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## GENERAL PHYSICAL SCIENCE

**PATTERNS AND PROCESSES OF SCIENCE**, Laboratory Text No. 3, Weisbruch, Donovan, Hinger, Palma, Brock, and Paulsen, 531 pp. and 293 pp., D.C. Heath and Company, Boston, 1968.

Preliminary editions of this book have been reviewed earlier in these pages, and this edition is the student text and the teacher's manual bound together. The book was originally aimed at 9th grade physical science but has been tested for some 4 years at various levels and in various schools, *a la* the curriculum studies' technique.

The result is a first rate production. The main "sets" are: experimental methods of science, measurement, mathematics, mass, chemical changes, radiant energy, and motion. Each "set" is subdivided into various chapters and topics. All are beautifully illustrated with up to date photographs and examples. This edition is coded to the teacher's manual so that there is an unusually rich resource for teaching.

The mathematics set intrigued this reviewer by its comprehensiveness and directness. It attempts to teach the mathematics necessary to understand some fundamental physical principles, and does it by using relevant examples from the scientific fields. Mathematics makes sense in this context. Would that all biology students had at least this background.

Another intriguing aspect of this production is the fact that curriculum study techniques have been used to develop text materials and financed by private enterprise and local school systems. If the national curriculum studies could leave no other heritage, this would be the important one.

Because this text is in the physical sciences a lengthier or more detailed review is probably not wanted here. But all biology teachers should examine this book and learn from it. This reviewer will predict that the biology teacher will insist on this type of course as a good and required background to a good biology course.

## MATHEMATICS

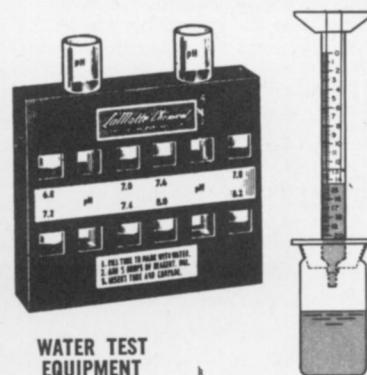
**INTRODUCTION TO PROBABILITY AND STATISTICS**, 4th Ed., Alder and Roessler, 333 pp., \$7.00, W. H. Freeman and Co., San Francisco, California, 1968.

While most biology departments require mathematics through calculus for their majors, undoubtedly the most valuable mathematics for the majority of biologists is probability and statistics. This volume, which appeared originally in 1960, has stood the test of time as a lucid presentation of statistics and probability for the beginner. It is one of the few that does not require the background of a mathematics major to comprehend. Two years of high school algebra will suffice for most of

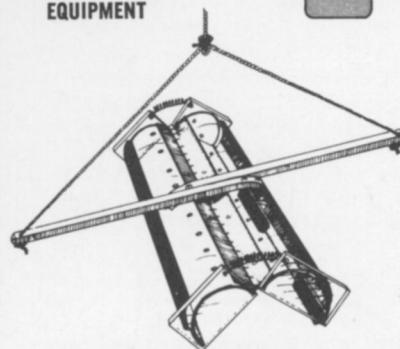
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the material, and a semester of trigonometry would be helpful but not essential for understanding regression and correlation. Calculus is not missed even though its absence forces the authors to deal with all populations as finite. Probability is not 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.

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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."

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### 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.

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