Quick and easy

ELECTRONICS FOR EXPERIMENTERS IN CHEMISTRY, PHYSICS, AND BIOLOGY. By Leon F. Phillips. 266 pp. Wiley, New York, 1966.

by Melvin Daybell

Four years ago there was no up-to-date text of the type indicated by the title of the book under review. Now there are at least three, the other two being Malmstadt, Enke and Toren's *Electronics for Scientists* (W. A. Benjamin, N. Y., 1962), and Donald Hunten's *Introduction to Electronics*, (Holt, Rinehart, and Winston, N. Y., 1964). For physicists, especially those working in high energy or nuclear physics, Raphael Littauer's excellent book *Pulse Electronics*, (McGraw-Hill, N.Y. 1965) should also be mentioned. Leon F. Phillip's new book is midway in level of sophistication between *Electronics for Scientists* and the more advanced *Introduction to Electronics* although, being shorter, its coverage is less complete than either of the older books.

All the usual topics of an elementary electronics course in essentially class A, RC-coupled voltage amplifiers are covered, including a discussion of feedback. In addition, there are sections on dc amplifiers, power supplies, phase-sensitive detection, and a brief but clear section on oscillators and switching circuits. Bandwidth and noise limitations on amplification are the subject of a well written separate chapter, although the effect of bandwidth limitations on feedback stability is nearly ignored, as is that of feedback on noise. The last chapter deals with converting circuit diagrams into functioning hardware, and without this chapter, as the author points out, "the subject is likely to degenerate into an abstract pastime, almost a branch of topology." Layout, soldering, use of test instruments, and how to convert a piece of hardware that exudes "burning smells, unusual frying noises, visible sparks . . ." etc into functional hardware are covered.

Throughout the book, the author demonstrates a ready familiarity with electronics and the problems and solutions that arise in its actual use. Transistors are integrated into the development more smoothly than is the case with the two earlier books. New semiconductor devices are discussed, and enough is said about their characteristics that the reader could probably work with any of them. This is done without first making him a solid-state physicist.

Consistently the reader is able to come away from each new topic introduced with the comfortable feeling that he now understands pretty much what's going on, and that he could now believe in a circuit like that if he ran into one. What's more, no time has been spent going deeper than necessary into an idea. It is the only way to get so much electronics into so few pages, and it is done well.

The book has three faults that are important enough to point out to the prospective user. They are all related to the background expected of the reader, which is, according to the preface, " . . . the usual basic physics course offered to undergraduates majoring in chemistry . . ." (the book is in the "Wiley Paperback Series in Chemistry"). This course had better have included a thorough treatment of ideal voltage and current generators, and Thevenin's theorem. The first chapter of *Electronics for Experimenters* is at best a review of some of these concepts. No mention is ever made of the properties of an ideal voltage or current generator, and equivalent circuits for tubes and transistors are not used. Two other faults beyond this meager first chapter are that there is often a large gap between the material in the text and the level of problem that the reader is asked to do, and that, in order to do some of the problems, and to read some of the text, it is necessary to understand specific electronic terminology not previously (and sometimes not ever) explained by the author.

Thus we must ask, whom is the book intended for? Probably not the physics student, who will buy Hunten or Littauer. The chemistry or biology student? Yes, as a textbook in a formal course where he can ask questions, if he has or is provided with the necessary background. For self study Malmstadt would be a better choice, especially if his physics preparation is rusty or nonexistent. Another group who should definitely consider *Electronics for Experimenters* are those practicing chemists, biologists or physicists who feel that their electronic background needs updating. Here is a quick and easy way to do it.

* * *

Melvin Daybell has worked with electronics in high-energy physics, and currently in optics, as an associate professor of physics at New Mexico State University where he teaches a graduate course in electronics for scientists.

Zen physics

THE EIGHTFOLD WAY. Murray Gell-Mann, Yuval Ne'eman, eds. 317 pp. W. A. Benjamin, New York, 1964. Cloth $8.00, paper $3.35

by Elihu Lubkin

This reprint collection, with brief useful introductions is already a standard reference on SU (3) before SU (6). I remark on it as a means for a student to delimit areas he does not know.

The leading "Eightfold Way," heretofore unpublished, anticipates much of the sequel, but confusingly misses the notion of quarks, so I amplify Gell-Mann's warning: read chapter 7, "Triplets and Triality," together with chapter 1. The easy Lie algebra paper is J. J. de Swart's. It ties the book to a Lie algebra background, and unifies much of the physics.

The Yang-Mills idea is too important an early stimulus since logically it singles out the adjoint represen-