detail already available in modern compendia is repeated only where needed to provide a necessary background.

An introductory chapter reviews the concepts of Protochordata and Deuterostomia, and discusses possible phylogenetic relationships among deuterostomes. Modern groups are regarded as related clades, with the pterobranchs perhaps representing the existing group least modified from remote protochordate progenitors. Chapters on the Hemichordata (42 pp.), Urochordata (45 pp.), and Cephalochordata (57 pp.) summarize newer information on feeding and digestive processes, the nervous system and behavior, and selected aspects of reproduction, larval ecology, and life histories for each group. The accounts of microphagous feeding in ascidians and amphioxus, and of the nervous system and function of the gut in enteropneusts and amphioxus are particularly good. Other outstanding features are the discussion of the origin of the vertebrate pituitary and its possible homologs in hemi- and protochordate groups, and the excellent summary of work by the author and others on the organic binding of iodine and evolution of the thyroid gland. The chapter on Urochordata is less comprehensive and up to date than those on the other two groups, but the literature to be covered here is much larger.

Altogether the author has done an excellent job in selecting material of broad interest, in summarizing and evaluating it, and in pointing out the features that we vertebrates owe to our remote descent from ciliary-mucoid particle feeders. The illustrations are good, and approximately half of the 114 references listed date from the last decade. The book is recommended to students and teachers of both invertebrate and vertebrate biology.

D. P. ABBOTT
Hopkins Marine Station, Stanford University, Pacific Grove, California

Africa Today: Representative Cultures

Peoples of Africa. James L. Gibbs, Jr., Ed. Holt, Rinehart, and Winston, New York, 1965. xiv + 594 pp. Illus. $10.50.

Tyros have had nowhere to turn for concise descriptions of representative cultures of Africa. There is, of course, no real substitute for the prolonged visit to a tribal people which a book-length description affords. But for readers without the time or inclination to tarry with each tribe, *Peoples of Africa* now provides a well-conducted "Gibbs's Tour" through 15 societies south of the Sahara. Although designed primarily as a "student cruise," the itinerary is recommended for anyone with any social science background or with Bohannan's *Africa and Africans* as a foundation.

The authors of the profiles of *Peoples of Africa* are experts, depicting "their" societies with the intimacy of knowledge derived from protracted study in the field since 1950. Although the superb prose of Colin Turnbull's description of Mbuti Pygmy life is rare in the profession, the style and clarity of all of the writing is commendable. Selection of the authors was determined not only by such abilities, but also by the nature of the cultures they had studied.

Gibbs's selection of societies reflects African diversity in race, language, environment, economy, size of population, and in type of kinship and of government. Although the major categories of all of these features are represented in the sample, the societies can not be taken as "representative," in the sense of being typical of the classificatory divisions. Actually, where diversity is very great within such categories, a variety of examples is usually provided. On the other hand, there is no representation at all from the old French colonial area, and a third of the entire cultural sample comes from Nigeria. These biases, which reflect Anglophonic parochialism and an uneven distribution of research, are not as serious as they might seem. Three of the cultures studied in Nigeria extend more or less widely into previously French territory. The emphasis of the book is not on colonial or emergent Africa, and the sample provides a satisfactory picture of the outstanding features of traditional African cultures.

The various profiles are roughly comparable in format, each being introduced with editorial comment on the special significance of the particular society. There follow the familiar categories of ethnological description, plus some less standard ones, such as child training and law. The common outline proved to be no straitjacket for the authors, but the standard categories assured greater comparability among the profiles. Unfortunately, such comparison is not facilitated by the book's index, which is internally confused and sometimes actually misleading. The maps, diagrams, and bibliographies are helpful and a half-dozen snapshot-size illustrations add meaning and flavor to each description.

Although emphasizing the indigenous aspects of African life, the cultural sketches show their modernity by avoiding the old fiction of a precolonial "ethnographic present." The traditional past is carried into the observed present throughout virtually every profile. This too involves some fictions, but little worse than the kind of oversimplification entailed in forcing "the life of a people" into 40 pages. Largely missing in the discussion of change are the conflicts and problems of Africans caught up in the punishing opportunities of "development." Here the anthropologists have been more prone than the tribesmen to read the literate, urban clerk out of the tribe. But, like all fictions, this one is useful. It keeps an introduction to the complexities and varieties of African culture as simple as possible.

There are more than 30 American universities with a concentration of courses on Africa. It is difficult to see how they have gotten along without *Peoples of Africa*. None should try to do so now.

HORACE M. MINER
Department of Anthropology, University of Michigan

Magnetohydrodynamics

Engineering Aspects of Magnetohydrodynamics. Proceedings of the third annual symposium (Rochester, N.Y.), March 1962. Norman W. Mather and George W. Sutton, Eds. Gordon and Breach, New York, 1964. xiv + 675 pp. Illus. $34.50.

This volume is an almost complete collection of the papers presented at the third symposium on engineering aspects of magnetohydrodynamics (MHD) held at the University of Rochester in March 1962. It is the second and last

attempt to collect and publish in a single volume the papers presented at a symposium in this now well-established series. The editors point out in defense of this procedure that it serves to retain the unity of the subject matter; this was also the objective of the Rochester meeting. If prompt publication had made this volume available by the fall of 1962, it would not have been without value in this respect. However, the excessive delay that has occurred between the symposium and final publication of the papers has greatly reduced the value of this volume, particularly in view of the fact that many of the papers have the character of progress reports.

This volume, following the organization of the symposium, is divided into four sections that deal with plasma diagnostics and communications, energy conversion, flight applications, and controlled fusion. The pattern of subsequent symposia is apparent in that magnetohydrodynamic electrical power generation is the topic most strongly represented. Presumably, this situation has arisen because workers in plasma physics and its actual and potential applications to communications and fusion reactors have ample opportunities to present their work elsewhere. The area of propulsion and flight applications similarly offers alternative outlets for presentation and publication.

One particularly pleasant feature of the volume is that it contains an account of the original MHD generator experiments undertaken by Karlovitz and Halasz at the Research Laboratories of the Westinghouse Electric Corporation in 1938. In the field of MHD power generation, the paper by J. J. W. Brown, on power plant economics, should be read by all those concerned with the ultimate utilization of this process. Other papers on MHD power generation indicate trends toward topics that are receiving an important share of current research efforts. This category includes those dealing with closed-cycle power systems operating from nuclear heat sources, and with the utilization of nonequilibrium ionization in MHD generators. Although the direct a-c generation of electric power is no longer advocated with plasma-type MHD generators, the paper on fringing effects should be consulted by those who are concerned with the use of a liquid metal as the working fluid in closed-cycle power systems.

Papers in the other major areas cover a variety of topics ranging from specific plasma diagnostic techniques to plasma accelerators and confinement schemes. Speculative engineering is represented through reports on MHD control of vehicle re-entry and thermonuclear propulsion using superconducting magnets.

The organizers of subsequent symposia in the series have abandoned plans to publish proceedings volumes, and, instead, have arranged to circulate preprints. The volume under review is tangible evidence in support of this procedure, and its chief value will be its service as part of the record of the evolution of engineering interests in the topic of magnetohydrodynamics.

WILLIAM D. JACKSON
Department of Electrical Engineering, and *Research Laboratory of Electronics, Massachusetts Institute of Technology*

Science for the Layman

La Science Contemporaine: Les Sciences Physiques et leurs Applications. vol. 1. Louis Leprince-Ringuet, Ed. Librarie Larousse, Paris, 1964. viii + 360 pp. Illus.

The first part of this two-volume compendium is edited by Louis Leprince-Ringuet, well-known investigator of cosmic rays. It is devoted to the physical sciences and has as its main purpose the enlightenment of those among the general public who are eager to keep informed, but whose knowledge of the theoretical and experimental principles of research is feeble. No attempt is made, however, to state and to elucidate the nature of these principles. The easier way is chosen of describing some of the giant modern research installations and then discussing certain important results achieved with their aid. The fact is stressed that modern research is largely cooperative and that individuals and small groups have less and less chance to compete with the large organizations, a point of view with which I am only partly in agreement.

First, the large installation (the synchrotron at Cern, near Geneva) for the acceleration of protons up to 28 billion electron volts and the results achieved with the analysis of the many new elementary particles of matter are described. This is followed by a comprehensive discussion of the instruments and radio telescopes used by optical (classical) astronomers and radio astronomers. The conventionally known cosmic objects are competently described, but too little of the most recently gathered information on the properties of these objects and on astronomical discoveries is offered.

The description of rockets used for space research is stimulating and presents a wealth of facts and principles on propulsive power plants and propellants, as well as on astronomical results already achieved with high flying missiles and satellites, the good discussion of which will certainly be appreciated by the eager lay reader. Interesting vistas into the future of nuclear and electrothermic (plasma ejecting) jet engines are also presented.

Next follows a competent chapter on the design of optical instruments that will make possible the recording and the analysis of all of the essential properties of light which emanates from cosmic, macroscopic, and microscopic bodies. The marvels of modern electronics and their applications to the fields of communication, to the analysis of information, and to ultrafast computing are presented in lucid detail.

There is also a good chapter on nuclear energy and what has been achieved so far to mobilize the insights gained for military, industrial, scientific, and medical purposes. Of particular interest is the discussion of what some have termed the most difficult problem of physics—that is, the mastery of nuclear fusion and its use for the production of inexhaustible quantities of energy. Finally, the organic chemistry of the macromolecules is discussed, and it is briefly indicated how this new scientific discipline has arrived at the threshold of the understanding of the essential processes of life itself.

The book is profusely and well illustrated, partly with excellent color photographs. There is only one formally unfortunate feature: volume 1 has no name or subject index, which, it is promised, will be incorporated in the indexes of the second volume.

Generally, the book is to be recommended highly.

F. ZWICKY
Mount Wilson and Palomar Observatories, and *Department of Physics, California Institute of Technology*