outlining landform unit, soils and vegetation, and special-purpose maps (i.e. active layer thickness, plant growth form, etc.).

The final section includes the References and two Appendices. Appendix A consists of four master maps, coded numerically and by colour, outlining landforms, soils, vegetation, etc. Appendix B presents profiles of the major soils in the area.

The atlas, though an interesting document, would be much more useful if the authors had provided at least one bar scale and north arrow per page of maps. The authors create some confusion about the size of the area they are mapping. Their detailed colour maps for area three are not 3.6 km², but rather 3.6 km square.

Should the atlas be revised and a new edition be brought forth, we feel that the special-purpose maps would merit considerable elaboration so as to demonstrate the great potential of the data in assisting in the orderly industrial development of the region. For example, in developing the oil spill sensitivity map the authors use essentially a single factor, vegetation recoverability potential, to delineate their units. They note that willow and sedge species are quite resilient to moderate spills and that these species are associated with wet areas. On the other hand, *Dryas integrifolia*, which is found on the dry tundra, is a species very sensitive to oil. Thus their sensitivity map delineates the dry tundra with *Dryas* as the most sensitive area and the wet tundra as having a good recovery potential. They fail to consider that in the event of an oil spill the oil, if above its pour point, would migrate to the wet tundra and terrain depressions thus complicating the development of sensitivity maps. This confusion could be eliminated if the authors had labeled their map "vegetation recovery potential under oil spills of moderate intensity".

For anyone interested in undertaking similar geobotanical studies, the atlas provides a format and a methodology that can be adopted or modified to fit special circumstances. For those interested in the environment of the North Slope or in teaching about it, it provides an easily comprehended style and many interesting observations. The extensive references provide access to additional data.

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AN ARCTIC ECOSYSTEM: The Coastal Tundra At Barrow, Alaska. Edited by JERRY BROWN, PHILIP C. MILLER, LARRY L. TIESZEN, and FRED L. BUNNELL. US/IBP Synthesis Series No. 12. Stroudsburg, PA: Dowden, Hutchinson and Ross, 1981. i-xxv + 571 p. $29.50 U.S. (Distributed by Academic Press, Inc., 111 Fifth Avenue, New York, NY 10003.)

Establishing during the last war, the Naval Arctic Research Laboratory at Barrow, Alaska, has been the base for many fundamental arctic studies. It is regrettable that lack of funding has recently resulted in the closing of its doors to the support of scientific research.

The present book synthesises much of the extensive U.S. IBP tundra biome research that was carried out at the lab from 1970-1974. Thirty-two authors and 24 contributors are listed and many others assisted in various ways. The broad objectives of this research were to: determine how the coastal tundra operates; obtain data to compare this with cold-dominated ecosystems elsewhere; and gather information on degradation, maintenance, and restoration of temperature-sensitive and cold-dominated tundra and taiga ecosystems. Companion volumes have appeared elsewhere on the limnology of tundra ponds by John Hobbie, and the vegetation and production ecology of tundra by Larry Tieszen. Actually, the title of the present book is misleading as it encompasses the content of all three volumes.

There are 12 chapters: the coastal tundra at Barrow; climate, snow cover, microclimate and hydrology; biophysical processes and primary production; photosynthesis; control of tundra plant allocation patterns and growth; pattern and succession in the vegetation; the soils and their nutrients; composition, biomass and ecology of the microflora; microfloral activities and decomposition; the herbivore-based trophic system; the detritus-based trophic system; and carbon and nutrient budgets. The editors point out that "within each of these subdivisions, the reader will find the common theme of the limitation of rates of biological processes by low temperature and related conditions of short growing season and the presence of permafrost". The book ends with a list of references cited; appendices listing the IBP tundra biome projects, personnel, site locations, and location of the major biome plots; and a subject index.

The extensive use of ecological models has aided understanding by allowing ecosystem simulations; however, oversimplification has at times led to an inadequate coverage of the individual species that occur in the area. Lichens, bryophytes, insects and spiders, all of which are abundant and important in the area, have, with few exceptions, received very scant treatment. It would have helped if there had at least been an Appendix in which all life forms known from the area were listed. It is a sad documentary that recent arctic ecological work has often been carried out by individuals who knew, and gathered data on, only the larger and more striking species, and that funding for major research programs did not allow the hiring of scientists with better taxonomic knowledge.

An impressive amount of information has been discovered about the coastal tundra at Barrow, and it is generally well presented, but one should not get the impression that the job has been thoroughly done; much work remains. Little attempt has been made to show how typical or atypical the tundra on the Barrow area is to that found elsewhere. While many general principles hold true throughout the arctic, the tundra is far more variable than most people realize.

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EFFECTS OF FIRE IN ALASKA AND ADJACENT CANADA — A LITERATURE REVIEW. By LESLIE A. VIERECK and LINDA A. SCHANDELMEIER. Anchorage, Alaska: U.S. Department of the Interior, Bureau of Land Management. Alaska Technical Report 6. 1980. 124 p. Soft cover. Gratis.

This comprehensive, highly readable and useful review brings together more than 300 papers on the ecological effects of fire in taiga and tundra ecosystems of Alaska and adjacent Canada. Based on a computerized and abstracted bibiliography containing about 750 references, the review discusses the most recent and important of these. Since some of this literature is contained in unpublished reports, the review provides access to otherwise unavailable information. The authors interpret and derive conclusions from these diverse studies to describe the available information and unanswered questions about fire effects in Alaska resulting in a reference, state-of-the-art handbook. This review is one of a series of recent high-quality technical reports produced by the Bureau of Land Management in Alaska.

The review is organized into six sections. Literature references for each of the topics covered are listed at the end of each section as well as all together at the end of the report. An introductory section summarizes the information sources including a list of several symposia and workshops which have been held to discuss and review fire effects in the North. Viereck and Schandelmeier's review clearly fills a need not addressed by these symposia proceedings, which tend to lack continuity owing to the diversity of authors and geographic areas covered.

The second section on fire regimes and fire history is particularly useful in that it brings together a number of reports on fire frequencies in different parts of Alaska and Canada. Exceptional fire years appear to be characteristic of the Alaskan taiga and tundra with 1940, 1957 and 1969 outstanding in the taiga and 1977 a year of widespread tundra fires in northwestern Alaska. The authors point out that better fire records and more accurate mapping of fire boundaries are needed, particularly for tundra regions. This second section of the review also clarifies a number of important but confusing terms in the literature such as fire severity and fire intensity. In the following section on the effects of fire on soils and watersheds, fire severity is discussed in relation to the amount of organic material removed from the soil surface — a key effect which subsequently controls permafrost changes and post-fire revegetation.

The two longest sections of the review describe the effects of fire on vegetation and animal life in Alaska. By treating tundra and taiga fire separately in the vegetation section, the authors emphasize the general lack of knowledge about all aspects of tundra fire. The effects of fire on treeline in Alaska are also poorly understood. In the vegetation section, fire effects both on individual species components and on ecosystem processes and post-fire revegetation patterns are covered. An interesting observation here is that fire returns both black spruce taiga and tussock-shrub tundra ecosystems to a more productive condition with a larger available nutrient capital.

The effects of fire on animal life are discussed with reference to caribou and reindeer, moose, furbearers, small mammals, birds, aquatic life and terrestrial invertebrates. A particularly important aspect of this section is the discussion of fire-caribou interactions in which it is made clear that the relationship is controversial, complex and unresolved. The authors caution that recent declines in caribou numbers should not necessarily be ascribed to increased fire frequencies. Through a review of fire effects on caribou in each of six regions in Alaska, they show that relationships may be different in different areas of the North and in different herds. The authors also point to conspicuous gaps in our knowledge of fire effects on bird populations, aquatic life and invertebrates.

The review does not include a discussion of fire management policy for Alaska nor does it translate the review information into such policies. However, in contrast with past fire control and prevention approaches, the review definitely promotes the role of fire as a natural ecosystem process and therefore a "tool" to reach certain management objectives. With the settlement of land claims in Alaska, each of the land-managing agencies will be required to formulate a fire management policy. The present review should contribute greatly toward this end.

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VASCULAR PLANTS OF CONTINENTAL NORTHWEST TERRITORIES, CANADA. By A. E. Porsild and W. J. Cody. Published by the National Museum of Canada, Ottawa, 1980. ISBN 0-660-00119-5. I-VIII, 667 p. Illustrated. Cloth. $105.00.

For years now, those of us interested in arctic and subarctic vascular plants have had a very meagre selection of floras from which to determine our collections. Hultén's *Flora of Alaska and Neighbouring Territories* (1968) has been a mainstay for those of us working in the Western Arctic whereas Porsild's *Illustrated Flora of the Canadian Arctic Archipelago* (1957) has been a constant companion during our wanderings in the Arctic Islands. For the more southerly of the northern researchers, a various assortment of provincial floras have had to do the job.

Many pleasant and often frustrating hours have been spent both in the field and seated in our cloistered laboratories staring at our more obscure specimens collected somewhere away from the main transportation routes east of the Mackenzie River and west of Hudson Bay. Our specimens have stared up at us like fixed points of reality in a botanical black hole, taunting and daring us to force them into some taxonomic framework developed for areas hundreds of miles away. All too often we have forced our specimens into nomenclatural niches by "stretching the keys" so as to simplify our perceptions of nature and place human order into what would otherwise be apparently unordered objects.

With the publication of Porsild and Cody's book, the botanical black hole now appears less black. The keys and descriptions for the 1112 species provide us with taxonomic pigeonholes in which to place our diverse collections, while the distribution maps and line drawings of most of the species (978) instill confidence that someone has actually examined specimens from within that 1 500 000-km^2 area.

The authors begin their thesis with a brief review of the usual climate, bedrock geology, Pleistocene aspects, treelines, active layers and phytogeographical provinces. They point out that few attempts have been made to subdivide the continental Northwest Territories into phytogeographical regions, and then propose the following six tentative provinces on the basis of our present knowledge of the flora: (1) Mackenzie Mountains; (2) east slope of the Richardson Mountains and north from the Peel River gap to the Arctic coast; (3) Mackenzie River delta and coastal plain between the lower Mackenzie and Anderson rivers; (4) treeless northern portion of the District of Mackenzie and all but the southern portion of the District of Keewatin; (5) Precambrian Shield area and Mackenzie lowlands between the Shield and Franklin Mountains; and (6) south of the southern shores of Great Slave Lake to the Provincial boundaries, a floristic province similar to that of northern Alberta and Saskatchewan.

Before entering into the taxonomic work itself, the authors provide an interesting, slightly unorthodox and of necessity incomplete chronological review of the history of plant collecting in the north. Some might dismiss this section as *too folksy*; however, we feel this presentation is eminently appropriate given the long-standing ties and empathy that both authors have not only with their subject plants but also with the north in its entirety.

As for the adequacy of the floral keys themselves, it would be premature to judge them as only time and use by botanists will allow fair judgment to be made. The proof of the pudding is always in the eating. We did, however, test the keys on material we have collected over the past few years from the Anderson, Horton, and Mackenzie rivers and Banks Island. After the normal period of adjustment to a new flora as one becomes acclimatized to the authors' use of morphological terminology, we found them to be generally very adequate. With a book of this magnitude, it is difficult to relate text and illustrations. It would have increased the usefulness of the book had the distribution maps and illustrations been placed adjacent to the species descriptions.

The book is clearly essential to any northern researcher with anything more than a fleeting interest in northern plants, and most important to the botanical researcher. It provides nodal species definitions for a little-known area thus giving us mental bench marks upon which to begin our investigations into intraspecific variation.

We take our hats off to you, Dr. Cody, and posthumously to you, Dr. Porsild, for completing such an onerous undertaking. A special note of thanks to Dr. Porsild for a very long life of significant northern scientific contribution which culminated in the production of this book.

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EXPLORATION IN ALASKA: CAPTAIN COOK COMMEMORATIVE LECTURES. Edited by Antoinette Shalkop. Anchorage: Cook Inlet Historical Society, 1980, 219 p., 109 plates, references. $12.50 U.S. Available from Anchorage Historical and Fine Arts Museum Sales Shop, 121 West 7 Avenue, Anchorage, AK 99501. (Add $1.00 mailing charges.)

Over the last decade bicentennial celebrations of James Cook's explorations have followed the path of his voyages around the Pacific. Beginning in New Zealand and Australia in 1969, the cycle concluded in the north Pacific in 1978 when both British Columbia and Alaska celebrated the presence on their shores of the greatest of all navigators. Many of these bicentennial celebrations have produced contributions to scholarship and *Exploration in Alaska* is a collection of essays that were given in Anchorage to commemorate Cook's visit.

Although occasioned by the celebration of Cook's exploration of Alaska, this collection does not concentrate on that alone. It is much broader in scope. There are essays dealing with the background to Cook's exploration of the Pacific; papers on explorers of other nationalities, particularly the Russians and the Spanish, who visited Alaskan waters; there is an interesting piece that examines the collective identity of later American explorers of inland Alaska; and finally a section dealing with the immediate and long-term impact of the arrival of Europeans on the native peoples of the area. The editors have brought together a number of scholars from a variety of disciplines to look at many aspects of the exploration of Alaska.