There are a few minor inaccuracies such as the statement that 43-million-electron-volt O^{16} ions can be obtained from a tandem with 6-million-volt terminal (the beam intensity would be miniscule) and the statement that alpha-particles are excluded from two- or three-stage (tandem) acceleration because helium cannot be produced as a negative ion. Because the design of accelerators has become a very specialized field and because it is relatively rare for those in this field also to be users of accelerators, many users, particularly biologists, chemists, solid state physicists, and physicians, should find this monograph useful. It would have been helpful if the bibliography had listed references according to the various types of accelerators described in the text for those who want more detailed information about a particular type.

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Three-Body Problem

Three-Particle Scattering in Quantum Mechanics. Proceedings of the Texas A & M Conference, College Station, 1968. J. GILLESPIE and J. NUTTALL, Eds. Benjamin, New York, 1968. x + 462 pp., illus. $15.

This volume summarizes a conference held in April 1968. The speedy publication is commendable, but the volume has had to be printed directly from a typescript prepared by the editors. This of course means some sacrifice esthetically, but also rather few (less than 200) words to a page.

Abstracts of contributed papers occupy about 20 pages of the volume, and are useful in giving some flavor of the sort of problems which are being tackled in this area, though the abstracts are too brief to be of much more use than that. The main part of the book consists of eight invited papers plus a relatively short summary paper by R. Blankenbecler.

As was to be expected, the Faddeev formalism is the main theme running through the book, though the variational approach is also prominent. The papers by R. D. Amado on three-nucleon collisions and by D. Y. Wong on the (3α) and the (e-H) systems fall into the first category, as does the longest paper in the book, by H. P. Noyes and H. Fiedeldey on the calculation of three-nucleon low-energy parameters. The bibliography of this article contains some 150 references, around 100 to work published after 1964, giving some indication of the interest and activity in a field that might look, at first sight, rather narrow and specialistic. About half of the references in the book as a whole are related to this article.

In the second category, there are articles by L. Spruch and by L. M. Delves on the variational approach. Although, as Spruch points out, variational principles can often provide compact unifying formulations of physical laws, both these articles are concerned with the variational approach as a computational tool. In his article, Delves makes a strong plea for more systematic use of the variational approach, both with linear and nonlinear parameters. His work is concerned with the use of realistic local potentials, and he pays considerable attention to the rate of convergence of the method, as well as presenting some numerical results for the three-body problem. A novel feature is his plot of the variational estimates of the triton binding energy against the year of Our Lord, an asymptote appearing at—6.5 Mev! Delves also points out that the variational approach may afford another valuable attack on the Faddeev equation with local potentials.

The remaining three papers are more formal, though no less interesting to the present reviewer. R. L. Omnès and J. L. Basdevant discuss the limitations of the relativistic versions of the Faddeev equation as well as the use of the separable approximation in this area. Analyticity properties of nonrelativistic three-particle scattering amplitudes are discussed by R. L. Sugar, who also points out that the question of the analytic structure of the three-particle amplitudes in the complex angular momentum plane remains unsolved. In the discussion, which is also summarized in the book, it emerges that knowledge of the analytic properties of the amplitude provides a general framework for discussing the threshold laws for cross-sections. The paper by C. Schwartz on generalized Bethe-Salpeter equations for coupled two- and three-body amplitudes makes interesting reading, though it is again somewhat formal. The volume as a whole has a good balance between formal theory and practical calculation and forms a useful progress report in this field.

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Measuring Trace Elements

Atomic Absorption Spectroscopy. WALTER SLAVIN. Interscience (Wiley), New York, 1968. xviii + 310 pp., illus. $12.95. Chemical Analysis, vol. 25.

During the past ten years, simple combustion flames have become one of the most useful devices available for the quantitative determination of trace elements in solution. Their usefulness stems from the very simple way in which flames of various types can release free atoms of the metallic elements when they are found in solution. All that is necessary is to make an aerosol or spray of the solution and introduce it into the flame. A fraction of the dissolved metal atoms is eventually converted into free atoms, which the analyst can then detect at the trace level by three simple but different spectroscopic techniques, namely, atomic absorption, atomic emission, or atomic fluorescence. This book is concerned with the atomic absorption method.

The author has been deeply involved in the popularization of this analytical technique in the United States, and his many experiences are reflected in the valuable pragmatic approach he has employed.

In the preface, three main purposes of the book are identified. First, "the book is intended to supply the spectroscopist and the analytical chemist with an understanding of *why* atomic absorption spectroscopy works as it does, as well as information on *how* to apply the technique." The author has done this task well, although I believe that topics related to flame chemistry and structure, to the effect of flame stoichiometry on free-atom formation processes, and to spatial distribution of free atoms in flames deserved more discussion.

Another stated purpose of the book is to "guide the developer of new analytical methods, the chemist who is being introduced into the discipline, and the prospective purchaser of equipment." The author has done this well.

The author also expresses the hope that the book will serve as a "critical guide through the large literature that has developed." Here he is less successful. There is a tendency throughout the book to sidestep critical commentary. Let me cite some important examples. In the preface, the author notes that "the use of flame emission spectroscopy . . . applied to the determination of metals has waned considerably as a result of the upsurge in atomic absorption spectroscopy." That statement is, in-