REVIEWS AND DESCRIPTIONS OF TABLES AND BOOKS

The numbers in brackets are assigned according to the indexing system printed in Volume 22, Number 101, January 1968, page 212.

1 [2.00, 2.10, 2.20, 2.35, 3, 4].—FORMAN S. ACTON, *Numerical Methods that Work*, Harper & Row, Publishers, New York, 1970, xviii + 541 pp., 24 cm. Price $12.95.

This textbook is written for 'upper class students in engineering and physical sciences . . . whose motivations lie in the physical world'. It deals with techniques for using a computer—and one's own brain—to deal with standard numerical problems. The subject matter includes: locating zeros; quadrature; ordinary differential equations; eigenvalues of matrices; minimization and network problems.

This reviewer found the book easy to read, stimulating and highly amusing in places. Section headings such as 'What not to compute', 'How to seek and destroy singularities', 'Evil in recurrence relations' and even 'Minimum tree construction in Alabama' enticed me to read much more of the book than I had first intended. But, of course, being familiar with much of the subject matter, I am not the sort of person for whom the book is written. Whether a student in the throes of a life and death struggle with a new topic sees the point of the humor—or is simply annoyed by it—is a matter of conjecture.

The book is written in a fluent colloquial style. It is rather as if Mr. Acton had recorded his lectures, expanded the text and written the resulting speech as a book. This method of producing a book is not without drawbacks.

One of the main purposes of a lecture is to impart the enthusiasm and motivation of the lecturer to the student. The lecturer *talks* mainly about aspects of a subject that interest or stimulate him and he tends to leave out parts which he finds dull. In the course of his lecture, he may move rapidly from one topic to another as the momentum of his monologue demands.

However, what is a virtue in a lecture may be a defect in a textbook. Important aspects of a subject can be left out. And it may be very difficult to locate a particular result in a sea of expansive discussion. For example, the author gives an excellent description of quadrature, dealing in detail with all sorts of problems relating to singularities and infinite ranges. However, there is no reference whatever to Gauss-Laguerre, Gauss-Hermite or Gauss-Jacobi quadrature rules. And while advocating quite appropriately the use of elliptic functions, the author gives no definition of $sn(x)$, $cn(x)$ and $dn(x)$. Instead, he draws a picture and states some of the interrelations referring the reader for the definitions to a book which happens to use a different notation. Incidentally, my own view is that this sort of subject matter (which is conventionally omitted from numerical analysis textbooks) is extremely relevant, and I was happy to see it included. The omissions mentioned above stem from the general style and not from the choice of subject matter. By leaving out tiresome definitions and traditionally important techniques which may be tedious to discuss, Mr. Acton has made his book more enjoyable.

Thus, in the course of producing this book, Mr. Acton has possibly performed an additional service to the academic community. This is to focus attention on a more profound pedagogical problem. To what extent, if any, should a textbook be a written-out lecture? Should the book, or lecture, both or neither, be long-winded and expansive or concise or thorough—or even humorous?

Whatever the individual instructor's views on this might be, he should certainly enjoy reading this book himself. And if he agrees that a lecture and a textbook should be roughly equivalent, he now has at his disposal the means to put his own view to a practical test in class.

J. N. L.

2 [2.05].—A. TALBOT, Editor, *Approximation Theory*, Proceedings of a Symposium held at Lancaster, July 1969, Academic Press, Inc., London, 1970, viii + 353 pp., 25 cm. Price 75s.

The advent of high-speed computers and the importance of approximation theory as a tool in computation have stimulated a great deal of recent research. *Approximation Theory* is a compendium of twenty-four papers presented at the International Symposium on Approximation Theory, held at the University of Lancaster, England, in July of 1969. The papers deal with a wide range of topics, both classical and modern, theoretical and practical. Of particular note is the inclusion of the first English account of the "method of functionals" developed by E. V. Voronovskaya. The papers give a good indication of the diversity and beauty of the field of approximation theory, and, hopefully, will help to stimulate more activity. The material is generally well presented and free of errors. This book should be a worthwhile addition to the library of anyone interested in approximation theory or numerical analysis. The table of contents follows: