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Contents

Cover illustration: *Department of Conservation staff head away from the tiny cove which gives access to the site of former marble quarry on the south side of Caswell Sound, Fiordland. Quarry workings, now hidden by bush, were to the left (east) of the obvious bluff of white marble (Photo: P. Dalley, DOC, 2017).*

The Caswell Sound marble quarry, Fiordland
Part 1: the marble and its exploitation

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Introduction

After an outcrop of fine white marble was found at Caswell Sound in early 1878 a prospecting licence was taken out followed by a licence to quarry in 1880. These moves were handled by two different companies, the first based at Hokitika and the second in Wellington. After a slow start the second company had failed by 1886 due to the variable state of the marble, the logistics of managing a business far removed from Wellington, and the wet climate with its myriads of sandflies.

Like many people I had never heard of this venture until I went there, in September 2000, on a boat trip from Doubtful Sound to Milford Sound, visiting all sounds in between. As the Fiordland historian John Hall Jones was along, many of the shore visits made were to historical sites, including this one at Caswell. Despite the cold wet September afternoon my interest was immediately piqued, not just from the various relics lying around - bits of machinery and old huts - but by the marble in which there is a cave. However, having neither a good light nor a hard hat, I didn't venture far beyond the cave's drippy entrance area, the way on being guarded by a wall-to-wall pool of water. In retrospect, an opportunity missed because even today Caswell Sound is quite a remote (and expensive) place to get to.

Catching up with friends upon my return home – I live on the West Coast - I found that Paul Caffyn, veteran sea-kayaker, caver and geologist had paddled with a friend into Caswell Sound the previous summer on their way north and found, whilst taking a shore break, a small marble cave on the north side of the sound. What's more he had a map of Caswell Sound, plus a few notes, which had been given in the 1980's by another geologist, Jack Bradshaw, and on this was the location of the former marble quarry, plus other marble prospects.

Copies of both the map and notes were quickly squirrelled away with other bits and pieces about Fiordland karst and caves until I found time in my retirement to look further into the marble quarry venture than the few lines in John Hall Jones' 2002 book, *Fjords of Fiordland*.

An interesting aside in researching this story was learning about New Zealand's stone masonry trade and the importance of marble for monuments of all kinds. Research shows that in many small towns, like Hokitika, the undertakers were also 'monumental' masons, i.e., they not only organised funerals but also bought and sold headstones and did the inscribing work (Fig.1). Whilst white Carrara marble could be imported from Italy, this took time and was relatively expensive, so from early on the hunt was on for comparable New Zealand sourced material. Many headstones were a mix of imported marble and local granite. Marble was also much used for public and home garden statuary, for kitchen worktops and building facings.

Fig.1. *Advertisement in West Coast Times, 28/12/1875.*
The Hokitika firm of Sinclair and Jack was well established by the time marble was found at Caswell Sound in 1878. McLean Watt Jack had been Mayor of Hokitika the previous year and soon became an active director of the first Caswell Sound Marble Company, visiting Caswell Sound in the spring of 1878 to see for himself where the marble had been found. He and George Munro then made a detailed joint report to the newspapers in December.

This is why some of the most active proponents of the first Caswell Sound Marble Company were the monumental masons, McLean Watt Jack, a Hokitika undertaker, and George Munro from Dunedin. However, whilst early 'hand-picked' samples of Caswell Sound's white marble soon gained favourable comment from both the trade and scientists like Dr James Hector of the Colonial Museum, it was found, once quarrying began in earnest, that much of the more readily available white marble was either shattered or intruded with veins of other minerals. Between the flaws in the marble and Caswell Sound's remote location it was an industry in the end which was just not to be.

Caswell Sound marble

Description

There is no one full description of the marble found at Caswell Sound, only fragments, the main sources being the backers of the original finders – those who wanted to exploit the finds – and a handful of geologists. Reports by the former tended to be overly optimistic about the marble's good qualities – the crystalline whiteness and high suitability of the white marble for statuary work – whilst playing down potential issues like some of the marble being intruded by other minerals or exhibiting a shattered appearance. Of the geologist's reports, only that by McKay (1882) contains any real detail and only about Locations 2 and 5 (Fig.2).

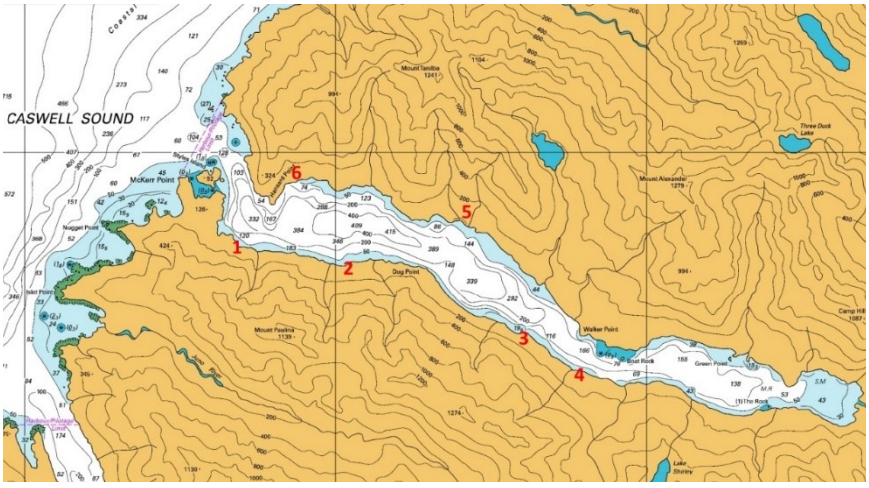


Fig.2. *Marble finds were made on both sides of Caswell Sound as follows: Localities **2**, **5**, **6** found by Turnley and Smith (1878); **2** and **5** reported on by McKay (1882);**1**, **2**, **3**, **4** noted and mapped by Bradshaw in the early 1980s; **6** (cave), also noted by sea-kayakers P. Caffyn and B. Walker (Caffyn 1999). The white marble quarry was at **2**. Map: LINZ Chart NZ 7623 Bligh Sound to Caswell Sound.*

Written material

A selection of extracts covering all locations shown in Fig.2 follows.

1878, 4th November, *New Zealand Times.*

Marble described in this extract is from Locations **2** and **5**. Note that when describing the cave at Location **2**, McKay in fact noted non-calcareous rocks in both walls, in different places.

By the *Maori* which arrived on Saturday from the Sounds, we were shown some splendid samples of marble from Caswell Sound. The white is a pure sychrine, and of a very superior quality to any that has been seen in the colonies. Mr. Munro (of Dunedin) has compared it with statuary marble which has cost as much as £5 per foot in London, and finds that this marble stands better up to the chisel, and is capable of greater relief in fine ornamental work than he has hitherto worked. Mr. Munro left Dunedin by the *Maori* on purpose to visit the quarry, and from his personal observation found that the quantity was unlimited. The reef is about two and a half chains wide, and has been traced to the height of 1500 feet from the water's edge. There is a cave running straight into the marble from the water's edge about two chains deep, showing it all the way on each side. The blue marble is a continuation of the same reef running towards the north side. This is described as being beautifully marked, some of it resembling a tree in full foliage. The Sound is too well known to require any comment. It is landlocked, and is a safe harbour in any weather. The facilities for shipping the marble are exceptionally good. At the edge of the quarry there are fifty fathoms of water, and little or no expense is required for shipping it'.

1879, 14th February, *Otago Daily Times.*

Once again the marble described is from Locations 2 and 5. Such descriptions were used to get people to invest in the second company formed to exploit the marble.

'Mr George Munro, the sculptor, since his return from the West Coast, has had several blocks of Caswell Sound marble, which he brought over with him, cut up and polished. He says he would not wish for a better quality of marble. It takes a fine polish, as may be seen from the specimens at his yards, Moray place. The samples are of the purest white, and a most beautiful dove colour. There are outcroppings of this valuable stone 3000 feet high, and Mr Munro says there would be no difficulty in getting it to market'.

1882, McKay, A: *On the Caswell Sound Marble.*

This extract describes Location 5 (only), intimating possible deformation at Location 6 at the end.

'The rocks forming the western headland of the little bay are of a granitic character. At the eastern end of the stony beach a wooded ridge about 100 feet in height slopes abruptly to the water's edge, and, striking north, abuts against and loses itself in a line of high cliffs which, starting from a point higher up the sound, strikes north-west and west, forming a semi-circular wall of rock at the back of the bay and the flat ground already mentioned. The ridge forming the eastern headland of the little bay is composed of blue or grey marble, showing from the water's edge to its highest point, and from the point where this ridge joins the line of high cliffs the marble is continued to the northwest. The total thickness of the outcrop of calcareous rock may be estimated at 200 feet. The marble rock is sound and free from joints, and apparently could be quarried in blocks of any size required. Lines of stratification are to be detected, showing that the dip is to the south-east and east; and at many places the marble contains masses of granitic rock of varying sizes, while at other places scales of mica and graphite and nests of crystals of iron pyrites occur in the lines of bedding, or are promiscuously

scattered through the body of the marble rock itself. Much of the stone is, however, comparatively free from these impurities, and for those purposes for which it is suitable might be worked at a moderate cost. So far as I examined it, I found that the marble was evenly bedded, and lacked the highly-contorted structure of a blue marble said to occur on the same side of the sound, about two miles inside the heads, but which I had no opportunity of examining, and of which the exact locality had not been discovered when the steamer left.'

1882, 27th January, *Otago Daily Times*

Samples taken back to Wellington by McKay were analysed soon after by Herbert Cox, Hector's 'other' geologist. In just which regard the Caswell Sound white marble was '17%' superior to Carrara marble is not clear but it was repeated by most newspapers of the day. It would be good to find the details of this analysis.

'The *New Zealand Times* states that the stone from the quarries of the Caswell Sound Marble Company has been subjected to analysis at the hands of Mr. S. Herbert Cox, of the Colonial Museum and Laboratory, who has pronounced it superior to the finest Carrara marble by 17 per cent. The supply of stone is practically unlimited, and in Australia alone the demand for it will amount to a very considerable sum per annum'.

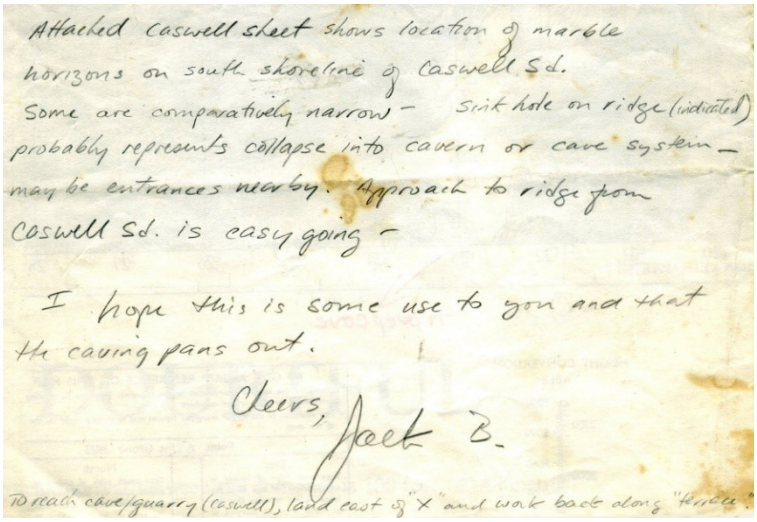
1947, C.O. Hutton, *Contributions to the Mineralogy of New Zealand*, Part 3.

This extract is from one of the very few later articles regarding Caswell Sound Marble. Note that the locations which best fit Hutton's 1½ miles (2.4kms) from Styles Island are locations 1 and 6, which whilst being 'either side of Caswell Sound' are not the former quarry which was at Location 2.

Hutton noted that *phlogopite* 'is not readily seen in the white, sugary, closely jointed marble, although in other localities [*in Fiordland*] the mica forms very conspicuous flecks and distinctive foliae'(p.485).

Early 1980's, J. Y. Bradshaw material

The handwritten note shown in Fig.3 was attached to a photocopy of part of the 1 inch:1 mile topographic map showing Caswell Sound (Fig.4) given by Jack Bradshaw to fellow geologist Paul Caffyn, sometime in the early 1980's when they met in Wanaka. As Paul was interested in the karst potential of the marble, Bradshaw also made note of the small cave at the former white marble quarry. The topographic map marks (X's) the position of four outcrops of marble (Locations 1,2,3,4 in Fig.2) on the southern side of Caswell Sound.


Attached Caswell sheet shows location of marble horizons on south shoreline of Caswell Sd. Some are comparatively narrow – Sink hole on ridge (indicated) probably represents collapse into cavern or cave system – may be entrances nearby. Approach to ridge from Caswell Sd. is easy going –

I hope this is some use to you and that the caving pans out.

Cheers, Jack B.

To reach cave/quarry (Caswell), land east of "X" and walk back along "ridge"

Fig.3. *Jack Bradshaw's hand-written note.*

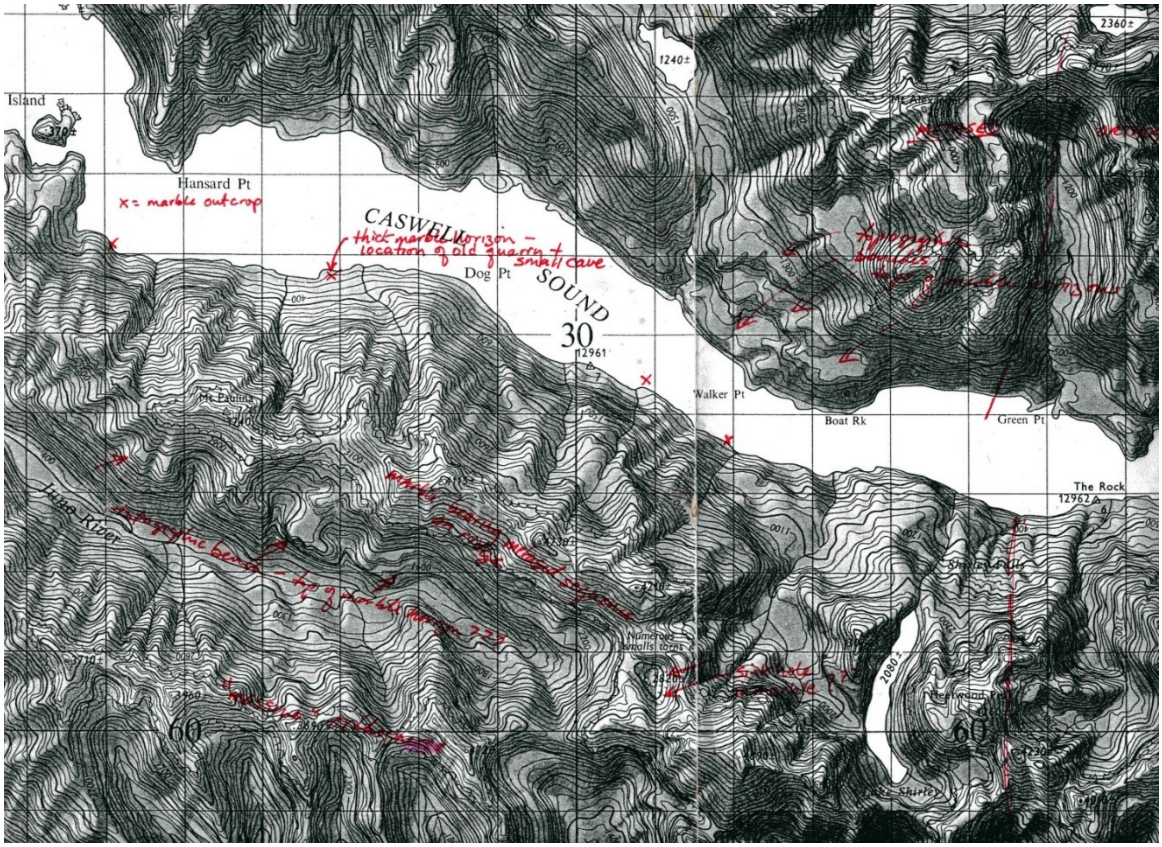


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Fig.4. *Copy of detail of 1inch:1mile topographic map showing Caswell Sound, marble outcrops and notes about marble in red, given to Paul Caffyn by Jack Bradshaw in the early 1980s.*

2022, 6th October, email from P. Caffyn to M. Trayes

In 1999 Paul Caffyn and colleague Bevan Walker came across Turnley and Smith's marble find at a small east–west section of beach on the north side of Caswell about 2 km from Styles Island. Once ashore they found the entrance to a small cave at the back of the beach and began exploring. About 30m in they found a small tomo overhead and a moa skeleton at their feet, its bones calcified into the cave floor. Paul describes the marble as follows:

'The marble outcrop was a big, wide, semi-vertical grey 'seam' steeply dipping east to west, but nice solid grey marble on the 'beach' with a small stream trickling over the marble. Location 6 (Fig.2) I recall is where a stream comes tumbling down onto an east-west section of beach'.

Visual Material

It has been difficult to find photographs, with dates and details, about any aspect of the marble at Caswell Sound. The best field photo is the one taken by a DOC staff member (the cover illustration of this issue) and two hand specimen photos taken by Julia Bradshaw, Canterbury Museum Curator (Figs. 5 and 6). These are probably samples sent to the museum in late 1878 by H. Turnley of the original prospecting party which found the marble as per the extract below. Note however that the labels are very different so one or the other may have been donated at a different time.

‘The following contributions were received by the Canterbury Museum during the quarter ending December 31st, 1878:—
…….. Mr. H. Turnley, Hokitika—Specimens of marble, copper ore, and other rocks from Caswell Sound, West Coast of Otago.’

Fig.5. *White or ‘statuary’ marble from quarry on the south side of Caswell Sound. (Photo: Canterbury Museum F1/5)*

Fig.6. *‘Dove’ (blue-grey) marble probably from one of two locations on the north side of Caswell Sound. (Photo: Canterbury Museum F1/9).*

The Quarry Story

First find

Prior to the 1878 discovery of marble at Caswell Sound, the earliest mention found of marble anywhere on the West Coast of the South Island is in the last sentence of a short report in the *Nelson Examiner and New Zealand Chronicle* of 21/1/1843:

‘Captain Anglin (*sic;Anglem*) reports that there is very fine white marble in the neighbourhood of the spot where the accident occurred, but, for some reason, is unwilling to give any precise information whereabouts it was.’

The accident referred to is dealt with in Julia Bradshaw’s 2021 paper on pounamu speculation in 1840s New Zealand, having occurred when Anglem and party had tried to blast a large pounamu boulder into smaller pieces for transporting back to their ship at Anita Bay. Between the limited historical information available and the aid of recent pounamu hunters, Bradshaw concluded that the accident (and by corollary, the ‘very fine white marble find’) probably occurred at Barn Bay (South Westland).

The only carbonate rock anywhere near there is a thin band of creamy white limestone (Awarua Limestone) and a wider band of grey indurated limestone (part of the Jackson Formation), both accessible just upriver of the Hope River estuary (which enters the sea at the south end of Barn Bay), so a fair assumption is that Anglem was referring to the former, as was suggested by Grapes and Nolden (2021).

However, in view of Anglem's 'hedging' about the exact whereabouts of his finds, and later reports of white marble being found on beaches at both Anita Bay (entrance to Milford Sound) and Transit Beach (next beach south), the writer thinks it more likely that the pounamu hunters were referring to Anita Bay where their ship was moored.

Whichever, no record has been found either recently or in the past about attempts to utilise Awarua Limestone anywhere between Jackson Head and Martins Bay compared with the two recorded for Fiordland marble, one at Caswell Sound, and the other at Dusky Sound.

It should be mentioned here that Bradshaw (*op.cit*.) noted (p.186) that it was not uncommon for 19th century speculators to obfuscate about what they were up to, and where, in order to give themselves a commercial edge and keep would be competitors away. In fact, this is just what the finders of the marble at Caswell Sound did in 1878 in order to give themselves time to file an application for a prospecting licence, a process which could – and did – take weeks at the time.

Subsequent finds

The early 1840's attempt to exploit West Coast pounamu was in many ways a venture ahead of its time, one entirely plied by sea without modern communications – ships were still under sail, there were no regular shipping schedules, no telegraph or radio, no roads, no homing pigeons. However, forty years later, despite the town of Dunedin being established and technological advances such as Bluff and Hokitika being linked to the telegraph system from the mid 1860's, and the advent of steam for shipping, Caswell Sound was still very remote. Of those advances, the one which was of most use for those seeking to find commercially useful resources in the Sounds area was the start in late 1874 of a regular steamer service, using the *SS Maori*, which ran south about between Port Chalmers (Dunedin) and the West Coast, calling at all ports, and the Sounds as well by pre-arrangement.

Nevertheless, distances did not change – by sea, Caswell is about 300 km from Bluff and over 400 km from Hokitika – and weather was often stormy, so despite the *SS Maori* being scheduled to take six days from Hokitika to Port Chalmers, it often took longer (*Grey River Argus*, 14/12/1874). But right up until the 1920s when ships began to use radio, the only way they could communicate en-route was to hail another vessel, leave a message 'somewhere', e.g., 'Post Office Rock' at Anita Bay or walk across country as Hector did when the *SS Clio* was holed at Bligh Sound in 1871 (*Otago Daily Times*, 27/2/1871).

Overall, by the 1860s newspaper reports indicate that visits to the Sounds area were increasing, despite a fall-off in sealing trips, because both official and private trips were being commissioned from Westland and Otago in search of both agricultural country and mineral resources. On the Otago

Provincial Government's West Coast Expedition in late 1867, Mr. Wright, the Wakatipu District's Mining Surveyor, found some white crystalline material at Transit Beach (just south of Milford Sound), which turned out to be the same as some marble taken from Anita Bay not long before. The relevant part of the *Otago Daily Times* long report (25/12/1867) mentions that:

'Among his gleanings [*at Transit Beach*], Mr Wright got specimens of hornblendic and felspathic schist, of gneiss, and of what was at first accepted as very crystallised felspar, but which, since experiments have been made in Dunedin, has proved to be limestone or marble. It is the same as some pieces of stone which were recently brought round from the West Coast by the William Miskin* — obtained, I think, in Anita Buy, not far from this beach, and is stated to be a pure marble, with crystals of considerable size; but one or two specimens were got, in which the grain was very fine. It was only found in the shape of shingle, or of small boulders, on the beach.'

[*The *William Miskin* was a screw steamer of 115 tons which did intermittent trade between Dunedin and the West Coast, 1865–67.]

A similar voyage looking for mineral resources was made by the government-chartered *SS Luna*, with Hector aboard in early 1873. This sailed from Wellington to Preservation Inlet via the West Coast to look at coal prospects there and then back to Milford Sound direct. The only mention of marble from this trip was that in the *Otago Witness* (22/2/1873), which reported:

'In Milford Sound, building stone of the most durable and handsome kind can be obtained with great facility - comprising granites, gneiss, and other crystalline rocks. There are also good indications of the existence of a fine quality of white marble, and also mineral lodes which have not yet been properly investigated.'

After scrutinising similar reports it seems it was not until early 1878 that the marble at Caswell Sound was reported as having potential to be commercially viable. The initial finds were made by a team working out of the Jackson Bay Settlement which was under the administration of Duncan Macfarlane, Hokitika businessman and entrepreneur.

Whilst Macfarlane is chiefly remembered today as the man at the helm of the failed *Jackson Bay Settlement* he was also a keen backer of mineral prospecting to the south both overland and by sea, in the hunt for resources with commercial potential. One of these prospecting trips was made in early 1878 by H. Turnley and C. G. Smith, and probably others. Their mode of transport to the Sounds has not been recorded but they were picked up for the return trip by the *SS Maori*. Turnley, who had both goldmining and prospecting experience, had just completed three years working as Macfarlane's clerk, while Smith, originally a Hokitika architect, had undertaken some surveying with Gerhard Mueller, Westland's Chief Surveyor, at Arawata.

The first company

When Turnley and Smith returned to Jackson's Bay in late January with some samples of white and 'dove' (blue – grey) marble and some copper, Macfarlane quickly saw their potential and sent them on to Hokitika where together with a number of local businessmen, including McLean Watt

Jack of Sinclair & Jack, local undertakers, a company was soon set up followed by application to the Otago Waste Lands Land Board for a prospecting licence. By late June this had been granted, with Turnley and Smith then returning to Caswell Sound to obtain further samples.

From late 1878 well into 1879 samples of marble, particularly the white 'statuary' form, were well vaunted around the country, being sent to people in the trade, exhibitions and museums. For example, samples of the white marble were sent to the International Exhibition in Sydney in mid-1879, the accompanying news item in the *Otago Daily Times* (10/4/1879) being a good example of the sort of press the marble was getting throughout 1879 – 80.

'In Dunedin, so far, …numerous applications for space [at *the International Sydney Exhibition*] have already come in…our local sculptors, too, will not be behind-hand, and Messers Munro, Godfrey, and Thomson and Co. will show what can be done with Oamaru stone, and also with some of the West Coast marble.'

The second company

By mid-1879 operational activity was lagging well behind ample promotion and it was not until a new company was formed in mid-1880 that the necessary quarry permits and land leases were finally arranged. From the limited information available it seems that the original Hokitika-based company had insufficient capital to exploit their find, so a new one, the *Caswell Sound Marble and Portland Cement Mining Company* (generally known as the *Caswell Sound Co*.) was floated in Wellington.

However, despite employment of a manager to oversee day to day affairs such as company registration, obtaining the necessary quarry permit and land leases and getting men, plant and supplies down to Caswell Sound, progress in opening up the quarry was slow. It wasn't until 27 October 1881 that the *SS Kennedy*, chartered by the company, left Wellington with more workers and the plant needed to start actual quarrying.

In the meantime, the company relied on bringing out more samples, most of it hewn from stone which had previously fallen from what was to become the quarry face, to keep the venture in the public limelight and ensure that shareholders answered the call when more money was needed to keep it going. To back their promises the company also made regular news reports, usually including a quote from one or more of those who had formed a favourable opinion of the enterprise, like Dunedin monumental mason George Munro, and James Hector and Herbert Cox of the New Zealand Geological Survey, such as that in the Wellington *Evening Post* (25/10/1880) and promoted in all regional newspapers:

'NEW ZEALAND MARBLE.

The prospectus has just been issued (a summary of which will appear in a few days in our advertising columns) of a proposed company for the purpose of working the marble and other mineral deposits at Caswell Sound, New Zealand. There is no doubt that in the development of the mineral wealth of this colony is to be found a very powerful remedy for the depression from which it is at present suffering. The success of such enterprises is therefore a matter which concerns not only the shareholders, but the inhabitants of the colony generally, and

in that belief the new venture now under notice has our best wishes. The statements put forth in the prospectus are certainly unusually promising. Both Dr. Hector, the Government Geologist, and Mr. S. H. Cox, his assistant, speak in high terms of the quality of the marble, which took first prize at the Sydney Exhibition. We are assured also that the deposits are of great extent, and the promoters show their confidence in the undertaking by accepting 800 paid-up shares for their interest in the property. The lowest wholesale quotation for marble is 12s per foot, while the cost of production, with the present rough appliances, is stated to be only 2s per foot. A deep-water harbor close to the works give unusual facilities for shipping the marble, and if the undertaking is only properly managed the result should be the establishment of a very important colonial industry.'

Such quotes seem to have sat well initially with Hector but a year on and no actual quarried material having appeared on the market, the Government directed him to obtain a 'proper' geological report. Hector's response was to send his field geologist, Alexander McKay, down to Caswell on the *Kennedy* on 27th October 1881, tasking him to make as full a report as possible about the extent and quality of the marble. McKay's report was on Hector's desk by the 14th November so he wasted little time writing it up after the *Kennedy's* return to Wellington on 10th November. However, the media wasted even less time, the *New Zealand Times* saying on the 11th that:

'We understand that Mr. McKay of the Geological Department, visited the Sound, and speaks highly of the prospects of the company.'

In fact, McKay's report does not say this at all (see Appendix), instead he presented a detailed as possible report for the two sites he was able to visit - there were time and weather constraints - followed by a guarded conclusion, where all he would say regarding the potential of the 'white' marble quarry, where some of the marble in both the face and the cave had a shattered appearance:

'Nevertheless, there is every prospect that marketable blocks will be produced in quality equal to the sample specimen: but until the quarry is fairly opened out the average size and frequency in which these will be found is but a matter of speculation.'

It is notable here that there had been a similar note of caution about the white marble quarry's prospects nearly three years before which came from a report written by the *Otago Daily Times* 'Special Correspondent' regarding that summer's cruise of the *SS Rotorua* to the West Coast Sounds. This article was published in the *Otago Daily Times* on 9th January 1879, the relevant part saying:

'Rain set in on Friday night, and Saturday morning commenced with a bad outlook. The start was delayed in the hope of finer weather, but rain continued, and we weighed anchor about 9 o'clock and steamed out to sea and on to Caswell Sound, to visit the marble quarries. Here a short halt was made, and the boat launched, but not many faced the driving' rain to view the quarries. The vein is of white marble, about fifty feet thick, running obliquely to the shore, and dipping at an angle of 50 or 60 degrees to the horizon from the shore line. Some of the stone is of good quality, with occasional patches of pink and blue throughout the whole mass. It lies between indurated sandstone rock. The marble is very much broken. Where blocks from three to four feet square have been opened by the quarrymen, they present a very uneven fracture, which will make it difficult to work in large blocks, if such are to be found. The rock is cut up in various directions by intrusive veins of a brown-coloured rock material. These veins are of all thicknesses up to two feet, and running across the bedding

in various directions. The rock, as it shows near the water, although much broken, is not so much affected by the intrusive veins as it is higher up, consequently small blocks of good marble for building purposes may be found.'

Just who the 'Special Correspondent' was, or who might have advised him about geological matters, remains unknown, no passenger list being found for this voyage.

Amongst all the positive spin put on the regular media releases put out by the company in Wellington, most of which were published verbatim in the country's provincial newspapers, there were the odd discerning reporters who looked twice at what was being published and put two and two together coming up with less favourable spin on the (second) company's progress.

For instance, the Shipping columns of the Wellington *Evening Post* for 27/12/1881 noted that four workmen had just returned from Caswell on the Government steamship, the *SS Stella*. The following day, and presumably having made some enquiries, the same paper noted amongst the usual positive spin, that:

'The *Stella* brought back some invalided miners for medical treatment. The weather has been very severe of late in the Sounds, and a good deal of illness has been occasioned thereby.'

The same news items also said that the size of the blocks brought had been limited by the 'lifting power' available. The lack of a suitable-sized crane was still a problem when the quarry was finally closed down in 1886.

Just how much heed was taken of such observations, and the other difficulties of operating a business in a remote place – the slow communications, supply issues, the wet climate, the myriad sandflies – by potential investors has been difficult to ascertain, but it is certain that only some of those who invested in the initial prospecting company went on to take out shares with the second. And in the latter, confidence must have waned by late 1883 after the company failed to charter a ship or find the necessary men to erect imported stone-sawing machinery at Caswell Sound. The alternative was to set up a factory in Wellington and ship the marble there for processing, by which time share calls were beginning to go unanswered by some investors and less favourable comments were beginning to appear in the press such as that in the *Wanganui Herald* (19/2/1884):

'The second annual balance sheet of the Caswell Sound Marble Company discloses some curious facts. The fortunate shareholders have paid in calls £2499 15s. The sale of marble realised — *one pound!* The amount paid as salary (and it is presumed to the secretary) was £208; whilst the wages amounted to *two pounds six shillings and eight pence!* It is, however, but right to state that the marble appears to be of first-class quality; but whilst so much is paid away in salaries, and so little expended in wages, the industry is not, it is to be feared, likely to make much headway'.

To counter such articles, the second company made by regular media releases provided by its Wellington manager, William McLean. Most of these were repeated verbatim in New Zealand's provincial newspapers and having 'positive spin' most readers had no idea until near the end that things were less than publicly portrayed.

Reading of many of these news items today shows clear practice of ‘talking up’ the venture based on the many marble samples brought out which had won praise from experts such as stone masons and government geologists or done well at major exhibitions, and ‘playing down’ problems such as worker retention, shipping reliability, slow communications and the wet climate.

McLean continued to work hard on the company’s behalf throughout 1884 including purchase of further key equipment including a new Ingersoll rock drill and contracting a man experienced in marble quarrying, James Meldon from Vermont, USA, to take over management of the operation at Caswell Sound. In October he also paid a visit to the quarry on one of the regular visits there by the Government steamer, the *SS Stella*. Upon his return the *Evening Post* (18/10/1884) noted that ‘Mr McLean reports that the works are progressing satisfactorily’. But were they?

In March 1885 the small steamer *SS Napier*, which had been contracted by the Government the previous November to run a shipping service between Karamea and Caswell Sound, calling at all ports in-between, was weather-bound at Caswell Sound for seven days (WCT, 13/3/1885). The following month the *SS Stella* paid another of her regular visits to the Sound, taking away workers whose contract time was up. The *Grey River Argus* (14/4/1885) pulled no punches the following month when reporting on working conditions at Caswell Sound.

‘Amongst other places visited by the Government steamer Stella while on her trip was Caswell Sound. The majority of those who had been there had left, the time for which they engaged having expired, and only three now remain altogether. It is said not to be a desirable place to reside in. "The rain it raineth every day" is the only expression that in brief phraseology can adequately describe the humidity of the climate. Then it is the home of the irrepressible and insatiable insectivorous bloodsucker, and they are so persistent in resisting the encroachment of any intruder that life is made absolutely intolerable. That is why it is so difficult to get people to remain there’.

Fig.7. *This photograph was taken from the far (eastern end) of Caswell Sound (another not shown here shows this more clearly) by Greymouth photographer James Ring, who visited briefly on a service trip made by the SS Grafton in September 1884. It was clearly cold there at the time with snow on the tops. (Photo: J. Ring, History House, Greymouth).*

Quarry demise

Back in Wellington questions were being asked as well and by June the Company had elected one of their directors, J.D. Baird, and also Wellington City Council's engineer, to go down to Caswell on the *SS Stella's* June visit to see what was going on. Once again, the *Grey River Argus* (3/7/1885) was first with the news, the *Stella* having called there on the return trip north to Wellington. As part of their daily editorial the newspaper said:

'The Caswell Sound Marble Company, from which such great things were expected, may practically be considered among, the things that were. The sand flies and the kiwis have it all to themselves now. Not a soul is left at the marble quarries. The Government steamer Stella took away the last of them the other day to Wellington. Amongst the passengers by the Stella, when she called here on Wednesday last, was Mr. Blair, formerly Provincial Engineer for Wellington and more recently engineer for the corporation of Wellington. He visited the Caswell Sound marble quarries in his capacity as one of the directors of the company, in order to discontinue operations and bring the people away. It appears that the cause of this unexpected collapse is that the marble is too much shattered to pay for quarrying. The quality is unexceptionable, and superior to a great many varieties of marble, but it is a very difficult matter to get a sound block of any great size. It appears that by means of terrestrial force subsequently to the laying down of these beds of marble they have been shattered to such an extent as to almost destroy the, marketable value of a commodity which otherwise is in such plenteous store as to be equal to the wants of the whole world. The *Stella* took a few sample blocks with her to Wellington. It is not so very long ago that the company sent to the United States of America for an expert in marble quarrying, and obtained one from the state of Vermont; who was brought up to the business, and it is understood that it is mainly upon his report that operations have been discontinued at Caswell Sound. Whether they will be resumed again, or, if, so, when, is at present very doubtful; but it is quite possible that a section of the field may yet be discovered where the eruptive or other terrestrial agency that has so splintered the Caswell Sound quarry has not been felt so acutely as where the company selected as a site for their quarry. Indeed, it might have been worthwhile to have organised a prospecting expedition in order to discover whether marble beds of a less shattered character could be found. Of course, it is quite possible the company may decide upon doing so yet before finally abandoning an enterprise which at one time seemed so full of promise.'

There are a few misnomers here – in fact when Blair went down to see what was happening and decided to shut things down and bring the remaining men back, Meldon, the American quarry manager, was so annoyed that he took the company to court over contractual issues. Once that was sorted, he was then the first to put his hand up to return to Caswell when the Company finally decided to give things another go in January 1886.

More interesting are the reporter's efforts at explaining why the marble was shattered – the 'terrestrial force' bit – and the wholly sensible notion that more effort should have been put into prospecting for a better quality of marble in the area before giving up. In fact, McKay said that the blue-grey marble he had seen on the north side was better – not shattered that he could see - and there was more of it, as well as better areas nearby for accommodation and machinery.

It is unclear from the information found post-Blair's decision, whether further prospecting was discussed as part of the agreement to return to Caswell early the next year. That decision was based on an estimate that it would only take a further 1000 pounds to get the venture back up and running, but

when the *Stella* dropped off three company directors, McLean, their manager plus Meldon and nine workmen, they soon realised that far more capital than they had was needed make the quarry a paying enterprise. After two days, and the retrieval of further assets from the area, they came away again, this time for good. By the end of the year the company had been wound up and creditors paid out. Only company manager, William McLean, retained any enthusiasm for further quarrying but his attempts to gain overseas capital had come to nought by the end of 1887.

By 1900 the only thing being heard in the papers were occasional re-hacks about the great quality of the white marble or prizes which samples had won in various exhibitions and the odd account about a visit to the former quarry as part of a summer boating trip to the West Coast Sounds. It was not until after World War II, when Caswell Sound became part of Fiordland National Park and scientists of all kinds got into some really in-depth research, that the site was once again re-visited. As a result, there are two very good *New Zealand Archaeological Association* (NZAA) site reports for the former Caswell Sound Marble Quarry and a plethora of reports about the geology of the area, some of which don't fit well with the locations of the marble given so far, as will be discussed in Part II.

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Appendix

1882. Alexander McKay, in Reports of Geological Explorations during 1881

ON THE CASWELL SOUND MARBLE.

REPORT BY MR. ALEXANDER M'KAY.

14th November, 1881.

During the three days that the "Kennedy" remained in Caswell Sound, from the 30th October to the 3rd November, the weather was so stormy and wet that only the most urgent examinations could be undertaken. Anchor was first dropped on the north shore of the sound, nearly opposite Dog Point, where a slight indentation having a stony beach, backed by a few acres of flat ground, is bounded by rocky bluffs on either hand. During the afternoon the steamer was shifted to the south side of the sound, so that the two hours she remained here was the only chance I had of examining the rocks on the northern side.

The rocks forming the western headland of the little bay are of a granitic character. At the eastern end of the stony beach a wooded ridge about 100 feet in height slopes abruptly to the water's edge, and, striking north, abuts against and loses itself in a line of high cliffs which, starting from a point higher up the sound, strikes north-west and west, forming a semicircular wall of rock at the back of the bay and the flat ground already mentioned. The ridge forming the eastern headland of the little bay is composed of blue or grey marble, showing from the water's edge to its highest point, and from the point where this ridge joins the line of high cliffs the marble is continued to the north-west. The total thickness of the outcrop of calcareous rock may be estimated at 200 feet. The marble rock is sound and free from joints, and apparently could be quarried in blocks of any size required. Lines of stratification are to be detected, showing that the dip is to the south-east and east; and at many places the marble contains masses of granitic rock of varying sizes, while at other places scales of mica and graphite and nests of crystals of iron pyrites occur in the lines of bedding, or are promiscuously scattered through the body of the marble rock itself. Much of the stone is, however, comparatively free from these impurities, and for those purposes for which it is suitable might be worked at a moderate cost. So far as I examined it I found that the marble was evenly bedded, and lacked the highly-contorted structure of a

blue marble said to occur on the same side of the sound, about two miles inside the heads, but which I had no opportunity of examining, and of which the exact locality had not been discovered when the steamer left.

The white statuary marble, towards the development of which the chief energies of the company are directed, shows at the water's edge on the south side of the sound, about one mile west of Dog Point. The total thickness of the deposit at this point is from 45 to 50 feet. The stratum strikes from the shore of the sound in a south-east direction, and dips to the south-west at an angle of about 45°, in which direction the calcareous rocks are overlaid by a dark-grey granitic rock, from which veins varying from 6 to 18 inches are projected in an irregular manner into the upper portion of the marble. These veins and other isolated enclosures of similar rock somewhat mar the look of this part of the quarry; but, as far as external appearances go, this upper portion will yield larger blocks of stone than the central part of the quarry. Several blocks derived from this upper part of the deposit lie near the water's edge at the foot of the steep slope formed by the marble outcrop. These might measure 3 ft. x 2 ft. x 2 ft., and considerably larger blocks could be obtained *in sitû*, but only by the production of a considerable amount of smaller blocks and rubbly material. The marble in this upper portion of the quarry may be from 8 to 10 feet in thickness.

The middle portion of the quarry, some 20 to 25 feet in thickness, presents externally a very shattered appearance, and the bands of stone in it are undoubtedly much jointed. I believe, however, that on the removal of the surface stone many of the joints and fissures will disappear, as clearly a great number of these are due to accidental fractures rendered more evident by the powerfully solvent waters escaping from the forest-covered slopes at a higher level. In the lower portion of the quarry there is a thickness of from 10 to 12 feet of a sounder description of stone, from which the largest blocks and perhaps the finest description of marble will be obtained. Near the base of the deposit the stone is of a bluish tinge, and includes fragments of granitic rock, and from its position cannot be so conveniently worked as the upper and middle portions, unless, indeed, the whole body of stone be removed.

Along the junction of the marble with the underlying granitic rocks a nearly circular recess bounded by vertical rocky walls recedes from the shore-line a distance of about 20 feet. The bottom of this is filled with blocks of marble and other rocks from the cliffs overhead. In the face of this cliff is the entrance to a cave which has a single gallery, 8 to 10 feet wide and 12 to 14 feet high, running along the strike of the marble stratum, or in a south-east direction, for a distance of 200 feet. In the pile of *débris* lying in front, and partly choking the entrance to the cave, are

several blocks of marble, the largest of which is about 5 feet in length, 3 feet 6 inches in breadth, and from 2 feet to 2 feet 6 inches in thickness. From one of the smaller of these blocks was obtained a specimen 18 in. x 14 in. x 7 in., which I brought with me. At its entrance the cave lies within the marble deposit; but some 40 feet from the entrance the underlying granitic rocks appear in the north-eastern wall. Farther on these shortly disappear, and for the remainder of the distance the cave lies wholly within the marble itself. Inside the cave much of the stone overhead and in the higher part of the cave-walls has a shattered appearance; but underfoot, where smoothed by the action of the underground stream which at several places still flows along the bottom of the cave, the marble looks sound, and apparently could be raised in blocks of considerable size.

Along the south-western wall of the cave enclosures of non-calcareous rocks were observed, which, as in its upper part, are likely to be troublesome in working the quarry.

At the surface the marble can be traced no farther than the brow of the cliff, in which it is seen at the water's edge, and it is therefore in the cave that its extension in a south-east direction is ascertained, although such a direction was indicated by the strike of its junction with both the underlying and overlying rocks.

On the higher part of the range to the south-east, and lying in the line of the marble outcrop should it extend so far, are lofty cliffs of light-coloured rock which may possibly be marble, the exact nature of which the boisterous weather prevented my ascertaining. I could only endeavour to judge of this by examining the materials brought down from the same line by a mountain stream falling into the sound a quarter of a mile above the quarry, but found nothing but an occasional block of highly-contorted blue marble; nevertheless I doubt not but that the white marble will be traced for a considerable distance south-east in the direction of its strike, as observed at its exposure on the shore of the sound and in the cave excavated along its course in that direction.

In the foregoing report I have given the facts observed as favourable a colouring as in my opinion they will bear. Having no experience in the working of such deposits as those forming the subject of this report, my opinion as an expert can apply only to the geological conditions under which the marble occurs, and, therefore, with reference to the more special subject, namely, the prospects of the deposit being worked profitably as a marble quarry, I have only described things as seen at the surface, or drawn such inferences as were fairly deducible from the facts themselves; and, beyond what is already stated, I do not consider it to be within my province to indicate what in the future the company's prospects may be: yet I would here state that, in working the white quarry, there can be no doubt but that a large amount of rubble and small blocks will be produced, and it is also

certain that the larger blocks are liable to contain coloured patches and enclosures of non-calcareous rocks of varying size, so that much care will have to be exercised in trying to avoid these defects. Nevertheless there is every prospect that marketable blocks will be produced in quality equal to the sample specimen; but until the quarry is fairly opened out the average size and frequency in which these will be found is but a matter of speculation.

Aotea stone from Makawhio River, and notes on Westland pounamu

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In the ethnologist Elsdon Best's book on stone implements of the Maori, he mentions under the heading "Aotea" that the historian and journalist James Cowan informed him,

'...that the Ngati-Mahaki Maoris, of the Jacob's River district (south Westland), apply the name aotea to malachite, which is found in Makawhio Creek, south of Bruce Bay, about two hundred miles south of Hokitika (Fig.1). These natives are still stone-workers to a limited extent, and fashion pendants of the above material. Toki (adzes) were made of this stone in former times.'(Best 1912; 1974 reprint, p.39).

The origin of this statement appears to be an article in the Otago Witness of 21st March 1906, entitled 'Overland from Westland, via Haast Pass. Mr. T. E. Donne's trip. An interesting expedition'. Thomas Edward Donne was the superintendent of the New Zealand Government Tourist Department and was accompanied by J. Cowan and J. McDonald, also in the same department. The relevant section in the article is quoted below.

'A REMOTE MAORI COMMUNITY.

Far down the West Coast Mr. Donne and his fellow travellers found a little Maori hapu, the Ngati-Mahaki section of the Ngaitahu tribe — the most remote and isolated Native community in New Zealand. This was on the banks of the Maka-whio, ("River of the Blue Mountain Duck"), a short distance north of Bruce Bay. The Maoris, who only number some 20 or 30 in all were much surprised at being greeted in their own tongue by Mr Donne and his fellow pakehas, for the Maori language is not much cultivated by the white men of the Coast. The principal man of the village is old Hakopa (Jacob) Kapo, who was born at Taumutu, in Canterbury, and is related to the Taiaroa family, of Otago Heads. These people were once expert in the manufacture of greenstone weapons and ornaments, but nowadays their pursuits are pretty well identical with those of their pakeha neighbours, and they live in weatherboard cottages. In the bed of the Makawhio (also known as Jacob's River), near here, specimens of a pretty malachite stone (called "Aotea" by the Natives) are often found.'

In the descriptive and historical account of the New Zealand International Exhibition of Arts and Industries held in Christchurch in 1906-7 (Cowan 1910) is stated that 'a particularly rare and beautiful specimen shown was amazonite, a stone of a remarkable deep sea-green from Jacob's River, in south Westland' (p.213).

Malachite is bright green-coloured hydrated copper carbonate [$Cu_2(CO_3)(OH)_2$], is relatively soft with a Mohs hardness of 3.5-4 on a scale of 10, and is not found in the Makawhio River. Amazonite, with a hardness of 6-6.5 is green or bluish-green coloured alkali feldspar (microcline; $KAlSi_3O_8$) – the colouration due to the presence of trace amounts of Pb and /or Fe^{3+} and in Westland has been found as float derived from granite but not in the Makawhio River[1]. Cowan and the newspaper article have confused the green colour of malachite and amazonite with that of the emerald-green chrome-bearing muscovite (known as fuchsite), which commonly occurs with blue kyanite in river cobbles. This is the stone called *aotea* utilised by the Ngati-Mahaki people, that today has become a thriving jewelry business on the West Coast (Fig.2).

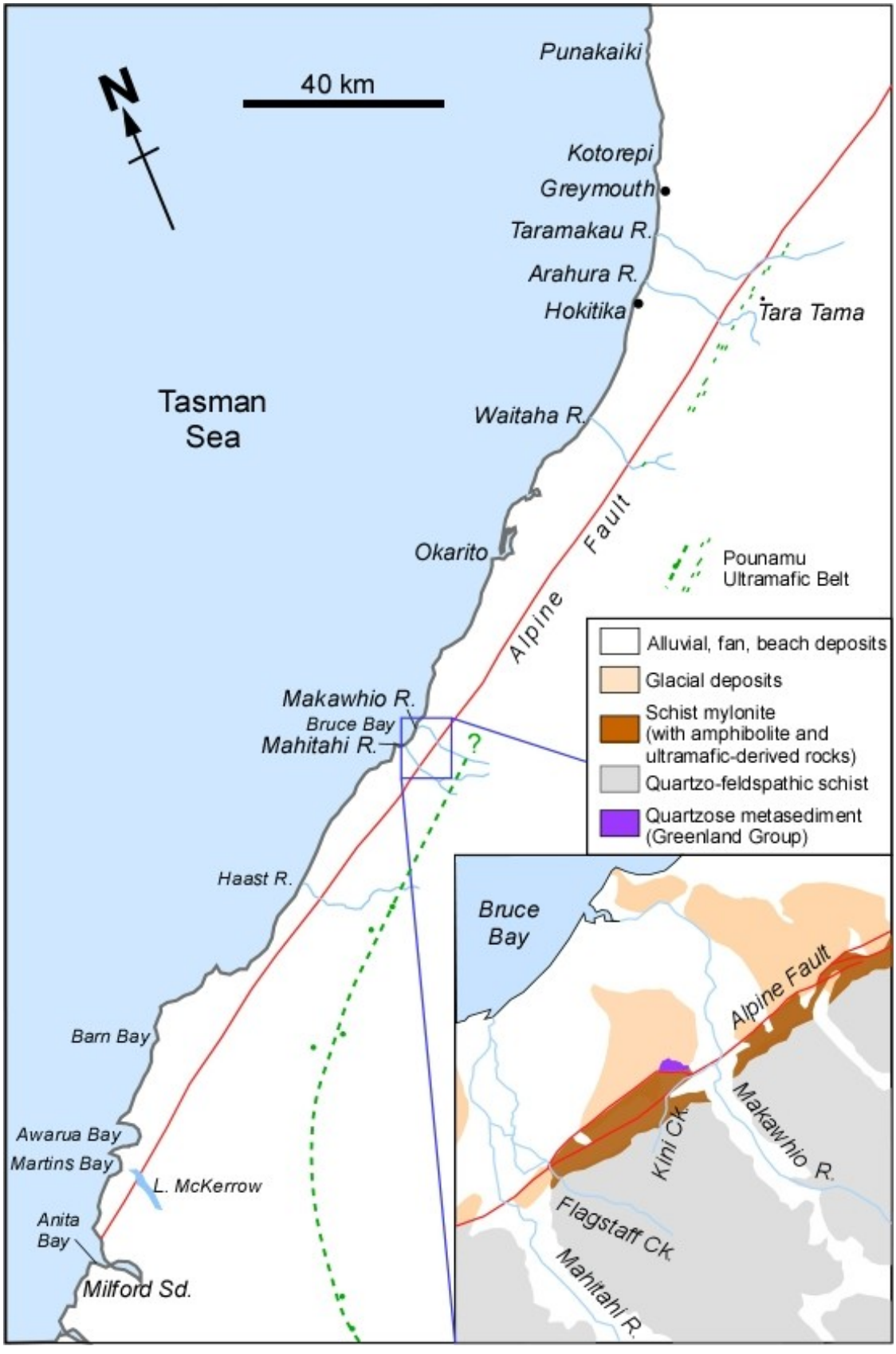


Fig.1. *Map of West Coast showing locations of names described in the text. Inset map showing geology of area defined by* ***blue square*** *simplified from Rattenbury et al.(2010).* ***Dashed green line*** *southern extension of Pounamu Ultramafic Belt from Cooper (1976).*

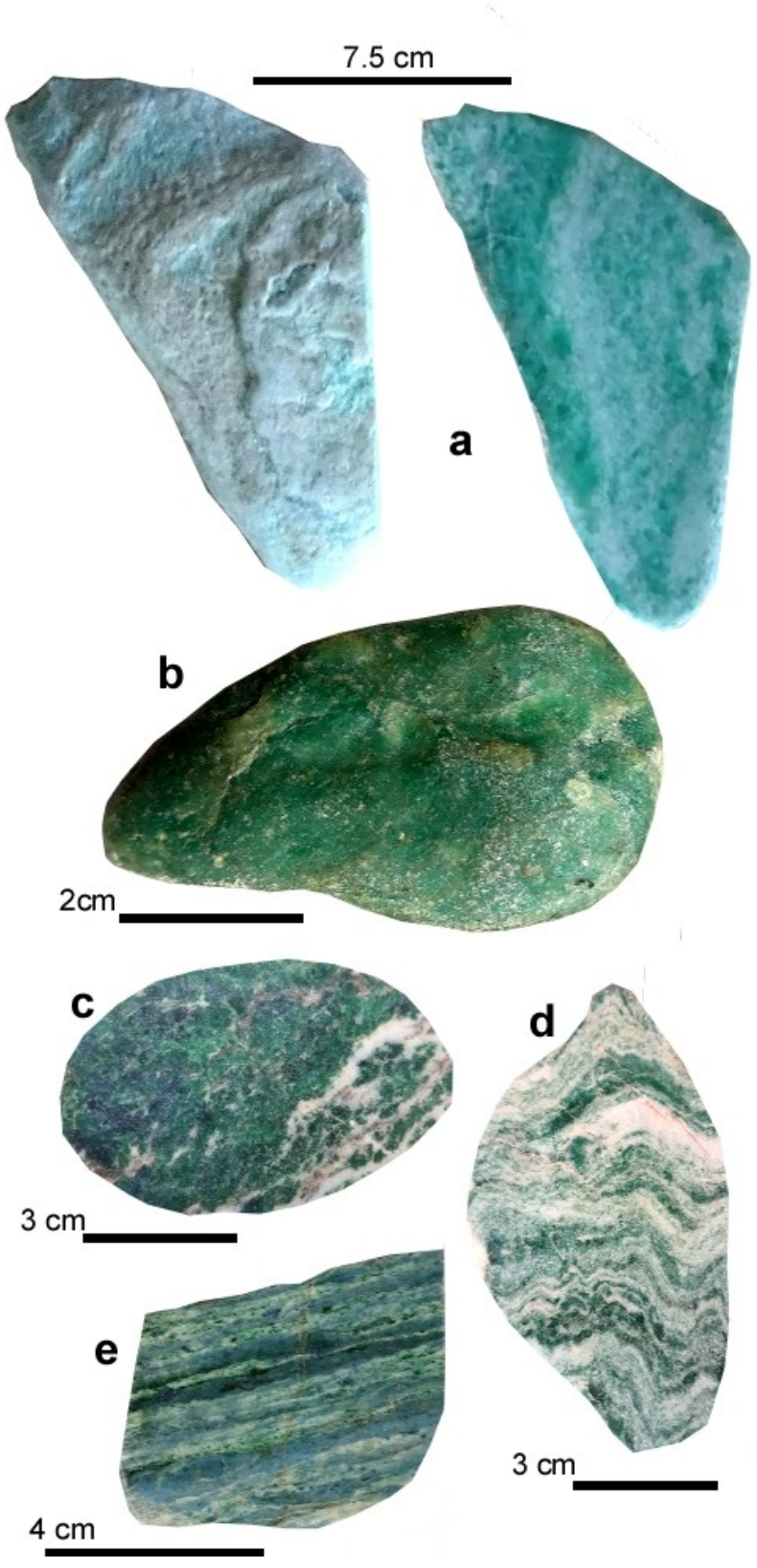


Fig.2. *Examples of 'aotea' stone cobbles.* ***a****. Sectioned cobble (Photo: Mary Trayers);* ***b****.Fuchsite-rich cobble (Kini Creek) (Photo. R. Grapes);* ***c, d, e****. Sectioned and polished cobbles (Kini Creek); blue patches and layers = kyanite; white areas = quartz (Photos: R. Grapes).*

The fuchsite-(and kyanite) bearing rocks have been traced to an in-situ source in the upper reaches of Kini Creek that drains into the Makawhio River where they occur as interlayers with amphibolite in quartzo-feldspathic mylonite schist developed along the eastern side of the Alpine Fault (McClintock and Cooper 2003), (Inset in Fig.1).

The rock is a variety of kyanite-plagioclase schist as classified by McClintock and Cooper (2003), distinguished by bright bluish-green to green bands; the diffuse green (fuchsite-dominated) and blue (kyanite-dominated) horizons intercalated with white quartz/plagioclase on a millimetre-scale. As yet, although no actual outcrop of this particular rock variety has been found, McClintock and Cooper describe float boulders in Kini Creek where this lithology is shown interlayered with the kyanite amphibolite exposed as in-situ stream outcrop. Mineral components of the 'kyanite-plagioclase' samples examined by McClintock and Cooper are: quartz – plagioclase - chromian muscovite (typically known as *fuchsite*) - kyanite +/- talc +/- scapolite +/- margarite, and specimens I have examined may also contain small amounts of phlogopite and chlorite. The characteristic green colour of the fuchsite, and therefore the important component of *aotea* stone, is due to presence of 0.82 - 0.90% Cr_2O_3; the 'malachite-amazonite-like' samples found in the Makawhio River are thus specimens rich in fuchsite (Fig.2).

The relationship between *aotea* rock and mineral content is illustrated in terms of a three component chemographic diagram, wt.% Al_2O_3 - (CaO + $[Na,K]_2O$) - (Fe,Mn,Mg)O projected from SiO_2 (quartz) in Fig.3. The diagram shows that kyanite, plagioclase and talc form the apices of a composition triangle (*thick orange lines*) that includes margarite, phlogopite, fuchsite, scapolite, phlogopite, chlorite, and the spread of host *aotea* rock compositions.

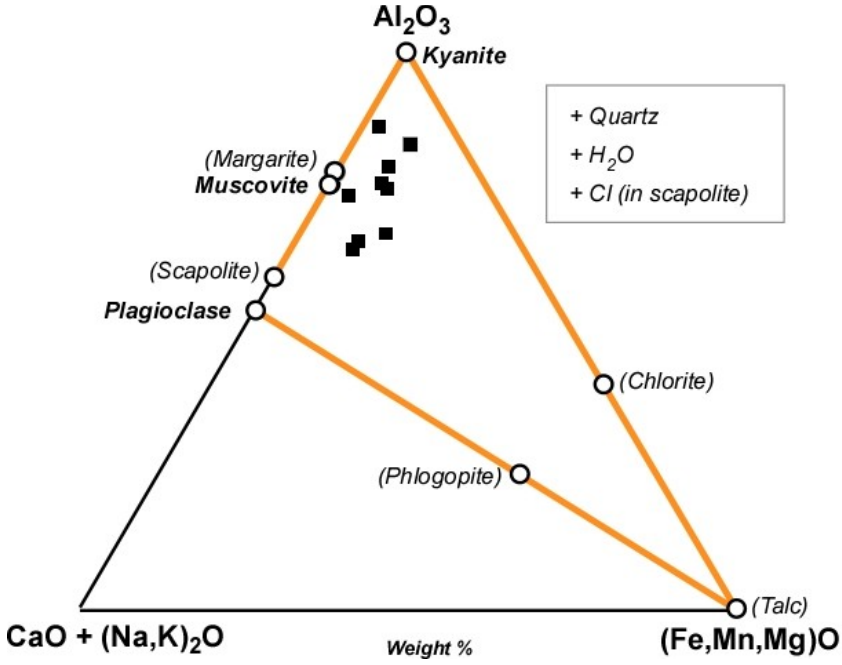


Fig.3. *Wt.% Al_2O_3 – CaO + $(Na,K)_2O$ – (Fe,Mn,Mg)O plot of minerals (**open circles**) and rock compositions (**black squares**) of 'aotea' stone. Bracketed minerals are minor components. Rock compositions are from Table 4 in McClintock and Cooper (2003). Note that compositions cluster near and along the plagioclase-muscovite (fuchsite)-kyanite join of the composition triangle.*

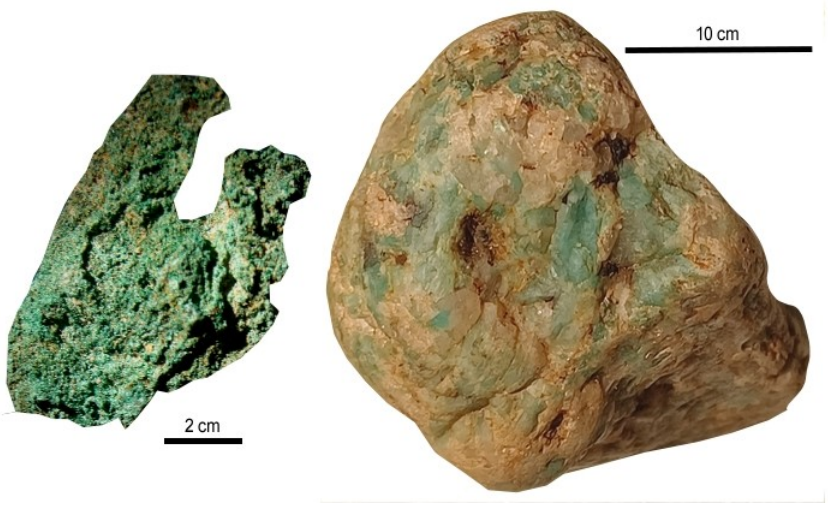
Nephrite is unknown from the Makawhio River, although in the Kini Creek rare float of green tremolite-rich rocks are found. They are characterised in hand specimen by randomly orientated interlocking elongate blades of green tremolite with minor white talc (McClintock and Cooper 2003) and therefore lack the typical fine-grained foliated and felted nephritic texture of tremolite in true nephrite pounamu. However, the fact that Katau te Nahi of the small Makawhio River community exhibited specimens of worked 'greenstone' at the 1906-7 International New Zealand exhibition (Cowan 1910, p.221) suggests the possibility that perhaps some nephrite pounamu may also have been found there.

The historian, William Henry Sherwood Roberts (1834-1917), mentions in an article titled 'Maori nomenclature, interesting information' published in the *Grey River Argus* of June 16, 1908, that 'The Maoris say the "tangiwai" variety of greenstone was found near the Mahitahi River'[2] (Fig.1). Information gathered by the Chief Surveyor of Westland, George John Roberts (1848-1910) in 1897 from four elderly inhabitants at Matawhio River (ms papers of Johannes Carl Andersen; see also Skinner 1912) records the names of localities where pounamu was found; the Arahura riverbed, Milford Sound (on the hillside exposed by a slip), Kotorepi (only one block)[3], Hohonu (loose on the ground), Gorge River (a big boulder; *~9km south of Barn Bay*), and off Tarotawa (*sic. Tara Tama; 1854m*), (Fig.1). The same source also states that pounamu was not generally found at Makawhio but there was one type in the area called Aotea, together with details of how the stone was worked and how the pounamu trade operated in the area. There was no mention of a 'near the Mahitahi River' *tangiwai* occurrence.

Thus, with reference to *aotea* stone, the Reverend James Stack (letter dated 31st July 1881, citing information from the Ngai Tahu chief Hakopa te Ata-o-Tu, at Kaiapoi, in Chapman 1891; p.515) refers to it as 'counterfeit greenstone, opaque; often mistaken when in river beds by the unskillful'. The name *aotea* is not referred to by any of Chapman's other Pakeha sources, John White, Dr. Edward Shortland, Charles Heaphy, Reverend Johann Wohlers, that he cites. The Austrian geologist, Ferdinand von Hochstetter, whom Chapman does not cite, lists as pounamu terms 'aotea or kaotea' and describes this 'variety' as 'light green, milky, with black specks and nodules; is collected on the West Coast near the mouth of the Taramakau River' (Hochstetter 1864; p.471). He has mistakenly equated *aotea* with the *kahotea* variety of pounamu which Reverend Stack defines as 'a dark-green with spots of black through it, rather more opaque than the other varieties' (Chapman 1891; p.33). In addition, Hochstetter groups *aotea* stone with the pale green coloured, milky-cloudy, only slightly translucent varieties of pounamu such as inanga, which he thought reminiscent of agate, chalcedony and other siliceous rocks with greater hardness (6-7) and lacking foliation. Rather than reflecting the colourless to pale green tremolite of the inanga variety of nephrite pounamu, the 'pale green-coloured milky-cloudy' appearance of the non-nephritic, essentially opaque *aotea* stone indicates the presence of green fuchsite with quartz and plagioclase. Hence the label of 'counterfeit greenstone' given by Hakopa te Ata-o-Tu, i.e., *aotea* is not a variety or type of pounamu.

It is interesting to note that in Charles Heaphy's account of his West Coast journey as far south as the Arahura River in 1846 he records that 'Greenstone is also found at Wakatipo, or Milford Haven, towards Dusky Bay, where it exists in the form of a large boulder rock on the beach. Inshore from that place, on a river called Otea, is found the tangiwai, a beautiful green crystal, transparent and

glassy, which also is formed into ear ornaments by the natives. It is apparently a species of axinite'. There are several problems with this passage[4], but there was/is no river called 'Otea'. Paul Madgwick, chairman of Te Runaga o Makaawhio, Hokitika, considers that '…Heaphy is mistaken in his reference to 'Otea' river, and that his Poutini Ngai Tahu informants were actually referring separately to the taonga Aotea, gathered from the Makawhio (Jacobs) River. Heaphy, of course, didn't travel south of Hokitika and so he had only heard of this second-hand, hence his confusion. Brunner did cross the Makawhio on his next journey but leaves no mention of the taonga, which may be because the inhabitants of the local pa at that time were living further south at Arawhata and Whakatipuwaitai (Martins Bay)' (pers. com., 4th September 2022)[5].



[1] ***Left**: Malachite. Gossan in marble, Copperstain Creek, NW Nelson (Photo: R. Grapes).*

***Right:** Green amazonite with 'rusty' quartz from Greenstone River just downstream from confluence with French Creek, Westland (Photo: John Caygill, provided by Mary Trayes).*

[2] The Ngai Tahu Poutini legend of Tama-ahua as related by Hare Hongi* (1896, p.236) says that the tangiwai variety of pounamu is still found in the Mai-tahi (*sic*) River. Further north, the *tangiwai* variety of pounamu is known to occur within discrete elongate pods of serpentine forming a linear belt conformable with enclosing green/greyschist in the southern Alps, and designated as the *Pounamu Ultramafic Belt* (Fig.1). Morgan (1908) records a talc-serpentine outcrop a quarter of a mile east of Jumble Top (1610m), Diedrich Range, where 'on the joint surfaces, which are also movement planes, there are thin flakes of a fairly hard, transparent, green substance, which may be called bowenite (*tangiwai* of the Maoris)". Ireland et al. (1984) mapped the serpentinite pods in the Diedrich Range where the sheared boundary serpentinite may be converted to translucent *tangiwai* with a greasy lustre. Between the southernmost known outcrop of serpentine in the watershed of the Waitaha River there is a c.140 km gap in the NE-SW trend of the Pounamu Ultramafic Belt in central and south Westland until exposures resume just south of the Haast River (Cooper 1976; Fig.1). An unmapped occurrence of serpentine such as that found the Diedrich Range area, and located within the catchment of the Mahitahi River and its tributaries, e.g., Flagstaff Creek that cuts through mylonite schist that supplies the *aotea* stone (Inset in Fig.1), may be the source of the *tangiwai* mentioned by Hongi (1896) and Roberts (1908).

***** Hare Hongi (1859-1925), pen name of Henry Mathew Stowell, Maori-English interpreter and genealogist of European and Maori (Ngapui iwi) descent.

[3] Cowan (1910; p.219) mentions Kotorepi 'a little bay north of Greymouth' as one of the 'famous greenstone-bearing localities in Westland. Here there is a deposit of very hard greenstone, regarded as sacred by the olden Maoris, and the weapons and ornaments made from it were *tapu'*. Locations of pounamu 'blocks and pieces' displayed at the 1906-7 New Zealand International Exhibition included 'Kotorepi (the Nine Mile, north of Greymouth)'. Although the beach is known for the presence of pounamu pebbles (Mary Trayes, pers.com. October 16, 2022) carried north by longshore drift from the Taramakau/Arahura rivers, there is no possible source rock of pounamu in the vicinity, and Cowan's reference to a 'deposit of very hard greenstone' and the weapons and ornaments being made of it is incorrect. The Kotorepi poenamu is designated as 'tapu' as it linked to Poutini Ngai Tahu legends as the place where the leaking Tairea canoe was force to land at Kotorepi for repairs. Having to bail out as the vessel approached shore, the bailings are reputed to have turned into pounamu which is still being washed up on beach as pebbles. Paul Madgwick (cited above, and pers.com October 26, 2022) writes that 'Kororepi is indeed well outside the pounamu zone, except for pebbles washed out of Arahura and carried on the tide as far as Pakiroa (Barrytown Beach). These of course are the pounamu referred to in the Tairea legend, handed down through the generations, including the kaumatua who referenced a block of pounamu at Kotorepi. I would respectively suggest that they were simply recounting the various places where they found the pounamu; perhaps their language or maybe the interpretation (*by Roberts 1908*) was imprecise, as they would have known all too well that only pounamu found there was in pebble form, albeit beautifully tumbled by the sea and all the more precious on account of the location and allusion to the ancient story'.

Nephrite pounamu pebbles from Kotorepi (Nine Mile Creek beach) in the collection of Bruce Annabell (clipped from a photo provided by Mary Trayes).

[4] Heaphy's 'Wakatipo' refers to 'Whakatipu Waitai/Lake McKerrow' that empties into Martins Bay as the Whakatipu Ka Tuka/Hollyford River, north of the entrance to Milford Sound (Fig.1). The large greenstone boulder on the beach was at Barn Bay, north of Milford Sound (Fig.1) as recorded by Dr.

David Monro in 1844: Greenstone '… has principally hitherto been worked in a place called Barn Bay. A block of it, weighing several tons, lay on the beach here…'. The term 'axinite' is incorrect. In Heaphy's time 'axinite' was the name of a specific mineral now represented by the formula $Ca_2Fe^{2+}Al_2BO_3Si_4O_{12}(OH)$ - the name given by the French mineralogist Hauy (1801) derived from the shape of the crystals, which somewhat resembles that of an axe. What Heaphy meant was a variety (*tangiwai*) of *Jade axinien* (Brongniart 1808) or *axestone*, a species of *common nephrite* (Jameson 1816), described as *Neuseelandischer Nephrit* (*New Zealander nephrite*) by Oken (1813) and *Punammustein* (*pounamu stone*) by Blumenbach (1825).

[5] Thomas Brunner (1821-1874), surveyor and explorer, crossed the Makawhio River on November 14th 1847.

Acknowledgements

I would like to especially thank two Westland residents; Mary Trayes, Hokitika, for valuable information and photographs, and Paul Madgwick, chairman of Te Runaga o Makaawhio, Hokitika, for sharing his knowledge of the West Coast Maori and their traditions.

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Adkin, Cotton and the Tararuas

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Charles Cotton (1885–1970)[1] was New Zealand's leading 20th-century exponent of geomorphology, the branch of earth science that deals with landforms. He had a distinguished career, becoming the first lecturer in geology at Victoria University College in 1909 and a full professor in 1921, when he was already earning an international reputation. The landscape around Wellington—by then denuded of forest—provided examples for Cotton's many scientific papers and textbooks.

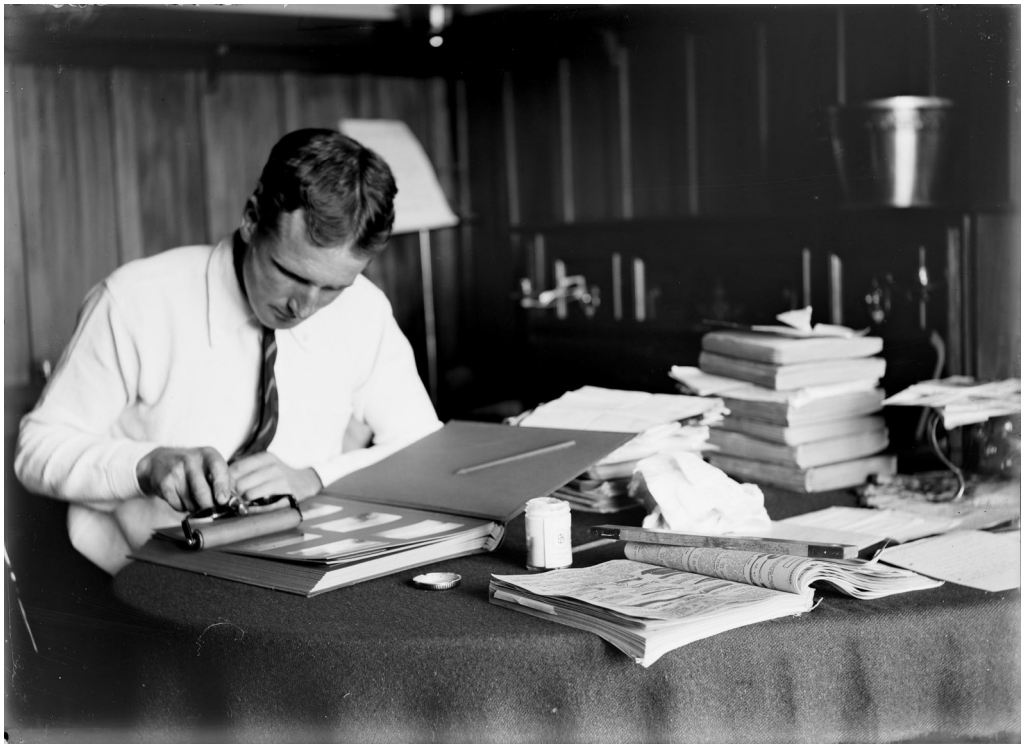
Charles Cotton in 1926. (Alexander Turnbull Library, S.P. Andrew coll. PAColl-3739, ref 1-2-043482F).

Some of Cotton's many publications. His copiously illustrated Geomorphology of New Zealand (1922, at back) became a standard textbook in New Zealand and overseas. After being reprinted seven times, it was revised, enlarged and reissued in 1942 as Geomorphology: An Introduction to the Study of Landforms, at left.

Three years younger than Cotton, Leslie Adkin (1888–1964) grew up near Levin in the shadow of the Tararua ranges. Despite the limitations of having only secondary education and the demands of farm work, he brought to his interpretation of Tararua landforms insight, attention to detail, thoughtful observation and draughtsmanship.

In his spare time during the months after his historic 1911 crossing of the Tararuas with Ernest Lancaster and Harry Thompson, Adkin developed a long paper on geological aspects of the range. That September, he presented extracts to a meeting of the Wellington Philosophical Society, where many (including Cotton) received his ideas with scepticism. His papers on the Ōhau River (1911),

Tararua glaciation (1912) and the Horowhenua coastal plain (1919) appeared in the *Transactions of the New Zealand Institute*[2], but the editor rejected another about the structure and drainage of the Tararuas[3]. Although Adkin touched on this in other papers during the early 1920s[4], it remained otherwise unpublished. Meanwhile, Cotton, working and publishing in the same territory, dismissed Adkin's interpretation as 'extremely doubtful'[5].



Leslie Adkin in 1918. (Museum of NZ Te Papa Tongarewa B022811).

Gentlemanly disagreements[6] between the respected academic and the persevering amateur continued, often with lapses of years between published opinion and counter-opinion. Their most significant difference concerned the topography of the lower North Island ranges, which Cotton explained as the result of 'adjustment to structure'[7]. He said that selective erosion of north-northeast-trending zones of shattered rock had created the main valleys, leaving bands of intact rock to stand out as ridges. But Cotton, 'not noted for arduous foot-slogging'[8], lacked first-hand knowledge of the Tararuas. For him they were but one element in the landscape.

In contrast, for Adkin the ranges were an abiding passion. His ideas about the formation of Tararua ridge and valley systems differed radically from Cotton's. He saw the Tararua–Remutaka range as a 90-mile-long up-fold or 'geanticline', plunging northward to the Manawatū Gorge and southward to Cook Strait. Westward tilting created its highest part in the east, the Pukeamoamo/ Mitre-Holdsworth range, beside which Adkin recognised a major overthrust fault[9].

Adkin proposed that after the greywacke block was worn down to a peneplain, subsidiary folds had developed: a main set trending north-northeast and another at right angles. This formed a grid of growing, intersecting corrugations that controlled the developing drainage pattern. In his view, tectonics rather than the internal structure of the rock mass determined the topography.

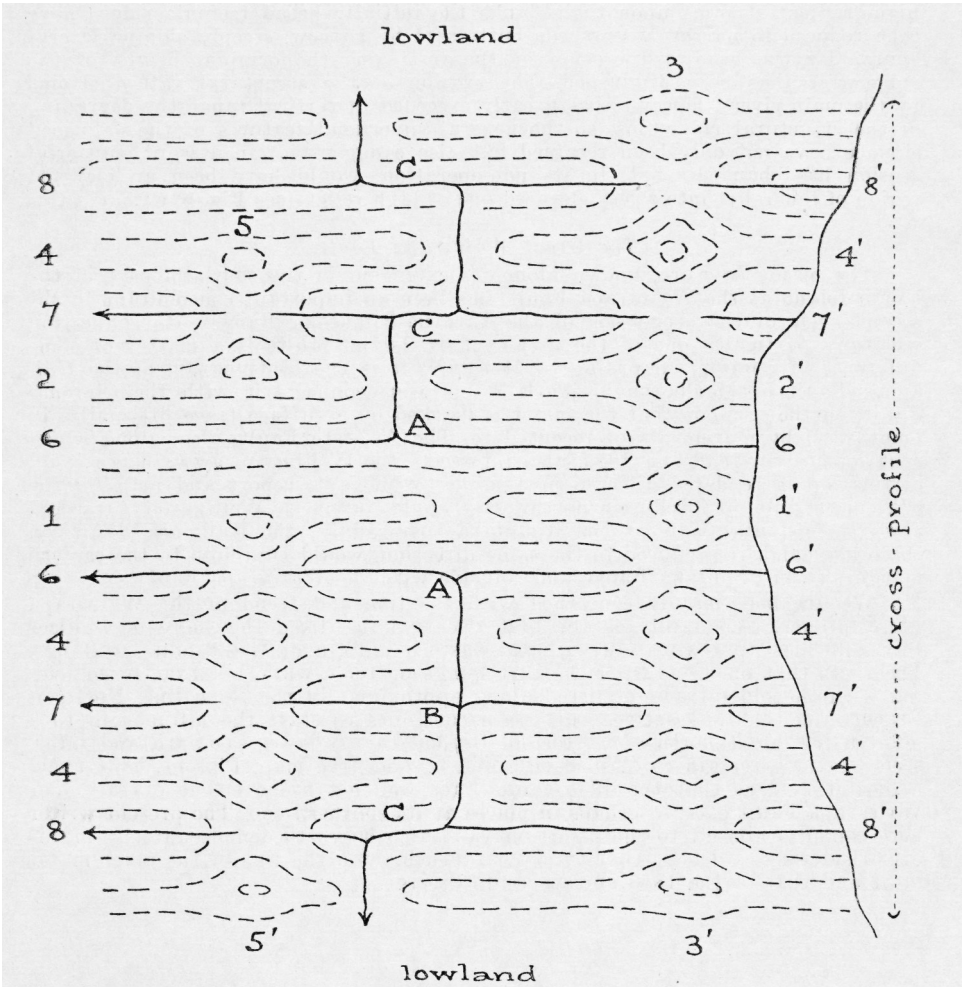
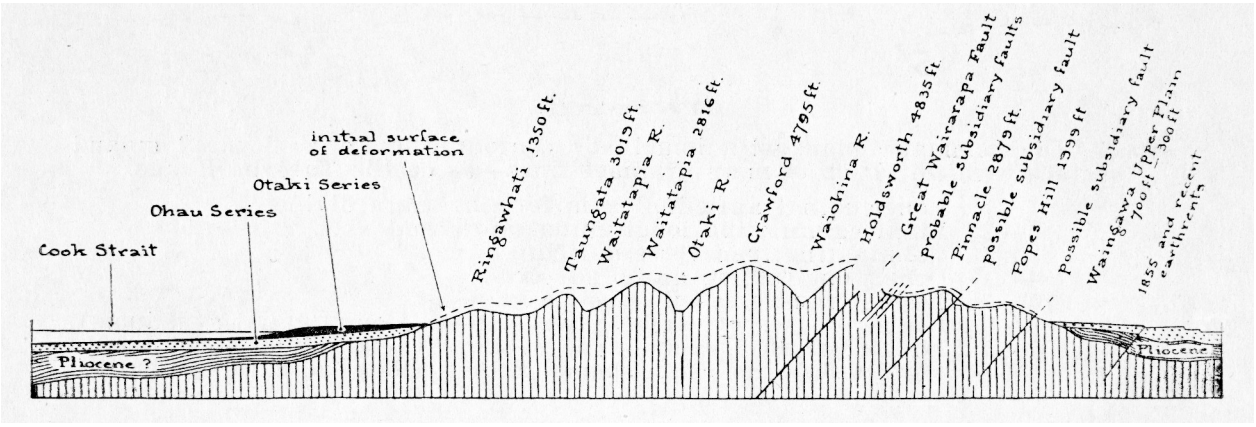


FIG. 4—Diagrammatic plan, with imaginary contour lines, of a flexured upland surface with initiation of main drainage lines—as on the Tararua Range.

1—1′. Longitudinal anticlinal axis forming main divide.
2—2′. Final culminating longitudinal anticlinal axis.
3—3′. Culminating transverse anticlinal axis.
4—4′. Other longitudinal anticlinal axes.
5—5′. Lesser transverse anticlinal axis.
6—6′. Highest series of canoe-shaped valleys (longitudinal synclinals).
7—7′. Middle series of canoe-shaped valleys (longitudinal synclinals).
8—8′. Lowest series of canoe-shaped valleys (longitudinal synclinals).



Figures from Leslie Adkin's 1949 paper 'The Tararua Range as a unit of the geological structure of New Zealand'. Adkin considered that where rivers ran across upward 'transverse flexures' they maintained their courses by down-cutting as the flexures rose, changing 'what would have been an elevated region of low relief, into a less elevated one of high relief'. His cross section of the Tararuas with westward-dipping thrust faults foreshadows modern interpretations (Transactions of the Royal Society of NZ; Alexander Turnbull Library).

At the widest part of the Tararuas Adkin recognised eight longitudinal folds producing the main range, the eastern range and six subsidiary flanking ridges, reducing to a single fold at the Manawatū Gorge. The Waiopehu–Arete–Bannister–Waingawa and Kapakapanui–Hector–Cone ridges, by which trampers can cross the Tararuas dry-shod, represent two of Adkin's transverse folds.

In 1946 Adkin joined the staff of the New Zealand Geological Survey in Wellington. One of his new colleagues, E.O. Macpherson, published an overarching memoir on the country's geological structure[10], including an innovative concept of growing folds[11]. This matched what Adkin had long believed about the Tararuas and encouraged him to present to the 1947 congress of the Royal Society of New Zealand[12] the hypothesis that he had nurtured for decades[13]. What had been beyond the pale in 1911 was now relatively mainstream thinking, and Cotton—again in the audience—admitted that Adkin was right[14].

[1] From 1959 he was Sir Charles Cotton.

[2] Adkin GL 1911. The post-Tertiary geological history of the Ohau River and of the adjacent coastal plain, Horowhenua County, North Island. *Transactions of the New Zealand Institute* 43: 496–520; Adkin GL 1912. The discovery and extent of former glaciation in the Tararua Ranges, North Island, New Zealand. *Transactions of the N.Z. Institute* 44: 308–316; Adkin GL 1919. Further notes on the Horowhenua coastal plain and the associated physiographic features. *Transactions of the New Zealand Institute* 51: 108–118.

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[4] e.g., Adkin GL 1920. Examples of readjustment of drainage on the Tararua western foothills. *Transactions of the New Zealand Institute* 52: 183–191.

[5] Cotton CA 1918. The geomorphology of the coastal district of south-western Wellington. *Transactions of the Royal Society of New Zealand* 50: 212–222.

[6] Concerning the development of the Horowhenua coastal plain and uplift versus subsidence around Porirua Harbour (Brook 2008).

[7] Cotton CA 1912. Notes on Wellington physiography. *Transactions of the New Zealand Institute* 44: 245–65.

[8] Collins BW 1966. Sir Charles Cotton, Doyen of New Zealand Geologists. *Geological Society of New Zealand Newsletter* 20: 14–17.

[9] He called it the 'Great Wairarapa Fault', regarding it as a branch of the Wairarapa Fault that lies east of the range.

[10] Macpherson EO 1946. An outline of Late Cretaceous and Tertiary diastrophism in New Zealand. *D.S.I.R. Memoir* 6: 1–32.

[11] Burton, Peggy: *The New Zealand Geological Survey 1865–1965*. N.Z. D.S.I.R. 1965: 83–84.

[12] Successor to the New Zealand Institute.

[13] Adkin 1949.

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On moa hunters and their tools:

Museum exchange and correspondence of Adolf Bernhard Meyer (Dresden) and Julius von Haast (Christchurch)

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Introduction

The *Museum für Völkerkunde Dresden* holds a fine collection of objects from New Zealand including stone tools chipped from larger rocks, similar to the stone tools found all over the world. Similar stone tools from Europe are dated to the Palaeolithic period. The collection of stone tools, likely used as instruments for cutting, were sent to Dresden in 1881 and 1882 by Julius von Haast (1822-1887), director of the Canterbury Museum in Christchurch. In exchange, Haast received objects from Adolf Bernhard Meyer (1840-1911), director of the Royal Zoological and Anthropological-Ethnographic Museum Dresden, as additions to the collections of the Canterbury Museum.[1]

Today, these stone tools from New Zealand are in storage among the museum collections and not on public display, as they may not appear to be as typically characteristic of Māori culture as the wooden carvings and polished stone objects from more recent periods. Haast, however, recognised the significance to these artefacts. In the 1870s, they were the basis for an at times intense dispute between New Zealand's leading scientists, which had repercussions as far away as Europe. It was about a counter-thesis to the now generally accepted idea of New Zealand's settlement history. The starting point of the debate at the time was the question of who exterminated the moa, a flightless giant bird (Dinornithifornes), and when.

Julius von Haast

Johann Franz Julius Haast was born in Bonn on 1 May 1822.[2] He did not complete formal academic studies at the university there, but did acquire some knowledge of mining and geology. He became interested in rocks and minerals at an early age. Little information has survived about his life in Germany.[3] He travelled extensively and stayed in London for some time. In 1858, the English

1 This paper is a translation by the author of revised and updated research originally published in German. See Christine Schlott, C 2021. Über Moa-Jäger und ihre Werkzeuge. Der Austausch zwischen Adolph Bernhard Meyer (Dresden) und Julius von Haast (Christchurch). *Abhandlungen und Berichte der Staatlichen Ethnographischen Sammlungen Sachsen* 55: 2020, pp.51-69.

2 Julius Haast was not born into the nobility, but was only knighted by the Austrian Emperor in 1875. Since then his name has been Julius von Haast.

3 Compare Rodney Fisher, Sir Julius von Haast. In: James N Bade, ed., *Eine Welt für sich. Deutschsprachige Siedler und Reisende in Neuseeland im neunzehnten Jahrhundert*. Bremen: Edition Temmen, 1998, pp. 195-202. The most important source on the life of Julius von Haast is the biography of his son: Heinrich Ferdinand von Haast. *The Life and Times of Julius von Haast: explorer, geologist, museum builder*. Wellington 1948. Other sources include: Peter B. Maling. 'Haast, Johann Franz Julius von', *Dictionary of New Zealand Biography*, first published in 1990, updated October, 2017. Te Ara - the Encyclopedia of New Zealand,

shipping company Willis Gann & Co. commissioned him to travel to New Zealand to examine the islands with respect to their suitability for the settlement of German immigrants.[4] Haast arrived in Auckland on 21 December 1858 on the ship *Evening Star*, one day before the Austrian frigate *Novara* arrived there.[5] On board the *Novara* was, among others, the geologist Ferdinand Hochstetter, who took leave from the expedition at the request of the New Zealand government and stayed in New Zealand until October 1859 to search for gold, coal, and other mineral resources in both islands. Hochstetter and Haast met shortly after both landed and Hochstetter invited Haast to join him as his assistant and companion for his explorations in New Zealand.[6] During their joint ventures, Haast expanded his geological knowledge so that he was able to undertake further geological expeditions on his own after Hochstetter's departure. In 1861, he was employed by the Canterbury Provincial Government as Provincial Geologist. During the following years, he explored his new surroundings in Canterbury and Westland, in the South Island of New Zealand, and collected fossils, plants and birds. Many places on the South Island bear his name today, such as the Haast Pass, the Haast River and the township of Haast on the west coast. He himself named places after natural scientists or patrons he appreciated, such as the Franz Josef Glacier, after the Austrian Emperor, who rewarded him with a knighthood in 1875.[7]

Learned societies and professional networking

Haast was one of the founders of the Philosophical Institute of Canterbury in Christchurch in 1862, which aimed to encourage the scientifically interested inhabitants of the region to exchange ideas.

Haast carried on an extensive correspondence with scholars in Europe and America. His exchange with his old homeland was extensive. His correspondents in Germany included the Dresden physician, artist, natural philosopher and president of the "Leopoldinisch-Carolinische Akademie der Naturforscher Leopoldina", Carl Gustav Carus and his son Gustav Albert, the ornithologist Otto Finsch, the shipowner Johann Caesar Godeffroy, the Berlin engineer Franz Reuleaux and the Dresden museum director Adolf Bernhard Meyer.[8]

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https://teara.govt.nz/en/biographies/1h1/haast-johann-franz-julius-von (accessed 14 November 2022); Wolfhart Langer. Der Bonner Neuseelandforscher Sir Johann Franz Julius von Haast (1822-1887). In: Bonner Heimat- und Geschichtsverein (ed.): *Bonner Geschichtsblätter*. 39, Bonn 1989, pp. 273–293 as well as https://en.wikipedia.org/wiki/Julius_von_Haast (accessed 14 November 2022). Simon Thode is very critical of Haast and his life in Germany. Among other things, he doubts Haast's aborted geology studies. (See Simon Thode: Bones and words in 1870s New Zealand: the moa-hunter debate through actor networks. In: *The British Journal of the History of Science*, Vol. 42, Issue 02, June 2009, pp. 225-244, p. 230).

4 See: Maling, https://teara.govt.nz/en/biographies/1h1/haast-johann-franz-julius-von (accessed 14 November 2022)

5 The Novara Expedition was a large-scale circumnavigation of the globe by the Austrian navy in 1857-59, prepared by the Imperial Academy of Sciences in Vienna. Its highly regarded scientific results were published in a multi-volume work (20 volumes in total).

6 See Maling, https://teara.govt.nz/en/biographies/1h1/haast-johann-franz-julius-von (accessed 14 November 2022)

7 See Maling, https://teara.govt.nz/en/biographies/1h1/haast-johann-franz-julius-von (accessed 14 November 2022).

8 The inward correspondence of Haast is held in the collections of the Alexander Turnbull Library in Wellington, and the author accessed the archived microfilm copies in the preparation of this paper. See Haast family: Collection, ATL-Group-00475.

With many of his correspondents, he exchanged New Zealand bird skins, fossils (especially bones of extinct birds) rock samples, and plants for similar items from other parts of the world. In this way Haast was able to build up a considerable collection, which was to form the nucleus of the Canterbury Museum founded in 1867. Haast was the founding director and the first dedicated museum building was opened in 1870.[9]

Moa bones

His biggest asset and most valuable currency for exchanges were the moa bones from a swamp at Glenmark Station, generously made available to him by the runholder George Henry Moore (1812-1905) in 1866. Moore had found a large quantity of bones of the extinct giant birds in a swamp on his land at Glenmark Station in Canterbury, known as the Glenmark Swamp, and had granted Haast access to the site and the bones, as well as offering help with the excavation.[10] Haast estimated that the find in the swamp was the bones of about one thousand moa and countless other birds.

Since the first bones of the giant ratite were discovered in New Zealand, there has been a great interest among European and New Zealand scientists to examine them and acquire them for their collections.[11] Like the bird skins of the New Zealand bird population, which had been rapidly decimated by introduced European predators such as rats, cats, weasels, etc., these bones were coveted objects in the international trade.

Moa-hunters and their tools

In New Zealand itself, a heated debate broke out in the 1870s between two different camps about who might have been the first inhabitants of New Zealand and since when the moa had become extinct. This so-called moa hunter debate arose after Julius Haast gave a lecture[12] to the Philosophical Institute of Canterbury in March 1871 in which he argued that the first settlement of New Zealand could be attributed to a Palaeolithic non-Māori indigenous population that had also wiped out the moa. As evidence for his thesis, he used stone tools that had been found at various sites where moa had been dismembered and eaten. These were raw stone chips of quartzite, flint and slate, which were not comparable to the finely polished stone tools used by the Māori in the nineteenth century.

A camp of the so-called Moa hunters with a large number of stone implements was found in 1869 at the mouth of the Rakaia River south of Christchurch. Earth ovens were spread over an area of 20 acres of land [approx. 81,000 m²] and the bones of moa and other animals were piled up into rubbish heaps or middens.[13] Haast referred to this site in his 1871 publication of the above lecture in the *Transactions and Proceedings of the New Zealand Institute* in the same year. He wrote:

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9 See Fisher, 1998, p. 199-201; Thode 2009, p. 230; Maling; https://teara.govt.nz/en/biographies/1h1/haast-johann-franz-julius-von.

10 See Thode 2009, p. 230.

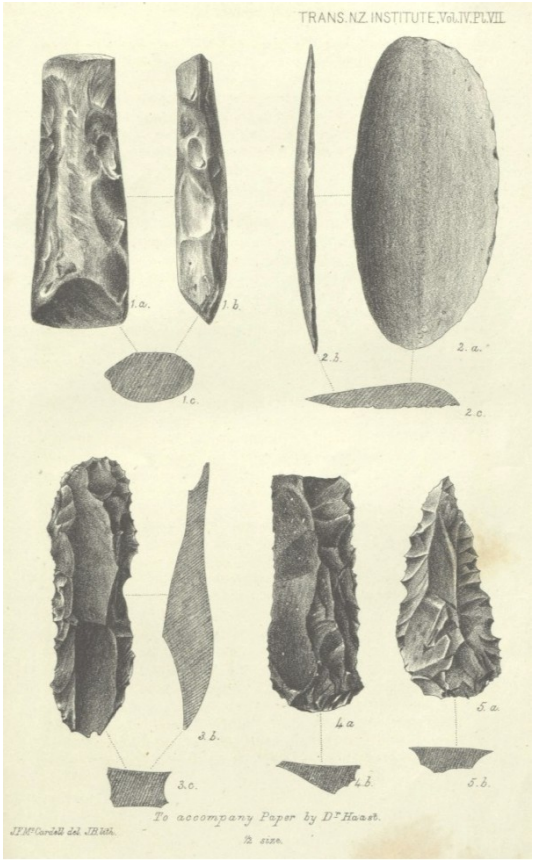
11 The first reconstruction of the possible appearance of the moas from only a few bones was achieved by the physician, biologist and palaeontologist Richard Owen (1804-1892) in the 1840s, curator of the "Hunterian Collection" in the "Royal College of Surgeons", London, and later head of the natural history collection at the British Museum. Owen later initiated the foundation of the Museum of Natural History in London. See https://en.wikipedia.org/wiki/Richard_Owen, (accessed 14 November 2022).

12 The lecture was published in *Transactions and Proceedings of the New Zealand Institute*, 1871, vol. 4, pp. 66-90.

13 See Duff 1977, p. 195.

‘Scattered over the ground an enormous quantity of pieces of flint are strewed, proving that the manufacture of rude knives or flakes must have been carried on upon the spot for a considerable period of time. The most primitive form of stone implement, and of which a great number is found lying all over the ploughed ground, consist of fragments of hard silicious sandstone, broken off apparently with a single blow from large boulders, and for the manufacture of which considerable skill must have been necessary. The boulder was always selected in such a form that if fractured in the right way it would yield a sharp cutting edge. […] These primitive knives are mostly three to four inches long and two to three inches broad, possessing a sharp cutting and sometimes serrated edge; but there are also some of larger dimensions, being six inches long and nearly four inches broad. Some of them have evidently been much used. They were probably employed for cutting up the spoil of the chase, and severing the sinews’.[14]

From the fact that some tools made of obsidian, which only exists on the North Island, were also found in the South Island and that, on the other hand, moa bones of the same kind as on the South Island were also discovered in the North, Haast concluded that the Cook Strait, which separates the two islands, could not have existed at the time of the Moa hunters. Since the makers of the stone knives found would have been at “such a low state of civilisation”[15], they would have been hard pressed to build boats to get from island to island. He wrote:



‘In any case, we may safely conclude that the human races in the southern hemisphere are of far greater antiquity than might appear at first sight, and, instead of migrations, possible and impossible, to explain the peopling and repeopling of New Zealand, geological changes might afford a more satisfactory explanation. If we admit the former existence of land in the Pacific Ocean, either as a continent or large island, where now the boundless ocean rolls, and if we further suppose this land inhabited by *autochthones*, of whom we find remnants all over the island, either still existing or extinct, and only proving their former existence by their works of art, the whole problem is solved. Such an explanation is, moreover, in better accordance with the present state of geological and ethnological science’.[16]

Plate VII (actually Plate IV) showing Maori-implements in Haast (1871).

14 Haast 1871a, vol. 4, p. 82f.
15 Haast 1871b, p. 84.
16 Haast 1871b, p. 84, emphasis in the original.

He compared the stone knives found with the "post-Pliocene"[17] stone tools found in France and other areas of Europe and concluded that the moa was a contemporary of the giant animals of this epoch in the northern hemisphere.[18]

Haast explained the nephrite axes and polished stone tools found at such camps (although these are completely absent from the Rakaia), as used by the Māori as late as the nineteenth century, by the fact that the later immigrants had used the same campsites. Haast concluded that they were not responsible for the extinction of the moa because the giant bird did not appear in Māori mythology:

> Another argument in favour of this supposition, that the *Dinornis* must have become extinct much earlier than we might infer from the occurrence of bones lying amongst the grass, is the fact proved abundantly by careful inquiries, that the Maoris know nothing whatever about these huge birds, although various statements have been made to the contrary, lately repeated in England ...[19]

He referred to the work of the missionary and naturalist William Colenso (1811-1899), who arrived in New Zealand 1834, and had found that, with the exception of a few people, there was little knowledge of the moa among the Māori population.[20]

Haast versus Hector

Haast's opponent in this controversy was James Hector (1834-1907), Director of the New Zealand Geological Survey and head of the New Zealand Institute in Wellington. Hector, a Scot who studied medicine in Edinburgh but also attended lectures in zoology and geology, took part in an expedition to western Canada in 1857. His good reputation after this expedition earned him membership of the Royal Society of Edinburgh and the Royal Geographical Society. In 1861 he was nominated for the post of Director of the Geological Survey of Otago. Hector went ashore in Dunedin in 1862, just as the city was becoming New Zealand's largest due to the discovery of gold in Otago. When Hector was appointed director of New Zealand Geological Survey, he went to Wellington, which became the new capital of New Zealand after Auckland.[21]

Hector and his followers held that the Moa hunters were the ancestors of today's Māori. In the same volume of the *Transactions* in which Haast expounded his theory, Hector published the lecture he had given to the members of the Otago Institute in September 1871.[22] He was convinced that all the objects found at the ancient campsites - bones of moa, dogs and humans, rough and polished stone tools - belonged together. He took the large quantity of eggshells at the camp sites as evidence that

17 Haast 1871b, p. 84.

18 Haast probably meant the Pleistocene, the ice age that followed the Pliocene. The Pliocene began circa 5.3 million years ago and ended circa 2.5 million years ago. Typical representatives of European fauna at this time were mammoths, big cats, rhinoceroses, gazelles, giraffes, etc.
see https://en.wikipedia.org/wiki/Pliocene, (accessed 14 November 2022).

14 However, there were no humans at that time. Homo sapiens did not migrate to Europe until about 40,000 years ago. The Pleistocene began about 2.5 million years ago and ended around 10,000 BCE, with the last ice age. Some of the large mammals of Europe (e.g. the mammoths) had survived until then. (See https://en.wikipedia.org/wiki/Pleistocene, (accessed 14 November 2022).

19 Haast 1871, p. 71.

20 Colenso 1846, pp. 81-107.

21 See Thode 2009, p. 231.

22 Hector 1871, pp. 110-120.

moa eggs must have been a great delicacy, and that excessive consumption of them had caused the bird to die out very quickly.[23]

Haast countered that finding moa bones, eggshells and polished stone tools in the same place was not proof that they were also connected. It could not be proven that the Māori had not visited the same place later. Any similarity between the Māori and Moa hunter camps would only mean that the Moa hunters had come to New Zealand from Polynesia in an earlier wave of immigration and thus had a similar cultural background, but differed in the degree of 'civilisation' they had achieved.[24]

This debate was very heated throughout the 1870s and only ended after Haast's death in 1887. It is not within scope here to discuss the entire debate, which has been well documented and evaluated elsewhere.[25] Rather, the aim here is to show the theoretical background against which the inclusion of the rough-hewn stone tools from the Rakaia estuary and Shag Point[26], another large Moa hunter camp, in the collection of the Dresden Ethnological Museum took place.

Correspondence and exchanges

How the exchange of letters and objects between Julius von Haast and Adolf Bernhard Meyer, the first director of the Royal Zoological and Anthropological-Ethnographic Museum Dresden, came about can unfortunately no longer be completely reconstructed, as the correspondence has not been preserved in its entirety. Some of the letters from Meyer to Haast are held in the Haast family Collection in the Alexander Turnbull Library, in Wellington.[27] Some of Haast's letters to Meyer, on the other hand, are preserved in the "Sächsisches Staatsarchiv Dresden" [State Archive of Saxony in Dresden].[28]

From the letter that Meyer addressed to Haast on 22 June 1880 in response to the latter's letter of April of the same year, which unfortunately is not available, it can be seen that Haast had invited Meyer to enter into scientific exchange with him and had offered him artefacts and other objects from New Zealand. Meyer was expecting a consignment from Haast at the time of his letter, which was to include a preserved *Nestor* parrot and Māori hair samples.[29]

23 Hector 1871, p. 116. A similar conclusion was reached by an international group of researchers who examined moa bones and eggshells with state-of-the-art equipment. See Oskam et al. 2012, pp. 41-48.

24 Haast 1871b, p. 105.

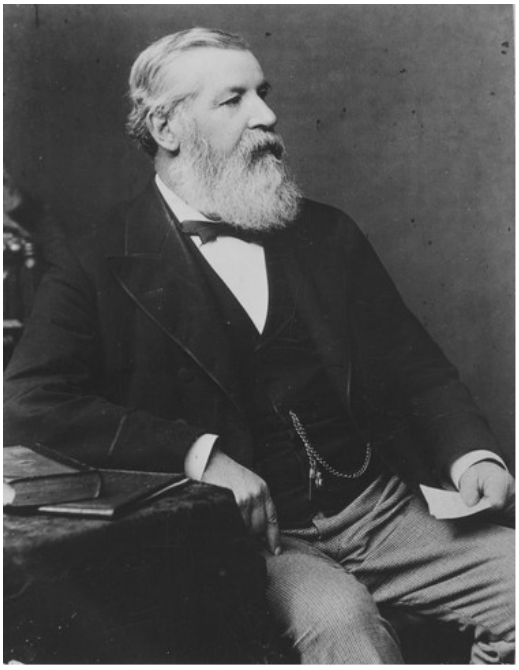
25 See Thode 2009, where further sources for analysing the debate can be found.

26 Shag Point is at the mouth of the Shag River on the southern east coast of the South Island in Otago. Later, a large-scale archaeological excavation was carried out there. The finds made are preserved in the Otago Museum. See Skinner 1924, pp. 11-24; Teviotdale 1924, pp. 1-10.

27 Letters from Meyer to Haast are held in the Alexander Turnbull Library, see: Adolf Bernhard Meyer MS-Papers-0037-201 (See https://tiaki.natlib.govt.nz/#details=ecatalogue.74015).

28 Sächsisches Staatsarchiv, File Senckenberg / Museum für Tierkunde, Nr. 30, Briefwechsel, wissenschaftliche Korrespondenz, 1880-1890, without page reference.

29 A later letter dated 25 January 1881 (see below), in which Meyer thanks him for the hair samples and the *Nestor* parrot (Kaka), shows that he had ordered both.




***Left**: Portrait of Sir Julius von Haast (1822-1887), by Alexander Bassano, London, 1886 (Alexander Turnbull Library, PAColl-5381). **Right**: Portrait of Adolf Bernhard Meyer (1840-1911), photographer unknown. (Archive of the Staatliche Ethnographische Sammlungen Sachsen).*

Meyer wrote:

„Dresden, 22. Juni 1880
Kzool. Mus.
Hochgeehrter Herr College,
freundlichen Dank für Ihre Zeilen vom 23. April & Ihr gütiges Angebot.
Von Neuseeland wären ethnographische Objekte von Nephrit, Knochen etc. sowie alles Ethnographische (Schnitzereien in Holz) & Anthropologische für diese Abteilungen des unter meiner Leitung stehenden Museums sehr erwünscht & findet sich gewiss unter unseren Doubletten (speciell Neu Guinea) manches dagegen für Sie.
Es soll mich herzlich freuen, mit Ihnen in wissenschaftlichen Verkehr zu treten & danke ich für jetzt schon im Voraus für den Nestor meridionalis[30] in Spiritus & für die Maori Haare.
Stets gern zu ihren Diensten bin ich mit ausgezeichneter Hochachtung
Ihr ergebenster
AB Meyer"[31]

[Dresden, 22 June 1880

R[oyal] Zool[ogical] Mus[eum].

Most esteemed Colleague,

Kind thanks for your letter of 23 April and your kind offer.

30 The *Nestor meridionalis* or Kaka is the second surviving Nestor parrot in New Zealand, along with the Kea.
31 MS-Papers-0037-201-01, Alexander Turnbull Library.

From New Zealand, ethnographic objects of nephrite, bone etc. as well as everything ethnographic (carvings in wood) & anthropological for these departments of the museum under my direction, would be very desirable and certainly among our duplicates (especially from New Guinea) some things can be found for you.

It shall give me great pleasure to enter into scientific communication with you & I thank you in anticipation for the *Nestor meridionalis* in alcohol and for the Māori hair.

Always gladly at your service, I remain,

Your most devoted

AB Meyer]

Unfortunately, the corresponding letter of reply is not extant. On 11 October 1880, Meyer wrote another letter to Haast in which he formulated object requests for the Dresden Museum:

„Dresden, 11. Oct. 1880
Kzool. Anthr. & Ethn. Mus.
Verehrtester Herr College,
Ich wage eine kühne Bitte im Interesse unseres jungen Ethnographischen Museums.
Ist es möglich, ein gutes Nephrit Tiki Tiki sowie ein großes Mere von Nephrit & Steinbeile aus demselben Material, sowie ein Stück Rohmaterial von Nephrit (wenn auch klein) zu erhalten?
Mir ist wohl bekannt dass es schon lange schwer hält [sic] *diese Objekte von den Eingeborenen zu erhalten, allein besitzt nicht Ihr Museum Doubletten? Ich bin sicher daß unsere Regierung ein Opfer nicht scheuen würde um diese Objekte zu erwerben & daß sie Ihre Bemühungen daraufhin auch zu schätzen wissen wird.*
Endlich nenne ich noch Hatteria[32] *als Desiderat!*
In der Hoffnung, daß Sie mir diese Wünsche nicht versagen wollen & daß es möglich sein wird, wenn auch nicht alle, so doch einige zu befriedigen verbleibe ich ganz zu Ihren Diensten
Ihr hochachtungsvollst ergeb.
A.B. Meyer“[33]

[Dresden, 11 Oct[ober] 1880

R[oyal] Zool[ogical], Anthr[opological] & Ethn[ographic] Mus[eum].

Most esteemed Colleague,

I take the liberty of making a bold request in the interests of our young Ethnographic Museum.

Is it possible to obtain a good nephrite tiki tiki as well as a large mere of nephrite, and stone axes of the same material, as well as a piece of raw nephrite (albeit small)?

I am well aware that it has long been difficult to obtain these objects from the indigenous peoples, but does not your museum possess duplicates? I am sure that our government would not hesitate to make a sacrifice to acquire these objects and that it will appreciate your efforts.

32 Hatteria is a synonym for *Sphenodon punctatus* Tuatara.
33 MS-Papers-0037-201-02, Alexander Turnbull Library.

Finally, I mention Hatteria as a desideratum!

In the hope that you will not deny me these wishes & that it will be possible, if not all, at least to satisfy some, I remain at your service.

Yours most respectfully.

A.B. Meyer]

By the end of 1880, the desired hair samples had arrived in Dresden. Meyer thanked him for this in his next letter. In Dresden he had begun to build up an extensive collection of hair samples from all over the world. The *Nestor* parrot, however, seems to have been delayed in arriving:

„Dresden, 25. Januar 1881,
K. Zool. Anthr. & Ethn Mus
Verehrtester Herr College,
Herzlichen Dank im Namen des Museums für die gütige Übersendung der Maori Haarprobe. Ich bedauere daß Sie Mühe davon hatten, allein um so schätzenswerther sind mir diese Proben.[34]
Es ist zu wichtig dgl. zu besitzen, denn wenn man sieht wie die meisten Anthropolog. Schriftsteller über die Haare der Menschenracen schreiben & Theoreme aufbauen ohne die Objecte zu kennen, so gruselt's Einem.
[...] Herren Shaw, Savill & Co London habe ich geschrieben wegen der Kiste mit Nestor in Spiritus & werde Ihnen nach Empfang berichten. Jedenfalls im Voraus besten Dank. Sollten Sie so gütig & überhaupt geneigt sein unserem Museum von dort Einiges zukommen zu lassen so werde ich einen speciellen Bericht darüber an die Regierung aufmachen und bin sicher daß dieselbe Ihnen ihre Anerkennung nicht versagen wird.
Ich erwähnte in meinem letzten Schreiben schon Einiges & Sie haben die Güte zu sagen daß sie nach Rückkehr der S[amm]l[un]gen aus Melbourne sehen wollten ob Sie uns etwas zuweisen könnten. Das wäre ja sehr schön, da wir von Neuseeland schlecht vertreten sind. Es fehlen uns alle Schnitzwerke, alle Steinwaffen & Idole nebst deren Rohmaterial – Alles zu wichtige & unentbehrliche Objecte. Von Zoologischen Desideraten nannte ich schon Hatteria & Sie fragen wegen Dinornis Resten[35] *gütigst an.*
Ich kaufte vor einigen Jahren von Dr Finsch Reste folgender Arten:
Dinornis maximus 1 Bein ohne Fuss nur 4 Wirbel
Dinornis gracilis 2 Beine ohne Füsse und ein paar Wirbel
Meionornis didiformis Beine, Becken, und einige Wirbel
Meionornis casuarinus ziemlich vollständig
Palapteryx elephantopus[36] *1 Bein*
Euryapteryx rheides ziemlich gut.
Sie sehen also, daß wir eigentlich nur von 2 Arten passabele [sic] Ex. besitzen & daher für Alles Weitere sehr dankbar wären.

34 Haast sent hair samples from Māori living in Christchurch, including several children. Since the head, and hair in particular, are tapu for Māori - sacred and must not be touched - it was very difficult to get traditionally living Māori to cut off their hair and give it away. See Best 1934, p. 84.

35 Moa bones.

36 Described and named by Haast, synonym for *Pachyornis elephantopus*.

Ich empfehle unser Museum in Bezug auf Alles die Moas Betreffende ganz speciell Ihrer Fürsorge da man fürchten muss je länger man es aufschiebt sich damit zu versehen, daß es desto schwieriger werden wird.
Kann ich Ihnen mit irgend etwas dienlich sein so bitte ich ganz über mich zu verfügen. Von Neu Guinea Vögeln z. B. besitzen wir schöne Doubletten aber auch sonst bin ich bereit Ihren Wünschen nach Kräften nachzukommen.
Mit dem Ausdrucke freundschaftlichster Hochachtung
Ihr ganz ergebener

AB Meyer"[37]

[Dresden, 25 January 1881,

R[oyal] Zool[ogical], Anthr[opological] & Ethn[ographic] Mus[eum].

Most esteemed Colleague,

Thank you very much on behalf of the museum for kindly sending the Maori hair samples. I regret that you have had trouble with them, but they are all the more valuable to me.

It is too important to have them, because when you see how most anthropologists write about the hair of the ethnic groups of people and construct theorems without knowing the objects, one is naturally concerned.

[...] I have written to Messrs Shaw, Savill & Co in London about the box with Nestor in alcohol and will report to you on receipt. In any case, my best thanks in advance. Should you be so kind and feel inclined to send our museum something from there, I will make a special report about it to the government and am sure that they will not deny you their recognition.

I already mentioned some things in my last letter and you have the goodness to say that after the return of the [exhibits] from Melbourne you would see if you could allocate something to us. That would be very nice as we are sparsely represented by New Zealand. We lack all carvings, all stone weapons and idols together with their raw material - all too important and indispensable objects. Of zoological desiderata I have already mentioned Hatteria & you kindly inquire about Dinornis remains.

Some years ago I bought remains of the following species from Dr Finsch:

Dinornis maximus 1 leg without foot only 4 vertebrae
Dinornis gracilis 2 legs without feet and only a few vertebrae
Meionornis didiformis legs, pelvis, only a few vertebrae
Meionornis casuarinus quite complete
Palapteryx elephantophus 1 leg
Euryapteryx rheides pretty well

As you can see, we actually possess only passable specimens of two species and would therefore be very grateful for anything further.

37 MS-Papers-0037-201-03, Alexander Turnbull Library.

I entrust our museum in relation to everything concerning the moa quite specifically to your care as one must fear that the longer one puts it off, the more difficult it will become.

If I can be of service to you with anything, I am completely at your disposal. We have beautiful duplicates of New Guinea birds, but I am also prepared to do my utmost to meet your wishes.

With the expression of the most friendly esteem

Yours sincerely,

AB Meyer]

In the letter quoted above, Meyer explicitly asks for bones of the moa, which had meanwhile become popular museum display items in Europe. Haast sent to the Dresden Museum the objects he wanted, as far as he was able. These were divided among the museum's various departments of natural history, ethnology and anthropology. In exchange, he also received a considerable number of pieces from Meyer for his museum. Since the Royal Zoological and Anthropological-Ethnographic Museum Dresden was later separated into the Museum of Natural History and a Museum of Ethnology, the collections are today spread over two buildings.

The files of the Dresden ethnological collection contain the receipt of the objects received from Haast in 1881 with some additions from the following year:

"2 Nephrit-Meissel von Neu Seeland
1 Nephrit Tiki von Neu Seeland
1 Nephrit Block von Neu Seeland[38]
2 Steinbeile von Viti
1 Steinbeil von Salomo Inseln
2 Maori Steinmesser
2 Abgüsse von Maori Steinmessern
1 Maori Schädel
10 Haarproben[39]

Tausch von Haast 1882
70 Steinsplitter[40] *(zu Dinornis-Resten gehörig)"*[41]

[2 Nephrite chisels from New Zealand
1 Nephrite tiki from New Zealand
1 Nephrite block from New Zealand
2 stone axes from Viti
1 Stone axe from Solomon Islands
2 Maori stone knives

38 According to the accession record, the nephrite block was later given to the mineralogical museum, Dresden, in exchange in 1907.

39 The skull and the specimens of human hair are held in the Anthropological Collection of the Museum für Völkerkunde Dresden.

40 The tools of the Moa hunters were given to the museum together with moa bones. Today, however, there are two more than mentioned here in the collection of the Ethnological Museum.

41 Accession records of the Museum für Völkerkunde zu Dresden to 1945, H1_0004_a.

2 casts of Maori stone knives
1 Maori skull
10 hair samples

Exchange from Haast 1882
70 stone chips (belonging with Dinornis remains)].

a. *Nephrite mere, Canterbury, South Island, New Zealand, made by the 68-year-old Tamata Tikao Mahia from Wainui near Christchurch in eight years of work, sent to Dresden by Julius von Haast in 1882. (See Königliches Ethnographisches Museum zu Dresden. III. Jadeit- und Nephrit-Objecte. P. 58) (Museum für Völkerkunde Dresden, cat. no. 5086,1).* **b**. *Nephrite adze, Rangiora, Canterbury, South Island New Zealand. "The small axe was sent to us by Mr. v. Haast in 1881, and comes from Massacre Pa near Rangiora on South Island." (Königliches Ethnographisches Museum zu Dresden. III. Jadeit- und Nephrit-Objecte. P. 59) (Museum für Völkerkunde Dresden, cat. no. 5087,1).* **c**. *Nephrite adze, Kaikoura, South Island New Zealand. "From a grave on the Kaikoura Peninsula in the north-east of the South Island. By Mr. v. Haast, 1881. It is remarkable that nephrite axes were placed in the grave as precious possessions." (Königliches Ethnographisches Museum zu Dresden. III. Jadeit- und Nephrit-Objecte.P. 59) (Museum für Völkerkunde Dresden, cat. no. 5088,2).*

Tiki, pendant, nephrite, South Island , sent to Dresden by Julius von Haast.
(Museum für Völkerkunde Dresden, cat. no. 5096,1).

Meyer's wish to obtain the generally sought-after objects made of nephrite was thus fulfilled as late as 1881. He published them in 1883 in Volume III of the publications of the Dresden Museum under the title *Jadeit- und Nephrit-Objecte. B. Asien, Oceanien und Afrika*.[42]

Although Meyer shows interest in everything concerning the moa in his letter of January 1881, it is difficult to see this as anything more than a zoological desire to collect, for only the remains of the bird were difficult to obtain, not the crude stone tools of the Moa hunters. It is not possible to reconstruct from the correspondence whether Haast sent these tools in 1882 on his own initiative as an advance payment for a desired acquisition or whether there was a corresponding request from Meyer's side. They were not published. However, they are listed individually in the inventory catalogue. The items in question are:

1 Steinmesser der Moajäger, Süd Rakaia, Canterbury, Südinsel
1 Steinmesser der Moajäger, Nord Rakaia, Canterbury, Südinsel
4 Steinmesser der Moajäger, Neue Mündung des Rakaia, Canterbury, Südinsel
48 Steingeräte der Moajäger (Messer?), Shag Point, Otago, Südinsel
10 Steinmesser der Moajäger, Shag Point, Otago, Südinsel
3 Bruchstücke von Steinmessern der Moajäger, Shag Point, Otago, Südinsel
2 Steinmesser der Moajäger, Shag Point/ Shag River, Otago, Südinsel
1 Axtklinge (?) der Moajäger, Shag Point, Otago, Südinsel
2 Steingeräte (Abfall?) der Moajäger, Shag Point, Otago, Südinsel

[1 Moa hunter Stone Knife, South Rakaia, Canterbury, South Island
1 Moa hunter stone knife, North Rakaia, Canterbury, South Island
4 Moa hunter stone knives, New Mouth of the Rakaia, Canterbury, South Island
48 Moa hunter stone implements (knives?), Shag Point, Otago, South Island

42 Meyer 1883, pp. 58-63, plate 6, fig. 1-6.

10 stone knives of the Moa hunters, Shag Point, Otago, South Island
3 fragments of stone knives of the Moa hunters, Shag Point, Otago, South Island
2 stone knives of the Moa hunters, Shag Point/ Shag River, Otago, South Island
1 axe blade (?) of the Moa hunters, Shag Point, Otago, South Island
2 stone tools (waste?) of the Moa hunters, Shag Point, Otago, South Island]

a. *Stone tool (knife?) of the moa hunters, quartzite, Shag Point, Otago, South Island New Zealand, sent to Dresden by Julius von Haast 1882. (Museum für Völkerkunde Dresden, cat. no. 12222,1).*

b. *Stone tool (knife?) of the moa hunters, quartzite, Shag Point, Otago, South Island New Zealand, sent to Dresden by Julius von Haast 1882. (Museum für Völkerkunde Dresden, cat. no. 12223,1).*

c. *Stone tool (knife?) of the moa hunters, quartzite, Shag Point, Otago, South Island New Zealand, sent to Dresden by Julius von Haast 1882. (Museum für Völkerkunde Dresden, cat. no. 12224,1).*

In exchange for Haast's consignments to Dresden, Meyer sent archaeological artefacts from Europe and America as well as bird skins (parrots and kingfishers, including very rare specimens), 128 objects in all, at the latter's express request. A list of the objects sent is enclosed with the letter to Haast that Meyer wrote on 22 December 1882.[43] Meyer estimated the value of the consignment at 1000 Marks. The box was sent from Hamburg to London and from there shipped to New Zealand with the New Zealand Shipping Company.

The archaeological objects Meyer sent to Christchurch were: 43 stone axes from Schleswig, 3 stone axes from Zeeland, 2 stone axes from the island of Rügen, 2 stone axes from Osterfeld, 2 stone axes from Germany, 1 cast of a stone axe from Mexico (the original of which is kept in the Dresden Museum), 3 archaic pottery from Lusatia, 3 archaic pottery from Serkowitz near Dresden, 3 archaic pottery from Tolkewitz near Dresden, and 3 archaic pottery from Schleswig.[44]

In a letter Meyer dated - possibly erroneously - as 3 June 1883, he expresses his gratitude for the moa bones and stone implements and promises to send archaeological artefacts in return. However, he points out the difficulties in procuring such by exchange for Haast - quite obviously, because they were not in scope of the Dresden museum's collections.

43 MS-Papers-0037-201-06, Alexander Turnbull Library.

44 As is evident from Meyer's letter to Haast dated 3 June 1883, Meyer had procured these prehistoric objects especially for the exchange, as the Dresden Museum did not collect archaeological objects.

„Dresden, den 3. Juni 1883[45]
K Museum
Verehrtester Herr v. Haast
Ich empfing Ihr w[erthe]s Schreiben vom 11 April nachdem wenige Tage vorher die Sendung Moa Reste und sonstige praehistorische Sachen eingetroffen waren für welche ich Ihnen verbindlichsten Dank sage. […]
Ich werde als nächstes eine Sendung ethnologischer Objecte aus Afrika, Asien & Amerika an Sie abgehen lassen. Leider haben Sie mir wegen des Tellers von Meißener Porzellan nicht wieder geschrieben so daß ich ihn nicht beipacken kann. – Praehistorische Objekte kann ich schwerer erhalten im Tausche doch will ich sehen was ich thun kann & sollen Sie jedenfalls durch meine Sendung zufriedengestellt sein. Zool. Sachen zu senden wird mir allerdings leichter. Endlich habe ich viele Doubletten von Vögeln von Neuguinea, Celebes etc., zweitens Nester und Eier hiesiger Vögel die Sie doch wohl dort nicht haben im Museum. Also über diese können Sie wenn Sie wollen mich noch informieren […].
Mit herzlichen Grüßen Ihr aufrichtigst ergeb
AB Meyer"[46]

[Dresden, 3 June 1883

R[oyal] Museum

Dear Mr von Haast

I received your esteemed letter of 11 April a few days after the arrival of the consignment of moa remains and other prehistoric objects for which I thank you most sincerely [...].

Next I will send you a consignment of ethnological objects from Africa, Asia and America. Unfortunately, you have not written to me again about the plate of Meissen porcelain so that I cannot enclose it. - It is more difficult for me to obtain prehistoric objects in exchange, but I will see what I can do and you shall in any case be satisfied by my consignment. Zoological specimens, however will be easier for me to send. Finally I have many duplicates of birds from New Guinea, Celebes etc., secondly nests and eggs of local birds which you probably do not have there in the museum. So you can still let me know about these if you wish [...].

With best wishes, your sincerely devoted,

AB Meyer]

From the chronological sequence, Haast's letter, to which Meyer refers here, should have been sent as early as April 1882, because the desired ethnographic and anthropological objects reached Dresden as early as 1881. The "prehistoric objects" that arrived in 1882 would then probably have been sent by Haast at about the same time as his letter of April 1882. Meyer would have replied to this in June 1882 with the last letter quoted, in which he refers, among other things, to his difficulties in exchanging the archaeological objects desired by Haast (as director of a non-archaeological museum) from other museums in return for the consignment. In December 1882, he was finally able to send this type of object, among others, to Christchurch.

45 Meyer probably got the date wrong here. It would be more logical for the letter to have arrived in Christchurch in 1882.

46 MS-Papers-0037-201-07, Alexander Turnbull Library.

Be that as it may, on the basis of the archival records found in New Zealand and Dresden, one must assume that Meyer was only interested vis-à-vis Haast - apart from anthropological objects - in such museum display items as were generally in demand at this time, but not in the crude stone tools of the Moa hunters and consequently probably not in Haast's hypothesis of a very early first settlement of New Zealand by non-Māori.[47]

There is no evidence of any correspondence after 1883. The other correspondence dating from this year was dominated by Haast's wish to obtain models of marine animals (corals and polyps) from the Dresden glassblowing artist Leopold Blaschka, which Meyer was to procure for him. Since Blaschka's work was in demand all over the world and, according to Meyer's letter, he was also a somewhat eccentric man who did not accept every commission, this endeavour turned out to be somewhat difficult and protracted.[48]

The Moa hunter debate that dominated Haast's life in the 1870s is thus not directly reflected in the letters between Haast and Meyer from the early 1880s. The former had already had to accept more and more of his opponents' arguments that the Moa hunters had not lived in as distant a time as he believed. Haast's desire for prehistoric European objects, however, suggests that he was still pursuing the goal of proving the Palaeolithic, Neolithic, Bronze Age and Iron Age periods in New Zealand as well.[49]

The view put forward by Haast in 1871 had already been weakened in 1872 when Alexander McKay (1841-1917) found polished stone tools in a cave containing moa bones and eggshells near Sumner, a suburb of Christchurch, in addition to the rough-hewn stone chips, which could not be divided into two different cultures. Since no polished stone axe blades were found at Rakaia, Haast assumed that the site at Rakaia was the older one. However, the moa found at Sumner were identified as a larger species of bird (*Dinornis robustus*). From this, however, McKay and other specialists concluded that the Sumner site was an older moa hunter's camp. McKay explained the lack of polished stone blades in the younger camp at Rakaia by saying that the hunters there had been more careful with these polished tools than those at Sumner. With the publication of his results in 1874 in the *Transactions and Proceedings*,[50] he thus publicly opposed Haast, for which the latter never forgave him.[51]

In his next publication in 1874, Haast acknowledged that the rough-hewn stone chips and the polished implements could well belong to the same culture, thus conceding a higher level of "civilisation" to the Moa hunters than in 1871. He wrote:

> But now, as it were at once, the Moa-hunters disappear from the scene; but not without affording an insight into their daily life, by leaving us some of their polished and unpolished stone implements, a few of their smaller tools, made of bone, a few personal ornaments, as

47 It would be speculative to assume that between the arrival of Haast's 1881 consignment and the receipt of the rough stone tools in 1882, Meyer wrote another letter to Haast, now no longer extant, in which he may have asked for se special stone tools.

48 See letters from Meyer to Haast, 28 January 1882, 22 December 1882, 3 June 1883 (or 1882?), 2 December 1883. MS-Papers-0037-201, Alexander Turnbull Library. The models eventually arrived in Christchurch, and are described and illustrated in Shaw et al. 2017.

49 Thode 2009, p. 232.

50 McKay 1874, pp. 98-105.

51 See Thode 2009, p. 238.

well as fragments of canoes, whares, and of wooden spears, fire-sticks, and other objects too numerous to mention; but by which the fact is established that they had reached already a certain state of civilization, which in many respects seems not to have been inferior to that possessed by Maoris when New Zealand was first visited by Europeans.[52]

Through the mediation of the president of the Royal Society of London, Sir Joseph Hooker, the New Zealand scientists slowly came closer together. In the years after 1874, numerous finds were made that supported Hector's theory that the moa hunters were the ancestors of today's Māori and that they had only migrated several hundred years ago. Haast then made further concessions to his opponents.[53]

A complete consensus on who were the first inhabitants of New Zealand and Moa hunters was never really reached. In addition to the two viewpoints mentioned above, a group of scientists held a third hypothesis, namely that a first group of immigrants had come from Melanesia. The inhabitants of the Chatham Islands, 800 km east of New Zealand, the Moriori, were considered by them to be the direct descendants of these early immigrants still living today:[54]

The idea of a distinct race did not hinge entirely on Haast's proposal. This proposal existed alongside the idea of an earlier race often identified with the Moriori of the Chatham Islands. The existence of this race, often perceived as of mixed or Melanesian ethnicity or origin, was supported by Māori traditions that were later expanded upon by the ethnologist S. Percy Smith and his allies.[55]

For the next few decades after Haast's death, the debate about the various waves of immigration dominated the scientific discussion in New Zealand. In the process, people fell back on Haast's theory. Thode writes about this:

The Great Fleet and the theories of the Melanesian Settlement of New Zealand dominated study in the first half of the twentieth century and much of their archaeological foundation came from Haast's identification of two distinct cultures, primarily in the existence of two distinct sets of stone implements.[56]

In 1897, Haast's successor, Frederick Wollaston Hutton (1836-1905), sent a collection of Moriori stone tools from the Chatham Islands to Dresden. These were 2 stone clubs, 13 stone blades of axes or chisels, 1 stone tip of a drill, 3 stone knives and 1 earring made of shell.[57] The fact that Hutton sent the objects to Dresden can be interpreted as an indication that Haast's thoughts on early non-Māori immigration to New Zealand continued to have an impact beyond his death.

What is the significance of these objects, which were apparently not a high priority acquisition by the Dresden Museum at the time and seem unassuming today at first glance? They are documents

52 Haast 1874, p. 82. Whare is the Māori term for a dwelling, hut or house.

53 See Thode 2009, p. 240; Haast 1879, pp. 150-153.

54 On the question of the origin of the Moriori, a similar, long-running debate developed in New Zealand, which will not be the subject of discussion here. See for example King 1990 and 2000.

55 Thode 2009, p. 240.

56 Thode 2009, p. 241.

57 Unfortunately, due to the lack of letters, it is not possible to understand why Hutton sent these objects to Dresden. Perhaps Meyer had asked for objects by Moriori, who at the time seemed enigmatic.

for a long-lasting hypothesis about New Zealand's settlement history. At the same time, the Moa Hunter debate is a revealing example of theoretical history, namely of a change in the interpretation of archaeological finds based on archaeological comparative material found later. The New Zealand archaeologist Roger Duff (1912-1978) proved in his book *The Moa-hunter period of Maori culture*, first published in 1950, that the stone tools found at the Moa-hunter camps clearly belonged to the stone tool complex of the East Polynesian peoples and that corresponding knives and objects in knock-off technique, but also cross axes found at Rakaia and Shag Point, also occurred on Easter Island, Pitcairn and Hawaii. Meanwhile, archaeologists agree that at least the inhabitants of New Zealand's South Island migrated from East Polynesian islands around the year 1300.[58] Ultimately, the stone tools of the Moa hunters are interesting documents for the everyday culture of the Māori in the time before European colonisation.

Summary

The *Museum für Völkerkunde Dresden* holds a fine collection of Māori stone tools from New Zealand. These stone tools date to the early phase of Māori settlement in New Zealand and were found in large quantities at resting places where moa were slaughtered, cut up and eaten. The moa (Dinornithifornes) are different genera of a flightless giant bird that has been extinct in New Zealand for several centuries.

Julius von Haast, director of the Canterbury Museum in Christchurch, sent the stone tools together with nephrite (pounamu) objects and wood carvings to Adolf Bernhard Meyer, the director of the Royal Zoological and Anthropological-Ethnographic Museum Dresden in 1881 and 1882. In exchange, Haast received objects that enriched the collection of the Canterbury Museum.

While this collection of prehistoric stone tools may have seemed unremarkable to the Dresden museum director, as he did not mention them in the published catalogue of the museum's Māori collection - Julius von Haast attached great importance to these artefacts. In the 1870s, they were the basis for an at times highly engaged dispute between New Zealand's leading scientists, which had repercussions as far away as Europe. The issue was a counter-thesis to the now generally accepted idea of New Zealand's settlement history. The starting point of the debate at the time was the question of who eradicated the moa and when.

The German geologist Julius von Haast sought evidence for his thesis that the phases of human development that evolutionist palaeontologists had identified for Europe (the sequence of Palaeolithic, Mesolithic, Neolithic, etc.) could be applied in the same way to the Southern Hemisphere. Accordingly, in Haast's view, the moa hunters with their simple tools had migrated much earlier than the Māori, whom he assigned to a more recent wave of immigrants. His opponents held that the moa hunters were the ancestors of the Māori.

Even though Haast himself later changed his opinion, this dispute continued to have an impact on scientific hypotheses about the settlement history of New Zealand for a long time.

58 See among others Duff 1977 and Buckley 2010, pp. 1-18.

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