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# BOOK REVIEWS

*Modern Applied Algebra* by Garrett Birkhoff and Thomas C. Bartee. McGraw-Hill, New York, 1970. 431 pp.

Over the past forty years or so, modern (abstract) algebra, as envisaged by van der Waerden in his classic book, has become a well-accepted, standard course topic in most college mathematics curricula. This corresponds, of course, to the increasing importance of algebraic thought in many branches of theoretical mathematics. The past two or three decades have now brought a surprising growth in the applications of abstract algebraic concepts and results in various outside areas. The best-known —but by no means only—examples of this are probably applications in electronic engineering and computer science, such as the uses of Boolean algebra in connection with switching networks, the development of algebraic coding theory, and, more recently, the algebraic study of finite state machines and of formal languages.

Very few of our college mathematics departments have taken much notice of these applications of abstract algebra, and special courses on the particular topics mentioned are now most often found in electrical engineering or computer science departments. However, the last years have seen a developing awareness of the need for the mathematics community to accept a responsibility for broader educational opportunities in a more encompassing "mathematical science" in which students may explore the areas of overlap between mathematics, its applications, and scientific computing.

The present book is an important contribution to this need for a broadening of mathematical education. Its aim is to present a sound introduction to basic ideas and techniques of modern algebra which have proved to be useful in certain applications while, at the same time, familiarizing the reader with these applications themselves. It addresses itself first and foremost to mathematics students with interests in scientific computing although it could be very useful as well for students from, say, computer science or electrical engineering. At the same time, the work does not really constitute an applied mathematics text in the narrow sense since its emphasis is predominantly on theorem proving rather than on problem solving.

By necessity the authors had to concentrate on certain specific applications of algebra, and they chose for these some of the problem areas cited above related to data communication and the design of switching networks; in particular, a recurring problem considered throughout the text is that of optimal coding of binary information. Correspondingly, the principal algebraic structures discussed are Boolean algebras, monoids and