linear algebra, iteration, and collation. This is admitted to be limited treatment in a relatively new field. However, there is a considerable amount of the theory on integral equations in this chapter including the derivation of integral equations, which again seems out of place in a book on numerical analysis, especially as the advantage or otherwise of obtaining integral equations is not discussed.

Of the five appendices, two contain tabular material, namely Lagrangian coefficients for numerical differentiation, and abscissæ and weights for Gaussian and other quadratic formulæ. The other three are devoted to Tchebysheff interpolation, operator methods, and algebraic equations, the first being by far the most important. D. C. GILLES

CULBERTSON, J. T., *Mathematics and Logic for Digital Devices* (D. van Nostrand Co., Ltd., London, 1958), 217 pp., 36s.

The main criterion of this book is that one is unsure to whom it is directed. The publishers and author describe it in terms of " a study of the special kind of mathematical reasoning essential to the use of computers ". Taking these words at their face value, they express a statement which, to the reviewer, is decidedly fallacious. The field covered by this book is not essential to *users* of computers ; it may, however, be of interest to those engaged in the design and construction of computers and the related biological field.

The book gives in fact an elementary account of certain branches of mathematics, namely permutations and combinations, probability, traditional logic, and Boolean algebra, together with two chapters on topics applicable to computers, number systems and switching circuits. This is preceded by an introductory chapter giving a résumé of ideas that are considered known—notably the definition and examples of algorithms, and an explanation of the notation for finite sums and products—and introducing the conception of a " neuron ".

The mathematical topics are treated with a slight bias towards computers ; for example, the chapter on probability includes a discussion of nerve nets composed of neurons. On the whole, however, the material can be found in any textbook within the field, and the treatment is in no cases more than elementary—witness the inclusion of a chapter on permutations and combinations.

Of the other chapters, that on numerical systems considers numbers of any radix. Arithmetical operations with such numbers are explained, and nerve nets for certain operations (including addition and subtraction) of binary numbers are included. These nets always consider parallel operation with consequently greater complexity in structure, but this is not mentioned.

The chapter on switching circuits is concerned mainly with the representation of circuits by Boolean algebra. The use of this method in the simplification of circuits is discussed, and the construction of some circuits satisfying given closure conditions described.

On the whole little is covered by this work that is not available elsewhere. Its one advantage seems to be that an account of certain fields of mathematics relevant to the design of computers occurs within one book. D. C. GILLES

ROY, S. N., *Some Aspects of Multivariate Analysis* (John Wiley & Sons), 214 pp., £3, 4s.

In contrast to Professor T. W. Anderson's recent book on multivariate analysis, this book by Professor Roy is not a textbook of standard multivariate theory. It is concerned with certain fairly recent developments in this field, due mainly to the author. These developments spring from the notion of simultaneous