ographical documentation and description of academic museums, laboratories, libraries, and publication activities. However, its numerous contributors have done a much better job in assembling information than in coordinating it into an integrated and explicitly meaningful study. The Academy's involvement in the growing philosophical and sociological problems of science has been almost completely ignored. The gigantic role of foreign scholars in advancing scientific thought in Russia has not received the thorough and systematic scrutiny that it deserves.

Despite these obvious shortcomings, this book will be of lasting value and will prove essential for all serious students of Russian intellectual history.

ALEXANDER VUCINICH
*Department of Sociology, University of Illinois*

## Applied Physics

**Foundations of Plasma Dynamics.** E. H. Holt and R. E. Haskell. Macmillan, New York, 1965. xviii + 510 pp. Illus. $12.95.

"This book is written as a text in the fundamentals of plasma dynamics," state the authors in the first sentence of their preface. Although many books on plasma physics have recently been published, only a handful are useful for a complete classroom sequence. This volume is aimed at students with a background of 3 years of college work in science and engineering, and the implications are that it is also useful for the practicing engineer.

The subject matter is divided into 15 chapters that average 30 pages in length. The first and last chapters constitute, respectively, a well-written historical introduction and a very qualitative description of plasma sources. The second chapter reviews Cartesian tensors and the indicial notation that is used throughout the text, and chapter 3 establishes the rudiments of Maxwell's equations. Particle motions and collisions are scattered throughout chapters 4, 8, and 15; kinetic theory in 5 and 10; macroscopic theory in 6; plasma theory in 7 and 9; waves in 11, 12, and 13; and magneto-fluid mechanics in 14. On a chapter average, there are about eight figures of which 75 percent are line drawings, about nine exercises practically all of which relate to the development of formulas in the text, and about ten references of which 80 percent are to other texts.

Pedagogy is an all-important but somewhat elusive variable for evaluating classroom texts. From my vantage point, the desirable aspects are: (i) the book is an ambitious undertaking to distill and logically present the fundamental knowledge in the broad field of plasma physics; (ii) the mathematics is at an appropriate level (although there is no basis for the author's implication that the indicial notation is superior), with the steps of sufficient detail for a clear understanding, and (iii) the text is of reasonable length.

The less desirable aspects are: (i) the development of physical insights is left almost entirely to the reader—thus only one example (whistlers) is used throughout to elucidate any theory, and it is disturbing to find that no connection is made between the Van Allen belts mentioned in the introduction and the magnetic force in a longitudinal gradient; (ii) exercises are related only to the development of equations; and (iii) subject matter is at times too loosely connected—for example, there is no stated relationship between the MHD waves of chapter 14 and the EM waves of chapter 13. Thus instructors who adopt this text will need considerable experience, and only experience with its use will determine the book's educational effectiveness.

D. R. WHITEHOUSE
*Department of Electrical Engineering, Massachusetts Institute of Technology*

## Modern Biology

**Selected Papers on Molecular Genetics.** J. Herbert Taylor, Ed. Academic Press, New York, 1965. xii + 649 pp. Illus. Paper, $5.95; cloth, $9.

This volume provides both the student and the professional with an excellent, instantly available, reprint collection of many of the important papers on molecular genetics that have been published during the past several years. Also included are papers from the pre- and early "molecular" eras—for example, Beadle and Tatum's 1941 paper on the biochemical genetics of *Neurospora*; Pauling, Itano, Singer, and Wells's paper on sickle cell hemoglobin; as well as papers by Sturtevant, Creighton, and McClintock and Avery, MacLeod, and McCarty that are fundamental to the development of ideas of chromosome and nucleic acid structure.

Fifty-five papers related directly to the organization, molecular structure, and function of the genetic material are reproduced in five sections: Biochemical Genetics; The Nature of the Genetic Material; DNA Structure and Replication; Genetic Recombination; and The Function of the Genetic Material. Taylor has provided a short introduction to each section which helps to provide some perspective about the development of the concepts that led to the experiment described.

On the whole the collection is an excellent one and it is a very handy supplement to the texts now available to those who are studying and teaching molecular biology.

SAMSON R. GROSS
*Division of Genetics, Department of Biochemistry, Duke University*

## Computers

**Electronic Computers.** S. H. Hollingdale and G. C. Tootill. Penguin Books, Baltimore, 1965. 336 pp. Illus. Paper, $1.65.

**Electronic Analog Computer Primer.** James E. Stice and Bernet S. Swanson. Blaisdell (Ginn), New York, 1965. xii + 160 pp. Illus. Paper, $2.75.

*Electronic Computers* was written for the general reader. The chapters that deal with the historical development of computers and with some of the programming of digital computers can probably be read with interest and profit by intelligent individuals without technical background, but to follow the content of this book the reader should have a mathematical background through elementary calculus, and preferably, some knowledge of electric circuits. Such terms as impedance, voltage, resistance, and differentiation are explained by the authors but are not likely to be clearly understood by nontechnical readers.

Analog and digital computers are discussed, and a clear distinction is drawn between the two. The analog computer is characterized as a special-purpose device of limited precision. The digital computer, on the other hand, is recognized as the general-purpose tool that it is. The authors provide a good description of what the digital computer can do and of how it is pro-

grammed, as well as an account of its accomplishments and limitations. In discussing integration and differentiation, it might have been worthwhile to emphasize that integration is a smoothing process whereas differentiation brings out all the unpleasant features in a function and should, therefore, be avoided on computers.

The authors conclude by looking at the future of computers. Their discussion is pertinent and interesting, but it is limited to improvements of components and of existing computers. It might have been worthwhile for them to indicate that the very high computing speeds required for certain problems are likely to lead to the design of parallel processing digital computers.

In conclusion, it seems to me that this book would be a valuable adjunct for beginning students in computer programming. It should give these students a pretty good idea of what can and cannot be done with various computers. For the general reader, its value is questionable.

If they have knowledge of elementary differential equations and preferably some acquaintance with circuit theory, *Electronic Analog Computer Primer* is an excellent introductory text for those who wish to learn how to use analog computers. The authors clearly and concisely explain how to perform the operations of addition, subtraction, multiplication, and integration and display the circuits required for these operations, together with the symbols used for such circuits. This will permit the reader to follow current literature. They wisely point out the difficulties involved in using analog computers for differentiation and advise that such use be avoided. Time and magnitude scaling are clearly explained together with the limitations encountered in using various methods of magnitude scaling. The authors discuss certain problems and their solutions in detail, and also provide a list of problems from various fields.

Reading alone is not sufficient. Those who wish to learn how to set up and solve problems on an analog computer would be well advised to use this text in connection with an analog computer and to solve problems of increasing complexity as they read the text. The book is so clearly written that it could well be used for self-education by anyone interested in this field.

M. OSTROFSKY
*Westinghouse Electric Corporation, Baltimore, Maryland*

## Sources of Science Series

**Kepler's Conversation with Galileo's Sidereal Messenger**. Translated, with an introduction and notes, by Edward Rosen. Johnson Reprint Corporation, New York, 1965. xix + 164 pp. $9.

The transition from observations made with the naked eye to those made with the aid of a telescope was sparked by Galileo's observations recorded in 1610 in his *Sidereal Message*. At Galileo's request, Kepler described his reaction to that booklet in a letter dated 19 April 1610, which Kepler shortly thereafter amended slightly and published. This revision is now available in a complete English translation. It illuminates the transition.

At a time when many were skeptical of Galileo's discoveries, Kepler unquestioningly accepted them as a contribution to astronomy and concerned himself with their significance. Edward Rosen contrasts the practical Galileo with the imaginative Kepler, whose fancy carried him far beyond known, or even suspected, fact. Kepler, an ardent supporter of the heliocentric theory, had already speculated on the nature of the moon and of the stars and on the size and structure of the universe; he had just published his *New Astronomy*, had already described lenses and systems of lenses, and could supply the theory behind the telescope.

Among the topics considered are Jupiter's satellites and the cosmological considerations they entailed, the optical problems involved in the construction and use of a telescope and in the crystalline lens of the eye, earthshine, the moon (its surface, mountains, density, possible atmosphere, and motion), the sun (its brightness, parallax, and rotation), and the number and nature of the stars and whether they are self-luminous. And behind these considerations lay the role of the telescope and what might still be hoped for from that instrument.

Not only is Rosen a careful and accurate translator, but he is also a keen scholar with a broad and deep knowledge of Kepler's times. He is thoroughly familiar with Kepler's works and correspondence, the books that Kepler knew, and the books about Kepler. Rosen uses his wealth of knowledge to annotate the book. The notes do much more than furnish the reader with translations of pertinent passages from the writings of Galileo, Kepler, and others. They give the book its proper perspective.

Unfortunately, this scholarly apparatus makes the book cumbersome. To the seven pages of introduction and 49 pages of text are added 104½ pages of notes, two pages on which certain notes are continued, and a useful six-page index. The number of notes, and thus the number of times the reader is interrupted, could be greatly reduced by not pointing out individual mistranslations in Bryk's 1918 German translation. These notes distract the reader by introducing erroneous ideas. Similarly, references to errors made by others might be omitted. Nonetheless, the volume is most valuable, interesting, and enlightening.

C. DORIS HELLMAN
*School of Humanities and Social Science, Pratt Institute*, and
*Department of History, New York University*

## The Caravan City of Timbuctoo

**The Primitive City of Timbuctoo**. Horace Miner. Doubleday, Garden City, N.Y., revised ed., 1965. xxiv + 334 pp. Illus. Paper, $1.75.

*The Primitive City of Timbuctoo* is an anthropological account of the people of Timbuctoo, the famous caravan city that became a center of considerable importance as a trading point between North Africa and the savannah lands across the Sahara in the early 14th century. The account is based on 7 months of research carried out in 1940 when Timbuctoo was still a part of the French West African empire. Miner planned his research as a test of some of Robert Redfield's hypotheses about the folk-urban continuum and the nature of urbanism. He chose Timbuctoo because it was an Islamic city, founded for and sustained by trade, and little touched by Western urban ideas deriving from the Industrial Revolution.

Since 1940, a great deal has been published on the various peoples of Mali who contribute to the population of the city, and a good deal has been published about the political and economic history of the savannah region in general. There has also been a major political revolution in which Mali has become independent of France. Some 25 years of technical, social, economic, and political change separate the Tim-