

graphic talents! All in all, however, the author has done excellently what he set out to do. He has described the expedition's aims and achievements in the domain of natural history and its impact on the development of American science. It is to be hoped that someone will undertake the equally fascinating and demanding task of tracing the influence of the Lewis and Clark expedition on European cartography and natural history.

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Early Inhabitants of the Arctic

Eskimo Prehistory. HANS-GEORG BANDI. Translated from the German edition by Ann E. Keep. University of Alaska Press, College, 1969 (distributed by University of Washington Press, Seattle). xii + 228 pp., illus. \$6.50. Studies of Northern Peoples, No. 2.

Many North American arctic scholars, aware of the existence of Bandi's *Urgeschichte der Eskimo* and of its enthusiastic reception by reviewers, have eagerly awaited the promised English edition, which after considerable delay has finally appeared. The book is no mere translation of the original but embodies the results of subsequent research and takes into account comments and criticisms by other authorities in the field. It will be the indispensable handbook on the subject for some time to come.

Since they were first discovered by Europeans, the Eskimo have been an object of unflinching interest not only to scholars all over the world but to the general reading public. The ingenuity with which this distinctive ethnic group—the only non-Indian population in the New World—has exploited the world's most difficult and forbidding environment with a bare minimum of resources holds an inherent fascination for us all. It is not surprising that from the beginning scholars have speculated about the origin of the Eskimo and their unique way of life, and have theorized about the history of their conquest of the American arctic. But until recent years such inquiry remained in the realm of speculation and theory. Today, now that archeology has begun to provide factual information, the prehistory of the

Eskimo is proving to be far more complex than would have been suspected a few decades ago—but all the more fascinating for that reason. Bandi provides us with a timely and masterly synthesis and interpretation of the accumulated data. From his background in studies of the Paleolithic of Europe he brings to the subject a body of relevant knowledge and experience not possessed by most Eskimo specialists, and in this makes a particular contribution.

An introductory sketch of the recent Eskimo and of early (prior to the days of archeology in the Arctic) theories of their origin is followed by a chapter on "The first discoverers of America" which, although it has little to do with the Eskimo, provides useful background. The author here draws heavily on the views of Müller-Beck, though he coins the term "Gravettoid" to replace the latter's "Aurignacoid," which still appears on the accompanying maps, to the possible confusion of the reader. After a brief but comprehensive historical sketch of archeological work in the American arctic, the main body of the book is occupied by a survey of the results of this work, region by region—a masterpiece of condensation of a vast body of complex material. The concluding chapter offers a concise summary of Eskimo prehistory as seen by the author, who warns that he may have made it appear to have been more simple than was actually the case. Contrasting views are set forth in an appended series of diagrams which show the origin, development, spread, and chronology of Eskimo culture as reconstructed by other leading authorities. There are useful chapter bibliographies, and a supplement includes titles as late as 1968. Illustrations remain the same as in the original German edition, although reproduction of photographs is generally not as good. The maps have been redrawn and expanded.

Eskimo Prehistory is both a survey of present knowledge for the general reader and an invaluable reference for the scholar. We may hope that the author will favor us with periodic revisions in future years as he and his fellow workers shed further light on this remarkable story of human adaptation.

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Another Continent

Geological History of Southern Africa. S. H. HAUGHTON. Published for the South African Chamber of Mines by the Geological Society of South Africa, Johannesburg, 1969. viii + 536 pp. + plates. R10.50.

Southern Africa, the area lying south of the Zambezi to the east and the Cunene to the west, is remarkable for the number of unique and excellently preserved geological features it contains. The Bushveldt Igneous Complex, best exposed but least understood of the world's great layered intrusives; the Great Dyke of Rhodesia, an extraordinary linear feature 400 miles in length but only 3 to 7 miles wide and comprised of four overlapping funnel-shaped layered intrusives; hundreds of kimberlite pipes, depositories both of diamonds and unique rock fragments brought up from the upper mantle; the Fig Tree sediments in the Barberton Mountain region, the world's oldest known fossiliferous rocks; the highly auriferous Witwatersrand Basin; these are but a few examples. But what is the geologic framework into which these and numerous other features fit? Their importance to our fragmentary understanding of earth's history cannot be overestimated, yet it is unfortunately true that the geology of southern Africa is hardly known, let alone appreciated, by most geologists.

In large part the provincialism of attitude reflects the difficulty one faces in trying, as an outsider, to obtain an overall picture of the geology of another continent. It can hardly be done, even by an expert, from the flood of papers on local and specialized topics. In the case of South Africa, we have turned to A. L. duToit's monumental, but unfortunately tedious, *Geology of South Africa*, most recently published in 1954. Haughton has not only provided a worthy successor to duToit's volume, he has prepared a more useful and readable book for students outside Africa by passing over topics such as the pedological, mineral-deposit, and detailed paleontological data included by duToit. The book is written for students in southern Africa, however, and though its style is engaging, it nevertheless stresses many details of stratigraphic terminology and correlation that are of little but local interest. Considering his intended audience, Haughton wisely avoids overemphasis of controversial theories of

origin or geologic history and sticks closely to factual observations. Yet it is a pity that he has not often taken pains to point out which observations tend to support a given hypothesis, for his long experience in the region gives him a unique opportunity to do so.

The volume is certainly the best general summary available and will be widely read. At the same time, its local flavor clearly illustrates the continuing need for a concise presentation of the geological evolution of the African continent addressed to the scientific profession at large.

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New World Archeology

Prehistory of North America. JESSE D. JENNINGS. McGraw-Hill, New York, 1969. xiv + 402 pp., illus. \$9.95.

Prehistory of North America is an introductory synthesis written as a textbook. It follows a logical progression, giving an outline of methods, descriptions of prehistoric cultures, and discussions of theoretical issues. It should fulfill its intended function well. Descriptions of sites and artifacts are accompanied by numerous drawings; there are no photographic illustrations. Archeological social reconstructions are discussed, but the author relies on ethnographic analogy where possible.

Continent-wide culture stages provide the organizational theme for Jennings's account of the establishment of big-game hunters and the subsequent development of a stable Archaic hunting-and-collecting way of life. In dealing with aspects of the succeeding Formative stage the book necessarily takes on a more specific regional organization.

Classic stage cultures of Central America are not considered, but the origins of plant domestication in Mexico are included because these events transformed the Archaic lifeway. The Arctic is treated as a unique region because its cultures do not fit the author's definition of the Archaic stage; they lack the necessary "total exploitation" of vegetal resources. This is the least convincing argument in the book.

It is Jennings's discussion of hypotheses and future problems that provides the most interesting and informative passages; from the catalog of what we

do not yet know an overview of the current status of American archeology emerges. The probability of an Asiatic-chopper-tool substratum and the likelihood of significant Old World stimulus in the Americas are examples of still-unresolved problems regarding which the author believes fieldwork may provide evidence in the future.

Jennings thinks that the terms "Woodland" and "Mississippian" have outlived their usefulness but does not attempt to devise replacements—wise from the textbook point of view but disappointing from that of synthesis. He does, however, put forward the concept of *archaic efficiency* as a modification and extension of the idea of primary forest efficiency. Archaic-stage technology, utilizing new raw materials by means of innovations in tools, provided a stable way of life, regardless of regional differences. Efficiency resulted in increase in population to the supportive capacity of the land. The author asserts that the Archaic stage would have lasted indefinitely had not outside stimulus resulted in regional changes after 2000 B.C.

Jennings clearly regards the idea of archaic efficiency as the most important contribution of his new synthesis of North American prehistory. There is no denying that he has provided much food for thought as well as an admirable text.

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Microbial Biochemistry

Bacterial Physiology and Metabolism. J. R. SOKATCH. Academic Press, New York, 1969. xii + 444 pp., illus. \$14.50.

The major catabolic and biosynthetic pathways in many bacterial genera are now firmly established, and there is also detailed knowledge of the enzymic reactions. A teacher faced with providing a course for graduate students or senior undergraduates in bacterial biochemistry can quickly alienate the class by recitals of metabolic pathways and fermentation balances. It seems better to give the principles, with detailed treatment of selected examples, and Sokatch's book should be a most suitable adjunct to a course in which this is attempted. It provides broad, accurate, and up-to-date coverage of metabolic pathways in bacteria, supple-

mented with physiological background and with molecular biology.

The book is divided into three parts: on physiology, energy metabolism, and biosynthetic metabolism. The first section includes a general discussion of the diverse nutritional requirements of bacteria ranging from the chemolithotrophs to the exacting Lactobacillaceae. There is also a thorough description of the characteristics of bacterial growth in batch and continuous culture and under synchronous conditions. This section ends with a most useful chapter on the chemical composition of bacteria, which includes recent work on the lipids and on the surface layers.

Energy metabolism is treated in logical sequence, beginning with a discussion of the utilization of oligosaccharides, followed by a chapter on sugar transport, a process whose nature is now being clarified by the isolation of specific transport proteins. Anaerobic and aerobic breakdown of carbohydrate is considered in detail, with emphasis on the experimental approaches used to reveal the mechanisms. Utilization of nitrogenous compounds and of aromatic hydrocarbons is also covered well. In addition to descriptions of the enzymic steps, there are many useful figures and schemes showing the chemical structures of the various intermediates. The work with *Mycobacterium phlei* is given the most attention in the chapter on aerobic electron transport and coupled phosphorylation, but the diversity of the systems by which these processes occur in bacteria is clearly pointed out. The principles of photophosphorylation in photosynthetic bacteria are briefly discussed, and the oxidation of inorganic substrates by the chemoautotrophs receives quite extensive treatment. The methane-producing bacteria are not considered in this book, an omission which must surely be remedied in future editions, in view of present interest in these organisms.

Biosynthesis is given comprehensive treatment. This section considers not only the formation of monomers but also synthesis of cell wall materials, complex lipids, nucleic acids, and proteins. A good synopsis is provided of studies of protein synthesis and its regulation up till 1968; this should provide a framework for the student trying to keep up with the current literature. "Classical" biosynthesis is covered in detail, beginning with the utilization of carbon dioxide by photosynthetic and chemosynthetic bacteria and with brief