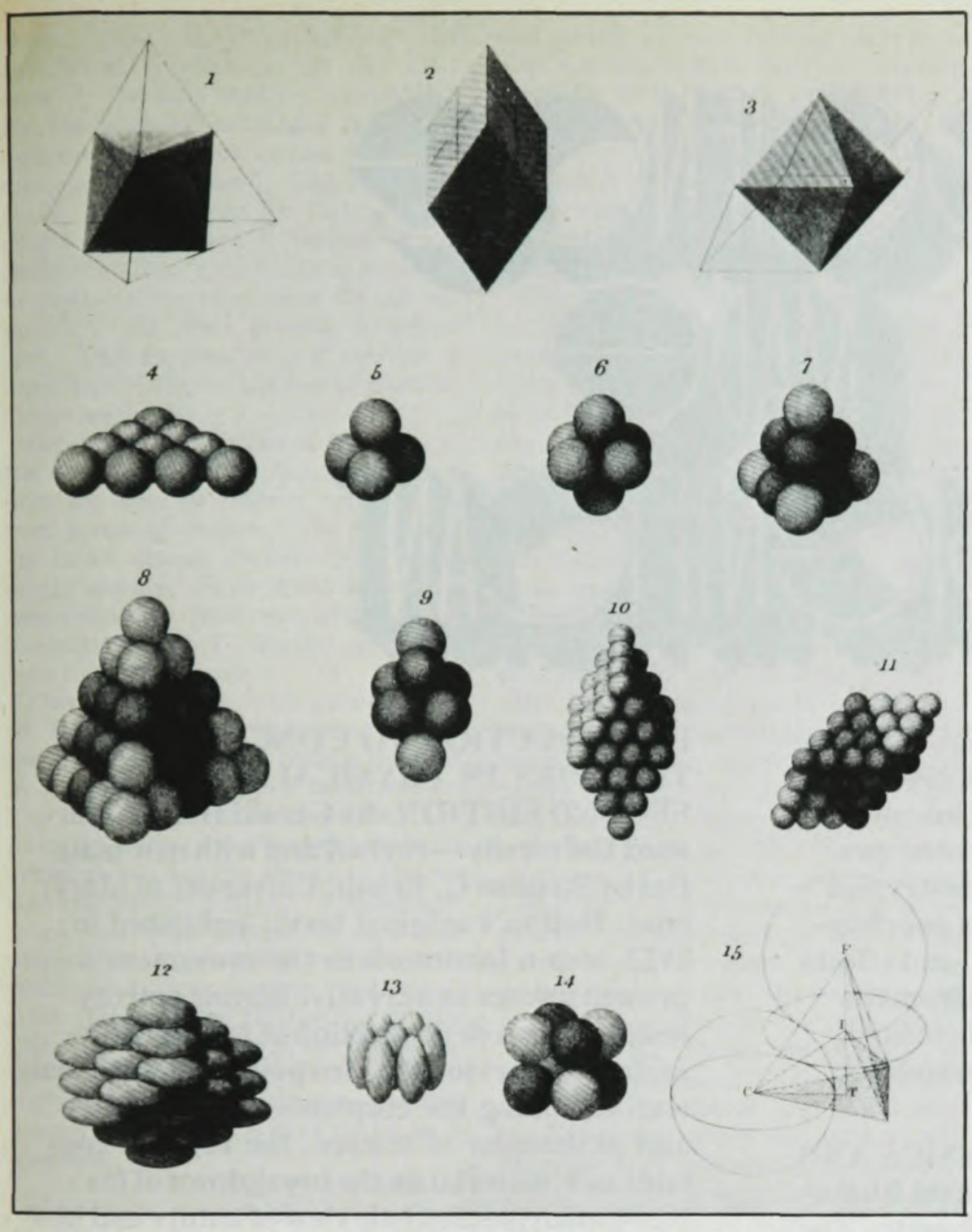

Crystal structure. These figures, which illustrated a lecture given by William Wollaston in 1812, show how it was thought that the regular shapes of crystals could be formed by appropriate arrangements of elementary particles. Some of Wollaston's papers and those of others who have investigated the structure of matter are included in M. P. Crosland's book.

ranged chronologically, beginning with Aristotle on the Ionian principles (6th century B.C.) and ending with C. N. Yang on the conservation of parity (1958). Crosland's introduction emphasizes that the anthology represents —as any honest anthology should—a "personal" selection. Personal it may be, but the selections are not eccentric. In addition to a general introduction designed to explain why opinions on the nature of matter are worth study, Crosland gives each of the 33 sections in which the selections are grouped brief but insightful introductions.

The volume gives, in the words of their originators, a sampling of many of the seminal scientific ideas: Lucretius, Paracelsus, René Descartes, Robert Boyle, Galileo, Sir Isaac Newton, Denis Diderot, Boscovich, Joseph Priestley, Antoine Lavoisier, John Dalton, Sir Humphrey Davy, Joseph Proust, Michael Faraday, James Clerk Maxwell—to name a prominent few. For the 20th century about 70 pages of text appears to offer less than complete coverage. If one were to quarrel with Crosland's selections, the quarrel would possibly revolve around which papers should be included for the 20th century. Max Planck's papers are not represented although there are references to him and one of the introductory sections abstracts his work.

All anthologies suffer from selections that are too short; "snippets" is the pejorative term. For an anthology of scientific writing the problem becomes acute, as Crosland admits, since economy requires that experimental evidence be omitted. Crosland attempts to remedy the deficiency by giving the precise reference to the work from which the anthologized section was taken, collected in "Sources" at the end of the work. His name and subject indexes supply further guides for the reader.

Three classes of readers are served by an anthology: students surveying a field find brief samplings, useful introductions and guides; serious researchers find quick references helpful; casual browsers oftentimes find short selections from quality material both provocative and beguiling. Crosland's anthology should be attractive to all three groups.

J. Z. Fullmer
Ohio State University
Columbus, Ohio

Statistical Methods in Experimental Physics

W. T. Eadie
American Elsevier, New York, 1972. $17.25

The experimental physicist frequently needs an understanding of some of the more advanced methods for the statistical analysis of his data. Many of us have learned our methods as the need arose and lack a knowledge of the theoretical basis for such methods. The authors have attempted to meet this need by writing a text designed to be more than a handbook of methods and formulae. They have included many of the theoretical concepts, while at the same time trying to keep the text short enough to tempt the experimentalist to use it. This was done by stating most results without proof and by omitting techniques judged of lesser importance to experimental physicists.

The text begins with the necessary coverage of the theory of probability. The emphasis here is on convergence and the Central Limit Theorem. This is the basis for later discussions of the differences between the asymptotic properties of distributions and the finite sample properties. Chapter 4 is a catalogue of the more common ideal distributions and an all too brief discussion of "real life" distributions. The distributions are illustrated by many good computer-generated plots. The usefulness of several of these plots is unfortunately diminished by the fact that there are no labels on some of the curves.

The remainder of the text treats the subject of statistics. The authors choose to emphasize the Anti-Bayesian (classical) approach, but frequently point out the differences with the Bayesian view. They approach the subjects of point and interval estimation from the viewpoint of information

theory (that is, "maximizing the amount of information in the estimate"). Decision theory ("minimizing the loss involved in making the wrong decision about [a] parameter value") is discussed in Chapter 6. The book concludes with methods for testing one's data to see whether it verifies or disproves a given hypothesis as opposed to another given hypothesis (or the ensemble of all other possible hypotheses). The authors do not include a discussion of the techniques of numerical optimization.

One of the real virtues of this book is the use of illustrative examples drawn from the field of physics rather than from games of chance. The examples are taken almost entirely from high-energy physics, which is not surprising considering the book was written by a statistician (W. T. Eadie) and four high-energy physicists.

I would rate the book excellent on the basis of content, but unfortunately the effectiveness of the book is reduced by a style of writing that lacks clarity. The book would be improved by the inclusion of more explanatory material aimed at relating the theory to the actual laboratory situation. It should be noted that even though the text was prepared by typewriter composition, it contains numerous errors and omissions, including the misspelling on the title page of the name of one of the authors. Many experimentalists (especially those in elementary-particle physics) will find this text useful as a reference.

LARRY D. KIRKPATRICK
University of Washington
Seattle

Mössbauer Spectroscopy

N. N. Greenwood and T. C. Gibb
659 pp. Harper and Row, New York, 1971. $38.50

The discovery 15 years ago by Rudolf Mössbauer of recoil-free emission and resonant absorption of nuclear gamma rays has had an impact on surprisingly diverse areas of science. Applications have spread from nuclear and solid state physics, on which the effect is based, to relativity, chemistry, biophysics and metallurgy. The reason for the enthusiastic acceptance of this technique lies in the fact that it provides new ways of observing the motion of atoms in solids, and the hyperfine coupling between the nucleus and its electrons. It also provides a new measurable parameter, the isomer shift, which has immediate relevance to questions of chemical bonding.

Starting in 1960, after a slow induction period, an ever growing volume of work has appeared in the literature devoted to what is now called "Mössbauer Spectroscopy." This, in fact, is the title of a recent 659 page volume by Norman N. Greenwood and T. C. Gibb which undertakes to review the literature of the first decade of Mössbauer-effect research.

The authors, who until recently were in the Department of Inorganic Chemistry at the University of Newcastle upon Tyne, have made many contributions to Mössbauer spectroscopy during the last decade: Greenwood is the founder and chairman of the Chemical Society's Mössbauer discussion group and organized the first Faraday Society International Symposium on Mössbauer spectroscopy.

This book is clearly the most ambitious effort in the field. No other compendium of so great a scope is available. Earlier publications include introductory monographs, conference proceedings, the widely used *Mössbauer Data Index* of Arthur Muir, Ken Ando and Helen Coogan, and a collection under the title *Chemical Applications of Mössbauer Spectroscopy* edited by Vitali Goldanskii and Rolfe Herber and published in 1968. The latter, the most recent review of the subject, does not offer the unified point of view available in the new work. None of the earlier efforts are as systematic or exhaustive as the present work, which makes a large fraction of the Mössbauer effect literature of the period through 1970 readily accessible.

It is interesting to note that this volume as well as some of its predecessors are the work of chemists. This accurately reflects the fact that a very large fraction of research utilizing the Mössbauer effect is done by chemists. In fact the dust jacket proclaims that it was "written by chemists for chemists ..." a statement that may quite unjustifiably make the nonchemist browser return it to the shelf. Actually, I think that anyone in the field would find it a valuable reference work, with the advantage of serving to underscore the close connection between solid-state physics and inorganic chemistry.

In the first 86 pages, the book provides a concise introduction to the concepts of the Mössbauer effect. The scope here is comparable to those available in other introductory monographs, but includes the more recent developments as well as more detailed tabulations. The rest of the book is devoted to an isotope by isotope discussion of the literature. In the case of Fe^{57}, which takes up about one half of the remaining pages, further subdivisions are employed to bring together related work.