

## Book Reviews Geoarchaeology

**Espacio, Ambiente y los Inicios de la Agricultura Indígena en el Noroeste Argentino: Un Enfoque Arqueológico.** María Marta Sampietro Vattuone. 2010. JAS Arqueología Editorial S.L.U., Madrid. 188 pp., ISBN978-84-938146-4-9, 19€ (paperback).

María Marta Sampietro Vattuone is the first recipient of a doctorate in archaeology from the Facultad de Ciencias Naturales, Universidad Nacional de Tucumán, Argentina. Currently, she is the director of the Geoarchaeology Laboratory and professor at the same institution, as well as adjunct researcher for CONICET (the Argentine Council for Science and Technology). Her main interest is in geoarchaeology, specifically, Quaternary processes linked to human activity and biological anthropology. Responsible for a large volume of publications on the geoarchaeology of early agriculture in northwestern Argentina, she is committed to reconstructing the history of environmental change and human impact during the early occupation of the Tafi Valley, Tucumán Province.

“Relevance” is a word that captures the essence of this important book. Using geoarchaeological models and strategies, Sampietro Vattuone summarizes several years of research focused on geomorphology and archaeology before and after the settlement of sedentary communities in the Tafi Valley, including the development of pre-Hispanic agriculture. Hers is one of the earliest attempts to integrate physical and cultural elements (e.g., paleoenvironments, agriculture) in understanding the transition from a nomadic to sedentary lifeway as a result of environmental change and human activity in this area. In the book, she analyzes the processes that form distinct sites, factors related to site selection, and methods of land use. The book provides a multidisciplinary approach that includes geomorphology, stratigraphy, soil science, geochronology, geochemistry, and, of course, archaeology. Integrating this multidisciplinary strategy, she proposes models of occupation over the past 6300 years in northwestern Argentina (NWA).

Throughout 10 chapters, Sampietro Vattuone takes us step by step through a detailed understanding of the regional geology and archaeology of the Tafi Valley. Chapter 1 summarizes the geological and physical settings encountered by ancient inhabitants of the Tafi Valley during the Formative period (700 B.C.–A.D. 1000) occupation of NWA. In this chapter, she identifies the geomorphological features that constrained human occupation and how that occupation evolved over time. In her work, she highlights the importance of the Tafi Valley to the study of pre-Hispanic cultures in NWA, both as a source for understanding the human-environment relationship and as an important trading partner with sites in the Atacama Desert. “Menhires” (large, upright standing stones) in the area suggest development of a stratified society and are another indicator of social development.

In Chapter 2, the author documents current knowledge on paleoclimate and paleoenvironments in NWA and on how they influenced human activity. For the purpose of this study, she describes alternating arid to wet cycles regionally recorded in palynological proxy data over the past 6300 years. Next, using the pollen data, she analyzes paleoenvironments of the Tafi Valley and how climate influenced sedimentary units and landforms (e.g., alluvial fans and debris flows) in the area. With this perspective, she compares our current knowledge of the archaeology of the Tafi Valley with that of the surrounding area, summarizing the regional literature. She notes that the extant archaeological record, though significant, is poorly studied.

To place her research into an anthropological context, Sampietro Vattuone asks some key questions in Chapter 3, such as: “What was community life like for men, women, and children?”; “How did they distribute and develop their social and labor roles?”; “What is the evidence of their diverse activities?”; “What activities are still in use by modern communities?”; and “What can we learn from the archaeological record?” The author explores how the tools of geoarchaeology have been applied elsewhere to answer these questions, and their potential to better understand the current study area. She recognizes that geoarchaeology is a dynamic, well-structured, and chronological study of physical, chemical, and biological events associated with anthropogenic activity. Sampietro Vattuone prepares the reader to take a geoarchaeological perspective and explore the environmental factors and forces responsible for the settlement and evolution of pre-Hispanic agricultural societies during the Formative period in the Tafi Valley.

Chapter 4 summarizes the tools used in this study. Sampietro Vattuone describes the geoscientific methods employed to identify the site’s morphogenesis, paleopedology, lithostratigraphy, paleoclimate, and geochronology, that together help to reconstruct the paleoenvironments where Formative period people of this region lived. She explains the field and laboratory methods used in her investigation, including excavations, sampling strategies, and age control. The author cites the physical and chemical analyses used in the study; however, she fails to provide a justification for each one of them. This missing information is not an obstacle to understanding her goals. She also discusses the application of geographic information systems (GIS) to create layers that allow her to distinguish between agricultural and living areas and to identify the level of complexity that developed over time.

Village structures and their geographic locations are presented in Chapter 5. Sampietro Vattuone identifies five types of structures (simple, double, compound, complex, and fences) along the piedmont and valley at four archaeological sites: El Tolar on a cone glacis, Cumbres Calchaquies on the piedmont, and Costa 1 and Costa 2 on alluvial fans. She also distinguishes occupation as agricultural or habitation. The author then analyzes the geological evolution of each site since the late Pleistocene,

followed by a detailed description of the diverse anthropogenic structures built at each of the four sites.

In the next four chapters, Sampietro Vattuone provides some examples of how she tackled the questions proposed in Chapter 3. For example, in Chapter 6, she describes one particular excavation of a compound unit where she explains the relevance of taking soil profiles from intrahabitational space and from spatially related agricultural fields. Excellent illustrations and GIS models help the reader follow her discussion of age control and chemical analyses. Measurements of alkalinity, as well as available and organic phosphorus, allow the author to identify the specific use of space (e.g., storage, burial).

In Chapter 7 and the following chapters, Sampietro Vattuone presents the environmental reconstruction of the Formative period. The author concludes that the Tafí Valley was subjected to prolonged episodes of climatic and landscape stability occasionally altered by aridization before and after the Formative period. Environmental stability encouraged the practice of agriculture between 700 B.C. and A.D. 1000. In Chapter 8, she summarizes the types of agriculture practiced by Tafí farmers. Using chemical signatures of agricultural soils as well as archaeobotanical and palynological evidence acquired from each site, she identifies cultigens from wild species that, in turn, offer an opportunity to estimate human population size. However, in the Synthesis section (8.4: pp. 152 and 153), some prominent editorial errors make the reading confusing and deserve the attention of the publishers, as well as the author, in future editions.

Chapter 9 synthesizes geoarchaeological information for the four sites in the Tafí Valley. The stable environment that long prevailed in NWA during the Formative period favored the development of fertile soils appropriate for the arrival of agricultural ceramic populations that settled in the region. Sampietro Vattuone's work shows the evolution of this relationship over time as the gradual transformation of the community from prehistoric to modern times left an imprint on the land. Chapter 10 offers a synthesis and conclusion regarding the Formative period in the Tafí Valley. Integrating her results and interpretations in light of questions discussed in Chapter 3, she successfully portrays a dynamic model of human environment relationships. She highlights environmental differences between the Formative period and the present, and presents the type and magnitude of anthropogenic impacts left on Formative period soils by the Tafí culture.

This publication is a valuable contribution to the study of archaeology in Argentina. It is an important tool for archaeologists and anthropologists interested in understanding the evolution of human communities in an environmental context. It also serves as a significant reference for a wider group, including policymakers and environmental scientists. Sampietro Vattuone's stresses the importance of motivating members of the geoarchaeological community to pay more attention to understanding the Formative period and subsequent periods in NWA in terms of paleoenvironments. Equally significant is one of her closing statements: "Without planning and the appropriate mitigation programs, archaeological sites will continue to suffer the negative impact of modern agriculture and tourism in the Tafí Valley . . . ."

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