

birth in quick succession of civilization in Egypt, India, and China. The sharp contrast between the precivilized and the civilized worlds from our vantage point is neatly drawn by Seton Lloyd. "The clear historical character of this later period, the evidence of political development and religious thought, the sequence of royal names and the battles or treaties associated with them, all serve by contrast to emphasize the drab impersonality of the 'archaeological' ages which preceded it, where the biography of a nation can be written only in terms of broken pottery and the discarded belongings of its most humble artisans. Yet, even in this obscure half-light of 'material cultures' and 'racial criteria', . . . brief moments of illumination do intermittently occur" (page 185).

Illuminating, Brief Moments

The pictorial parts of *The Dawn of Civilization* provide an assemblage of many such "brief moments of illumination" in our knowledge. The sum total of the 940 illustrations underlines the astonishing richness of the human imagination, faced with a multitude of environments and varying amounts of knowledge, in its ability to represent in material form the world of reality as well as the equally important world of dreams. Most philosophers would probably agree that while the birth of civilization is important, the birth of imagination and the consequent world of thought is even more fundamental to the human condition. Regrettably, the early stages of this obviously rich landscape of the mind are largely lost to us. Yet, even so, from the multitude and complexity of the objects set before us in this volume something of its quality and meaning may be inferred. The anthropologist, Loren Eiseley, describes this "dream world" in one of his essays. "It was a weird multiheaded universe, going on, unseen and immaterial save as its thoughts smoldered in the eyes of hunters huddled by night fires, or were translated into pictures upon cave walls, or were expressed in the trappings of myth or ritual. The Eden of the eternal present that the animal world had known for ages was shattered. . . . Through the human mind, time and darkness, good and evil, would enter and possess the world."

Earth's Yesterday

History of the Earth. An introduction to historical geology. Bernhard Kummel. Freeman, San Francisco, Calif., 1961. xiv + 610 pp. Illus. \$8.75.

Has the geology instructor ever been confronted by so many new textbooks on historical geology? Moore's *Introduction to Historical Geology* (1958), the veteran among the five, is still valuable. Distribution maps, correlation charts, the wealth of photographs and diagrams, and the mature treatment of the material make it a good classroom and a good reference book. To my mind, Dunbar's *Historical Geology* (1960) is too simple and easy, largely because it avoids the interesting problems. Stokes' *Essentials of Earth History* (1960) is very strong on the organic side, with excellent chapters on evolution, migration, and similar subjects. Clark and Stearn's *Geological Evolution of North America* (1960) is the first truly regional text published in some 30 years; the diagrams alone make it tempting.

As a traditional text, Kummel's book has unusually full introductory chapters as well as an excellent treatment of the Paleozoic, Mesozoic, and Cenozoic eras of North America and of the life of those eras. But what is new and different in Kummel?

This is the first textbook to give the history of all continents, rather than just that of North America. Now we have an over-all view. No longer are we trapped in the Appalachian geosyncline—we see what is happening at the same time in other parts of the world. Nor are we misled into thinking that the Triassic is all red and nonmarine; Tethyan history is enlightening. The Cenozoic of the Alps, the Himalayas, and the Philippines is treated briefly but exceedingly well. These chapters are valuable both for current study and for permanent reference.

Also completely new is the chapter "Gondwana formations." Discussion ranges widely, from rock type to glaciation, from *Glossopteris* flora to paleomagnetism. The chapter is a marvel of condensation and completeness and an outstanding example of what a "problem chapter" should be.

Throughout the text the unifying theme is "evolution and interrelations of mobile and immobile belts." Local detail is held to a bare minimum, and

attention is focused first on geosynclines and then on stable areas. This is not new, but it is clearly and consistently worked out.

Also, the author has brought in a wealth of new material or has revitalized the familiar. Examples are: the history of the ammonoids (pages 215–16 and 287–92); geographic range of fossil reefs (pages 296–97); Pleistocene climates (pages 468–78); and the extended account of the evolution of man (pages 483–505).

Not everything in the book meets with my approval. I think the author has gone completely overboard in favor of "tectonism"; I wonder why there are eugeosynclines on only the maps of North America. I regret that we are told nothing about the "how" of oil in the Middle East. Also, the next edition must have more extensive bibliographies, especially for students. I can find out what "G. G. Simpson, 1953" refers to (in Fig. 14-36, page 465), but a first-year student, or even a more advanced one, needs encouragement to look up anything.

Which book to choose? If you are already using a familiar, straightforward text, without complications, you may want to stick to it. If you want a challenging, somewhat difficult text, one that everywhere shows the intelligence and learning of its author, a complex book with many facets, then you must consider Kummel's volume.

LINCOLN DRYDEN

*Department of Geology,
Bryn Mawr College*

Sherborn's Index Extended

An Index to the Genera and Species of the Foraminifera, 1890–1950. George Vanderbilt Foundation, Stanford University, Stanford, Calif., 1961. 393 pp. \$10; unbound, \$9.

This volume, which is similar in style to the annual indexes published by Hans Thalmann for many years, provides students of the Foraminifera with an invaluable tool, for it covers all newly proposed generic and specific names that appeared in the literature between 1890 and 1950.

In 1955 the Smithsonian Institution reprinted Charles Davies Sherborn's *An Index to the Genera and Species of the Foraminifera*. Sherborn's volume, long

out of print and difficult to find, covered the genera and species described through 1889, but the lack of complete coverage of the literature published after 1890 remained a serious handicap for workers in the field. Students of Foraminifera now owe a debt of gratitude to Thalmann for continuing the earlier work of Sherborn and completing an index of genera and species for the 60-year period 1890 through 1950 and to the George Vanderbilt Foundation (Stanford University) for undertaking publication of the important volume. The index is published in an attractive, well-printed, double-column, quarto volume. The following data are given for generic names: reference, type species, family assignment, and geologic age; for species: reference, geologic age, and area from which described. The generic and specific names are printed in boldface type. Some references for years prior to 1890 are given when they were not included in the Sherborn index.

Complete coverage of the well-scattered literature on Foraminifera published through 1950 is now available.

ALFRED R. LOEBLICH, JR.
*California Research Corporation,
La Habra, California*

Selected Overview

Recent Advances in Human Genetics.

L. S. Penrose, Ed. Little, Brown, Boston, Mass., 1961. 194 pp. Illus. + plates. \$8.

In a field developing as rapidly as human genetics, it would be impossible to handle all recent advances adequately in one volume. As an alternative, Penrose has chosen to select eight specific areas for careful treatment. His choice is excellent, and the style of writing is surprisingly uniform for a book with several contributors. The volume as a whole can be described as illustrative and concise, rather than as exhaustive and detailed.

Each chapter presents an overview of a specific problem, with comments about its historical development and the proper use of relevant terms. Significant principles are stated clearly and illustrated well. Some of the most recent findings are summarized, and the nature of current research problems is indicated.

Readers interested in clinical implications of genetics will appreciate Harnaden's discussion of techniques and results in chromosome studies and the review of normal and abnormal sex differentiation by Miller. Penrose points out that birth weight can be studied profitably from the statistical and genetic points of view, and he also reviews the interaction of genetic and environmental factors in congenital malformations. Topics in human biochemical genetics are deliberately omitted in view of their adequate treatment elsewhere.

Statistical methods and theory are discussed by Smith, with an emphasis on procedures for analyzing genetic ratios, gene frequencies, and segregation ratios. Renwick presents a very clear review of methods and results in the study of linkage. At present only three autosomal linkages can be accepted with confidence, and only color-blindness loci are generally useful as sex-linked markers. Penrose outlines assumptions and procedures used in estimating mutation rates and stresses sources of bias which can lead to exaggerated values. Analysis of fingerprint patterns (discussed by Holt) reveals the strong effect of heredity upon pattern size and provides an interesting model for the study of quantitative traits in man.

Gerald's survey of abnormal hemoglobins has clinical implications, but it also highlights some insights and puzzles concerning the genetic determination of complex protein structure. Both qualitative and quantitative alterations in hemoglobin synthesis are described, and genetic interrelationships among the variants are interpreted. Other implications for understanding gene structure and action are included in the chapters on mutation, chromosomes, and linkage.

This book should appeal to a wide variety of readers. Interested laymen and scientists in fields other than genetics will find it a readable and authoritative starting point for understanding the topics discussed. Graduate and medical students and physicians will profit from the clear statement of basic principles and assumptions, as well as from the review of current techniques. For those who wish further details, there is a list of over 500 references (about half are later than 1955).

V. ELVING ANDERSON
*Dight Institute,
University of Minnesota*

On Science and the Scientist

Atoms and Men. Louis Leprince-Ringuet. University of Chicago Press, Chicago, Ill., 1961. 118 pp. \$3.

The title page describes this book as a "translation," but it nowhere appears whether this is a translation of a book originally published in France, or whether we have here a translation made directly from an original French manuscript.

The author is director of the laboratory at the École des Hautes Études and is an atomic energy commissioner of France. The book is primarily addressed to the Frenchman who has suddenly become aware (and who is disturbed by all the implications of this awareness) that an absolute condition for the greatness or even the survival of a modern nation is that the nation take its place among the nuclear powers. One section is entitled "Can France Stage a Comeback?" The Frenchman has to take account of two different sorts of things, if he is to understand the implications of becoming a nuclear power. He must understand, as far as possible, the factual scientific background, and he must also understand what manner of man the scientist is to whom the destinies of his country will have to be increasingly entrusted. The author tries to accomplish both these ends by a popular, almost chatty, method of approach. It is somewhat surprising that nowhere in the book is there any explicit mention of the recent French decision to construct their own atomic bomb.

The translation reads smoothly enough, but one cannot help questioning the technical competence of the translator, when confronted with a passage like this (page 103): "It [uranium] is extremely *thick*." The context does not indicate whether "thick" means density or atomic weight. One's confidence in the technical competence of the author himself is somewhat shaken when confronted by: "We know, of course, that one can ascertain the mass of a marble or projectile by throwing it at a certain speed and then spotting the place where it falls" (page 6). And one does not know whether to question the technical competence of the author or of the translator when confronted by: "The piles of projectiles for an accelerator called a bevatron were ready" (page 24). One can only wonder to