tundras are proposed as optimal environments for early hunter-gatherer populations. Paleoenvironmental understanding of the Pleistocene interglacials remains a problem because these have generally (and incorrectly) been taken to be uncomplicated, warm-dry intervals, the main interest in them being in the function that they serve as stratigraphic markers. The importance of controlling fire—known since the Elster II glaciation at Choukoutien, China, and Torralba, Spain, about a half-million years ago—was that it allowed human penetration of mid-latitudes during cold periods. The environmental changes that occurred in Western Europe at the end of the Pleistocene, between 11,500 and 7500 B.C., marked the disappearance of the reindeer and mammoth, and the absence of these animals is viewed as the cause of a cultural crisis through food shortage, with consequent severe decline in numbers of human occupants of the area. The much-argued topic of man's influence as the agent responsible for the extinctions, at the end of the Pleistocene, of such animals as the elephant, rhino, steppe bison, cave bear, cave lion, and spotted hyena is reviewed, and human agency as a main factor is discounted. Climatic change, especially desiccation, as a factor to account for agricultural dispersals from the Near Eastern hearth area is seen to have little weight, and the alternatives of land-shortage owing to shifting agriculture and chronic overpopulation are proposed as more likely causes for this diffusion.

This volume, in attempting a synthesis of data of a variety and magnitude not heretofore attempted, most effectively shows the extent of our present knowledge of man-land relationships in prehistory, and, with respect to future investigation, it will no doubt be an important force in showing where the lacunae lie and the methods that are available to fill them. One finishes reading this book with a renewed sense of the greatness of the accomplishment of human survival, and an awareness of how little understood is the 2-million-year run of man's history. One also wonders where we have gone astray in our failure to persuade the public that a knowledge of human history is as useful and important, and equally as interesting, as a trip to the moon.

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Flowering Plants of Mexico: A Literature Survey

A Selected Guide to the Literature on the Flowering Plants of Mexico. Ida Kaplan Langman. University of Pennsylvania Press, Philadelphia, 1964. 1015 pp. $25.

This bibliography is the most important event in Mexican botany since Standley's *Trees and Shrubs*. In what amounts to both a love of labor and a labor of love, this *Guide* to the literature of Mexican seed plants has been arranged by the author and fully cross-indexed as well. There is a topical four-column index of 156 pages. Many authors (for example, Berlandier, Blake, Liebmann, Orcutt, and Purpus) take on a new dimension; for others the enormity of the bibliographic problem is only suggested. Books, articles, theses, manuscripts, archivia, and trivia—all come in Langman's purview. Some authors have supplied addenda; Ruggles Gates corrects his paper published 50 years ago. Librarians' comments spice the entries *passim*: See Miss Meeder's estimate of Orcutt. Just browsing will be rewarded.

Accuracy, said A. E. Housman, is a duty and not a virtue. Yet a bibliography that is both scholarly and meticulous will not be free from error. Unfortunately, this volume's narrow margins will not accommodate corrections, and, worse, rebinding will be a catastrophe. The indexes, like directions given by the man at the filling station, will prove to be approximate at best.

Sixty years ago J. Christian Bay insisted that the urgent needs of botanical bibliography would be solved only by the single-minded enthusiasm of individuals. The human mind remains irreplaceable in the face of mechanical devices often deemed the salvation in the compilation of a bibliography like Langman's. A computer has a medulla oblongata but lacks a cerebrum. The Swiss bibliographer Haller set forth the author's contribution, not the minutiae of the book's torso. Langman, like Haller, is concerned with what the book offers the reader. For society it is fortunate that such bibliographers have not gone with the chimney sweep. *Labor ipse voluptas*. Every user will be grateful to the foundations that have intermittently supported the enterprise, but most grateful to the compiler for her persistence.

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Evolution of Life on the North American Continent

Stratigraphy and Life History. Marshall Kay and Edwin M. Colbert. Wiley, New York, 1965. 775 pp. $9.75.

This profusely illustrated book attempts to set forth for beginning students the principles of stratigraphy and to give a summary of the main events in the evolution of life and of the North American continent. Either task is formidable in itself, and both call for skillful blending and summarizing of a vast and confusing array of data if a coherent and meaningful story is to emerge. A prodigious amount of information is assembled in this book, but assembled in such a poorly organized manner, and with so many sidelights inserted, that the point is often lost. The stratigraphic principles are obscured, and the main historical events tend to be isolated and rather meaningless.

The first 400 pages are devoted to presentation of stratigraphic principles, which are intertwined with summaries of the history of the Precambrian, Paleozoic, and part of the Mesozoic Eras. The principle of superposition of strata is emphasized in early chapters on Precambrian rocks, together with a somewhat cryptic treatment of the problems of correlation of nonfossiliferous rocks and dating by means of isotope geochemistry. The principle of uniformitarianism, the basis for all stratigraphic and paleoecological interpretation, is not mentioned. Rock-stratigraphic and time-rock units are introduced in a discussion of Cambrian rocks, but clear distinctions and good examples of these types of units are not given. Faunal zones are not defined until much later in the book. Sedimentary and biologic facies are illustrated in a series of chapters, drawing on examples from Ordovician and younger Paleozoic rocks. Tectonic control of sedimentation is suggested in a discussion entitled the "Taconian revolution."

The second half of the book is a more straightforward presentation of

the sort of material usually found in textbooks on historical geology: the development of Paleozoic and Mesozoic life, with emphasis on the vertebrates; the development of Cenozoic life; geologic history during the later Mesozoic, Tertiary, and Quaternary; a rather chary review of continental drift; and summaries of the origin and evolution of the continent, fossil organisms, and stratigraphic principles and methods. The next to the last chapter, by Dean B. McLaughlin, is a beautifully written, lucid, and well-illustrated discussion of the origin of the earth.

The explosive proliferation of geologic knowledge during the past decade places a heavy burden on those who write textbooks on historical geology. One wonders if it is possible for an individual to keep abreast of developments throughout the continent and to present a broad synthesis that is modern, meaningful, and reasonably accurate. Although the authors of this book make no claim to all-inclusiveness, some geologists, particularly those along the Pacific Coast, will find that their part of the world has been given a rather inadequate and out-of-date presentation.

The text is relatively free of typographical errors. Most of the photographs and line drawings are well done, but they are not well integrated with the text. Some lack sufficient explanatory matter—for example (p. 87), no geographic features of the land are identified on the geologic map of the British Isles. The following are among the numerous minor errors noted: fig. 17-4, *Oistoceras* and *Amaltheus* are interchanged; fig. 18-4, two out of the three ammonite genera illustrated as Cretaceous forms are from the Lower Jurassic; fig. 18-20, the Queen Elizabeth Islands are incorrectly identified as the Queen Charlotte Islands; and fig. 18-21, Colville, Ninuluk, and Topagoruk Formations are misspelled.

The lack of bibliographic references or lists of suggested reading following each chapter or major section is a serious omission, one that diminishes the utility of the book. The editorial standards are not what one expects from this publisher: much of the writing and many definitions are marked by imprecision and a somewhat murky style. This book is perhaps more suited for selected reading assignments than for use as a general textbook in beginning classes on historical geology or stratigraphy.

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Neutron Fields: Production, Transport Character, and Detection

Neutron Physics. K. H. Beckurts and K. Wirtz. Translated from the second German edition (1964) by L. Dresner. Springer-Verlag, New York, 1964. x + 444 pp. Illus. $17.

This text on neutron physics considers in depth only those aspects of the subject that are concerned with the production, transport character, and detection of neutron fields. It does not consider, for example, those aspects that are related to the application of neutron radiation to the analysis of nuclear, molecular, or crystalline structures. It is an excellent text for any neutron physics laboratory, particularly so for a laboratory in which the research is oriented around the use of reactor-produced neutrons. It is also worth noting that, although the book could well serve those interested in the design and engineering of reactor systems, it does not deal directly with the subject of reactor physics. For example, the theory of multigroup computations is touched on in the text, but not in sufficient detail to permit coding and analysis.

The heart of the text is contained in the two central parts entitled "The Theory of Neutron Fields" and "The Determination of Flux and Spectrum in a Neutron Field." The theoretical treatment of these subjects is excellent and in all instances is accompanied by a good qualitative discussion that should provide real insight for the reader. The particular techniques employed in measuring flux and spectrum are also analyzed in detail, so that the text becomes a real working document for those interested in making such measurements. This involvement with foils, choppers, colimators, and other apparatus is useful to experimenters interested in the application of neutron radiation to research generally, but is principally directed toward those interested in precision radiation standards.

Discussion and analysis of additional techniques for the generation and extraction of neutron radiation would also have been of great value to experimentalists, and still within the scope of the text. In particular, the generation of cold or long wavelength neutrons and the methods of piping beams of these neutrons using optical properties is not included in the text, but would have been a welcome addition.

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A History of Chemistry in the 19th Century

The Development of Modern Chemistry. Aaron J. Ihde. Harper and Row, New York, 1964. xii + 851 pp. Illus. $13.50.

Several relatively short histories of chemistry and Partington's recently published, monumental, four-volume work are available, but a treatment that lies between the two extremes and gives more details without serving merely as a reference work is needed. The present volume partially fills that need. However, one qualification must be made. As the title states, this is essentially a history of modern chemistry. Events prior to the 19th century are covered in about 90 pages, and in the remaining 650 pages the modern period is treated, in increasing detail as the most recent times are approached. Thus, what is essentially supplied is a detailed account of the newest developments in all branches of chemistry. No other work gives so much information about this period, and so the volume will serve the unique function of giving the student of chemistry today something he greatly needs: a view of the theories he studies in his current courses, not as isolated items dogmatically presented as revealed science, but as the outgrowth of ideas and experiments that had a logical reason for existence. The many excellent illustrations will also help to bring alive the otherwise meaningless names that are often attached to new developments. It is even to be hoped that some students may be spurred to trace chemical ideas even further back and thereby to find that our modern problems are merely more detailed considerations of fundamental ideas that have concerned the thinking man since ancient times.

This is not to say that the book will be of value only to students. The mature chemist and the historian of chemistry will find much of value here.