

in Plants" we find the traditional discourse on leaf morphology (venation patterns, patterns of blade dissection, variability of leaf margins), floral structure, and types of inflorescences and fruits—but there is no indication of their adaptive value, if any, to the plant.

The text is divided into six major parts: organization of data, chemicals and cells, function and environment, reproduction and development, adaptation and evolution, and diversity. Each part contains several chapters, most of which have excellent photographs, drawings, and flow sheets. Several chapters contain "study boxes," each of which itemizes the important concepts of a particular portion of the chapter. These study boxes appear frequently in early chapters, occasionally in following chapters, and not at all in the last 13 chapters—which makes one wonder about their value to students. New terms are introduced in boldface type, are summarized at the end of each chapter, and are defined in a glossary at the end of the book.

Most of the chapters contain information that can be found in any up-to-date but traditional botany textbook. There are a couple of refreshing exceptions, however. Chapter 1 deals primarily with the processes of data-gathering, organization, and retrieval: it introduces the computer as a basic tool of data-processing. Chapter 4 is devoted exclusively to the economic aspects of plants, a topic frequently glossed over in other general textbooks. A distinctive feature (retained from the first edition) is the chapter devoted to representative life cycles from most of the 33 listed plant divisions. This chapter is printed on colored paper: it stands out for quick reference. Unfortunately the choice of representative organisms occasionally leaves something to be desired; for example, *Vaucheria* for Chrysophyta and *Selaginella* for Microphylophyta.

Chapter 3 is likely to cause many a botanist to squirm: though entitled "Modern Botanical Sciences" it is devoted almost exclusively to taxonomy, even to the point of describing in detail the preparation of an herbarium specimen. And paleobotanists will be surprised to learn that woody psilophytes were well established and widely distributed during the Silurian.

Gilbert A. Leisman
Kansas State Teachers College
Emporia

BOTANY: AN INTRODUCTION TO PLANT BIOLOGY, by T. Elliot Weier, C. Ralph Stocking, and Michael G. Barbour. 4th ed., 1970. John Wiley & Sons, New York. 717 pp. \$12.50.

Like its earlier editions, this book gives a good, accurate overview of

plant biology. It is divided into 30 chapters. An introductory chapter is followed by one on classification and relationships of plants. The next 14 chapters are devoted to the structure, function, nutrition, and development of the seed plant. Although one might expect the roles that hormones play in development to be included in this segment, this is postponed until chapter 20. The subject matter is handled in a traditional fashion, but every attempt has been made to reflect the latest available information.

Most of the second half of the book is a survey of the plant kingdom. It also includes chapters on inheritance, ecology, taxonomy, and evolution.

14 full-color plates, containing numerous photographs, most of which are outstanding, give the book a special appeal. Numerous excellent line drawings, shaded in greens and grays, are distributed throughout the book. There are also many black-and-white photographs; these are generally good, but they suffer somewhat from the grade of paper on which they are printed. On the whole, the book is profusely illustrated, and this is one of its strongest features.

While this work undoubtedly will have wide appeal, its rather slow-moving, traditional format and style are likely to have an adverse effect on some, especially among the younger set. Yet those who teach plant biology will surely find it to be one of the most authoritative and thorough works of its kind.

O'Neil Ray Collins
University of California
Berkeley

Cell Biology

CELL FUSION, by Henry Harris. 1970. Harvard University Press, Cambridge, Mass. 108 pp. \$6.00.

Henry Harris, professor of pathology at the Oxford University, gave the Dunham lectures at Harvard in 1969. They make a most remarkable book.

In 1965, Harris and J. F. Watkins reported that an inactivated virus inoculated into a culture of cells from different animal species caused fusion of the cells and that the multinucleated or multichromosomal hybrids were viable. (This remarkable discovery was heralded in the London press but did not have much impact on American biologists.) Subsequent evidence from other workers supports the view that the fusion is an energy-consuming reaction requiring calcium ions; that it is inhibited by the same conditions that interfere with oxidative phosphorylation in the normal cell; and that the more irregular is the normal-cell surface, the more likely is the possibility of fusion.

The book contains magnificent photographs of fused cells, showing distinctly different nuclei from different species within the same live cell. Beautiful autoradiographs show interspecific heterokaryons of known composition. Binucleate heterokaryons can go through mitosis and give rise to mononucleate daughter cells; these, Harris asserts, "contain within a single nucleus the chromosomes of both parent cells." A new term is introduced: synkaryon, meaning a hybrid mononucleate daughter cell. "Over a wide range, species differences in the parent cells do not appear to affect the ability of synkaryons to multiply," Harris says. Parental properties that determine the occasional incompatibility in the hybrid cell are at present unknown. It appears, however, that within the cells of vertebrates there are no mechanisms for recognizing and expressing cytoplasmic or nuclear incompatibility similar to the mechanisms responsible for the recognition of and reaction to tissue or organ grafts, as in the antigen-antibody reaction between individuals.

The techniques and principles discussed in the book will undoubtedly lead to further breakthroughs in our understanding of the modes of expression of genetic information. It is "must" reading for every first-rate biologist or biology teacher.

Alfred Novak
Stevens College
Columbia, Mo.

Environmental Education

THE INVISIBLE PYRAMID, by Loren Eiseley. 1970. Charles Scribner's Sons, New York. 173 pp. \$6.95.

Today the environmental book shelves are cluttered with the rantings of polemicists. Half-truths and conjecture are written as fact. Opportunists exploit ecology as despoilers have exploited the environment. Impractical solutions to real problems and impractical problems for which there are no solutions are to be found in the plethora of volumes currently available. Thus, it is refreshing to find an intelligent book written by an intelligent man concerning space-age man and nature.

This is a beautiful book—both beautifully written and beautifully executed; a treat for the eye, the mind, and the soul. The title is derived from the fact that Eiseley views the building of the great pyramid at Giza, almost 5,000 years ago, as requiring great public sacrifice. He extrapolates that modern science is involved in the construction of a similar "invisible" pyramid that demands great sacrifice and persistence of purpose across the generations.

As an historian of science, Eiseley is conscious of the past and our current

efforts to ignore it. He points out that there are times of social disruption when people grow tired of history and, if they cannot remake the past, tend at least to destroy it and pretend that history has never been. This formidable role of the erasure of the past in human experience has occurred from the introduction of solar monotheism into Egypt to the assault of Cromwell's Puritans upon the statuary of the English cathedrals. In earlier times, when encountering comets or firebrakes, it was thought well to pronounce the name of God with a clear voice. Eiseley points out this act was performed once more in our rocket age by many millions when the wounded Apollo 13 soared homeward: "A love for earth, almost forgotten in man's roving mind, had momentarily reasserted its mastery, a love for the green meadows we have so long taken for granted and desecrated to our cost."

It isn't often that the style of a poet and the mind of a scientist are combined in one individual. Eiseley uses both to explore the ideas and aspirations of man, his potential, and his limitations. If you have one book to buy this year, make it *The Invisible Pyramid*, a volume to cherish as your own and to give as a gift to your very best friends.

William V. Mayer
University of Colorado
Boulder

MAN AND WILDLIFE, by C. A. W. Guggisberg. 1970. Arco Publishing Co., New York. 224 pp. \$12.50.

During the declining Age of Dinosaurs there was no one around to write of dinosaurian demise. Today, on the other hand, a relatively new species on the biospheric scene not only writes about, praises, and contemplates his fellow creatures but also saves, exploits, and executes them.

Man and Wildlife is a book that literately and incisively delineates this ambivalent relationship between *Homo sapiens* and the other vertebrates with which he shares the earth. In five extremely well-illustrated chapters, Swiss ecologist Guggisberg develops the varied historical relationships between man and wildlife from Paleolithic times. The underlying theme, sadly enough, involves man's destructive and exploitive tendencies—his slaughter of the North American bison, the extermination of the elephantbird, the great auk, and the moa, the aphrodisiac assault on the rhino—but there are bright-spot inclusions as well, especially with respect to the preservation of wildlife reserves and the recovery of certain endangered species. The latter third of the book is a valuable annotated compendium on national parks and wildlife preserves of the world.

Thoughtless destruction of wildlife

species by the "smartest" mammal that has ever existed—Man—can in large measure be related contemporarily to failures in our educational process. From this standpoint this particular book should be digested by all biology teachers: it may influence their approach in dealing with diversity in the biosphere.

"What does it really matter," the author reflects in concluding one chapter, "if there are no more rhinoceroses, orang-utans or whooping cranes?" *Man and Wildlife*, as part of your reading background, will give you a better historical perspective from which to answer this important question, lest monoculture leave our species without the diversified stimuli necessary for its postdinosaurian survival.

Richard G. Beidleman
Colorado College
Colorado Springs

BIOLOGY AND THE SOCIAL CRISIS, by J. K. Brierly. 1970. Fairleigh Dickinson University Press, Rutherford, N.J. 270 pp. \$8.00.

First published in England in 1967, *Biology and the Social Crisis* attempts to relate a variety of biologic ideas to human ecologic problems. The bibliography includes approximately 175 titles. Unfortunately, none of the references is dated later than 1967, and almost all of them are British or European; this would, perhaps, reduce the book's value to American high school students or secondary teachers. Brierly's style is formal and not always easy to follow, but he includes in one volume factual items that should be useful to the teacher and might be difficult to locate elsewhere.

The book has six parts: human heredity; race; man's health and food; the crisis of numbers; youth and age; and brain and behavior. All but the first are quite short. The section on human heredity is by far the most readable and most valuable as a reference. Many tables and diagrams are included in all sections, but they usually refer to English or European studies that are often not especially applicable in the United States. The section on heredity, however, is an excellent capsule treatment of the subject; here the statistics may not be recent but are still usable. It is rather obvious that genetics is Brierly's main interest.

The section on man's health and food contains a discussion of the effects of affluence on human diseases and on human psychology. This treatment is a bit different from the usual one, which only treats of the effects of poverty on human disease. This section helps the reader to understand that affluence may have adverse effects as well as desirable ones.

As Brierly himself points out, the material in this book is not original; rather, it is a compilation from many sources,

presented in the hope that the reader may develop his own interpretations of the subject.

Biology and the Social Crisis would be most useful as a supplementary reference, at least in the United States.

Jean E. Cooper
East High School
Cheyenne, Wyo.

Education

REACHING THE DISADVANTAGED LEARNER, ed. by A. Harry Passow. 1970. Teachers College Press, New York. 371 pp. \$5.95 softback, \$8.85 hardback.

This book consists of 17 papers presented at the sixth annual Work Conference on Urban Education at Teachers College, Columbia University. The participants shared their knowledge of ways of reaching the disadvantaged learner.

The initial papers discuss compensatory programs in general; culture, class, poverty, and urban schools; and compensatory education for early childhood. Specific programs, presented in some detail in additional papers, have to do with the improvement of classificatory competence among kindergarten children; programmed instruction; the use of concrete learning-materials in math, science, and social studies; increasing reading-achievement; developing a more relevant curriculum; and instructional materials for the disadvantaged. The remaining discussions deal with the community-school concept; leadership roles in the inner-city high school; desegregation and integration; the college-bound program; public education and manpower development; slum schools and unemployed youth; and the use of auxiliary personnel.

The book contains a number of salient points for teachers. One critical question is this: are the characteristics used to describe disadvantaged children the result of the home environment or a consequence of the kinds of experiences provided by the schools?

One researcher found that although many designers and teachers of compensatory-education programs are enthusiastic about their achievements there is very little hard evidence by which to evaluate these programs. A concept emphasized in a number of papers is that the involvement of parents and pupils in the design of a program is important if the program is to be successful. Another contributor states that the failure of most children to learn is the failure of the school to develop curricula in keeping with the environmental experiences of the pupil.

Some parts of the book may prove difficult for the teacher of biology who is accustomed to reading scientific literature; but the book as a whole is