terpretation of Mead’s rise to iconic status. I think Mead would have liked this solidly researched and convincingly interpreted book, and I think she deserved it. I think she would think that she chose well when she chose Lutkehaus as her assistant half a century ago.

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Ceramic Ecology, Ethnological Analogy, and the Interpretation of Archaeological Change
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Diachronic study is largely the domain of historians and archaeologists who consider time as a critical dimension of research. It is rare to find ethnological studies addressing change and harder yet to appreciate how it might be recorded. A human lifetime would not be expected to incorporate factors that could track transformations, but this particular viewpoint limits the scope and potentials of ethnographic research. Investigations that consider issues in quantitative terms, such as number of households, supply of resources, and distribution of products, can track cultural transformation over time periods as short as a decade. While these changes are most often perceived as ephemeral when research is focused on longer periods of time, they can also be viewed as the short term of cultural “evolution.” Indeed, there are questions that can be investigated ethnographically that bear significantly on historical and archaeological interpretations, particularly those of household activities.

Certainly, an understanding of the archaeological record requires grounding in ethnography. As Dean Arnold asserts in his new book, Social change and the evolution of ceramic Production and Distribution in a Maya Community, to decipher history or prehistory, we rely explicitly or implicitly on analogy. This is the point of departure for Arnold’s well-researched treatise on ceramic production that identifies critical conditions for change, demonstrates how these circumstances are measured and tracked over time, and reveals their upmost relevance to understanding not only the present but also the past.

Arnold’s book comes to us, in part, as a reflection on nearly four decades of research founded in Thompson’s (1958) initial study in the town of Ticul, Yucatan. The stretch of time embraced by Arnold’s research provides an essential backdrop for an appreciation of internal and external impacts to the chart of changes in ceramic production and associated technology. He also provides insight into how household producers and products of any kind can be influenced and mediated by the local physical environment. The discussion is benefited not only by the material base that Arnold brings to his subject but also by his conscious effort to consider both evolutionary processes impacting changes in ceramic production and the context of technological choices and significant cognitive factors involved. Appreciating the value of multiple paradigms, Arnold demonstrates a breadth in understanding culture from a holistic perspective, eschewing the popular themes and providing concrete data to substantiate his far-reaching interpretations and conclusions.

The research is aimed at the archeologist, but there is no doubt the ethnologist will find much reward in Arnold’s grasp of his topic of ceramic ecology, as set forth by Matson (1965) and others more than 40 years ago. By ecology, we find, in his multipronged research design, a consideration for the natural and social environment, each contributing to the whole. To make pottery, you need clay, and this resource has specific qualities and distributions that vary geographically. The sources may be close or distant to the ceramicist, easy or difficult to access, simple or complex to process, but all require investment and practice to provide continuity for the product. To maintain the potter’s craft, there needs to be a context for learning the associated technology, the space for manufacture, and a social organization that meets a consumer demand. In short, the disclosure of the process of adaptation and its consequent changes orbit around how the procurement, production, and distribution of ceramics are managed within a population.

Bringing Cathy Costin’s (1991) production parameters to the forefront, Arnold organizes his discussion and analyses around the framework of demand for the potter’s wares, the relationships of potters to one another, the scale of production in terms of size and recruitment, and the intensity of time the potters spend on their craft, based on variables of efficiency, risk, and scheduling. Costin’s article provides a theoretical foundation for Arnold’s book, and we are called to reread her important contribution.

Arnold uses Costin’s archaeological variables, providing a test for evaluating her contentions and a basis for refining them. Bearing on his argument for the value and importance of ethnographic analogy, Arnold asks, is the context and evolution of specialization universal, as archaeologist Costin opines, or is it limited to the unwritten past? He revisits this question in the conclusion to provide a new level of understanding regarding processes impinging on ceramic production and, for that matter, specialized production in general.

Unpacked in separate chapters, eight critical variables of ceramic production are considered by Arnold. First, the population and organization of potters are exposed in terms of
the forces of continuity and change, where household recruitment and learning traditions are maintained. Next, demand and consumption are evaluated in terms of quantitative measures focused on traditional and new opportunities related to social changes. Third, the role of product distribution is assessed as a vital link to changes in the demand for commodities, as the two processes are gradually separated from one another in Ticul over time.

Fourth and fifth, clay and temper procurement, both basic to the process of ceramic production, are evaluated. For an archaeologist, the use of clay and temper are among the most measurable variables that can be used in analyses of ancient ceramics. It was a revelation that while clay and temper were readily measured relative to the number of associated sources and access to them, the quality of raw materials and both mining technology and specialization were all significantly impacted by ownership of the resources.

I have been investigating the origin of volcanic ash temper in Late Classic Maya ceramics (Ford and Spera 2007) and have used Arnold’s (1985) research to guide my inquiry. Arnold found that procurement distances for clay and temper, the principal components in ceramic products, come from a close proximity. Although commonly used as a temper in serving wares of the Late Classic period, fresh volcanic ash, unidentified as an indigenous raw material of the limestone Maya lowlands, must have been a local resource when it was used as a dominant component in the multitude of serving vessels collected in this region. Yet there have been no recorded sources for this tempering agent near Tikal or El Pilar, where volcanic ash exhibits a wide distribution throughout all residential and ceremonial contexts. Here new dimensions impacting resource procurement, such as changes in access, technology, and even specialization, could be considered.

Following this reflection of variables involved in resource procurement, Arnold’s sixth chapter initiates an examination of factors important to the physical process of ceramic production, the fabric of the pottery or the paste. Pastes consist of the admixture of the clay and temper and are evaluated on the basis of component effects, affected by changes in factors, such as raw material procurement strategy, that are reflected in the final product. But paste, as demonstrated by Arnold, is also impacted by the technological choices of the potter. The seventh variable examined is forming technology, described and evaluated in terms of the conservative nature of the production unit and the evident need to adapt the craft to new demands. The final variable is that of firing: the point when formed vessels are concretized in their shape on the basis of the firing process. Factors such as access to fuel, the rate of fuel consumption, and the number of firing production units within a defined population can be measured in the final product. Arnold’s coverage provides an essential outline for any research on production specialization.

Illustrations are an important information source, and Arnold’s comprehensive book uses these materials to great advantage. Maps are effective, charts and graphs summarize the text, tables distill data, and figures and photographs are illuminating. The selection of data presented is invaluable in the appreciation of the foundations of change in ceramic production. The information on the distribution of production, the complexity of demand, the challenges of resource procurement, the importance of production infrastructure, the flexibility of standards, and the value of the social context of production are all supported with the tables and charts. These data compilations are crucial to understanding and appreciating the fact that, in only decades, changing forces of procurement, production, and distribution are indelibly reflected in the household, the community, and the region.

Arnold’s use of the tenets of ceramic ecology as a basis for his research underscores the significance of the relationship of the craft specialist to the environment, an affiliation that cannot be ignored in analyses of ceramic production. As a consequence, the results of Arnold’s presentation are vast and prove the value of Costin’s archaeological variables of demand, concentration, scale, and intensity in the ethnographic context. Arnold’s conclusions take Costin’s themes to a higher level, demonstrating nuances and details that come from his long-term research in Ticul. The exposition is enhanced by perceptive observations and personal experiences that provide the human connection that Arnold brings to his ethnographic research. His quantitative data collection finds life in these vignettes, and the reader becomes aware of how deep the author’s ties are to the community of Ticul.

Arnold’s book sets a high standard for all future ethnographic research in general, as well as more specifically in craft specialization and production. His parsimonious tests, his clear identification of theoretical considerations, and his use of the literature provide a comparative basis for understanding organization, household production, and change in our world today. He promises future synthetic books on related issues of production in Ticul, and they are to be eagerly anticipated.

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