

The History of Julius Haast's Topographical Mapping of the Southern Alps

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Julius Haast's brief, when appointed Provincial Geologist for Canterbury in 1861, was to complete a geological survey of the whole province. In order to do that he needed to topographically survey the unmapped parts of the province, which included most of the Southern Alps and the West Coast. The results of the topographical survey, undertaken in conjunction with the geological survey over the next eight years, was summarised on a large, professionally-drafted map of the Southern Alps, which Haast submitted to the Provincial Council in 1868.

This article discusses Haast's acquisition of surveying and cartographic skills before tracing the development and interim publication of his topographical mapping of the Southern Alps up to the submission of the completed map. Haast's efforts to have it published within New Zealand and overseas are then examined, including eventually submitting it to the Royal Geographical Society in 1870, which published a finely detailed reduced-scale version of the map. The use made of various versions of Haast's 'great map' within New Zealand and overseas is considered, and the belated recognition of the importance of his map is highlighted. In conclusion, the ultimate fate and state of each of Haast's manuscript and draft maps of the Southern Alps are discussed.

Keywords: Julius Haast, manuscript map, published map, Royal Geographical Society, Southern Alps, topographical survey

Introduction

An article in a Christchurch newspaper (*Lyttelton Times*, 29 March 1862: 4), which quoted passages from a 14 March letter from the Canterbury Provincial Geologist Julius Haast (1822–1887), stated that it was his “intention ... to visit the district around Mount Cook, and, if the weather permitted, ascend the mountain”. According to a further published letter (*Lyttelton Times*, 7 June 1862: 4) dated 8 May, Haast's party, which included assistant surveyors Arthur Dobson (1841–1934) and William Young (1842–1913), “started to ascend Mt. Cook” on “a cold but sunny morning” at daylight on 12 April 1862. There was no intention of “climbing dangerous mountain peaks” (Dobson 1930: 34) such as the summit of Aoraki/Mount Cook at about 4,000 metres (13,200 ft), given their lack of mountaineering experience even though they had ice axes and ropes (Hook and Lorrey 2024). The practical objective was to ascend the Kirikirikatata/Mount Cook Range from their camp near the terminus of the Haupapa/Tasman Glacier, and to proceed along the crest of that range, which rises to meet Aoraki/Mount Cook, as far as they could practically go and return in one day, while establishing a series of topographical stations along the way. At around “7500 feet above the sea” (circa 2,300 metres), their progress was thwarted when they encountered a precipice which they could not bridge as they “had not a ladder with us to throw across”. In the biting icy wind and below zero temperature they were forced to retreat to an eastern spur, most likely about one kilometre south of Mount Mabel, where they had earlier decided to establish their first station at “about 6500 feet”. At that location “with a hand trembling with the cold” Haast “executed a panoramic sketch” (Fig. 1) in order “to fix the bearings

of the principal topographic features”, while Dobson had “no little trouble to keep the stand of the instrument steady from the strong blasts of wind sweeping over the exposed height” (Haast 1879: 34).

According to Haast's son Heinrich von Haast (1864–1953), besides conducting a geological survey of the entire Province of Canterbury, Haast was also expected to “map and sketch the country where the surveyors had left off, to explore for passes from east to west, for country suitable for pasture or agriculture, above all to discover gold, coal, and other mineral wealth” (Haast 1948: 129). On the 1862 expedition to headwaters of the Waitaki River, which included exploration of the Kirikirikatata/Mount Cook Range, Haast discovered no auriferous rocks, but as shall be seen his topographical surveying work did eventually result in him being rewarded with gold.

Mapping the unsurveyed parts of Canterbury, which included a major section of the Southern Alps and that part of the west coast now known as Westland, as well as conducting the geological survey of Canterbury Province, occupied Haast over a period of eight years from 1861 to 1868. This culminated in him presenting his “great map of the region of the Southern Alps” (Haast 1948: 2) titled *Reconnaissance Map of the Interior of the Province of Canterbury* (Fig. 2) and his *Geological Map of the Province of Canterbury and the County of Westland*, to the Secretary of Public Works Edward Jollie (1825–1894) in August 1868. In the accompanying report, Haast wrote “thus my task – according to the contract into which I entered with the Government of



Figure 1. Julius Haast, *View from Mt Cook Range towards the beginnings of the Tasman & Murchison Glaciers*. 12 April 1862. Watercolour, ink and pencil on paper, 170 x 430 mm. Alexander Turnbull Library C-097-083

this Province – is accomplished. I herewith hand these two Maps over to you” (Haast 1868: 3–4).

This article traces the genesis, development and iterations of Haast’s topographical mapping of the Southern Alps up to the submission of the professionally drawn copy of his original map to the provincial government in 1868. Haast’s efforts to have his map published within New Zealand and overseas are then examined, and how different versions of his topographical map of the Southern Alps were displayed within New Zealand and at major international exhibitions. In conclusion, the international recognition that Haast received for his topographical surveying and mapping labours, as well as the ultimate fates of Haast’s manuscript and draft maps are discussed.

Haast’s Topographical Survey Training and Prior Survey

Before discussing the genesis and development of Haast’s topographic map of the Southern Alps, the topographical surveying training Haast received and the surveying work he had engaged in prior to his services being employed by the Canterbury Provincial Government need to be considered.

In the monumental biography of his father, Heinrich claimed that “it was no doubt from his training under von Dechen that Haast acquired his skill as a topographer, which enabled him to produce ... his great map of the region of the Southern Alps” (Haast 1948: 2). Heinrich von Dechen (1800–1889) the director of the Prussian mining department and professor of geology at the University of Bonn, was a highly skilled geological cartographer who mapped the whole of Rhenish Prussia and Westphalia in western Germany on the scale of 1:80,000. While Haast may have attended some of Dechen’s lectures while he was in Bonn during the late

1830s undertaking a 2-year apprenticeship, possibly as a mining technician (Burrows 2005: 17), there is no evidence that he matriculated in any university course in which he might have learnt topographical mapping skills (Langer 1992: 273–293). Nor does the correspondence between Dechen and Haast suggest that Haast was enrolled in any of Dechen’s courses or had a significant relationship with him while in Bonn.¹

More convincingly, Haast would have learnt topographical surveying and mapping skills while accompanying Ferdinand von Hochstetter (1829–1884) on his geological and topographical surveying and mapping expeditions in the Province of Auckland during 1859. Hochstetter had been fortunate to work under experienced field geologists when working on the geological mapping of the Bohemian Forest region and spent many months over the summer each year from 1853 to 1856 in the field surveying and in the winter months draughting maps and reports back in the office (Nolden 2017: 6–7). It should be noted, though, that in Europe there were nearly always topographical maps, to which the geologist added the geology while completing a geological survey, which was not the case in New Zealand. Hochstetter’s well developed topographical surveying and map-making skills are evidenced by the high-quality topographical maps of regions of New Zealand (Hochstetter and Petermann 1864) that he produced in collaboration with the cartographer August Petermann (1822–1878). Hochstetter’s surveying assistant during their exploration of the North Island, however, was William Drummond Hay (1827–1881) who, as a former officer in the Royal Artillery, had surveying and map-making skills (Nolden and Hayward 2023: 58 footnote 94). Regardless, Haast would have become involved in the topographical surveying and map plotting and would have rapidly learnt under the expert tuition of Hochstetter and Hay.



Figure 2. Alfred Jarman, *Reconnaissance Map of the Interior of the Province of Canterbury by Julius Haast P.H.D [sic], F.R.S.* The lower portion of the country furnished by the Survey Department. Signed and dated: Christchurch July 30 1868 Julius Haast. Scale 4 miles to the inch (1:253,440). Watercolour and ink on linen-backed draughting paper, varnished and mounted on wooden rods, 1150 x 1700 mm. Green Map, Archives New Zealand, Christchurch R22668481

When Hochstetter was subsequently engaged to conduct a geological survey of parts of the Province of Nelson, commencing in August 1859, Haast accompanied him, but as topographical maps were available for those locations no significant mapping work was undertaken (Johnston et al. 2012; Johnston and Nolden 2014). After Hochstetter departed the colony in October, Haast was engaged to conduct a geological survey of the rugged, bush-covered north-western part of the province. As there were unsurveyed areas, Haast was obliged to survey those areas and plot a topographical map as well as a geological one, a task for which he was to earn his topographical surveying and cartographical ‘spurs’. The survey work, which took 7 months to complete with the assistance of the surveyor James Burnett (1826–1872), was conducted in very difficult conditions in sometimes dangerous environments, and with very limited resources. By August 1860 Haast had returned to the township of Nelson, where he was engaged in plotting and most likely drafting his *Topographical Map of The Central and Western Part of the Province of Nelson, New Zealand, 1861* and the geological map, as well as writing his report (Haast 1861a) over the next 4 months, which he then submitted on 27 November 1860. On that map (Fig. 3) Haast marked the locations of his topographical stations with red triangles (see inset), a practice he did not follow on later draft maps.

Haast's Topographical Surveying Practice

To fully appreciate Haast's mapping of the Southern Alps some insights into how Haast conducted topographical surveys are required. The equipment available for Haast's surveying party to use in Nelson (Haast 1861a: 7, 82–83) and Canterbury² included the following: a prismatic compass with a tripod for measuring magnetic bearings to the nearest half degree; a Gunter's chain for measuring the length of base lines; a pocket sextant for determining true north; aneroid barometers, a sympiesometer, thermometers and an apparatus to determine the boiling point of water, all of which were used in estimating altitudes. This would be typical of the equipment used on what was known as a ‘rough survey’ in difficult terrain. Despite not being supplied with more accurate instruments for determining bearings, such as a circumferentor or a theodolite, Haast's highly disciplined surveying practice, which involved repeated measurements, enabled the “compilation of accurate maps” (Johnston and Nolden 2011: 238). It should be noted that such rough surveys were intended to produce ‘reconnaissance maps’ rather than highly accurate survey maps. When Haast was interrogated on 29 October 1862 by a select committee examining surveys, he claimed that his work was “sufficiently accurate to be put upon the maps of the Chief Surveyor” (Report 1862: 8) which, as will be shown later, was indeed true.

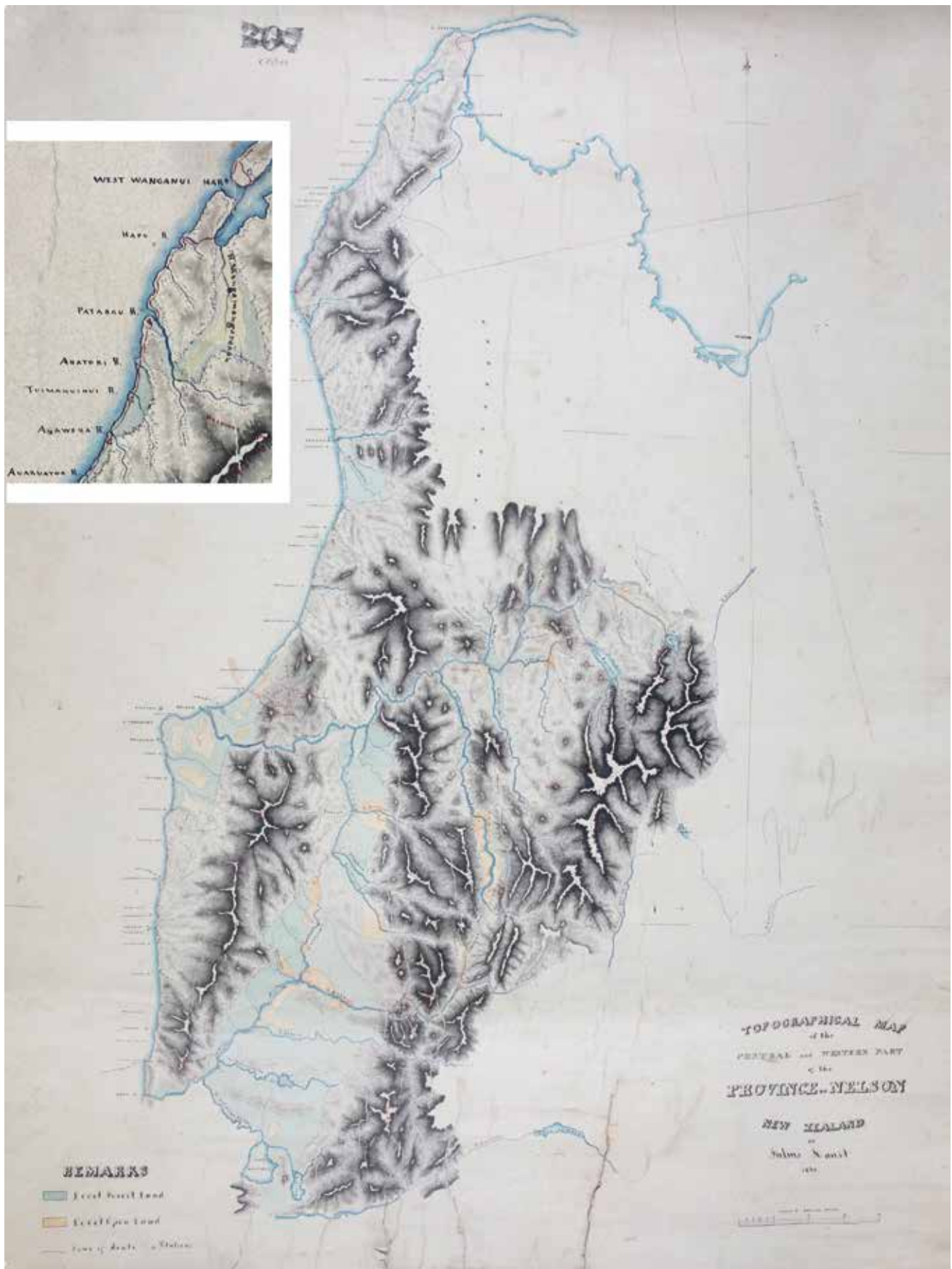


Figure 3. Julius Haast, *Topographical Map of the Central and Western Part of the Province of Nelson, New Zealand, 1861*. The inset enlargement shows the red triangles which indicate topographical stations. Watercolour and ink on canvas-backed paper, 975 x 725 mm. Nelson Provincial Museum, Bett Collection M1670

In a description of how he carried out his topographical surveys Haast stated that the Survey Department provided him with maps of areas that had already been surveyed in the relevant catchments, which mostly “went only a short way above the Alpine Lakes” (e.g. Fig. 5) and “did not include the Central Chain” (Haast 1868: 3). Admiralty charts for the relevant coastline were also supplied for his west coast surveys.

When surveying the headwaters of major river catchments on the eastern side of the Main Divide, his team used a method known as ‘traverse’ as it could readily accommodate the varying terrain encountered and required fewer observations. Haast’s team would commence ‘chaining’ from a marker, such as a cairn, where the previous survey had ended, up to the glacier sources. They measured the lengths and compass bearings of connected straight lines using the Gunter’s chain and prismatic compass. The series of connected straight lines, forming the traverse, followed a route up the valley to the sources of the river, usually meltwater flowing from glaciers. The bearing and the length of each discrete section would have been recorded as part of a continuous diagram crossing multiple pages of a pocket-sized field book (Easdale 1988: 16–17), but the field books used on Haast’s expeditions have not been located. Longer straight sections of the chained traverse, usually of at least several kilometres in length, provided base lines of known length. Haast stated he “repeatedly measured base lines, sometimes on the glaciers themselves”, a practice that later surveyors in the Southern Alps, such as Thomas Brodrick (1855–1931), had to emulate. These base lines were used “to fix by triangulation the surrounding peaks and other peculiar features of the country” (Haast 1879: 177–178 footnote). The intersection of two bearings to a landmark, taken from the ends of any straight section of the traverse, could then be used to locate that landmark when the map was plotted back in the office of the Geological Survey.

In order to preserve accuracy and utility, further baselines were established as the survey progressed up a river valley. Haast usually measured a baseline near the source glacier if the valley was wide enough. Using those particular baselines, he “fixed most of the principal peaks, as accurately as the work with a prismatic compass can be depended on”, in many cases “with more than approximate correctness” (Haast 1868: 3).

As they went Haast established topographical stations at useful vantage points, not necessarily on the chained pathway, from which bearings would be taken for all the major landscape features. The locations of these stations were determined and altitudes measured. At many of these stations Haast would make a panoramic topographical sketch of all the visible peaks, which were systematically numbered and often named (e.g. see Fig. 1), and their bearings recorded either on the sketch or in the field notebook, so that their locations could be plotted later. According to Haast, the “several hundred topographical sketches” he made provided information for inserting many details on his topographical map, which “otherwise would have been unattainable” (Haast 1868: 3).

On the western side of the Main Divide Haast tried “to use the coast line as base line for fixing orographical features”



Figure 4. Edward Jollie, [Land around Lakes Tekapo, Pukaki & Ohau, c. 1858–59]. Watercolour, ink and pencil on paper, c. 900 x 600 mm. Archives New Zealand, Christchurch R22668668



Figure 5. Edward Jollie, *North of the Ashburton River* (detail), c. 1860. Watercolour, ink and pencil on paper, c. 1300 x 1700 mm. Archives New Zealand, Christchurch R22668045

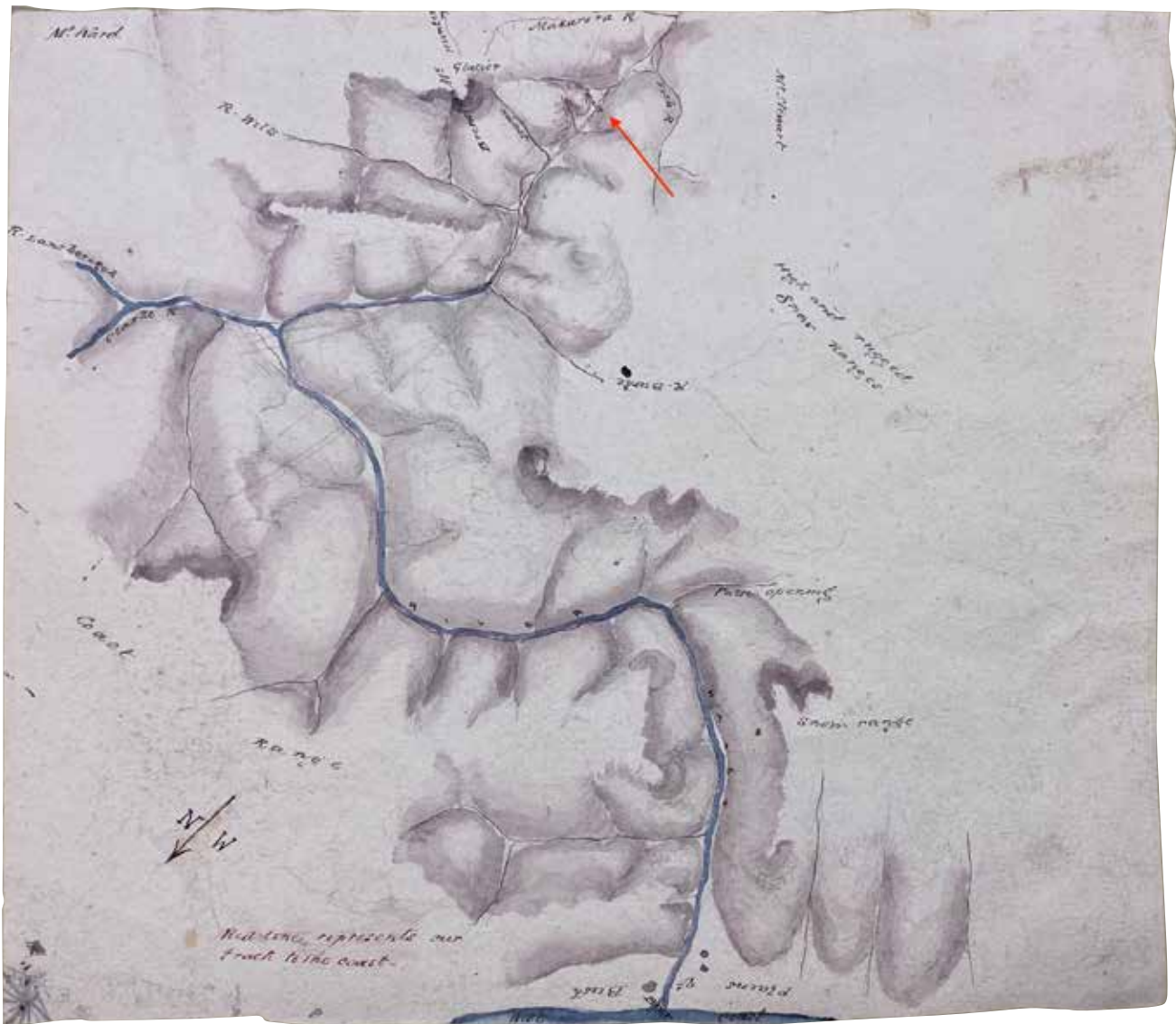


Figure 6. Julius Haast: [Map of the Haast River from its mouth to the Makarora River. 1863]. The added red arrow indicates the pass. Watercolour and ink on paper, 165 x 195 mm. Alexander Turnbull Library C-097-161

but found “serious errors both in latitude and longitude” of some features plotted on the Admiralty charts. These errors were so significant that in some cases he had to rely “entirely upon the bearings obtained on the eastern side”. Haast’s party was able to chain some rivers to their glacial sources (e.g. the Waiho River up to the Franz Joseph Glacier), but not others “owing to the rugged and precipitous character of the western side of the ranges ... [the] almost impenetrable nature of the forest vegetation, ... [and] the wild and impassable mountain torrents”. Given he could not obtain sufficient bearings Haast had to “fill some portions of maps from eye sketches”, but he was confident, though, that no important feature had been overlooked (Haast 1879: 177–178 footnote).

Progress of the Topographical Survey

After concluding negotiations with Haast, in a letter dated 12 November 1861, the Superintendent of the Province of Canterbury, William Moorhouse (1825–1881), made it clear what was expected: “a Geological and Topographical Survey of the Canterbury Province Of course you will supply detailed reports and maps

similar to those furnished for the Nelson Government”.³ During the previous decade, following on from the arrival of the early Canterbury settlers in late 1850 and the establishment of the Provincial Government in 1853, the whole of the Canterbury Plains, as well as land suitable for farming in the foothills, were rapidly surveyed in order to assign land titles and record ownership. More adventurous latecomers pushed on further into the high country to find and squat on land suitable for growing wool. The Provincial Government was then forced to survey the headwaters of the major river catchments wherever suitable land existed in order to confirm leasehold runs.

Rangitata and Ashburton Headwaters 1861

Haast arrived in Christchurch on 15 February 1861, and after a few days of preparation left to begin his exploration of the headwaters of the Rangitata and Ashburton Rivers with one assistant, Richard Stringer. The Survey Office would have provided him with relevant maps from earlier surveys, such as the one of the Ashburton Lakes produced by Jollie (Fig. 5). Haast would have made tracings of such maps rather than

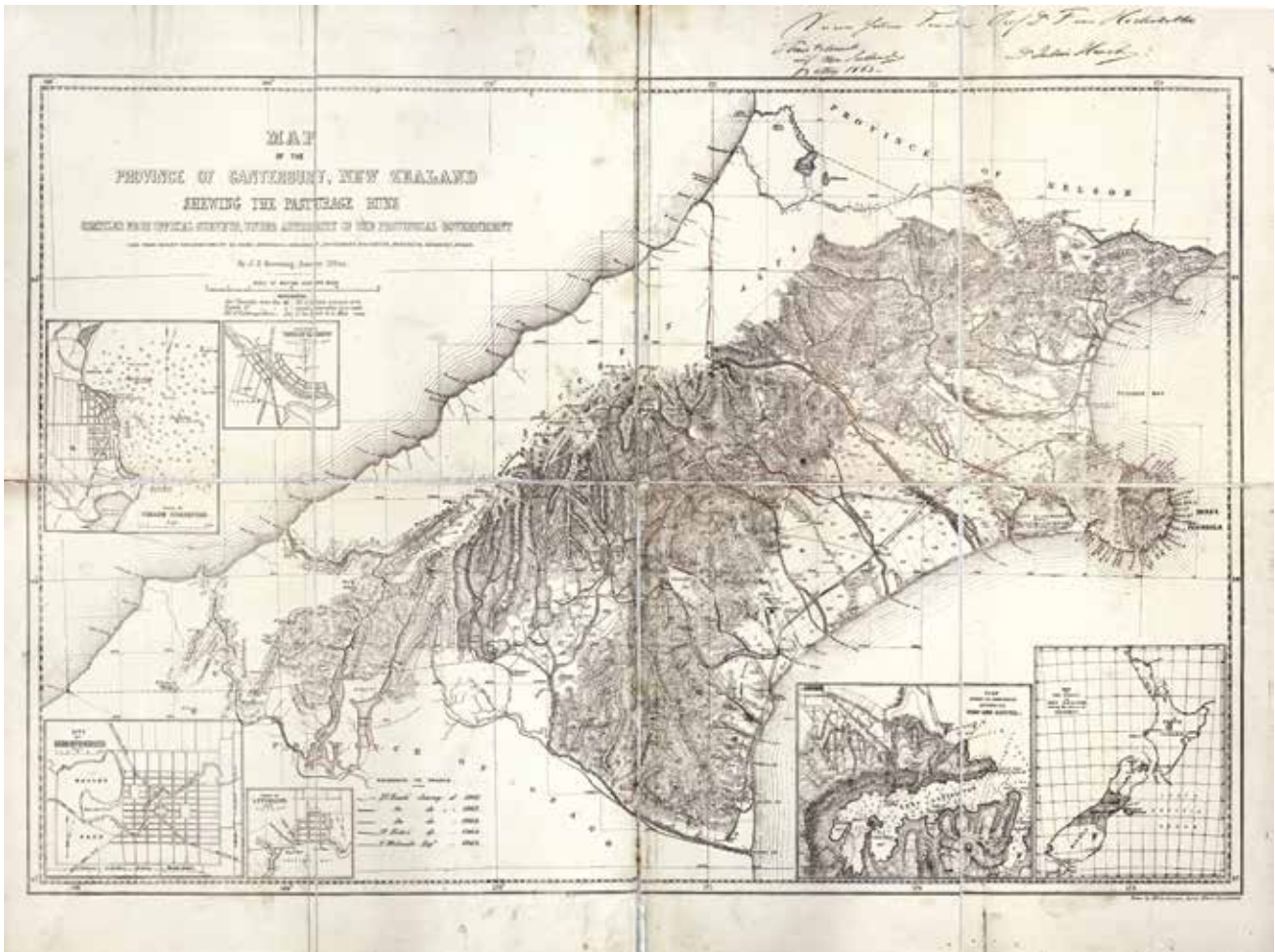


Figure 7. Alfred Jarman, *Map of the Province of Canterbury, New Zealand. Shewing the pasturage runs, compiled from official surveys, under authority of the Provincial Government, and from recent explorations by Dr Haast, Provincial Geologist, Canterbury & Dr Hector, Provincial Geologist, Otago, by JS Browning, Survey Office, [August 1863].* Scale 10 miles to the inch (1: 633,600). Lithography, 570 x 765 mm. Ward & Reeves; published by the Provincial Government of Canterbury. Copy with Haast's manuscript inscribed dedication to Ferdinand von Hochstetter, dated 13 August 1865. Hochstetter Collection Basel HCB 3.9.2 (Nolden and Nolden 2013: 115)

being allowed to take them into the field given the possible risk of loss or damage.

Haast spent the next 4 months conducting the topographical and geological survey work. In his description of that expedition he makes no mention of the topographical survey work, other than when he reached the Ashburton Glacier he returned by a different river “in order to connect my survey with that of Mr Edward Jollie, who had left off at the beginning of the gorge 12 miles from the glacier” (Haast 1861b: 34). Later in 1861, Haast wrote his first scientific paper, which he submitted to the Royal Society of Victoria as he had been invited to contribute an article. The article provided a lengthy description of his first Canterbury expedition. Haast also supplied a topographical map illustrating the headwaters of those rivers.

When Haast returned from the Rangitata and Ashburton expedition he had a much better idea of what would be needed to complete the topographical and geological surveys of Canterbury. Realising that a much smaller area of the province had been surveyed than he had been led to believe, in a letter dated 18 June 1861,⁴ Haast informed the Superintendent that the “ruggedness”

and extent of the unsurveyed “country would require a longer time for a thorough topographical and geological survey” of at least three years, although he could not vouch for that (Haast 1948: 193). As it turned out, he did not complete the surveying work until 1868 as that work was often delayed when the Provincial Government made other demands upon his time.

Waitaki Headwaters 1862

Haast's next expedition, which occupied him from January to June 1862, surveyed the headwaters of Canterbury's largest river catchment, the Waitaki, which includes the lakes Tekapō, Pukaki and Ōhau, as well as the rivers and glaciers that feed those lakes. This involved running “rough compass and chain traverses up the three rivers” (Dobson 1930: 33). As mentioned previously, for this expedition Haast was provided with two topographical assistants, Dobson and Young so that he could concentrate more on the geological survey, particularly the search for auriferous rocks, now that gold had been discovered in payable quantities in Otago. Young had worked for Jollie on his 1858–1859 survey of the Mackenzie Basin, an experience that proved invaluable for Haast. Jollie and Young had surveyed the high country between the Rangitata

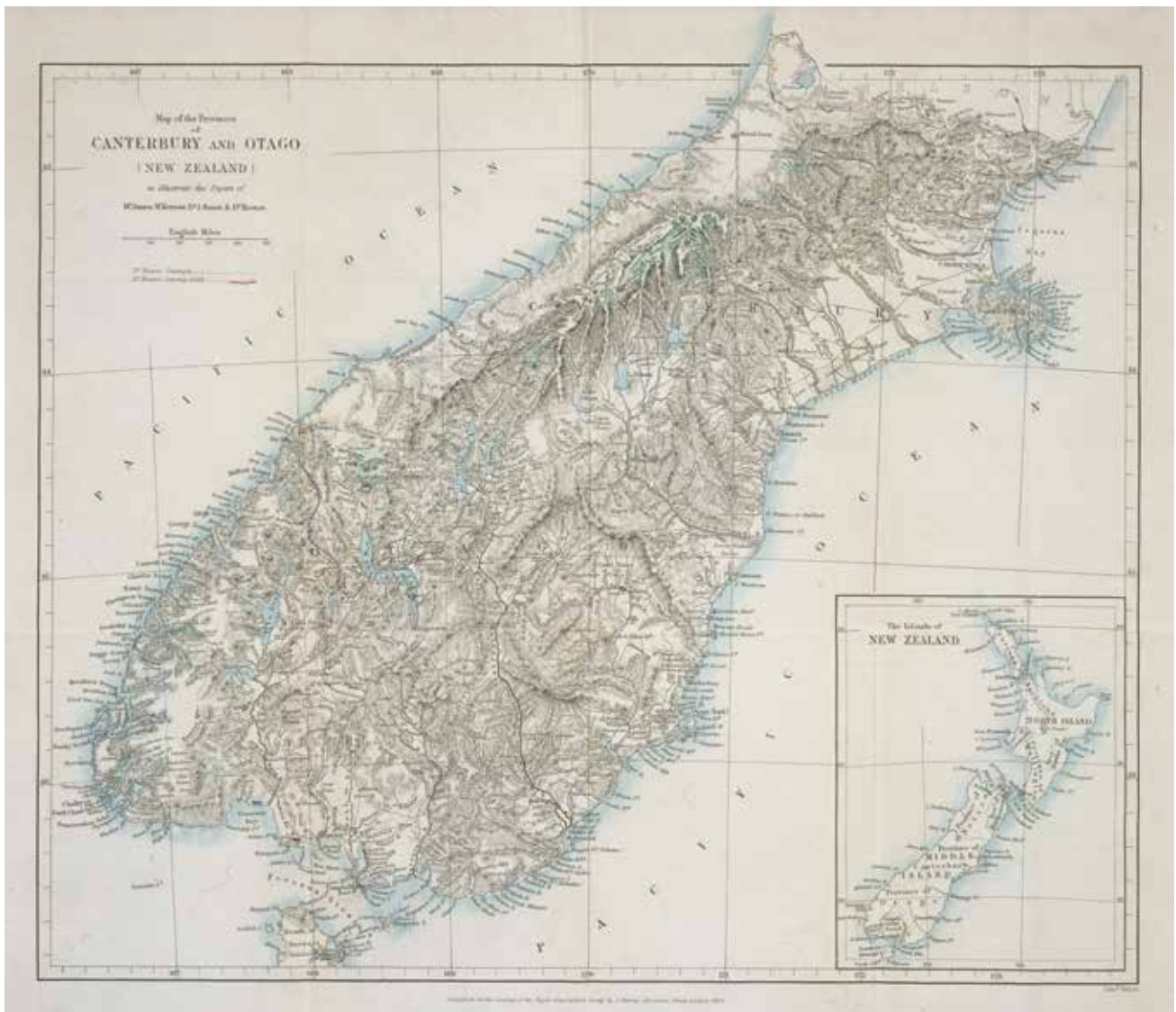


Figure 8. Edward Weller, *Map of the Provinces of Canterbury and Otago (New Zealand) to Illustrate the Papers of Mr. James McKerrow, Dr. J. Haast & Dr. Hector*. Scale c. 26.5 miles to the inch (1:1,676,400). Hand-coloured steel engraving, 295 x 500 mm. Printed for the *Journal of the Royal Geographical Society* by J Murray, 1864. Alexander Turnbull Library MapColl-834atc/1864/Acc.45207

and Waitaki rivers, using only “a prismatic compass [and] a gunters chain” (Jollie 1880: 43). One of Jollie’s maps (Fig. 4), which Haast would have traced before departing Christchurch, gives an idea of the extent of the unsurveyed territory, which basically terminated at the head of each lake. Haast noted in his 1879 magnum opus, *Geology of Canterbury and Westland*, that during the survey conducted by his team “about 130 miles were chained, and numerous points were fixed from the base lines thus obtained”. A later passage provides further insight into Haast’s traverse surveying practice:

between the two main glaciers [Classen and Godley], I established my principal topographical station, and as the ice was here for a considerable distance comparatively smooth and level, we measured a base line, on the two extreme points of which we fixed all the principal features of the mountains around us, connecting them at the same time with some important stations lower down the valley, which we had previously fixed (Haast 1879: 19, 24).

On returning to Christchurch in May, Haast spent several months in ‘closet work’, plotting the topographical and geological maps and writing his report. In his October 1862 submission to the Superintendent, Haast noted that before he could give a “fuller account” of the geology of Canterbury, it would be necessary for him to visit the West Coast, which he proposed “to go thither as soon as possible”. He promised that on his return he would “prepare a more detailed report, together with geological and topographical maps” (Haast 1862: 122).

Haast Pass/Tioripātea and West Coast 1863

In December 1862, Haast revisited Ohau to complete his survey of the headwaters of that lake before turning his attention to the southwest corner of the province, where there was a greater possibility of finding evidence of gold associated with the schist formations, after his failure to find auriferous rock in the Waitaki headwaters. Haast proceeded to survey the headwaters of the Hunter River that fed Lake Hāwea and then the headwaters of Lake Wānaka, both of which were inside the boundary of the Province of Canterbury. As well as



Figure 9. Julius Haast, *Panoramic View of the Southern Alps New Zealand from the Mouth of the Waiau, June 17th 1865*. Watercolour and ink on paper, 214 x 1215 mm. Hochstetter Collection Basel HCB 1.3.2 (Nolden and Nolden 2011: 24–25)

searching for sources of gold, Haast also needed to find a route to the western side of the province. In January 1863, up in the headwaters of the Makarora River, he located an old Māori pass, now known as Haast Pass/Tioripātea, and his party, which included assistant surveyor Young, made the first crossing by Europeans using that route to the west coast (Bradshaw 2022: 45). Haast surveyed the route as they travelled but the rugged topography, mountain torrents and thick bush made chaining impossible for a large part of the trip. Despite this, he was still able to use triangulation from known topographical stations on either side of the Main Divide to prepare a small topographical sketch map (Fig. 6). That map is one of the few extant field sketch maps of Haast's. In a letter dated 3 March, he informed the Superintendent that Young and himself had ascended a peak, which he had named Mount Brewster, and used it as a "topographical" station. At the end of his report Haast commended Young, "who, with great perseverance and under manifold difficulties, conducted the topographical survey".⁵

Mapping Developments

After completing each of these explorations of the Southern Alps, back in the Geological Survey office, on the first floor of the tower of the Provincial Council building, Haast plotted the recently acquired topographical data on his large 4 miles to the inch map, gradually filling in the blank spaces. Although he did not seek to publish an interim topographical map of the Southern Alps until late 1863, earlier that year he shared tracings of his map with the Survey Department. In August 1863 that department published a map of the Province of Canterbury prepared by Assistant Surveyor John Browning (1831–1909) and drafted by Alfred Jarman (1835–1916), which included topographical features mapped on "recent explorations by Dr Haast" (Fig. 7). Unfortunately, this map located Aoraki/Mount Cook at the foot of the Haupapa/Tasman Glacier rather than at its head. Haast sent copies of this map to a number of European scientists and scientific societies, on which he marked in colour the routes of his 1861 to 1863 expeditions.

During the second half of 1863 Haast prepared a large topographical map of the Southern Alps, titled *Province of Canterbury showing the Glaciers and Alpine Range*, and submitted the draft map, along with an accompanying article (published as Haast 1864a) and 12 watercolours by John Gully (1819–1888), based on Haast's field sketches of glaciers, to the Royal Geographical Society in London (Hook and Lorrey 2024). As the editors of the society's

journal were intending to publish papers by James Hector (1834–1907) the Otago Provincial Geologist (Hector 1864), and James McKerrow (1834–1919) the Otago District Surveyor (McKerrow 1864) in the same edition, both of which included a map, a decision was made to compile a map that would incorporate features of all three submitted maps plotted onto a base map of the whole of the lower three-quarters of the South Island. A finely-detailed map (Fig. 8) was produced by a leading English cartographer Edward Weller (1819–1884), which was duly published as a folded insert with the three accompanying articles in 1864. Haast received additional copies of the map once it was printed, but he would have been cross with himself had he realised it perpetuated the Aoraki/Mount Cook error. Haast's routes were marked on the map but he would have been disappointed that other features of the Southern Alps were not as obvious to viewers as they would have been if his map had been reproduced separately on a larger scale. Haast's manuscript map was listed under "Accessions to the Map Room – New Zealand" in the *Proceedings* of the society.⁶

Further Progress in the Field

Rangitata Gorge, Arrowsmith Range and Ashburton Lakes, 1864

Early in 1864 Haast explored the Rangitata Gorge and the Arrowsmith Range, and revisited Lake Heron near the headwaters of the Ashburton River. Later in the winter of that year he investigated the formation of the Canterbury Plains. In his August report to the Superintendent, the Provincial Geologist listed the maps he was currently working on, which included a "topographical sketch map of that part of the province of Canterbury first explored by me, the reconnaissance survey of which was made by me, or under my direction; scale four miles to the inch" (Haast 1864).

West Coast Again, 1865

During 1865 Haast completed two expeditions to investigate the geology of the West Coast of Canterbury Province, particularly as it related to the goldfields. The first of which involved topographical surveying in its later stages, when Haast's party travelled southward from Hokitika along the coast to the Waiho River, then up to the Franz Joseph Glacier, with Haast taking many bearings on peaks and valleys of the Southern Alps along the way. In October of that year, Haast had to make another trip to the West Coast goldfields, but his "second and more onerous duty was to examine the geology and topography of the transalpine route between the Wilberforce branch of the Rakaia River and the Arahura-Styx Valleys"

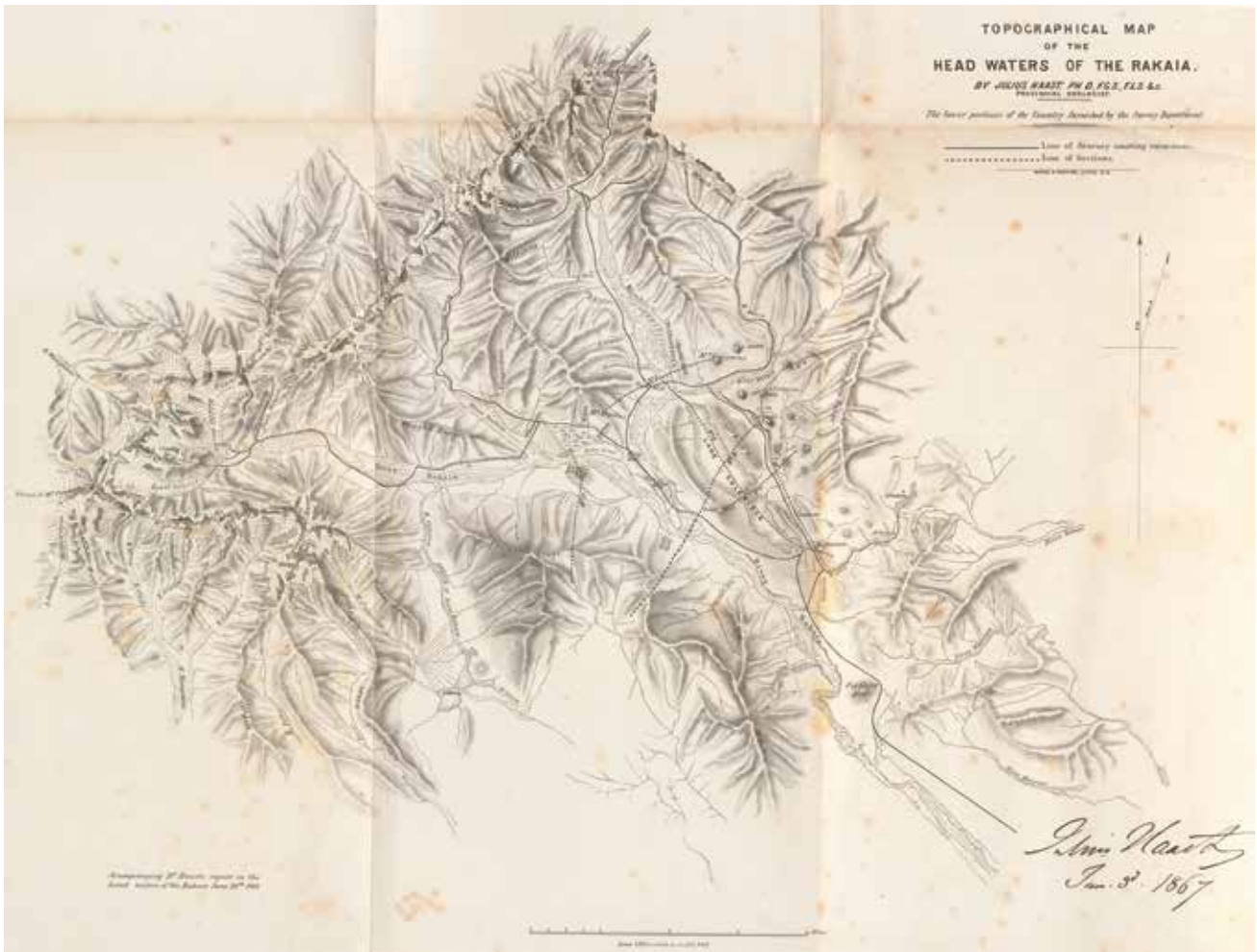


Figure 10. Julius Haast, *Topographical Map of the Headwaters of the Rakaia River*. The lower part of the country furnished by the Survey Department. Signed and dated Julius Haast Jan 3rd 1867. Scale 4 miles to the inch (1:253,440). Lithography, 375 x 485 mm. Ward & Reeves, Christchurch (Haast 1866). University of Auckland, Early New Zealand Books Collection

on the West Coast (Burrows 2005: 64–65), a route he traversed from west to east. After each of these surveys he completed sketch maps of the districts involved and continued to fill in the gaps on his large topographical map of the Southern Alps, using the survey data, sketch maps and topographical sketches (e.g. Fig. 9). According to his son Heinrich, all of the ‘goldfield maps’ were later “destroyed in bonfires of back files by the Land Office, in which they were deposited on the abolition of the Provinces” (Haast 1948: 1065).

Rakaia Headwaters, 1866

In 1866, Haast investigated the headwaters of the last major river system on the eastern side of the Main Divide, the Rakaia and its tributaries. Haast’s party carried out a major geological and topographical survey lasting from February through to April. He acknowledged in the report he submitted on 20 June that “the Survey Department [had] already accurately surveyed the headwaters of the Rakaia proper I had thus two good base lines upon which I could fix the results of my topographical and geological examinations” (Haast 1866: 5). Haast personally prepared (Haast 1866: 51) the very finely detailed map *Topographical Map of the Head Waters of the Rakaia* which, in this instance at least, was published as a folded insert (Fig. 10) in the front of his report after printing was delayed for 6 months.

Five Routes and Altitudinal Accuracy

An essential part of any topographic survey, especially in alpine regions, is the recording of altitudes wherever possible, particularly at topographic stations. As Haast did not indicate altitudes on his published maps, they are usually recorded as an appendix in the accompanying report or scientific paper. In July 1866 Haast submitted a paper to the Royal Geographical Society on the five main routes across the Southern Alps in Canterbury, which was accompanied by a topographical map (Fig. 11) of the province showing the routes, and altitudinal sections of each.

The paper (Haast 1867) was published with the sections and map combined on another impressive map by Weller (Fig. 12). In the concluding section of the paper, titled *On the Value of Barometric Observations for calculating Altitudes*, Haast compared the altitudes he measured barometrically while travelling from eastern Canterbury over Arthurs Pass to the West Coast in 1865, with those recorded by the more reliable spirit-level method when the Arthurs Pass – Otira road to the west coast was constructed by the Public Works Department during 1865–1866. As many of Haast’s altitudes were close to the spirit-level values, although slightly on the high side, Haast concluded that “altitudes calculated from barometric observations ... are nevertheless

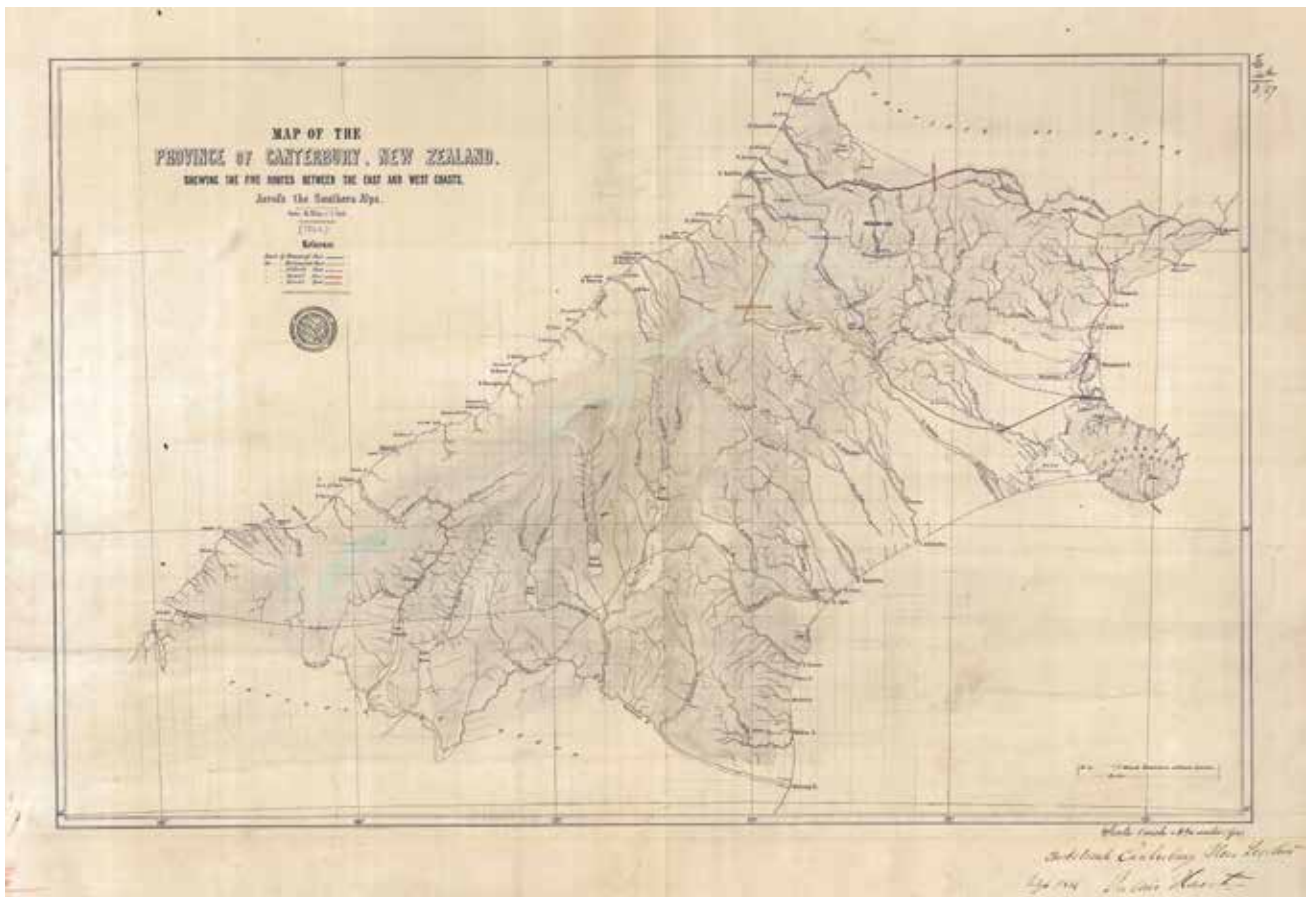


Figure 11. Julius Haast, *Map of the Province of Canterbury, New Zealand, Shewing the Five Routes between the East and West Coast, across the Southern Alps*. Signed and dated: July 6 1866 Julius Haast. The map has been gridded for reduction. Scale 10 miles to the inch (1:633,600). Watercolour and ink on paper, 480 x 750 mm. Archives Royal Geographical Society RGS565849

sufficiently accurate for all practical purposes” (Haast 1867: 338).

Completing the Field Surveying Work

By mid-1866 Haast and his men had explored and surveyed the headwaters of all of the major rivers on the eastern side of the Main Divide, and of many of the major rivers of the western side. In September of that year, Haast informed Joseph Hooker (1817–1911), Director of the Royal Botanical Gardens at Kew, that he was “very busy to plot all my alpine field work which will take me a few months more, but which will make a very interesting map” (Nolden et al. 2013: 104), and Charles Darwin (1809–1882), that he was “just occupied to plot my alpine work on a large scale which will take me another 3 months, but I hope then to publish a map of the Southern Alps proper which will not be uninteresting”.⁷ Ten months later on 11 July 1867, as the mapping project was nearing completion, Haast, with a sense of déjà vu, wrote to Hector, that “there is no money to print my topographical map of the Southern Alps or the geological map of the Province”. Regardless, he went on to say that he could “have both printed at once in Germany, but think that it would be wrong to send them there before all means to have them printed in New Zealand or in England are exhausted. What do you think?” (Nolden et al. 2012: 119). There is no record of a response from Hector to Haast’s question.

Submitting Professionally Drafted Maps of the Southern Alps

During the first half of 1868, Haast employed Jarman to produce a professionally drafted version (Fig. 2) of his topographical manuscript map of the Southern Alps, and an unnamed draughtsman, not Jarman, made a copy of Haast’s geological manuscript map of Canterbury. When completed to his satisfaction, he signed off the topographical map on 30 July, and the geological one on 3 August. By then Haast had completed the report that accompanied the maps, which was submitted to Jollie, who by then was the Secretary for Public Works. In that report Haast stated he had:

finished the Topographical Map of the Interior of this Province, and the Geological Map of the Province of Canterbury and the County of Westland; and that thus my task – according to the contract into which I entered with the Government of this Province – is accomplished I herewith hand these two Maps over to you ... (Haast 1868: 3, 4).

Haast went on to state that his map was only a “reconnaissance survey”, but that it was done “as accurately as work with a prismatic compass can be depended on.” He did not doubt that corrections would need to be made because often he had “obtained only one bearing to remarkable points” (Haast 1868: 3, 4).

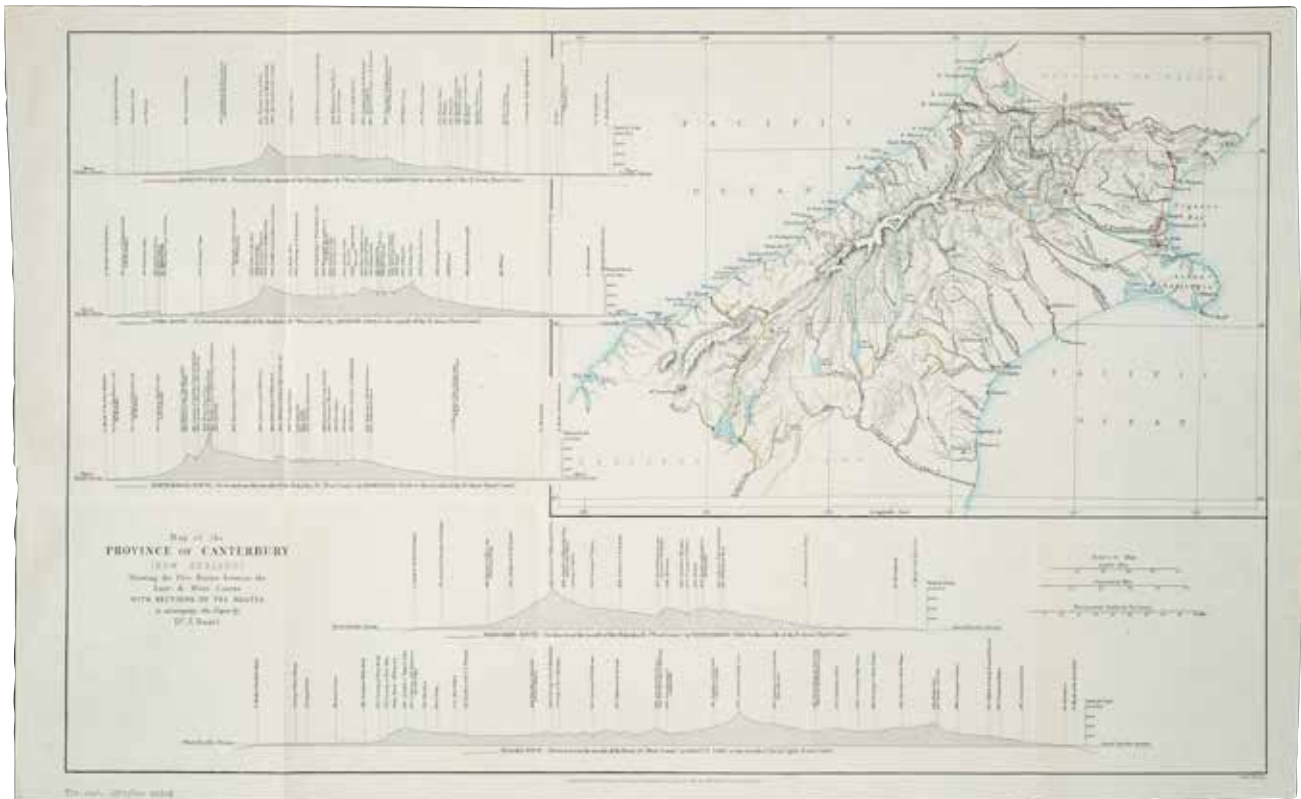


Figure 12. Edward Weller, *Map of the Province of Canterbury (New Zealand). Showing the Five Routes between the East & West Coasts with Sections of the Routes, to accompany the paper by Dr. J Haast.* Scale circa 24 miles to the inch (~1:1,500,000). Hand-coloured steel engraving, 500 x 735 mm. Printed for the *Journal of the Royal Geographical Society* by J Murray, 1867. Alexander Turnbull Library MapColl-834.4atc/1867/Acc.45206

On 7 August Jollie responded:

*I have the honor to acknowledge the receipt of your letter of the 31st ultimo, and of the two maps, which accompanied it viz. the Topographical map of the Interior of this Province and the Geological map of the Province of Canterbury and the County of Westland I have much pleasure in acknowledging the zeal and ability which you have uniformly displayed during your official connection with the Province.*⁸

Publishing his Map of the Southern Alps

Shortly after the handover, Petermann, the leading international geographical publisher, wrote to Haast from Gotha in Saxony, congratulating him on the anticipated completion of his map: “This map will mark a new era in the cartography of New Zealand. It will be a brilliant opus and I look forward to the map with great anticipation”.⁹ In December of that year, Haast wrote again to the Secretary of Public Works stating that Petermann wanted to publish his topographical map of the Southern Alps, and asking whether Jollie would “furnish [him] with a tracing of that Map”, the one Haast had handed over 5 months previously.¹⁰ No record of Jollie’s response has been located but clearly, to Haast’s frustration, a tracing did not eventuate. At some time during the following year Haast decided on an alternative strategy for getting his map published, which was to submit a copy of his map to the Royal Geographical Society as part of an article. In June of 1869 Haast wrote to Sir Roderick Murchison (1792–1871), the then President of

the society, saying that:

*Unfortunately when that map was finished the Provincial Government of Canterbury had become so impoverished that they would not undertake either to have it published or to have a copy made of it, to be presented by you to the Royal Geographical Society. As I had not the time to copy it myself, I at last resolved to have it done by somebody else at my own expense and I hope that I shall be able to send you that copy by next mail, accompanied with the necessary notes in explanation.*¹¹

Haast had employed the draughtsman James Francis McCardell (1823–1916) to make an identical copy of the Jarman map of the Southern Alps, which would have cost him no less than £40.¹² This would have been a very considerable financial cost for Haast who at that stage was only engaged in an honorary role overseeing the establishment of Canterbury Museum as his surveying contract had expired.

By November of 1869 that map (Fig. 13) was ready, and after Mary Haast had made a ‘fair copy’ of the manuscript for her husband, Haast posted them directly to Murchison. In the introduction of his manuscript Haast stated that “the original [of the map] is in the possession of the Provincial Government of Canterbury” (Haast 1869: 1). Murchison quickly refereed Haast’s paper and recommended publication with the map being reproduced on a reduced scale. The editor of the *Journal of the Royal Geographical Society*,

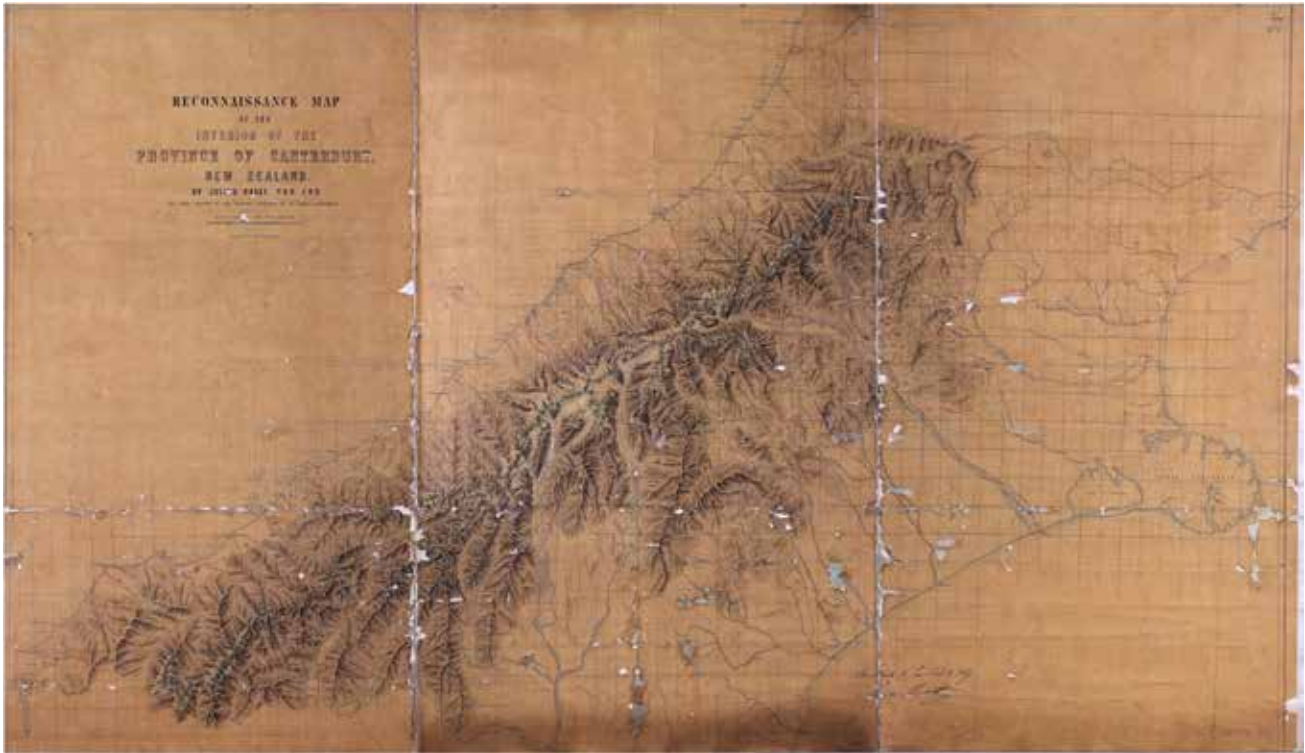


Figure 13. JF McCardell, *Reconnaissance Map of the Interior of the Province of Canterbury, by Julius Haast P.H.D [sic], F.R.S.* The lower portion of the country furnished by the Survey Department. Signed and dated: 25 Novb. 25 1869. The map has been gridded for reduction in scale. Scale 4 miles to the inch (1:253,440). Ink and watercolour on paper, 965 x 1675 mm. Archives of the Royal Geographical Society RGS565850

Henry Bates (1825–1892), wrote to Haast in March 1870 stating that the “map has been laid before the Council & very greatly admired for the beauty of its execution and the insight it gives into the wonderful physical Geography of the Canterbury Province”, and promising to send Haast copies of the map and paper as soon as they were available.¹³

The society again engaged the cartographer Weller, who produced another high quality map. To Haast's delight, his map (Fig. 14), along with the article and table of altitudes, was published in the *Journal of the Royal Geographical Society* later that year (Haast 1870). In his presidential address the following year, Murchison praised Haast's paper, for its “valuable contribution on the physical geography and topography of the New Zealand Alps”, and Haast's “Topographical Map, which itself is a magnificent addition to New Zealand geography” (Murchison 1871: 300).

A Later Map Making Use of Haast's Topographical Surveys

Seventeen years after Haast completed his topographical survey of the Southern Alps, his “original sketch surveys of the Southern Alps” were used to compile an 1885 map (Fig. 15) of the Provincial District of Canterbury, produced by the Survey Office in Christchurch, which in 1876 had become part of the Lands and Survey Department of New Zealand. Intriguingly, this map leaves blank some areas of the Southern Alps in Canterbury that Haast had not been involved in surveying, although he had travelled through them.

Haast's Map on Display Nationally and Internationally in the Nineteenth Century

In the meantime, on 1 October 1870 Haast opened Canterbury Museum in its new, purpose-built premises designed by the Christchurch architect, Benjamin Mountfort (1825–1898). In a photograph (Fig. 16) taken by Dr Alfred Barker (1819–1873) a week after that opening, of what is now known as the Mountfort Gallery, the professionally drafted version of Haast's great topographical map of the Southern Alps made by Jarman could now be seen hanging on the left of the tall chart showing geological profiles, with the professionally drafted geological map to its right.

During the 1870s New Zealand was represented at several international exhibitions, with extensive courts constructed by the colonial government in order to promote trade and settlement. The appointed commissioners requested contributions from Haast and he provided geological maps, profiles and samples, as well as topographical maps. Late in 1872, Haast engaged the draughtsman McCardell, who “completed a very excellent copy of Dr Haast's map of the Southern Alps, for transmission to the Vienna Exhibition.” This second copy by McCardell was displayed at the Interprovincial Exhibition held in Christchurch (16 December to 8 January 1873), which formed part of a process for selecting items to be forwarded to the 1873 Vienna World's Fair (1 May to 31 October 1873). That iteration of Haast's topographical map was pasted onto a large sheet surrounded by twelve full-plate-sized photographs of the mountains, particularly of the glaciers, taken

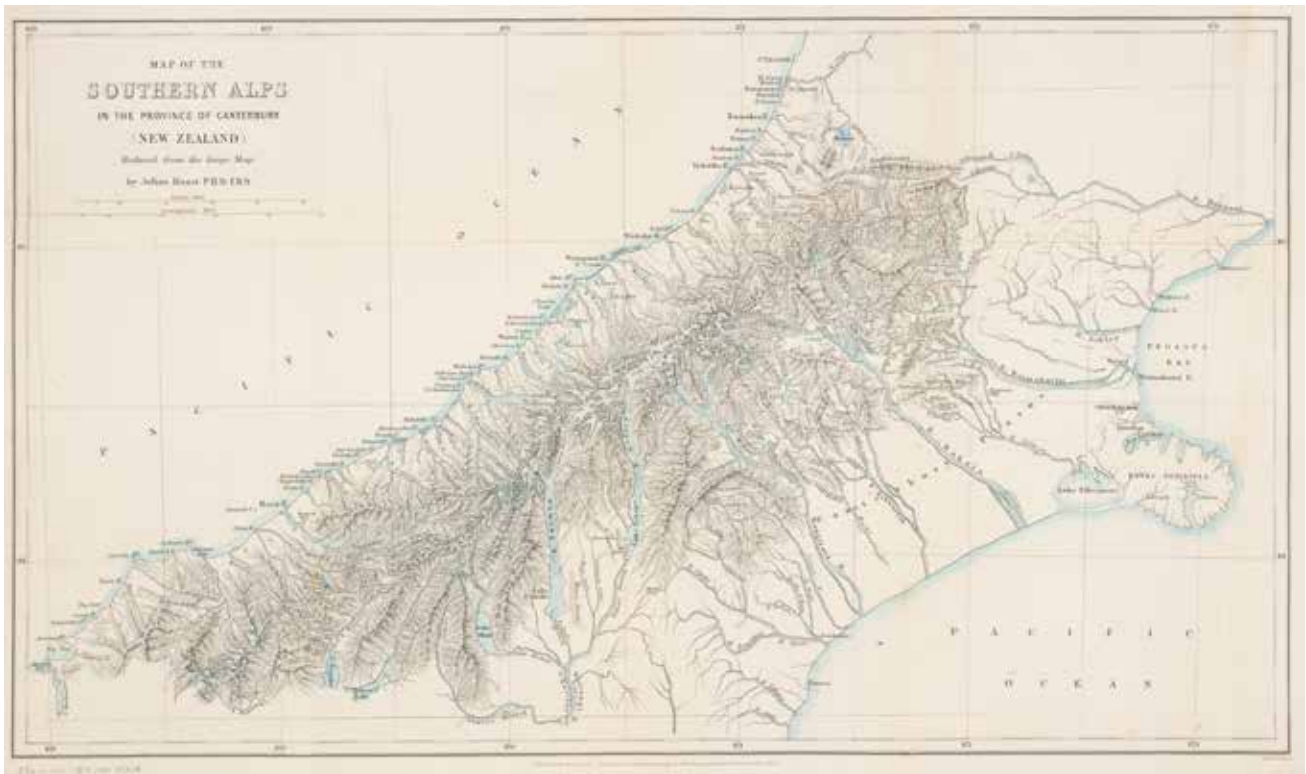


Figure 14. Edward Weller, *Map of the Southern Alps in the Province of Canterbury (New Zealand)*. Reduced from the large map by Julius Haast, P.H.D. [sic], F.R.S. Scale 16 miles to the inch (1:1,000,000). Hand-coloured steel engraving, 345 x 595 mm. Printed for the *Journal of the Royal Geographical Society* by J Murray, 1870. Alexander Turnbull Library MapColl-834.4atc/1870/Acc.45208

by Edward Percy Sealy (1839–1903), Thomas Pringle (1858–1931) and Alfred Burton (1834–1914) (*The Star*, 29 January 1873: 2).

Needless to say, the map was selected for Vienna, with the Colonial Secretary, Julius Vogel (1835–1899), writing to the New Zealand commissioners in Vienna requesting that Haast’s maps be “carefully mounted and varnished, and hung in some prominent position”.¹⁴ There appears to be no photograph showing his map of the Southern Alps on display at that exhibition, but Hochstetter wrote to Haast on 29 August 1873 saying that he had only just managed to get “your alpine map and your geological maps and sections half decently” displayed (Nolden 2013: 163). Regardless, in an article about maps exhibited at the fair, Joseph Lorenz (1825–1911) judged Haast’s map of the Southern Alps to be “the most interesting map of its kind ... among the maps of all nations exhibited” (Klemun 2022: 111).

After the Vienna exhibition closed Hochstetter took responsibility for Haast’s contributions, writing on 22 June 1874: “Your beautiful map of the Alps and the geological map of the Malvern Hills are lying here with me at your complete disposal”. On 21 March of the following year, Hochstetter suggested that Haast might like to attend the International Geographical Congress in Paris later that year so that he could “once more exhibit your alpine map, which is still here with me” (Nolden 2013: 165, 171–172).

Neither the map nor Haast made it to Paris, but the 12 watercolours of the Southern Alps that John Gully painted, based on field sketches by Haast, and the 1864

Topographical Map of the Provinces of Canterbury and Otago (Fig. 8) were displayed at that congress by the Royal Geographical Society (Hook and Lorrey 2024). On 12 January 1876 Hochstetter informed Haast that he had shipped his maps “well stored, soldered in a tin box” to Albert Ottywell (1840–1916), the London agent for Canterbury Province, for him to forward to Haast (Nolden 2013: 174). In the meantime, the commissioners appointed to organise the New Zealand court at the Centennial International Exhibition in Philadelphia (10 May to 10 November 1876), which included Hector, “set about soliciting and purchasing items that could be freighted to Philadelphia. They hoped this could be supplemented by items from the 1873 [Vienna] exhibition that were stored in London” (Nathan 2015: 140), which fortuitously included Haast’s maps. The McCardell iteration of Haast’s map of the Southern Alps, surrounded by twelve photographs of mountains, can be seen hanging on the left side of a photograph (Fig. 17) of the New Zealand court at that exhibition. If he didn’t already know, Haast would have learnt from a report by Hector in a local newspaper (“Philadelphia Exhibition”, *Press*, 7 August 1876: 3) that his map had made it to the United States.

Haast Receives Gold for his Mapping Work

During the 1920s and 1930s, members of the Canterbury Mountaineering Club engaged in exploring isolated alpine regions and climbing unconquered peaks found that “in many places the best available maps were those prepared by Haast in the 1860s” (Nathan 2023: 74). Nearly half a century earlier, the Irish mountaineer Reverend William Green (1847–1919) who, along with

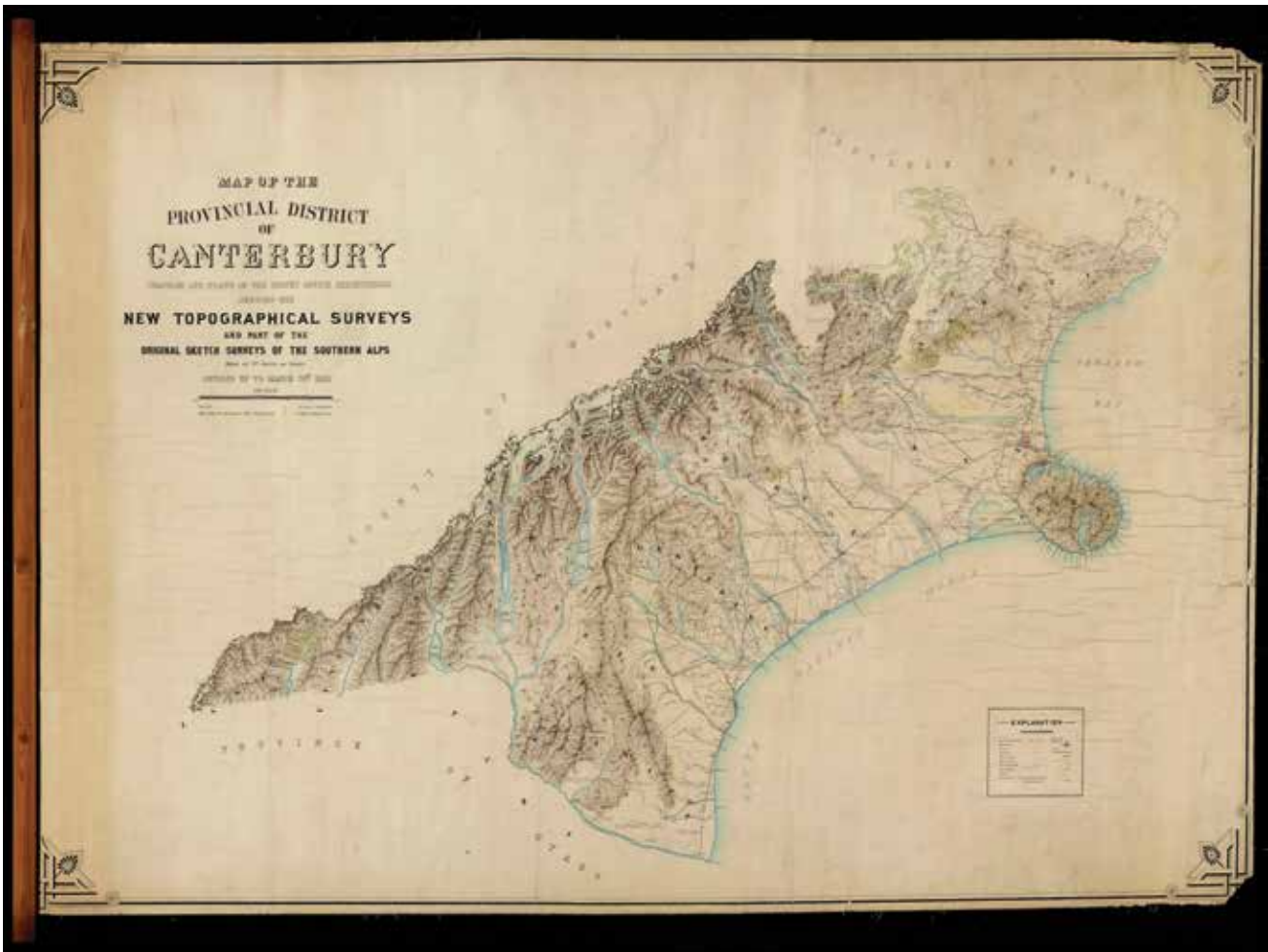


Figure 15. R Schmidt and C Koefoed, *Map of the Provincial District of Canterbury*. Compiled and drawn by the Survey Office Canterbury. Shewing the New Topographical Surveys and Parts of the Original Sketch Surveys of the Southern Alps Made by Dr Julius von Haast. Revisited up to 1885. Scale 4 miles to the inch (1:253,440). Manuscript map, hand-coloured, on linen-backed paper, mounted on wooden rod, 1340 x 1800 mm. Archives New Zealand, Christchurch R22668133

the Swiss mountaineer Emil Boss (fl. 1881–1883) and mountain guide Ulrich Kaufmann (1840–1917), made the “first recorded attempt on the summit” of Aoraki/Mount Cook in March 1882, coming within 20 metres of the summit before being driven back by the weather (Green 1883). Green wrote that he had “studied Dr Haast’s map of the district so closely that all of the peaks seemed familiar” when he arrived there. He also made use of the advice Haast provided on which route to attempt when he met the geologist in Christchurch, although that particular route proved impassable (Green 1883).

On the evening of 7 January 1884, Green read his paper *Recent Explorations of the Southern Alps of New Zealand* to the Royal Geographical Society in London, in which he reminded members that when Haast was “appointed geologist to the province of Canterbury [he] set to work at once to explore the great alpine range which has been called by Captain Cook the Southern Alps”. Green devoted several pages early on in his manuscript to describing Haast’s exploration of Tasman Glacier and his party’s “most interesting expedition up the great southern spur of Mount Cook” (Green 1884: 57–61). In response to an earlier request from Haast,¹⁵ at this gathering Green did his best to

“bring [Haast’s] work forward”, and subsequently he took a “further opportunity of laying your case” for recognition by writing to the secretaries of the society.¹⁶ Green’s efforts on Haast’s behalf paid off as he unofficially informed Haast in a letter dated 14 May that he had just been “elected to a Gold medal The election took place the day before yesterday and I had a note from the Secretary [Henry Bates] this morning. So my suggestion on the subject was just in time, and the general opinion is that you should have had one long ago”.¹⁷

At the Anniversary Meeting of the society held on 26 May 1884, the President, Lord Aberdare (1815–1895), announced that the Patron’s Gold Medal had been awarded to Haast. The awarding of this medal (Fig. 18), which is embossed with the Society’s motto *Ob terras reclusas* (For the discovery of lands) and displays the tools of geographical explorers and cartographers, required the approval of the patron Queen Victoria (1819–1901). The medal was belatedly awarded for Haast’s “extensive explorations in the Southern Island of New Zealand”. The President stated he had been informed that “it had been in the mind of our late President, Sir Roderick Murchison, to propose him for the honour many years ago, in acknowledgment of his



Figure 16. Full-plate glass negative (cropped) showing the Mountfort Gallery in Canterbury Museum, 7 October 1870. Photographer: Alfred Barker. Dr A C Barker Collection, Canterbury Museum 1944.78.68

performances as a bold and enterprising discoverer”, but that Haast had “since established a still higher claim for it in a capacity which we delight to honour, that of a steady scientific worker”. Aberdare went on to describe how when Haast was appointed Government Geologist in about 1860 he at once “commenced the series of explorations which have been the foundation of that great work, his Map of the Southern Alps”. After some “ten years” of exploration Haast compiled the result of his observations “in a great map of the Southern Alps one manuscript copy of which is deposited at Christchurch, while another was sent home and reproduced by our own Society, on a reduced scale, in the 40th volume of the Journal”. That map (Fig. 14) laid down “with singular accuracy the main features of a most complicated ice-clad range”. In conclusion, the President noted that Haast had “aided in the perfection of other provincial maps”, and had given the world “the results of his labours as a geographer, a geologist, and as a naturalist in at least twenty different [scientific] communications”, and stated that it gave him “especial pleasure to send a medal for the first time to New Zealand” (Bates 1884: 415–417).

The Ultimate Fates of Haast’s Draft and Manuscript Maps

Surveying a major part of the Southern Alps was challenging enough, as Green noted in 1884 that Haast’s explorations of the mountains and glaciers a “quarter of a century ago ... were not made without great peril” (Green 1884: 416), but there followed the trials and tribulations of getting his topographical maps of the South Island published, as documented in this article, let alone preserved for future generations to appreciate. The ultimate fates of his draft and manuscript maps are summarised below.



Figure 17. Centennial Photographic Company, 1876 Philadelphia International Exhibition - New Zealand section main building. The inset enlargement shows Haast’s map surrounded by the 12 photographs. Albumen silver print, 216 x 257 mm. Museum of New Zealand Te Papa Tongarewa O.031161

Haast’s draft *Topographical Map of The Central and Western Part of the Province of Nelson, New Zealand, 1861* (Fig. 3) languished unpublished in the archives of the Nelson Provincial Museum until Heinrich produced a carefully drawn, black and white copy, which was published as a folded insert in the back of his biography of Julius (Haast 1948: Map No. 1). Haast’s first topographical map of the Southern Alps proper covered the headwaters of the Rangitata and Ashburton rivers, but that 1861 map was lost, along with his first scientific article, by the Royal Society of Victoria (Nolden and Hook 2023). The draft map *Province of Canterbury showing the Glaciers and Alpine Range*, which Haast sent to the Royal Geographical Society in 1864, is no longer extant. The draft map that the lithographers used to produce the *Topographical Map of the Head Waters of the Rakaia* (Fig. 10) found in the front of his 1866 report, has not been located. The draft *Map of the Province of Canterbury, New Zealand, Shewing the Five Routes* (Fig. 11), which Haast submitted to the Royal Geographical Society in 1866, is still in existence in that society’s archives.

With regard to Haast’s *Reconnaissance Map of the Interior of the Province of Canterbury* drafted by Jarman in 1868 (Fig. 2), in his 1879 magnum opus Haast stated that the map he sent to the Royal Geographical Society in 1869 (Fig. 13) was a “copy” of the “original” which “hangs in the Canterbury Museum” (Haast 1879: 177 footnote). As the map he sent to London is an identical copy of the Jarman-drafted map, this confirms that the latter was still hanging in the Mountfort Gallery a decade after the Museum opened. Furthermore, a photograph of the Mountfort Gallery (Fig. 19) taken by the commercial photographer Theophilus Easter (1832–1913) in either 1890 or 1891 shows that the *Reconnaissance Map* was still hanging in the Mountfort Gallery two decades after



Figure 18. The Royal Geographical Society's Patron's Medal awarded to Julius von Haast in 1884. Cast by William Wyon of the Royal Mint. The rim of the medal is engraved with the text 'Dr Julius von Haast 1884'. Alexander Turnbull Library Curios-005-025

it was first displayed.¹⁸ Surprisingly, that map is now no longer held by Canterbury Museum. After the abolition of the provinces in 1876, the archives of Canterbury Provincial Government, including the maps produced by the Survey Department, were initially placed in the care of the Christchurch office of the recently established Department of Lands and Survey. At some stage, the topographical survey maps were separated from the rest of the provincial documents and became part of what is known as the Black, Red and Green series of maps. Those maps were eventually stored in Canterbury Museum, which was an acknowledged repository of Archives New Zealand. Perhaps because the Jarman-drafted map was originally lent to the Museum by the Provincial Government, that map was assimilated into the historical provincial collection and classified as a Green Map. The Black, Red and Green maps were transferred to the newly built Christchurch repository of Archives New Zealand at Wigram in 2010,¹⁹ where Haast's 'Green Map' now resides, although in a fragile state²⁰ and in need of conservation treatment.

The identical copy of the Jarman-drafted *Reconnaissance Map of the Interior of the Province of Canterbury* that Haast paid McCardell to produce in 1869 (Fig. 13) is still in existence in the archives of the Royal Geographical Society, but the location of the second identical copy that McCardell drew in 1872 for the Vienna World's Fair, if still in existence, is unknown.

Unfortunately, the original manuscript map of the Southern Alps that Haast had plotted over a number of years, upon which the map drafted by Jarman was based, is no longer extant. Most likely it was disposed of some time after the professionally drafted version was completed. The same appears to be true for Haast's original manuscript map of the western part of the Province of Nelson.

Conclusion

Despite the loss of the manuscript topographical maps that Haast had plotted, the legacy of his pioneering survey work in the Southern Alps endures, not only in the extant topographical cartography itself, but also through the rich array of toponyms he bestowed on landmarks and other geographical features. Haast is better known for his geological survey work and cartography, as represented by numerous published reports and a variety of maps, but this paper has shown the importance of his contribution to the topographical mapping of a major part of the South Island. Thus



Figure 19. Theophilus Easter, *The Museum, Christchurch* [c. 1890-1891], cropped. The inset enlargement shows Haast's manuscript map of the Southern Alps. Albumen print, 237 x 196 mm, with debossed words "T Easter Photograph" lower right. Collection of Akaroa Museum.

Haast helped promote Canterbury through maps that were exhibited and published internationally, including those produced by the Royal Geographical Society, which belatedly paid tribute to Haast for those efforts in rewarding him with their gold medal, the first to go to New Zealand.

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Endnotes

1. Correspondence of Heinrich von Dechen and Julius Haast, 186–1864 and 1886–1887, Alexander Turnbull Library, MS-Papers-0037-168 and MS-Papers-0037-178
2. Julius Haast, *List of Plant, in use of the Geological Survey*, 8 November 1861. Archives New Zealand, Christchurch, R22199235
3. Session 17 - Papers and Returns - Correspondence between the Superintendent and Julius Haast on the subject of the geological survey of the Province of Canterbury - 22 October 1861. Archives New Zealand, Christchurch, R20592424
4. Archives New Zealand, Christchurch, R22199235
5. "Further News from the West Coast", *Lyttelton Times*, 1 April 1863, 4.
6. *Proceedings of the Royal Geographical Society*, Vol. 8, No. 3, issued 28 April 1864: 55–57.
7. Letter from Julius Haast to Charles Darwin, dated Christchurch, 8 September 1866. Darwin Correspondence Project, "Letter no. 5207", accessed on 18 March 2024, <https://www.darwinproject.ac.uk/letter/?docId=letters/DCP-LETT-5207.xml>
8. Letter from Haast to Jollie, dated 7 August 1868, Alexander Turnbull Library, MS-Paper-0037-016-29, -30
9. Letter from Petermann to Haast, dated 10 August 1868, Alexander Turnbull Library, MS-Paper-0037-216-08
10. Letter from Jollie to Haast, dated 18 December 1868, Archives New Zealand, Christchurch, R8418127
11. Undated copy of a letter from Haast to Murchison sent to Hooker on 9 June 1869 (Nolden, Mildenhall and Nathan 2013, 142–143).
12. Letter from Haast to Petermann, dated 23 July 1868, Forschungsbibliothek Gotha, Briefsammlung Julius Haast, Sammlung Perthes, Schriftleitung PGM, Mappe 273.
13. Letter from Bates to Haast, dated 8 March 1870, Alexander Turnbull Library, MS-Papers-0037-029-21
14. The Vienna Exhibition, (papers relating to). Appendix to the journals of the house of representatives, 1873 Session I, H-05 page 9.
15. Letter from Haast to Green, dated 15 January 1884, Alexander Turnbull Library, MS-Papers-2308
16. Letter from Green to Haast, dated 17 March 1884, Alexander Turnbull Library, MS-Papers-0037-068-11
17. Letter from Green to Haast, dated 14 May 1884, Alexander Turnbull Library, MS-Papers-0037-068-12
18. In a letter to the *Press* dated 31 May 1982, the Acting Curator of Canterbury Museum Frederick Hutton stated that Mr Easter took photographs for the Museum during the period 1890–1891.
19. Email from Caroline Etherington to George Hook, dated 7 March 2024.
20. Email from Rosalie Ballantyne to George Hook, dated 15 August 2023.

References

- Bates HW. 1884. Geographical Notes. *Proceedings of the Royal Geographical Society* 6 (2).
- Bradshaw J. 2022. "never anybody has been in that part of the country": Contextualising Haast's Journey over Tioripātea. *Canterbury Museum Bulletin* 11.
- Burrows CJ. 2005. *Julius Haast in the Southern Alps*. Christchurch: Canterbury University Press.
- Dobson AD. 1930. *Reminiscences of Arthur Dudley Dobson Engineer 1841–1930*. Wellington: Whitcomb and Tombs.
- Easdale N. 1988. *Kairuri: the Measurer of Land*. Petone: Highgate/Price Milburn.
- Green WS. 1883. *The High Alps of New Zealand*. London: Macmillan.
- Green WS. 1884. Recent Explorations in the Southern Alps of New Zealand. *Proceedings of the Royal Geographical Society* 6 (2): 57–70.
- Haast HF von. 1948. *The Life and Times of Julius von Haast: Explorer, Geologist, Museum Builder*. Wellington: HF von Haast.
- Haast J. 1861a. *Report of a Topographical and Geological Exploration of the Western Districts of the Province of Nelson*. Nelson: C and J Elliott.
- Haast J. 1861b. On The Physical Geography and Geology of New Zealand principally in reference to the Southern Alps. Manuscript. [Copy by Ernst Bernhard Heyne (1825–1881) of Haast's manuscript is held in the Hochstetter Collection Basel].
- Haast J. 1862. Report on the Geology of the Province of Canterbury. *New Zealand Government Gazette* IX (XVIII).
- Haast, J. 1864a. Notes on the Mountains and Glaciers of the Canterbury Province, New Zealand. *Proceedings of The Royal Geographical Society* 34.
- Haast J. 1864b. Report of the Geological Survey of the Province of Canterbury. *Provincial Council Canterbury Session XXII*.
- Haast J. 1866. *Report on the Headwaters of the River Rakaia*. Christchurch: Provincial Government of the Province of Canterbury.

- Haast J. 1867. Altitude Sections of the Principal Routes between the East and West Coasts of the Province of Canterbury, New Zealand, across the Southern Alps. *Journal of the Royal Geographical Society* 37.
- Haast J. 1868. Report of Dr J. Haast, Provincial Geologist, on the completion of the Topographical and Geological Survey of the Province of Canterbury. *Proceedings of the Provincial Council of Canterbury Session XXX*.
- Haast J. 1869. Notes to accompany the Topographical Map of the Southern Alps in the Province of Canterbury, New Zealand. [Manuscript held in the archives of the Royal Geographical Society in London].
- Haast J. 1870. Notes to Accompany the Topographical Map of the Southern Alps, in the Province of Canterbury, New Zealand. *Journal of the Royal Geographical Society* 40.
- Haast J von. 1879. *Geology of the Provinces of Canterbury and Westland: a report comprising the results of official explorations*. Christchurch: Provincial Government of the Province of Canterbury.
- Hector J. 1864. Expedition to the West Coast of Otago, New Zealand; With an Account of the Discovery of a Low Pass from Martin's Bay to Lake Wakatipu. *Journal of the Royal Geographical Society* 34.
- Hochstetter F von, Petermann A. 1864. *Geological and Topographical Atlas of New Zealand: six maps of the provinces of Auckland and Nelson*. Auckland: T Delattre.
- Hook G, Lorrey AM. 2024. Depiction and description: insights into Southern Alps glaciers conveyed by John Gully's paintings and Julius Haast's paper. *Journal of New Zealand Studies* 38.
- Johnston MR, Nolden S. 2011. *Travels of Hochstetter and Haast in New Zealand*. Nelson: Nikau Press.
- Johnston MR, Nolden S, Hoke L. 2012. *Hochstetter's Nelson Diary: 6 September – 2 October 1859 and Dun Mountain Report*. Wellington: Geoscience Society of New Zealand.
- Johnston MR, Nolden S. 2014. *Hochstetter's First Nelson Diary 27 July – 5 September 1859*. Takaka: Geoscience Society of New Zealand.
- Jollie E. 1880. Reminiscences 1841–1865. Manuscript, Alexander Turnbull Library, MS-Papers-4207
- Klemun M. 2022. Haast, Hochstetter, New Zealand and the 1873 World Exhibition in Vienna: Mobilizing Nature by Knowledge, Objects, Labels and Inscriptions. *Canterbury Museum Bulletin* 11.
- Langer W. 1992. Der Bonner Neuseelandforscher Sir Johann Franz Julius Haast (1822–1887). *Bonner Geschichtsblätter* 39.
- Lovell-Smith B. 1988. *Maps: a catalogue of historical maps in the Canterbury Museum*. Christchurch: Canterbury Museum.
- McKerrow J. 1864. Reconnaissance Survey of the Lake Districts of Otago and Southland, New Zealand. *The Journal of the Royal Geographical Society of London* 34.
- Murchison RI. 1871. Address to the Royal Geographical Society. *Proceedings of the Royal Geographical Society of London* 15 (4).
- Nathan S. 2015. *James Hector: Explorer, Scientist, Leader*. Lower Hutt: Geoscience Society of New Zealand.
- Nathan S. 2023. Julius von Haast and the Naming of Topographic Features. *Geoscience Society of New Zealand: Journal of Historical Studies* 75.
- Nolden S. 2013. *The letters of Ferdinand von Hochstetter to Julius Haast*. Geoscience Society of New Zealand miscellaneous publication 133K.
- Nolden S. 2017. *Ferdinand von Hochstetter: Briefe aus dem Böhmerwald*. Ottensheim: Edition Thanhäuser.
- Nolden S, Burns R, Nathan S. 2012. *The Correspondence of Julius Haast and James Hector 1862–1887*. Geoscience Society of New Zealand miscellaneous publication 133D.
- Nolden S, Hayward BW. 2023. *Hochstetter's Auckland Dairy*. Wellington: Geoscience Society of New Zealand.
- Nolden S, Hook G. 2023. Julius Haast's first scientific paper: the long-lost Royal Society of Victoria manuscript of 1861 rediscovered. *Geoscience Society of New Zealand: Journal of Historical Studies* 74: 1–56.
- Nolden S, Mildenhall E, Nathan S. 2013. *The correspondence of Julius Haast and Joseph Dalton Hooker, 1861–1886*: Geoscience Society of New Zealand miscellaneous publication 133H.
- Nolden S, Nolden SB. 2011. *Hochstetter Collection Basel: Part 1 - New Zealand Paintings & Drawings*. Auckland: Mente Corde Manu.
- Nolden S, Nolden SB. 2013. *Hochstetter Collection Basel: Part 3 - New Zealand Maps & Sketches*. Auckland: Mente Corde Manu.
- Report & Evidence of the Select Committee of the Provincial Council of Canterbury on the Public Works, Surveys, &c. 1862. Provincial Government of Canterbury.