

range of caribou, reindeer (domestic animals) and "feral reindeer" is shown on 11 separate maps scattered in the book. Unfortunately the complete range of the species is not compiled on a single map.

The volume is divided into two parts, one descriptive and the other analytical. Although this division is practical in some aspects, it leads to repetition. In the descriptive part Greenland is divided into 20 caribou regions of vastly different sizes. The West Greenland regions are much smaller than the North and East Greenland regions, because much more is known about the recent history of the caribou in West Greenland. For each region the geological, archaeological and historical records are reviewed, followed by the present status. In the analytical part the 20 regions are assembled in 5 broader regions, which are discussed with respect to zoogeography. Finally, there is a discussion on the causes of the large fluctuations in the caribou population size in West Greenland.

When Meldgaard started his work only five radiocarbon dates on Greenland caribou remains had been published. One of these (K-3865: 7980 ± 115 years before present [B.P.]) proved that the species was already present in North Greenland in the early postglacial (Holocene). Meldgaard presents eleven new dates. Unfortunately, he has not been able to extend the history of the caribou in Greenland back in time, but it now appears that caribou were present in North Greenland during much of the Holocene, although perhaps intermittently. Meldgaard also shows that the caribou remains from southeast Greenland, which represent dwarfish animals, were present in that area from c.300 to c.1200 A.D. Meldgaard has overlooked an important date from East Greenland, Lu-1096: 6200 ± 70 years B.P., which shows that the species was present in this vast region in the middle Holocene. This date is hidden in a list of dates in the journal *Radiocarbon* (Vol. 18:302), which might not be an obvious place to look for data on the history of the caribou in Greenland. However, numerous other dates on Greenlandic organic material are published in this journal, including several bone dates.

In Canada and the United States the presence of a Peary Land refugium or North Greenland refugium, where many animals and plants survived the last glacial period — the Wisconsinan or Weichselian — is often taken as a well-established fact. However, although recent work on the glacial geology of the region indicates that large areas did remain unglaciated, I agree with Meldgaard that such large mammals as the caribou probably did not survive. Meldgaard suggests that the species immigrated to Greenland primarily via Nares Strait. In the early Holocene most of Greenland was populated by small animals (*Rangifer tarandus pearyi* size). In the middle Holocene larger animals (*R. tarandus groenlandicus* size) immigrated to West Greenland. Some animals may also have arrived from Baffin Island via the Davis Strait or from Svalbard.

Population size of the West Greenland caribou fluctuates dramatically. Meldgaard documents these changes in detail, using historical, ethnohistorical, game-statistical sources and recent work by game biologists. He believes that the fluctuations are cyclic, with a periodicity of 65-115 years, and that fluctuations in different populations are synchronized. The population builds up over a period of only about 10 years, followed by a population maximum of 10-25 years. The population crash takes about 10 years, while the population minima last from 35 to 70 years. Three possible causes for this pattern are discussed, namely, predation, overgrazing and climate, and it is concluded that climatic changes are the driving force. Although weather and climate may to some extent explain the fluctuations, I believe that some intrinsic factors may also be of importance and that the caribou may overutilize the vegetation at the population maxima.

No new taxa (species, subspecies, races) are proposed and no previously described taxa are considered synonyms, although it is questioned whether the caribou in northernmost Canada (*R. tarandus pearyi*) and the one formerly living in central East Greenland (*R. tarandus eogroenlandicus*) should be maintained as separate subspecies.

Concerning Meldgaard's use of place names, some names, at least in North and Northeast Greenland, are misspelled, inconsistently spelled or are not the official names authorized by the Greenland Place Name Committee. This inaccurate use of place names may easily lead to

confusion. Also, the use of a very old map of Greenland that predates modern maps of North Greenland (published c.1960) is unfortunate.

The work is very well documented, with a long list of references. The volume is rather expensive, but it is of interest not only to those interested in arctic mammals and their history, but also to those interested in the Holocene history of the Arctic, and it forms a background to archaeological and ethnographical studies.

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BERING'S VOYAGES: THE REPORTS FROM RUSSIA. By GERHARD FRIEDRICH MÜLLER. Translated with commentary by CAROL URNESS. Fairbanks: The University of Alaska Press, 1986. 221 p.

Scholarly interest in and research on 18th- and 19th-century Russian explorations in the North Pacific has been spotty. This is true of Russian literature both before and since the 1917 revolution. It is even more true of works that have been produced in the West. The few studies that appeared were marred by the failure of their authors to consult original sources; by careless research; by inadequate familiarity with the problem or the language; by ideological blindfolds; by Russian official secrecy and often deliberate disinformation concerning their explorations; and by an erroneous feeling among some Western scholars that the Russians somehow were incapable of the achievements their explorers actually had made.

The situation has changed for the better in recent years with the emergence of a small group of competent scholars (in the U.S.S.R. and in the West), the publication in the Soviet Union, Canada and the United States of a number of documentary collections, memoirs and classic works, and the appearance of a good number of original analytical studies (monographic and periodical). Space will not allow the listing of all these efforts. For the record, however, it should be noted that a number of scholars and publishers in the United States, Canada, the Soviet Union and the United Kingdom have played a vital role in promoting the current renaissance of interest in Russian activity in the greater Pacific Northwest. Likewise a series of international conferences in the United States, England and France concerning this problem have contributed to the development of a positive climate.

While these efforts have been a step in the right direction, they still fall short, because the new breed of Western and Soviet scholars have not coordinated their research and because the complexities of Soviet relations with the West have hindered the exchange of scholarly views and the undertaking of scholarly joint ventures. Yet such cooperation is essential in illuminating the problem of Russian explorations in North Pacific because the bulk of source material is divided among Soviet, American, Canadian, British, Spanish and French repositories. It follows, therefore, that no definitive study of this topic can be undertaken without cooperative involvement of the foremost experts from these countries.

The volume under review is one of the latest examples of the growing interest in Russia's North Pacific explorations. Its stated purpose is to reexamine the writings of Gerhard Friedrich Müller (1705-83) in order to ascertain his role in the interpretation of Bering's and of Russia's achievements that have elicited both praise and criticism over the years. Focusing on Müller is important because he initiated true scholarly interest in Russian expansion to the Pacific and to North America. He achieved this through three efforts. First, as a member of the celebrated Second Kamchatka Expedition (1733-43) he examined, copied and gathered thousands of documents on historical, geographic, ethnographic, linguistic, legal and other topics. Second, he was the first scholar to use this evidence in writing the first comprehensive history of

Siberia and of different aspects of Russian explorations. And third, as the official archivist of Imperial Russia from 1763 to 1783, Müller collected additional evidence that, together with his earlier material, is now known as "Müller's portfolios." Over the years a number of scholars have tapped this rich reservoir, but it would appear that none has yet been allowed complete and unrestricted access to it.

The present work consists of two fairly even parts. The first is lengthy background information by Carol Urness detailing Russian preparations for the historic undertaking. Included here are: brief biographical sketches of various participants, 23 maps showing Russian explorations, and an analysis of the views of several 18th-century West European observers on a number of controversial points concerning Russian discoveries and of Müller's responses.

The second part is a new translation of Müller's accounts of the two Bering expeditions published in 1758 in Müller's *Sammlung russischer Geschichte*. As a result we now have three English translations of Müller's account: two, inadequate and incomplete, published in 1761 and 1764 respectively, and the present satisfactory one. This new translation has 17 chapters, which discuss the following topics: the First Kamchatka Expedition, 1725-30; events in Kamchatka between 1730 and 1740; preparations for the Second Kamchatka Expedition, 1733-41; Russian explorations in the Arctic Ocean, 1734-39; Russian naval reconnaissance in Japanese waters, 1738-42; charting of Bering's and Chirikov's voyages of 1741; events surrounding Bering's and Chirikov's voyages; contributions of S. Khitrov, G.W. Steller and S. Waxel; events surrounding Bering's and Chirikov's return; and Müller's commentary on published West European accounts critical or doubtful of Russian exploration achievements.

Those interested in Russian explorations in the greater North Pacific region in the first half of the 18th century owe gratitude to Carol Urness for making available a new English version of Müller's classic treatment. Her translation is clear, it reads well and, as evident in extensive footnotes, it has been well researched. This reviewer, however, feels that this long-overdue and otherwise sound work is marred by two shortcomings: a glossary that falls short of expectations on account of its brevity and terseness of definitions; and a bibliography that, while fairly long, omits many important earlier and recent studies. Most glaring is the failure to include works by such noted Russian and Soviet scholars of Bering's voyages as Vasilii N. Berkh, Lev S. Berg and Evgenii V. Kushnarev. This criticism in no way diminishes the value of the work. Indeed, it belongs in every library.

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DISCOVERY OF THE NORTH: THE EXPLORATION OF CANADA'S ARCTIC. By DANIEL FRANCIS. Edmonton: Hurtig Publishers, 1986. 224 p., 10 maps, 21 illus., index, bib. Hardbound. Cdn \$16.95.

Discovery of the North presents a summary of the major expeditions and personalities involved in the exploration of the Canadian Arctic from the voyages of Martin Frobisher in the late 16th century to the Canadian Arctic Expedition led by Vilhjalmur Stefansson in the early 20th century.

To attempt a detailed synthesis of all expeditions and personalities would have been beyond the scope of the book (and indeed any single book), and Francis has wisely concentrated only upon those that are the best known and documented, though many others are referred to in passing. The book consists of ten chapters, each dealing with a major era of arctic exploration: the 16th- and early 17th-century exploration of Baffin Island and Baffin Bay (chapter 1), the 17th- and 18th-century exploration of Hudson Bay (chapter 2), the 18th-century overland expeditions of Hearne and Mackenzie (chapter 3), the early 19th-century

Royal Navy expeditions of Ross, Parry and Franklin (chapter 4), John Ross's voyage to Boothia Peninsula in 1829-33 (chapter 5), the early 19th-century expeditions of Back, Dease and Simpson, and Rae (chapter 6), the Franklin expedition of 1845-48 and subsequent search expeditions (chapter 7), Hall's three expeditions in the mid- and late 19th-century (chapter 8), the late 19th- and early 20th-century expeditions of Sverdrup and Amundsen (chapter 9), and finally the various Canadian government-sponsored expeditions and patrols of the early 20th century (chapter 10).

The book is oriented toward the interested non-specialist. Emphasis is placed on expedition highlights and the context in which each was undertaken, rather than on detailed expedition summaries. Furthermore, although citations are common, the individual sources from which they are taken are not given. On the one hand, this results in lucid, entertaining accounts of the various expeditions and personalities. On the other hand, it makes the book of limited value to arctic historians or others already familiar with arctic exploration.

In place of a comprehensive reference list is a "bibliographic essay" of selected readings, which presents a useful guide to further literature on arctic exploration and offers suggestions for both primary and secondary "summary" sources. One major omission, however, is Richard J. Cyriax's *Sir John Franklin's Last Expedition: a Chapter in the History of the Royal Navy* (1939), by far the most important work on the Franklin expedition of 1845-48.

As in any attempt to cover a topic of as wide a scope as arctic exploration, factual errors can be expected, and *Discovery of the North* has its share. The account of John Ross's expedition of 1829-33 is a case in point; Ross's *Victory* was fitted with one new engine, not "engines" (p. 103, 105); the Netsilik Inuit did not trade snowshoes to Ross, as they did not use snowshoes (p. 105); the sun is not "continuously below the horizon" until April at the latitude of Lord Mayor Bay (70°N), but first appears on 18 January, and by 1 April there are approximately 14 hours of daylight (p. 106); during the summer of 1831, the *Victory* was able to sail approximately 20 km to a new harbour, not "6.5 km" (p. 108); and finally, Ross's "King Williams Land" was determined definitely to be an island by Rae in 1854, not Dease and Simpson in 1839 (p. 120).

Certainly a major failing of the book, however, is in the lack of maps indicating the routes of the various expeditions. Each chapter has only a single map on which are indicated several locations mentioned in the text, but many more important locations are omitted. Returning again to the Ross expedition of 1829-33 for example, none of the four wintering localities (Felix, Sheriff and Victoria harbours, Fury Beach) is indicated, nor are other locations that figured prominently in the expedition, such as Cape Adelaide (where James Ross located the north magnetic pole) or Port Leopold (from which the expedition members finally made their escape).

Overall, the book's appeal will be to those without previous knowledge of the history of arctic exploration, who will find it an enjoyable introduction if they are not concerned with the geography or routes associated with the various expeditions.

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THE ANTARCTIC TREATY REGIME — LAW, ENVIRONMENT AND RESOURCES. Edited by GILLIAND. TRIGGS. Cambridge: Cambridge University Press, 1987. 238 p. Hardbound. £30. US\$54.50.

The human species has a longing to understand and an urge to exploit. While understanding often leads to creative utilization of the natural environment and resources, recent history points more and more to destructive consequences in the use of our knowledge and research. The Antarctic is both a model of cooperation in international