the necessary description of the paltry coffin hardware and the few durable items of dress. The review of attitudes serves mainly as background material and has little bearing on the real potential for the mortuary practice studies that Elia and Wesolowsky seem to be striving toward. It is revealing of the relative uselessness of this literature to mortuary studies that is has so little to say about the realities of differential treatment of the dead by age, gender, and health. Beneath the ideals of the 19th century lies the starkness of behavioral realities according to social priorities of that period. The two perspectives complement each other, but until the underdeveloped potential of mortuary studies is allowed to fulfill its promise our perceptions of the recent past are bound to remain one-sided.

Elia concludes the monograph clearly in Chapter 8. The only new material included is an attempt to reconcile the age and sex of the 45 individuals the records state to have died as inmates of the poor farm with the 31 (or 32 if the neonate is counted) individuals actually buried at the farm proper. The difference between the two is highly revealing. Although not much is made of it the difference in the two figures complements the social picture drawn from the skeletal biology. It is evident that a substantial number have been winnowed from the number of potential dead. The reason for their absence is that they were claimed by townspeople, while those that were left behind were not. They were too marginal. Either no one wanted to recognize them, or they had neither survivors nor relatives sufficiently close to claim them. Although a detailed list of potential poor farm dead has been compiled, it would be of interest to discover who among them had living (and solvent) relatives living nearby. One suspects that some were bereft of relatives nearby that were in a position to help even at the end.

In sum, the Uxbridge poor farm cemetery study is a revealing one. It is encouraging to read how opportunities for advancement of mortuary archaeology have been met by creative response in a salvage setting. It is obvious that the collaboration of the archaeological historian and osteologist was crucial in making the difference between a routine report of a small and seemingly typical graveyard population and a study that has contributed to setting of higher sights in 19th-century archaeological research.

This volume marks a special event. It is the first publication of the rejuvenated BAR reports, now under the new ownership of Tempus Reparatum. The new ownership is to be congratulated for publishing a cleanly printed book with clear halftones, including both field views and high-quality prints of human bone. The text is easy to read and a salute to the potentialities of desktop publishing. Dressed in the old dark red covers and printed in the same format, the BAR International Series should be a welcome format in which to publish.

Canal Irrigation in Prehistoric Mexico: The Sequence of Technological Change


Reviewed by Vernon L. Scarborough, Department of Anthropology, University of Cincinnati, Cincinnati, OH 45221.

The origins and development of canal irrigation in areas of the world that experienced coincidental state formation have been a major focus of theory for over four decades. Karl Wittfogel's model of hydraulic society (1955, 1957) was championed by Julian Steward, and provided the topic for the first Pan-American Union monograph to deal with early states and their emergence (Steward 1955). In brief, Wittfogel's hypothesis proposed that the early development of a hydraulic bureaucracy required establishment of control over other fundamental aspects of society and led to complex statecraft. Since that historic symposium, however, the hypothesis has suffered severe criticism. The two most damaging arguments against it are 1) the frequent observation that cities and associated indicators of complexity and scale appear before canal systems of consequence existed (Adams 1966, 1981), and 2) many ethnographically observed groups operating at levels less complex than that of a state developed sophisticated water management schemes (Millon 1962). Although Doolittle's book does not attempt a direct treatment of these issues, any work taking on a sizable portion of a culture area as influential in the development of early statehood as Mesoamerica and examining it through canal irrigation must be reviewed in their light.

Canal Irrigation in Prehispanic Mexico is an important contribution to the carefully collected and interpreted corpus of information examining ancient canal irrigation schemes. Doolittle's strength is his focus: reviewing flow canal irrigation systems within the present-day borders of Mexico. The book is well organized and takes a "developmental" approach to the technology of canal construction and use. Descriptive case studies drawn from what is known of canal systems are compared and contrasted using similar definitional characteristics. The information presented is primarily taken from archaeological reports,
though the book sometimes provides relevant historical sources.

Chapter 1 provides the orientation for the study. Doolittle offers several useful definitions for guiding examination of a hydraulic system, since a myriad of terms are associated with canalization studies in the Old and New Worlds. He criticizes studies that lump broad periods of development when the temporal context could be more carefully controlled. He cautions, however, against studies that emphasize the ecological context of a particular site area without comparisons to neighboring zones. The developmental approach taken in the book is defined as endorsing a diffusionary model for the spread and elaboration of canal technology.

The bulk of the volume is divided into four chapters examining canalization through time. Doolittle divides these chapters into an Era of Experimentation (1200–350 B.C.), a Time of Maturation (350 B.C.–A.C. 800), a Period of Expansion and Intensification (A.C. 800–1200), and a Golden Age (A.C. 1200–1520). The technological linkages defining this sequence adhere loosely to the Formative, Classic, Early Postclassic, and Late Postclassic period divisions identified with much of Mesoamerica. The last two chapters further review the technology associated with canal systems in prehispanic Mexico and present two theories for the origin of irrigation, one emphasizing drainage requirements and the other floodwater farming. Two additional points of merit are made. The first argues that though canal systems can be expanded, the labor and planning effort will be substantial. Although the author chooses not to develop this point, it is important because the decision-making body sanctioning expansion may overtax its resources and leave itself weakened by the investment. Social institutional changes can result (Flannery 1972). The second point is that the new technologies introduced by the Spanish were easily adapted to earlier systems, with colonial irrigation systems deriving much of their success from local knowledge and previously designed irrigation schemes.

Doolittle’s volume is significant because it represents the first comprehensive, pan-regional approach to the development of canal technology in Mesoamerica. It is a major service to the disciplines of anthropology as well as geography. Certain relevant factors stimulated by this study, important to anthropologically oriented archaeologists, are less well explored, however. One reason these questions are little addressed is because of the book’s orientation towards a unilateral diffusionary model for the development of canal irrigation technology. This approach hinders a direct assessment of the organizational shifts associated with the labor and planning changes identifying advances in water control. Considerable effort has been invested in identifying the origins of canal technology, with less consideration of the socioeconomic context from which the technology evolved. For example, were simple forms of irrigation practiced on agriculturally marginal lands in concert with early experiments in domestication? If so, were the economic factors precipitating this development similar to those expected for agriculture? These are difficult questions, but ones meriting additional consideration. We are given very little background about the societies from which these systems evolved. In Doolittle’s defense, it is true that information treating population structure or degrees of sociopolitical centralization is difficult to obtain from many of the case studies he provides, especially for the earliest periods. Nevertheless, an attempt at providing such a backdrop would surely reveal a more complex and interrupted development than is apparent from this study.

The clear focus of the book on Mexico and canal irrigation provides its organizational strength. This strength, however, is weakened by utilizing current national boundaries for a study of prehispanic irrigation. Little mention is made of the water systems in the Maya area, primarily because these systems are defined as drainage canals and therefore outside the purview of formal “irrigation.” The Veracruz drained-field systems, a massive investment in wetlands agriculture within the present-day margins of Mexico, are avoided for the same reasons. With the attention given to drainage as one of two potential causal agents for the origins of canal irrigation, additional treatment of these systems is warranted.

By only focusing on flow canal irrigation, a discussion of water management in the development of complex society can scarcely be addressed. The investment made in the manipulation of water requires analysis in its entirety. The role of raised and drained fields, especially the chinampa gardens of the Basin of Mexico, for example, greatly influenced the use of water. Although Doolittle minimizes the theoretical import of his work, his case studies and their temporal sequencing could have profound anthropological implications if integrated into broader water management concerns. While water management is a significant force in the evolution of complex society, canalization is but one of its components.

What, then, is the relationship between Canal Irrigation in Prehistoric Mexico and the Hydraulic Hypothesis? Doolittle indicates that most canal systems prior to the time of the Aztecs were not large scale, state-maintained water projects. State formation would seem to have preceded sophisticated waterworks. Isolated, community-based irrigation schemes embedded in the activities of the greater
state are implied (cf. Scarborough 1991), but the degree of potential control over lake levels and chinampa garden plots by the state is not addressed. We still do not know the degree to which water management may have been influenced by state control. How centralized were the complex societies associated with later canal systems and what were the economic as well as social costs of reservoir construction or drainage control? Although the Hydraulic Hypothesis may have been championed with a proselytizing spirit and a deterministic tone far overstating notions of total power, the influence and organization of early water systems deserve renewed attention.

One of the book’s most intriguing arguments is that the American Southwest was associated with irrigation systems far superior to those of Mexico at comparable periods. Few would associate the developments in the Hohokam region with state levels of complexity, but the investments made in irrigation were markedly more elaborate and technically advanced than in their southern neighbors’ region. This could be interpreted as additional evidence for dismissing the Hydraulic Hypothesis. The presence of complicated water management systems among “less advanced” societies further precludes a discussion of water as a catalyst for social change and complexity. Or does it? Alternatively, there may be an opportunity for archaeologists to reassess the complexity of Hohokam.

Doolittle’s work is a welcome addition to the growing corpus of reliable studies examining ancient water management practices. His work invites regional analysis of canal systems and a more complete understanding of water management in Mesoamerica.

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Adams, Robert McC.


Flannery, Kent V.

Millon, Rene

Scarborough, Vernon L.

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Steward, Julian H., ed.

Wittfogel, Karl A.


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**Quantifying Archaeology**


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**Quantifying Diversity in Archaeology**


Reviewed by W. Fredrick Limp, Arkansas Archeological Survey, University of Arkansas, Fayetteville, AR 72701.

Two ostensibly similar but actually quite different books serve as the topic for this review. Shennan’s volume is best seen as a text, introducing a wide range of quantitative techniques for archaeologists. The second book is a collection of papers that define and then use a series of quantitative methodologies to address the problem of “diversity” in archaeology.

The goals of *Quantifying Archaeology* are modest but well defined by Shennan [p. 331] as enabling the reader to carry out basic data analysis and to talk to statisticians without mutual incomprehension; you should also be able to follow many of the statistical arguments in the literature and obtain the general idea of most of the rest; and you should have a firm basis for further reading and finding out about other techniques.

Shennan achieves these goals handsomely. His intent is to present an intuitive, rather than rigorous, understanding of statistical methodology and reasoning. Within this constraint his book is clearly one of the most comprehensible, even readable, introductions to statistical methods as they are applied to archaeology. The volume starts out