is introduced, giving an alternative and possibly more intuitive formulation of the concept of effective procedure. The discussion of the symbol manipulation systems of Post (2) sheds new light on the importance of the concept of computability.

An elegant proof is given for the difficult Post normal form (canonical systems) theorem, also yielding a short proof of the undecidability of Post's correspondence problem (3). Finally, additional universal (i.e. Turing machine equivalent) devices are defined: two register program machines (obtained from the 4-register machines using a simple Goedel incoding), one-register program machines, two-tape non-writing Turing machines and Post tag-systems. Following Shannon's suggestion to measure the size of a universal Turing machine by its state-symbol product, the book incorporates Prof. Minsky's own construction of a 4-symbol 7-state universal Turing machine, the smallest such machine known to date. The various formulations of effective procedure are proved equivalent by a chain of theorems, partly in Part II, partly in Part III: Turing machine computability implies general-recursive computability, this implies program-machine computability, this implies two-register machine computability, this implies Turing machine computability; Turing machine computability implies Post-tag-system computability, and vice versa.

(1) The terminology of "A logical calculus of the ideas immanent in nervous activity", McCulloch W.S., and Pitts W., is used. In: Bulletin of Mathematical Biophysics, 5 (1943), pages 115-133.

(2) Introduced originally for investigating properties of proofs in formal systems.

(3) A direct and short proof of this theorem, based on the equivalence of production systems and Turing machines, is found in "New proofs of old theorems in logic and formal linguistic", Floyd R. W., Carnegie Inst. of Technology, Pittsburgh 1966. 13 pages.

H. Maurer, University of Calgary

Oeuvres mathématiques, by Raphael Salem. Hermann, Paris, 1967. 648 pages. 90 F.

Raphael Salem (1898-1963) was a mathematician of consummate artistry, deep insight and great prowess. His remarkable expositions of the broad, yet unified, range of ideas he considered make his work a pleasure to read.

He was also a warm, kindly and lively personality.

On both scientific and human grounds the mathematical community will welcome the issuance of his writings. It is very useful to have available again the (out of print) monograph which was his doctoral

dissertation, "Essais sur les séries trigonométriques"(Actualités Scientifiques et Industrielles, 862, 1940). His other two monographs are omitted: "Algebraic Numbers and Fourier Series" (Boston, Heath, 1963) and one written in collaboration with J.-P. Kahane, "Ensembles parfaits et séries trigonométrique" (Paris, Hermann, 1963).

The present volume has a full-page informal snapshot of Salem, a photograph of one page of a handwritten manuscript, a complete bibliography of his mathematical publications, a biographical sketch by A. Zygmund and a longer analysis of his research by J.P. Kahane and A. Zygmund.

Their illuminating and vivid comments add greatly to the value of this collection and to an appreciation of Salem's personality and background. It is, therefore, superfluous to insert here any additional remarks concerning the great value to a significant section of the world mathematical community, crossing a variety of important and active research interests, of having Salem's papers gathered in a single volume.

Unfortunately, however, the publisher, despite his long experience of mathematical books, has chosen to mar this worthy undertaking with a major blunder. In a penny-pinching effort to keep costs down, the publisher has deleted the references collected at the ends of seventeen of Salem's last papers. Even worse: From paper B-19 (Power series with integral coefficients, Duke Math. J. v. 12 (1945), pages 153-172), five pages of mathematical text, plus one page of references, are missing, i.e., pages 167-172 of the original. This omission occurs at page 365 of the present Oeuvres. This saved the price of photographic reproduction of a number of pages. But it means that a user of this volume will not be able to locate references cited in these papers without recourse to the journals in which they appeared originally, so that even cross-references to Salem's own contributions (reproduced in this volume) are not provided in these cases.

This policy both detracts considerably from the usefulness of the collection and makes its title somewhat of a misnomer. The pages of references listed at the end of a mathematical paper constitute an integral part of that paper.

The publisher should recall the copies already distributed and replace them by volumes in which each of Salem's papers is contained in its entirety. Should he elect to do so, the publisher would free himself from the self-condemnation of his integrity which the present copies represent. And he would be rendering the mathematical community a permanent service of high value.

In any such reimpression of Salem's works, usefulness would be enhanced also by retaining (in addition to consecutive pagination) the numeration on each page of the original publication, for ease in checking references to Salem's works, and also the original "by-lines" in joint

articles so that users of the collected works would be certain of employing the precise references as in the originals.

Lee Lorch, University of Alberta

Introduction to elementary vector analysis, by J. C. Tallack. Cambridge University Press (The MacMillan Company of Canada Limited), 1966. i + 140 pages. $3.00.

The title of the book under review is to be taken literally for the material covered is the following: vector addition and subtraction, multiplication by scalars, differentiation, integration and scalar multiplication (dot products). An anomaly is the absence of the cross product. Although the book is intended to be brief, there seems little justification for this omission.

The author in his preface states that his aim is "to provide an easy introduction" and that "although the material is of an elementary nature, it has been developed rigorously." His aim has nearly been fulfilled in that the treatment of vectors proceeds intuitively through a discussion of displacements and geometry; at times, however, the reading is made more difficult because the author has failed in his attempt to make the development rigorous. In particular, the derivative of a vector is defined without giving any consideration - much less a definition - of the notion of the limit of a vector function of a scalar. The integral of a vector function is defined as the anti-derivative; yet, the author moves ahead expecting the reader to swallow the line integral with absolutely no mathematical definition!

In the reviewer's opinion, the content is too bare for use in standard vector analysis courses offered in Canada and the United States, and the material is inappropriate for the new vector courses being developed for prospective secondary teachers.

S. Schuster, University of Minnesota

Iterative solution of elliptic systems and applications to the neutron diffusion equations of reactor physics, by Eugene L. Wachpress. Prentice-Hall Inc., Englewood Cliffs, N. J., 1966. xiv + 299 pages. $12.95.

This book deals with many aspects of the theory and practice of the numerical solution of the elliptic equations of reactor physics. It is based upon the author's experience in the naval reactor programme while employed at the Knolls Atomic Power Laboratory, Schenectady, N.Y., and introduces a new non-linear iterative procedure based upon the periodic application of a variational acceleration technique. The earlier chapters of the book, dealing briefly with matrix analysis and the formulation of discrete boundary value problems, contain material which has been