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the material, and a semester of trigonometry would be helpful but not essential for understanding regression and correlation. Calculus is not missed even though its absence forces the authors to deal with all populations as finite. Probability is not explained through set terminology, but this is a wise move in that it reduces the size of the book by making a separate chapter on sets unnecessary. Inclusion

of nonparametric tests, most of which require little mathematical background, fits well with the basic philosophy of the book.

Each chapter concludes with pertinent exercises selected from a variety of content areas, including biology. While the book was primarily designed for a one or two quarter college course, there is no reason it could not be used at the high school level, where it would certainly prove more attractive than a course in trigonometry. This is a heartily recommended, cogent exposition of probability and statistics that represents an intelligent series of compromises between adequate exposition and overly demanding mathematical pre-requisites. Even the fact that the appendix presents only the answers to the odd numbered exercises represents a compromise between those who would prefer that all of the problems be answered and those who would prefer that no answers be included.

William V. Mayer
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CHEMISTRY

THE SCIENCE OF CHEMISTRY, Ira M. Freeman and A. Rae Patton, 131 pp., \$1.50, Random House, New York, 1968.

One of the most significant features of the contemporary revisions of science curricula is the presentation of science as a systematic process, through which knowledge becomes available to virtually anyone. It is sad, then, that books like this one continue to be published, or even written. It is something of a throwback to that science filled with mysterious facts and commanding awe, especially from the younger reader.

If the title of the book does not dismay the serious reader, surely the absence of logical development expressed in

the chapter headings will. An early chapter on molecules is followed by one on petroleum. Two chapters later we are in a steel mill, and still reading about Bessemer steel, no less. A quick journey through the mysteries of extractive metallurgy, foods and nutrition, agricultural chemistry, and we close with chapters on fibers, plastics, and rubber. The content orientation of the book is abetted by the heavy-handed use of boldface type for the too-numerous technical terms, and photographs and drawings of questionable worth.

Finally, one questions the values in the photograph showing policemen using chemical Mace in the chapter on "More Good Things From Chemistry."

Anthony LaDuca
Brooklyn Technical High School
Brooklyn, New York

HISTORY AND PHILOSOPHY OF SCIENCE

MUSIC OF THE SPHERES, 2 Vols., Guy Murchie, 644 pp., \$4.00, Dover Publications, Inc., New York, 1967.

Music of the Spheres cannot be read rapidly, nor does the organization make it particularly easy to use as a reference work. It does provide an excellent overview of the physical sciences with an abundance of helpful analogies. There is a skillful inter-weaving of the humanistic aspects of history within the context of current theories. Mr. Murchie's style is rather poetic and at times his choice of words seems to be influenced more by elegance of expression than by clarity.

The first volume is not so much a study of astronomy as an attempt to view man and the earth in the framework of space. Instead of emphasizing classifications of planets, stars, and galaxies, the author tries to point out relationships by considering their effect on the formidable problems of space travel. In addition to a description of current theory, some perspective may be gained from the humanistic presentation of the historical development of astronomy. For example, there is a certain whimsey in his description of Kepler which gives the reader a feeling that Kepler, in addition to being a brilliant scientist, was also a human with faults and foibles.

The second volume begins by describing the atomic-molecular model and kinetic theory. There is an excellent historical treatment of mechanics and the two models of light. In many cases, Mr. Murchie offers not only information, but also a description of the experiments by which the knowledge was gained. In this way the reader is able to get a better appreciation of the information and the creative aspect of scientific research.

The interaction of matter with electromagnetic energy and the problems

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imposed by quantum mechanics on models of matter are discussed at length, with many illustrative analogies.

This book is an impressive review of physical theory and philosophy. It also serves to remind us that there is no way to compel nature to give comprehensible answers when we ask inappropriate questions.

Donald Chaney
Los Gatos High School
Los Gatos, California

THE PARABLE OF THE BEAST, John Bleibtreu, 305 pp., \$6.95, The Macmillan Co., New York, 1968.

The Parable of the Beast displays an impressive series of instances of man's breakthrough in glimpses of the underlying philosophy of biological creation. The scientific characteristics and functions of life in its lower as well as its more advanced forms are related with meaningful reference to man.

The plan, the design, the beauty, and the purpose that underlies the biological creation is presented in a style created to hold the attention and interest of a reader without specific scientific orientation. When unusual terms are used, they are defined, or an explanation is implied in an understandable context. The author has a feeling for and relates well with the general reader. The chapter on *Sociality*, especially exhibits this point in recounting the life and work of the Russian Prince, Petr Alekseyevich Kropotkin.

The book is rewarding reading, not only from the scholarly point of view, but enjoyable from the viewpoint of the aesthetic.

Sister Mary Ivo Miller
Science Coordinator
Archdiocese of Chicago School Board
Chicago, Illinois

SCIENCE: MEN, METHODS, GOALS, Boruch A. Brody and Nicholas Capalid, Eds., 343 pp., \$8.00, W. A. Benjamin, Inc., New York, 1968.

A collection of readings in the physical sciences grouped around the headings of: 1) Nature of scientific theory (reductionism, realism, instrumentalism), 2) Discovery and justification of scientific theories (classical), and 3) Science and mathematics (measurement, arithmetic, geometry). The editors' comments are extensive and helpful. There is no index.

THE GAME OF SCIENCE, Garvin McCain and Erwin M. Segal, 178 pp., Cole Publishing Co., Belmont, California, 1969.

A paperback to be used as a supplementary text and to explore the meaning of science, scientific attitudes and methods, the life of the scientist, and something of the scientific establishment. It is told in an informal style

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but not breezy. There is a bibliography and index.

It is hard to see in what traditional course this book might be an assignment, although there is no quarrel with the idea that it would be useful reading for the beginning science student. The divisions are: attitudes, concepts, rules, ideas, inquiry, scientists, ethics, and social implication. The authors do well on their treatment of scientific ideas.

An interesting book for teacher and student.

TOWARDS A THEORETICAL BIOLOGY, C. H. Waddington, Aldine Publishing Company, Chicago, 234 pp., 1968.

This book is essentially the result of a 1966 bull session at Lake Como by erudite, chiefly Anglo-American scientists. Of the 19 participants only one was from France and one from Switzerland. The aim of the symposium was to attempt to formulate a core of concepts and methods around which theoretical biology could grow to the current stature of theoretical physics. The week's work only indicated the necessity of further discussion and interchange. The bulk of the book consists of a series of unconnected articles mostly written subsequent to the symposium, although a few reprints of articles originally appeared in *Science* as early as 1961. The reporting of free, intense, and stimulating symposium discussions might have been far more

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