instruction sets, but unfortunately does not point out that he is doing so. The result leaves the impression to the naive reader that all machines are constructed in more or less this way, when in fact current machine architecture is far more diverse than this book would lead one to believe. The material on virtual address spaces, paging, and segmentation is not quite so narrow in its view, but it is plagued by repetitions of the same material in slightly altered form, with no cross-referencing among these repetitions. For instance, the term *activation record* is defined three different times in the first chapter (and several more times in succeeding chapters) as though the earlier definition had never existed. Also, the author defines access modes to information in a virtual memory, and later defines the same access modes for information in segments, but no relationship is given between these two sets of definitions.

The second chapter is a discussion of assembly programs, and is somewhat better than the first chapter. However, this chapter also suffers from a certain vagueness and lack of cohesiveness.

The third chapter is on macro generators and the lambda calculus. The discussions of Strachey's general-purpose macro-generator and of Mooers' TRAC system are well written, and there is some effort made to relate the two. The material on the lambda calculus is unfortunately more obscure than it needs to be, since the author fails to introduce appropriate abbreviative devices and thus is saddled with awkward notations for much of the exposition. However, there is much useful material here, particularly the section on Landin's SECD machine for evaluating lambda-expressions.

The fourth chapter is on procedure-oriented languages, and is probably the best chapter in the book. In this chapter, the author discusses ALGOL and several strategies for its implementation. He also describes a number of aspects of PL/I, with emphasis on those parts of the language, such as controlled storage allocation and structure definition, that are not in ALGOL. The chapter concludes with a discussion of simulation languages. There are also apprendices on syntactic specification and analysis and on the syntax of ALGOL 60.

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56[13.15, 13.20].—JULIAN D. COLE, *Perturbation Methods in Applied Mathematics*, Blaisdell Publishing Co., Waltham, Mass., 1968, vii + 260 pp., 23 cm. Price $9.50.

The literature of applied mathematics contains many ordinary or partial differential equations solved by various kinds of asymptotic expansions and connection procedures. It is difficult for a graduate student or research worker, not active in the field, to find a good reference from which to start learning the techniques. An earlier book devoted to this aim, *Perturbation Methods in Fluid Mechanics* by Milton Van Dyke, Academic Press, New York, 1964, fulfills the goal for those interested in fluid dynamics, but would be difficult reading for others. The book under review is similar in approach and style to Van Dyke's book, but the newer

one covers a distinctly broader range of problems and is readily accessible to a general reader. While the style is somewhat too formal for this reviewer's taste, the book does represent an excellent source to which the student or researcher may turn.

A sampling of the subjects discussed includes the van der Pol oscillator, shock structure, some adiabatic invariants, the Mathieu equation, WKB method, numerous fluid dynamic boundary layer problems, slender body theory, the piston problem of gas dynamics, and brief excursions into elasticity, shallow water theory and magneto-hydrodynamics.

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