Book Reviews

Cold-Climate Foragers

Boreal Forest Adaptations. The Northern Algonkians. A. THEODORE STEEGMANN, JR., Ed. Plenum, New York, 1983. xii, 360 pp., illus. $49.50.

In times before European contacts, there were two principal patterns of culture and subsistence in the Arctic and Subarctic of North America. Inuit (or Eskimo) exploited the circumpolar seamammal populations of the coastal tundra from Greenland to Alaska. Less well known from the literature, but vastly more diverse, were the roughly 50,000 to 100,000 subarctic Indians who lived within the inland boreal forests of Canada and Alaska. This is a huge area with a continental climate that produces some of the lowest winter temperatures in the world. Native residents of the Subarctic were able to survive in this environment by means of hunting, fishing, trapping, and gathering, or what is known as foraging subsistence. Their success in these activities depended on the development of three material items that increased levels of mobility—the toboggan, snowshoes, and the birchbark canoe. For many years the Inuit have been identified as the archetype of human adaptation to polar conditions. The authors of *Boreal Forest Adaptations* argue that subarctic Indians were equally well adapted to these conditions by virtue of cultural patterns that had been developed over several thousand years of continental, subarctic residence.

Boreal Forest Adaptations arose from a project to explore patterns of adaptation, particularly to cold, of Algonkian-speaking Cree and Ojibwa Indians living in the Severn River drainage system of northern Ontario. Dawson ("Prehistory of the interior forest of northern Ontario"), Rogers ("Cultural adaptations: the Northern Ojibwa of the boreal forest 1670–1980"), and Szathmary and Auger ("Biological distances and genetic relationships within Algonkians") each contribute detailed review papers on the northern Algonkian-speaking peoples. From these reviews, we learn that the basic pattern of cultural adaptation to the boreal forest has considerable time depth (perhaps going back as much as 10,000 years) and has persisted despite European trade and other forms of intervention from the 17th century to the present. The remaining six chapters in the volume, by Steegmann, as project director, Hurlich, Marano, and Winterhalder, are each based on the ethnohistoric literature and the authors' own field experiences during the research project. I shall focus on these contributions.

In the introductory chapter, Steegmann outlines how the Algonkian research began and then describes, with considerable candor, how the original physiological design of the project evolved toward a more historical perspective. He then notes that, despite an initial concern with the scientific question of cold adaptation in the Algonkians, he is now no longer convinced "that cold represents a significant problem" (p. 4) as a stress to these native residents of the boreal forest. This is a recurring theme in several other chapters. In fact, there appears to be general agreement among the authors who participated in the research project that cold temperatures are today, and were in the past, almost completely buffered by clothing, tents, fire, snowshoes, and other largely behavioral coping mechanisms. The evidence presented to support this proposition includes observations of the apparent ease with which Indians hunt and trap under conditions of very low temperature; the personal experiences of one of the authors, who married into an Ojibwa family and spent considerable time hunting and trapping with his affines; and the fact that cold is seldom a direct or accessory cause of death among Indian residents of the north.

Marano, in his contribution on present hazards and adaptations, is so convinced that culture is the dominant or overriding force that he states, "Not only is a perfectly ordinary human phenotype sufficient, but the mediating force of [Algonkian] culture is so strong, that even individuals with severe physical handicaps are able to do well in this harsh setting" (p. 271). This statement is followed by several anecdotal tales of disabled men who were successful hunters. The remainder of the chapter is devoted to supporting the contention that hypothermia and frostbite are not major hazards, whereas fire deaths and drowning are. Within all this impressionistic and speculative writing, Marano does present an interesting idea. He states that an important way in which Indians prevent hypothermia during long hunts is by remaining fully clothed during periods of exercise. This leads to an increase in body heat load and conservation of stored heat, while at the same time leading to high sweat rates. The accumulated sweat is evaporated and damp clothing dried during frequent tea breaks. This is an intriguing idea, but, as with other intriguing ideas in this and other chapters, there is no attempt to test it. Do Indians indeed conserve heat by these means during the hunt? Do they sweat less than unacclimatized people? Do they have an advantage over others by having high levels of physical fitness? None of these questions is considered.

Winterhalder's contributions are considerably more substantial. He provides a highly technical and authoritative chapter on boreal zone ecology and history, where he characterizes the environment spatially as a very "patchy" mosaic of vegetation communities and temporally as highly variable and fluctuating. This background material is used in a later chapter as a springboard for discussion of optimal foraging strategies in a small community of Cree Indians at Muskrat Dam Lake. Winterhalder tested several hypotheses concerning breadth of diet, patch use, marginality of resources, and settlement patterns.

Hurlich writes on disease patterns and demography of Algonkians. Many of the disease data are from ethnohistoric and archival sources, whereas most of the demographic data are from the Hudson Bay town of Ft. Severn, where the author spent a year with the people. Epidemic diseases and starvation were major causes of death in the past, as would be expected. Present-day health problems include accidents (particularly those linked to fire and water transport), alcoholism and alcohol-related diseases and accidents, and tuberculosis. Infant mortality, quite high in the past, has declined markedly in recent years.

In a general sense, this volume was a disappointment to me for a number of reasons. First, expecting a balanced and integrated presentation of the biological and cultural aspects of human adaptation to the northern subarctic woodlands, I found instead a perspective that relegated biology to an inferior role and argued for culture as the sole basis of adaptation. Second, the "science" in several of the chapters appears to have been subordinated to "history." History, as Steegmann points out in the introduction, is important to the understanding of Algon-

kian adaptation. I fully agree. However, historical analysis is not the fundamental way to understand human adaptation to the environment when populations are there to be studied in situ. Third, I have a sense that there is considerable interpretation based on limited data. Perhaps the major problem is that whether the book was to be a regional study, in which the basis is sociological and historical, or a local study, in which the data base is anthropological and it is the small population groups that are of primary interest, was not resolved. My bias is in favor of the small population unit to resolve questions of human adaptation, and it is at the local population level that this volume is deficient. On balance, however, and at the regional level of analysis, the volume is a rich source of information on the lives of Northern Algonkian hunters.

MICHAEL A. LITTLE
Department of Anthropology, University Center at Binghamton, State University of New York, Binghamton 13901

An Organization of Engineers

75 Years of Progress. A History of the American Institute of Chemical Engineers, 1908–1983. TERRY S. REYNOLDS. American Institute of Chemical Engineers, New York, 1983. vii, 200 pp., illus. $20; paper, $15.

The American Institute of Chemical Engineers (AIChE) was organized in June 1908 at a meeting attended by 19 persons of diverse background. Chemical engineering was not yet a professional category well recognized by industry. Many chemical plants were designed by mechanical engineers, and industrial functions that demanded a knowledge of chemistry were generally handled by analytical or industrial chemists. Few universities had programs for training chemical engineers; where programs existed, they were usually loosely knit—the student was taught some mechanical engineering, some chemistry, and some practical information about production processes in particular industries. By electing to call themselves chemical engineers, the founders were expressing more an ambition than a fact; by setting up an autonomous professional organization, they were anticipating rather than responding to the emergence of a discipline.

In 1983, membership in the AIChE exceeded 50,000, and those 50,000 chemical engineers no longer faced acute problems of self-definition. The concept of unit operations, introduced by Arthur D. Little in 1915, gave chemical engineering an integrity that, despite recent challenges, has never been lost. Academic programs have proliferated and become far more rigorous and systematic. Opportunities for chemical engineers in industry have multiplied as the chemical and chemical-process industries prospered. Industry and academe have recognized chemical engineering as a profession.

Terry Reynolds's craftsmanlike and well-balanced history sets the development of the AIChE against the backdrop of these larger changes in the nature of chemical engineering. Eschewing a detailed year-by-year chronology, Reynolds focuses on a series of major events in the development of the Institute: its foundation, its efforts to develop educational standards for chemical engineers, its transition from a small and selective club to a mass-membership organization, and its efforts to strike a balance between narrowly professional programs and activities of a broader social nature. Especially valuable is his account of the 1970's, a period when unemployment intensified economic conflicts within the membership and when environmental regulation of the chemical industry became a matter of political controversy.

Reynolds fairly observes that outside of its immediate areas of professional concern, such as publications and education, the AIChE has been exceedingly cautious. When it has joined debate on political and social issues, it has generally adopted conservative positions. It lobbied for the maintenance of the Chemical Warfare Service during the 1920's and against the National Industrial Recovery Act during the 1930's. More recently, it has steadfastly opposed the unionization of chemical engineers and has refrained from condemning actions by members that violate environmental standards.

It may seem paradoxical to some readers that Reynolds should define the AIChE as a success, whatever its membership statistics, when its record on social and political issues has been so consistently timid or conservative. But to condemn the organization for its social and political stance is to imply that it was free to pursue other policies. Reynolds repeatedly stresses that a voluntary association, such as the AIChE, is constrained by its very nature to work within narrow limits. If it is to retain the loyalty of its membership, it must not adopt policies that provoke internal controversy. Consensus serves as the basis of action. Educational reform had broad support among the membership, hence the AIChE pursued a vigorous program in this area; unionization and environmental regulations, though supported by some, were anathema to other constituencies within the organization, and hence progressive action was blocked.

Readers of this book who expect more of a professional association will be disappointed by Reynolds's gentle treatment of the AIChE. But they would do well to ask themselves whether an organization that has done so much to promote excellence in the practice of engineering should have been jeopardized in the interest of pursuing social or political goals.

JOHN W. SERVOS
Department of History, Amherst College, Amherst, Massachusetts 01002

Audition

Hearing. Physiological Bases and Psychophysics. R. KLINKE and R. HARTMANN, Eds. Springer-Verlag, New York, 1983. xvi, 399 pp., illus. $27. From a symposium, Bad Nauheim, Germany, April 1983.

This book is the proceedings of the Sixth International Symposium on Hearing. This series of symposiums, held every three years since 1969, is intended to foster cross-fertilization of auditory physiology and psychoacoustics. The book contains 57 papers (circulated prior to the symposium) organized into six sections. Most of the papers are followed by discussion by symposium participants. Three of the six sections begin with invited review papers. Inasmuch as most of the authors are European, the papers tend to reflect the "European school" of auditory science.

Section 1, Inner Ear Mechanisms and Cochlear Emissions, begins with a brief review of hair-cell mechanisms (Flock). In an especially lucid paper, Lewis and Hudspeth present evidence that hair cells isolated from the bullfrog sacculus are electrically resonant and that a calcium-activated potassium channel contributes to this resonance. Other papers concern the effect on hair-cell receptor potentials of transient asphyxia (Russell and Ashmore) and efferent stimulation (Fuchs *et al.*); electrical properties of hair cells (Dallos); basilar-membrane, hair-cell, and neural responses (Johnstone *et al.*); stochastic (Bialek) and electrochemical (Konishi and Salt) properties of the cochlea; cochlear potentials in homozygous and heterozygous mice (Bock); primary neuron properties in anurans (Lewis; Narins and Hillery); and acoustic emissions (Fritze; Kemp and