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 Microphyllophyta.

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 monocleate 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
Stephens 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