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LORDS OF THE HILLS-ANCIENT MAYA SETTLEMENT IN THE PUUC REGION, YUCATAN, MEXICO-DUNNING, NP

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Lords of the Hills: Ancient Maya Settlement in the Puuc Region, Yucatan, Mexico.



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by this time, had passed from existence). The Achaemenid Persians themselves were not associated with aqueduct excavation; the technology apparently entered the Iranian Plateau from Central Asia during the tenth century A.D. through the agency of the immigrant Ilysid and Samanid dynasties. The terms *qanat* and *foggara* are among the best known of the roughly fifty terms applied to subterranean aqueducts in the literature. Both are Semitic—the former ultimately derived from a Sumerian loan-word in Akkadian, *qannu*; the latter from the Arabic term, *fuqara*. The most widely used Persian term is *qhryz*, later *karez*, first known from Middle Persian fragments discovered in the Turfan Depression of China.

The discussion of Greek urban location determinants is qualified somewhat by the pre-Hellenic origins of many "Greek" cities. Corinth (Korinthos), for example, is believed to be of Luwian origin. Evidence of Luwian settlement in the Mediterranean basin resides in the suffixed elements *-ssos* and *-nthos* in place-names such as Parnassos, Knossos, Tylissos, Amnisos, and Tiryns (genitive Tirynthos).

The strengths of the book are in the areas of community and domestic water use. I am aware of no single volume that does a better job of breathing life

and meaning into the management of water resources in antiquity. Much of the information contained in the book is of direct relevance to contemporary planning—for example, the integration of differing grades of water into strategies for use, reuse, and conservation. Particularly valuable are the five sections concerned with planning; supply, distribution, and drainage; the description and quantification of water-system elements; physical constraints upon built form; and amenity and necessity. They are substantive, detailed, well-illustrated, and well-documented.

Water Management in Ancient Greek Cities is a thoughtful, interesting book. Its strengths and weaknesses are anticipated in the author's preface: "T[he] book is a first attempt to examine ancient Greek cities from [a] protechnical point of view. It has the virtue of freshness, but it suffers from the difficulties of bending to its purpose data that were accumulated for very different purposes" (p. vii). It is a book troubled by ambition.

Key Words: architectural history, Greek urbanization, karst landscapes, water management.

Lords of the Hills: Ancient Maya Settlement in the Puuc Region, Yucatán, Mexico. Nicholas P. Dunning. Madison: Prehistory Press, 1992. *Monographs in World Archaeology* No. 15. xv and 303 pp., ill., tables, gloss., apps., and refs. \$38.00 paper (ISBN 1-881094-04-09).

Reviewed by Andrew Sluyter, Department of Geography, The University of Texas at Austin, Austin, Texas.

The Puuc or "hill lands" occupy a particular place in Maya prehistory as well as in the minds of Mayanists seeking to reconstruct this history. For most of the Quaternary they stood as rugged hills above the karst plain of the Yucatán peninsula. For a dozen generations they supported a people who marshalled enough water to fill its valleys with abundant crops, impressive cities, and extensive causeways. By the middle of the tenth *baktun* (ca. A.D. 1000), the Puuc region produced a record of fallen lords and crumbling palaces. Today, they have become part of a tropical colonization frontier subject to the processes of global environmental change. For two decades, geographer Nicholas Dunning has been journeying to, doing field research in, and writing about these dry, thorny hills and the Maya who once flourished among them. This monograph presents his carefully

accumulated understanding of a place and a people and the ecology that conjoined them.

Maya ecology has generally remained enigmatic. The processes involved in classical Maya society's emergence, florescence, and collapse ca. A.D. 900 have fascinated and puzzled several generations of scholars. Dunning has contributed an investigation of one of the least studied subregions in the Maya Lowlands, yet one that rose to prominence late, exerted a broad influence, and therefore seems central to gaining a broader perspective on the waning period of classical Maya society and such processes as tropical deforestation.

Dunning's objective is to discover how and why people colonized the Puuc Hills ca. A.D. 600, elaborated their basic settlement patterns, largely abandoned their accomplishments ca. A.D. 900, and to

relate these developments to processes elsewhere in the Maya Lowlands. Chapter 1 casts these questions in a cultural ecological perspective that seeks to provide a model systemically interrelating environmental, socioeconomic, and ideological elements. Using this framework and the limited, preexisting knowledge of the Puuc Maya, Dunning proposes that: fertile soils first drew people into this otherwise inhospitable hill land; population increase and surplus agricultural production for export tested the limits of carrying capacity; and the relations between lord and farmer were rooted in an untenable human ecology mediated through an iconography manifested in the landscape through architectural means. The subsequent chapters, then, with the partial exception of Chapter 4, provide a test and elaboration of these interrelated hypotheses.

Chapter 2 sketches the spatial and temporal patterns of "Geology, Water Resources and Climate." In contrast to the surrounding plain, orogeny has lifted the Puuc Hills well above the regional water table. Only through a few deep caves could people access water—the resource that becomes the crucial variable during the long, parching dry season.

Chapter 3 and Appendix I represent the first of the two major substantive and methodological contributions of the fieldwork: a systematic analysis of the Puuc soilscape. While orogeny prohibited ready access to the water table, it did ensure soils older, deeper, and better drained than those of the surrounding plain. Drawing inspiration from Barbara Williams' pioneering ethnopedological studies in the Basin of Mexico, Dunning employs USDA criteria to systematize the Puuc folk taxonomy by defining pedons and catenas, topographic and hydrologic associations, and capability classes.

Chapter 4 reviews the state of understanding of the "Cultural History and the Organization of Maya Society," particularly as regards relationships with the Puuc. Based on the spread of the Puuc architectural style across Yucatán ca. A.D. 800–900, Mayanists have speculated that colonization of the fertile hill soils proceeded as population pressed against the limited resources of the surrounding plain and that the staple-exporting lords of the hills eventually achieved economic and political dominance over their neighbors.

Chapter 5 and Appendix II offer the second key contribution, "The Settlement Survey" covering 725 square kilometers. Dunning rank-orders the population nucleations based on areal extent, architectural volume, and sociopolitical indicators—stelae and ball courts, for example. Time-dependent architectural

styles established by previous researchers facilitate a rough chronology and synoptic maps. Spatial-temporal analysis demonstrates that the earliest settlement correlated with the highest capability soils, accessible water, and substrates suitable for cistern excavation. As settlement expanded, lower capability soils came under cultivation, and a six-tiered settlement hierarchy emerged that clustered into thirteen "polities."

Chapter 6 brings together the settlement and soil data in analysis of population *vis-à-vis* carrying capacity. Based on intensive room counts at a sample of the settlements, the total population peaked at 210,000 people. Based on the area of each soil capability class and assuming a combination of hand-irrigated house gardens and shifting maize cultivation during the wet season, the maximum potential carrying capacity was 209,300 people. No evidence exists for other agroecosystems in the Puuc. Even admitting a substantial margin of error to account for the uncertainty of the assumptions underlying the calculations, the Puuc Maya were testing the limits of their environment with no margin for surplus production. The lords of the hills likely did not establish their dominance over the plains through staple exports.

Chapter 7 establishes linkages between Puuc ideology and ecology through a reading of landscape and architectural iconography. Cosmologically significant azimuths aligned major buildings and causeways. In particular, solar and Venusian horizon positions marked critical dates in the agricultural calendar. Architectural motifs, often phallic and indicative of patriarchy, replicated the celestial signs and related them to terrestrial elements such as rainfall and ground water. More speculatively, the siting of some settlements might have had geomantic imperatives: "From the summits of the taller buildings at Uxmal, the hills appear as two serrated ridges, reminiscent of the toothed jaws of a reptile, tapering to a hinge near Yaxhom, and opening . . . towards the coastal plains" (p. 145). Dunning argues that the architectural iconography at Uxmal is uniquely replete with a suggestive and corroborating motif: a human head in the jaws of a feathered serpent—perhaps on one level a manifestation of Itzamná, the reptilian deity whose back formed the terrestrial plane of the Maya cosmos and was associated with water, fertility, and agriculture. In typical Mesoamerican style, the Puuc lords seem to have accumulated enough power over the farmers that they were able to mediate agricultural productivity in part through cosmological-ideological means.

In the concluding chapter, a scant four pages long,

Dunning recaps the two most likely reasons for the Puuc collapse: 1) competition from the exogenous Itzá people of Chichén, an emerging and militaristic state some one hundred kilometers to the east; 2) increasingly frequent droughts that diminished carrying capacity and the legitimacy of lordly power. He further proposes that anthropic deforestation itself might have forced the drying trend. Problematically, the relationship between deforestation and climate change at local scales remains poorly understood at both empirical and theoretical levels. Yet exactly such regional paleoecological studies as *Lords of the Hills* are key to better diachronic and spatial modeling of such human-environment processes. Speculatively then—and not rigorously testable given the existing database—ideological inertia might have prolonged lordly power and corollary pressure on the biophysical subsystem beyond the tenable, ensuring a quantum environmental degradation that prohibited regrouping at a more modest production level.

In sum, this is a regional monograph with an emphasis on primary data presentation. As such, its main appeal will be for Mesoamericanists. Its strengths lie in the innovative eclecticism of the methods employed to elaborate a straightforward, tightknit thesis and in the presentation of a generous amount of supporting data. Appendices of soil and settlement

attributes fill a third of the pages; fourteen tables present quantitative data; maps and other illustrations are rife throughout, an average of more than one every second page.

Several typographic errors, bibliographic omissions, missing diacritics, and an errata sheet diminish the otherwise diligent proofing. The binding should withstand field consultation, at least during the dry season. Figures integrate well with text, and drafting generally is effective, but the printer occasionally stunted and occasionally slathered the ink, obscuring details of photographs and of maps often already at the limits of legible reduction.

For some time now, the significance of contributions by geographers to human paleoecological research in Latin America has been greater than the numbers involved might suggest (cf. Martinson 1992). Dunning's volume extends that tradition.

Key Words: ethnopedology, human paleoecology, landscape iconography, Mesoamerica, Puuc Maya, settlement survey.

Reference

Martinson, T. L., ed. 1992. *Benchmark 1990. Conference of Latin Americanist Geographers* 17/18.

The Coca Boom and Rural Social Change in Bolivia. Harry Sanabria. Ann Arbor: The University of Michigan Press, 1993. xii and 277 pp., gloss., biblio., and index. \$47.50 cloth (ISBN 0-472-10313-X).

Reviewed by Ray Henkel, Department of Geography, Arizona State University, Tempe, Arizona.

This book focuses on aspects of change in a rural village in highland Bolivia resulting from the entry of peasant farmers into coca leaf production to supply the international cocaine market. The stated goals of the author were: 1) to systematically examine some of the social and economic consequences that producing coca for the international cocaine market had on members of Pampa, a peasant village near Cochabamba, Bolivia; 2) to examine how and in what context Bolivian peasants forged links with and contributed to the emergence of this market; and 3) to examine critically and adopt a position on current narcotics and economic development policies in Bolivia, largely devised and implemented by foreign

policy makers having as their purpose the control and elimination of coca production.

In the introductory chapter, Sanabria reviews and critiques some of the current theories on peasant wealth accumulation. This critique focuses primarily on theories of subsistence and accumulation in peasant societies in transition to a cash economy and the applicability of these theories to Bolivian peasants entering the cash economy through coca cultivation. Chapter 2 presents an overview of the physical, historical, and social landscape of peasant community in highland Bolivia where the peasants have long resided and of the Chapare Region in the tropical lowlands where they have migrated to either cultivate