faint suggestion of the wealth of detail to be found in Professor Roman's book.

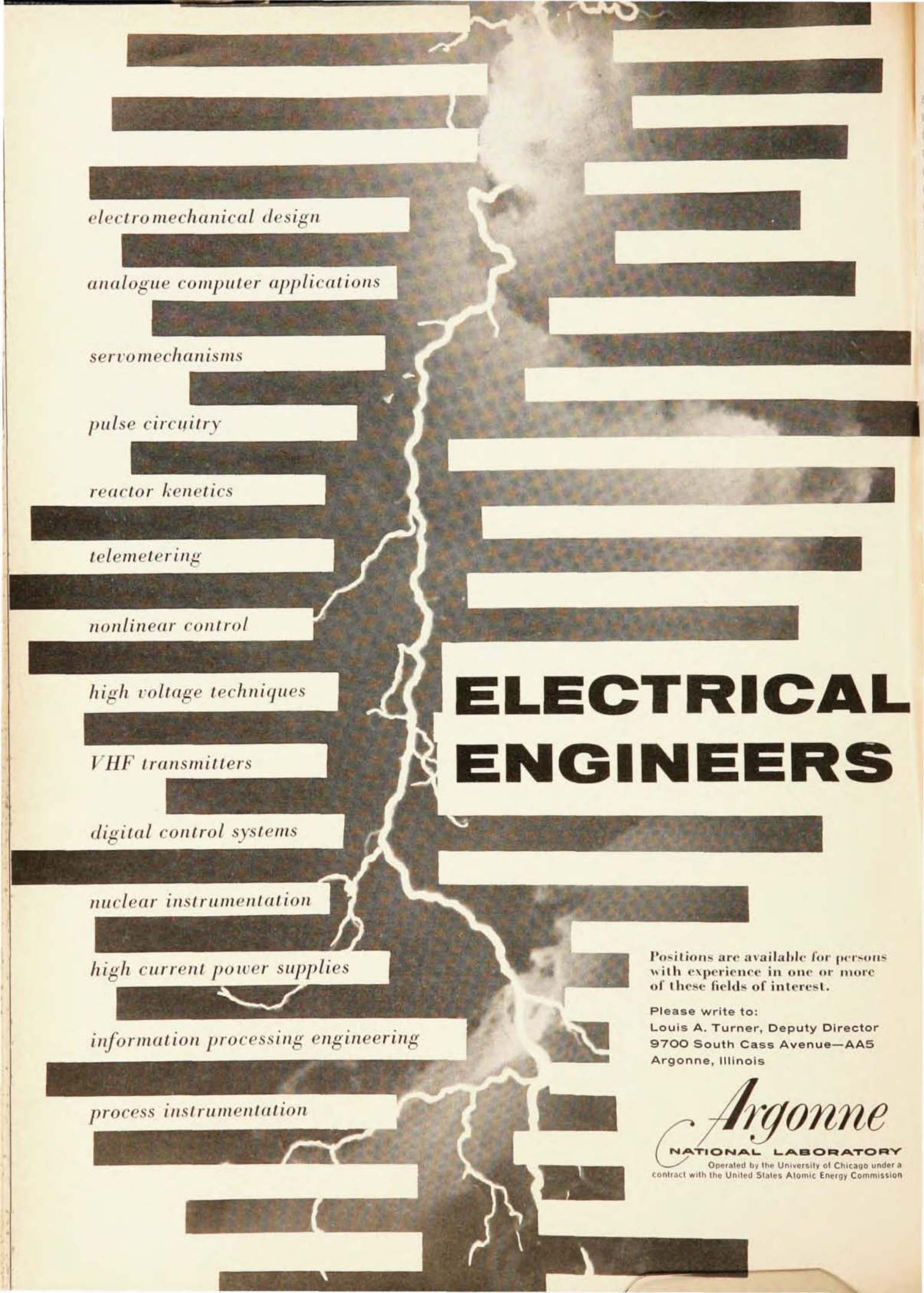
In the preface the author disavows any attempt to present a complete account of the theory. Nevertheless, in a book of this length, one might have expected some recognition of the fact that dispersion theory has, in fact, occupied a large share of the attention of physicists working in this field. There is no mention of this theoretical tool so far as this reviewer could discern. There is very little or no phenomenology to be found in these pages. As already implied, there is very little discussion of experimental results and of the comparison thereof with theory. Such experimental data as are cited are not too well referenced. The conclusion that this book is an able presentation of a *limited* part of elementary particle theory is obvious. However, one can feel disappointed in the severity of the limitation. A list of errata is appended but, unfortunately, it is rather incomplete.

Quantentheorie des Atoms. By A. Rubinowicz. 486 pp. Johann Ambrosius Barth Verlag, Leipzig, Germany, 1959. DM 31.80. *Reviewed by Nicholas Chako, Queens College.*

AMONG an increasing number of books on elementary quantum mechanics, there are only a few which contain a balanced presentation between the mathematical treatment of the theory and its physical foundations and interpretations. Other noticeable omissions are treatments of the historical development of quantum theory and the analysis of atomic and molecular phenomena in terms of the old quantum mechanics. This break in the continuity of ideas and development of quantum theory, which one finds in many elementary texts, is rather unfortunate from the viewpoint of the reader and, especially, from the pedagogical standpoint. Therefore Professor Rubinowicz' book should be examined in this light.

A careful reading will show that the author has been guided by the above considerations. Emphasis is put on the physical development and the interpretation of the quantum mechanical description of atomic and molecular phenomena without losing sight of the mathematical aspects of the theory. In that respect the book is a valuable contribution to pedagogical literature in this field.

The book has three main parts. The first, covering a third of the text, deals primarily with the development of quantum theory and the analysis of atomic and molecular spectra and other phenomena carried out on the old quantum theory model. The stress is put on the physical interpretation of the theory rather than on mathematical procedures. However, this must not be interpreted as suggesting that the author has relegated the mathematical treatment of the topics to a mere enumeration and analysis of the formulas. The mathematical analysis of the problems is complete, as can be seen from the clear and detailed treatment of Sommerfeld's theory of the fine structure, Bohr's correspond-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ence principle, Pauli's principle, and their applications to atomic and molecular spectra and structure. Thus, this part contains a rather comprehensive account of the essential features of the old theory and its shortcomings, which was inaugurated by Bohr and further developed by him and by Sommerfeld, Born, and others in paving the way for the new quantum mechanics.

The second part is devoted to the new theory. Starting with de Broglie's ideas and Schrödinger's development of wave mechanics, the author proceeds to treat atomic and molecular phenomena, including radiation and scattering processes, which usually fall within the scope of a first course in quantum mechanics. The essential elements of the theory of linear operators for the understanding of the mathematical structure of quantum mechanics are included. No attempt is made to formulate the general theory in terms of the modern theory of linear operators as it would be out of place in a book of this character. However, the author has devoted a chapter to Dirac's theory of the electron. As in the first part, the physical description of the theory is always in the foreground.

The last part contains an account of the mathematical apparatus needed for the solution of specific problems, i.e., an introduction to special functions. A good feature of this section is the analysis and discussions of many questions and problems briefly touched in the text, as well as a good selection of problems supplementing the material of various sections in the book.

Finally, the volume should be of interest to a wide circle of readers, including both students and teachers. The reviewer would like to see an English translation of this work, since in his opinion it is one of the best written books in this field. However, in the English version several sections on the old quantum theory should be omitted and new chapters on the elements of nuclear theory should be included.

Electronic Computers: Principles and Applications (2nd Revised Ed.). By T. E. Ivall. 263 pp. (Iliffe, London) Philosophical Library, Inc., New York, 1960. $15.00. *Reviewed by Peter L. Balise, University of Washington.*

ALTHOUGH a number of books have been written on automatic computation, very few cover all types of computers in more than a superficial way. Mr. Ivall has performed a service by putting into one book a clear and comprehensive presentation of the field. This is the more remarkable since his approach is nonmathematical, although intended for engineers and scientists rather than for laymen. However, almost anyone interested in computers, including an intelligent layman or technician, should find some value in the book; a review of this second edition therefore seems worthwhile.

It has been written with obvious care to omit unessential details and yet include all that is necessary for understanding of the principles. Very elementary explanations are given where useful, but the material is not oversimplified while being leavened with some humor. The line drawings are clear, and there are many excellent photographs.

About half the book is devoted to the analog computer, and about half to the digital computer. Although not intended as a manual of operation for either type, the book gives the reader a good appreciation of operation procedures, and could serve either as an introduction or as additional background to the computer user. There are lucid explanations of internal circuitry, such as the chopper-stabilized amplifier and logic elements, as well as specific illustrations of a variety of computer applications. Differences are made clear, such as between simulation and differential equation solution, and between data processing and computation.

This second edition has been largely rewritten, with new chapters on analog computing circuits, digital computer programming, and recent developments. The latter are quite completely presented up to the publication date. British equipment is emphasized, and some important American work is omitted, but the book provides a realistic view of computers.

Mathematics and the Physical World. By Morris Kline. 482 pp. Thomas Y. Crowell Co., New York, 1959. $6.00. *Reviewed by Philip J. Davis, National Bureau of Standards.*

WITH the publication of this book, Professor Kline adds a second title to his semipopular writings on mathematics. Here is a lucid and often eloquent description of the role that mathematics has played in the formulation of classical physical theories. Passing from arithmetic to non-Euclidean geometry via calculus and differential equations, the author relates these to mechanics, gravitation, and oscillatory phenomena. While celebrating the method of abstract thought, he throws in ample portions of legend and anecdote, history and philosophy, and the result ought to do much to nourish the sophomore and convince the philistine.

We are indebted to Galileo, says Mr. Kline, for shifting the emphasis from "explanations" to "descriptions" of the world. In the same way, shunning explanations, Kline describes what mathematics does and leaves us crying out for an explanation of why it is useful. "How can it be," says Einstein in a passage quoted, "that mathematics, a product of human thought independent of experience, is so admirably adapted to the objects of reality?" In a timorous final chapter, Kline records a view, now abandoned, of the Creator as Mathematician, and replaced by something which he obviously has no zest to describe. I wish he had done more with this chapter. The discussion of such imponderables, even though conducted in the vague language of metaphysical speculation, can often lend ornament to thought and warm the heart of the tender minded.