perimental papers greatly exceeds the number of theoretical papers.

We have limited ourselves, in this review, to the aspect of the conference that should be most important to readers of *Nuclear Science and Engineering*. Much has been omitted. The reader will find discussions of the (small!) modification of resonance-capture cross sections by chemical binding effects, of precise calculations of scattering by molecular gases and of several magnetic effects. The Proceedings contain 67 papers (for $16.00, paper-bound), which may be compared with the eleven papers presented at the first meeting of this type in Stockholm, 1957. A fourth conference will have taken place in Bombay before this review is published. It will be most interesting to chart the rate at which this young subject continues to grow.

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Introduction to Neutron Distribution Theory. By L. C. Woods. Methuen and Company, Ltd., London, (1964). 132 pp. $5.50.

Neutron distributions are usually described only in terms of the neutron-phase space density that satisfies the linear Boltzmann equation (the transport equation); and it is in this conventional sense that this monograph presents an introduction to neutron-distribution theory. It is in fact, an introduction to steady-state neutron-transport theory with emphasis on the transport equation itself and on the deduction of several approximating equations to be used in the treatment of special problems. As such, it provides a useful and concise summary of much of the material presented in Davisson's *Neutron Transport Theory*.

In this reviewer's opinion the breadth of coverage and the attention to physical principles achieved in approximately 130 pages is truly remarkable. Furthermore, though the exposition is terse, it is lucid and largely self-contained. It should be comprehensible to anyone with the motivation, adequate mathematical background, and some appreciation of classical physics. Matters pertaining to nuclear dynamics are barely mentioned explicitly, but sufficient attention is devoted to the meaning and analytical representations of cross-sections and the scattering and fission frequencies to provide considerable insight into the problems of neutron moderation, thermalization and space-energy diffusion.

The book is divided into three chapters of roughly equal length. The first, entitled "Basic Equations," is primarily concerned with the development and discussion of the integro-differential and integral equations of neutron-transport theory. A derivation of the equations for the zeroth- and first-harmonic (velocity angular) moments of the phase space density is then sketched and the P_1 approximation introduced. A concept of the slowing-down density is described and the way in which it enters into the equation for the zeroth-harmonic moment is indicated. (Considering the generality of most of the presentation in this book, it was mildly disappointing that the author chose to restrict the notion of the slowing-down density to that of downward flow in energy only, instead of employing the slightly more useful and distinctly more general notion of net downward flow.) The equations of the P_N approximation are deduced and boundary conditions appropriate to the phase space density and its various harmonic moments are discussed.

Chapters two and three present a sampling of special applications of these equations rather carefully chosen to illustrate either fairly general ideas or widely used and/or generalizable mathematical techniques. To a certain extent, chapter two deals mainly with the former and chapter three with the latter. The second chapter is devoted to a discussion of neutron moderation in homogeneous, infinite and finite systems. Consequently many of the fundamental concepts important to reactor theory are brought out and clarified. The equations for the zeroth- and first-harmonic moments (the consistent-P_1 equations) are used here. Approximations are introduced when needed to keep the analytical treatment going—usually without much comment but with considerable operational precision.

Finally, in chapter three, some of the mathematical techniques of reactor analysis are summarized under the heading of "Multi-Group Theory." Considering the diversity and subtlety of the mathematical methods that have been brought to bear on the problem of calculating neutron densities in special instances, it is not unexpected that this chapter is the least coherent and self-contained of the three. Nevertheless a large amount of information about mathematical technique is described—interesting in itself to the casual reader and useful as an introductory survey to the more deeply committed student of the subject.

This book should have a wide appeal to applied scientists and engineers who seek an introductory (or refresher) account of steady-state neutron-transport theory with applications to nuclear reactors. Furthermore, it should prove valuable to students in nuclear engineering who have reached at least an intermediate level in their study of reactor theory.

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Advances in Computers, Volume 4. Edited by Franz L. Alt and Morris Rubinoff. Academic Press Inc., New York, (1963). 312 pp. $12.00.

This book, Volume 4 of *Advances in Computers*, is the latest, but perhaps the least interesting to people in the nuclear science and engineering fields, of the four volumes which have been published in this series. It was the intention of the editors to present in this volume a broader coverage of various aspects of the computer field. This has been accomplished, but at the expense of making the book less interesting to people involved in technical applications of computers.

The book consists of five articles:

Article 1 - "The Formulation of Data Processing Problems for Computers" by William C. McGee, page 1 through 52.

Article 2 - "All-Magnetic Circuit Techniques" by David R. Bennion and Hewitt D. Crane, page 54 through 133.

Article 3 - "Computer Education" by Howard E. Tompkins, page 135 through 168.

Article 4 - "Digital Fluid Logic Elements" by H. H. Glaettli, page 169 through 243.

Article 5 - "Multiple Computer Systems" by William A. Curtin, page 245 through 303.

Even though Articles 2 and 4 deal with computer hardware, it is not the hardware of the commonly used scientific or engineering computer. Article 1 is concerned with data-processing problems and again is not aimed for technical computing people. The article on computer education is of considerable interest. The final article dealing with multiple computer systems does have relevance for technical computations but is of secondary importance for most scientific calculations.

The first article is concerned with the commercial use of computers for the solving of data-processing problems. Although data-processing problems have been run on computers for a decade, it is only in the last four years that there has been deep interest in the fundamental aspects of data processing. One of the basic problems has been the choosing of an efficient and convenient programming language. The major effort, without too much success, has gone into developing a machine-independent data-processing language. COBOL, FACT, and COMTRAN are leading representatives of the procedural languages. Presently there also exists considerable interest in non-procedural (not step-by-step) languages. It would appear that data-processing problems and languages are less well-formulated and determined than their technical counterparts.

The article dealing with all-magnetic circuit techniques appears to be quite thorough and comprehensive. This article reviews the status and the techniques involved in replacing magnetic cores and wires, and perhaps resistors. The interest in all-magnetic logic circuits was originally justified on the basis of their reliability. The all-magnetic systems are limited primarily by speed and are therefore not suitable for general purpose, high-speed computers. In certain special applications, such as easy input-output communication and for reliability in nuclear radiation fields, it appears that all-magnetic circuit techniques will have considerable use.

Article 4 also deals with hardware but of a non-electronic nature. The logical elements are determined by hydraulic or pneumatic circuits. Again, this article deals with recent exploratory work and the applications to computers is not yet clear. It would appear that these fluid logic elements may have distinct advantages in situations where either mechanical input signals are initiated or where mechanical output signals are desired, and a limited amount of computing is required.

The article on computer education is in many ways the most interesting one in the book. A number of questions immediately arise in the mind of the reader of this article. Typical of these is the question of the proper relationship between universities and industry in the educating of computer personnel. Comments are made concerning present computer education in industry, colleges, high schools, and communities. Remarks are also