



## Geo-ethnoarchaeology in action



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### ABSTRACT

For over half of a century, ethnoarchaeology has served as an important analytical tool in the development of archaeological theory and the interpretation of human culture. In recent years, with the growth of geoarchaeology as a subdiscipline of archaeological research, scholars have begun to examine contemporary and recent contexts by applying analytical methods from the field of geosciences (e.g., soil micromorphology, mineralogical, elemental, phytolith and isotope analysis) in order to better understand site formation processes and depositional and post-depositional processes. First, this paper explores, as contributions to archaeological sciences, the concept of ethnoarchaeology in general and the emergence of geo-ethnoarchaeology in particular. Second, through examination and synthesis of several key case studies, this paper emphasizes the usefulness of a broad range of laboratory-based analytical methods in linking the archaeological record and human activity. Third, this paper brings together data from recent geo-ethnoarchaeological studies conducted in Africa, South and Central America, Europe and South and West Asia that analyze floor deposits, hearths, degradation of mud houses, use of space, use of plants, animal husbandry and cooking installations. A wealth of information is assembled here to form a reference framework crucial to any study of archaeological materials and sites and for the interpretation of archaeological site formation.

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### 1. Introduction

Ethnoarchaeology has been a well-established subdiscipline within archaeological research for over half a century. The ethnographic component, and especially the availability of direct

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information regarding human activity in relation to formation of archaeological materials and sites, plays a significant role in forming frameworks of interpretation of archaeological materials and sites (see [David and Kramer, 2001](#), for detailed account on ethnoarchaeology). Geo-ethnoarchaeology is a research strategy applying geological principles and methods in an ethnoarchaeological context in order to link human activities (i.e., within sites and human interaction with the environment) and the formation of archaeological sites and landscapes. The main goal of geo-ethnoarchaeology is to facilitate interpretation of archaeological materials and contexts from a geosciences perspective.

### 1.1. The emergence of geo-ethnoarchaeology

Although few studies could be considered geo-ethnoarchaeological prior to the 1990s (e.g., [Gifford, 1978](#); [Gifford and Behrensmeier, 1977](#); [McIntosh, 1974](#)), it was during the last decade of the 20th century that geo-ethnoarchaeology became a popular research strategy. This research strategy emerged when several geoarchaeologists sampled sediments from living communities in order to obtain new data that might allow better association of the archaeological record beyond the visible range with past human activity and site formation processes (e.g., [Brochier et al., 1992](#); [Goldberg and Whitbread, 1993](#); [Middleton and Price, 1996](#)). In fact, the living context did allow geoarchaeologists to better understand the microscopic materials and chemical residue deposition patterns observed in archaeological sites. Geoarchaeologists were able to observe the complete sequence of events – from human activity to post-depositional processes – that eventually formed the archaeological record and associated specific activities or contexts with microscopic and chemical signatures.

A few pioneering geoarchaeological studies used ethnoarchaeological contexts and methods, and in doing so, they helped to establish geo-ethnoarchaeology as a widely used research strategy. One of the first geoarchaeologists to conduct a detailed study in an ethnoarchaeological context was Jacques Brochier ([Brochier et al., 1992](#)). Following his observation of microscopic fibroradial calcitic crystals associated with archaeological dung ([Brochier, 1983](#)), he studied with others several cave sites and open-air sites in Sicily that were used for sheep and goat herding. Their study was the first to establish a framework and guidelines for the identification of animal enclosures in archaeology ([Brochier et al., 1992](#)). Following this important study, many others embraced a geo-ethnoarchaeological approach to better understand archaeological dung remains (e.g., [Elliott et al., 2015](#); [Goren, 1999](#); [Gur-Arieh et al., 2013](#); [Lancelotti and Madella, 2012](#); [Milek, 2012](#); [Portillo et al., 2014](#); [Shahack-Gross et al., 2003, 2008](#); [Shahack-Gross and Finkelstein, 2008](#); [Tsartsidou et al., 2008](#)).

Another example of a pioneering geo-ethnoarchaeological study was performed by [Goldberg and Whitbread \(1993\)](#). They studied earth floor deposits of a living Bedouin tent through a micromorphological analysis of thin sections. They showed the association of specific micromorphological patterns and the presence of various materials within different activity areas (e.g., tent interior and exterior, dung heaps, hearth and refuse areas). In addition, they were able to both evaluate the turbation of the deposits due to post-depositional processes and estimate the ability to identify such patterns and materials in the archaeological record ([Goldberg and Whitbread, 1993](#)). Their work formed a methodological framework, later adopted by many others, that called for applying a micromorphological analysis of floor deposits in ethnoarchaeological contexts in order to better understand archaeological floor deposits and site formation processes (e.g., [Boivin, 2000](#); [Friesem et al., 2011, 2014a, 2014b](#); [Goodman-Elgar, 2008](#); [Milek, 2012](#); [Shahack-Gross et al., 2003](#)).

[Middleton and Price \(1996\)](#) sampled floor deposits from a living house in Mexico. These samples were later analyzed for their elemental composition. Working in an ethnoarchaeological context, their results served as key reference data for associating specific activity areas with chemical signatures. Their work was widely used in later archaeological studies (e.g., [Homsey and Capo, 2006](#); [Hutson and Terry, 2006](#); [Milek and Roberts, 2013](#); [Parnell et al., 2002](#); [Sarris et al., 2004](#); [Wells, 2004](#), to mention but a few). The study by [Middleton and Price \(1996\)](#) also inspired others to study living communities in order to evaluate the chemical residues left by human activities and to form a reference dataset of chemical signatures of human activity (e.g., [Fernández et al., 2002](#); [Knudson et al., 2004](#); [Knudson and Frink, 2010](#); [Lancelotti and Madella, 2012](#); [Rondelli et al., 2014](#); [Terry et al., 2004](#)).

Although those few studies were influential and significant in laying the methodological foundations of geo-ethnoarchaeology, the wide spread of such an approach can be attributed to the beginning of the 21st century, which saw a major increase in geo-ethnoarchaeological publications. In her doctoral research, [Boivin \(2001\)](#) used soil micromorphology to study rituals in rural India that resulted in layered patterns of wall plaster. She associated the symbolic aspects of such rituals with the formation of microscopic deposition patterns, as observed by micromorphological analysis, and compared the patterns to similar patterns observed in the Neolithic site of Çatalhöyük ([Boivin, 2000](#)). In that aspect, Boivin succeeded in bridging the more ‘common’ ethnoarchaeology – which focused on symbolic and cultural meanings of material deposition – and micromorphology, which focused on analysis of microscopic deposition patterns. Two years later, Ruth Shahack-Gross published her own work, conducted as part of her doctoral study, in which she studied the formation of enclosure floors for herbivores ([Shahack-Gross et al., 2003, 2004](#)). To do so, she sampled sediments from recently abandoned animal enclosures of the Maasai of Kenya. By sampling recently abandoned sites, she could, on one hand, obtain detailed information by interviewing people who personally used the enclosures (e.g., animal type, duration of use, type of use and time of abandonment) and, on the other hand, simulate a near-archaeological setting in sites that were abandoned for more than twenty years since these sites usually had organic material already degraded. In her work, Shahack-Gross combined several methods of analysis to develop guidelines for the identification of animal enclosures in the archaeological context ([Shahack-Gross et al., 2003, 2004, 2008](#)). The work of Shahack-Gross and colleagues emphasized the importance and usefulness of using the ethnoarchaeological context to study recently abandoned sites – as opposed to sampling only living contexts – in order to form a near-archaeological setting to better simulate archaeological site formation processes. This approach was later followed in many other geo-ethnoarchaeological studies (e.g., [Friesem et al., 2011, 2014a, 2014b](#); [Goodman-Elgar, 2008](#); [Koulidou, 1998](#); [Mallol et al., 2007](#); [Milek, 2012](#); [Tsartsidou et al., 2008](#); [Wilson et al., 2005, 2006, 2008](#)).

## 2. Theoretical and methodological framework

### 2.1. Ethnoarchaeology

Ethnoarchaeology can be defined as a study embodying a range of approaches to understand the relationship of material culture to culture as a whole, both in the living context and as it enters the archaeological record. The aim of ethnoarchaeology is to exploit such understandings in order to inform archaeological concepts and to improve interpretation ([David and Kramer, 2001](#)). Archaeological research uses various analytical methods to understand the nature of physical remains found in archaeological contexts. In

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