

Book Reviews

Modern Digital Circuits. By Samuel Weber. Published by McGraw-Hill Book Company, Inc., New York, N. Y. Published 1964. 355 pages. \$9.50.

This book is a compilation of previously published articles from *Electronics*. Mr. Weber states in his preface that the book is intended primarily to provide the design engineer with convenient access to the accumulated experience of others in the field.

The compiled articles, 109 in all, have been grouped into nine chapters covering design techniques, pulse and switching circuits, storage, digital logic, counting circuits, conversion, digital communications, digital measurements and testing and miscellaneous applications.

The best chapters are probably chapters one, two and four. They contain circuit design articles that, in general, are less limited in their application than some of the system-oriented articles. In particular, the articles on tunnel diode circuits offer an interesting insight into the potential of this device. The articles in these chapters are well-illustrated and most of the circuit discussions include examples.

In chapter seven, there are eleven articles on digital communication. Five of them are devoted to modulation techniques that provide the reader with a quick comparison of some of the newer techniques.

Chapter eight, covering digital measurements and testing, presents some rather nonconventional approaches to a series of specific testing problems. As a consequence much of the value of the chapter is restricted to those engineers or technicians with very similar problems.

Of the remaining digital arts covered by the book, the best survey of a subject is presented on storage, in chapter three. The articles cover specific applications of conventional core, thin film, ceramic and twistor memory devices. Judicious use of the data presented, however, will permit a cursory state-of-the-art comparison of these storage elements. Highlight of the chapter is a series of articles on the use and specification of magnetostrictive delay lines.

Over-all, the book is less rigorous in its treatment of design problems than one might wish; however, it does meet Mr. Weber's stated intent.

While not a textbook in any sense, *Modern Digital Circuits* covers a very wide range of interesting topics. It is a practical, 'Cook Book' reference that will likely find application in bridging the gap between the classroom and industry for the neophyte engineer or technician.

Dan McMillin

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About the Reviewer: D. L. McMillin graduated from the University of Miami with B.S. degrees in electrical and mechanical engineering in 1953. In that same year he joined Bell Telephone Laboratories and became engaged in the development of airborne radar systems. In 1958 he joined a group developing high speed, special-purpose computers for military applications.

Since 1963 Mr. McMillin has been involved in the selection and application of commercial computers for real time, data-processing systems.

The Two-Nucleon Interaction. By Michael J. Moravcsik. Clarendon Press Oxford - Oxford Library of the Physical Sciences. (1963) 154 pages, \$2.90.

Central to the study of the nuclei is the hope that their structure and their interactions can be explained in terms of the elementary forces which act between the neutrons and protons which make up a nucleus. It was this goal which provided the impetus for the early investigations of nuclear forces. But by now this provides only part of the motivation, for the nucleon-nucleon interaction has become an independent area of study. Indeed the desire for a more complete understanding of nuclear force and its origin led to the high-energy experiments which revealed the new world of elementary physics with its 'strange' particles, and its boson systems and its excited baryons.

In parallel with these remarks this volume is divided into two parts. In the first of these the various required experiments and their summary in terms of various potential models is discussed while in the second the attempts to relate the

experimental results to the particles of elementary particle physics is reviewed.

The experimental approach is made more difficult by the fact that the nucleons have spin. Thus the forces can depend upon the relative orientation of the spin of the two particles and upon their orientation with respect to the plane of scattering. In addition there is an isotopic spin dependence; i.e. speaking very roughly the forces between neutron and proton. A great variety of experiments are required. In addition to the usual single scattering experiments there are a number of double and triple scattering experiments in which, for example, the nucleon becomes polarized and is scattered with a consequent change in polarization which is analyzed by the third scatterer. The phenomenological potentials suffer from a similar degree of complication, their form being restricted only by invariance principle. These matters, the type of experiments needed, the types of potentials possible and finally the nature of the potentials which have been fitted to the experiment are recapitulated.

A particular result of some importance is the discovery that the long range part of the nucleon-nucleon interaction ($>1.4 \cdot 10^{-3}$ cm) is a consequence of the possibility that the nucleons can interchange a single π meson. For shorter distances the interchange of two π mesons seems to be important while at still smaller distances the interchange of higher-mass boson systems seems to play a role. The calculation of the consequent potentials, an attempt to use a dispersion theoretic treatment instead of the usual Schrödinger equation, and finally the role of the heavy mesons form the second half of the book.

The author has labored in these vineyards for many years. Within the compass of this book he has managed to include some discussion of nearly all the topics (he does not discuss photodisintegration of the deuteron and other electromagnetic effects in any detail) which would be of interest to the theorist. The discussion, in such a small volume is, a fortiori, sometimes skimpy, and a certain level of sophistication on the part of the reader is presumed. It is a well written authoritative book but it is not for a beginner.

Herman Feshbach

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About the Reviewer: Herman Feshbach is Professor of Physics at Massachusetts Institute of Technology. He was a Guggenheim Fellow in 1954-55, Ford Foundation Fellow at CERN 1962-1963 and is a member of the American Physical Society.

Aqueous Reprocessing Chemistry for Irradiated Fuels. Proc. Symposium, Brussels, April 23-26, 1963. McGraw-Hill Book Company, New York, 471 pp., \$8.00.

This book is an important contribution to the literature on processing nuclear fuels and is recommended for those interested in the nuclear fuel cycle. It contains 26 papers^a and resumes of discussions from a symposium jointly sponsored by the European Nuclear Energy Agency and the Eurochemic Company in April 1963 at Brussels, Belgium. This symposium is the latest in a series of European conferences on fuel processing: Geneva 1955, Brussels 1957, and Geneva 1958. About 150 scientists from 15 countries participated. The papers are of high quality and in total present the current status of fuel processing in Europe, including research, development and production. Several survey papers included summaries of work in Europe, the U. S. and at other research and development centers. Papers presented at this type of symposium are particularly important since much of this information is not available otherwise or appears in small increments which are difficult to evaluate. Indeed, the discussions (recorded) following the papers and during the panel session are of particular interest since they represent the current thoughts of leaders in this field from 15 countries.

The objective of the symposium was to present the status of aqueous fuel processing in Europe. In addition, several excellent survey papers summarized world-wide developments in both aqueous and nonaqueous processing. Thus, the title of the symposium (Aqueous Processing) is a misnomer because three papers were given on nonaqueous (fluoride volatility) processing. Four invited papers were presented from the United States, three on solvent extraction with tributyl phosphate (TBP), amines or organophosphorous compounds, and one on economics. The latter, by F. L. Culler (Oak Ridge National Laboratory^b), was the only formal paper at the symposium concerning the economics of fuel processing.

Areas of work covered included 1) the use of amines as a replacement for TBP in solvent extraction; 2) U(IV) as a reductant for Pu(IV); 3) fuel-processing status at Marcoule, France and at Windscale, United Kingdom, and proposed fuel-processing system at the Eurochemic plant, Mol,

^aEighteen papers in English and eight in French. English translations of French papers available as ORNL-tr-numbers 61, 62, 65, 73, 78, 91, and 207 and AEC-5811 from Division of Technical Information Extension, P. O. Box 62, Oak Ridge, Tennessee.

^bOak Ridge National Laboratory, operated by Union Carbide Corporation under contract with USAEC.