This ended his active exploration. Despite living to 1962, his activity becomes less important to Hunt than the controversy and ideas with which he dealt. At the peak of his influence, with an almost proprietory sense, he became more of a promoter and propagandist. His influence in Canada, already shaken by quarrels over the results of the Canadian Arctic Expedition and resentment in the civil service, was dealt a further blow by two failed schemes. Although he advocated the domestication of muskox to assist the Eskimo, he sponsored a reindeer-herding scheme on Baffin Island. Using second-hand reports, he ignored, as Jenness pointed out, lack of lichen preferred by reindeer. Stefansson blamed failure on Lapp herders. Hunt does not mention similar proposals in northern Quebec.

More crucial was his "blessing" of a fatal attempt to claim Wrangel Island, based on the *Karluk*. Though Hunt correctly points out the men did not follow his advice, by custom, law and interest, Canada's claim was spurious.

His reputation lay not so much in what he accomplished but in the books he wrote in place of expedition reports. The books were often controversial. Hunt notes that *My Life With The Eskimo*, describing his second expedition, was criticized by Anderson's wife for ignoring her husband's contributions, relegating them to an appendix. Discussion of the "Blond Eskimo" minimized his early explanation of the Greenland origins. In *The Friendly Arctic*, dealing with the CAE but published in 1921, he minimized conflicts, putting others in a less favourable light. The theory of the friendly Arctic was a theme he would always return to. By adapting to conditions he spoke of survival. Hunt notes that was in contrast to the Amundsen-Nansen view of hardship and suffering.

Other books, articles and lectures resulted. He passionately defended Peary's claims. *Adventures of Errors* related several frauds. *Northward Course of Empire* stressed the need for northern development in contrast with the traditional wilderness theory. Controversy followed *New Compass of the World* because an article on the U.S.S.R. angered McCarthyites. His crowning achievement, *Arctic Encyclopaedia*, was cut short when funds were withdrawn.

Though Hunt speculates as to why he was ignored in Canada but not why the U.S. accepted him, Stefansson continued to advise the Americans. He helped plan the Alaska air route, he advised the U.S. Army though Diubaldo suggested the *Arctic Manual* was considered out of date. Stefansson assisted in establishing Dartmouth College's northern program.

There are some errors, from variance in the spelling of Canada's west coast naval base to the publication date of *Arctic Manual*. In commenting on Stefansson's analysis of the discovery of the remains of Andrée's ill-fated balloon attempt to cross the Pole in 1897, Hunt places White Island near Southampton Island, not between Svalbard and Franz Josef Land.

By diaries, articles, books and correspondence, Hunt illuminates Stefansson's many sides: bibliophile, publicist, hard worker, prophet of arctic air and submarine links, independent thinker and actor, weak leader, promoter of northern development. Maps and illustrations allow the reader to follow his progress.

More balanced than LeBourdais, fuller than Diubaldo, it is a biography of an important figure. Hunt does not analyze in detail, except in early contacts, his scientific achievements. Though in 1962 his dietary research was seen as perceptive, Diubaldo suggested his research was superficial. Jenness was more systematic. Yet Hunt notes he could not hate his detractors.

What emerges is a publicist/explorer who helped create interest in the Canadian North.

Robert J. MacDonald
Coordinator, Senior Citizens' Course
The Arctic Institute of North America
The University of Calgary
Calgary, Alberta, Canada
T2N 1N4

ICEBERGS: A BIBLIOGRAPHY RELEVANT TO EASTERN CANADIAN WATERS. Edited by LYNNE M. HOWARD. Environmental Studies Revolving Funds Report No. 030. Ottawa: ESRF, 1986. Softbound. Cdn$55.

This report was prepared under the auspices of the Environmental Studies Revolving Funds (ESRF) office through a contract to the Arctic Science and Technology Information System (ASTIS) at the Arctic Institute of North America, University of Calgary. It was published by the ESRF office, which is administered by the Canada Oil and Gas Lands Administration for the Departments of Energy, Mines and Resources and Indian Affairs and Northern Development, Ottawa. Funds for ESRF activities are provided from special levies on the oil and gas industry and are dependent on the level of the latter's exploration activities. The year 1986 will long be remembered as marking a major downturn of the Canadian oil and gas industry's activities in the offshore arctic and sub-arctic regions. Therefore the recent appearance of this particular bibliography, directed mainly as it is toward the oil and gas industry, is almost, and certainly unexpectedly, epitaphic. However, a recovery or restructuring of oil prices could easily see an immediate reversal of current research trends and make this bibliography a basic requirement for anyone working in the arctic offshore environment. Nevertheless, there will still be a core of researchers who will need this report.

On first reflection the point of reviewing a bibliography would seem to be abjectly obscure. However, a scan of the 1135 citations presented in this report reveals a basis for some form of constructive review, which I will now attempt.

The book comes in a handy, attractive paperback format, has clear, bold headings that are author oriented and contains concise, useful abstracts of the referenced material. A versatile selection of useful indices is available: subject, geographic, title and serial. At the end of each citation there is a major location code, which enables an interested reader to access the material through inter-library loans. A complete list of relevant libraries and addresses is provided. As the author (editor) states in her introduction, "there are undoubtedly some works which should be in this bibliography but which have been missed. We would ask the reader's help in locating them." There are two omissions worth mentioning. They both refer to iceberg calving from Jakobshavn Gletscher, which is the largest single iceberg-producing glacier in Greenland. The references are Lingle *et al.*, 1981, and Hughes, 1986.

An initial but premature reaction was that *ice islands* had been missed out since they are not specifically mentioned in the Introduction under scope of the bibliography. The subject index does contain the item *ice islands*, but the terminology is not always used correctly. Since the bibliography is meant to be relevant to eastern Canadian waters, it would seem at first sight that the ice islands of the Arctic Ocean have no place here. But this is not so, as we may see from entry 797, the documentation of the drift of the fifth and easternmost fragment of the Ward-Hunt Ice Shelf, which underwent a major calving in 1962. That particular mass of ice (WH-5) initially blocked Robeson Channel before moving south through Kane Basin and Davis Strait. Evidence that this might not have been the only recorded instance of the escape of ice islands from the Arctic Basin through Robeson Channel is provided by Loewe (1971), another reference that was missed. However there is some confusion whether this account truly referred to a piece of Ellesmere Island shelf ice or whether it might have originated in Greenland. This uncertainty is created by an apparent quotation from Franz Boaz's 1885 work that refers to the total thickness of the ice (described then as an iceberg) as being between 100 and 150 m. Loewe considers that the full description "fits that of a typical ice island." Reference to Armstrong *et al.*, 1966, shows that this cannot be the case. However, if one accepts an error in the thickness (which can only have been estimated), then Loewe's conclusion would seem to be correct and the account immediately becomes a valuable piece of information, because it is relevant to the problem of estimating the *return time* for arctic *ice islands* that exit through Robeson Channel. They thus clearly pose a threat to operations in eastern Canadian waters. My discussion

about ice islands is deliberately detailed because of the confusion existing in the general literature regarding these important features. Thus, my criticisms are not directed toward the editor of this bibliography. According to Armstrong *et al.*, 1966, an ice island is "a form of tabular berg found in the Arctic Ocean with a thickness of 30 to 50 m" (in actual fact thicknesses of 25-60 m have been measured), usually with a maximum area of up to 100 km^2 and with "an undulating surface." These features may become grounded, in which case the term island is quite appropriate. On the other hand, the term iceberg is defined (Armstrong *et al.*, 1977) as a large mass of floating or stranded ice of greatly varying shape, *usually* more than 5 m above sea level, which has broken away from a glacier. (The word *usually* was added to include tabular bergs originating from *low* ice shelves.) However, many of the "low" Ellesmere Island ice shelves, parts of which have a freeboard of 5 m, are not composed of "glacier ice" nor are they attached to land glaciers, so the fragments that calve from them would never qualify for the term iceberg. What are now unequivocally referred to as icebergs in the Antarctic were once called ice islands, which, as we have seen, is a term now reserved exclusively for the Arctic Ocean species. Even there the term is in disfavour with current researchers and it may be a candidate for planned obsolescence.

Now, when one looks in the bibliography subject index under *ice islands thickness measurements* and finds (entry 998) that it refers to Antarctic tabular icebergs up to 280 m thick, then a correction is clearly in order. There are other similar cases to be found in the index-reference system concerning ice islands. Lastly, co-authors take up, and thus waste, space in the main "text." Since this is not purely author-structured it would seem more efficient and convenient to have a separate author index.

These difficulties contrast with some very entertaining entries, such as one (item 630) on iceberg psychodynamics, which is based on the hypothesis that icebergs have minds of their own (in order to "explain" seemingly erratic drift tracks). Another is a novel patent entry (1098) the possible brilliance but hopeless impracticability of which is shrouded in an indigestible matrix of legal prose. There are even five bibliographies to be found within this bibliography. Could there be bibliographies within those bibliographies?

Despite these criticisms and considering the full year of effort that has gone into producing this bibliography, the report is a very valuable and indeed, so far, the most complete source of references on icebergs that I know of, and it is well worth the list price of $55.

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Gerald Holdsworth
National Hydrology Research Institute
Environment Canada
11 Innovation Blvd.
Saskatoon, Saskatchewan, Canada
S7N 3H5

THE PERMAFROST ENVIRONMENT. By STUART A. HARRIS. Totowa, New Jersey: Barnes and Noble, 1986. 275 p., 94 diagrams, 20 photos, index, bib. Hardbound. US$31.50.

The objective of this book is to provide up-to-date information on the use of permafrost areas and the problems of their development at a level suitable for advanced undergraduates and professionals. This is a laudable aim since there is a gap in the literature on this subject and no such review of this rapidly advancing field currently exists in monograph form. The author has worked in permafrost regions for many years, particularly in areas of high-altitude permafrost, and therefore appears well qualified to conduct this task. Unfortunately, this book falls short of its aspirations and is flawed by omissions of information, by factual errors and by poor presentation.

The book is divided into ten chapters. After an introduction, two lengthy sections deal with permafrost identification, nature and processes, and the distribution and stability of permafrost. The remaining seven chapters cover foundations, roads and railways, airfields, the oil and gas industry, mining, water supply and waste disposal, and agriculture and forestry. The bulk of the book does not concern the permafrost environment *per se* but rather its use. With the exception of the last chapter, all the rest could have been covered better by a title such as "Permafrost Engineering."

The best chapter is on the oil and gas industry and includes descriptions of the drilling methods used on land in permafrost areas and offshore in the sub-sea permafrost of the Beaufort Sea. It draws together literature on terrain disturbance, gas hydrates, sea ice, artificial islands, pipelines and tankers. It is disappointing, however, that the topic of gas pipelines is covered in less than two pages and that the Norman Wells to Zama oil pipeline, which traverses the discontinuous permafrost zone of Canada, is not mentioned.

In terms of content, the major shortcoming is that virtually all examples of engineering methods or problems are North American. The greater degree of development of permafrost regions in the Soviet Union is rarely acknowledged, and in the chapter on airfields, for example, there is a map showing their distribution in the U.S.S.R. but no further description in the text. It is recognized that it is not easy to obtain information on the Soviet Union, but the North American bias also results in little reference in any chapter to Greenland, Svalbard or the permafrost areas of China and Tibet, and no mention of northern Scandinavia.

A number of factual errors are present in the book. The most unfortunate of these is the statement that permafrost ". . . is the result of a negative heat balance at the surface of the earth . . ." (p. 21). The heat balance at the earth's surface in a permafrost area actually can be in equilibrium, producing stable permafrost, can be positive, producing degrading permafrost, or can be negative, resulting in aggrading permafrost. The explanation given perpetuates a popular misconception among undergraduates and is inexcusable in a book targetted for this group.

The presentation of the book leaves much to be desired, and responsibility for this surely must rest with the publisher. The pages were produced from camera-ready typescript rather than typeset. Numerous commas have been inserted by hand and there are a significant number of typographical errors. There are too few photographs, considering the practical approach taken to the subject matter, and after reproduction some appear too dark to observe the details noted in the text. Diagrams are plentiful and generally fairly clear. However, the base map of North America used several times in the book is a very poor choice for a discussion of permafrost. Most islands in the Canadian arctic archipelago are omitted, with the result that the airfield at Resolute Bay on Cornwallis Island appears in the middle of sea (Fig. 6.1) and the Polaris mine on Little Cornwallis Island (Fig. 8.1) accomplishes the same feat. There are also errors present on some diagrams, such as the Alaskan and Yukon coastal plain appearing as sub-sea bottom permafrost (Fig. 1.1).

Despite flaws, selected pages of this book could be useful on a reading list for an undergraduate course on the development of the North. Given the price of the book, however, its purchase may not be the best use of limited library or personal resources.

Antoni G. Lewkowicz
Department of Geography
Erindale Campus, University of Toronto
Mississauga, Ontario, Canada
L5L 1C6