

a little to fit Drake into the Baconian-Whig mold—his therapeutics, for example, is more traditional than otherwise—in general they have succeeded in buttressing their perceptive introductory essays through the selections printed, and they have been particularly successful in their stated purpose of presenting Drake as a representative figure of his time rather than as a hero struggling for individual success.

It is perhaps unfortunate that so many of Drake's writings were originally lectures. To modern readers' eyes, they suffer from the oratorical style of the 19th century, which could inflate a one-sentence thought into a full page of varied allusion and metaphor. Drake's largely descriptive scientific publications are written in a more direct and simpler style.

Finally, it is worth noting that some of the selections are from hitherto unpublished manuscripts, and that the book concludes with a comprehensive bibliography of Drake's writings.

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Prehistory

The Archaeology of Early Man. J. M. COLES and E. S. HIGGS. Praeger, New York, 1969. 456 pp., illus. \$16.

General summaries of man's cultural development over the past two to three million years are not numerous. The sheer scope of the topic, the obscurity of the sources where many of the basic data are recorded, and the frequently conflicting interpretations of these data by regional specialists have all contributed to the paucity of useful syntheses and summaries. For this reason, Coles and Higgs have done a real service for those who are interested in prehistory in presenting this volume that summarizes the archeological evidence from the earliest recognized tools to the beginning of food production. The authors have achieved a genuine success in bringing together a wealth of data into a thoroughly competent summary of our knowledge at the present time.

The layman or nonspecialist will find this book hard going. The text is often heavy with detailed description of stratigraphic sections and lithic artifacts, and the numerous drawings, although well executed, may tend toward monotonous repetition to the uninitiated. These details that may deflect

the casual reader are the strength of the book to the student of prehistory, however. One suspects that the major market for the book will be as a text for advanced undergraduate courses on world prehistory. A better text is not available.

Geography and time provide the major structure for the organization of the data. After a general introduction containing a discussion of some of the basic methods of prehistory, the book is arranged according to four main geographic areas: Africa, Europe, Asia, and the New World. Each of these areas is in turn divided into several regions, and for each region the more significant data are summarized, beginning with the earliest tools and ending with the most recent known Paleolithic materials. These summaries are then followed by detailed descriptions of the most important sites in the region, again arranged chronologically from early to late. Although the book deals with the evidence on a worldwide basis, the major emphasis is on Africa, Europe, and the Near East, reflecting not only the fact that more work on prehistory has been done there than in other parts of the world (except for North America) but also that the record of human occupation in this area is longer, at least so far as is now known. In general, the Americas are given only cursory treatment, and this section should probably have been omitted.

As must be expected in any summary of this magnitude, there are many details of interpretation with which one might quarrel, and, indeed, perhaps few regional specialists will truly be satisfied with the summaries of their areas. Most of the disagreements, however, either will reflect a different emphasis or will be based on knowledge recently acquired and not available to Coles and Higgs. The latter is certainly the case in their summary of the Egyptian Paleolithic. The new data obtained as a consequence of the salvage archeology done in the Aswan Reservoir and the subsequent work along the Nile have drastically altered our concepts of that area.

A more basic criticism of the book can be directed at the absence of some features that would have made it both more useful as a reference and more readable as a text. The absence of profile drawings, either to portray schematically the regional stratigraphic sequence or to show in detail the units described at the more significant sites,

is particularly puzzling. Many of the long and often tedious descriptions of these deposits could have been greatly clarified or even reduced in length had profile drawings been included. A similar question is raised by the absence of charts to summarize the chronological positions of the key localities in each region. Such charts would have greatly facilitated the reader's effort to visualize the time relationship between various levels in some sites, particularly in the more complex areas such as Western Europe. The book is also curiously deficient in references, in spite of the nearly eight pages in the bibliography. For the most part, the major sites are referenced by a single entry, the most important publication about the site. In some instances, however, the authors allude to different interpretations or new data which cannot be obtained from these initial references, and to track down some of the uncited material would require a considerable search of the literature. One suspects that these minor deficiencies are due largely to editorial policy at the publishers'. Presumably, more extensive bibliographic data and the inclusion of correlation charts would lend a more technical atmosphere to the book and thus make it less attractive to the general reader.

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Airborne Pathogens

An Introduction to Experimental Aerobiology. ROBERT L. DIMMICK, ANN B. AKERS, ROBERT J. HECKLY, and H. WOLOCHOW, Eds. Wiley-Interscience, New York, 1969. xviii, 494 pp., illus. \$23.95.

This is a worthwhile and timely addition to the Environmental Science and Technology series of books devoted to research on the quality of the environment and the methods for its conservation.

Too few people today appreciate the importance of the microbial world in maintaining the steady state in such component parts of the ecosystem as the air, soil, and water. The word "aerobiology" in its broadest definition refers to all relationships between the atmosphere and living beings. But this book is restricted to experimental laboratory studies on possible disease-producing airborne bacteria, fungi, and viruses

that may be transmitted by the respiratory route to man. Such studies are necessary to understand (i) how microorganisms remain alive and are disseminated in the air, (ii) what environmental factors alter the ability of such organisms to produce disease, and (iii) how important the agents are in maintaining a healthful atmosphere.

The techniques of aerobiology are presented in six chapters which cover such topics as the production of aerosols and the bioassay of airborne pollution. Various types of aerosol chambers and their uses are described in detail in four chapters. Nine chapters are devoted to an analysis of concepts and results obtained in experimental aerobiology. These cover the various aspects of microbial survival, aerosol immunization, and the significance of aerobiology in hospitals, dental clinics, and veterinary medicine. A glossary and a good index are presented.

The book is easy to read, the figures and illustrations are clear and serve a purpose, and the chapters are well documented with recent references.

Even though aerobiology may be in an early stage of development, everyone concerned with clean air or air pollution can learn from the data presented in this volume.

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Protein Chemistry

Enzymes and Isoenzymes. Structure, Properties and Function. Vol. 18 of the Fifth Meeting of the Federation of European Biochemical Societies, Prague, July 1968. D. SHUGAR, Ed. Academic Press, New York, 1970. x, 362 pp., illus. \$14.50.

This book has been excellently edited by D. Shugar. The first ten papers are contributions from participants in the symposium entitled Relation of Enzyme Structure and Activity (organized by J. I. Harris and B. Keil). Papers 11 through 35 comprise the symposium entitled Isoenzymes, Their Properties, Structure and Function, which was organized by G. Pfeleiderer and B. Večerek. The subject matter is somewhat heterogeneous, but this defect is compensated for by the articles themselves, which provide clear and concise discussions of various enzymes.

The first group of papers give a rather comprehensive view of the current knowledge of the structure and

function of pig and lobster muscle glyceraldehyde 3-phosphate dehydrogenases, yeast and liver alcohol dehydrogenases, and the cytoplasmic aspartate transaminase from pig heart. Other papers in this group present specific information on rabbit muscle aldolase, muscle-type lactic dehydrogenase, trypsin, and pepsin. The molecular evolution of some of these proteins is considered. Harris and co-workers observe that the amino acid sequence of glyceraldehyde 3-phosphate dehydrogenase is strongly conserved, which suggests that the three-dimensional structure and enzymic mechanism of action likewise are conserved during evolution. In contrast, Zwilling and Pfeleiderer note many divergencies between bovine and invertebrate trypsins and suggest that proteases might be most variable owing to adaptation needs arising through their contact with the exterior environment in the digestive tract. Noteworthy too is the review by Braunstein, who presents extensive data and references on the molecular mechanism of action of aspartate transaminase, a pyridoxal phosphate-enzyme.

The second group of papers gives an excellent accounting of the currently available data on lactic dehydrogenase isoenzymes. Some other enzymes that exist in multiple molecular forms are discussed more briefly. These include malate dehydrogenase, a hormone-sensitive lipase, alkaline phosphatase, α -amylase, β -galactosidase, creatine kinase, and aldolase isoenzymes. A general paper by Tepper and Hommes treats "Changes in activity and isoenzyme patterns of glycolytic enzymes in the developing rat liver." Other papers discuss some factors that affect isoenzyme distribution within a single tissue and the tissue distribution of various enzyme forms. For example, Hellung-Larsen and Andersen present kinetic studies of changes in lactic dehydrogenase patterns of human lymphocytes induced by variations in pO_2 . The heterogeneity of human alkaline phosphatase is described by Moss, who discusses thoroughly the differentiation of this enzyme in human tissues, the heterogeneity of the enzyme within a single tissue, and the possible origin of these variations. Schapira and co-workers discuss results obtained for aldolase, lactic dehydrogenase, and creatine kinase in diseased muscle. In these cases it was noted that the isoenzyme patterns appear to resemble that of embryonic muscle, which shows a predominance of the brain type; the authors point out

that this may be an expression of de-differentiation at the molecular level through repression of the synthesis of the most specific forms of the enzymes.

In conclusion, this book will be useful to investigators engaged in protein chemistry and in studies of the structure, properties, and physiological significance of isoenzymes.

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Blood Hormone

Erythropoietin and the Regulation of Erythropoiesis. SANFORD B. KRANTZ and LEON O. JACOBSON. University of Chicago Press, Chicago, 1970. x, 330 pp. \$9.75.

Considerable evidence has been amassed over the past 20 years to establish now with certainty the existence of a circulating principle, erythropoietin, that controls erythropoiesis in vertebrate organisms. Krantz and Jacobson review, in a comprehensive and often critical manner, physiological, biochemical, and clinical aspects of erythropoietin and the regulation of erythropoiesis. More than 1400 references are listed, and it is difficult to find a pertinent article in the erythropoietin field in the last 20 years that has not been cited. Consideration is given to the factors that influence production of erythropoietin, its metabolism, site (or sites) of formation, and chemical properties as well as its loci and mechanisms of action. Of particular interest are recent indications that: (i) erythropoietin is a glycoprotein with a molecular weight of 60,000 to 70,000 and although highly purified is not as yet entirely pure; (ii) the kidney in mammals serves as the primary site for the production of a precursor or activator of erythropoietin; (iii) the stimulating action of erythropoietin on erythroid cell differentiation is mediated most likely through transcriptional and translational effects concerned with the production of hemoglobin and other proteins in the hematopoietic precursor cell (erythropoietin committed cells) and probably in more distal components of the erythroid cell line as well; and (iv) hormones of the adeno-hypophyseal-target organ axis influence erythropoiesis by altering the production of erythropoietin, effects that may arise in part from the ability of anterior hypophyseal, gonadal, thyroidal, and adrenal cortical hormones