

"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, Brønsted 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

achieves the objectives stated in the preface by providing a complete description and analyses of the catchment study. Because of the cohesiveness of the various articles, this volume should be a valuable reference document for senior researchers and beginning graduate students interested in investigating various acid precipitation problems. It is unfortunate that almost no discussion of the soil and lake liming experiments is provided, as the inclusion of this material would have substantially increased the usefulness of this document. Despite this omission, the volume provides an important contribution to the understanding of the acidification history and status of terrestrial and aquatic environments along the Swedish west coast, and it underscores the need to consider both the terrestrial and aquatic environments when evaluating the causes and mechanisms behind the acidification of freshwater ecosystems.

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THE ALASKA HIGHWAY: A PERSONAL AND HISTORICAL ACCOUNT OF THE BUILDING OF THE ALASKA HIGHWAY.

By PHYLLIS LEE BREBNER. Erin, Ontario: The Boston Mills Press, 1985. 80 p. plus illus. Softbound. Cdn\$9.95.

Phyllis Lee Brebner is a writer who was employed by the R. Melville Smith Company at Fort St. John, British Columbia, in 1942-43, when this Canadian management contractor was involved in building the highway to Alaska. Upon joining the Canadian Army, she travelled from her home in Ontario to the Fort St. John construction camp in October 1942. Following the dismantling of the camp, she spent some time in the Chicago offices of the U.S. Engineering Division participating in the secretarial tasks that still remained to be done in connection with the highway construction project. In recognition of her work, the U.S. Public Roads Administration gave her a Certificate of Merit.

The Alaska Highway is popular history for the general reader. Brebner provides a short account of the building of the road between Dawson Creek, British Columbia, and Fairbanks, Alaska, tracing the story of its construction from the United States-Canada agreement in March 1942 (several months after Pearl Harbor) to proceed with it, to the roles played by the U.S. Army Corps of Engineers and the American Public Roads Administration, with its group of Canadian and American contractors, to the official opening of the trail on November 20 of the same year. She also describes the problems encountered by the engineers as they built different kinds of permanent bridges to suit the varying conditions of the terrain, 133 in all. Although the author focuses on the spectacular 2275-foot Peace River Bridge, she stresses the importance of all these structures. In addition, she emphasizes the significance of the air bases that were established on the air staging route in Alaska at places such as Whitehorse in the Yukon and Fort St. John, pointing out that during the war these facilities were put to good use in delivering short-range aircraft to both Alaska and the U.S.S.R. Brebner notes that the Canadian Oil (Canol) project, which resulted in oil being piped from Norman Wells to a refinery at Whitehorse, has been subjected to a great deal of criticism, but she argues that it was an essential source of petroleum products for the army trucks and the planes on the Edmonton-Fairbanks run.

The author's respect for the surveyors, engineers, truck drivers, bush pilots, soldiers and civilians who had a part in bringing the Alaska Highway into existence comes through clearly. Her positive assessment of their work parallels the findings of a number of the contributors to the scholarly 14-essay volume on the history of the road edited by Kenneth Coates. Readers who are sensitive to the dangers, hardships and trying circumstances to which the road builders were exposed in this northern environment will likely find Brebner's book informative. One of the best aspects of the story lies in her descriptions of situations in which the skills, endurance and courage of the workers were

revealed. She does, however, not allow her admiration for such individuals to conceal the fact that the demands and frustrations of construction life were too much for many workers. The result was a high turnover in the labour force.

A strength of this account is that the author skillfully handles the question of Canadian sovereignty in the northern parts of British Columbia and Alberta, the Yukon and the Northwest Territories — the areas where the American military sometimes launched operations before the approval of the Canadian government had been given. In trying to be fair to all parties concerned, she notes, among other things, the grounds for Prime Minister Mackenzie King's worries about the American presence in the Canadian Northwest.

Although a comment on the back cover of this narrative informs the reader that "this book is a personal account of life in the camps . . .," a point that is also contained in the sub-title, only one personal recollection is evident, in a brief, tantalizing paragraph in the introduction where the author says something about the excitement she felt at having an opportunity to contribute to Canada's war effort. Unhappily, there are no further glimpses into Brebner the person in this book. Could a real sense of the inner Brebner have been included in the chapter "Camp Life at Fort St. John"? One wonders why this chance has been missed.

Dozens of well-selected photographs of the men and women who were instrumental in constructing the Alaska Highway enhance the book. Certainly, the story told here helps to bring the interesting development of the road into the consciousness of the reading public.

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