BURROWS C. 2005. *Julius Haast in the Southern Alps*. Canterbury, Canterbury University Press. 216pp. ISBN 1-877257-08-7, hardback. NZ$49.95, $29.97.

The publisher's release advertising this book has as its key theme 'Celebrating the man who put Canterbury/Westland on the map', a play on words as Haast not only made internationally significant contributions to glaciology and glacial geology, but also made some of the first comprehensive maps of regions little-known to Europeans on New Zealand's South Island. Indeed, this reflects Colin Burrows' stated aim of bringing Haast to the public's attention. The book is well illustrated and fortunately includes prints of some of Haast's impressive watercoloured sketches of many key areas he visited, as well as the first maps of the spectacular high country areas in New Zealand.

The first three chapters set the scene of life in New Zealand in the latter half of the 19th century, in which Haast found himself as an immigrant from Europe. This involves an integration of the initial settlement and colonization of New Zealand by the *pakeha* (the indigenous Maori name for New Zealand's white settlers), Haast's early life and personal history and his arrival and first work in New Zealand, and lifestyles on Haast's arrival, specifically in the city of Christchurch and Canterbury Province on the South Island.

Chapters 4 and 5, 'The mountains and glaciers 1861–62' and 'The mountains and glaciers 1863–79', describe conditions and events on Haast's first and subsequent scientific expeditions into New Zealand's Southern Alps. The latter chapter includes some brief mention of Haast's ideas on glacial history in the area and citations of his published works. Continuing the chronological sequence, but going beyond Haast's work, chapter 6, 'Glaciers of the Southern Alps 1860–2000', includes a layman's description of how glaciers work and then goes on to document the Holocene history of retreats and downwasting. It presents colour photographs and glacial geological maps comparing Haast's mapped positions to locations in the 1990s. Burrows also includes a discussion of how climatic variations drive the snowline up and down, and consequently influence glacial mass balance; concluding that in Haast's time the climate was cooler, with New Zealand more in the grip of Antarctic air and water masses, with frequent sightings of Antarctic icebergs offshore.

Using the appropriate literature, Burrows reviews what is known of the older glaciations in chapter 7, 'Glaciers of the Southern Alps in the past 14,500 years'. The review includes a table of all known radiocarbon dates and leads to a discussion of past climate based on various types of proxy records, to ultimately place New Zealand's climate history through this period in a global context. In chapter 8, 'Haast and older glaciations', Haast's and his compatriot Ferdinand Hochstetter's observations are evaluated relative to what is known and understood today, with an explanation that initially Haast interpreted all of the glacial deposits as being glacimarine, following the 'drift' hypothesis. Later, in 1864, Haast followed the Agassiz theory that had gained acceptance, and produced a map of 'The Great Glacier Period'. After further fieldwork Haast recognized the erosive power of glaciers and realized there were numerous episodes within the 'Great Glaciation'. However, he did not consider climate as the prime driver of the South Island's glaciations, rather that they were a result of tectonics – primarily the uplift of the Southern Alps. Burrows ends this chapter by synthesizing what he believes were Haast's prime contributions to New Zealand geology, and climatic and glacial histories, with the following being of global relevance: (i) weak friable rock in the mountains provides large volumes of glacial deposits; (ii) modern landforms may be relict from glaciations prior to the most recent one; and (iii) rock types within glacial deposits are helpful in interpreting glacial history.

The chronological theme is extended in chapter 9, 'Two and a half million years of South Island glaciation', where Burrows presents another literature synthesis as of 2001, integrating land and marine records (excluding sequence stratigraphic literature). Three topics are reviewed in detail: Canterbury and Westland glacial events, the Kaihinu Interglacial (125–75 kyr) and the Otira Glaciation (75–40 kyr). The latter includes a lengthy discussion of palaeo-environmental conditions with climatic inferences. The chapter ends with a brief evaluation of how this South Island record relates to the record of events in the North Island and then globally using a selection of particular proxies.

The last chapter, 'Haast's scientific achievements in the Southern Alps', follows the stated goal of the book and impresses the reader with a sense of Haast the man, and places his accomplishments in historical context within the history of New Zealand geology and glacial geology, and within the societal development of Canterbury.

Finally, the book includes four appendices: 'Landscape features named by Haast', 'Academic and other awards made to Haast', 'Dating methods applicable to natural events in the Aranui period in the Central South Island' and 'Dating and correlation methods applicable to natural events in the New Zealand pleistocene', and a glossary.

In summary, this book is of great value, especially its reproductions of Haast's maps and sketches and its photographs demonstrating how the modern settings have changed. Although more recent and yet-to-be-published research will advance our understanding of glacial history of the central South Island, Burrows does a valuable service to the community in summarizing, through descriptions and comparisons, tables and maps, what is understood about the topic as of 2001. He certainly achieves his goal of relaying the importance of Haast's contributions to glacial geology, and further demonstrates his own breadth and contributions to understanding New Zealand's glacial history.

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