may become a standard text for an undergraduate course.—*David Kirby, University of Southampton, England*

Theory of Problem Solving: An Approach to Artificial Intelligence by RANAN B. BANERJI. 189 pages. $14. American Elsevier, 1969.

The author begins with a conservative definition of artificial intelligence as "the totality of all attempts to make and understand machines that are able to perform tasks that, until recently, only human beings could perform." The tasks considered are problem solving, game playing, and pattern recognition. The book is primarily concerned with giving formal descriptions of these tasks, as abstract axiomatic structures, and proving theorems about those structures. Thus it can be read as a mathematical text.

The author's approach might be described as the development of programmer intelligence rather than machine intelligence, since the problem of getting the machine to think is neglected, emphasis being given to conceptual restructuring of the task into hopefully mechanizable form.—*Errett A. Bishop, Mathematics, University of California, San Diego*

Mathematics of Classical and Quantum Physics, Vol. 1, by F. W. BYRON, JR. and R. W. FULLER. 310 pages. No price given. Addison-Wesley, 1969.

This book is an introduction to abstract mathematical techniques in physics for advanced undergraduates or graduate students. The introduction is a motivational chapter describing how concepts in linear algebra appear in classical physics. After a short digression into the calculus of variations, the authors develop the theory of finite dimensional vector spaces and inner product spaces. Finally, there is a chapter on infinite dimensional Hilbert space, with applications to orthogonal sets of functions, Sturm-Siouville theory, and quantum mechanics.—*James Arthur, Mathematics, Yale University*

Methods for the Numerical Solution of Partial Differential Equations by DALE U. VON ROSENBERG. 128 pages. $9.50. Elsevier, 1969.

The author demonstrates expertise in leading the practicing engineer rather painlessly through finite difference methods for partial differential equations of *parabolic* type. The treatment of elliptic and hyperbolic equations, however, is superficial and shows no awareness of recent major advances, such as the development of the Lax-Wendroff technique. Navier-Stokes systems, the minimal surface equation, and other significant, but difficult, classes of partial differential equations are neglected entirely. The reader with the assumed minimal background will not be able to detect errors like the one related to the stability condition for Thomas' method on page 8, nor will he learn from this book how to decide when the use of a digital computer is warranted.—*Donald Greenspan, Computer Sciences, University of Wisconsin*

Simplified Independence Proofs: Boolean Valued Models of Set Theory by J. BARKLEY ROSSER. 217 pages. $10. Academic Press, 1969.

Set theory is the most widely known foundation for mathematics. In the 1930s K. Godel showed that if set theory is consistent, so is set theory augmented by the axioms known as the generalized continuum hypothesis and the axiom of choice. In the early 1960s P. Cohen showed by a method he called forcing that if set theory is consistent, then (1) so is set theory plus choice plus the negation of the continuum hypothesis, and (2) so is set theory plus the negation of choice. This method has been refined to resolve many independence questions, but has shed little light on what new axioms to accept. R. Solovay and D. Scott developed a variant to Cohen's method, regarded by many mathematicians as easier to follow, using boolean valued logic rather than two valued logic. Rosser's book is a very valuable exposition of this method. To the reviewer's knowledge, however, all new independence results have been obtained by Cohen's method; and the boolean valued approach has shed more light on boolean algebras than on set theory.—*Anil Nerode, Mathematics, Cornell University*

History and Philosophy of Science

Scene of Change—A Lifetime in American Science by WARREN WEAVER. 226 pages. $7.50. Scribner's, 1970.

In Chapter 9 of this autobiography, the author quotes Benjamin Franklin as writing to Joseph Preistley: "The rapid progress science now makes, occasions my regretting sometimes that I was born too soon." The author has "no similar regret. I had the good luck to be born at the right time (1894) . . . because of the exciting and majestic developments in science during my lifetime. . . . Indeed, I would claim that I picked almost precisely the right time." This reviewer (b. 1890) concurs with Warren Weaver. Among the many developments, he stresses changes in physics, the discovery of the electron, nuclear transmutation, relativity and quantum theory, solid-state physics, micro-electronic devices, computers and nuclear science; in astronomy, the location of sources of radio-energy, pulsars, and quasars; in chemistry, the synthesis of complex molecules leading finally to the spectacular advances in genetics, molecular biology and the detailed double-spiral structure of DNA, the synthesis of an enzyme, the isolation of a gene.

The scenes of change vary from birth in a Midwestern rural village, Reedsburg, Wisconsin, population "something under 2000 persons" to "retirement" in a home he built in the country just outside New Milford, Connecticut, where he and his wife "looked forward to a life that would involve a lot of gardening." In the years between, the scene shifted from college at Madison, Wisconsin, teaching first at Throop-Cal.-Tech. and back at Wisconsin; on the staff of the Rockefeller Foundation; the war years with Vannevar Bush and the Office of Scientific Research and Development in the fire-control section and later in the Applied Mathematics Panel, with duties which took him to the Blitz in London; back once more with the Rockefeller Foundation in postwar activities which included the agricultural developments resulting in improved corn in Mexico, India, and "the great Far Eastern crescent"; "retirement" in 1959, at the statutory age of 65, and the rich years that followed with the Sloan Foundation, the Salk Institute, and writing on philanthropy, on *Science and Imagination*, and the present volume.

This last is not only a record of the scenes of change but closes with three chapters whose titles, "Science Then and Now," "Some Limitations of Science," and "Science, Contradiction and Religion," reveal the philosophy of life animating the author in his extraordinary career of service to science. Vannevar Bush recommends that these chapters "deserve more than one reading; introduce profound reasoning." The present reviewer concurs.—*Hugh Taylor*

Biographical Memoirs of Fellows of the Royal Society, 1969, Vol. 15. 266 pages. $6.50. Royal Society, London.

The present volume memorializes thirteen members of the Royal Society, three of whom were foreign members: the mathematician L. E. J. Brower, the physicist L. D. Landau, and the American student of nutrition E. V. McCollum. The remaining ten include F. P. Bowden of Tasmania, who transferred to Cambridge, England, where he became professor of physical chemistry specializing in lubrication, friction, and fracture; E. J. Conway, an international figure in biophysics and outstanding Irish scientist; and William Hume-Rothery, who became a specialist in the structure of metals and alloys in Oxford. The remaining sections of the book record the lives and work of W. G. Fearnsides, F. R. Miller, J. E. Richey, E. C. Stoner, H. H. Storey, and P. J. du Toit, the South African expert in veterinary medicine.—*Hugh Taylor*