Each chapter is followed by a list of exercises and a list of open problems, many of which reflect the author's special interest in problems of a combinatorial type.

The book also contains a fairly complete bibliography on universal algebra including more than five hundred items.

The admiration the reviewer feels for the content of the book and for the arrangement of the material does not in all cases extend to the presentation of the detail. It is, for example, not quite clear to the reviewer whether the author's polynomial symbols are objects of the theory or just "symbols", i.e. metamathematical notions. Both views are, of course, possible and one might argue that in the final outcome it does not really matter which view one takes. But it would have been highly beneficial for the beginner to have at least included some comments concerning the use of metamathematical notions versus objects of the theory.

There are many places in which one feels that the author's main concern is to provide an overall picture of a situation rather than a rigorous argument. This certainly has its merits and, at times, is highly enlightening, but in many instances it leads to statements which, if taken verbally, are just not correct. To mention only one important example: Birkhoff's characterization of equational classes as stated in this book (p. 171, Theorem 3) is incorrect. Since the author is reluctant to admit the product of the empty family, the empty class becomes equational but cannot be characterized by equations.

But these little things can in no way detract from the value and importance of this book. Indeed, everybody interested in universal algebra can only be grateful to the author to have provided us with this unique source of information.

G. Bruns,
McMaster University, and the University of Massachusetts

Algèbre moderne et théorie des graphes, orientés vers les sciencies économiques et sociales, Tome I, par Bernard Roy. 416 pages. Dunod, Paris, 1969. 96 F.

This book is directed primarily to the non-mathematician who seeks "dans l'approche scientifique de problèmes nés des sciences humaines, une source de développements mathématiques originaux venant en quelque sorte prendre le relai de cette source d'inspiration déjà ancienne que constitue le monde matériel." It is intended to provide "un langage qui tout en ayant la rigueur qu'exigent les mathématiques, soit adapté aux besoins de ceux qui se préoccupent de mieux comprendre et de mieux maîtriser les phénomènes du monde économique et social; des concepts, des résultats, des algorithmes qui, tout en étant adaptés à la résolution de problèmes concrets, s'insèrent déjà dans une théorie où soient susceptibles d'en constituer l'amorce." In the opinion of this reviewer, the book is admirably suited to this purpose. The presentation is polished, yet readable. There are many fine illustrations and worked examples, the latter emphasising concrete applications.

This volume contains chapters on sets, mappings, binary relations and graphs, transitivity and connectivity, and special graphs. The second volume is to deal mostly with graph theory, and to include one chapter on network flows and another on search algorithms. As might be expected, the emphasis throughout the text is on the explanation of basic concepts through repeated illustrations, rather than on proofs of theorems. (The "modern algebra" of the title is a misnomer.) The books should prove an excellent introduction to applied graph theory for a non-mathematician.

W. G. Brown,
McGill University

Lectures on numerical methods, by I. P. Mysovskih. 344 pages. Translated by L. B. Rall. Noordhoff, Groningen, 1969. U.S. $12.50.

In this book the course of lectures on numerical methods (part I) given by the author to students of the mathematics-mechanics department of Leningrad State University is set down. As stated in the preface, "only topics which, in the opinion of the author, are of the greatest value for numerical methods are considered in this book".

The book contains four chapters. Ch. I deals with the numerical solution of non-linear equations. A large part of the chapter is used to discuss the general method of iteration (both for a single equation and for systems), the method of Newton (a number of convergence theorems for the case of a single equation are given), and the method of Lobačevskii (Graeffe's root-squaring method). Methods for solving systems of linear equations are not considered in the book.

Ch. II is on algebraic interpolation and consists of the standard topics: calculus of finite differences, divided differences, Lagrange interpolation, formulas of Newton, Gauss, Stirling, and Bessel. Hermite interpolation is treated in greater detail than it is usually done in similar books. A brief section on numerical differentiation concludes the chapter (extrapolation to the limit is not mentioned).

The approximate calculation of integrals is discussed in Ch. III. Here a section on Markov's quadrature formulas is, in the opinion of the reviewer, particularly valuable. The other sections present material on Newton–Cotes and Gaussian quadrature, Bernoulli numbers and polynomials, and the Euler–Maclaurin formula. Remarks regarding the selection of a particular quadrature formula are added in a final section.

In the last chapter the numerical solution of the Cauchy problem for ordinary differential equations is studied. Again the reader finds most of the classical topics: the methods of Runge–Kutta, finite-difference methods in general, the methods of Adams type, and the methods of Cowell and Störmer for second-order equations. For the methods of Adams type a very detailed error analysis is given in the last