Book Reviews

Lesser-Known, Marginal Civilizations

Vanished Civilizations of the Ancient World. Edward Bacon, Ed. McGraw-Hill, New York, 1963. 360 pp. Illus. $28.50.

In 1961 McGraw-Hill brought out the American edition of a British volume on world prehistory, *The Dawn of Civilization: the First World Survey of Human Cultures in Early Times*, edited by Stuart Piggott [see *Science* **134**, 723 (1961)]. The present volume is a sequel; it is identical in format, maintains the same high intellectual standard (unusual for a popularization), and sells for the same high price, which is not exorbitant considering the number and quality of the illustrations. The two books make a handsome set of publications, which will enhance the libraries of those who can afford them.

This book might better have been designated volume 2 of *The Dawn of Civilization*, for it serves to fill most of the gaps in that volume's coverage. Taken together, the two almost achieve the goal of a worldwide survey of prehistory. (They omit only Anglo-America and Australia, presumably because these would not interest the British audience for which the volumes were planned.) However, Edward Bacon, the editor of the second volume has chosen to emphasize a different theme, the enigma of lost civilizations. From this standpoint, too, one volume is incomplete without the other, since the best known of the lost civilizations—Indus, Minoan, and Shang—are discussed in the first volume.

Both volumes open with an introduction by the editor, which sets the theme for the volume. There follow a series of articles, each by a specialist in the archeology of a certain area. Each article begins with a map of the area and, if possible, a chronological chart. Then comes a selection of plates (8 to 22 pages) done in the style of *Life* magazine and, finally, an equivalent amount of text by the specialist. The first volume had an epilogue, in which the theme of the volume was recapitulated, but this one does not, an omission which heightens the effect of diversity. Each of the 13 essays is an independent contribution.

In the first essay, "The fertile Sahara: Men, animals and art of a lost world" (pp. 11 to 32) Henri Lhote summarizes the entire archeological sequence in the Sahara Desert from the Australopithecines to the Iron Age, with emphasis on the rock paintings of Tassili, a specialty of the author. Lhote also stresses the point that the Sahara was moist enough at several times in the past, most recently between 8000 and 2000 B.C., to support a relatively large population.

In "City of black gold: The riddle of Zimbabwe" (pp. 33 to 54) Roger Summers concentrates on the medieval Zimbabwe civilization of Southern Rhodesia, the origin of which has been a mystery that was compounded by the refusal of racists to recognize that it might be Negro. Summers shows convincingly that it was Negro and that local Bushmen also congregated in the cities and mining centers of the Zimbabwe civilization.

L. P. Kirwan's "The X-group enigma: A little-known people of the Nubian Nile" (pp. 57 to 78) describes a culture on the fringes of the Byzantine Empire, which is of interest because it has left a rich harvest of grave objects in the Egyptian tradition and because these lie in the region that will be flooded by the Aswan Dam. It is to be hoped that archeologists now working in the basin of the dam will finally determine the identity of the X-people.

"Who were the ancient Ainu? Neolithic Japan and the white race of today" (pp. 79 to 104), by William Watson, seems out of place in this volume, since it is concerned with a fishing people, the Jomon, and with their presumed modern descendants, the Ainu, neither of whom can make any claim to civilization. The article is also out of date; it does not include the recently discovered Post-Jomon culture of Hokkaido (from which the Ainu may alternatively be derived), the preceramic sequence on that island, or the radiocarbon dates which indicate that "Neolithic" Jomon culture began well before 2000 B.C.

"The collapse of the Khmers: The god-kings of lost Angkor" (pp. 105 to 138), by Christopher Pym, combines a fascinating presentation of Khmer art and architecture—the article has the largest group of plates in the volume—with a sophisticated analysis of the functioning of this medieval Cambodian civilization. Pym is inclined to attribute the decline of the civilization to a series of interrelated factors: incursions by the Thai, which damaged the irrigation systems; the introduction of a new religion, Therevada Buddhism, which weakened the authority of the god-kings and their ability to reconstruct the systems; and the consequent laterization of the fields, which caused a loss of fertility.

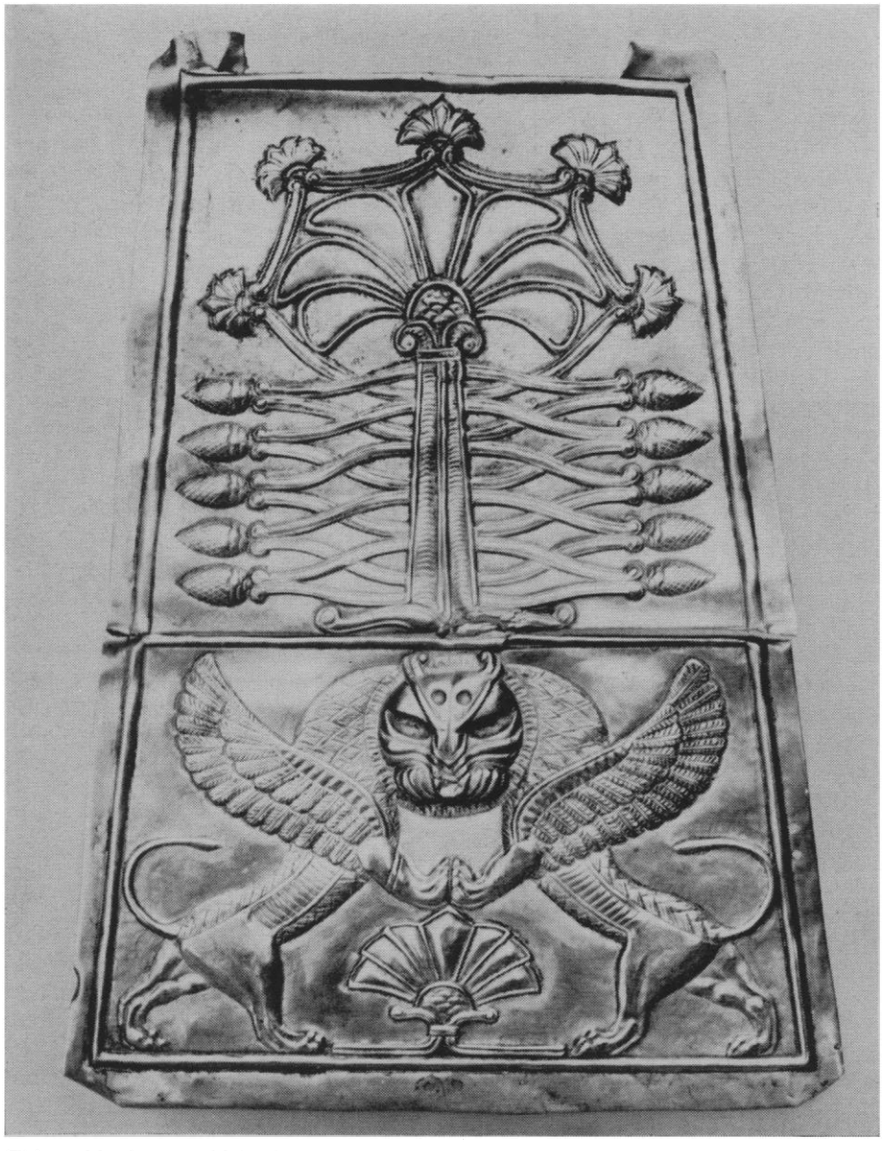
In "The Gods that failed: The glory and decay of Maya culture" (pp. 139 to 168), J. Eric S. Thompson deals with another theocratic civilization, similarly situated in a tropical-forest environment, and raising the same problem of decline. Yet, so independent are the contributions to this volume that neither Pym nor Thompson discusses the parallels, nor do they bring out the striking differences between Khmer and Maya civilizations, though these will be apparent to the reader. Thompson attributes the decline of the Maya to the preoccupation of the priestly class with such esoteric pursuits as mathematics, astronomy, and the calculation of time, in which it led the contemporary world, and to its failure to meet the more practical needs of the peasant farmers; he minimizes the effect of incursions by the practically more advanced peoples of the Mexican highlands.

Donald Strong's essay is entitled "The Etruscan problem: An historic people who left no history" (pp. 169 to 200). The Etruscans pose an unresolved problem of origins: did they migrate from Lydia or did they develop locally? The author is more concerned with their artistic achievements and with their role in transmitting such Greek innovations as the city state to

the people who later became the Romans.

"The Sabian mysteries: The planet cult of ancient Harran" (pp. 201 to 220), by J. B. Segal, brings together a scattered series of historical references to a little-known people of northern Mesopotamia, who are interesting not only because of their peculiar religion, which survived the coming of Christianity and Mohammedanism, but also because they played a major part in the transmission of classical learning to the Arabs and thence to western civilization. The archeology of these people is poorly known; they seem to have arisen in the time of Abraham and to have finally succumbed to Mongol invasions in the 13th century, though the present Mandaeans of the lower Tigris and Euphrates valley may be a remnant.

"The peoples of the highland: The vanished cultures of Luristan, Mannai, and Urartu" (pp. 221 to 250), by E. D. Phillips, is built around three remarkable groups of finds, products of the mountain peoples who lived along the northern and eastern edges of the Assyrian Empire: the Luristan bronzes and the treasures of Ziwiye and Hasanlu. Phillips sets his description of these finds against a background of history, bringing out the role of the mountain peoples as a buffer between the Mesopotamian civilizations and the nomads of the northern steppes, such as the Scythians and the people who later became the Persians.



This gold plaque which shows two Assyrian winged lions with their heads merged into one under a tree of life was found in a bronze coffin at Ziwiye in the Iranian part of Kurdistan. Accompanied by other precious objects stylized differently, it may have belonged to the Scythian chief Bartatua. [Metropolitan Museum of Art, from *Vanished Civilizations of the Ancient World*]

In "Bridge to the ancient East: The new knowledge of early Afghanistan" (pp. 251 to 278), Edward Bacon considers cultural developments in the region between the Mesopotamian and Indian centers of civilization. An outline of this development is beginning to emerge, and it is well summarized here by the editor of the volume, who, as archeological editor of *The Illustrated London News*, has followed the research. Bacon begins his summary with the earliest, Mousterian inhabitants and carries it through the arrival of the Greeks and of Buddhism. It would appear that the main line of diffusion was via northeastern Iran and Afghanistan, bypassing the more direct route through southern Iran and Baluchistan. Agriculture, pottery, and in later times, various Indo-European peoples followed this line eastward, while elements of the Indus and Buddhist civilizations went westward along it.

T. Sulimirski's "The forgotten Sarmatians: A once mighty folk scattered among the nations" (pp. 279 to 298) traces the migrations of the Sarmatian nomads as they moved westward through the Russian steppes on the heels of the Scythians, came into contact with the Romans, and were finally scattered by the Goths and Huns. The Sarmatians then lost their identity by merging with the local people, but, as Sulimirski points out, they have left their imprint in "Gothic" art, in a series of names (of both people and places), and in archeological remains scattered all the way from the Urals to Great Britain and northwest Africa.

"The migration of the megaliths: A new religion comes to ancient Europe" (pp. 299 to 322) is by Gale Sieveking. Of course, it was not the megaliths that migrated but Mediterranean seafarers of the Neolithic and Bronze ages, who traveled around the Iberian Peninsula to France, the British Isles, and Scandinavia, impelled, according to Sieveking, by the same urge to colonize that later motivated the Greeks. We have no historical records of these migrations, but a detailed analysis of the archeological remains shows that the migrants were responsible for only a portion of the megalithic monuments; they introduced the idea of erecting them, for use in burials and other religious purposes, and the local people

then proceeded to work out their own distinctive forms.

Thor Heyerdahl's "Navel of the world: The red-topped giants of lonely Easter Island" (pp. 323 to 344) is the last essay. It is fitting that the volume ends with Polynesia, because it was the last major part of the world settled by man, but a more balanced presentation of this event would have been preferable. Heyerdahl is the only contributor who limited himself to one of two opposing and controversial interpretations and who presented only the facts that favor his interpretation. The reader should bear in mind that migration from Peru, which Heyerdahl presents with such conviction, is not the only side to the story of the Easter Island statues. If the reader is interested in the alternate view, he may obtain it from the following publication, which is not included in the otherwise comprehensive bibliographies at the end of the volume: *The Island Civilizations of Polynesia* by Robert C. Suggs.

One theme ties the articles together: they all deal with peoples who were marginal to the centers of civilization in their times. The volume could have been given more unity by emphasizing this theme. It would have been interesting, for example, to inquire into the nature of the blend between local traits and influences from the centers, which is shown by all the civilizations discussed. One wonders about the effect of trade with the centers (see, for example, the plaque illustrated in the figure). Why did many of these peripheral civilizations preserve earlier customs and styles of art, which had gone out of fashion in the centers? Why did they have little or no writing? And what, in general, was the result of being in a peripheral position?

A more balanced coverage of the marginal peoples and civilizations would also have been desirable. For example, the Norse, the Pueblo Indians, and the mound builders of the eastern United States might well have been substituted for the Maya, the Sarmatians, and the megalith builders of western Europe, all of whom had been treated in the first volume, though in less detail. Nevertheless, the editor is to be commended for bringing us an authoritative view of some lesser-known civilizations, which are usually not included in compendia of this kind.

IRVING ROUSE
Department of Anthropology, Yale University

Number Theory

Elementary Theory of Numbers. W. J. LeVeque. Addison-Wesley, Reading, Mass., 1962. viii + 132 pp. $5.

A Second Course in Number Theory. Harvey Cohn. Wiley, New York, 1962. xiii + 276 pp. Illus. $8.

LeVeque's *Elementary Theory of Numbers* is written in somewhat more leisurely fashion than a number of beginning textbooks on the subject, including the first volume of his own two-volume work. It is intended for use by teachers, and the author hopes that it will enrich high school courses and serve as an introduction for college students. LeVeque begins with a discussion of number theory and of some of its methods and solved and unsolved problems; he gives some attention to proofs by induction and indirect proofs, since in this subject such proofs are frequently used.

The volume is concerned with the Euclid algorithm and its consequences, linear and polynomial congruences, primitive roots of a prime modulus, continued fractions, and the Pell equation. The quadratic reciprocity law is not dealt with. There are many historical references, and the author frequently sketches the idea of a long proof before embarking on its formal development. Many examples are worked out, and exercises of varying degrees of difficulty are given. The book is most suitable for use as a textbook.

A Second Course in Number Theory presupposes knowledge of the usual beginning course in number theory through the quadratic reciprocity law. The approach is developmental in that Cohn continually points to what is ahead and shows what is needed for the proofs that are later developed. The content is strongly algebraic, with special emphasis on quadratic fields.

The first two chapters provide a preview of some of the paths that are followed (for example, composition of binary forms and primes in an arithmetic progression), a review of basic concepts, and preliminary discussion of abelian groups. The third chapter deals with characters and culminates in Dirichlet's lemma that any real character modulo m can be expressed in terms of Kronecker's symbol. The fourth and fifth chapters consider integral domains and lattices, leading to a proof of Kronecker's theorem on abelian groups, and some results on minima of quadratic forms.

Part two is concerned with ideals and ideal classes and their connections with the geometry of numbers.

In the final part, previous results are applied to establish a relationship between Dirichlet L-series and the binary class number to prove Dirichlet's theorem on primes in an arithmetic progression and Weber's allied result that every ideal class of a quadratic field contains an infinite number of primes. The author closes with an ideal-theoretic proof of the quadratic reciprocity law, the composition of forms, equivalence classes, class numbers of orders of binary forms, and Hilbert's symbol. Possible further extensions are described.

The exercises are an important part of the development of this clearly written book. The choice of topics is unusual, and an amazing amount of ground is covered. By working through the volume, the careful and studious reader should acquire much of the flavor of modern developments in number theory.

B. W. JONES
Department of Mathematics, University of Colorado

Ecology

Animal Ecology. Aims and methods. A. MacFayden. Pitman, New York, ed. 2, 1963. xxiv + 344 pp. Illus. $10.

This second edition of a book originally published in 1957 reflects both the large accrual of information and the changes in perspective that have characterized ecology in the last few years. Much of the book is new. Of its three major divisions, which deal respectively with the ecology of individuals, populations, and communities, the last contains the largest additions. MacFadyen expresses the sanguine point of view that fragmentation within ecology is decreasing, and he justifies that viewpoint with a relatively successful attempt to bridge the gaps between the study of populations and ecosystems by means of a metabolic approach. Although his interest in soil invertebrates is very much in evidence, he presents major ideas in a well-balanced manner Documentation is extensive; it is particularly pleasing to find evaluations of