hear this mentioned down your way you will confer a favour on me by contradicting it, and telling people that it was Mr Farmer M.L.C. who got me my appointment as a personal favour to him, and I daresay that if the truth were known we should find that Hector tried all he could to keep me out. I hope to have the pleasure of reading your new reports soon for the Geo Reports for the year will not come out until your reports arrive. In fact if I was to leave, and you were to refuse to work for Hector, the Geo Survey would die a natural death, for he could not write reports himself, only sketches.

Yours truly
F.W. Hutton.

⁹ MS-Papers-0037-108, sheet 11 ends, MS-Papers-0037-108, sheet 9 inserted.

94. Hutton to Haast, 31-07-1872
ATL MS-Papers-0037, folder 108-12

Wellington
31 July 1872

My dear Haast

The shuffling that our fossils have undergone puzzles me sometimes. I want you to help me out of a puzzle with your fossils.

Has the *Dosinia* that is found at Amuri ever been found associated with *Conchithyra parasitica* at the Selwyn. This *Dosinia* is quite distinct from *D. grayi* Zettel and is not found at Waipara, but 2 or 3 specimens without any labels are among those sent from Selwyn. You make no mention of them in your report and they may have got misplaced.

The uncertain feeling that I have in some cases as to localities is very unpleasant. As it may lead to mistakes, and at any rate complicate a subject that may be very simple. I throw out many doubtful specimens.

You must not expect to see the fossils published for a long time, for it will take Buchanan 6 months steady work to draw them, and there are no signs yet of his commencing.

When he does begin he is sure to be taken away to draw maps for Hector which are never used, and then it will be time for him to begin the illustrations for Vol V of the Transactions. I don't expect to see it published for 18 months.

Yours truly
F.W. Hutton

I am delighted to hear just now from Travers of your grand success in Moas and more especially the complete skeleton of *Harpagornis*. I wish you could find the skeleton belonging to the original *Dinornis* skull, which no doubt belonged to the *Rallidae*.

This reminds me that there is no such bird as your *Dinornis casuarinus*. This name was given to the skull, which does not belong to a Struthious bird at all, and as Owen has now adopted the name *Dinornis* for *Palapteryx*, *Palapteryx* goes out altogether and? *Casuarinus* is an unknown rail.

F.W.H.

[Illegible note in Haast's writing]

Note at top of 1st page

Could you send me a description of *Belemites fibula* from India]

95. Hutton to Haast, [Undated, probably 1872¹⁰]

ATL MS-Papers-0037, folder 238-61

[Undated fragment]

If you have named any fossils I wish you would read descriptions of them to the C.P.S. and send me a copy of the paper, for you know that the rule is not to accept names published without a description, as Hector has been doing in his Catalogue of the Col Museum never mind a copy of your fish paper as your new species are evidently not the same as mine.

Have you seen Dr Buller's book Part I with its grand title page, and the announcement in the prospectus that he means to tell us all about the only living representative of an extinct race, and how his position of Resident Magistrate gave him unusual opportunities for going all over the country.

He finds fault with me for laying any stress on such a "worthless character" as the thickness of hawks legs, and then, on the next page but one he uses the slenderness of the legs as his chief character for distinguishing *H. brunnea* from *H. Nova-zealandia*.

However we shall no doubt get a good deal of information out of it

96. Hutton to Haast, 2-10-1872

ATL MS-Papers-0037, folder 108-13

Wellington
2nd October 1872

My dear Haast

Many thanks for your paper. You will certainly be able to prove that you made out the greater extension of the glaciers before Hector wrote anything about it, but I do not see that your paper bears the least on Ramsays theory, as you do not even mention the names of rock basins in it. You ask for a list of the birds that we want, here they are

Xenicus longipes

Rhipidura tustes with white spot over ear

Creadion carunculatus - Young

Apteryx haasti

Howatopus? subocollis

Recurvirostra subocollis

Trinya canutus

Sterna nereis

I enclose your one pound note as Dickson says that he will make no more skeletons.

Yours truly
F.W. Hutton

¹⁰ This fragment is may be a postscript to another letter. It was probably written in the later part of 1872 as Part 1 of Buller's book was published in April 1872.

97. Hutton to Haast, 27-02-1873

ATL MS-Papers-0037, folder 109-01

Wellington
27th Feb 1873

My dear Haast

I can find no mention of the word "Moa" in either of Polack's books.

In Prof. Lee's Vocabulary (published in 1820) the word "Moa" is said to mean "a stone"; also the name of a person, and of a place.

Yours truly
F.W. Hutton

98. Hutton to Haast, 12-11-1873

ATL MS-Papers-0037, folder 109-02

Otago Museum
12 Nov 1873

My dear Haast

We like this place more the more we see of it. I am getting on very well so far, and find a very nice set of people here. The preliminaries of the Museum are settled and I have got Jennings at work as Taxidermist. I hope to be able in the winter to re-arrange the Museum and add considerably to it, but there is hardly anything in it behind the scenes to work upon. Nothing but the birds you sent, and some European ones – no books either at present.

I can send you a skin of *Eudyptes antipodus* if you wish to exchange. You could send me a dozen or two of your duplicate foreign birds for it, as well perhaps as a skin of *Recurvirostra subucollis*.

There are only two other skins of this Penguin in N.Z. and one, I suppose, at the British Museum, in existence.

I start for field work this afternoon and cannot send you the Penguin until I come back, as I cannot remove it out of the Museum until the other specimen I have just got is ready to replace it.

Mrs Hutton sends her kind regards to you and Mrs Haast. I add mine also.

Yours truly
F.W. Hutton

99. Hutton to Haast, 19-01-1874

ATL MS-Papers-0037, folder 109-03

Otago Museum
19 Jan 1874

My dear Haast

You will be delighted to hear that I have got a large collection of Moa bones from a swamp at Hamiltons diggings on the Taieri. I don't know what there will be yet, but the place is just similar to the Glenmark swamp and the known hole full of bones is larger than the one you got yours out of.

There are a great variety of bones. In a very short time I got a tarsus of *Aptornis* and a coracoid of a strong flying bird, perhaps *Harpagornis*? Also half a humerus of a bird not bigger than a lark, besides several other bones that I do not know.

It will be the making of this Museum, and they will have now to put up a building.

Yours truly
F.W. Hutton

Please let me have the birds out of the Paris cases as soon as you can, for Jennings will be hard up for something to stuff before long.

100. Hutton to Haast, 16-04-1874

ATL MS-Papers-0037, folder 109-04

Otago Museum
16 April 1874

My dear Haast

Unfortunately I cannot say what is a fair money value for the different skins, as I have no experience in valuing. Before I sent the penguin to you you wrote to me and said that you would give me more than two dozen of your duplicate foreign birds and some N.Z. birds for it, and the Sun fish was sent afterwards without any reference to your letter. I must also remind you that I never asked you to pay my expenses on the Sun fish. I was very sorry when I saw your cheque, for I knew you had done it in a huff, but I thought I should only be making matters worse by returning it to you.

If you had asked me to value the Sun fish I should have told you that the one in this Museum was presented by Mr. R. Gillies who paid Jennings £9.10 for it.

I do not know what you mean by the skins having been sent to me under a wrong impression.

I have stuffed three, the only three I had not before, and the other 29 I gave to a man in Invercargill for a skin of a variety of *Platycercus auriceps*, so that you cannot have them back. But if you like to return me the Penguin I shall be very happy to send you 32 other skins back again.

I am sorry that your Trustees do not consider the exchange satisfactory. It is certainly not so to me and I hope we shall have no more without the names and state of preservation of the specimens mentioned on both sides before hand.

Yours truly
F.W. Hutton

101. Hutton to Haast, 25-06-1874
ATL MS-Papers-0037, folder 109-05

Otago Museum
25 June 1874

My dear Haast

I shall be very glad indeed to arrange exchanges with you as it will do us both good. The best way is I think to settle before hand what each are to send and then there will be no disappointment.

On the next page I send you a list of things I can send off at once.

For the *Cnemiornis* bones I should like *Aptornis* bones – Bone for bone about.

For the skeleton (incomplete) of the new genus of Duck you could send me New Zealand fossils if you have plenty to spare, if not you could suggest something.

I will send you the penguin skin & take *Strepsilas* in part exchange – if you could send me also *Recirvirrostra rubricolles* I should be satisfied.

About the bird skins (foreign). I will send you skin for skin. I do not want any European birds, nor those of Australia except the waders and water birds, or anything rare. My skins re in very fair condition, but some are of course better than others.

Yours truly
F.W. Hutton

[List of birds on next page]

Himalayan Birds

Hypotrionchis chiquera
Tinnunculus alandarius
Accipiter vingathis?
Spilornis cheela
Buteo canerceus
Buteo rufinus
Circus cineraceus
Athene brawa?
Coracias indica
Palornis torquatus
 “ *rchisticeps?*
Picus brunneiferous?
Gecinus striolatus
Brachypterus awrautius?
Lecithrix? Luteus
Corvus splendens
Garrulax lanceolotatus
Dendrocitta rufa
Sturmopartor? Contra
Acridolteres? h----
Teminuchus malabarneus?
Crocopus phinicopterus?
Chalcophaps indicus [sic]
Francolinus vulgaris
Ontygornis ponticeruiana?
Avabates? subcristatus from Brazil
Megalaima virens
Megalaima caniceps
Xantholiema? Indica
Perucrocotus breverostius?
Dicurus balcarrius?
Dicurus caerulescens
Mycophonus? terr----kii?
Merula bouboul
Powatorhinus? Erythrognus
Garrulax leucolophus
Garrulax albogularis
Trachalopteroi? Rufogulare?
Trachalopteroi? Lineatum
Chatarrhoa? Candata
Hypsipetes psaroides
Otocompoa? Leucogenys
Pycnonotus pygous?
Oriolus kundoo

102. Hutton to Haast, 06-07-1874
ATL MS-Papers-0037, folder 109-06

Otago Museum
6 July 1874

My dear Haast

All right about the exchange. I will send you all I said in my letter very shortly. I sorted out all my Moa feathers into 12 equal packets for exchange, and I now send you one of them – I have only three more left. These feathers were all that Dr Thomson had and I do not suppose that we shall be likely to get any more, for digging is on the decline and it was only by washing away the river bank that these were found.

I will make the skeleton of the duck as complete as possible, and I hope you will send me a good lot of N.Z. fossils for it. I do not much care for Vienna basin fossils as they do not help us in our paleontology here, and have no particular interest from a general point of view, but if you think that your N.Z. fossils are not enough you can make up the exchange with them.

I am delighted to hear of your £14,000, for it does me all the good in the world in getting money here. I cannot hope to compete with you in buildings or foreign collections, but I shall do my best to beat you in New Zealand collections.

A commencement of our Museum has not been made yet, as the architect is not yet fixed upon. I hope for a large hall and back buildings.

Yours truly
F.W. Hutton

The King Penguin is a very fine specimen.

103. Hutton to Haast, 21 July 1874
ATL MS-Papers-0037, folder 109-11

Otago Museum
21 July 1874

My dear Haast

I am sure that we shall arrange a very satisfactory exchange, as I think you will like the things I send you. And I hope this is only the first of a lot of exchanges. I shall be able to send you some vertebrae & toe bones of *Cnemiornis* presently but I don't know yet what I have got, as I have no room to sort out my things and a great deal too much to do.

I send you photographs of the Moas leg. You may have seen my description of it. It is in the Otago Times of the 14th & in the last Southern Mercury. I have not got a copy. You will see that the measurements agree very closely with those given by Owen for *D. ingens*, in his last paper on *D. gravis* (which is the only one that I have as yet). I do not think that it affords the slightest evidence of the Moa having been alive quite lately as most of the bones of the same bird are quite decomposed. I think it is almost certain that the Moa has not been alive here for the last 200 or 300 years, but I do not at present feel inclined to put the date further back than that.

I ought to have mentioned that the Moa feather in Trans. N.Z. Inst 1871. Plate IX, was drawn by Buchanan and printed off during my absence from Wellington, and while I do not say that no Moa ever had feathers like it, I do say that no one as yet has seen a Moa's feather like it. They are all like those I sent you.

The length of the first phalanx of the hind toe of this specimen is 1.25 inch, and of the ungual phalanx 1.75 inch. I found the sesamoid bones in their position at Hamiltons (posterior surface of tibio metatarsal articulation) in *D. elephantopus*, and the present leg of *D. ingens* has one still in its place. I did not know that you had any in your Museum, and Dr Coughtrey I think never saw them. I only asked you about them so that when Coughtrey describes them he might not omit to quote your paper if such had existed.

Yours truly
F. W. Hutton

[Footnote]

Coughtrey will have one or two papers on the anatomy of the moa.

[Note at top of 1st page]

Mrs Hutton is very anxious to hear how Mrs Haast is for we have heard that she is ill.
F.W.H.

104. Hutton to Haast, 09-11-1874
ATL MS-Papers-0037, folder 109-07

Dunedin
9 Nov 1874

My dear Haast

I have been so busy that I have quite forgotten to write to thank you for your paper on the Sumner Cave. I have read it with very great interest: you have evidently worked it out with great care and it is a most important addition to our knowledge. The lowest remains certainly appear to be very old, but I suppose that the occurrence of ground stone implements takes them out of the Pleistocene period; and of course the negative evidence of not finding Moa bones in the upper part, is not so satisfactory as the positive evidence of finding the skin and flesh of the Moa in Otago, with regard to the date of the last extinction of the bird.

We are both sorry to hear that Mrs Haast is still so ill, but hope that the change of air in Melbourne will put her all right again.

I am afraid that, now your Museum has grown so large, you will hardly find time for making a new geological survey of your province.

Fortunately for me I hope to get all the heavy part of my geological survey over while the Museum is still in embryo.

I am getting on very well with my collections and have just had a very valuable collection of animals of all kinds from the South Sea Islands given me by Mr G. McLean.

I hope that tenders will be called for our new building in a week or ten days time.

Have you heard that an Assistant Geologist of the name of Cox is coming out to Hector. I know nothing about him.

Yours truly
F.W. Hutton

Note at top of 1st page

Excuse me if this letter is not properly addressed. I do not know your correct title no

105. Hutton to Haast, 26-12-1874
ATL MS-Papers-0037, folder 109-08

Otago Museum
26 Dec 1874

My dear Haast,

I should certainly have tried to go to Shag Point with you, if you had given me more time, and if I had been at home; for I had arranged to dig out those ovens with Dr Coughtrey as soon as he returned from England. Until then I had not meant to touch them, but now I suppose I must have them cleared out at once, or you will be going there again. It will be a great disappointment for Coughtrey, who means to take up there ethnological questions.

About the fossils I am much obliged to you, but as Hector is taking home large collections of fossils (including I understand the tertiary fossils to be redescribed and figured in England) it would only be making confusion to do anything more in them until we see what he is taking with him. Also I could not afford to pay an artist to draw them.

I am glad to hear better accounts of Mrs Haast. We are all right. The tenders for the first portion of our new Museum are to be in by the 5th of next month; so I hope soon to see the foundation down.

G. McLean brought me a fine lot of things from the Islands. About 40 species of birds, and a lot of duplicates in spirits which I am sending to Finsch.

I hear that your having published your paper on the Sumner cave in the newspapers makes it optional with the governors of the N.Z. Inst whether they publish it or not. It was Mr Hare who told me this, but I do not suppose for a moment that they contemplate not publishing so important a paper. There will be one or two of mine in the same box.

Yours truly
F.W. Hutton.

106. Hutton to Haast, 27-1-1875
ATL MS-Papers-0037, folder 109-09

Otago Museum
Dunedin
27 Jan 1875

My dear Haast,

As you seem anxious to know my opinion about your squabble with Hector, I may as well tell you, although I do not wish to be drawn into it, that in my opinion McKay had no right at all to publish anything about the Sumner Cave without first obtaining permission from you. As you paid him no doubt all the facts were your property, and I also think that Hector ought to have declined reading it. I also think that, as the Governors have the right of veto on any paper, they should not publish McKay's, but if they had been obliged to give legal reasons for not publishing it they could hardly do so.

You now know the opinion I have always held on this subject, and you may judge whether I am likely to have said that I thought your conduct "infamous" as reported by some of my dear friends in Wellington.

I am in a position to prove, and I shall do so in my report on the Geology of Otago, that Moa remains occur in connection with extinct shells, but I cannot agree with you that the Shag vally Maori ovens shew the remains of two distinct races of men the later not being Moa hunters.

I have just returned from there and Mr Rich tells me that I saw as much as you did, but I am now having a deep trench cut right across the sand hills, so as to prove incontestably the structure of the whole affair. I am afraid also that you have not correctly determined the shells found in the Maori ovens. I shall always be glad to help you in naming these things if you will send me numbered specimens.

By the bye I can find no tertiary & volcanic rocks at the North & South peaks in the Horse range as shewn by your map & sections. I suppose you put them from information derived from others.

I enclose a tracing of the geology south of the Waitaki.

Yours truly
F.W. Hutton.

107. Hutton to Haast, 18-5-1875
ATL MS-Papers-0037, folder 109-14

Dunedin
18 May 1875

My dear Haast,

Your letter just received. I had also been going to write to you to say how sorry I was that you had lost your money (only for the present I hope), as it will be a great hindrance to you in developing your museum. I have also now to say that I am sorry you are not going to Europe, but as Mrs Haast likes it, and as you will now have time to complete your geological survey of the province it is not so serious as the loss of the vote.

I shall be very much obliged to you for the King bird of Paradise, as well as the cast of the *Aepiornis* egg. I must try to send you a return but really your collection is now so large that it is difficult for me to send you anything that you have not got. Thanks for the receipt for the kali art-----, I shall try it. On second thought I did not send my correspondence with Buller to Newton, as I hate these personal matters, although always ready to fight when a scientific point is involved.

J.T. Thomson told me that he was going at our last meeting to bring up the subject of publishing McKay's paper, and I told him that I should support him in expressing my regret at the course pursued by the Governors of the Institute, but for some reason he did not do so. Perhaps he is waiting, until the volume with McKay's paper in it is published.

Buller seems to think that he can say what he likes about me, but when I take it up he calls it reopening an old grievance. It was he who reopened it to you.

I am told that Cox came down here in the *Luna*, and was a day or two in Dunedin, but he never called upon me; which looks as if he had been told in Wellington to keep clear of me. Anyhow it is odd that a member of the Geological Survey should not try to make my acquaintance when here.

We are both very glad to hear that Mrs Haast is so well.

Yours truly
F.W. Hutton.

108. Hutton to Haast, 17-07-1875
ATL MS-Papers-0037, folder 109-10

Otago Museum, Dunedin
17 July 1875

My dear Haast

I think that J. T. Thomson has dropped the subject about A. McKay, but I mean to bring it forward myself, but cannot do so until the next volume is issued, for at present we have no evidence that McKays paper is to be printed, only newspaper reports.

I am delighted to see that you have got your money at last and that the Museum will be proceeded with.

Ours gets on very slowly and it will be at least 18 months before it is open to the public.

Many thanks for your promises of the things you are going to send me. I have no doubt but that I shall be able to repay you before long, as things now are beginning to come in considerable quantities.

My report on the Geology of Otago is in the press, but it will be two months before it can be issued as the map takes so long. The map will be printed in 13 colours.

We are both so glad to hear of Mrs Haasts complete recovery. Are you both going to Europe now. I had a letter from Finch saying that he was looking forward to seeing you.

Yours truly
F. W. Hutton

109. Hutton to Haast, 6-8-1875
ATL MS-Papers-0037-109-12

Otago Museum
6 August 1875

My dear Haast,

Many thanks for the Bird of Paradise and the *Aepyornis* egg. I have been through your recent shells and return you the list. Nos 24, 25, 34, 53, 113, 137, 141, 155, 183 I will determine presently when working up a revision of our shells, which I hope to be able to do next year, and will send you the names. Nos 157, 175, 178, 193, 202, 203, and 207 you must either determine yourself or send me specimens to keep, for I do not like to name species without having a type specimen near me for reference when wanted. I will go at the fossils at once but they will take longer than the recent shells.

It is a mistake about me being Professor of Geology. It was only suggested in a newspaper article, written by I do not know who, and has never been seriously entertained.

I have seen the new volume of the *Transactions* and shall bring up your matter as soon as members have their copies so as to read the evidence. I shall make out as strong a case for you as I can but as I do not wish to make any mistake in it, I want to know if you can tell me two things.

(1) Was the pos[t]cript to your paper read before the Canterbury Phil. Soc? or did it only appear in the newspapers? and

(2) Did McKay's paper appear in full in the Wellington papers? or only in abstract?

I want accurate information on these two points so as to prevent any mistakes in wording our resolution.

The lithographer who is doing my map, belongs to Mills & Dick, of Dunedin.

He is the man who did most of the geological maps for the survey of Victoria. Seven out of 13 colors are finished and as far as it has gone it is excellent and accurately registered.

I hope that you will be able to get your map and report out before the Provinces are done away with, as it will force Hector into something.

I am rather doubtful as to how our museum & myself will get on after abolition of provinces as we have no endowment. You are all right. I will return your shells shortly together with a few others from New Zealand, Campbell Island, and Auckland Islands (both the latter are very rare). I shall be glad to exchange invertebrata with you and wish especially for Annelids, and Holothurians in alcohol, and the true star fishes (Asterozoa) either dry or in alcohol more particularly, but all kinds of Echinodermata and crustacea are welcome. I can send lots.

Yours Truly
F.W. Hutton.

110. Hutton to Haast, 9 Aug 1875
ATL MS-Papers-0037, folder 109 13-15

Otago Museum
9 Aug 1875

My dear Haast

I send you the lists of the fossils you sent me. As might be expected there are many new species, which I hope to describe before long.

You will see that I refer all these beds (except perhaps the last) to the Pareora formation, although there are two fossils – *Struthiolaria tuberculata* from White Rock river, and *Fusus crawfordi* from Mt Harris – which I only knew before as Ahuriri fossils-; still in both cases the accompanying species shew unmistakably that they belong to the Pareora formation. It is quite certain that all our tertiary rocks from the Oamaru to the Pareora formations inclusive are very closely connected; and all I now believe belong to the Miocene period. It is also just as certain that between the Waipara and Oamaru formations there is a large break both stratigraphically and paleontologically. I am as certain of this as I am of my own name, in spite of all that Hector says to the contrary.

The coals near Oamaru and Awamoko are only lignite of pliocene or pleistocene age, and of no value. But up the Waitaki at Big Gully Creek there is an outlier of the Oamaru(?) formation underlied by brown coal of fair quality. This outlier goes over into the Canterbury Province. It is marked on the tracing that I sent you.

You are quite right about the volcanic rocks on the top of South Peak. I made a mistake in the locality. I have been there again and found basalt. I only asked you about it to be certain that I was right, which I was not.

As my appointment of Provincial Geologist will probably be knocked on the head in a few months I do not expect to do much more geology in New Zealand. But if I remain in Dunedin I propose to turn my attention principally to the tertiary paleontology, if I can get sufficient materials.

We are both very glad to hear that Mrs Haast keeps so well. We are all flourishing and eat rather more than we can afford to pay for.

Yours truly
F. W. Hutton

J. T. Thomson is still here.
I can send you a badly stuffed specimen of *Paradisea minor* if you wish for it.

111. Hutton to Haast, 8-9-1875
ATL MS-Papers-0037, folder 109-15

Dunedin
8 Sept. 1875

My dear Haast,

I have been waiting before writing to you hoping that I should be able to say that the contract for the last part of our museum had been accepted, but the Dep Super has forwarded it to Wellington as he does not like to accept it himself. The tenders are rather higher than they like as I have tried to make the building completely fire proof, and if they will not accept it, I must substitute wood for iron and concrete and so make it cheaper.

I am very sorry that you cant bring out your report. Mine will cost about £250 – 500 copies in cloth boards – It seems absurd that your government should pay a provincial geologist for so many years, and then not pay £250 for printing his report. If you do not get it out at once I do not think you will get it out at all, as Provinces are sure to be done away with this year.

I shall be very glad to get crows, Thrushes and Saddlebacks, and will send you what I can in exchange. I can send now 6 or 8 good specimens of *Ocydromus troglodytes*. Penguins for the present I have promised to Finsch, but as soon as his box has gone (next month) I will send them to you. I will make up a box for you as I have a few shells to send, as well as some of yours to return.

Finsch is very angry with Buller for publishing without leave his private notes on the birds sent to him (see Art XXIII); and I think the Governors were wrong to publish it, especially as it is all in Finsch's own paper. As Finsch could not have got his volume of the *Transactions* it is evident that Buller must have sent him copies of his paper before it was published. No one else is allowed to have copies until after publication. Another instance of partiality. The *Guardian* had yesterday an article taking your side.

I have Krefft's *Snakes of Australia*, but would buy his *Mammals*. If you would write and ask me as Secretary for a copy of the resolutions we passed about the N.Z. Institute I will send it you.

Yours truly
F.W. Hutton.

112. Hutton to Haast, 19-9-1875
ATL MS-Papers-0037, folder 109-16

Dunedin
19th Sept. 1875

My dear Haast,

Your questions are difficult to answer. I should very much like to see you resume writing papers in the *N.Z. Trans*, and I sincerely hope that you will do so somehow or other. But when you ask me whether you should preface your first paper with the remarks you mention, I hardly know how to answer. Different people are differently constituted, but if I were in your place I think I should consider that I had won all that I had been fighting for, for you may be sure that the Governors will never do the same thing again, and I should therefore think it more dignified to let the matter drop and resume writing as if nothing had happened.

You may think differently and I would sooner see you commence writing again with your preface remarks, than see you remain outside as now. You must remember that printing McKay's paper has done you no harm scientifically; it is only the principle of publishing it that is wrong, and that I think has been sufficiently vindicated.

That is my honest opinion, I counsel moderation, and it is always a nice thing to make the first step towards a reconciliation.

I have no further news about the Museum. The whole thing is hung up at present, but I am quite willing to agree to any modifications they wish.

About N.Z. birds I shall be glad to send you all that I can spare, but I have so many orders for them that I find very great difficulty in getting up a stock. Last mail brought me an order from Finsch for all *Ocydromi* that I could spare, as well as blue ducks. I have however kept a pair of *O. troglodytes* for you and a couple of Blue ducks. I have also a good specimen of *Phaeton rubricauda* young, for you. It is very pretty, white spotted with black, and I feel sure that you have not got it, for this plumage has never yet been described, as far as I know. I have also a skin of the adult bird if you want it, but it is not a very good one, the head being dirty. I could send you a dozen Tuis, or *Platycercus novae zealandiae* and *auriceps*, and also *Sterna antarctica*, if you want them. Skin for skin is probably the best way of exchanging birds. I have just made an arrangement with a man at Port Chalmers to supply me with Shags so I do not care particularly to get others, but have no objection if you are not well off for crows & thrushes. Have you a *Sterna nereis* to spare? Or *Larus bulleri*?

Yours truly
F.W. Hutton.

20th. Copies of letters just received. If your expression "by your own shewing" is correct, you have the best of it. But I should be very glad to see the whole matter dropt now.

113. Hutton to Haast, 15-01-1876

ATL MS-Papers-0037, folder 110 sheets 01 and 12

Otago Museum
15 Jan 1876

My dear Haast

We have a meeting in about a fortnight & I will read Finch's paper then, & ask Mantell to print it this year. It will want rewriting. We use I II III the same as you do.

About the 3000 years.

You have over and over again said that the Moa was extinct before the present race of Maoris came to New Zealand, and you also reject with scorn the idea of its only [having become extinct since a few hundred years ago. You will find both these stated in your first paper. Are we agreed so far –

Well then there are only two theories about the time of the advent of the Maori, one putting it at 300 or 400 years ago, the other (Hale's) at 3000.

As you evidently reject the former, for you say that the discovery of the well polished stone adze at the West Coast 15 feet below the surface proves this - you must I suppose agree with the latter period of 3000 years for the advent of the Maoris and consequently more than 3000 years for the extinction of the Moa.

My idea that this was your opinion was strengthened by the following sentence in your first paper (p71)

"I cannot conceive that Moa bones could have lain in such exposed positions for hundreds, if not thousands, of years without decaying entirely".

This undoubtedly means that the latest moa bones must be hundreds if not thousands of years old.

When I wrote the remark you object to you had not corrected your mistake of ground implements never being found with moa bones, but I am not aware that you have altered any other of your opinions on the subject. Unless it be that you now admit that the Maoris are descended from your Moa hunters. This is a point that no one seems to be able to make out what you mean, and I think that in your next paper it would be as well to explain yourself more fully about it.

Yours truly
F.W. Hutton

Our Museum is getting on first rate.

[110-12 inserted here – appears to be an extended footnote]

I forgot to mention that the text of the description of *Mesoplodon* does not appear to be published yet, at any rate we have not got it; but Coughtrey will send you tracings of the plates in *Ost des Cetaces Preneden & fervais*, and when the text arrives it will be sent for you.

It is all very well for you to say that we should not talk about having the best Museum for you are endowed and safe. But it is necessary for me at present to work on the rivalry between the provinces to get something done. You must not mind it, there is really not a particle of jealousy in it. It is only a dodge for raising the wind, and as soon as this museum is safe it will end. There would have been no Museum in Dunedin if you had not first started one in Christchurch.

I am sorry that you did not accept McKay's apology at the end of his letter. It would have placed you in a better position, without giving in a bit; and you need not have resigned the presidency of the Cant Phil. Soc. But what is done cannot be helped.

F. W. H.

114. Hutton to Haast, 30-4-1876

ATL MS-Papers-0037, folder 110-02

Otago Museum
30 April 1876

My dear Haast,

All right. I am quite as anxious as you are to keep friends. I only objected to your saying that my conduct was "disgraceful", an expression which I think rather strong unless you intend to quarrel. However thats all over now.

I never mix scientific controversies with private matters & you may pitch into me as much as you like in print and I shall not mind it. Everyone should either stick up stoutly for his own ideas or else say frankly that he has been mistaken.

About Shag Point. I think that you have been mistaken and you think that I have been mistaken. I dont see that that should lead to a quarrel. I am sure that you cannot find in my paper anything personally offensive to you. And you must not get angry at being contradicted.

I hear that you have received Hookers decision in the Sumner Cave question. When will it be published.

Yours truly
F.W. Hutton.

115. Hutton to Haast, 19-5-1876
ATL MS-Papers-0037, folder 110-03

Otago Museum
Dunedin
19 May 1876

My dear Haast,

I expect a giraffe skin from Paris, and so I should not like to spend £25 on one, unless I was sure that the one from Paris was not coming. So I think I will decline the American's offer. I have also skeletons of Rhea Ostrich & Cassowary, and I am getting an Emu from Australia.

My collections are increasing very fast, but the building goes on very slowly. At present there is a stoppage, a contractor for iron work having thrown up his contract. The walls are not quite half up yet. There is very little chance of its being open to the public before a years time.

I have nothing new except a couple of fishes. I am working away at invertebrata principally insects. I cannot work at the fossils until the Museum is open and I can unpack my boxes; but as soon as that is done I mean to revise my catalogues of shells and fossils as far as possible.

Hooker is very much given to gammon, and I always had an idea that he would praise both sides and give his vote in the middle. I am very glad indeed that you have buried the hatchet.

I think that if we could get the N.Z. Institute to be peripatetic and meet annually at the different towns, we should have a much greater hold upon it.

If this were done Hector's power as manager would soon decline. At any rate there ought to be regular annual meetings at which the scientific men from all Provinces should attend. Hector would funk this as he would very soon find his level there. Still the plan will recommend itself so much to the public that if the societies of Auckland Christchurch and Dunedin were to unite in demanding it, I think it would be done.

This is the best course for us to pursue in my opinion.

Yours truly
F.W. Hutton.

116. Hutton to Haast, 23-2-1877
ATL MS-Papers-0037, folder 110-04

Museum
Dunedin
23/2/77

My dear Haast,

I must apologise for not having written before, but a crowded steamer is not comfortable. Thanks for your congratulations. I see that I have also to congratulate you, I did not know it when I was in Christchurch.

When I first came here I spoke to Mr Macandrew about getting alcohol duty free, but he did not like to trouble the Government about it, and at that time I could get it pretty cheap from the distillery. I am ready now to try again and think that the best way would be for both of us to send application to the Minister of Customs. He is here now and I will try to see him about it. He goes to Wellington next week, and I think it would be best to send our applications to him there, as there would be less risk of their being lost.

The Wellington Museum is very poor. The building is much improved but a great deal of space is wasted, and the general effect is spoilt by a very heavy gallery railing. However it looks better and is better lighted than I expected. About the collection the less said the better, there is nothing worth looking at except the N.Z. fossils & fishes in alcohol.

He has got a cow, and some other ruminants, a few monkeys and a tapir, that looks like a hogshead on legs. The only good mammal is an Aard vak. Burton's bird stuffing is simply atrocious. I never saw anything worse. Hector was not very cordial and was engaged cutting with a penknife a plaster model of N.Z.

He told me that he was going to bring out a new catalogue of the N.Z. Fishes, as mine is out of print. I think that this is treating me worse than he did you. He would not let me see the drawings that he said Buchanan was making to illustrate my catalogue of fossils, although they are nearly finished.

Yours truly
F.W. Hutton.

117. Hutton to Haast, 02-05-1877
ATL MS-Papers-0037, folder 110-05

Dunedin
2nd May 1877

My dear Haast

I am sorry to say that it is impossible for me to leave Dunedin now. I am busier than I have ever been, as I am just commencing to put the things into the Museum, and to lecture for the Session.

I think that you have a treasure in Reischek, and am surprised that he should come out for so small a salary.

He is evidently very zealous and wanted to exchange at once; I told him that he would get plenty at Christchurch, but as he still seemed anxious to do some business I promised to send him a box of fishes. I am now getting this ready and it will go to him before the end of the month. I suppose that I had better send it to the Museum.

Yours truly
F.W. Hutton

I got the newspaper – thanks – It is very interesting but I doubt the Tamil.
F.W.H.

Two cases have come from London for you by the ship Wellington. I will have them sent on.
F.W.H.

118. Hutton to Haast, 28-05-1877
ATL MS-Papers-0037, folder 110-06

Dunedin
28 May 1877

My dear Haast

I should very much like to come to your opening Exhibition, but it is impossible, as I have to give a lecture every evening, and two a week in the afternoons.

I am also just commencing to put up some skeletons in the Hall of the Museum.

We are in a dreadful mess at present, but things look as if they would get straight soon. The cases are all in the hall, but the glass has yet to be put into them.

I do not know what your proposal is about Reischek but I am afraid I shall have to decline it for several reasons.

1st I have no money: I can only just get along as I am.

2nd I have no mammal skins fit for Reischek to display his skill upon.

3rd There is no room in our Museum for groups, which appear to me to be better adapted to an art gallery than to a Natural History Museum.

I shall look forward with great pleasure to coming to Christchurch to see his work, after the University Session is over; and I shall send Jennings up as soon as we have got our Museum open to the public.

Yours truly
F. W. Hutton

We are very sorry indeed to hear about Mrs Haast. We are all right here.

119. Hutton to Haast, 04-07-1877
ATL MS-Papers-0037, folder 110-07

Dunedin
4 July /77

My dear Haast

Our Museum will soon be opening & the question will arise about Sunday.

I am in favour of opening from 2 p.m. to 4 p.m. on Sunday but one of the Committee is against it & grounds his objection on the supposed fact that it has been a failure in Christchurch, and that your Museum is only used on Sundays by fashionable loungers.

I should be much obliged if you would give me your opinion on the subject, and also tell me if you open on every week day also.

Yours truly
F. W. Hutton

120. Hutton to Haast, 17-07-1877
ATL MS-Papers-0037, folder 110-08

Dunedin
17 July /77

My dear Haast

I waited for your answer before thanking you for the photographs.

Reischek's stuffing seems to be perfection – the chamois & birds especially attract me but I am not a convert to grouping – on the contrary I dislike it more than ever.

The information about your Museum was just what I wanted – it will enable me to have ours opened on Sunday.

There are no end of delays in finishing the fittings but I hope to open by 1st Sept.

I read the review in the Wellington paper and thought it a skit probably by Mantell.

Yours truly
F. W. Hutton

121. Hutton to Haast, 27-9-1877
ATL MS-Papers-0037, folder 110-09

Dunedin
27 Sept. 1877

My dear Haast,

Jennings is delighted at the idea of coming up to help Reischek. He will leave here on Tuesday morning for Oamaru and will go on by train.

He will take up the skin of *Saiga tartarica*, and can bring back the porcupine, for which I shall be very much obliged.

I will also get him to take with him the skin of an antelope; which, after the Elephant is finished, he can (if you have no objection) stuff under the eye of Reischek. It is a lesson in stuffing deer that I want him to have most.

I have not seen Hector's remarks in the report of the Institute, and I should not take any notice of them under any circumstances. I am sorry now that I did not give him plenty of rope to hang himself with years ago.

He was here the other day with Coutts Crawford, on their way to Melbourne, Adelaide, & Sydney. He told me that he had not seen the new part of your building nor any of Reicheck's work.

Yours truly
F.W. Hutton.

122. Hutton to Haast, 25-09-1878
ATL MS-Papers-0037, folder 110-10

Dunedin
25 Sept 1878

My dear Haast

Blaschka's address is 9. Schies-gasse – Dresden.

There is no hurry in sending me the shells, corals etc.

I am now at work making you up a set of Polyzoa. It takes some time as each has to be examined with a microscope but I am getting on.

Have you any duplicates in the way of Gorgonias etc?

Mrs Hutton was very poorly for a fortnight but I am happy to say is nearly well now.

Remember me to Mrs Haast.

Yours truly
F.W. Hutton

Note in another hand

I should by no means be displeased if you would get rid in my favour of a lot of those interesting Cornish minerals you spoke of. We have plenty of room in our cases!!!

Gluck Auf
George H. F. Ulrich

123. Hutton to Haast, 22-11-1878
ATL MS-Papers-0037, folder 110-11

Dunedin
22 Nov /78

My dear Haast

Thanks for the arms of *Pentacrinus* which are very valuable to me.

Mr Stack will take back your two volumes of Atlas of the United States Exploring Expedition. As they are heavy I told him that I will telegraph to you when he has started, and perhaps you could send someone to the train to meet him.

Yours truly
F. W. Hutton.

Turn over

I am afraid that Bathgates notion that the Otago University leave the University of New Zealand will be carried.

If so the New Zealand University should protest against our getting a charter, or at any rate against our walking off with 10,000 acres of their land in Southland.

Mention this to some of the others.

F.W.H.

Ulrich has gone to Melbourne to bring back his sister-in-law.

124. Hutton to Haast, 06-10-1882
ATL MS-Papers-0037, folder 111-01

Cant. College
6 Oct 1882

Dear Sir

You said that I was in error in using the word Stalagmite for an incrustation that you now say there is no English term for. Perhaps the following quotation from Dana's System of Mineralogy may shew you that I used the right word.

“Stalagmite is the same material covering the floors of caves, it being made from the water that drops from the roof, or from sources over the bottom or sides”.

I can assure you that Stalagmite is always used for these incrustations on the sides of caves, caverns, fissures or any where else that it occurs.

English geologists also use the word sinter, and have taken it from the German – but it means a totally different thing as it is the incrustations formed by springs when the incrustation is solid. Calc-sinter is also an English word, but it means Travertine, is indeed identical with it, and is quite different from stalagmite.

In justice to myself, as there were no books in the library to prove my case last night, I intend to bring the subject forward again at the next meeting of the Institute.

Yours truly
F. W. Hutton

Professor von Haast

In 1880 Hutton was appointed Professor of Biology at Canterbury University College in Christchurch. He saw Haast regularly, so there are few letters apart from a disagreement in 1882 when there was a frosty relationship for a period. In 1886-87 Haast was appointed executive commissioner for the Indian and Colonial Exhibition in London, and Hutton took over his lectures. They corresponded while Haast was overseas.

125. Hutton to Haast, 06-10-1882
ATL MS-Papers-0037, folder 111-02

Canterbury College
6 Oct 1882

Dear Sir

If you will look at page 129 of Greens "Geology for Students (Physical Geology)", which is one of the text books you recommend to your students, you will find the following

"This is also the origin of those long bodies known as stalactites, which hang from the roofs of Limestone caverns; of the lumps of carbonate of lime, called stalagmites, which rise from their floor; and of the sheets of the same substance which coat their walls".

Yours truly
F. W. Hutton

Professor J. von Haast.

Response in Haast's writing

Museum
Oct 6 82

Dear Sir

I was perfectly well aware what Green says, but the expression "of sheets of the same substance" applies to Carbonate of lime & not to stalagmite.

There is a semicolon after floor, which you have doubtless overlooked and thus misconstrued the sentence. Moreover the Weka Pass rock shelter is not a Limestone cavern where from water percolating through the rock Carbonate of lime is often deposited on the wall. This deposit of Carb of Lime on the walls we call in German Kalksinter (an expression also used for deposits of calcareous springs). I do not think Engl. Geol. use the expression for the same.

126. Hutton to Haast, 14-8-1886
ATL MS-Papers-0037, folder 111-03

Christchurch
14 August 1886

My dear Von Haast,

I was very glad to get your letter and interesting paper on the geology of Canterbury; which shall be read next meeting.

It is very satisfactory to feel we are at last treading on firm ground in this matter, but I do not see that Ettingshausen bears out McCoy's opinion; I should have thought that is was just the contrary. Neither can I understand how you can suppose the plant beds of Clent hills and Malvern hills to be the oldest in the Alps, if they are only Triassic.

I doubt whether the Grey Coal series are so much older than the Malvern Hills younger plants beds. Possibly the difference may be accounted for by diverse floras on the east & west sides of the Alps.

I should much like to see the exhibition which I feel sure must be splendid. I hope the collection from the Colonial Museum is better than the catalogue wh. Hector has published to illustrate it. This I am quite ashamed of.

I hope much that you will succeed in getting the British Museum authorities to catalogue our fossils. Nothing more important for science in New Zealand could be done.

Hector has made an awful mess of the Tarawera business. Every one is laughing at him. He was in such a funk the whole time he was at Rotorua that he never took his clothes off. He went to Taupo as soon as he could, but even then he would not let them shut a door at night for fear it should be jammed by an earthquake. His report is full of mistakes.

Last term my geology classes were

Junior 7

Senior 1

Saturday 3

11

This term they are only

Junior 4

Senior 1

Saturday 1

6

Yours truly
F.W. Hutton.

127. Hutton to Haast, 05-11-1886
ATL MS-Papers-0037, folder 111-06

Christchurch
5 Nov 1886

My dear von Haast

I got your letter this morning and am glad to hear that some one will undertake to describe our fossils, although I wish it was going to be done in English. I hope that we shall receive copies of the papers in Christchurch; of course I could not expect valuable papers like these to be sent to private persons like myself, but I think that the Museum library ought to get copies.

I am working away at petrography now and have just read a paper on the Gabbro you gave me from Dun Mountain. It is a very interesting rock but the foliated mineral is not Diabase but a variety of Anthophyllite cleaving parallel to 110.

The specimen of Dunite you gave me also turns out to be not olivine but enstatite. It is a curious rock made up entirely of Enstatite & Bronzite. The Enstatite looks very like olivine but shews abundant cleavage faces.

I am now at work on other rocks from Nelson.

Some time ago Malet called on me and said that you had applied for six months extra leave and asked me if I would continue the geological lectures on the same terms as before. I was surprised that you had not written to me about it, but as Malet said that the case was urgent and that if I would continue the lectures the board would grant you an extension of leave, I consented. You still do not mention anything about this so I tell you the arrangements Malet made with me in order that you may advise your son.

We all congratulate you on your new appointment as Secretary to the Imperial Institute. I hope the salary is a good one.

Yours truly
F. W. Hutton

128. Hutton to Haast, 15-12-1886
ATL MS-Papers-0037, folder 111-08

Christchurch
15th Dec 1886

My dear Von Haast,

You will be glad to hear that I am going next month to the West Coast to do some work for the Midland Railway co. between Greymouth & Nelson. I have long wished to go over this ground. Tomorrow I take Charlewood to Malvern Hills for a week to teach him some field geology. He is my only advanced student, and if he passes he is going on with Honours Geology next year. You will see that the Senate of the University has adopted a Syllabus of the Geology which makes it much better for teachers; for we now know what we have to teach. Unfortunately Rupert Jones did not pay the slightest attention to the syllabus in his examination papers, indeed I think that he could not have read it.

We have arranged the fossil plants you sent back from Ettingshausen in two lots – one botanical the other geological – they look very well. I sometimes wish that I had sent you the crocodilian teeth from Waihao greensand, to shew to Seeley, or some one, but I did not like to say anything to Sparks about it; and it is too late now. Sparks is doing very well in the Museum, and it is kept in capital order during your absence.

I am told that some of the Dunedin people are trying hard to get the Government to send home Twopeny to take charge of the New Zealand portion of the Imperial Institute. I do not know how much truth there is in this, but it appears that he does not give satisfaction as Editor of the *Otago Daily Times*.

Hector has published no Geological Reports since you went – at least I have seen none – so as yet the promised answer to your paper on the N.Z. Alps remains concealed.

Yours truly
F.W. Hutton.

129. Hutton to Haast, 31-12-1886
ATL MS-Papers-0037, folder 111-07

Christchurch
31 Dec 1886

My dear von Haast

I have just got your letter of the 18th Nov. and am sorry to hear that you will lose the chance of getting the whole of the Geol. Soc. publications because you cannot afford £8. But I suppose that the books do not make sufficient show in a Museum, from your point of view.

I have just been spending a week in the Malvern Hills and have arrived at some conclusions very different from yours. For example the rocks of the Selwyn Gorge appear to me to be arranged very differently from your section. I fancy you have mistaken jointing for bedding, but I shall go over the section again carefully before publishing anything. Your "diabase ash" also is certainly not diabase, but its exact name I have not yet arrived at. I saw no ash beds, only eruptive rocks and the "cherts" and limestones are not independent bedded rocks, but only parts of the dyke altered. Indeed the so called cherts are only the green rock slightly altered. The Cairn Range Rocks are also certainly younger than those of the gorge, and not older as you confidently state. I think that I have good proofs of this. Again I cannot think that you are right about the alteration of the coal in Harts Mine by the dyke, but this point I am going carefully over again. I found *Inoceramus* in the beds of Wilson's coal on the west side of Mt Misery.

Everyone is of opinion that Stout will entirely remodel the N.Z. University this year; so that you will lose nothing by having been absent for two sessions, for you would have been off the Senate anyhow.

Spackman, Garcia and Walker (of Ashburton) have been elected Governors of Cant. College. The first two seem to take great interest in it. Garcia especially, who has been put on the Committee of Schools of Art and Museum, is a great addition. Spackman is on the Library Committee.

We hear very confused and contradictory reports about your appointment, but I suppose that is natural.

Yours truly
F. Hutton

130. Hutton to Haast, 9-2-1887
ATL MS-Papers-0037, folder 111-09

Christchurch
9 Feb. 1887

My dear Von Haast,

I yesterday received your letter of 18 Dec, saying that you had written to your son to tell him to continue paying me until you come out. When you are here you will no doubt be able to make arrangements with the Board for handing me over the lectures permanently. As I told you I am willing to give them for nothing provided I am made Professor of Geology as well as of Biology.

I am very sorry I congratulated you on an appointment you did not get. I hope you did not think that I was joking. It was reported in the *Lyttelton Times* that you had the appointment, although since then there have been all kinds of rumours to which I pay no attention.

I suppose you have heard that a University College is to be established at Wellington and that Hector is to be Professor of Geology. Stout told me that Hector had objected but had been informed that if he did not do it the Government would get somebody else. I fancy that great changes will take place in Wellington. Montgomery told me that the Geological Survey was to be abolished; but this may be only a rumour.

I am sorry not to have been able to send you my report on Tarawera before this. I corrected the proofs last September; but last Wednesday I looked in at the Mines Department, Wellington, to see what was delaying it and found that they had forgotten all about it. They were much obliged to me for reminding them of it and gave orders to have it printed off at once. Highly flattering to me wasn't it.

Yours truly
F.W. Hutton.

131. Hutton to Haast, 22-04-1887
ATL MS-Papers-0037, folder 111-10

Christchurch
22 April 1887

My dear von Haast

A splendid fish has been caught in Governors Bay and given by Potts to the Museum.

It is much like the Scombridae but covered with large eyeloid scales, of which I enclose a specimen. I think therefore that it belongs to the Nomeidae. But, if so, it must be a genus not in Gunthers catalogue.

I send you a description & sketch of the fish, and as it is a very large one and probably pelagic in habit I should like you to give these to Dr Gunther and ask him to name it if new & you might publish the description in the Annals of Nat Hist.

Sparks will make a skeleton of the fish and a drawing has been made by Chapman.

I think it probable that it is the same as a skull in the Wellington Museum referred by me provisionally to *Pelamys chilensis* (Cat. Fishes of N.Z. p.22) but the large scales prevent it belonging to *Pelamys*.

I hope that you have quite recovered and are bringing a large collection out with you. The Board of Governors have decided to start an Engineering School here and the class room at the end of the Hall is to be finished at once.

Yours truly

F.W. Hutton

Haast died suddenly in August 1887, only a few weeks after returning to Christchurch from his overseas trip.

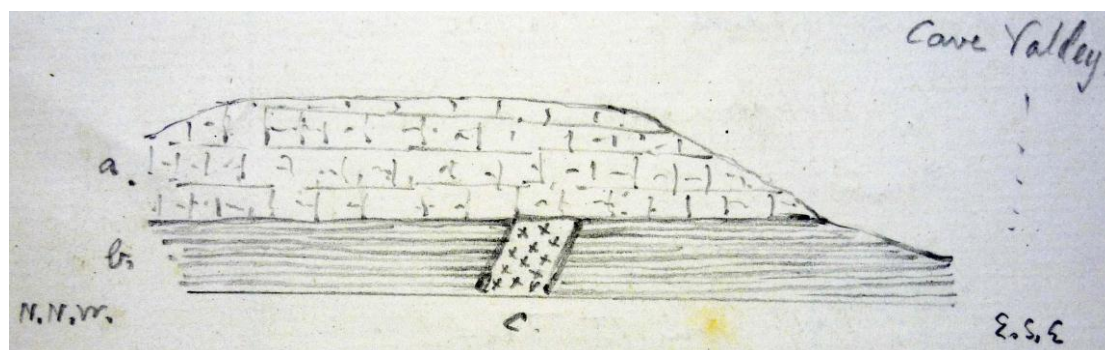
Appendix 1: A stratigraphic sequence near Oamaru

132. Hutton to Haast, [undated]

ATL MS-Papers-0037, folder 111-05

[Undated]

Section in Railway Cutting Cave Valley Oamaru



- a. Ototara limestone
- b. Diatomaceous ooze
- c. Dyke of Basalt, 20 ft thick

The diatomaceous ooze underlies the Ototara Limestone at several places near Oamaru. It is best seen in the railway cutting at Cave Valley (Section). It is underlain by volcanic rocks and overlain by the Ototara limestone, but its thickness cannot be made out exactly for neither the top nor bottom are exposed.

However it exceeds twenty feet. In Cave Valley it is cut by a dyke of Basalt; here the junction between it and the Ototara limestone is obscure but from the south there is the following section to be seen.

6. Ototara Limestone
5. Clay
4. Tuffaceous clay
3. Palagonite Tuff
2. Diatomaceous ooze
1. Volcanic Rocks.

The diatomaceous ooze therefore belongs to the earlier part of the Oamaru System during which volcanic energy was active in many places on the eastern side of the South Island. It probably belongs to the Oligocene period.

F. W. Hutton

I presume you mean the light yellow compact rock of which I sent a specimen to Professor Rupert Jones. I know no other diatomaceous deposit from Oamaru. But you had better see Rupert Jones' specimen.

Appendix 2. Correspondence with W.L. Buller in 1875

133. Hutton to Buller, 14-4-1875

RSNZ Archives

Dunedin
15 April 1875

My dear Buller

Dr Haast was here last Tuesday & in the course of conversation he mentioned that you had been saying, on Dr Hector's authority, that I had urged Dr Hector strongly to allow me to publish my catalogue of birds of New Zealand, and that at last he had consented. I would be much obliged to you if you would inform me whether this is correct or not, for if it is I must take steps to contradict it, as it is altogether untrue.

The truth of the matter is this. You will remember that before you left New Zealand I drew up for you short diagnoses of all the petrels. Dr Hector saw me doing this and asked me whether I could do the same for all the New Zealand birds. I replied that it would be very easy, and he then told me to do so. I stated at the time that perhaps you might not like it, and he said that it would do you a great deal of good, as it would popularise ornithology in the Colony, and make your book sell: and also that the Museum had bought your collection of birds and ought to make use of them. All this was of course before you had left New Zealand. Subsequently he gave me definite instructions to begin the catalogue, which he said was to be the first of a series that he had determined to bring out on the New Zealand fauna (see Museum Report 1871.)

Of course I naturally thought that he had written to you about it; at any rate I, as his subordinate, had only to obey orders. I feel sure that Dr Hector will not deny this and you are at liberty to send him this letter.

While on the subject there is another point between us that ought to be cleared up. In the *Ibis* and in the *Trans. N.Z. Inst.*, you accuse me of having concealed the fact of you having pointed out to me that --- *Colluricincla concinna* was *Graucalus melanops*. This was a very

[line missing.....]

nevertheless it was an error. I found out my mistake myself when unpacking the collection of foreign birds in the Colonial Museum, and my letter to *Ibis* was posted about a fortnight (if I remember rightly) before I got your letter on the subject. The date, of your letter from Melbourne, and mine to the *Ibis* will probably prove this, but I have not got them here.

I would not do such a mean thing as that which you impute to me, and I think that you must know that I have always fairly acknowledged my mistake, and said to whom I am indebted for correction.

Yours truly
F.W. Hutton

134. Buller to Hutton, 19-4-1875

RSNZ Archives

Copy

The Terrace
Wellington
April 19 1875

My dear Hutton,

I received today your letter of 15th instant.

I am sorry that Dr Haast said anything to you about "Cat B. of N.Z." because it seems like raking up old grievances to no good purpose.

I felt very sore at the time that my own Collection of Birds was made use of for your Descriptive Catalogue in direct anticipation of my book, and I told Hector so. He assured me that he did not know the exact nature of your 'Catalogue' till it was actually in print, - that he directed you to prepare merely a synoptical list for the purposes of identifying the specimens.

I think that he said he was away from Welln. when the 'Catalogue' was published; and he called my attention to the circumstance that in this instance his name as Director does not appear on the title page.. He admitted that the publication of your Catalogue was unfair to me, but he disclaimed on your behalf any intention of doing me wrong.

This is a simple statement of the facts, and just as I gave it to Haast, although it would appear not exactly as repeated to you. Hector never said that you had "strongly urged" the case, but simply that you had done the work without his seeing it, and that, although technically responsible, its character was quite unknown to him until after its publication.

As you demanded an explanation I have given it; but I think it is a great pity that Hector's name is made the subject of ungenerous discussion while he is away from the Colony, and cannot be heard for many months.

For my own part I was satisfied with Hector's statement, and time had removed any little soreness I had felt. So it was a pity that Haast raked the matter up.

Unless we all manage to pull more together, I fear we shall lose the good name we have at Home for cooperation. Now, for the other matter. Your explanation is quite satisfactory; and if you wish it, I shall put the matter right, as regards *C. concinna*, in my next budget of 'Notes'.

You sometimes acknowledge mistakes, but not always! Remember the case of the 'freshwater algae'.

In my History of *Gerygone flaviventris*¹¹ I gave you a cutting footnote; but when the proof sheets came I magnanimously struck it out!

The *Trans. Vol VII* makes good progress, and will be issued in about four weeks.

I am glad you have given us Finsch's "Revision", which will be useful.

With Mantell's permission I have added an editorial footnote re *Podiceps hectori*.

Faith. Yours
W.L. Buller

135. Buller to Hector, 8-5-1875

RSNZ Archives

My dear Hector,

We hope soon to hear of your safe arrival with Mrs Hector, in the Old Country.

We are jogging along as usual out here. The Volume of *Trans* (VII) is making satisfactory progress. The reprint of Vol I will be out in about a month.

You will see from the enclosed that I have been in correspondence with Hutton about the "Catalogue".

He has replied to my letter of April 19th in a very nasty spirit and says that he is forwarding the correspondence to Newton. However I will send you his last letter after I have replied to it and you will see how the case stands.

Haast has returned from Melbourne, and I am happy to add that his wife is perfectly restored. He is naturally very angry with me for giving up his private letter, and says that it was a "breach of trust". But he left me no alternative and has no right to complain. The following appears in this morning's Telegram¹².

Believe me
----- Yours
W.L. Buller

¹¹ Buller, W.L. 1873: Remarks on Captain Hutton's notes on certain species of New Zealand birds. *Transactions of the New Zealand Institute* 6: 123-126.

¹² Blank space in letter