The second part is concerned with the description of typical nuclear reactor calculations and of the mathematical and programming techniques employed to solve them. The problem treated in detail, that of Fission-Product Poisoning, reduces to the tabulation of an analytic solution of a pair of ordinary differential equations, and would be regarded as routine in most computing laboratories. Despite the detailed treatment afforded this problem, no mention is made, either in this part, or in the chapter on numerical analysis, of how the computer evaluates the exponential functions appearing in the solution. This calculation is the essence of the problem; the rest is mere technical detail. Other problems treated, in less detail, include diffusion calculations, the numerical solution of the transport equation, and various engineering or other non-nuclear problems associated with nuclear reactor design. One-dimensional diffusion problems are reduced to the numerical solution of certain transcendental equations; while more complicated problems are approached by means of finite-difference approximations to the basic partial differential equations. A constantly recurring problem is the treatment of interfaces separating regions of different physical properties. In addition, the linear systems arising in this way can be very large, requiring the application of iterative techniques. The treatment of these problems suffers from a profusion of formulae and complicated notation which tend to obscure the basic problems, otherwise this section has a good deal to offer to the applied mathematician seeking an introduction to nuclear reactor problems.

James L. Howland, University of Ottawa

A Primer on Real Functions, by R. P. Boas, jr. Wiley, New York, and Math. Assoc. of America, Carus Monograph, 1960. xiii + 189 pages. $ 4.00. ($ 2.00 for Members of the Association.)

As the author states in his preface, this book is not a treatise or textbook, but is a book for the beginning graduate student, showing some of the highlights of the theory of functions of a real variable. The book is ideal for such a student, being full of concrete examples, which would supplement the fairly abstract approach in the present day graduate course.

There is an excellent list of references for further study, and what is rare in a work at this level, quite a large number of examples for the reader, with outlines for the solutions at the end of the book.

One should mention the very clear development of Baire's theorem, together with a few interesting examples to show the power of the theorem.

The book has two chapters, the first dealing with sets, countability, metric spaces, compactness and ending with Baire's theorem and sets of zero measure. The second chapter covers functions, continuity, uniform convergence, approximations to continuous functions, linear functions, Dini derivatives, monotone and convex functions, ending with some interesting results about infinitely differentiable functions.

Arwel Evans, McGill University

The Extension of Darboux's Method, by D.H. Parsons. Mémorial des Sciences mathématiques 142, Gauthier Villars, Paris, 1960. 75 pages. $4.25 or 20 NF.

This tract of 75 pages describes the author's theory of a certain class of partial differential equations of the second order in three independent variables. The work is an extension of Darboux's method for equations with two independent variables, which in turn arose from the work of Monge, Ampere, and Laplace on the explicit solution by quadratures of partial differential equations.

For the purposes of his work the author uses a modified definition of a characteristic as an integral element of contact of a suitable order n, which satisfies a further total differential equation. The rank of the partial differential equation is defined by means of a discriminant, and the author shows that for ranks 1 or 2 there are respectively 1 or 2 distinct systems of characteristics of each order $n > 2$. If the equation has rank 3, there are no characteristic multiplicities and this theory does not apply.

The relationship of involution is defined for pairs of equations, one of which is of rank 1 or 2, and the author gives necessary and sufficient conditions that two equations should be in involution. Such equations possess an infinity of common integrals and have in common a characteristic of each order greater than n. The author shows how knowledge of another equation in involution with a given one enables the problem of finding the characteristics to be reduced.

It is shown that if there exists one characteristic system of order 2 with 5 invariants, then an integral can be found by solving the partial differential equations of the first order. The work concludes with a number of special cases and examples. An extension of these theorems to equations with m independent variables is stated without discussion.

This is an intricate work in the classical style, in which a subject that has long resisted generalization has been made to yield successful and interesting results.

G. F. D. Duff, University of Toronto