and French, which explains the purpose and organization of the book. The bibliography itself is organized under nine subject areas, primarily the main geographic areas where ice scour occurs, including individual sections on lakes and emerged sea floor areas. Two other principal categories are 1) Theory and Modelling and 2) Protection from Ice Scour. The last category is a general one where papers dealing with other aspects of ice scour, such as methods of analysis and research needs, are placed. Within each category the papers are fully referenced alphabetically by the principal author, followed by an abstract, usually in full, or a preface of an article that did not have an abstract or summary. Also included with each reference is an ASTIS (Arctic Science and Technology Information System) document number and a location code indicating where the documents may be obtained on interlibrary loan. A comprehensive index has been compiled under the categories of title, author, geographic location, subject and serial (publisher).

The bibliography contains 379 citations, the majority of which are obtained from the "grey literature" due to the fact that much of the research is the result of industrial contracts and opportunity based observations that were made as part of operational activities or scientific programs. It is this aspect that makes this bibliographic search unique. Many of the citations are very obscure but, nonetheless, are significant; a library subject search would be nowhere as complete as this compilation.

The book concentrates, in particular, on Canadian and United States shelf waters, and there appears to be a lack of information from Antarctica, where the world's largest icebergs occur on a shallow shelf. This is apparent from the title, where the Canadian term ice scour is used instead of several other terms, such as gouge and plough mark, used in the scientific literature of other countries. Also, literature from Scandinavia and the Soviet Union is almost entirely lacking, something the editors readily admit within their Introduction. Papers from these regions may not be abundant, but it is apparent that time constraints did not allow the editors to properly research what work has been carried out in these areas. As a consolation, they indicate that both ESRF and ASTIS will continue to update this bibliography in the ASTIS data base under the subject term "ice scouring," but this does not help the purchaser of the book.

For the Canadian and U.S. offshore areas the bibliography is quite complete and the citations summarize the different papers and reports very well. The book is suited to the reader who wants a complete breakdown of all papers written on various aspects of this subject, but it will not itself give the new reader to this subject the necessary understanding of the processes of ice/iceberg scour or the engineering designs to counteract the potential hazard; such a book would be very welcome in the published literature.

For someone wanting some information on the subject of ice scour in relation to their own interest, it would be wise to obtain this book from a library, considering its price. For researchers and engineers involved in high latitude shelves and, particularly, in offshore resource exploitation in areas prone to sea bottom scour, this bibliography is highly recommended.

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CULTURES IN CONTACT, The Impact of European Contacts on Native American Cultural Institutions, A.D. 1000-1800. Edited and with commentary by WILLIAM W. FITZHUGH. Washington, D.C.: Anthropological Society of Washington Series, Smithsonian Institution Press, 1985. 320 p., maps, figs., illus., bib. Hardbound. US$29.95.

This is a significant book, not only because it deals with a wide variety of early contact areas from Greenland to the Caribbean, but also because it has brought a multidisciplinary approach to a study of the problems that ensued after indigenous populations of eastern North America first encountered Europeans. William Fitzhugh, who has edited and provided the commentary for a collection of papers delivered at meetings of the Anthropological Society of Washington during the 1981-82 season, must be congratulated on the broad sweep of the contributions chosen for this volume. Archaeological, ethnographical, historical, pathological and socio-political points of view have all been brought to bear on the subject of what actually happened during the first century or so of interaction between native Americans and the "aliens from the east," whether of Scandinavian, Basque, English, Spanish or other stock.

Although these papers demonstrate that the patterns of interaction showed considerable differences, depending on the region and the ethnic groups involved, and that in some areas the indigenous population, as, for instance the Narragansett, were temporarily better able to cope with the commercial and territorial expansionism of the Europeans than in other regions, nevertheless the end result was in most cases appallingly similar. In practically every case dealt with in this volume, with the exception of Labrador and Greenland, the original inhabitants of eastern North America were either annihilated by a combination of epidemic disease and warfare or suffered painful diminishment both culturally and statistically. Meanwhile there was, of course, a concomitant establishment of Europeans in all the regions most appropriate for settlement. As Fitzhugh has noted in his commentary on Part I, only in the Arctic and sub-Arctic, where until the 18th century interaction was mainly ship-based rather than land-based, was the effect of a European presence not devastatingly negative; there, however, Inuit language, culture and population survived, and "Inuit people . . . continue to occupy their territorial homeland."

The dates given in the book's subtitle might imply that detailed coverage has been given to contact areas from the time of the first Norse establishments in Newfoundland through to the end of the 18th century, but that would be a very difficult task for one volume to cover. The majority of these papers are concerned with the 16th and 17th centuries, and it is clear that the collection was never intended to cover all the contact areas of eastern North America. However, it is surprising that one very important area of early contact has not been included. Apart from Susan Kaplan's paper, which touches on the French seigneury period in relation to French-Eskimo contact in Labrador, there is barely a mention in other papers of the widespread influence of French traders and settlers. The selected case studies are based mainly, though not entirely, on archaeological research projects relating in Part II to Narragansett, Skakheag and Iroquois tribes; Part III examines the Powhatan chiefdom and other Algonkian groups in the Chesapeake area and Part IV is a final section by Kathleen Deagan on "Spanish-Indian Interaction in Sixteenth Century Florida and Hispaniola."

It is to be hoped that further volumes will include such vital areas as the Gulf of St. Lawrence, since there are fruitful comparisons that could be made between Spanish, French and English approaches to trade and settlement that appear to have little to do with an "institutional" vs. an "entrepreneurial" approach, and more to do with informal modes of interaction such as intermarriage (discussed in Deagan's paper). In southern New England, according to the paper by Peter Thomas: "Interracial marriage was forbidden" and "Social boundaries were closely prescribed by colonial law,' whereas attitudes to intermarriage were entirely different in areas such as the Gaspé and Acadia, where from the 1580s onward there was sustained social interaction between Indians and the trader-fishermen (although it should be noted that the Gulf was not "rapidly deluged . . . after its discovery by Cabot," by Basques or any other fishermen, as is stated in the commentary to Part II).

The influence of both Moravians in Greenland and Catholic missions in Florida are discussed in Parts I and IV, and particular attention is paid by Deagan to the work and concern of men such as Bartolome de las Casas and the Dominican fathers, while J. Frederick Fausz has pointed out that by 1625 more than one Englishman felt, like Sir Francis Bacon, that settlements should not be allowed where Indians had to be

"displanted . . . for else it is rather an extirpation than a plantation," but the fact that this same concern was being shown, for example, by isolated missionaries in Acadia, and that this concern was not in every case linked with trade might be usefully examined in future papers.

The importance of trade as the main linking factor or "bridging mechanism" between Europeans and native populations is stressed by nearly all the contributors to this volume, who have shown that the long-term effects of trade varied enormously according to who was doing the trading and what was being traded. Trade in food, particularly maize, often had, for example, conspicuously different results from trade in furs: cultures that depended to a large extent on agriculture found their economic life disrupted more rapidly by land-hungry settlers than cultures that provided hunters or middlemen for the fur trade.

Not only because of the contrast in the cultures discussed, but for many other reasons, this is a thoroughly stimulating book for the lay reader, and it must surely be essential reading for any anthropologist. Historians might like to see more of the "fine grain" of history referred to by Fitzhugh, and ably contributed to by Fausz, but all readers should be appreciative of the careful preparation that has gone into this volume. It would be nice to think, too, that it may be read by officials who can prevent bulldozers from operating unchecked in coastal areas or along inland waterways where many contact situations took place. Bulldozers and modern buildings are doing a splendid job of finishing off the final traces of cultures already extinguished by rampant European enterprise and disease. Unfortunately, it is too much to hope that anyone will be able to check similar types of enterprise in countries like Brazil, where still in the 20th century the same disastrous chains of events are taking place.

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LAKE GÅRDSJÖN, AN ACID FOREST LAKE AND ITS CATCHMENT. Edited by F. ANDERSSON and B. OLSSON. Ecological Bulletin No. 37. Stockholm, Sweden: Förlagstjänsten, 1985. 336 p. Hardbound. US$44.00.

This volume represents a collection of 38, mainly original, publications that together provide a comprehensive documentation of an ecosystem study of the effects of acid deposition on the soils and waters of Lake Gårdsjön (Sweden) and its catchment. The book is organized into six sections, including an introduction to the physiography and biological features of the area, the historical development of the area, water and element cycling, the population dynamics and community structure of the lake biota, the sediment properties and processes, and an excellent synthesis of the varied studies on the Lake Gårdsjön system.

Although the articles in this Ecological Bulletin can stand alone as individual research papers, the first two in the introductory section provide important background information that is very helpful for understanding the rationale of the project and acidification history of the region. In the opening paper, Andersson outlines the developments that led to the initiation of the Lake Gårdsjön project, including the reasons for choosing the study area and the basic aims of the project, "to quantify surface water acidification by studying the interaction between deposition and buffering processes of soil and the contribution of acidifying substances from the soil to the ground and surface water environment."

This paper is followed by a detailed article on the physiographical and biological features of the area. Besides giving the general patterns of climate, geology, geomorphology, hydrology and vegetation, the authors include extensive information on the structural and chemical composition of the soil that is useful in subsequent articles examining the buffering capacity of the terrestrial system.

The next section of seven papers continues with a presentation of background information on the development of the Lake Gårdsjön area largely from a historical viewpoint. Olsson provides a history of the land use in the area since the 1700s by interpreting early maps and taxation records, and also by interviewing the area's inhabitants to gather information for the last century. Added to this information base, Renberg, Wallin and Wik utilize data obtained from lake sediment cores to deduce the acidification history of Lake Gårdsjön. These authors integrate three distinct information sources for this analysis, namely, pollen counts of the terrestrial vegetation, the vertical distribution of acid tolerant diatoms and leaves of *Sphagnum* moss, and the density of soot particles at different levels in the recent lake sediments. Although this sediment core information would have made a greater impact had it been incorporated into a single article, the articles demonstrate that recent lake acidification is due to the deposition of acid containing compounds from the atmosphere, rather than changes in land use. The final contribution in this section describes changes in the fish populations of the Lake Gårdsjön and other area lakes and streams during the 1900s as indicated in historical documents and recent faunal surveys. From this historical analysis it is clear that species successfully stocked during the years 1880-1983 have all been seriously affected or eliminated as a result of recent (post-1950) decreases in the pH of the lake.

Following this acidification history of Lake Gårdsjön, the remaining contributions to the volume are divided into sections on hydrogeochemical studies, biotic relationships in the lake and properties of the sediments. Several of the primary goals of the Lake Gårdsjön project were to establish the residence time and transport routes of water in the ecosystem, to quantify the total atmospheric deposition, including the input of gases and particles, and to construct budgets for chemical elements and species, including free oxonium ions, Brønstedt acids, strong acid anions, base cations and nutrients. The work reported in the ten articles on hydrogeochemical studies accomplishes many of these original goals and sets the stage for future simulation modelling efforts and liming experiments to be conducted on land and in the lake.

The studies on the biological relationships within the lake focus on the changes in production and species composition as a direct result of toxicity to increased acidity or heavy metals and community level changes due to reductions in grazers or predators. For most of the biotic components (phytoplankton, attached algae, zooplankton), researchers were unable to study the development toward the present stage of lake acidification; thus their analyses rely heavily on the description of the current biological status (i.e., production and community composition), often combined with rather liberal "ad hoc" explanations for this current biological state. However, taken together these works establish a consistent decrease in species numbers of the algae, invertebrates and fish, as well as documenting apparent increases in biomass of benthic algae and *Sphagnum* moss. One of the most surprising conclusions from these studies is that the loss of top level fish predators from the acidified lake has caused an increase in invertebrate predators and the concomitant reorganization of the biotic structure of the prey communities.

Studies on the properties of the lake sediments essentially either document present chemical conditions and historical changes that occurred within the lake during acidification or quantify ongoing processes in the sediment water interface, such as the exchange of dissolved substances and decomposition rates. Major findings in these eight articles include evaluations of the effect mats of *Sphagnum* moss and filamentous blue-green algae have on sediment-water fluxes of P and N, a suggestion that microbial activity is unchanged by the acidification of freshwater sediments and that "decomposition of coarse leaf detritus in the littoral zone is more a function of detritivore abundance than a direct function of water acidity."

Finally, the volume is rounded out with excellent synthesis articles that discuss the processes contributing to soil and water acidification, the biotic structures and relationships within the lake and the quantification of sediment processes.

Overall, this well-edited and nicely produced Ecological Bulletin