always have done justice to Lee Boltin's original plates.

If the reader has already passed beyond the introductory stage in this branch of archeology, he may feel that the author's choice of what has to be omitted, given the space available, is sometimes questionable. To take a particular example, the special techniques used for producing hand-ax and cleaver blanks in the African Acheulian, which are a vital key to any understanding of the typology of the finished implements, are not mentioned. On a more general level, chapter 6, which contains most of the information on Mesolithic and Neolithic implements, is entitled "Microliths and ground stone tools," which, since it is an accurate description of the principal contents, may perhaps indicate how serious are the omissions here in presenting a balanced picture of the ordinary range of lithic tools and weapons of, for example, the Western Neolithic of the Old World. There are other places in the book where space limitations rule out the possibility of proper discussion of controversial points, but this is more or less inevitable, and in any case the provision of such a comprehensive bibliography largely offsets this deficiency. Apart from such limitations, this remains a very useful introduction to one of the basic studies of the prehistoric archeologist, and it would be unfair while commenting on omissions not to remark that on the other hand there are plenty of things which it is excellent to see included—for example, the work of Crabtree on the effect of heat treatment on the flaking properties of flint, which deserves to be much more widely known.

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## Big Machines

**Linear Accelerators.** PIERRE M. LAPOSTOLLE and ALBERT L. SEPTIER, Eds. North-Holland, Amsterdam; Elsevier, New York, 1970. xxii, 1204 pp., illus. $61.

One can only admire the ambition of the editors in attempting in a single volume to "describe in enough detail theoretical as well as technological aspects of linear accelerators in general and briefly cover the various types constructed and their applications." To this end, they have enlisted the help of 50 specialists. The result is a volume of some 1200 pages which comes close to describing the state of the art of linear accelerators in 1967.

The principal sections of the book are devoted to electron linear accelerators (540 pages) and proton linear accelerators (440 pages). In the section on electron linear accelerators, there are chapters describing positron accelerators, the racetrack microtron, and radio-frequency separators which should have interest to some readers. Two other, shorter sections of the book describe heavy-ion linear accelerators and superconducting linear accelerators. These last two types have seen a large amount of activity in the last three years, which is unfortunately unreported.

A large variation in the skill with which the authors carry out their assignments is apparent. A few examples are worthy of mention for their usefulness. The Stanford Linear Accelerator group has done an excellent job on chapters dealing with electron accelerating structures, particle dynamics, beam breakup, and the technology of accelerating structures. G. Dôme's (CERN) review and survey of proton linac accelerating structures is a complete, unifying presentation that will serve as a reference for future investigations. For the chapter on preinjectors Huguenin and Vosicki (CERN) have done considerable research to compile comparative information on ion sources and accelerating columns. Unfortunately, this chapter had to be submitted for publication in 1968, before much information on the testing of the new generation of high-gradient accelerating columns was available, so the reader is left stranded. (The editors' note at this point is not much help and, in fact, is erroneous in reporting the design features of the National Accelerator Laboratory accelerating column.) C. S. Taylor (CERN) has reduced to print some of the lore associated with radio-frequency problems, in particular multipactoring and sparking phenomena, known only by a few in the linac fraternity and usually rediscovered at start-up time on new linacs. The chapters on technology bear special mention because laboratory reports on linear accelerator engineering problems and techniques are rare. The attempts to cover these subjects in this volume are commendable, though sometimes falling short—for example, one might have expected some discussion of mechanical engineering problems associated with the Alvarez structure and in particular drift-tube fabrication and alignment, where ingenious methods have been used to meet technical requirements.

Several good books are in existence describing circular accelerators, but the space devoted in them to linear machines has been relatively small. A few recent publications have provided more information on linear accelerators, but the best sources of information on them have existed in the form of internal laboratory reports and conference proceedings. This book is another step in meeting the needs of those who seek specific information in this growing field, although it may be questioned whether it will obliterate the necessity for reference to laboratory reports.

The main shortcoming of the book, recognized by the editors, stems from the difficulty of integrating the chapters into a coherent presentation. This has resulted in repetition and in some cases annoyances; for example, in four consecutive chapters different symbols are used for effective shunt impedance. Another manifestation of this problem is the nonuniform treatment of the references in the chapter bibliographies, and the final author index accentuates the problem. The subject index proves to be too abbreviated to be very useful. I fear that with all its virtues the book will fall short of fulfilling the hope expressed by the editors that it "should have a chosen place . . . on the shelves or on the desks of all scientists in laboratories where linear accelerators are either being built or used."

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## Chromatography

**Ion Exchange in Analytical Chemistry.** WILLIAM RIEMAN III and HAROLD F. WALTON. Pergamon, New York, 1970. xiv, 296 pp., illus. $17.50. International Series of Monographs in Analytical Chemistry, vol. 38.

The authors of this volume have attempted to take a wide view of ion exchange in its application to analytical chemistry. In this they have been successful, in that the book is not written from a limited practical point of view but presents synthetic and theoretical information and devotes a good deal of space to the less well known applications of ion exchange materials.

The initial chapters present infor-