they fashioned some amazingly sophisticated socketed spear points, pikes, knives, and harpoons as well as axes, adzes, chisels, awls, needles, and drills. The gamut of tools implies a woodworking tradition similar to that of the Archaic people. Although not, technically, a true metallurgy, the copper industry of the Great Lakes region was the earliest use of metals in the New World, long antedating the metal industries in Peru and Bolivia. Unlike those areas, where gold was the first metal worked and ornaments were the first artifacts, the ancient Lake Superior Indians began with a utilitarian employment of copper.

Whether the idea of burial mounds originated locally or was diffused into eastern North America from the Old World, the earliest burial mounds of the Upper Great Lakes region appear to be derivative from the Ohio-Mississippi territory to the east and south. Pottery comes at about the same time (500 to 100 B.C.). Some of it is thick-walled, cord-marked or fabric-impressed, conoidal-bottomed ware, while another style is thinner walled and features dentate and rocker-dentate designs. Similar Woodland pottery seems to be earlier in the northeastern United States than it is in the Upper Great Lakes or elsewhere in North America; presumably it was diffused from east to west in the last half of the last millennium B.C. Hopewellian culture held the field in the Upper Great Lakes region from about 100 B.C. until A.D. 700. Sites of this affiliation are clearly restricted to the southern part of the region and are not found north of a line that marks a modern 150-day growing season. Agriculture was undoubtedly known from this time forward. Among the Hopewellian manifestations are big earthwork sites in the St. Joseph River valley and near Grand Rapids.

From A.D. 700 until 1600 a series of subregional archeological cultures are found which all adhere, more or less, to a similar pattern of life. Effigy Mound, Peninsular Woodland, Michigan Owasco, Lalonde, Fisher, Lake Winnebago, and Blue Island cultures are grouped into a general Late Woodland period. They show, in varying degrees, influences from contemporaneous Mississippian cultures to the south. They were the archeological cultures ancestral to the Great Lakes Indian tribes identified after A.D. 1600, including such groups as the Menomini, Chippewa, and Winnebago. In chapters that follow his archeological presentation, Quimby has written a series of descriptive essays about these tribes as they were recorded in the period from 1600 to 1760. In a final chapter he summarizes the breakdown of the native societies and cultures after 1760.

A summary, simplified statement of the kind that Quimby has made points up the major weaknesses in the prehistoric record. For example, archeologists do not know what happened in the late Paleo-Indian to Archaic transition. This is true for most of North America. Events of this time (7000 to 5000 B.C.) must have been related closely to important environmental changes, and since these changes were by no means the same in all parts of the Americas, we may hardly expect that all cultural reactions were the same. Surely, some Paleo-Indian groups must have adapted to the disappearance of Pleistocene fauna and conditions by taking up new ways of life. But to what extent these adaptions were sparked, abetted, or controlled by new immigrations and diffusions from Boreal Asia is, perhaps, the major question. A second puzzle is the source of Early Woodland pottery. Is it of Asiatic inspiration? Curiously, some of the closest correspondences are between northwestern Europe and northeastern North America. Finally, from whence came the elements that were drawn together and fused into the Hopewell florescence? And what was the role of maize agriculture in Hopewell? Quimby's geographical distributions of Hopewellian sites in the Upper Great Lakes region suggest a greater importance for agriculture than Caldwell has been willing to allow.

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Elements of the Theory of Markov Processes and Their Applications. A. T. Bharucha-Reid. McGraw-Hill, New York, 1960. xi + 468 pp. $11.50.

The staggering range of applications for Markov processes covers almost every subject from astronomy to zoology. Hence, the appearance of a book which brings together between its covers an introduction to most of these applications is indeed welcome.

Although the choice of topics in this book is fascinating, it is probably a necessary corollary that not all topics are treated equally well. Some, such as the discussion of stochastic models in biology, fare quite well; while others, such as applications in astronomy and chemistry, are discussed only superficially and seem to have been transported unchanged from the original papers to the book.

The book begins with an exposition of the theory of Markov processes in continuous time with a denumerable infinity of states, but discussion of finite state Markov processes in discrete time is omitted. A good deal of space is devoted to branching processes; here, as in many other parts of the book, the author quotes rather than proves many important results. There is an account of birth and death processes and results in the theory of random walks. A large portion of the theoretical section of the book is devoted to diffusion processes and the Fokker-Plank equation, including recent work by Darling and Siegert and by Feller.

The major part of this work is devoted to applications. In the section on biology, an obvious forte of the author, the list of topics includes birth and death models for population growth, the deterministic and stochastic theory of epidemics, the theory of genetic propagation, and areas of radiobiology. The chapter on the cascade theory of cosmic ray showers is of interest mathematically; of course it does not include more practical treatments of the problem. An account of the theory of Geiger counters as developed by Feller and Takacs is then given, and there are several miscellaneous topics in physics. The subjects in astronomy include work by Chandrasekhar and Munch on brightness fluctuations and by Neyman and Scott on the spatial distribution of galaxies. The final chapter, on queueing theory, includes accounts of all the principal formulations of the theory and several of the results.

The author is to be complimented on the unusual completeness of the bibliographies. However, there are an overly large number of typographical errors (for example, the startling interchange of Fig. 7.1 and Fig. 9.1). In summary, although no single subject can be learned completely from it, the book provides an excellent introduction to a wide scope of applications.

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