Electrochemical power sources

M. Barak (Ed.)
Peter Peregrinus, 1980, 498pp. £22

Interest in batteries and power sources of various types is high at the present time. The electrochemical journals now carry a significant number of articles reporting investigations of possible battery materials. In addition specialist publications such as the Power Sources Conference Proceedings (pub. Academic Press) and the reports published by the American Electrochemical Society contain a great deal of information about the scientific and technological aspects of batteries.

It is against this background that one should view the present book. The book is largely slanted towards battery technology and four of the authors are well known in this field. I found the chapters on fuel cells and metal-air cells, primary batteries for civilian use, lead/acid storage cells and alkaline storage batteries to be informative. However, some of the chapters are over long and the chapter on lead/acid cells, for example, is too critical. The chapters on high temperature batteries and room temperature cells with solid electrolytes seem to me to have the virtue of brevity and contain sufficient information for an expert and for an interested outsider to get a good idea of the present state of the subject. The chapters are well written and cover the literature. Unfortunately, the book does not cover material relevant to the rest of the book.

An electrical engineer could gain from this book if he is prepared, in some of the chapters at least, to waste through a lot of detail which is mainly of interest to battery technologists.

J. A. HARRISON

Integrated injection logic

James E. Smith

Our industry has a large number of technical journals that cover a broad spectrum of topics such that it is not easy to obtain information on a specific subject without sorting through the literature. This difficulty has been overcome for the subject of integrated injection logic (I2L) with the publication of the book under review in the IEEE Press selected reprint series (prepared under the sponsorship of the IEEE Circuits and Systems Society).

The book collects together 63 reprinted papers on the subject of I2L by an editor who adds a good bibliography, author and subject index.

The papers are arranged by subject into the following 10 parts:

1. Conventional I2L
2. Injection and Logic
3. Second Generation I2L — Structuring and Fabrication Techniques
4. I2L Device Physics, Models and Simulation
5. High Performance Structures
7. Analogue IC Process Compatible I2L
8. Applications
9. I2L Memory Techniques
10. Reliability and Radiation Hardness

The editor provides introductory comments for each of the 10 parts to place the papers in perspective and to present the reader very good and useful tutorial information.

The intention of the book is to serve as a filter of, and to guide the reader through, the vast amount of literature on I2L. It also places in perspective the true position of I2L in the world of digital integrated circuit technology.

To summarise, if you want to know about I2L, the book provides an excellent introduction. Alternatively, if you are involved with I2L, either in its design or application, the book provides a good collection of state-of-the art information.

R. NAYLOR

Handbook of fibre optics: theory and applications

Helmut F. Wolf (Ed.)

In the rapidly growing field of fibre optics, producing a useful, up to date handbook is an almost impossible task. However, this is not truly a handbook but rather a collection of books and a review of, the whole field. Chapters cover sources, fibres, detectors, couplers, systems, and, more unusually, systems economics and the use of coherent fibre bundles in endoscopy. Written for USA publication in 1979, its views have been somewhat overtaken by events. Thus, communication systems operating at 1-3 um, although said to be desirable, are dismissed as far future developments, whereas they are in fact coming to fruition now.

The chapters on couplers and connectors, systems economics and endoscopes appear to be useful introductions to these files, with some useful reference data. The review of the Japanese and European activities gives a balanced view of progress. Elsewhere, however, the book is less satisfactory. Generalisations, lengthy descriptions and opinions abound, and there are also factual errors. Thus on page 233 we are told that the signal/noise ratio necessary for a bit error rate (BER) of 10^-9 in a digital system is 36 dB! A supporting graph shows a BER of 10^-7 as needing 26 dB, while on page 234 10^-6 needs 17 dB (Not one of these figures is nearly correct, although a correct figure appears on page 401!).

Throughout the book, there are many tables and graphs of component and systems performance. These are potentially very useful except for their 1978 viewpoint and, often, their lack of cross referencing to outside literature. Unfortunately, in view of evident anomalies, it is difficult to know what confidence to put in them. Thus, in the field of optical components, laser slope efficiencies are shown on page 198 as reducing with life, with threshold unaffected. In fact, all semiconductor lasers increase threshold significantly over their lifetime, and slope efficiency is relatively constant. For detectors, APD noise factor is incorrectly quoted, with no indication of variation with materials for different wavelengths. There is no indication of the design precautions needed to avoid unwanted noise problems with laser sources when coupled to fibre; in view of the experience with trial systems in the past few years, this is an unfortunate omission for a book published in 1981.

To summarise, the book will certainly serve to introduce the breadth of applications and future importance of fibre transmission, but the significant number of factual errors make it impossible to recommend it.

A. W. DAVIS

DC and AC circuits 2nd Edition

G. Lancaster
Oxford University Press, 1980, 325pp. £20

This treatment of elementary circuit theory is intended primarily for students reading physics at university. I found the emphasis on working from first principles, deriving relationships from the principles of electricity, as far as possible, very refreshing, and obviously written by a teacher. Its breadth of treatment is impressive, covering fundamentals of electromagnetism, DC circuits, AC theory, resonance, electromagnetics, pulses and transients, network analysis and synthesis, transmission lines and waveguides, transducers and instrumentation.

Unfortunately the book has serious shortcomings. There are a number of strange omissions; among them, complex power, the initial and final value theorems for Laplace transforms and the propagation of a pulse down a transmission line. The treatment is not up to date; no mention is made of the use of the computer as an aid to analysis, for example Cramer’s rule is suggested as the method of solution of a network, and there is no treatment of non-linear networks. For these reasons, I cannot recommend the book as a course book for the student who wishes to base his circuit concepts on physics, but I cannot recommend the book as a course book for electronic engineering students.

P. H. di MAMBO