

THE FOURTH OF JULY VALLEY, GLACIAL GEOLOGY AND ARCHEOLOGY OF THE TIMBERLINE ECOTONE. By JAMES B. BENEDICT. Ward, Colorado: Center for Mountain Archeology, Research Report No. 2, 1981. 139 pages, illus., maps. U.S. \$20.00.

The Fourth of July Valley, just off the Continental Divide west of Boulder, Colorado, is high, cold and rugged. In this handsomely illustrated report on it, Benedict's avowed aim was to secure information there that would permit the prediction of future short-term climatic changes. However, he concludes that there is no evidence of periodic cyclicity in the glacial advances over the past 12 000 or 13 000 years since the Pinedale. Nor do the advances in the valley correlate closely with chronologies established elsewhere in North America and Europe. He suggests that the morainal record at Fourth of July is unusually good, and that concepts such as "Neoglaciation" arise in places where the record is incomplete. At any rate, Benedict gives a painstakingly thorough description of several aspects of the glacial geology through time; cirques are all that now remain of the ice.

Archaeology plays second fiddle to geology, but Benedict tries to mesh the two together. Two sites are described in detail -- Fourth of July and Ptarmigan. Both were briefly noted in the first volume of this same series, *The Mount Albion Con* (Benedict and Olson, 1978). Both sites yielded only small collections in three components, but they are important ones for high-country archaeologists because of their rarity. For their interpretation, Benedict relies on his imaginative Mount Albion synthesis; two represent Altithermal occupations, and one component is slightly younger. He refrains from committing himself fully to the notion that hunters from the Great Plains found refuge in the Rockies during the Altithermal, though the idea has absorbed his attention for a number of years prior to this publication.

Clearly the work is not addressed primarily to readers of *Arctic*, but several geologists, climatologists and botanists will find it useful in drawing comparisons between conditions in the High Arctic of Alaska, Canada and Greenland and the Colorado Front Range. Benedict's volume is by and large site-specific and intensively descriptive of an ecotone that has parallels in the High Arctic.

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LEXICON OF CANADIAN STRATIGRAPHY. Vol. I: ARCTIC ARCHIPELAGO. Edited by R.L. CHRISTIE and A.F. EMBRY. Canadian Society of Petroleum Geologists, #229 - 640 - 5 Ave. S.W., Calgary, Alberta T2P 3G4, 1981. \$6.00 softcover; \$8.00 hardcover.

The Canadian Society of Petroleum Geologists recently published the first volume in a series of six lexicons of Canadian stratigraphy. This ambitious project will eventually cover the whole of Canada including Arctic Archipelago (Volume I), Yukon-Mackenzie (Volume II), Western Cordillera (Volume III), Western Canada (Volume IV), Central Canada (Volume V), and Atlantic Canada (Volume VI). The format chosen for this series is closely comparable to the earlier *Lexicon of Geologic Names in the Western Canada Sedimentary Basin and Arctic Archipelago* (1960, Alberta Society of Petroleum Geologists) of which bound copies have long since been out of print.

Volume I covers the Arctic Archipelago and is a good introductory volume to the series. The geographic area was not well covered in the previous lexicon; the present compilation includes 230 entries, a number of which are abandoned terms, compared to some 70 names published in the earlier lexicon for the region. The volume also contains three stratigraphic cross-sections illustrating the stratigraphy in generalized terms, which are very useful for quickly obtaining the stratigraphic sequence and lateral relationships. An appendix containing a listing of terminology tabulated by system also proves to be a convenient informational aid. A comprehensive list of references which includes virtually all the relevant literature published on the Arctic Archipelago is provided. Each entry includes information pertaining to age, original author, type locality, history, lithology, thickness and distribution, relations to other units, palaeontology, and pertinent references. The entries are presented in alphabetical order.

This volume is a much-needed compilation and very useful to geologists who deal with the Arctic Archipelago. Although the entries are in some respects generalized or not detailed enough for some researchers, the volume was not designed to be all-encompassing but rather to provide an outline and brief descriptions. This format provides an excellent initial reference and also provides several other reference sources which enable a geologist to initiate a more thorough literature review if desired. Compilations such as this are valuable to researchers who are unfamiliar with the region and constitute the surest and fastest method of obtaining the necessary background in the stratigraphy of the region. The layout, design and reproduction are excellent and no typos have been encountered to date.

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THE FRESHWATER FISHES OF ALASKA. By J. E. MORROW. Anchorage: Alaska Northwest Publishing Co., 1980. 248 p. Softcover. U.S. \$24.95 (\$29.95 in Canada).

This book contains descriptions, illustrations, life-history information and distributional data on 56 species of Alaskan freshwater fishes. There are also keys (for identification of families, genera and species), a short introductory essay and a glossary of technical terms.

The design of the keys is interesting, and although for professionals they are no better (or worse) than conventional keys, they may make identification somewhat easier for laymen. The life-history sections are good, and those that contain unpublished Alaskan material are particularly useful. The sections on range and abundance are helpful; however, the distribution maps are cluttered and difficult to interpret. Spot maps would have been more useful. The line drawings that accompany the species accounts are mediocre and some of the colour plates are poor; however, the carbon dust illustrations are excellent and it is a pity that they were not made from fresh specimens. The photographs are a mixed lot: some are good and some are terrible. The photo of a pygmy whitefish on page 86 is not a pygmy whitefish.

There are a few inconsistencies in what is included in the book. For example, there is a complete account of *Salvelinus anaktuvukensis* but only a passing reference to *Lethenteron alaskense*. Also, I can understand including marine species that habitually enter freshwater in a book on freshwater fishes; however, the inclusion of marine species like *Clinocottus acuticeps* and *Cymatogaster aggregata* that rarely (and barely) enter freshwater is curious.

In summary, a book like *The Freshwater Fishes of Alaska* must be judged against its predecessors. The foreword points out that this is the first (their italics) book to concentrate exclusively on Alaska's freshwater fishes. This is true, but it is also misleading. The entire Alaskan freshwater fish fauna (with the exception of two dubious species) is covered in *Freshwater Fishes of Canada* (Scott and Crossman, 1973). When judged against that work, it is this reviewer's opinion that *The Freshwater Fishes of Alaska* places a distant second.

REFERENCE

SCOTT, W.B. and CROSSMAN, E.J. 1973. *Freshwater Fishes of Canada*. Ottawa: Fisheries Research Board Bulletin 184. 966 p. & illustrations.

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THE PULLEN EXPEDITION: IN SEARCH OF SIR JOHN FRANKLIN, By H.F. PULLEN, Arctic History Press, 18 Waterman Avenue, Toronto, Ontario M4B 3G3, 1980. 230 p.

In 1847, the British Admiralty organized three expeditions in search of Franklin: 1) Lancaster Sound in an attempt to follow the expedition; 2) a

coastal search from the Mackenzie to Coppermine rivers; and 3) Point Barrow, Alaska to the Mackenzie River in open boats (Pullen Expedition).

The Pullen Expedition is the narrative of Commander W.J.S. Pullen and his small crew's hazardous journey in open boats along the north coast of Alaska to Fort Franklin and Fort Simpson for the winter, and the return in 1850 to search the coasts of Banks Island and Wollaston Peninsula. Anyone who has spent time in the Arctic cannot help but be amazed at the accomplishment. In both trips along the coast, hardships related to poor rations, insufficient clothing, wetness, leaking tents, ice conditions that frequently threatened to crush the small crafts and which resulted in overnighing in the open boats, and frequent encounters with apparently friendly but light-fingered Eskimos cast a constant threat over the expedition. Yet it succeeded in demonstrating, without the loss of a single individual, that Sir John Franklin was not to be found in that area. The narrative shows only dedication to the task at hand without regard for personal safety, comfort or gain, but only a desire to successfully aid "the real heroes" of the Franklin Expedition.

Following the first summer's successful completion, orders to return the second season to search yet another area met with apprehension, but a willingness on the part of all to return to the rigorous coastline for another try.

Their return to England was from Fort Simpson via rivers to York Factory and home. It was only on this leg of the journey that any apprehension for personal safety was shown and that related to moving boats through rapids.

The narrative provides interesting reading and insights into the motivation of the individuals who participated in such an undertaking. The cause justified the personal sacrifice and it was done without any thoughts of personal gain. (How different the motivation of those of today!) The book should be on the shelves of all those interested in the early exploration of the north and those interested in the changing motives of people.

A modern map outlining the route would have been a most welcome addition for those not completely familiar with the area.

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CLIMATIC CHANGE IN CANADA. Edited by C.R. HARINGTON. National Museum of Natural Sciences, Syllogeus No. 26. 1980. 246 p.

This book is the result of joint studies made from 1977 to 1978 by those involved with the Museum's project dealing with climatic change in Canada. The period covered is the past 20 000 years or, in other words, the time since continental glaciers last covered most of Canada.

After a brief introduction by Dale Russell, C.R. Harington describes the impact of the climatic change on people in Canada and the nature of the project itself; A.J.W. Catchpole discusses historical evidence of change in western and northern Canada; Claude Hillaire-Marcel, Serge Occhietti and Gilbert Prichonnet describe historical, hydrological and physical changes in eastern Canada; L.V. Hills and E.V. Sangster review paleobotanical studies relating to the time period in Alaska, Canada and Greenland; and J. Gordon Ogden III outlines late Quaternary paleoenvironments in eastern Canada.

The book does an effective job of bringing together most of the facts and theories that relate to the topic. This is especially true of the comprehensive chapter by Hills and Sangster. The book prepares the way for future research by pointing out what we know and what remains to be done. Much has been learned, but by the same token it is clear that scientists have only begun to scratch the surface.

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