

physics, then space exploration, cosmological evolution and biological evolution. The cement that made a meaningful mosaic of it all was Jastrow's curiosity about anything capable of stimulating the intellect.

The reader will, I think, enjoy the style of the book. Its words are those of someone who knows he must hold his audience. In addition many chapters end with collections of photographs presented in picture-magazine style. The pictures illustrate the preceding prose; long captions repeat the message in abbreviated, summary form.

While many of the people watchers in and around physics are worrying about failing interest and declining registrations, they might learn from a good look at this book. Its success on the bookstands may tell us that we are underestimating our audience.

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The reviewer is editor of PHYSICS TODAY.

Basic processes in the sun

A GUIDE TO THE SOLAR CORONA.
By Donald E. Billings. 323 pp.
Academic Press, New York, 1966.
\$14.00

by Jules Aarons

A very delicate balance is achieved by Donald E. Billings of the University of Colorado in his *Guide to the Solar Corona*. The volume stresses a physical understanding of processes in the solar corona, but current observations always buttress and supplement the basic physics. The balance allows the graduate student and research worker in allied fields to move from the basic physics of solar processes to current references that emphasize observations.

The book was planned by Billings and many members of the staff of the department of astrophysics of the University of Colorado. The author, a member of that staff and a prominent researcher specializing in coronal optical measurements, has turned out a very readable advanced text, with references at the end of each chapter and a good appendix.

The volume starts with a historical summary and moves into a description of optical and radio observational methods. The theories of emission and radiation processes are excellent; they are developed at the graduate-

school level without moving into the rarified air of the theoreticians. A brief discussion of the extent of the corona and its transition into the solar wind complete the book. The solar wind, with its literature and its measurements expanding at very high accelerations, is correctly discussed only sparsely since it is best treated in current review articles and in the periodicals.

This addition to the small list of books on the sun is slanted towards audiences different from those of recent books such as *The Solar Corona* edited by J. Evans, which is a conference proceedings oriented toward the solar physicist and the new edition of *Our Sun* by D. Menzel, which is slanted towards the undergraduate.

The volume emphasizes optical coronal measurements and to some extent (possibly because of the reviewer's bias) omits the contribution of the radio measurements. For example, although the techniques are outlined, the observations of the angular diameter and apparent temperature of the radio sources are not discussed. This, however, is a minor criticism since the volume does describe the basic processes and mechanism for emission of the active regions.

Well written and clear, amply il-

lustrated, delving into theory and outlining important observations, *A Guide to the Solar Corona* is recommended both for the astronomer and for the geophysicist.

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Jules Aarons, chief of the radio astronomy branch at US Air Force Cambridge Research Laboratories, Bedford, Mass., is editor of a recent volume *Solar System Radio Astronomy*.

Nonequilibrium systems and surroundings

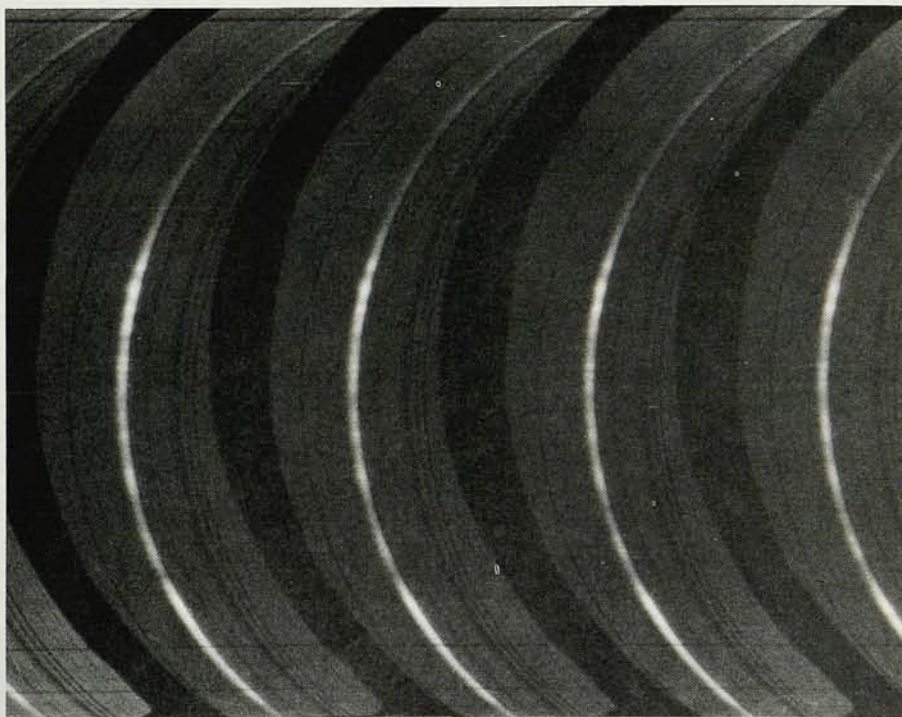
THERMODYNAMICS OF STEADY STATES. By Ralph J. Tykodi. 217 pp. Macmillan, New York, 1967. \$10.95

by Ralph J. Nossal

In recent years significant success has been achieved in formulation of the molecular basis of irreversible thermodynamics. Kinetic expressions have been established for many of the linear transport coefficients, and the origin of various "phenomenological" transport equations is increasingly better understood. However, most investigations of the properties of nonequilibrium thermodynamic systems have been presented for assemblies of infinite ex-

CORONAGRAPH SPECTRUM of green coronal line at 5000-km intervals above solar limb. A curved slit, with solar-image diameter, is parallel to the limb. The absorption lines are Fraunhofer lines in the spectrum of scattered sunlight.

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1964, 306 pp., \$12.00

INTERACTION OF HIGH-ENERGY PARTICLES WITH NUCLEI

edited by T. E. O. ERICSON, *CERN, Geneva, Switzerland*
Course 38—Italian Physical Society

Considers elementary particles and high-energy particles as probes for studying the properties of nuclei, and the complementary use of the nucleus as a tool for the study of elementary particles. Extensive interpreted experimental data and bibliographic material will orient the student and present the research scientist with the most recent deliberations of some of the world's foremost authorities on the subject of nuclei and elementary particle studies.

1968, 322 pp., \$16.00

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edited by WARREN P. MASON, *Columbia University*

The subject matter of this volume is a continuation in part of material presented in Volume IV A, namely, the applications of physical acoustics to quantum and solid state physics. A review is given of all the interactions that can take place between acoustic waves and electrons when magnetic fields are present, providing an excellent background for further studies in this rapidly growing field.

1968, 490 pp., \$19.50

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edited by ARTHUR J. FREEMAN and RICHARD B. FRANKEL, *Massachusetts Institute of Technology*

This unique collection of papers covers the entire range of basic principles and latest advances in the field of hyperfine interactions and associated relaxation phenomena. Based on the proceedings of a NATO Advanced Study Institute held at Aix-en-Provence, France, in 1966, this book includes papers by such eminent authorities as A. Abragam, B. Bleaney, S. Geschwind, R. L. Mössbauer and A. Steudel.

1967, 758 pp., \$16.00

AN INTRODUCTION TO THE LIQUID STATE

by P. A. EGELSTAFF, *A.E.R.E., Harwell, Berkshire, England*

Developed from a series of lectures given at the University of Reading, this volume gives a general introduction to the liquid state. Both equilibrium and transport properties of liquid are covered and emphasis is placed upon the microscopic behavior. The basic theory involving pair potentials and pair distribution functions is presented in the earlier part of the volume and the more complicated space and time dependent correlation functions follow. Monatomic liquids such as rare-gas liquids and liquid metals are discussed in detail and their properties compared.

1967, 236 pp., \$10.00

ACADEMIC PRESS



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111 FIFTH AVENUE, NEW YORK, N. Y. 10003

tent, for which interactions with surroundings may be assumed to be negligible. In the present volume, Ralph J. Tykodi, who until recently was a member of the chemistry department at the Illinois Institute of Technology and is currently associate professor of chemistry at Southeastern Massachusetts Technological Institute, addresses himself to the general problem of the interaction of nonequilibrium systems with their surroundings, that is, the apparatus dependence of steady-state thermodynamic quantities.

This book is primarily a consolidation and extension of the author's prior published investigations into various aspects of the *theory* of nonequilibrium thermodynamics. However, despite an emphasis upon theoretical matters, experimental applications are foremost in the author's mind, and data are analyzed in a number of specific examples; I think such viewpoint to be an outstanding attribute of this work.

The book is not easy to read. Tykodi stresses that he has a unique view

of the subject of nonequilibrium thermodynamics. He feels that problems in which he is interested necessitate reformulation of the theoretical foundation of the latter, and he has devoted considerable effort to this task. The principal characteristics of his theory seems to be: (1) utilization of the operational technique of always defining a system large enough so that only heat and work may be exchanged with its surroundings; (2) the assumption that such a system can always be divided into "terminal parts" and "gradient parts," the whole system being capable of sustaining steady-state operations; and (3) the imposition of an extended, global theory of minimum entropy production. An advantage of presenting original research in monograph form is that space can be given to a comparison of the author's work with alternative points of view, and I wish such had been done to a greater extent in the present volume. Also, in a number of respects the organization is uneven, and the notation

and terminology are unfamiliar, compounding the difficulties one has when trying to understand the author's main arguments. Consequently, it might be useful to read the author's original papers before undertaking the monograph.

Both the author and publisher suggest that the book is suitable as a text for graduate students in chemistry, physics and engineering. However, despite the fact that problems are suggested and a wide number of applications indicated, due to the specialized nature of the subject and the unusual nature of the presentation I think that the book would better serve as an auxiliary reference. On the other hand, a scientist actively working in this field might find a number of interesting points to take under consideration.

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The reviewer is a physicist at the National Institutes of Health, Bethesda, Maryland.

Masterful biography

JOSEPH PRIESTLEY: REVOLUTIONS OF THE EIGHTEENTH CENTURY. By F. W. Gibbs. 258 pp. Doubleday, New York, 1967. \$6.00

by Sanborn C. Brown

There is a growing number of teachers who are becoming convinced that teaching science in a historical perspective, particularly for the nonscientists, is good pedagogical technique. One of the difficulties in this approach is the lack of adequately authoritative case studies of particular men. Many biographies of scientists tend to separate their science from their life and environment, and hence lose value as a reference text in the teaching of science through the historical approach.

F. W. Gibbs has produced a masterfully written biography of Joseph Priestley which should be enthusiastically accepted by those interested in the development of chemistry during the 18th century as well as those whose natural curiosity is stimulated by the life of a man who so wholeheartedly entered into both the scientific and political revolutions of the day. His science is already legendary, and he challenged the authority of the Anglican church to a degree that sent mobs through the streets of Birmingham for

days searching out and destroying everything they felt was associated with Unitarianism.

As is true of many 18th and 19th century scientists, a number of biog-

phies have been written, and with Priestley the problem has always been the overwhelming amount of material that is available to those who want to write about him. As both a chemist

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