

The author list is an impressive register of world-leading scientists in the field of Antarctic studies. It is a testament to the editors that the individual chapters not only hold well as discrete articles, but blend together effectively to ensure the book has an organised and appropriate structure and flow. Many of the papers refer to each other, lending solidity to the stories put forward.

The book begins with an overview of the volume by the editors. This preface provides both a well-conceived historical context of the issues that the book addresses and a finely worded synopsis of the major findings that it records. The book is subsequently organised into five parts. The first is called the 'Setting,' in which there are two chapters on the physiography of the present-day ice sheet and the geological setting on which the ice sheet rests. In part two, the 'History' section, three chapters describe what is known about the changes to the WAIS that occurred in the recent geological past. For example, information about the last glacial–interglacial cycle is recorded in sea-floor sediments bordering the ice sheet, while more recent information (from the Holocene) is derived from the ice itself. Part three presents two chapters about the external controls that affect the WAIS, namely the ocean conditions and the sub-glacial geology. The oceans surrounding West Antarctica are important because they supply moisture to the atmosphere, which eventually leads to snowfall on the ice sheet. Thus, changes to the ocean conditions will cause changes to the ice-sheet mass balance and, hence, its configuration. Geological controls are also critical to the manner in which ice flows. It has been recently proposed that fast-flowing rivers of ice, called ice streams, are controlled by the sub-glacial geology. Changes to the geological setting therefore affect the flow of the ice sheet and, once again, its configuration. The fourth section, entitled the 'Flow' of the ice sheet, includes three papers on the dynamics of the WAIS. The discussion is based largely on field and remote-sensing measurements. In addition, a fourth chapter shows how these measurements can be used to construct numerical models of the ice sheet. This organisation is well thought out, because it is on numerical models that predictions about future changes to the WAIS will be based. Finally, the book includes a section on 'Case studies,' in which four articles present the current knowledge of four critical regions of the WAIS (Rutford Ice Stream, Pine Island Glacier, and ice streams B and C). The investigation of WAIS ice streams is critical to the subject of ice-sheet stability because these systems transport huge quantities of ice from the interior of the ice sheet to its margin. Importantly, one of these ice streams, Ice Stream C, has 'switched off' in the very recent past (30–130 years ago), which suggests that ice streams are not necessarily constant features in an ice sheet, but are susceptible to changes. These changes, and the causes behind them, are discussed in detail.

This book is excellent for a number of reasons. First, the idea behind the work is important and timely. I know of no other book that covers this subject area. Second, the

authors of the various chapters are highly regarded experts in their fields, which adds robustness to the arguments presented. Third, the flow of the book is extremely well organised and thought out. The editors deserve special praise for maintaining a strict line on the length of articles (they are all concise) and the use of cross-referencing, which does a lot to make certain the book holds well together as a single volume. I also find the book excels in combining information from a variety of techniques and subjects. For example, data referred to are derived from field measurements (including borehole drilling), satellite remote sensing, airborne geophysics, and shipborne geophysics. Further, the scientific disciplines covered in the book comprise glaciology, marine and terrestrial geology, climatology, and oceanography.

This book not only provides a benchmark of the current understanding of the WAIS but, in doing so, shows how such knowledge is possible only when information from a variety of techniques and subjects is combined. This work implies to me that future predictions of the stability of the WAIS will not be made by glaciologists. Instead, the ability to make such predictions will only be possible to those who have an appreciation for Earth systems science as a whole. I recommend this volume with much enthusiasm. (Martin J. Siegert, Bristol Glaciology Centre, School of Geographical Sciences, University of Bristol, Bristol BS8 1SS.)

**THE ICE MASTER: THE DOOMED 1913 VOYAGE OF THE KARLUK.** Jennifer Niven. 2000. London: Macmillan. xiv + 402 p, illustrated, hard cover. ISBN 0-333-77060-6, £16.99.

*Karluk*, one of the vessels of the Canadian Arctic Expedition, led by Canadian/American explorer Vilhjalmur Stefansson, and bound initially for Herschel Island, entered the pack ice on 1 August 1913 between Point Hope and Point Barrow in the Chukchi Sea. By late August, she was solidly beset just east of Prudhoe Bay. Initially the ice drift carried her east, but then it reversed and the ship began to drift steadily westwards. On 20 September, Stefansson, accompanied by two of the expedition's scientists, his secretary, and two Alaskan Eskimos, left the ship to sledge ashore, ostensibly to hunt caribou. Captain Bob Bartlett, a Newfoundlander with vast experience of handling ships in ice and in dog sledge travel, was left in charge of the ship.

*Karluk* drifted generally westwards until, on 10 January 1914, she was crushed by the ice and sank, some 130 km north of Ostrov Vrangelya (Wrangel Island). Fortunately there was plenty of time to offload a substantial quantity of equipment and provisions on to the ice, and a relatively comfortable camp was set up. Bartlett's plan was to wait until the days were longer and temperatures were somewhat higher and then, having installed a series of depots along the way, to guide the entire ship's personnel ashore, using dog sledges to transport equipment and supplies. A vanguard party of four men unfortunately disappeared; their remains were found on small, rocky Ostrov Geral'da (Herald Island) in 1924. Then a splinter party of four men, led by Dr Alistair

MacKay, who had been in the Antarctic with Shackleton and was critical, even contemptuous, of Bartlett and his methods, set off separately, man-hauling sledges. None of this group reached land.

Despite almost insurmountable pressure ridges, Bartlett and his party safely reached the north coast of Ostrov Vrangelya on 12 March; leaving instructions that the group should disperse themselves in a number of camps around the island to improve their hunting prospects, on 18 March Bartlett set off with Kataktovik, an Alaskan Eskimo, to cross Long Strait to the Siberian mainland with the intention of raising the alarm. They reached the mainland and headed east, reaching Bukhta Provideniya on 16 May and then St Michael's, Alaska, on 27 May. From there Bartlett sent a telegram to Ottawa to notify the authorities of the crisis. Meanwhile, on the island, with no effective leadership, the group had disintegrated into a number of squabbling factions. There turned out to be relatively little game on the island, and they were soon reduced to a diet of almost straight pemmican. Most of the party fell ill at different times and many suffered severely from frostbite. Three men died, one of them from a gun shot to the head, under very suspicious circumstances. The survivors were rescued by an Alaskan trading schooner on 7 September 1914. The total death toll was 11 men.

Captain Bartlett published an account of the unfortunate expedition soon after his return home (Bartlett and Hale 1916). Then, 60 years later, the youngest of the expedition's scientists, magnetician William McKinlay, at the age of 85 published an account of the expedition as seen from his perspective (McKinlay 1976). In it, while somewhat critical of Stefansson for abandoning the ship and her people, McKinlay refrained from 'taking the gloves off.' But for the next seven years, until his death at the age of 93, he worked on drafts of a more candid account of what had happened on the Canadian Arctic Expedition and of how he and the other survivors viewed Stefansson's behaviour — and much else.

Jennifer Niven has, to some extent, inherited McKinlay's unfinished project. Working from his unpublished drafts and voluminous notes; from the diaries of such participants as Jack Hadley, Bjarne Mamen, and John Munro; and from interviews with various relatives of the expedition members, she has produced a detailed, blow-by-blow account, which focuses particularly on events following the sinking of the ship, on the seemingly endless, starving months on Ostrov Vrangelya, and on the frictions and petty squabbling among the survivors on the island. Unlike McKinlay's earlier book, Niven's does not equivocate. For example, she states categorically that Stefansson had no intention of returning to the ship when he left her to go ashore on his 'hunting trip.' In this she is probably correct; but at the same time, it seems likely that Stefansson felt that *Karluk*, especially under Bartlett's command, was in no particular danger. Niven also reports that McKinlay was convinced that fireman G. Breddy's death was not a case of suicide and that he had been shot by Robert Williamson; among other things, the revolver with which he was shot was not found in his

hand, and his hand was not in the configuration which one would expect, had he shot himself.

Altogether Niven is to be commended for writing a well-researched, detailed account of one of the most tragic expeditions in the history of the Arctic. In particular she has dealt with aspects of the deteriorating situation on Ostrov Vrangelya that have previously tended to be glossed over. It is not a pretty story, but a candid description of how an effectively leaderless group can quickly go to pieces when under pressure.

One minor weakness, however, is her use of peculiar and inaccurate terminology when describing sea ice. Thus, on page 141, a lead is referred to as a 'chasm'! On page 152 is the strange statement that 'packs crashed into packs.' This is the first time that this reviewer has encountered the word 'pack' in the plural when used to describe sea ice. The author should have acquainted herself with the official nomenclature of sea ice, as published by the World Meteorological Organization, for example. The same sort of remarks apply to her ornithological terminology. The survivors on Ostrov Vrangelya killed large numbers of what Niven calls 'crowbills.' This is not even an accepted common name for any species. They were likely one of the Alcidae, most probably dovekies (little auks) (*Alle alle*). But why does she keep us guessing? In similar fashion, what Niven calls 'pirate gulls' are probably one (or more) of the jaegers (Stercorariidae).

A more serious fault is that Niven has uncritically accepted Bartlett's and Stefansson's statement that on 4 August the icebreakers *Taymyr* and *Vaygach* of the Imperial Russian Navy had been within 15 km of Ostrov Vrangelya, unsuccessfully attempting to rescue the survivors, but that when they had heard of the outbreak of World War I by radio, they had been ordered to abandon the rescue attempts and return to active duty. In fact by August 4 neither icebreaker had been north of Bering Strait; they had heard of the plight of the *Karluk* survivors at Bukhta Provideniya on 28 July. *Taymyr* had then crossed to Nome to get further details, arriving there on 3 August (as was reported in the *Nome Nugget*). On hearing of the outbreak of the war next day, *Taymyr* steamed back west to Anadyr' to request further instructions from Moscow; the two icebreakers were ordered to continue with their scheduled mission (the transit of the Northern Sea Route to Arkhangel'sk) after attempting to rescue the *Karluk* survivors; *Vaygach*, meanwhile, headed straight for Ostrov Vrangelya.

By 18 August *Vaygach* was beset in the ice some 24 km off Mys Gavay (Cape Hawaii); *Taymyr* reached the same area on that date, but she too was unable to get closer to the island. Meanwhile *Vaygach* became totally incapacitated by an ice tongue that became jammed in her propeller. After considerable effort, a diver managed to saw through the ice tongue, but *Vaygach* had already lost a propeller blade. Having escaped from the ice, the two icebreakers returned to Kolyuchinskaya Guba where they bunkered from a collier. About a week later they tried repeatedly over a two-day period to reach Ostrov Vrangelya, but each attempt was

foiled by heavy ice; finally they had to abandon their efforts and return to their scheduled mission of attempting the Northern Sea Route. It is unfortunate that Niven makes only vague, imprecise mention of these Russian efforts, the details of which have been readily available in English for 25 years (Starokadomskiy 1976).

Another major criticism concerns cartography. An accurate map of Ostrov Vrangelya is essential to try to follow the complex comings and goings of the various splinter groups of survivors on the island over the summer of 1914. Niven has supplied a map at the end of the book, but makes no reference to it in the text. Unfortunately this map is a tracing of Bjarne Mamen's sketch map of the island from his diary. It bears little resemblance to the true shape of Ostrov Vrangelya, and no scale is provided. Accurate, detailed maps of Ostrov Vrangelya are fairly readily available nowadays. On a related matter, it would have helped if the author had added all the official Russian names of locations mentioned (both in the text and on the map).

Despite these shortcomings, however, Niven has produced an excellent book, well illustrated with original photographs. As an accurate, gritty account of one of the most tragic and preventable disasters in Arctic history, it represents a valuable addition to the literature. Having inherited MacKinlay's task, she has fulfilled that task admirably, and the book represents a fine memorial to him, and to the 11 victims of Stefansson's chaotic Canadian Arctic Expedition. (William Barr, Arctic Institute of North America, University of Calgary, 2500 University Drive NW, Calgary, Alberta, T2N 1N4).

#### References

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**THIS EVERLASTING SILENCE: THE LOVE LETTERS OF PAQUITA DELPRAT & DOUGLAS MAWSON.** Nancy Robinson Flannery (Editor). 2000. Melbourne: Melbourne University Press. xx + 154 p, illustrated, hard cover. ISBN 0-522-84870-2. £19.50.

'The only way to cope with the grind of the trail is with the support of those you love the most.' In this one sentence, the Antarctic explorer Peter Treseder in his foreword to this unique collection of letters sums up the intense feelings of mutual affection that supported Douglas Mawson and his fiancée Paquita Delprat throughout the long, weary months of their separation during the Australasian Antarctic Expedition of 1912–14. The editor of the letters, whose late husband was a protégé of Mawson in the 1930s, has broken new ground by allowing us to share the most intimate feelings of this reputedly austere polar hero, in a theme taboo in its day and only slightly touched upon in our own time.

Nancy Flannery came upon Paquita Delprat's letters to Mawson in 1991 in the Mawson Collection at the University of Adelaide. Six years later she succeeded in unearthing Mawson's letters in a family collection, their presence there unsuspected. The letters, constituting virtually a complete set, are here presented in chronological order, dating from the eve of Mawson's departure from Hobart on 2 December 1911 up to his final return from the Antarctic on 26 February 1914. The background to these events is related in the editor's introductory chapter.

Francisca Adriana Delprat, known to her family as Paquita, was one of the five daughters of G. Delprat, a wealthy and influential Adelaide mining engineer, and his wife Henrietta. Paquita first caught sight of Mawson at a society gathering; she was 17, he then 27. Subsequently they met again at a dinner party, when 'Her flashing black eyes met his mischievous blue ones.' By the close of 1910 Mawson was writing to Mr Delprat seeking permission to marry his daughter. This was duly given, but with a number of reservations relating to Mawson's imminent departure for Antarctica and the probability of an extended separation, a foretaste of which followed as a consequence of Mawson's involvement with expedition affairs. Both Paquita and Mawson had hopes that wireless telegraphy, which was to be experimented with in Antarctica for the first time, would help to bridge the absence of regular correspondence. Inevitably the experiment proved not to be entirely successful, more especially for the exchange of innermost feelings. Thus the letters piled up, awaiting the annual visit of the relief ship *Aurora*. Their correspondence totalled 34 letters, 24 from Mawson to Paquita and 10 from Paquita. These are presented in three groups, along with linking paragraphs and footnotes. Understandably, the contents of many of these letters are naïve in the extreme, but there is no doubt about the depth and sincerity of their mutual affections. It is hardly surprising that as months lengthened into years doubts arose in their minds as to whether this love would survive. The frustration was especially felt by Paquita, who, despite the distractions of a prolonged tour of Europe in 1912, was driven to write: 'My love, my love, how I miss you. I close my eyes and lift up my lips but feel nothing.' Later still in 1913, with the expedition's return almost in sight, she describes writing to Mawson as 'writing to a wall' and cries out that 'this everlasting silence is almost unbearable.'

Mawson, for his part, attributed his survival from the disastrous far eastern sledge journey on which his two companions, Ninnis and Mertz, perished, as entirely due to his faith in Paquita's love for him. During his subsequent prolonged convalescence at Cape Denison, he became increasingly beset by doubts that his 'dedication to science might be at the expense of personal fulfilment.' He fears that his physical appearance may have changed for the worst: 'size me up critically and don't let us get married unless you feel nothing but attraction.' In the event, he had no cause for concern. Only a month after the final return of *Aurora* to Australia, they were married in Melbourne, a union destined to last for 44 happy years.