Oxford Handbooks Online

The Organization of Pottery Production: Toward a Relational Approach

Kim Duistermaat

The Oxford Handbook of Archaeological Ceramic Analysis
Edited by Alice Hunt

Print Publication Date: Dec 2016
Subject: Archaeology, Archaeological Methodology and Techniques, Production, Trade, and Exchange
Online Publication Date: Jan 2017 DOI: 10.1093/oxfordhb/9780199681532.013.9

Abstract and Keywords

A brief discussion of two traditional approaches in the study of pottery production organization, ceramic ecology and typologies of production, identifies several key problems. In order to move forward and develop new strategies, it is proposed to adopt a symmetrical perspective, integrating methods and concepts from a variety of theoretical origins, including chaîne opératoire, object biography, relevant user groups or cadena, and entanglement. A brief case study outlining a proposed strategy for a relational approach to the study of ceramic production organization concludes the chapter.

Keywords: pottery production organization, relational approach, symmetrical perspective, entanglement, chaîne opératoire, object biography

Introduction

THE organization of ancient pottery production has been a topic of interest in ceramic archaeology for decades,[1] because organization and production are seen as sources of information on the economy and sociopolitical processes in society (Schortman and Urban, 2004; Costin, 2005). However, besides viewing organization as a proxy for larger-scale economics or politics, it is equally interesting to study organization on its own merits (Kohring, 2012b). How people organize themselves in order to make pottery concerns the relations between the people who make pottery, the relationships between potters and pottery users, and the dynamics of power and authority between potters and others. How did people cooperate and communicate, and how did they control material, human, and spatial resources, as well as the products? And how is the organization of

pottery production related to the organization of other activities? Archaeologists try to approach these questions by searching for links between the material and the social aspects of pottery production. We usually try to identify material correlates for predefined social structures, often based on ethnographical examples. In this chapter I argue that these strategies have a tendency to limit our view on the diversity of ancient organizational practice, because their top-down perspective restricts the possibilities for identifying new, previously unknown ways of organizing. On the contrary, I advocate the development of a bottom-up, relational approach, building on several recent developments in the study of technology and organization. Such an approach will enable us to think outside the predefined boxes of types, modes, and parameters of production, in order to access the large variety of ways in which people organized pottery production in the past.

This chapter will first discuss several traditional archaeological approaches to the organization of pottery production, including ceramic ecology and typological approaches. My main focus is on what I see as a major issue: these approaches struggle to bridge the analytical divide between the material remains and the social structures (organization) they are (p. 115) trying to identify. I do not present a complete chronological or historical overview: many of these approaches were developed in roughly the same period, have mutually influenced each other, and are still influencing the work of many pottery specialists today. I will proceed to discuss a number of approaches that focus on technology and human–thing relations, including social constructivist approaches, behavioral archaeology, and approaches influenced by actor-network theory. The latter see “the social” not as a structure or framework that has left material traces; rather, the social is understood as an effect that comes about through the interaction of people, artifacts, materials, and animals. These perspectives do away with the gap between material and social. Not all of these “sociotechnical” approaches have yet been applied to the study of pottery production organization, but they jointly provide important tools and principles for future work. In the section entitled “Towards a Relational View of the Organization of Pottery Production”, I present some preliminary suggestions for a relational approach, using an archaeological case study as an illustration.

Ceramic Ecology

Which variables, which people, things, materials, circumstances, institutions, and events, influence how pottery was produced in a specific case? At least since the work of Frederick Matson (1965) it has been clear that ceramic production should not be studied

in isolation. Production is too strongly interlinked with consumption, distribution, and other processes in society to do so. We should study the organization of production as part of a larger whole, including the artisans and their social identities and roles, their technologies and the means of production, the objects themselves and their functions and meanings, the mechanisms for distribution, and the consumers (Costin, 2005: 1038–1039). That all these components together influence, and are influenced by, production has been central to pottery studies for a long time, especially since the articulation and spread of ceramic ecology, later combined with general systems theory (a historical review can be found in Kolb, 1989; see also Matson, 1965; Rice, 1984, 1987, 1996: 184–185; Van der Leeuw and Pritchard, 1984; Arnold, 1985; Pool, 1992; Pool and Bey, 2007: 17–20), and the "Leiden School" approach to pottery study (Loney, 2000; Van As, 2004). "Holistic ceramic ecology" presented a model in which the "pottery production system" is influenced by the physical, biological, human, and cultural environment, and by the economic, social, religious, and psychological subsystems (Kolb, 1989). The ceramic ecological approach explicitly aimed to focus on the relations between all "subsystems" and their constituent parts in the model. The aim to understand the relations between the environment, materials, social and economic factors, and the production and use of pottery, resulted in a boost in archaeometric, ceramic ethnoarchaeological, and experimental research. The approach encouraged archaeologists to work together with other disciplines, and to look at the total picture rather than one aspect of production only. This approach has in many different ways shaped archaeological ceramic research, and is still very much a visible influence in recent work (Pool and Bey, 2007: 19).

Critics have accused the model of "techno-environmental determinism" and of not focusing enough on understanding the exact nature of the relationships between the variables (Gosselain, 1998; Jones, 2004; Pool and Bey, 2007: 18; Arnold, 2008). The model groups social, economic, religious, and environmental factors in just as many subsystems, and (p. 116) keeps them apart from each other and from the pottery production subsystem. Although it acknowledges links between each of them, they are kept as separate analytical entities, forming a "frame" or "context" for pottery production. This creates an inferential gap between the data on the pottery and its manufacture, and the social, economic, or religious "frame" in which these data are supposedly set. We have to manage a jump from one system to the other, from the pots at hand to the "larger" context, but it is not clear how to do so. Moreover, in the ceramic ecological approach, materials, objects, and humans have rather passive roles to play. Human behavior is seen as an "adaptation" to the environmental, cultural, social, or economic context. Material properties and principles are often seen as main drivers behind technical choices, leaving "the social" in the background.

Typological Approaches

Between the 1970s and the 1990s, many archaeologists used modes or types of production organization to describe and classify the organization of craft production. Viewing organization as part of the socioeconomic context or of political economy, they explicitly aimed to focus on the social, economic, and political factors relevant to production. In pottery studies, the most often-used typologies include those of David Peacock (1982), Elizabeth Brumfiel and Timothy Earle (1987), and Sander Van der Leeuw (1977). Over the past two decades, critique on typological approaches has been fierce (e.g. Costin, 1991, 2004, 2005, 2007; Pool, 1992; Mills and Crown, 1995; Feinman, 1999; Clark, 2007a; Neupert, 2007; Pool and Bey, 2007; Shimada and Wagner, 2007; Arnold, 2012). A production type is a label that obscures the complex, continuously moving, multifaceted, and multilayered reality behind it. Types are limiting and prescriptive rather than helping us to understand. Many scholars of craft production have now abandoned their use; however, some current archaeological studies of pottery production still rely heavily on these classifications. Perhaps this is because of a tendency to search for simple ways to approach the enormous complexity of pottery production (Rice, 1996: 191; see also Costin, 1991, for a claim that identifying production organization is relatively easy). Unfortunately, the typological approach is still advocated in introductory texts (Tite, 2008; Orton and Hughes, 2013) and even in work that otherwise seems to have moved away from traditional typological thinking (e.g. Van der Leeuw, 2008: table 12.2).

As in the ceramic ecology approach, a fundamental problem of the typological approach is that production types are based on supposedly universal links between variables. These models assume agreement between a limited number of organizational variables, such as output, intensity of production, economic dependence on the craft, density of production debris, spatial extent of the distribution of the products, and the size, elaboration, and context of production locations (Feinman, 1999). However, many of these links are *assumed* to exist, mostly based on ethnoarchaeological case studies, but most links have not actually been studied very well. Furthermore, the material correlates of these variables are mostly assumed, rather than studied. Even those relations between variables and archaeological evidence that have been studied in more detail, through ethnoarchaeology, experimental archaeology, or archaeometry, are not universal (such as the causal links between organizational variables and “standardization”; for recent critical discussions see Berg, 2004; Gandon et al., 2014; Hilditch, 2014; Kotsonas, 2014; Roux, 2003b). Production types based on these (p. 117) links thus have limited relevance for real-life cases. However, our aim in studying pottery production should not be to

discuss the universality of the links assumed in the model, or the validity of the types of production. Our aim should also not be to classify our case in one or the other type. Rather, we should try to understand how—in our particular historical case—pottery production was organized and why in that manner, which links were there, and why.

A related problem is that these typologies also more or less explicitly assume relations between types of production and processes on a larger scale, such as the emergence of social complexity or state formation. Archaeologists tend to classify their case in a production type as a stepping stone to approach larger social processes, connecting those modes of production that are perceived to be more complex to increasing sociopolitical complexity (David and Kramer, 2001: 304). Related to this is the obsession with the concept of "specialization" as a cause or indicator of social complexity and political power (perhaps most clearly voiced in Rice, 1981; for more reading on the problematic concept of specialization see also Schortman and Urban, 2004; Hruby and Flad, 2007; Menon, 2008; Day et al., 2010; Baysal, 2013). This fascination with "specialization" is rooted in eighteenth-century political economy and nineteenth-century cultural evolutionism, and is shaped by our own experiences with capitalism (Clark, 2007a; Arnold, 2008). These theories sketch a unilinear evolution of human organization from egalitarian to capitalist, and frame organization in terms of costs, economics, and efficiency. This has historically defined the ways we understand the relations between specialization and human organization (Patterson, 2005; Kienlin, 2012), and the ways we understand the relations between technology and society in general (Dobres and Hoffman, 1994; Rice, 1996: 180; Arnold, 2008: 2–3; Dobres, 2010: 105). However, we should question whether neoclassical economic theory applies to past societies, or whether these models are limiting our views on the past (Clark, 2007a; Baysal, 2013).

More recently, it has been suggested that increasing sociopolitical complexity can better be characterized by a growing variety of simultaneously existing forms of production organization, not by the emergence of complex forms of organizations per se (Sinopoli, 2003: 21; Costin, 2004). Notwithstanding this nuance, it is unclear exactly how a type of organization such as "household production" (a label that covers a wide variety of cases and definitions), or a parameter such as "division of labor," connects to specific forms of sociopolitical organization; the precise links between them are not clearly defined. We should question, not assume, the nature of relations between organizational practices, political power, and social inequality (Schortman and Urban, 2004; Day et al., 2010).

Cathy Costin and Christopher Pool's Characterizational Approaches: Typologies in Disguise

In an attempt to overcome the drawbacks of rigid and prescriptive typologies, Cathy Costin (1991) suggested that we should describe production organization with the help of four parameters, which are not static but can each independently vary between extremes across a sliding scale. Originally these parameters were: context (the nature of elite control over production), concentration (the relative geographical concentration), scale (the size and constitution of production units), and intensity of production (the degree to which production (p. 118) is part-time or full-time). At almost the same time, Christopher Pool (1992; Pool and Bey, 2007) similarly proposed to study the "dimensions of variation" in production, consumption, and distribution. These included scale, intensity, size of production and consumption units, segregation of activities, location of production and consumption, the variability of products, and the range and direction of distribution. How these approaches differ is discussed in Mills and Crown (1995) and Pool and Bey (2007). Originally, Costin (1991) again proposed a typology, channeling the almost infinite number of possible combinations of the four parameters into eight types of production, ranging from "individual specialization" to "retainer workshop." There were several critiques on this approach: first, many aspects of the parameters (such as the amount of time spent on production, or the amount of income raised by production) are difficult to operationalize in the archaeological record (Sinopoli, 2003: 17; Shimada and Wagner, 2007; Menon, 2008; Kelly, 2009). Second, the focus is very much on the extremes of a parameter, but if a specific case sits somewhere in between it is difficult to position it in the model (Kelly, 2009). Moreover, the approach focuses mostly on the division of labor and sociopolitical centralization, and on artificial dichotomies such as prestige vs. utilitarian. And it neglects issues such as the value of things, time, and skill (Clark, 2007a; Shimada and Wagner, 2007; Day et al., 2010).

Again, each parameter conflates several aspects that are not necessarily causally related, thus reintroducing the problem with the assumed links between variables in the typological approaches mentioned above. For example, in Costin's model, the parameter "context" includes not only the relation of potters to authorities, but also makes statements on the types of product (utilitarian or luxury), on the principles driving production (such as efficiency), on the nature of demand, on the quality of the products, and on the access to products (whether controlled by elites or not). In "scale," the number of workers and the principles of their recruitment (kin-based or not) are conflated, although they are in reality not necessarily related. It is clear that in order to understand how these various aspects are related in a specific case, we must study them separately rather than conflate them in parameters (Pool and Bey, 2007; Arnold, 2008). In

her later publications Costin (2001, 2005) seems to abandon the eight types, stating that her approach of parameters varying along axes “eschews typology” (Costin, 2005). Furthermore, over the years Costin (2001, 2005, 2007) redefined the four parameters that are important for understanding production organization: they are now called the degree of elite control, the spatial organization of production units, the size of production units, and the relative amount of part-time or full-time production (Costin, 2007; Pool and Bey, 2007; Arnold, 2008). Additional important variables are listed as well, including the types of production loci, the social relations of production, the composition of the work-group, specialization, and the relations between producers and consumers (Costin, 2005).

Costin’s approach had a large impact in the field of pottery studies. Among the effects were a much more focused consideration of the various variables at play, and a clear realization that most variables are relative rather than absolute and thus can best be studied in comparison to other data. Many of the parameters are still found to be useful. Nevertheless, Costin’s approach, too, is limiting our vision to the specific nature of the links between all variables involved in the organization of pottery production in a particular case. Both typological and characterizational approaches decide beforehand which variables are most likely to be linked together and how, which variables are most interesting to look at, and which predefined sociocultural forms they may represent. This is overly reductive (Olsen et al., 2012: 184).

(p. 119) A Focus on Technology and Human–Thing Relations

The time has come to develop new strategies for studying the organization of pottery production in archaeology, to move beyond a search for the material traces of predefined forms of organization. Without disregarding the enormous wealth of information and useful concepts resulting from the approaches discussed above, I think a relational approach can be built from elements that are core issues in the approaches discussed below, all dealing with the study of technology and human–thing relations. It is time to consider “organization” as what has to be explained (the *explanandum*), rather than as a predefined category that explains the patterns in our data (the *explanans*; Latour, 2005). We should adopt a bottom-up approach that meticulously studies the data at hand on their own merit. Further, we should carefully study which relations exist between our data in our specific case, without relying from the outset on assumed, but non-universal, links. If our material conforms to such links, fine; if it does not, even better: we will have brought out new information. Moreover, we should take an holistic perspective and focus

on the materials, spaces, the potter, the pots, the users, and the function or use of the vessels. A future strategy should be applicable in cases where direct evidence for production is missing, and it should be useful for all kinds of societies. I think elements from approaches such as social construction of technology (SCOT), cultural technology, behavioral archaeology, holistic approaches, symmetrical archaeology, and entanglement can all contribute to the development of such a strategy, even if they have their roots in different theoretical or disciplinary backgrounds (for short introductions see Hodder, 2012b). In this section, I briefly discuss their principles and those elements I think are useful, before presenting a brief case study as an illustration.

The Social Construction of Technology

Social constructivist approaches were developed in sociology from the 1980s onwards. They reject explanations that attribute changes in technological practice only to their internal technical aspects, or to "black-box" mechanisms such as "efficiency," "market forces," "adaptation," or "progress" (Loney, 2000; Killick, 2004). For example, science, technology and society (STS) studies or social construction of technology (SCOT) studies (Bijker, 2010; Bijker et al., 2012[1987]) focus on how the choice for a particular technology is closely interwoven with the beliefs, social structure, and historical choices of various groups of people. Technology is socially constructed (Bijker, 2010). In the words of Dobres and Hoffman (1994: 247): "the relation between technology and society can be described as a 'seamless web' […] that dialectically weaves together social relations, politics, economics, belief systems, ideology, artifact physics, skill, and knowledge." One of the notions in this approach that is useful for my purposes here is the idea of "relevant social groups" (Bijker, 2010). SCOT acknowledges that an artifact, or technology, is heterogeneous: there is not one "real" artifact but there are many forms of it. This pluriformity exists because different social groups attribute different values and meanings to an artifact. In order to understand the social construction of technology, we have to identify these social groups and their view on the technology (p. 120) under study (Bijker, 2010). Social constructivist approaches have been criticized for privileging humans over things, artifacts, and technology, and for lacking adequate understandings of materials and technological processes (Killick, 2004). SCOT is rarely explicitly quoted as a source of inspiration for pottery studies (however, see Jeffra, 2011a; Murphy and Poblome, 2012).

Cultural Technology and *chaîne opératoire*

A social constructivist perspective that has become widely adopted in archaeology in general, and in archaeological pottery studies in particular, is that of technological choices or cultural technology (Lemonnier, 1992, 1993, 2012; Pfaffenberger, 1992; Dobres and Hoffman, 1994; Dobres, 2000, 2010). This approach claims that most components of a technique—the choice of materials, the energies transforming materials, the choice of tools, the specific gestures, and the knowledge and skills involved—are determined by social factors (Lemonnier, 1992, 2012). Techniques are never only ways to make things in a utilitarian sense; techniques are also ways to fulfil social, political, religious, and symbolic needs (Gosselain, 2011). One of the most important analytical tools offered by this approach is the use of the *chaîne opératoire*, or operational sequence, as a methodology to study social factors in technological choices (for a detailed discussion see Roux, 2011; Roux, Chapter 8, this volume). Another important idea is that technological choices in one technique may be paralleled in other techniques, together forming a technological system (Lemonnier, 1992, 2012). Pottery making and other crafts can share pervasive beliefs and practices, gestures, technical knowledge, or resources (such as clay or fuel). Relations between crafts may also concern the existence of similar objects in other media (Knappett et al., 2010), the shared use of space, a similar consumer group, or other crafts and activities carried out by potters during the day or year. Ideally then, pottery should not be studied in isolation from other crafts (Sinopoli, 1998, 2003; Sillar, 2000; Sillar and Tite, 2000; Killick, 2004; Sofaer, 2006; Brysbaert, 2007; Shimada and Wagner, 2007; Michelaki, 2008; Brysbaert and Vetters, 2010; DeMarrais, 2013; Goldstein and Shimada, 2013).

In ceramic studies the popularity of the *chaîne opératoire* approach has resulted in an increased focus on topics such as the social identity of potters, communities of practice, mobility and interaction of potters, skill, apprenticeship and learning strategies, and technological innovation and change (some recent examples are Gosselain, 1998, 2000, 2011; Roux, 2003, 2011; Berg, 2007; Michelaki, 2008; Brysbaert and Vetters, 2010; Jeffra, 2011a; Kohring, 2012a; Sofaer and Budden, 2012; Abell, 2014; Hilditch, 2014). These are all crucially important topics for understanding the organization of production. However, there seems to be less interest in studying organization. This is perhaps because in practice the *chaîne opératoire* approach as applied in archaeological pottery studies is mostly limited to the study of the producers and the production stage of ceramics: the preparation of raw materials, and the shaping, decoration, and firing stages, including the used tools, firing installations, and spaces (Sillar, 2000; Skibo and Schiffer, 2008; Hodder, 2012a). However, the organization of pottery production is influenced not only

by decisions made during the production of pots, but also by considerations related to their distribution and use. After production, pots become tools (Braun, 1983), components of other techniques such as storage, food preparation, transport, and burial, and therefore pots become part of the technological choices (p. 121) of users in their activities. Since all techniques can be studied with the *chaîne opératoire* approach, the method may be applied to the study of the whole life-cycle of a pot or an assemblage, from raw material selection, production, distribution, use, breakage, repair, and reuse, to discard, and to identify the social groups involved in these processes (Lemonnier, 1993, 2012; Naji and Douny, 2009; Knappett, 2012).

Behavioral Archaeology

One of the more vocal advocates of the need to focus on the interaction between people and things is behavioral archaeology. Developed since the 1970s by Michael Schiffer and colleagues, behavioral archaeology claims that it is impossible to directly observe "social processes," such as organization, since these are theoretical constructs. We can only study behavior, since behavior is composed of people–object interactions which leave traces (Schiffer et al., 2001; Schiffer, 2007, 2011; Skibo and Schiffer, 2008; LaMotta, 2012).

Behavioral approaches try to achieve a full understanding of a particular technology by studying, in minute detail, several core aspects. Well known is the focus on cultural deposition processes and site formation processes, a topic much neglected in other approaches to pottery production. Other core components of the approach are the behavioral chain and the life history (of objects or of technologies; Hollenback and Schiffer, 2010); activities and interactions; technical choices; and performance characteristics and compromises (Skibo and Schiffer, 2008; Hollenback and Schiffer, 2010). Behavioral approaches promote an integrated study of the complete life history of a technology or artifact, from procurement, production, use, reuse, and repair, to discard and deposition. Each link in this behavioral chain is an activity, an interaction between people and things. Behavioral chain analysis specifies all components of these interactions, such as the location, frequency, other artifacts, external influences, techno-communities, and *cadena*. The concept of *cadena* is used to indicate all social groups interacting with the artifact during its behavioral chain.

A *cadena* can be homogeneous, when all members appreciate the same performance characteristics of an object, or heterogeneous, including many different (and sometimes conflicting) demands on performance characteristics. The *cadena* and all activities in a behavioral chain provide input to the technical choices an artisan will make during

production, as an artisan weighs the effects of his choices on the various performance characteristics and demands (Walker and Schiffer, 2006; Schiffer, 2007; Skibo and Schiffer, 2008). The concept of *cadena* is comparable to the "relevant social groups" in the SCOT approach, but later publications suggest that a *cadena* not only includes people but may also contain objects and materials, treating people and things as socially equivalent or symmetrical (Walker and Schiffer, 2006; Schiffer, 2007; Skibo and Schiffer, 2008; Hollenback and Schiffer, 2010; a *cadena* also resembles the "entanglements" of Hodder, 2012a; see also below).

Behavioral approaches see *technical* choice as a (conscious or unconscious) decision based on the (utilitarian, symbolic, ritual, etc.) use of the *pot*, while the *technological* choice of the cultural technology approach concerns the (conscious or unconscious) adoption of a practice based on the experiences and background of the *potter* (such as social identity, community of practice, and learning patterns). Technical and technological choice are thus two complementary sides of the process of making things, which both may offer useful insights in the organization of production. For Schiffer's views on the differences and similarities (p. 122) between concepts of behavioral archaeology and cultural technology, such as behavioral chain vs. *chaîne opératoire*, technical choices vs. technological choices, and techno-communities vs. communities of practice, see Schiffer (2007) and Skibo and Schiffer (2008).

One of behavioral archaeology's main attractions for the study of the organization of pottery production is the focus on the people involved in all stages in the life of an artifact, which all may influence production, production decisions, and social relations during production. Behavioral archaeology moreover offers a practical methodology to study these processes. It actively advocates an integrated use of archaeology, ethnoarchaeology, experimental archaeology, and archaeometry.

Behavioral approaches have been said to be overly utilitarian and functionalist (Gosselain, 1998) or materially determinist (Hodder, 2012a: 229), emphasizing things over people (Webmoor, 2007). Although *in principle* they claim not to favor utilitarian, material-based, or functional perspectives over "non-utilitarian" social or ritual explanations (Skibo and Schiffer, 2008: 25; Hollenback and Schiffer, 2010: 318–319; Schiffer, 2011), *in practice* the approach is often understood as such. This is not in the least owing to the insistence that we have to identify utilitarian performance characteristics first, before thinking about possible non-utilitarian characteristics (as advocated in Skibo and Schiffer, 2008: 26; *contra* Dobres, 2000, 2010). Olsen et al. (2012: 186) furthermore object to the fact that behavioral archaeology puts the relational properties of things (performance characteristics) second to their "intrinsic" properties. Others point out that behavioral approaches do not pay enough attention to the deep

history of the involvements of people and things (Webmoor, 2007; Hodder, 2012a), and portray artisans as “engineers” doing tests and solving technical problems (David and Kramer, 2001: 141). An additional problem, in my view, is behavioral archaeology’s focus and reliance on predefined universal or nomothetic principles and assumptions about the relations between material traces and social processes. For behavioral archaeology they are not only the ultimate aim of our efforts but also an indispensable tool needed to bridge the gap between the archaeological record and our interpretation of it (as, e.g., in Schiffer et al., 2001; Walker and Schiffer, 2006; Schiffer, 2011). However, these principles and laws are obscuring our view of the actual associations between people and things (Gosselain, 1998; see also below).

Holistic Approaches to the Organization of Craft Production

An approach specifically developed to study the organization of craft production, and combining methods and insights from ceramic ecology, behavioral archaeology, *chaîne opératoire*, and constructivist perspectives, is the “holistic” approach developed by Izumi Shimada (Shimada and Wagner, 2007; Shimada and Craig, 2013). This ambitious approach explicitly looks at the whole craft production process, from raw material acquisition to product use and recycling, including both the material–technological and the social–ideological components of a craft production system, while trying to avoid modern preconceptions and analytical distinctions (Shimada and Wagner, 2007). It has four major components: (1) a regional, multi-site, and diachronic scope to clarify the environmental, historical, and social contexts of craft production and the distribution and use of its products; (2) the study of production sites, aimed at understanding the complete production process; (3) close interdisciplinary cooperation between complementary specialists; and (4) the integration of (p. 123) archaeometry, experimentation, and ethnoarchaeology (Shimada and Wagner, 2007). The focus in the holistic approach is very much on the detailed study of direct evidence for production, although in principle this approach can be applied as well to assemblages that lack such evidence.

Recent studies adopting an holistic approach to pottery production organization (including study of the environment, production, production locations, distribution, function, and use), whether or not explicitly following Shimada’s framework, are Day et al. (2006, 2010), Duistermaat (2008), Gagné (2012) and Greene (2013). Such holistic studies have been successful in bringing out the nuances and complexities of the (organizational) relations between all actors involved in craft production. They also clearly show that the study of craft production is far from an easy matter, and ideally involves a long-term commitment of an interdisciplinary team.

The Ontological Turn

Understanding the relationship between the social and the material, and developing theory and method to bridge the gap and understand the one by studying the other, has been a long-standing issue in archaeology (Olsen, 2003, 2010; Hicks, 2010); many would perhaps say that this is what archaeology is all about. A major transdisciplinary ontological turn that has been taking shape since the 1980s promotes a radically different perspective: the dualism between social and material, between humans and things, is not a given, but a construct of modernist thinking that we should let go of (Olsen, 2003; Walker and Schiffer, 2006; Witmore, 2007; Hicks, 2010; Watts, 2013). This perspective is strongly influenced by actor-network theory (ANT), a sociological approach originating in STS studies and developed since the 1980s (Law, 1992; Latour, 2005). In archaeology, approaches influenced by ANT that are relevant for my argument here include symmetrical archaeology (Shanks, 1998; Olsen, 2003, 2007, 2012, 2013; Webmoor, 2007; Olsen et al., 2012) and entanglement (Hodder, 2011, 2012a). Symmetrical concepts and ideas are also influencing behavioral archaeology (Walker and Schiffer, 2006; Schiffer, 2007; Skibo and Schiffer, 2008; Hollenback and Schiffer, 2010).

ANT-inspired approaches share an understanding of the social not as a category separate from the material, as a larger context or framework behind the material world. The "social" or "society" is not something written in or embodied by things; rather, things are an inseparable part of its constitution (Shanks, 1998; Olsen, 2010). "The social" is an interactive effect, emerging during the mutual interaction between humans, nature, things, animals, and so on. People, society, technology, and material culture are continuously coproducing each other, rather than one being embedded in the larger context or framework of the other. In order to see the effect we call "organizing," we have to reassemble the associations and interactions between all these actants, while treating people and things symmetrically, without any a priori ontological or analytical distinction between the two.

In this perspective there is no gap to bridge between the social and the material (Webmoor, 2007: 572); rather, the "materials of past (and present) societies are not seen as an epiphenomenal outcome of historical and social processes […] but actually as constituent—even explanatory—parts of these very processes" (Olsen, 2010). The lack of living people as a source of information in archaeology, as opposed to ethnography, is not seen as hindering (p. 124) or complicating the study of "the social" through material remains: "We uphold a materialist outlook—you do not have to talk to people to find out how they conceive of the world, because something of the way people operate, work, and do is wrapped up in their achievements. People are so involved with the world of material

goods that we can put to one side the old split between mind and matter, beliefs and the material world that may leave traces for the archaeologist to work upon" (Olsen et al., 2012: 167). This is not only relevant for archaeology: students of contemporary organizations increasingly turn to study materials and technology, irrespective of the fact that they can directly observe and interview organizational members (Orlikowski and Scott, 2008; Orlikowski, 2010; Leonardi et al., 2012; Carlile et al., 2013; Humphries and Smith, 2014). In this respect, organizational research is now starting to look at "things" using concepts and methods that have been used and developed in archaeology for decades.

Bruno Latour proposes that "reassembling the social" is best done by looking at situations of innovation, at the places where things are made (such as an artisan's workshop), at situations of breakdown and failure, and through looking at the history of technology (Latour, 2005). This, and the focus of ANT on technology, power, and organization, makes this approach especially interesting for those studying the organization of pottery production. However, there are as yet few pottery studies adopting ANT-inspired or symmetrical approaches (examples are Watts, 2008 (cited in Watts, 2013); Jervis, 2011, 2013; Stockhammer, 2012; Van Oyen, 2013).

Towards a Relational View of the Organization of Pottery Production

The approaches mentioned in the previous paragraph relate to, and differ from, each other in complex ways (Coupaye and Douny, 2009; Hicks, 2010; Hodder, 2012a; Ingold, 2012). A discussion of their compatibility or comparability falls beyond the scope of this chapter. In this section I propose these approaches may be combined to study pottery production organization. Examples of other strategies combining elements of these approaches are Hilditch (2008) and Jeffra (2011a).

Tracing Entanglements

As Latour (2005) suggested, "the social" (such as organizational practices) can be reassembled by empirically following, tracing, the numerous interactions between all human and non-human "actants." Similar strategies are employed by symmetrical archaeology using the term "rearticulation" (Olsen et al., 2012: 176) or entanglement (Hodder, 2012a). Interactions between these actants lead to the formation of actor-networks (Law, 1992; Latour, 2005), assemblages (Shanks, 1998; Alberti et al., 2013;

Fowler, 2013), or entanglements (Hodder, 2012a; see Fowler, 2013, for a more elaborate discussion of the differences and similarities between these concepts). Organization should be understood as a process, as emerging from such entanglements. There exist no such entities as "household production" or "attached (p. 125) production" which are out there and can be discovered, or which can be used to explain archaeological data. Rather, we have to explain how organization *becomes*, how it is a continuously emerging effect of the entangled and enmeshed relations and interactions of heterogeneous actants, including people, objects, tools, materials, spaces, and forces (Law, 1992; Hernes, 2008; Jervis, 2011; Humphries and Smith, 2014).

In the case of pottery production, the actants are many, and may include anorganic materials (clay, water, rocks, metal), plants (as fuel, organic temper, resins, rope and textiles, wood), people (potters, users, authorities, children, middlemen; including their skills, needs, demands, and identities), animals (transport animals, cattle and sheep providing dung for fuel and temper, bone tools, and hair as tools and temper), technologies (clay extraction, paste preparation, shaping, decorating, firing, transporting, cooking, storage, distribution, burial), architecture, places, and spaces (fields, mountains, the workshop and its location and layout, roads, places where pots are used), concepts, interests, feelings, and opinions (efficiency, aesthetics, magic, value, gender, norms), forces, energies, processes, and reactions (gravity, pressure, speed, oxidation, weight, temperature, time, decomposition). Each of these actants can, in their turn, be seen as entanglements, networks of relations. For example, a "potter" is a complex meshwork of interactions and associations between a human being, clay, tools, technology, knowledge, skills, other people's opinions about "potters," the community, and more. Recurrent interactions between all these may lead to a stable state that presents itself in daily life as a single entity, recognized as a "potter" (Law, 1992; Hernes, 2008; Michelaki, 2008; Orlikowski and Scott, 2008; Budden and Sofaer, 2009; Jervis, 2011; Fowler, 2013). One of the more challenging aspects of a research project is to determine which entanglements we decide to see—for analytical purposes—as such a black-boxed entity, and which entanglements we aim to "untangle" by following the interactions between all the actants involved (Latour, 2005; Hernes, 2008: 7–8). This depends on our research questions.

Research questions should avoid a top-down approach, avoid trying to fit archaeological evidence in (and searching for evidence of) a priori existing analytical distinctions (Shimada and Wagner, 2007), meta-narratives, frameworks, concepts, and models, such as "the emergence of complex societies," "craft specialization," or "modes of production" (Olsen et al., 2012: 175–176, 190). This does not mean that larger-scale questions are irrelevant. I am also not claiming that variables that are thought to influence craft organization, such as task divisions, specialization, or intensity of production (cf. Costin, 2005; Van der Leeuw, 2008: figures 12.2–12.8) are irrelevant.

Rather, I suggest that we should not let these constructs lead our way, determining from the start which associations are worth tracing. I propose that it is important to question, rather than assume, the existence and specific nature of these variables and the relations between them in each particular case, and to also actively search for any associations that do not fit these a priori frameworks. We have to adopt a bottom-up approach (Fahlander, 2013; Mímisson and Magnússon, 2014), focusing on practice and process, and systematically following the "networks of empirical, statistical, metaphorical, narrative, conceptual, causal and systemic association" in our data (Olsen et al., 2012: 176), while using our creativity and trying to think beyond our usual assumptions. Such a relational approach will also enable us to see how organization and complexity is apparent on any scale, and how we can approach larger-scale issues through the detailed study of materials on the micro-level (Day et al., 2006; Kohring, 2011, 2012b; Mímisson and Magnússon, 2014).

(p. 126) I propose four interlinked and overlapping strategies to study the organization of pottery production (Hodder, 2012a: 204–227; Humphries and Smith, 2014). First, it is important to attend to the material properties of the actants involved in pottery production, and to what they do: how they constrain, afford, or influence (organizational) practices. Secondly, using the *chaîne opératoire* approach, we can map the sequences, activities, and entanglements of pottery production and its organization, identifying all actants and establishing what they do. Thirdly, the *chaîne opératoire* approach may be used to follow the biography or life-history of our material. Last, we can trace the spatial aspects of these entanglements, including the location of materials and production, users and use activities, and the distribution and circulation of pottery. We can also trace the various temporal dimensions of the entanglements at various timescales (Hodder, 2012a). These approaches may be combined to bring the relevant social groups or *cadena* into view. All strategies are interlinked, and have no particular order or sequence (and most probably will be performed simultaneously). They provide different lenses one can use to look at the same material, to bring different aspects of it into focus. Together, they can be used to map entanglements and situate them in space and time.

I will briefly describe these strategies in more detail below, each time using a Middle Assyrian "carinated bowl" from Tell Sabi Abyad, Syria (*c*.1200 BC), as an example of an actant under study (all information is based on Duistermaat, 2008).[2] I chose this particular shape because it has become almost iconic for the supposedly standardized, centralized, state-controlled mass production of pottery in the Middle Assyrian period, a view which I find overly simplifying and unhelpful for understanding Middle Assyrian craft production. Moreover, my choice for a vessel instead of a find from the pottery workshop we also excavated at Sabi Abyad, will hopefully show that many useful insights can be gained in the absence of direct evidence for production. I chose to draw

“tanglegrams” (Hodder, 2012a) as a visual support of my point, but this actually may not be the most practical solution. Of course, tracing entanglements should not be limited to one bowl, but should include the whole ceramic assemblage (Roux, 2011; Van Oyen, 2013). It should also include tools, spaces, materials, texts, images, and any other actants involved in the organization of pottery production, as much as are available.

First Strategy: Tracing Material Properties

A first step in tracing entanglements involves tracing materials, and studying how the physical properties of materials affect the organization of production (Jones, 2004), what these materials do, and what happens to them during their life (Ingold, 2012). We can look at materials from at least three perspectives. The first perspective concerns the physical nature and properties of the materials involved in the actant under study, and their interrelations or entanglements with other materials and actants both within the object itself and outside it (Figure 9.1). Our bowl was made of calcareous clays with vegetal inclusions. Possibly, animal dung was used as temper material. If we focus on tracing the entanglements of dung, this opens up a range of connections to other actants and processes, such as animals, the plants they ate, agriculture, procurement of amounts of dung, drying times and places for dung cakes, seasonal activities, and the use of dung in other activities (e.g. as fuel, or as a component of plaster; cf. Sillar, 2000; Goldstein and Shimada, 2013). Of course, detailed (p. 127) understandings of materials will also provide information on the spatial dimensions of entanglements, for example when establishing the geographical source of materials. Secondly, we can study what materials do: how they interact together and how their interaction results in constraints and affordances for action of other actants, affecting the material engagement between material and potter (Malafouris, 2008), the *chaîne opératoire*, and the organization of work.

Click to view larger

Figure 9.1 Entanglements of the materials used to make a carinated bowl.

Materials do not have intrinsic properties that are waiting to be brought out by people; rather, these properties and affordances are the result of the interaction between actants in specific situations (Knappett, 2004; Hodder, 2012a; Jones and Alberti, 2013: 24) and have functional as well as representational aspects (Gosselain, 2011). In our case of dung temper, these interactions may result in specific technologies for mixing clay and dung, the smell of the clay body, effects of the dung temper on increased workability of the otherwise rather (p. 128) short clay body, effects of vegetal inclusions on coping with shrinking problems, and the behavior of the clay body during firing and its relation to kiln technology and firing skill. A third perspective focuses on what happens to materials during activities after their production: how they perform and affect use, but also how they change, decay, and disintegrate during their life-history. In our case most of the dung will have burnt out during the firing stage. However, the dung-containing fabric of the bowl will have particular qualities including fabric porosity and vessel weight. Together with size and shape, this fabric will have effects on, for example, tensile strength and mechanical shock resistance of the bowl, breakage patterns and frequency, or the resistance to hot contents. This particular fabric will also change during its lifetime; for example, as a result of its interaction with acid contents. Apart from the functional consequences of material properties, these properties also constrain or afford social practices (Jones, 2004). In our case (although this has not been studied yet), we may, for example, wonder whether any material properties of dung, such as its smell, may relate to cultural connotations of dung (Sillar, 2000); if these were negative, perhaps we can link them to the choice of dung-free fabrics for drinking goblets, the preference of the high elite for glass and metal drinking vessels, or the low social status of the potters and their profession. The entanglements of the calcareous clay and other components of the fabric can be traced in similar ways.

A second aspect of material properties is form; the specific size and shape of our vessel. Again, form is a bundle of connections among processes, uses, techniques, and performances (Olsen et al., 2012: 191). We are dealing with a small bowl with a flat base, a simple rounded rim, and a flaring, lightly carinated wall. The bowl is somewhat slanted to one side and the base is cracked. The surface is left untreated and undecorated. Comparisons with similar bowls show that ours belongs to the middle one of three loosely defined size groups. Form and material affect interactions between actants in specific situations, resulting in particular constraints and affordances (Knappett, 2004; Gosden, 2005; Hodder, 2012a). For example, our bowl affords the holding and taking out of food, drink, and other materials, it fits in a hand, the carination and surface prevent slipping and facilitate grip, it can easily tip over, it can be stacked (but the irregular slant prevents a high stack), it is lightweight, it is not very watertight, it fits the mouth of large jars as a lid, it can hold *c*.0.3 liters, it is not particularly beautiful, and it is very recognizable (and regarded as an archaeological "type-fossil" for the Middle Assyrian period). This specific form is closely tied to the way in which it was made, and to the ways it was expected to perform during use. It is also closely related to bowls made in the same shape, but from bronze. Bronze bowls were expensive and rare. Still, these bowls shared the shape of our everyday pottery bowl, which was found in huge quantities in a large variety of contexts. This suggests that the carinated shape is not only recognizable for us archaeologists but carried meaning for its users as well. Meaning and value may also be accessed through its quick and rather careless shaping and finishing, and through their relative uniformity.

Second Strategy: Tracing *chaînes opératoires*

Using the second lens to look at our bowl, the aim is to study in detail its *chaîne opératoire* and forming techniques, using a variety of low-tech and high-tech methods of analysis (p. 129) (e.g. Smogorzewska, 2007; Bouzakis et al., 2011; Berg, 2013), in order to trace the entanglements of the production process. A close mapping of all sequences and activities related to the making of our bowl will enable us to identify the actants related to each step of production (such as the potter, assistants, the clay and other ingredients, tools and firing installations, and spaces). We can study how materials and their properties affect the *chaîne opératoire*, and what happens to them during the work. Questions are provoked about the kind and size of spaces and tools needed, and about access to materials and spaces. A thorough study of the *chaîne opératoire* and traces on the vessels (such as fingerprints, mistakes and corrections, or differences in skill levels) provides information on the probable number of people at work, on task segmentation, repetition and serial work, and on the possible involvement of children or trainees (Crown, 2007; Joy, 2009; Sofaer and Budden, 2012). Moreover, through this approach, we

can come closer to gestures, knowledge, and skills. These are important aspects when addressing questions about the intensity of production or the output per potter, the relative skill level of the potter, or the amount of time spent on production (Roux, 2003a, 2003b; Crown, 2007). We can focus on the potter's social identity and status, and on communities of practice. The *chaîne opératoire* approach also helps to assess time, including issues such as seasonality and the involvement of people in other activities, time-flow of the work, and the minimum amount of time needed to complete the work. This is crucial information if we want to estimate the intensity and output of production. The *chaîne opératoire* opens up possibilities for comparisons with other crafts and activities using similar technologies, gestures, tools, spaces, or materials, producing similar products, or dealing with similar user groups (Sofaer, 2006; Brysbaert and Vetters, 2010). Regarding our interest in the organization of production, we may want to pay special attention to those parts of the *chaîne opératoire* that involve communication between people involved in production, and communication and cooperation with other human actors (such as neighbors, users, suppliers of materials, or authorities). We should also consider how techniques, tools, infrastructure, and spaces afford organizational practices.

Figure 9.2 presents a basic *chaîne opératoire* for our carinated bowl. In order to keep the image readable, I have listed the various materials, places, and activities that are part of the entanglement in separate boxes rather than in a tanglegram. Also, in order to focus on organizational practices, I have marked those steps that are likely to have involved task divisions or the help of assistants, as well as those steps that likely involved communication and cooperation with people outside the workshop (see also Sofaer and Budden, 2012). It appears that our bowl was made by a skilled potter and at least one assistant, who were able to throw vessels from the cone using the rather short local clay, and fire them with modest firing losses. Communication and cooperation with others was mostly needed for the acquisition of raw materials and tools, and perhaps for kiln building. Despite skill levels, or perhaps we should say enabled by them, our potter was focusing on output and speed, and less on quality and aesthetics. Among the interesting and unexpected entanglements of our bowl in production are the frequent links to scribes. In one phase of the site, the pottery production takes place in the courtyard of a scribe's house (identified by texts found there). Furthermore, cuneiform writing and seal impressions occur sporadically on our type of bowls, and unfired waste fragments from pottery production are found in recurrent association with unfired cuneiform tablets and clay sealing fragments. These entanglements show that the cooperation and social relations between potters and scribes may have gone beyond the sharing of raw materials.

(p. 130)

Click to view larger

Figure 9.2 Chaîne opératoire for a Middle Assyrian carinated bowl with a flat base. Gray circles indicate likely situations where communication with "outsiders" is necessary. Open circles indicate likely moments of task division and the presence of assistants.

Third Strategy: Tracing Biographies

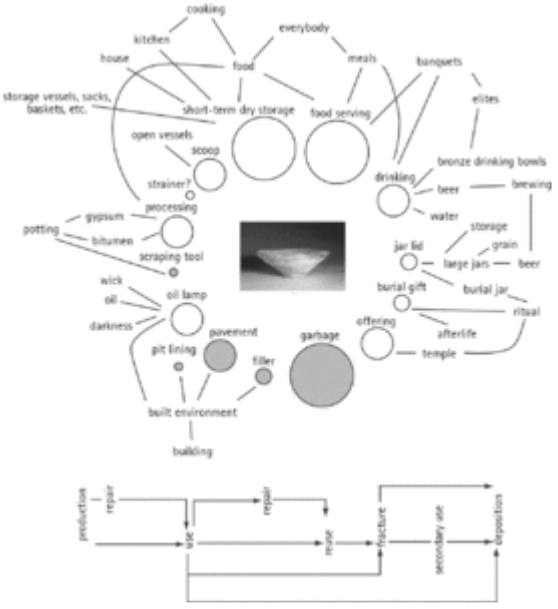
The "biography" approach has enjoyed some popularity in the past decades (Hicks, 2010). Some studies focus on the meaning or significance of objects to people (as in Kopytoff, 1986; Gosden and Marshall, 1999), some on the technical and functional changes of objects during their use-life (as in behavioral chain analysis, see above; see also Peña, 2007). Others call for more attention to the literary techniques of biography writing (Burström, 2014), discuss the long-term life-history or evolution of a particular technology (Roux, 2010, 2013; Laneri, 2011), or investigate the extension of an object's life-history into the present (Shanks, 1998; Holtorf, 2002).

I do not intend to sketch a linear or chronological life-course for our bowl, starting with production, through use, maintenance, and reuse, and ending with discard. Of course, all these stages in the "life" of our bowl are important to consider, but the sequential aspect (was it first used during meals, and later as a lid, or the other way around?) is (p. 131) often hard to reconstruct. My focus is mostly on the relations between objects and people during the post-production part of the bowl's life-cycle: these relations determine the use, value, and meaning of our vessels and directly influence production (Clark, 2007a). We will follow the bowl as it gathers entanglements of heterogeneous actors (Shanks, 1998). The purpose is to consider "the range of interactions between people and objects and [to

explore] how multiple forms of agency emerge through them" (Jervis, 2013: 219). Recurrent associations with other pottery vessels, with other objects and materials, with places, and with people create durability in the social assemblages in which our bowl was a participant (Jervis, 2011, 2013; Zedeño, 2013). Therefore, I will adopt a "relational" perspective and attempt to map the heterogeneous events and actions that our bowl (and similar bowls) was participating in (Joy, 2009), in order to understand the variety of activities and actants. These different activities, interactions, and resulting social assemblages (or *cadenas*) may have affected the organization of pottery production in different ways (Walker and Schiffer, 2006). The mapping of interactions is based on traces of use and repair and residues of contents (Skibo, 2013), specific find contexts, and the appearance of this particular shape in other materials, contemporary images, and texts. The same approach should, of course, also be applied to any available direct evidence for production, including spaces (e.g. Papadopoulos and Sakellarakis, 2013, using computer simulation to study the affordances of a room identified as a pottery workshop), architectural features, and tools (studying tool manufacture, acquisition, and style, e.g. Gosselain, 2010; Ramón and Bell, 2013), use-wear on potter's tools (e.g. Torchy and Gassin, 2010; Van Gijn and Lammers-Keijsers, 2010), and tool provenance (e.g. Murphy and Poblome, 2012; Fiaccavento, 2013: 85). It is crucial to link these studies to the *chaîne opératoire* studies of the pottery assemblage.

The resulting tanglegram (Hodder, 2012a) in Figure 9.3 presents several instances of our bowl's "cumulative" biography. Our bowl has now become a tool in other technologies, such as cooking, food preparation, storage, and burial. The entanglements of each of these technologies can be traced again by using the *chaîne opératoire* approach, following the courses of action resulting from these associations (Sillar, 2000; Jervis, 2013); Figure 9.3 shows only the very start of such entanglements (cf. also figure 3.5 in Hodder, 2012a). As Figure 9.3 shows, our bowl was a multipurpose bowl mainly used for the presentation and consumption of food and drink. As such, the bowl played a role in re-enacting and maintaining social relations, traditions, and feelings of "home," through specific ways of sharing meals. Perhaps these ways were similar to the modern Middle Eastern "mezzeh," where multiple small bowls containing different kinds of food are placed in the middle of a group of people, rather than each person having their individual plate. The connections with "brewing" raise questions about connections between potting and brewing, especially in the light of a contemporary text from the site suggesting that the brewer was on occasion in a position to order the potter to produce vessels (Wiggermann, 2008). Perhaps this lead can be followed further by attempting a better identification of the vegetal fibers in the pottery fabric. Did the potters indeed use animal dung as temper, or did they use the waste of the brewing process, so that the brewer was not only a user but also a supplier to the potter? Our bowl had additional roles in craft

production, storage, and ritual activities such as burial. Comparisons of this tanglegram with that of other types of small bowls reveals that other small bowls were never used in burials, nor as lamps or jar lids, although they do afford such uses. This, combined with the rather rare occurrence of maintenance and repair of carinated bowls, raises (p. 132) questions about the values and meanings our bowl had for the community living at the site. The use of specific vessels in burials and during shared meals touches on the creation of identity and community, issues that were of special importance in a settlement that was founded by Assyrians in “hostile” territory, as part of a hegemonic strategy to incorporate the region into the Assyrian empire. The variety of our bowl’s biography also illustrates its multiplicity, and this opens up ways to investigate the composition of the various “relevant social groups” interacting with our bowl. As these groups are directly contingent on decisions concerning design and technology, they are of interest for the study of the organization of pottery production.



Click to view larger

Figure 9.3 Entanglement of the life-history of carinated bowls, from production until deposit in the archaeological record. The size of the circles indicates the relative importance of this use. Gray circles indicate secondary uses after fragmentation beyond repair.

(p. 133) Fourth Strategy: Locating Entanglements in Space and Time

Tracing the spatial dimensions of the entanglements of materials, production, and biography will enable us to access issues of source, distribution, circulation, and deposition of materials and objects (Hodder, 2012a; Jervis, 2013). We can look at source

areas of materials and tools, helping to plot the location of production regionally, and bringing people–landscape interactions into focus (Druc, 2013; Michelaki et al., 2015). At different scales, we can study the spatial dimensions of the *chaîne opératoire*, the specific layout of the workshop, and the location of production in relation to the site (Stissi, 2012). Also important is the distribution of vessels after production: were they exchanged locally or further away, through which mechanisms, and which actants are involved? Each use also has its own spatial dimensions. At our site, we were fortunate to find the production locations where our pottery was made, including workshop areas, drying areas, and kilns. We were able to study the spatial organization of production activities in detail, both in the workshop as well as in relation to the rest of the site. But even if that is not the case, careful plotting of spatial dimensions may yield interesting understandings on the movement of materials, tools, products, and people. Again, we should study these processes through the whole life-cycle of the actants involved in production. One example of the spatial dimensions of our bowl is its regional distribution. Sabi Abyad was a fortified estate founded in order to incorporate the region into the Assyrian empire, and to exploit its agricultural resources. Texts suggest that there were numerous settlements in the close surroundings of our site, housing local non-Assyrian inhabitants who were dependent on the Assyrian administration. However, our typical carinated bowl was only sporadically found at such sites. This raises questions on how dependent the local population really was, and on the apparent lack of active attempts to “Assyrianize” the local population by encouraging the use of “Assyrian” vessels. Moreover, if pottery was not distributed among dependents, this informs us about the relatively small size of the user group for whom our potter produced, putting doubts on the idea that production was a full-time affair (Duistermaat, 2015).

Locating entanglements in time can also be done on several scales (Gosden, 2005; Hodder, 2012a). On one scale, there is “operational” time: the time and sequence that builds up each activity that is part of making or using our pottery vessels. There is often a specific order for doing things, and there are constraints and demands on time in each sequence. One can think of drying time needed before firing a vessel, or of the need to finish an operation before the wheel loses momentum. Moreover, certain cooking or storage techniques require vessels to be in use for considerable durations of time, while other uses result in quick fragmentation. The temporal perspective also brings in concerns of seasonality, and the simultaneous involvements in other tasks and crafts. On a second scale, we can consider the life-history of artifacts. This does not only concern the various uses an artifact had, but also the recycling, inheriting, or purposeful destruction or deposition of artifacts. Assemblages are never homogeneous in age: some pots will be brand new, while others will have been used and reused for decades. This is not only relevant for chronological purposes, but also directly impinges on production organization, affecting aspects such as replacement needs and rates, and output volumes.

On a third scale, we can look at the historical developments and changes of techniques and organization. The very important and currently much studied concept of innovation and technological change is crucial in this respect. Historical (p. 134) patterns—in the form of knowledge and experience—may constrain the adoption of new practices. For example, the use of a certain technique or production organization can complicate the adoption of a new one (Arnold et al., 2007; Van der Leeuw, 2008; Jeffra, 2011a), or a certain layout of a building may dictate future locations of walls (Hodder, 2012a).

Analyzing Entanglements and Reassembling Organization

Despite the hard work of tracing the innumerable entanglements of all possible actants we have at our disposal, one could argue (as do Jones and Alberti, 2013: 27) that this does not immediately bring forth an understanding of organizational practice. Nevertheless, in the process of doing so, we have gained an amazingly detailed understanding of our pottery, its production, and related materials and people. In itself, this is already much more than we ever could have learned from classifying our case based on a limited number of predefined criteria, as in typological approaches.

We have now identified the relevant actants (including people and non-humans) and traced their relations. But the relations between the actants should not simply be lines. It is more productive to view these relations as actions expressed with verbs, such as “use,” “produce,” “depend on.” To understand organizational practices, we should look at what these actants *do*: what are the actions they perform together and on each other, and how do they affect organizational practices? Which actants are “mediators,” influencing and consolidating roles, relationships, communication, control mechanisms, decisions, and power, and how do they do so (Latour, 2005: 37–42)? We should also look for patterns, recurrent actions, and routines (Olsen et al., 2012). Partly, these questions can be tackled through archaeometry or experimental archaeology.

For Latour, the clue to reassembling the social lies in the process of writing (Latour, 2005: 121–140; see also Burström, 2014). He sees the writing process as crucial, because the social will appear only through a well-written account. He defines a good account as a narrative in which every participant is a mediator, is *doing* something. The quality of an account is measured according to the number of actors the scholar is able to treat as mediators, without taking the shortcuts provided by concepts such as, for example, “efficiency.”

I think it is also interesting to see if we can approach the relations between actants in a more formal way. Any tracing of actants will quickly result in a large and varied collection of heterogeneous connections between heterogeneous actants, which need to be analyzed

for significant relational patterns. Would it be possible to approach these entanglements with techniques from the quickly growing field of network analysis and computer applications in archaeology (Knappett, 2011; Hodder and Mol, 2015)? Organization studies adopt such a formal approach with the concept of “narrative network” (Pentland and Feldman, 2007) or “action network” (Pentland et al., 2010), in order to visualize and analyze these patterns and routines to understand organizational practices. In a narrative network, each action between actants is a “narrative fragment” (e.g. “the potter forms a vessel on the wheel”). Fragments are linked together in coherent sequences (narratives), much like a *chaîne opératoire* (e.g. “potter waits for assistant to place clay on wheel—potter forms vessel on the wheel—potter cuts vessel from wheel head and puts it aside”). A narrative is different from the perspective of each of the multiple actants (humans and non-humans alike). All narratives together, and the links between them, form the narrative network which characterizes that particular (p. 135) organizational routine (e.g. “throwing a vessel on the wheel”). The narrative network can be visualized in a graphical image. Analysis of the network, and comparisons with networks for similar situations elsewhere in place or time, can yield information on which actants and actions affect organizational change the most (Pentland and Feldman, 2007; Hayes et al., 2011; Pentland et al., 2012). Narrative networks and organizational routines can also be analyzed and compared through a variety of statistics for network analysis (Pentland et al., 2010), and through agent-based simulation (Gao et al., 2014). Of course, this approach cannot be transferred from organizational studies to archaeology as is, but I think it is worthwhile to explore the possibilities it offers for the analysis of archaeological material.

As yet, archaeological applications of computer techniques in the study of craft production organization are rare: Brysbaert et al. (2012) discuss how process mining techniques can be used to analyze *chaînes opératoires*, and perhaps ontological datasets will be key in exploiting the strength of computers to search for meaningful patterns in our entanglements (Hong et al., 2013). An example of the application of agent-based simulation to the organization of salt mining in Hallstatt can be found in Kowarik et al. (2012); while Rouse and Weeks (2011) use agent-based modeling to study production specialization in Bronze Age Arabia. This is not the place to present a full discussion of network approaches and related computer techniques, nor of their compatibility with the approaches discussed in this chapter. Useful introductions are published elsewhere: for discussions of formal network analysis in archaeology, see Brughmans (2010, 2013, 2014), Knappett (2011, 2013), Östborn and Gerding (2014), Peeples and Roberts (2013); for introductions to complexity theory and modeling, see Bentley and Maschner (2007), Kohler (2012), Kohler and Van der Leeuw (2007); for introductions to simulation and agent-based modeling, see Barton (2014) and Lake (2013).

Conclusions

In this chapter I have discussed two major traditions in the study of pottery production organization: ceramic ecology and typological approaches. Despite their major contributions to our understanding of pottery production, there are two important shortcomings. First of all, there is an analytical gap between pottery production and the larger social or economic "context." It is often not clear how a certain type of production is linked to these larger-scale concepts. The nature of the relations between organizational practices, power, and social inequality should be the subject of our inquiries, not part of the typological label used as explanation. Secondly, typologies link variables such as output, intensity, economic dependence, or labor divisions, while these links should be questioned in each particular case.

These issues, as well as the more recent development of approaches focusing on technology and people–thing relations, suggest that the time has come to develop new strategies to study the organization of pottery production. I suggest that such strategies can be built from elements offered by SCOT, cultural technology, behavioral archaeology, holistic approaches, symmetrical archaeology, and entanglement perspectives. I provided brief summaries of each of these different approaches.

An approach to the organization of pottery production should view organization as a process, emerging from the specific interactions between people, materials, objects, animals, and so on. It should study organizational processes first on their own merits, rather (p. 136) than as a proxy for the larger sociopolitical or economic context or complexity. We should follow the evidence: organization should be explained from the relations emerging from our data, not used as a label to explain our data. We should adopt an empirical, bottom-up perspective, focusing on relations and actions. We should incorporate the multitude of factors influencing organizational processes in an holistic perspective, and allow for active roles of people, materials, and things in a symmetrical manner. This will result in an acknowledgment of the unique historical quality of each case, and in an appreciation of variation in organizational practices rather than a search for universal principles. The approach should ideally also cover the study of relations with related crafts and containers in other media, breaking down traditional boundaries between material categories in field projects.

As a limited illustration of these points, I proposed to study the organization of pottery production applying the concept of entanglement through four related strategies, focusing on materials, *chaînes opératoires*, biographies, and placements in space and time. These strategies can be used to trace the entanglements of all vessels, tools,

materials, spaces, and so on, relevant to the organization of pottery production, while keeping an open view on relations that do not fit our traditional concepts. They will also yield information on the relevant social groups or *cadenas* involved, and how they relate to production decisions. A careful analysis of this multitude of relations will allow us to "reassemble" organizational practices. I used the example of a small bowl to illustrate each strategy. The analysis of these entanglements can take the form of carefully written narratives. I also suggested that it would be worth exploring the possibilities offered by formal network analysis and computing technology. All this will only be possible by fully integrating archaeology, experimental archaeology, and archaeometry, and by enlisting the expertise of different specialists, something that is increasingly done (Pollard and Bray, 2007). Tracing entanglements and analyzing their patterns will be a laborious, time-consuming project, but I am positive that our analytical methods and techniques are capable of making such a project both feasible and worthwhile.

A new strategy does not need to discard all previous insights, but can build on them. Through mapping entanglements of materials, *chaîne opératoires*, and life-histories, and by placing them in space and time, many of the variables important for understanding organizational practices (e.g. those listed by Costin, 2005) will come into view. However, by carefully tracing entanglements, we can approach each variable independently, without any preconceived typologies, predefined links between variables, or a priori assumptions on organization. Tracing entanglements is a way to systematically and consciously explore relations and associations in our data, without following only those paths prescribed by models. This may yield new and unexpected understandings and avenues for research. The results of such a study will not yield a cover-all label to characterize production organization, but rather a detailed and animated narrative. This will not render cross-cultural comparisons impossible, only more laborious. In any case, I think it is an illusion to think that specific cases grouped under the typological label of, for example, "individual workshop organization" or "attached production" have more in common or are better comparable than cases described in detailed narratives.

In conclusion, the time is right to develop new approaches to the study of pottery production organization. A broad variety of theoretical perspectives and practical methods are being developed, including those that promote a radically new perspective on people, things, technology, and their mutual relations. Analytical techniques and methods, both in **(p. 137)** archaeometry and in computer science, have reached unprecedented levels of precision and strength, and have opened up a wide range of possibilities for studying pottery. I am confident that these developments will contribute to exciting new approaches and discoveries in the field of craft organization.

References

Abell, N. (2014). “Migration, Mobility and Craftspeople in the Aegean Bronze Age: A Case Study from Ayia Irini on the Island of Kea.” *World Archaeology* 46(4): 551–568.

Alberti, B., Jones, A. M., and Pollard, J. (eds) (2013). *Archaeology after Interpretation. Returning Materials to Archaeological Theory* (Walnut Creek: Left Coast Press).

Arnold, D. E. (1985). *Ceramic Theory and Cultural Process* (Cambridge: Cambridge University Press).

Arnold, D. E. (2008). *Social Change and the Evolution of Ceramic Production and Distribution in a Maya Community* (Boulder: University Press of Colorado).

Arnold, D. E. (2012). “The Social Evolution of Potters’ Households in Ticul, Yucatán, Mexico, 1965–1997.” In: Douglass, J. G. and Gonlin, N. (eds), *Ancient Households of the Americas. Conceptualizing What Households Do* (Boulder: University Press of Colorado), 163–188.

Arnold, D. E., Hutter Wilson, J., and Nieves, A. L. (2007). “Why Was the Potter’s Wheel Rejected? Social Choice and Technological Change in Ticul, Yucatán, Mexico.” In Pool, C. A. and Bey III, G. J. (eds), *Pottery Economics in Mesoamerica* (Tucson: University of Arizona Press), 59–85.

Barton, C. M. (2014). “Complexity, Social Complexity, and Modeling.” *Journal of Archaeological Method and Theory* 21: 306–324.

Baysal, E. (2013). “Will the Real Specialist Please Stand Up? Characterising Early Craft Specialisation, a Comparative Approach for Neolithic Anatolia.” *Documenta Praehistorica* 40: 233–246.

Bentley, R. A. and Maschner, H. D. G. (2007). “Complexity Theory.” In: Bentley, R. A., Maschner, H. D. G., and Chippendale, C. (eds), *Handbook of Archaeological Theories* (Lanham, MD: AltaMira Press), 245–270.

Berg, I. (2004). “The Meanings of Standardisation: Conical Cups in the Late Bronze Age Aegean.” *Antiquity* 78(299): 74–85.

(p. 138) Berg, I. (2007). “Meaning in the Making: The Potter’s Wheel at Phylakopi, Melos (Greece).” *Journal of Anthropological Archaeology* 26: 234–252.

Berg, I. (2013). “The Potter’s Wheel in Mycenaean Greece: A Re-Assessment.” In: Graziadio, G., Guglielmino, R., Lenuzza, V., and Vitale, S. (eds), *Φιλική Συναυλία Studies in Mediterranean Archaeology for Mario Benzi*. BAR International Series 2460 (Oxford: Archaeopress), 113–121.

Bijker, W. E. (2010). “How Is Technology Made?—That Is the Question!” *Cambridge Journal of Economics* 34: 63–76.

Bijker, W. E., Hughes, T. P., and Pinch, T. (eds) (2012) [1987]. *The Social Construction of Technological Systems. New Directions in the Sociology and History of Technology*. Anniversary Edition (Massachusetts: Massachusetts Institute of Technology).

Bouzakis, K. D., Pantermalis, D., Efstathiou, K., Varitis, E., Paradisiadis, G., and Mavroudis, I. (2011). “An Investigation of Ceramic Forming Method Using Reverse Engineering Techniques: The Case of Oinochoai from Dion, Macedonia, Greece.” *Journal of Archaeological Method and Theory* 18: 111–124.

Braun, D. P. (1983). “Pots as Tools.” In: Morre, J. A. and Keene, A. S. (eds), *Archaeological Hammers and Theories* (New York: Academic Press), 107–134.

Brughmans, T. (2010). “Connecting the Dots: Towards Archaeological Network Analysis.” *Oxford Journal of Archaeology* 29(3): 277–303.

Brughmans, T. (2013). “Thinking through Networks: A Review of Formal Network Methods in Archaeology.” *Journal of Archaeological Method and Theory* 20: 623–662.

Brughmans, T. (2014). “The Roots and Shoots of Archaeological Network Analysis: A Citation Analysis and Review of the Archaeological Use of Formal Network Methods.” *Archaeological Review from Cambridge* 29(1): 18–41.

Brumfiel, E. M. and Earle, T. K. (1987). *Specialization, Exchange and Complex Societies* (Cambridge: Cambridge University Press).

Budden, S. and Sofaer, J. (2009). “Non-Discursive Knowledge and the Construction of Identity. Potters, Potting and Performance at the Bronze Age Tell of Százhalombatta, Hungary.” *Cambridge Archaeological Journal* 19(2): 203–220.

Burström, N. M. (2014). “Things in the Eye of the Beholder: A Humanistic Perspective on Archaeological Object Biographies.” *Norwegian Archaeological Review* 47(1): 65–82.

Braun, D. P. (1983). “Pots as Tools.” In: Morre, J. A. and Keene, A. S. (eds), *Archaeological Hammers and Theories* (New York: Academic Press), 107–134.

Brysbaert, A. (2007). “Cross-Craft and Cross-Cultural Interactions during the Aegean and Eastern Mediterranean Late Bronze Age.” In: Antoniadou, S. and Pace, A. (eds), *Mediterranean Crossroads* (Athens: Pierides Foundation), 325–359.

Brysbaert, A., Bocchi, L., and Tuosto, E. (2012). “Relating Archaeological *chaîne opératoire* and Process Mining in Computer Science.” *Archeologia e Calcolatori* 23: 165–186.

Brysbaert, A. and Vetters, M. (2010). “Practicing Identity: A Crafty Ideal?” *Mediterranean Archaeology and Archaeometry* 10(2): 25–43.

Carlile, P. R., Nicolini, D., Langley, A., and Tsoukas, H. (eds) (2013). *How Matter Matters. Objects, Artefacts and Materiality in Organization Studies* (Oxford: Oxford University Press).

Clark, J. E. (2007a). “In Craft Specialization’s Penumbra: Things, Persons, Action, Value, and Surplus.” In: Hruby, Z. and Flad, R. (eds), *Rethinking Craft Specialization in Complex Societies: Archaeological Analyses of the Social Meaning of Production* (Archaeological Papers of the American Anthropological Association) 17(1): 20–35.

(p. 139) Clark, J. E. (2007b). “Who’s Minding Production?” Author reply, in: Hruby, Z. and Flad, R. (eds), *Rethinking Craft Specialization in Complex Societies: Archaeological Analyses of the Social Meaning of Production* (Archaeological Papers of the American Anthropological Association) 17(1): 182–185.

Costin, C. L. (1991). “Craft Specialization: Issues in Defining, Documenting, and Explaining the Organization of Production.” In Schiffer, M. B. (ed), *Archaeological Method and Theory*, vol. 3 (Tucson: University of Arizona Press), 1–56.

Costin, C. L. (2001). “Craft Production Systems.” In: Feinman, G. and Price, T. (eds), *Archaeology at the Millennium: A Sourcebook* (New York: Kluwer Academic/Plenum Press), 273–327.

Costin, C. L. (2004). “Craft Economies of the Ancient Andean States.” In: Feinman, G. M., Nicholas, L. M., and Skibo, J. M. (eds), *Archaeological Perspectives on Political Economies* (Salt Lake City: University of Utah Press), 189–223.

Costin, C. L. (2005). “The Study of Craft Production.” In Maschner, H. D. G. and Chippindale, C., *Handbook of Archaeological Methods*. (Lanham: AltaMira Press), 1032–1105.

Costin, C. L. (2007). “Thinking about Production: Phenomenological Classification and Lexical Semantics.” In: Hruby, Z. and Flad, R. (eds), *Rethinking Craft Specialization in Complex Societies: Archaeological Analyses of the Social Meaning of Production* (Archaeological Papers of the American Anthropological Association) 17(1): 143–162.

Coupaye, L. and Douny, L. (2009). “Dans la trajectoire des choses. Comparaison des approches francophones et anglophones contemporaines en anthropologie des techniques.” *Techniques & Culture* 52–53: 12–39.

Crown, P. L. (2007). “Life Histories of Pots and Potters: Situating the Individual in Archaeology.” *American Antiquity* 72: 677–690.

David, N. and Kramer, C. (2001). *Ethnoarchaeology in Action* (Cambridge: Cambridge University Press).

Day, P. M., Relaki, M., and Faber, E. W. (2006). “Pottery Making and Social Reproduction in the Bronze Age Mesara.” In: M. H. Wiener, Warner, J. L., Polonsky, J., and Hayes, E. E. (eds), *Pottery and Society. The Impact of Recent Studies in Minoan Pottery.* Gold Medal Colloquium in Honor of Philip P. Betancourt (Boston: Archaeological Institute of America), 22–72.

Day, P. M., Relaki, M., and Todaro, S. (2010). “Living from Pots? Ceramic Perspectives on the Economies of Prepalatial Crete.” In: Pullen, D. J. (ed), *Political Economies of the Aegean Bronze Age. Papers from the Langford Conference, Florida State University, Tallahassee, 22–24 February 2007*. (Oxford: Oxbow Books), 205–229.

DeMarrais, E. (2013). “Understanding Heterarchy: Crafting and Social Projects in Pre-Hispanic Northwest Argentina.” *Cambridge Archaeological Journal* 23(3): 345–362.

Dobres, M.-A. (2000). *Technology and Social Agency* (Oxford: Blackwell).

Dobres, M.-A. (2010). “Archaeologies of Technology.” *Cambridge Journal of Economics* 34: 103–114.

Dobres, M.-A. and Hoffman, C. R. (1994). “Social Agency and the Dynamics of Prehistoric Technology.” *Journal of Archaeological Method and Theory* 1(3): 211–258.

Druc, I. (2013). “What Is Local? Looking at Ceramic Production in the Peruvian Highlands and Beyond.” *Journal of Anthropological Research* 69: 485–513.

Duistermaat, K. (2008). *The Pots and Potters of Assyria. Technology and Organisation of Production, Ceramic Sequence and Vessel Function at Late Bronze Age Tell Sabi Abyad,*

Syria (Papers on Archaeology of the Leiden Museum of Antiquities PALMA 4) (Turnhout: Brepols Publishers).

(p. 140) Duistermaat, K. (2015). “The Pots of Assur in the Land of Hanigalbat—The Organization of Pottery Production and Hegemonic Practices in the Far West of the Middle Assyrian Empire.” In: Düring, B. (ed), *Understanding Hegemonic Practices of the Early Assyrian Empire. Essays Dedicated to Frans Wiggermann* (PIHANS 125) (Leiden: Nederlands Instituut voor het Nabije Oosten), 125–152.

Fahlander, F. (2013). “Sherlock against Lestrade: A Study in Scale.” In: Bergerbrant, S. and Sabatini, S. (eds), *Counterpoint: Essays in Archaeology and Heritage Studies in Honour of Professor Kristian Kristiansen* (Oxford: Archaeopress), 637–641.

Feinman, G. M. (1999). “Rethinking Our Assumptions: Economic Specialization at the Household Scale in Ancient Ejutla, Oaxaca, Mexico.” In Skibo, J. M. and Feinman, G. M. (eds), *Pottery and People. A Dynamic Interaction* (Salt Lake City: University of Utah Press), 81–98.

Fiaccavento, C. (2013). “Potters’ Wheels from Khirbet al-Batrawy: A Reconsideration of Social Contexts.” *Vicino Oriente* 17: 75–103.

Fowler, C. (2013). “Dynamic Assemblages, or the Past Is What Endures: Change and the Duration of Relations.” In: Alberti, B., Jones, A. M., and Pollard, J. (eds), *Archaeology after Interpretation. Returning Materials to Archaeological Theory* (Walnut Creek: Left Coast Press), 235–256.

Gagné, L. A. (2012). “Middle Cypriot White Painted Ware: A Study of Pottery Production and Distribution in Middle Bronze Age Cyprus.” PhD thesis, University of Toronto.

Gandon, E., Casanova, R., Sainton, P., Coyle, T., Roux, V., Bril, B., and Bootsma, R. J. (2011). “A Proxy of Potters’ Throwing Skill: Ceramic Vessels Considered in Terms of Mechanical Stress.” *Journal of Archaeological Science* 38(5): 1080–1089.

Gao, D., Deng, X., and Bai, B. (2014). “The Emergence of Organizational Routines from Habitual Behaviours of Multiple Actors: An Agent-Based Simulation Study.” *Journal of Simulation* 8: 215–230.

Goldstein, D. J. and Shimada, I. (2013). “An Experimental and Ecological Approach to Modeling Ancient Fuel Use.” In Damblon, F. (ed), *Proceedings of the Fourth International Meeting of Anthracology*. BAR International Series 2486 (Oxford: Archaeopress), 121–132.

Gosden, C. (2005). “What Do Objects Want?” *Journal of Archaeological Method and Theory* 12(3): 193–211.

Gosden, C. and Marshall, Y. (1999). “The Cultural Biography of Objects.” *World Archaeology* 31(2): 169–178.

Gosselain, O. P. (1998). “Social and Technical Identity in a Clay Crystal Ball.” In: Stark, M.T. (ed), *The Archaeology of Social Boundaries* (Washington, D.C.: Smithsonian Institution Press), 78–106.

Gosselain, O. P. (2000). “Materializing Identities: An African Perspective.” *Journal of Archaeological Method and Theory* 7(3): 187–217.

Gosselain, O. P. (2010). “Ethnographie comparée des trousses à outils de potiers au sud du Niger.” *Bulletin de la Société préhistorique française* 107(4): 667–689.

Gosselain, O. P. (2011). “Technology.” In: Insoll, T. (ed), *The Oxford Handbook of the Archaeology of Ritual and Religion* (Oxford: Oxford University Press).

Greene, A. F. (2013). “The Social Lives of Pottery on the Plain of Flowers: An Archaeology of Pottery Production, Distribution, and Consumption in the Late Bronze Age South Caucasus.” PhD thesis, University of Chicago.

Hayes, G. R., Lee, C. P., and Dourish, P. (2011). “Organizational Routines, Innovation, and Flexibility: The Application of Narrative Networks to Dynamic Workflow.” *International Journal of Medical Informatics* 80: xxx.e161–xxx.e177.

(p. 141) Hendon, J. A. (2007). “Production as Social Process.” In: Hruby, Z. and Flad, R. (eds), *Rethinking Craft Specialization in Complex Societies: Archaeological Analyses of the Social Meaning of Production* (Archaeological Papers of the American Anthropological Association) 17(1): 163–168.

Hernes, T. (2008). *Understanding Organization as Process. Theory for a Tangled World* (London and New York: Routledge).

Hicks, D. (2010). “The Material-Cultural Turn: Event and Effect.” In: Hicks, D. and Beaudry, M. C. (eds), *The Oxford Handbook of Material Culture Studies* (Oxford: Oxford University Press), 25–98.

Hilditch, J. R. (2008). “Reconstruction of Technological Choice, Social Practice and Networks of Exchange from a Ceramic Perspective in the Middle Bronze Age Cyclades.” PhD thesis, University of Exeter.

Hilditch, J. R. (2014). “Analyzing Technological Standardization: Revisiting the Minoan Conical Cup.” In: Kotsonas, A. (ed), *Understanding Standardization and Variation in Mediterranean Ceramics. Mid 2nd to Late 1st Millennium BC.* Babesch Supplements, vol. 25 (Leuven: Peeters), 25–37.

Hodder, I. (2011). “Human-Thing Entanglement: Towards an Integrated Archaeological Perspective.” *Journal of the Royal Anthropological Institute (N.S.)* 17: 154–177.

Hodder, I. (2012a). *Entangled. An Archaeology of the Relationships between Humans and Things* (Chichester: Wiley-Blackwell).

Hodder, I. (ed) (2012b). *Archaeological Theory Today.* Second Edition (Cambridge: Polity Press).

Hodder, I. and Mol, A. (2015). “Network Analysis and Entanglement.” *Journal of Archaeological Method and Theory* (online first: doi 10.1007/s10816-015-9259-6).

Hollenback, K. L. and Schiffer, M. B. (2010). “Technology and Material Life.” In: Hicks, D. and Beaudry, M. C. (eds), *The Oxford Handbook of Material Culture Studies*, 313–332. (Oxford: Oxford University Press).

Holtorf, C. (2002). “Notes on the Life History of a Pot Sherd.” *Journal of Material Culture* 7(1): 49–71.

Hong, Y., Solanki, M., Foxhall, L., and Quercia, A. (2013). “A Framework for Transforming Archaeological Databases to Linked Ontological Datasets.” In: Contreras, F. and Melero, F. J. (eds), *Fusion of Cultures. Proceedings of the 38th Annual Conference on Computer Applications and Quantitative Methods in Archaeology, Granada, Spain, April 2010.* British Archaeological Reports S2494 (Oxford: Archaeopress), 569–574.

Hruby, Z. and Flad, R. (eds) (2007). *Special Issue: Rethinking Craft Specialization in Complex Societies: Archaeological Analyses of the Social Meaning of Production* (Archaeological Papers of the American Anthropological Association) 17(1).

Humphries, C. and Smith, A. C. T. (2014). “Talking Objects: Towards a Postsocial Research Framework for Exploring Object Narratives.” *Organization* 21(4): 477–494.

Ingold, T. (2012). “Toward an Ecology of Materials.” *Annual Review of Anthropology* 41: 427–42.

Jeffra, C. D. (2011a). “The Archaeological Study of Innovation: An Experimental Approach to the Pottery Wheel in Bronze Age Crete and Cyprus.” PhD thesis, University of Exeter.

Jeffra, C. D. (2011b). “An Examination of Emic Possibilities: Experimental Archaeology and Cypriot Ceramic Typology.” In: Scarcella, S. (ed), *Archaeological Ceramics: A Review of Current Research*. BAR International Series 2193 (Oxford: Archaeopress), 103–116.

Jervis, B. (2011). “A Patchwork of People, Pots and Places: Material Engagements and the Construction of ‘the Social’ in Hamwic (Anglo-Saxon Southampton), UK.” *Journal of Social Archaeology* 11(3): 239–265.

(p. 142) Jervis, B. (2013). “Objects and Social Change: A Case Study from Saxo-Norman Southampton.” In: Alberti, B., Jones, A. M., and Pollard, J. (eds), *Archaeology after Interpretation. Returning Materials to Archaeological Theory* (Walnut Creek, CA: Left Coast Press), 219–234.

Jones, A. (2004). “Archaeometry and Materiality: Materials-Based Analysis in Theory and Practice.” *Archaeometry* 46(3): 327–338.

Jones, A. M. and Alberti, B. (2013). “Archaeology after Interpretation.” In: Alberti, B. Jones, A. M., and Pollard, J. (eds), *Archaeology after Interpretation. Returning Materials to Archaeological Theory* (Walnut Creek, CA: Left Coast Press), 15–35.

Joy, J. (2009). “Reinvigorating Object Biography: Reproducing the Drama of Object Lives.” *World Archaeology* 41(4): 540–556.

Kelly, G. O. (2009). “Craft Production and Technology during the Iron Age to Early Historic Transition at Kodumanal, Tamil Nadu.” *Tamil Civilization* 23: 1–14.

Kienlin, T. L. (2012). “Beyond Elites: An Introduction.” In Kienlin, T. L. and Zimmermann, A. (eds), *Beyond Elites. Alternatives to Hierarchical Systems in Modelling Social Formations* (Bonn: Rudolf Habelt Verlag), 15–32.

Killick, D. (2004). “Social Constructionist Approaches to the Study of Technology.” *World Archaeology* 36(4): 571–578.

Knappett, C. (2004). “The Affordances of Things: A Post-Gibsonian Perspective on the Relationality of Mind and Matter.” In: Demarrais, E., Gosden, C., and Renfrew, C. (eds), *Rethinking Materiality: The Engagement of Mind with the Material World* (Cambridge: McDonald Institute for Archaeological Research), 43–51.

Knappett, C. (2011). *An Archaeology of Interaction. Network Perspectives on Material Culture and Society* (Oxford: Oxford University Press).

Knappett, C. (2012). “Materiality.” In: Hodder, I. (ed), *Archaeological Theory Today.* Second Edition (Cambridge: Polity Press), 176–195.

Knappett, C. (2013). “Why Networks?” In: Knappett, C. (ed), *Network Analysis in Archaeology. New Approaches to Regional Interaction* (Oxford: Oxford University Press), 3–15.

Knappett, C. and Malafouris, L. (eds) (2008). *Material Agency. Towards a Non-Anthropocentric Approach* (New York: Springer).

Knappett, C., Malafouris, L., and Tomkins, P. (2010). “Ceramics (as Containers).” In: Beaudry, M. C. and Hicks, D. (eds), *The Oxford Handbook of Material Culture Studies* (Oxford: Oxford University Press), 582–606.

Kohler, T. A. (2012). “Complex Systems and Archaeology.” In: Hodder, I. (ed), *Archaeological Theory Today.* Second Edition (Cambridge: Polity Press), 93–123.

Kohler, T. A. and Van der Leeuw, S. E. (eds) (2007). *The Model-Based Archaeology of Socionatural Systems* (Santa Fe, NM: SAR Press).

Kohring, S. (2011). “Social Complexity as a Multi-Scalar Concept: Pottery Technologies, ‘Communities of Practice’ and the Bell Beaker Phenomenon.” *Norwegian Archaeological Review* 44(2): 145–163.

Kohring, S. (2012a). “Conceptual Knowledge as Technologically Materialised: A Case Study of Pottery Production, Consumption and Community Practice.” In: Stig Sørensen, M. L. and Rebay-Salisbury, K. (eds), *Embodied Knowledge: Historical Perspectives on Belief and Technology* (Oxford: Oxbow Books), 106–116.

Kohring, S. (2012b). “A Scalar Perspective to Social Complexity: Complex Relations and Complex Questions.” In: Kienlin, T. L. and Zimmermann, A. (eds), *Beyond Elites. Alternatives to Hierarchical Systems in Modelling Social Formations* (Bonn: Rudolf Habelt Verlag), 327–338.

(p. 143) Kolb, C. C. (1989). “Ceramic Ecology in Retrospect: A Critical Review of Methodology and Results.” In: Kolb, C. C. (ed), *Ceramic Ecology, 1988: Current Research on Ceramic Materials.* BAR International Series 513 (Oxford: British Archaeological Reports), 261–375.

Kopytoff, I. (1986). “The Cultural Biography of Things: Commoditization as Process.” In: Appadurai, A. (ed), *The Social Life of Things. Commodities in Cultural Perspective* (Cambridge: Cambridge University Press), 64–91.

Kotsonas, A. (ed) (2014). *Understanding Standardization and Variation in Mediterranean Ceramics. Mid 2nd to Late 1st Millennium BC.* Babesch Supplements, vol. 25 (Leuven: Peeters).

Kowarik, K., Reschreiter, H., and Wurzer, G. P. X. (2012). "Modelling Prehistoric Mining." *Mathematical Modelling* 7(1): 17–29.

Lake, M. W. (2013). "Trends in Archaeological Simulation." *Journal of Archaeological Method and Theory* 21(2): 258–287.

LaMotta, V. M. (2012). "Behavioral Archaeology." In: Hodder, I. (ed), *Archaeological Theory Today.* Second Edition (Cambridge: Polity Press), 65–87.

Laneri, N. (2011). "The Life-History of the Potter's Wheel in the Ancient Near East." In: Scarcella, S. (ed), *Archaeological Ceramics: A Review of Current Research*. BAR International Series 2193 (Oxford: Archaeopress), 64–72.

Latour, B. (2005). *Reassembling the Social. An Introduction to Actor-Network-Theory* (Oxford: Oxford University Press).

Law, J. (1992). "Notes on the Theory of the Actor-Network: Ordering, Strategy, and Heterogeneity." *Systems Practice* 5(4): 379–393.

Lemonnier, P. (1992). *Elements for an Anthropology of Technology.* Anthropological Papers no. 88 (Ann Arbor: University of Michigan Press).

Lemonnier, P. (ed) (1993). *Technological Choices. Transformation in Material Cultures since the Neolithic* (London and New York: Routledge).

Lemonnier, P. (2012). "Technology." In: Thieberger, N. (ed), *The Oxford Handbook of Linguistic Fieldwork* (Oxford: Oxford University Press), 298–316.

Leonardi, P. M., Nardi, B. A., and Kallinikos, J. (eds) (2012). *Materiality and Organizing. Social Interaction in a Technological World* (Oxford: Oxford University Press).

Loney, H. L. (2000). "Society and Technological Control: A Critical Review of Models of Technological Change in Ceramic Studies." *American Antiquity* 65(4): 646–668.

Lucas, G. (2012). *Understanding the Archaeological Record* (Cambridge: Cambridge University Press).

Malafouris, L. (2008). “At the Potter’s Wheel: An Argument for Material Agency.” In: Knappett, C. and Malafouris, L. (eds), *Material Agency. Towards a Non-Anthropocentric Approach* (New York: Springer), 19–36.

Matson, F. R. (1965). “Ceramic Ecology: An Approach to the Study of the Early Cultures of the Near East.” In: Matson, F. R. (ed), *Ceramics and Man* (Chicago, IL: Aldine), 202–217.

Menon, J. (2008). “Archaeological Problems with Specialization.” *Studies in History* 24(1): 137–157.

Michelaki, K. (2008). “Making Pots and Potters in the Bronze Age Maros Villages of Kiszombor-Új-Élet and Klárafalva-Hajdova.” *Cambridge Archaeological Journal* 18(3): 355–380.

Michelaki, K., Braun, G. V., and Hancock, R. G. V. (2015). “Local Clay Sources as Histories of Human-Landscape Interactions: A Ceramic Taskscape Perspective.” *Journal of Archaeological Method and Theory* 22 (3): 783–827.

(p. 144) Mills, B. J. and Crown, P. L. (1995). “Ceramic Production in the American Southwest: An Introduction.” In: Mills, B. J. and Crown, P. L. (eds), *Ceramic Production in the American Southwest* (Tuscon: University of Arizona Press), 1–29.

Mímisson, K. and Magnússon, S. G. (2014). “Singularizing the Past: The History and Archaeology of the Small and Ordinary.” *Journal of Social Archaeology* 14(2): 131–156.

Murphy, E. A. and Poblome, J. (2012). “Technical and Social Considerations of Tools from Roman-period Ceramic Workshops at Sagalassos (Southwest Turkey): Not Just Tools of the Trade?” *Journal of Mediterranean Archaeology* 25(2): 197–217.

Naji, M. and Douny, L. (2009). “Editorial.” *Journal of Material Culture* 14(4): 411–432.

Neupert, M. A. (2007). “Contingency Theory and the Organizational Behavior of Traditional Pottery Production.” In: Skibo, J. M., Graves, M. W., and Stark, M. T. (eds), *Archaeological Anthropology: Perspectives on Method and Theory* (Tuscon: University of Arizona Press), 138–162.

Olsen, B. (2003). “Material Culture after Text: Re-Membering Things.” *Norwegian Archaeological Review* 36(2): 87–104.

Olsen, B. (2007). “Keeping Things at Arm’s Length: A Genealogy of Asymmetry.” *World Archaeology*, 39(4): 579–588.

Olsen, B. (2010). *In Defense of Things* (Lanham, MD: Alta Mira Press).

Olsen, B. (2012). “Symmetrical Archaeology.” In: Hodder, I. (ed), *Archaeological Theory Today.* Second Edition (Cambridge: Polity Press), 196–216.

Olsen, B. (2013). “Reclaiming Things: An Archaeology of Matter.” In: Carlile, P. R., Nicolini, D., Langley, A., and Tsoukas, H. (eds), *How Matter Matters. Objects, Artefacts and Materiality in Organization Studies* (Oxford: Oxford University Press), 171–196.

Olsen, B., Shanks, M., Webmoor, T., and Witmore, C. (2012). *Archaeology. The Discipline of Things* (Berkeley: University of California Press).

Orlikowski, W. J. (2010). “The Sociomateriality of Organisational Life: Considering Technology in Management Research.” *Cambridge Journal of Economics* 34: 125–141.

Orlikowski, W. J. and Scott, S. V. (2008). “Sociomateriality: Challenging the Separation of Technology, Work and Organization.” *The Academy of Management Annals* 2(1): 433–474.

Orton, C. and Hughes, M. (2013). *Pottery in Archaeology*. Second Edition (New York: Cambridge University Press).

Östborn, P. and Gerding, H. (2014). “Network Analysis of Archaeological Data: A Systematic Approach.” *Journal of Archaeological Science* 46: 75–88.

Papadopoulos, C. and Sakellarakis, Y. (2013). “Virtual Windows to the Past: Reconstructing the ‘Ceramics Workshop’ at Zominthos, Crete.” In Contreras, F. and Melero, F. J. (eds), *Fusion of Cultures. Proceedings of the 38th Annual Conference on Computer Applications and Quantitative Methods in Archaeology, Granada, Spain, April 2010.* British Archaeological Reports S2494 (Oxford: Archaeopress), 47–54.

Patterson, T. C. (2005). “Craft Specialization, the Reorganization of Production Relations and State Formation.” *Journal of Social Archaeology* 5(3): 307–337.

Peacock, D. P.S. (1982). *Pottery in the Roman World: An Ethnoarchaeological Approach* (New York: Longman).

Peeples, M. A. and Roberts, J. M. (2013). “To Binarize or Not to Binarize: Relational Data and the Construction of Archaeological Networks.” *Journal of Archaeological Science* 40: 3001–3010.

Peña, J. T. (2007). *Roman Pottery in the Archaeological Record* (New York: Cambridge University Press).

Pentland, B. T. and Feldman, M. S. (2007). “Narrative Networks: Patterns of Technology and Organization.” *Organization Science* 18(5): 781–795.

(p. 145) Pentland, B. T., Feldman, M. S., Becker, M. C., and Liu, P. (2012). “Dynamics of Organizational Routines: A Generative Model.” *Journal of Management Studies* 49(8): 1484–1508.

Pentland, B. T., Hærem, T., and Hillison, D. (2010). “Comparing Organizational Routines as Recurrent Patterns of Action.” *Organization Studies* 31(7): 17–40.

Pfaffenberger, B. (1992). “Social Anthropology of Technology.” *Annual Review of Anthropology* 21: 491–516.

Pollard, A. M. and Bray, P. (2007). “A Bicycle Made for Two? The Integration of Scientific Techniques into Archaeological Interpretation.” *Annual Review of Anthropology* 36: 245–259.

Pool, C. A. (1992). “Integrating Ceramic Production and Distribution.” In: Bey, G. J., III, and Pool, C.A. (eds), *Ceramic Production and Distribution. An Integrated Approach* (Boulder, CO: Westview Press), 275–313.

Pool, C.A. and Bey, G. J., III (2007). “Conceptual Issues in Mesoamerican Pottery Economics.” In: Pool, C. A. and Bey, G. J., III (eds), *Pottery Economics in Mesoamerica* (Tucson: University of Arizona Press), 1–38.

Ramón, G. and Bell, M. (2013). “Re-Placing Plainware: Production and Distribution of Domestic Pottery, and the Narration of the Pre-Colonial Past in the Peruvian Andes.” *Journal of Anthropological Archaeology* 32: 595–613.

Rice, P. M. (1981). “Evolution of Specialized Pottery Production: A Trial Model.” *Current Anthropology* 22(3): 219–240.

Rice, P. M. (ed) (1984). *Pots and Potters: Current Approaches in Ceramic Archaeology* (Los Angeles: University of California Press).

Rice, P. M. (1987). *Pottery Analysis. A Sourcebook* (Chicago and London: University of Chicago Press).

Rice, P. M. (1996). “Recent Ceramic Analysis: 2. Composition, Production, and Theory.” *Journal of Archaeological Research* 4(3): 165–202.

Rouse, L. M. and Weeks, L. (2011). “Specialization and Social Inequality in Bronze Age SE Arabia: Analyzing the Development of Production Strategies and Economic Networks Using Agent-Based Modelling.” *Journal of Archaeological Science* 38: 1583–1590.

Roux, V. (2003a). “A Dynamic Systems Framework for Studying Technological Change: Application to the Emergence of the Potter’s Wheel in the Southern Levant.” *Journal of Archaeological Method and Theory* 10(1): 1–30.

Roux, V. (2003b). “Ceramic Standardization and Intensity of Production: Quantifying Degrees of Specialization.” *American Antiquity* 68(4): 768–782.

Roux, V. (2010). “Technological Innovations and Developmental Trajectories: Social Factors as Evolutionary Forces.” In O’Brien, M. J. and Shennan, S. J. (eds), *Innovation in Cultural Systems. Contributions from Evolutionary Anthropology* (Cambridge, MA: The Massachusetts Institute of Technology Press), 217–234.

Roux, V. (2011). “Anthropological Interpretation of Ceramic Assemblages: Foundations and Implementations of Technological Analysis.” In: Scarcella, S. (ed), *Archaeological Ceramics: A Review of Current Research.* BAR International Series 2193 (Oxford: Archaeopress), 80–88.

Roux, V. (2013). “Spreading of Innovative Technical Traits and Cumulative Technical Evolution: Continuity or Discontinuity?” *Journal of Archaeological Method and Theory* 20: 312–330.

Schiffer, M. B. (2007). “Some Thoughts on the Archaeological Study of Social Organization.” In: Skibo, J. M., Graves, M.W., and Stark, M. T. (eds), *Archaeological Anthropology: Perspectives on Method and Theory* (Tucson: University of Arizona Press), 57–71.

(p. 146) Schiffer, M. B. (2011). *Behavioral Archaeology. Principles and Practice* (London and New York: Routledge).

Schiffer, M. B., Skibo, J. M., Griffitts, J. L., Hollenback, K. L., and Longacre, W. A. (2001). “Behavioral Archaeology and the Study of Technology.” *American Antiquity* 66(4): 729–737.

Schortman, E. M. and Urban, P. A. (2004). “Modeling the Roles of Craft Production in Ancient Political Economies.” *Journal of Archaeological Research* 12(2): 185–226.

Shanks, M. (1998). “The Life of an Artifact in an Interpretive Archaeology.” *Fennoscandia archaeologica* 15: 15–30.

Shimada, I. and Craig, A. K. (2013). “The Style, Technology and Organization of Sicán Mining and Metallurgy, Northern Peru: Insights from Holistic Study.” *Revista de Antropología Chilena* 45 (1): 3–31.

Shimada, I. and Wagner, U. (2007). “A Holistic Approach to Pre-Hispanic Craft Production.” In: Skibo, J. M., Graves, M. W., and Stark, M.T. (eds), *Archaeological Anthropology. Perspectives on Method and Theory* (Tuscon: University of Arizona Press), 163–197.

Sillar, B. (2000). “Dung by Preference: The Choice of Fuel as an Example of How Andean Pottery Production Is Embedded within Wider Technical, Social, and Economic Practices.” *Archaeometry* 42(1): 43–60.

Sillar, B. and Tite, M. S. (2000). “The Challenge of ‘Technological Choices’ for Materials Science Approaches in Archaeology.” *Archaeometry* 42(1): 2–20.

Sinopoli, C. M. (1998). “Identity and Social Action among South Indian Craft Producers of the Vijayanagara Period.” *Archeological Papers of the American Anthropological Association* 8: 161–172.

Sinopoli, C. M. (2003). *The Political Economy of Craft Production: Crafting Empire in South India, c. 1350–1650* (New York: Cambridge University Press).

Skibo, J. M. (2013). *Understanding Pottery Function* (New York: Springer).

Skibo, J. M. and Schiffer, M. B. (2008). *People and Things. A Behavioral Approach to Material Culture* (New York: Springer).

Smith, M. E. (2004). “The Archaeology of Ancient State Economies.” *Annual Review of Anthropology* 33: 73–102.

Smogorzewska, A. (2007). “Technological Marks on Pottery Vessels. Evidence from Tell Arbid, Tell Rad Shaqrah and Tell Jassa el-Gharbi (Northeastern Syria).” *Polish Archaeology in the Mediterranean* 19: 555–564.

Sofaer, J. (2006). “Pots, Houses and Metal: Technological Relations at the Bronze Age Tell at Százhalombatta, Hungary.” *Oxford Journal of Archaeology* 25(2): 127–147.

Sofaer, J. and Budden, S. (2012). “Many Hands Make Light Work: Potting and Embodied Knowledge at the Bronze Age tell at Százhalombatta, Hungary.” In: Stig Sørensen, M. L. and Rebay-Salisbury, K. (eds), *Embodied Knowledge: Historical Perspectives on Belief and Technology* (Oxford: Oxbow Books), 117–127.

Stissi, V. V. (2012). “Giving the *kerameikos* a Context: Ancient Greek Potters’ Quarters as Part of the *polis* Space, Economy and Society.” In: Esposito, A. and Sanidas, G. M. (eds), *“Quartiers” artisanaux en Grèce ancienne. Une perspective Méditerranéenne* (Villeneuve d’Ascq: Presses Universitaires du Septentrion), 201–230.

Stockhammer, P. W. (2012). “Performing the Practice Turn in Archaeology.” *Transcultural Studies* 1: 7–42.

Tite, M. S. (2008). “Ceramic Production, Provenance and Use—a Review.” *Archaeometry* 50(2): 216–231.

(p. 147) Torchy, L. and Gassin, B. (2010). “Le travail de la poterie en contexte chasséen: des outils en silex pour la production céramique?” *Bulletin de la Société préhistorique française* 107(4): 725–735.

Van As, A. (2004). “Leiden Studies in Pottery Technology.” *Leiden Journal of Pottery Studies* 20: 7–22.

Van der Leeuw, S. E. (1977). “Towards a Study of the Economics of Pottery Making.” In: van Beek, B. L., Brandt, R. W., and Groenman-Van Waateringe, W. (eds), *Ex Horreo* (Amsterdam: University of Amsterdam), 68–76.

Van der Leeuw, S. E. (2008). “Agency, Networks, Past and Future.” In: Knappett, C. and Malafouris, L. (eds), *Material Agency. Towards a Non-Anthropocentric Approach* (New York: Springer), 217–247.

Van der Leeuw, S. E. and Pritchard, A. C. (eds) (1984). *The Many Dimensions of Pottery* (Amsterdam: University of Amsterdam).

Van Gijn, A. and Lammers-Keijsers, Y. (2010). “Toolkits for Ceramic Production: Informal Tools and the Importance of High Power Use-Wear Analysis.” *Bulletin de la Société préhistorique française* 107(4): 755–762.

Van Oyen, A. (2013). “Towards a Post-Colonial Artefact Analysis.” *Archaeological Dialogues* 20: 81–107.

Walker, W. H. and Schiffer, M. B. (2006). “The Materiality of Social Power: The Artifact-Acquisition Perspective.” *Journal of Archaeological Method and Theory* 13(2): 67–88.

Watts, C. (2008). *Pot/Potter Entanglements and Networks of Agency in Late Woodland Period (c. AD 900–1300) Southwestern Ontario, Canada*. British Archaeological Reports International Series no. 1828 (Oxford: Hedges).

Watts, C. (ed) (2013). *Relational Archaeologies. Humans, Animals, Things* (London and New York: Routledge).

Webmoor, T. (2007). “What About ‘One More Turn after the Social’ in Archaeological Reasoning? Taking Things Seriously.” *World Archaeology* 39(4): 563–578.

Wiggermann, F. A. M. (2008). “Cuneiform Texts from Tell Sabi Abyad Related to Pottery.” In: Duistermaat, K., *The Pots and Potters of Assyria. Technology and Organisation of Production, Ceramic Sequence and Vessel Function at Late Bronze Age Tell Sabi Abyad, Syria* (PALMA 4) (Turnhout: Brepols), 559–564.

Witmore, C. L. (2007). “Symmetrical Archaeology: Excerpts of a Manifesto.” *World Archaeology* 39(4): 546–562.

Zedeño, M. N. (2013). “Methodological and Analytical Challenges in Relational Archaeologies: A View from the Hunting Ground.” In: Watts, C. (ed), *Relational Archaeologies. Humans, Animals, Things* (London and New York: Routledge), 132–153.

Notes:

(1.) I do not use the phrase “craft specialization” here. The use of the word “specialization” where actually “organization” is meant, even in basic textbooks (Orton and Hughes, 2013), has caused a lot of confusion and discussion and should be avoided (Clark, 2007a, 2007b vs. Costin, 2007; Hendon, 2007; Smith, 2004: 82–83). Organization and specialization are different processes with different causes and dynamics (Neupert, 2007).

(2.) I used a typology based on vessel shape. However, for the approach proposed here a typology based on forming techniques and fabric, rather than shape, would have been more useful (Jeffra, 2011b; Roux, 2011). For more reading on categories and typologies, see Fowler (2013), Jervis (2011), Lucas (2012), Shanks (1998), Van Oyen (2013), and Zedeño (2013).

Kim Duistermaat

Universiteit Leiden