

of *Ambio* dedicated to the subject (1976), which have headed the list of essential reading in this field.

Many of the contributors to the volume are European, and there is some awkwardness in the translation of some of the papers. In the main, however, the papers are well presented and the meaning and intent are clear.

The papers range from excellent to average. In a well-done paper Grennfelt *et al.* evaluate the sulfur and nitrogen budgets for coniferous forests in southwestern Sweden. They make the important point that many substances that enter the ecosystem may have an acidifying effect, perhaps with some delay after deposition. Some of the substances, of course, reach the ecosystem by means other than simple snow or rain. Eaton *et al.* give a sulfur budget for the northeastern United States that is surprisingly close to that given by Grennfelt *et al.* for southwestern Sweden. Ulrich dwells on the minutest details concerning sources of and sinks for hydrogen ions, which makes reading laborious. A paper by Andersson *et al.* on forest ecosystem responses ranks among the best in the book owing to its ecological context and conceptual basis.

One matter that requires a great deal more research is chemical change that occurs in rainfall or other precipitation as it is intercepted by forest or other vegetation canopy, litter, and mineral layers of soil and moves through the watershed into streams and lakes. The two papers dealing with this subject, by Likens *et al.* and Gorham and McFee, represent significant steps in looking at watershed dynamics. The former paper presents new data that build upon data from previous years at Hubbard Brook, New Hampshire. The latter paper is excellent in its contribution to the conceptualization of the factors that must be taken into account in quantifying or modeling the dynamics of precipitation input and runoff.

Recent data might tend to cast some doubt on some of the conclusions reached by the editors in 1978 or provide a more penetrating understanding of some of the phenomena. In general, however, their conclusions and recommendations can still stand. Many of the matters on which they recommend further research are now being investigated intensively.

Scientists with an interest in atmospheric deposition, particularly its ecological effects, will find the book to be of great value.

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Adaptation to Cold

Comparative Mechanisms of Cold Adaptation. Proceedings of a meeting, East Lansing, Mich., Aug. 1977. LARRY S. UNDERWOOD, LARRY L. TIESZEN, ARTHUR B. CALLAHAN, and G. EDGAR FOLK, Eds. Academic Press, New York, 1979. x, 380 pp., illus. \$24.

Opportunities for research on cold adaptation are numerous and diverse. Because of the multitude of processes involved, however, many of the researchers in the field are specialized and communication across disciplines has been lacking.

The purpose of this book is to stimulate such communication. The 12 chapters and seven "discussions" are the products of a two-day symposium and workshop. The subject matter is about evenly divided between plants and animals, and the coverage is unusually broad. In addition to direct effects of temperature on specific processes, whole plant and animal mineral nutrition, the energy balance of a vegetation canopy, and even some population dynamics and reproductive biology are discussed.

The book is too short to provide detailed reviews. Instead, by juxtaposing diverse topics, from hibernation in homeotherms to ice formation in plant cells, it serves mainly to stimulate new questions. The last chapter of the book is devoted to future trends in cold adaptation research, and the next-to-last chapter describes research support facilities north of the Arctic Circle. Those interested in an encyclopedic treatment of a specific topic can look up the many review papers cited in the text. The emphasis here is on what is not known, why it is important to know, and how it can be found out.

Overall, the book is a success. In part, the success is due to the implicit ecological perspective of the editors and many of the authors. The word "ecology" is rarely used, but the environmental context is clear enough that diverse, specialized topics are almost unavoidably seen as part of an overall pattern of adaptation. Also the individual papers are concise and well-written enough that most readers can pull them together themselves, and they do not present more detail than nonspecialists can absorb. For these reasons the book will be stimulating to students and to a general scientific audience as well as provide inspiration to workers in the field.

Although there is no summary chapter, several common themes are apparent. Perhaps the most frequent are those

of acclimation vs. acclimatization, hypothermia vs. hibernation, and the difficulty of interpreting *in vivo* or laboratory results in terms of the whole organism in the field. Uncertainty about the role of membranes, particularly membrane phospholipids, in cold adaption is mentioned in at least five papers, with widely differing approaches.

Botanists tend not to distinguish between acclimation (adaptation to a specific environmental factor) and acclimatization (adaptation to a whole environmental complex). Zoologists are much more aware of the distinction but are unable to explain why, in the case of body fat accumulation, for example, the acclimation response to lower temperature is opposite to the acclimatization response to the onset of winter. Similarly, the peak in the photosynthetic response curve may vary with environmental temperature, but the photosynthetic rate at that temperature occasionally decreases to below the unacclimated rate. Clearly, both botanists and zoologists are trying to interpret such data in terms of single limiting factors when it is likely that direct and indirect effects of temperature are interacting. A mechanism for dealing with such interactions is suggested in a chapter by Miller *et al.* on simulation modeling, and the chapters on mineral nutrition by White and by Chapin suggest alternative pathways.

The emphasis on questions, rather than answers, conveys an excitement about cold adaptation research that is rare in such broad reviews. Certainly, enough questions are raised to keep researchers busy and communicating for years to come.

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Protein Chemistry

Protein Methylation. WOON KI PAIK and SANGDUK KIM. Wiley-Interscience, New York, 1980. xviii, 282 pp., illus. \$27.50. Biochemistry, vol. 1.

Enzymatic methylation is one of the mechanisms by which nature can alter the structure and thereby the biological activity of proteins. During the last 15 years, interest in the subject has grown tremendously. In this book, Paik and Kim, who have carried out much of the pioneering work on protein methylation, review our knowledge of these reactions and document their diverse nature and

potential importance in the regulation of cellular activity.

Since the discovery of ϵ -*N*-methyllysine in the flagella protein of *Salmonella typhimurium* in 1959, workers have found that not only lysine but also arginine, glutamic acid, aspartic acid, and histidine residues of proteins can be methylated to form nine major amino acid derivatives: ϵ -*N*-monomethyllysine, ϵ -*N*-dimethyllysine, ϵ -*N*-trimethyllysine, N^G -monomethylarginine, N^G , N^G -dimethylarginine, N^G , N^G -dimethylarginine, methyl ester of aspartic and glutamic acids, and 3-*N*-methylhistidine. The volume describes in detail the discovery of these derivatives and their general distribution in nature. Detailed procedures for their chemical synthesis, purification, and identification are provided.

These methylated amino acids are formed by reactions catalyzed by *S*-adenosylmethionine-dependent methyltransferases. Several of these enzymes, including protein-arginine *N*-methyltransferase, protein-carboxyl *O*-methyltransferase, and protein-lysine *N*-methyltransferase, have been purified and partially characterized. The authors provide detailed procedures for their assay and purification.

A substantial part of the book is devoted to the potential importance of protein methylation in the regulation of cellular activity. For example, the book reviews the role of lysine methylation in the regulation of the activity of histones and cytochrome *c*, in the biosynthesis of carnitine, in the assembly of ribosomes, in the visual function of rhodopsin in the retina, and in the assembly of flagellin in the bacterial flagella. Arginine methylation is reviewed from the standpoint of its possible involvement in the regulation of the activity of encephalitogenic myelin basic protein and histone and non-histone chromosomal proteins. The role of protein-carboxyl *O*-methylation in bacterial chemotaxis, in the storage and excretion of hormones, and in ligand-receptor interaction is also discussed.

Research on the biochemical significance of protein methylation, still in its infancy, is bound to yield important discoveries concerning the regulation of cellular events. This book will be important for those of us doing research on protein methylation, since it provides a concise yet extensive review of the literature. In addition, it should serve as an excellent introduction to workers entering this field of protein chemistry.

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The Anthropology of Brazil

Brazil. Anthropological Perspectives. Essays in Honor of Charles Wagley. MAXINE L. MARGOLIS and WILLIAM E. CARTER, Eds. Columbia University Press, New York, 1979. xviii, 444 pp., illus. \$20.

The study of the Brazilian people has become something of an industry at Columbia University, where for more than 25 years Brazilianist studies have flourished under the benevolent guidance of the anthropologist Charles Wagley. The 18 papers collected in *Brazil: Anthropological Perspectives* represent a sampling of that industry. In this festschrift in honor of Wagley, now at the University of Florida, Gainesville, his former students and colleagues, both American and Brazilian, have come together to attest to the value of his mentorship, while providing the reader with a collage of Brazil: its culture and society.

Wagley's introduction, "Anthropology and Brazilian national identity," is a personal account of the development of anthropology as a profession in Brazil. He chronicles the field expeditions of a group of young anthropologists from Columbia, among them Wagley himself, who beginning in the late 1930's undertook to do research in the hinterlands of Brazil. By the 1950's home-trained Brazilian anthropologists and sociologists began to take over their discipline from foreign-trained personnel. This volume contains contributions from an older Brazilian generation influenced by the teachings of French, German, and American anthropology as well as from a younger generation of American scholars.

The book provides a somewhat elliptical history of Brazilian anthropology. In some cases we are given updated work, illuminating to the initiated, perhaps puzzling to the novice (for example, Florestan Fernandes's interesting essay, "The Negro in Brazilian society: Twenty-five years later"). At times we are thrust precipitously into recent in-house arguments (for example, Marvin Harris's quarrel with Napoleon Chagnon on the causes of war among the Yanomamö). Robert F. Murphy's welcome brief on the absence of true lineages in lowland South America and Daniel R. Gross's challenge to structuralist interpretations of Gê social organization similarly presuppose a knowledge of the literature not provided in this volume. But this is a "failing" of the festschrift, when associates take the rare and welcome opportunity to rethink their previous published work and to "set the record straight."

The organization of the book presents a problem. It is apparent that the editors' intention is to place emphasis on topics (Some Perspectives from the Past, Environmental Adaptations, Social Structure, Political Organization) which cross-cut the usual divisions of single-nation studies into historical periods or regional units. For this reason, I assume, the eight papers devoted to interpretations of aboriginal life are distributed throughout the book's four sections rather than collected together. The effect of this distribution is to confound two kinds of anthropological study. Clearly the requirements for the study of a tribal society are different from the tools and techniques necessary for research in a technically more advanced society, possessed of a complex history and a written tradition. One cannot so easily ignore the qualitative leap from "cold" society to "hot" society, from "primitive" to "modern" society, by a blurring of the boundaries.

Many of the papers are concerned with the ways in which people adapt themselves to their physical environment. Emilio Moran discusses the cultural adaptation of settlers to the Trans-Amazon highway. The opportunities afforded to farmers and planters by agricultural frontiers in the southern parts of Brazil and the United States constitute the subject of Maxine Margolis's paper. Conrad Kottak provides a perspective on the way in which the differential rewards of fishing in Arembepe (Bahia) have prevented their development of "class or even group consciousness" (p. 205). In an examination of an Italian immigrant colony in Rio Grande do Sul, Thales de Azevedo shows how the Italian rural stem family and the "chapel," both Old World institutions, were preserved and accommodated in the New World. Papers by the late Eduardo Galvão and William H. Crocker also pursue the subject of cultural adaptation to changing environmental pressures on Brazilian Indians.

Other papers treat adaptations to the social environment. Their underlying, if not always explicit, subject matter is the patron-client relationship in modern Brazil. Diana Brown's work on Umbanda in Rio de Janeiro, Charlotte Miller's research on middle-class kin networks in Belo Horizonte, Robert Shirley's discussion of the legal system in rural Brazil, and Sidney Greenfield's study of "Patron-client exchanges in southeastern Minas Gerais" are instances.

In their excellent essay, "The political economy of patron-clientship: Brazil and Portugal compared," Shepard Forman and Joyce Riegelhaupt have put their