BOOK REVIEWS

Selection of books for review is based on the editors' opinions regarding possible reader interest and on the availability of the book to the editors. Occasional selections may include books on topics somewhat peripheral to the subject matter ordinarily considered acceptable.

PROVOCATIVE AND CONVINCING

Title Men, Machines, and Modern Times

Author Elting E. Morison

Publisher The M.I.T. Press, 1966

Pages ix + 235

Price $5.95

Reviewer Thomas Hughes

We have many histories of technology resting on library shelves accumulating dust. In far too many cases, the books remain unread not because of indifference to this field of history but because the authors have produced antiquarian chronological accounts of technology. In these unhappy examples of the historian's craft one finds little that has the quality of things as they really happened. The reader, if he is an engineer, scientist, or industrialist, cannot find situations described that ring authentic when compared to those he has experienced. Elting Morison's book is not of this disappointing kind.

Perhaps it is because since 1946 Professor Morison has taught at the Massachusetts Institute of Technology where he is now Sloan Fellows Professor of Management. An historian with solid credentials who has written a notable biography of Admiral William Sims and who has edited the papers of Theodore Roosevelt, Morison ventured from the more traditional areas of his craft to associate closely with the scientists and engineers at MIT and in Cambridge. In the Preface to *Men, Machines, and Modern Times* he acknowledges his debt to two distinguished groups there who did more than "read the manuscript"—they influenced the thinking behind it. A familiarity with their values, attitudes, and intellectual quality when coupled with his understanding of the culture and the way in which it changes, prepared him well to write the history of technology and culture.

This volume, which reveals his felicitous and philosophic style, comprises a collection of essays written over the past decade or so. The reader will find essays on the introduction of continuous aim gunnery in the US Navy before World War I; on innovation as manifest by the introduction of the Bessemer steel process in America; on the effort to introduce into the Navy an advanced-design iron and steamship by engineer Benjamin Franklin Isherwood after the Civil War; several essays on the computer; and several essays with general observations from Morison on the dialectic of technology and culture in change.

One major theme developed in these essays is the nature of technological innovation. While he focuses on the ideas, machines, processes, and men within the field of technology, he knows there are no boundaries to the field. This means that he extends his search for an explanation of technological change into the economic, and other, areas of the culture. Especially helpful to us in understanding technological innovation is his probing of sociology and psychology for insights. For example, in his essays on "Gunfire at Sea: A Case Study of Innovation," and "Men and Machinery" (Isherwood and the *Wampanoag*) he deftly analyzes the Navy as a society reacting to innovation, and he contrasts the psychology of the inventor (Admiral Bradley A. Fiske) and the innovator (Admiral Sims).

The nonhistorian who likes history should react favorably to Morison's approach to the problem of explaining technological change, for in Morison he will not find the naiveté of those who write of this change as if it were a linear process definable and predictable by elementary equations. Rather, Morison, an historian, sees chance confluence of trends, the chaos of events, and the complexity of personality wherever he probes.

Though his approach will undoubtedly win the respect of those who have been involved in history consciously, and especially those making the history of science and technology, they might disagree with some of his generalizations about the process of innovation. I find, for example, his summary of innovation given in Chap. 2 suggesting too much a straight-line process from invention through innovation, and too little recycling. Furthermore, the general impression he leaves of the Navy as a society resisting change is probably valid for the two cases he presents, but on other occasions—on the eve of World War I, for example, when caught up in the world armament race—the Navy showed a high degree of receptivity toward technological innovation.

There are other themes worthy of consideration running through the book. The most significant among these which apply to the relation between technological change and cultural change can be found in his concluding chapter. I find well-placed his stress upon the man-created environment as a complex of factors having tremendous effect upon man and his history. His call for us somehow to exercise more control over this environment which, though man-made, has a mass and a movement that seem to defy control, is also provocative and convincing.

Thomas P. Hughes is a visiting professor in the Johns Hopkins History Department teaching the History of Technology. A member also of the Center for the Study of Recent American History, he is writing a biography of engineer-inventor Elmer Sperry of gyroscope fame. The works he has edited include Lives of the Engineers *and* The Development of Western Technology.

RUNNING ON A TREADMILL

Title Semiconductor Counters for Nuclear Radiations, 2nd ed.

Authors G. Dearnaley and D. C. Northrop

Publisher John Wiley & Sons, Inc., 1966

Pages xx + 459

Price $12.75

Reviewer Brian D. Pate

This is the second edition of a book which, even though it suffers from the disadvantage of dealing with a fast-moving field, continues to be a useful reference text. It now contains descriptions of experimental procedures sufficiently detailed to permit the occupant of a reasonably well-supplied laboratory to fabricate his own semiconductor detectors of good quality, improve their longevity, and apply them to a variety of problems.

In addition, the treatment of device physics, particularly of charge collection and noise in semiconductor detectors, is of such lucidity that the average experimentalist can learn much of the quixotic physics and chemistry that lie behind this entire field.

The main differences between the first and second editions of this book reflect the advances that occurred in this field between May 1963 and September 1965. First and foremost was the rapid advance in the techniques of lithium drifting and the successful application of large-volume lithium-drifted silicon and germanium detectors to high-energy charged-particle spectroscopy and gamma-ray spectroscopy, respectively. This success has led to relatively less attention being paid to homogeneous conduction counters and gamma detectors fabricated from higher Z semiconductors, a change in emphasis reflected in this book.

Other advances reported are the discovery of "channeling" in the interactions of charged particles with crystals and the development of more sophisticated instrumentation for use with semiconductor detectors.

In short, this is a book that has a place in the book shelf of every experimentalist interested in making or using semiconductor detectors. This writer's main criticism of the second edition is, however, that it was, in a sense, published too soon. Since September 1965, there has been a continuous stream of publications (in the IEEE *Transactions on Nuclear Science, Nuclear Instruments and Methods,* and AECL Chalk River Reports, to mention only three media) that have reported the fundamental discoveries and rapid progress that has been made (particularly in the field of lithium drifting) in the last 18 months.

Hindsight is, however, always 20-20 and perhaps the authors were right in not delaying the publication of the second edition. It is entirely possible that, had this book been written in 1967, a reviewer might, in 1969, still be regretting the failure to include the latest and most exciting developments.

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SPREAD THE BURNING SAND

Title Water Production Using Nuclear Energy

Editors Roy G. Post and Robert L. Seale

Publisher University of Arizona Press, 1966

Pages 392

Price $7.50

Reviewer Lionel S. Galstaun

This volume comprises a collection of papers presented at a symposium held in March 1966 under sponsorship of the Nuclear Engineering Department of the University of Arizona. The topic of the symposium, the use of nuclear energy in desalting water, has been approached on a very broad basis; papers were presented on the future needs of water; the sociological, economic, and legal aspects which might confront large-scale desalting facilities; and directions of future advances in both nuclear and desalting technology. In addition, one paper describes the NAWAPA concept which would develop new sources of water and power for the greater part of the North American continent from streams in Alaska and Canada.

The greater portion of the book is concerned with descriptions of the state-of-the-art as of March 1966 in nuclear heat sources and desalination. Primary emphasis has been on large plants producing water at minimum cost. The reader is left with the impression that the results described are likely to be close to the ultimate that can be achieved using present technology, scaled up in size. This is likely to be the