

| | |
|------------------------|----|
| <i>List of Figures</i> | ix |
| <i>List of Tables</i> | xv |

INTRODUCTION

| | |
|----------------------------------------------------------------------------------------|---|
| CHAPTER 1 Reflections on Obsidian Studies in Mesoamerica: Past, Present, and Future | 3 |
| <i>Marc N. Levine</i> | |

SECTION I. ETHNOHISTORICAL AND
ETHNOGRAPHIC PERSPECTIVES

| | |
|------------------------------------------------------------------------------------------------------------------|----|
| CHAPTER 2 Ethnohistorical Evidence for Obsidian's Ritual and Symbolic Uses among the Postclassic Tarascans | 45 |
| <i>Véronique Darras</i> | |

| | |
|----------------------------------------------------------------------|----|
| CHAPTER 3 The Symbolism of Obsidian in Postclassic Central Mexico | 75 |
| <i>Alejandro Pastrana and Ivonne Athie</i> | |

| | |
|------------------------------------------------------------------------------------------------------|-----|
| CHAPTER 4 Machetes and Meaning: Some Notes on Cutting Tools in a Contemporary Mixtec Community | III |
| <i>John Monaghan</i> | |

SECTION II. SYMBOLIC DIMENSIONS OF OBSIDIAN
PRODUCTION AND EXCHANGE

| | |
|--------------------------------------------------------------------------------------------------------------------------------|-----|
| CHAPTER 5 Symbolic and Ritual Dimensions of Exchange, Production, Use, and Deposition of Ancient Maya Obsidian Artifacts | 127 |
| <i>Kazuo Aoyama</i> | |

| | |
|--------------------------------------------------------------------------------------------------------------------------|-----|
| CHAPTER 6 Obsidian Obsessed? Examining Patterns of Chipped-Stone Procurement at Late Postclassic Tututepec, Oaxaca | 159 |
| <i>Marc N. Levine</i> | |
| SECTION III. INTERPRETING OBSIDIAN IN RITUAL OFFERINGS AND USE | |
| <hr/> | |
| CHAPTER 7 Obsidian Symbolism in a Temple Offering from La Laguna, Tlaxcala | 195 |
| <i>David M. Carballo</i> | |
| CHAPTER 8 Ritual Use of Obsidian from Maya Caves in Belize: A Functional and Symbolic Analysis | 223 |
| <i>W. James Stemp and Jaime J. Awe</i> | |
| CHAPTER 9 Obsidian and Household Ritual at Xochitecatl-Cacaxtla | 255 |
| <i>Mari Carmen Serra Puche, Jesús Carlos Lazcano Arce, and Mónica Blanco García Méndez</i> | |
| CONCLUSION | |
| <hr/> | |
| CHAPTER 10 Reflections on Reflections | 279 |
| <i>William J. Parry</i> | |
| <i>List of Contributors</i> | 319 |
| <i>Index</i> | 321 |

Introduction

CHAPTER ONE

REFLECTIONS ON OBSIDIAN STUDIES IN MESOAMERICA

Past, Present, and Future

Marc N. Levine

Since the 1960s, obsidian studies have become a major area of research within Mesoamerican archaeology and have made important contributions to understanding the prehispanic past. The great archaeological focus on obsidian is understandable. Notwithstanding its brittleness, obsidian preserves indefinitely in virtually all environments, is nearly ubiquitous at ancient sites in Mesoamerica, and has compositional properties amenable to sourcing—allowing researchers to link individual artifacts with parent material from dozens of quarries. Obsidian crafting is also a subtractive technology that provides the analytical advantage of having artifacts from nearly every stage of manufacture represented in the archaeological record. Researchers have long recognized and exploited the aforementioned material characteristics of obsidian but have less frequently taken full advantage of other sources of information—especially iconographic, ethnohistoric, and ethnographic—to examine the cultural context of obsidian and its meaning in Mesoamerican societies.

The vast majority of volumes devoted to Mesoamerican obsidian and other lithic technologies have addressed questions either directly or indirectly related to political economy (e.g., Gaxiola and Clark 1989; González Arratia and Mirambell 2005; Hester and Shafer 1991; Hirth 2003a, 2006; Hirth and Andrews 2002; Hruby, Braswell, and Mazariegos 2011; Soto de Arechavaleta 1990). These fundamental efforts represent decades of diligent research that have advanced our understanding of obsidian's material characteristics, how it was crafted into objects, exchanged, and used in cultural practices. Archaeological studies of political economy include a variety of materialist

approaches concerned with examining how political elites fund their activities through the mobilization or extraction of surplus goods and labor from the populations they administer (Brumfiel and Earle 1987a:3; Clark 1987; Hirth 1996:205–6; Smith 2004:77). Within this framework, most work on obsidian has addressed aspects of technology and function to better understand these elements in their own right but also to examine the nature of elite involvement in managing or controlling obsidian production, distribution, or consumption. Ultimately, many of these studies tie into larger efforts to examine variability in the development of complex societies.

In contrast, the chapters in this volume seek to broaden the field of obsidian studies to examine the interplay among people, obsidian, and meaning and how these relationships shaped patterns of procurement, exchange, and use. Thus, while the efforts put forth here remain linked to studies of function and technology, they also depart from political economy perspectives in a number of ways. First, our scope of analysis includes political and economic factors but also consciously emphasizes obsidian's sociocultural and symbolic dimensions. Second, in addition to considering how obsidian may have functioned in past practices, we consider how decisions and motivations were also guided by understandings rooted in cultural logic and embedded in historical contexts. Thus, our point of departure is not limited to questions of how obsidian may have fulfilled structural or personal needs—as we might perceive them—but also includes how people “made sense” of obsidian and the manner in which their dealings with this material were bound up in crosscutting political, economic, social, and cultural relationships.

This project shares a kinship with recent efforts that seek to complement materialist approaches to political economy with more complete considerations of how indigenous worldview and religion, often articulated through ritual, also shape the organization and execution of economic pursuits (e.g., Agbe-Davies and Bauer 2010; McAnany 2010; McAnany and Wells 2008; Rice 2009; Schortman and Urban 2004; Spielmann 2002; Wells 2006; Wells and Davis-Salazar 2007). For instance, E. Christian Wells (2006:284) identifies “ritual economy” approaches as those concerned with “the materialization of socially negotiated values and beliefs through acquisition and consumption aimed at managing meaning and shaping interpretation.” These efforts attempt to fuse political economy and agency approaches to examine contexts in which economic activities merge with religious ritual or are otherwise ritualized in culturally meaningful ways. While a limited number of researchers have begun to more fully explore the symbolic and ritual dimensions of obsidian production and use, they remain the minority (e.g., see Carballo 2007, 2011;

Clark 1989a; Darras 1998; García Cook and Merino Carrión 2005; Heyden 1988; Hruby 2007, 2011; Parry 2002a; Pastrana 2007; Saunders 2001; Sugiyama 2005:124–40; Taube 1991).¹

By design, the subject matter covered in *Obsidian Reflections* is simultaneously narrow and broad. Focusing on obsidian alone encourages a cohesiveness born of similar methodological and theoretical possibilities because of obsidian's intrinsic properties and a shared Mesoamerican cultural context. At the same time, the contributing authors examine a diversity of intersecting points where relationships between obsidian and people cohere. This encourages investigations that more freely explore contexts of meaning that crosscut traditional analytical foci, such as “craft production” (see Hirth 2009). Although this introductory chapter argues that obsidian studies should explore a greater range of meanings in the past, especially the symbolic dimensions that emerge through complex relationships between people and obsidian, authors implement this program to varying degrees. The theoretical breadth of this volume promotes an implicit dialogue among authors and readers, who must come to their own conclusions regarding where the future of obsidian studies lies.

In the following section, I present a brief review of Mesoamerican obsidian studies and theoretical approaches to provide a historical vantage point from which we might craft new and innovative directions. As John Clark (2003a:43) has argued, chipped-stone studies in Mesoamerica have tended to be “parochial and, to a large extent, atheoretical.” I argue that addressing questions concerned with meaning can complement functional and technological inquiries to both invigorate and push obsidian studies into new theoretical territory (see also Clark 2007). In the penultimate section of this chapter, I carry out a reconnaissance of this territory, discussing the materiality of obsidian from the perspective of life history approaches, embodiment, object agency, and landscape, as well as Peircian semiotics. Finally, while this volume focuses explicitly on obsidian in Mesoamerica, the overarching ideas will have far-reaching implications for lithic studies in general, as well as studies of material culture.

OBSIDIAN STUDIES IN MESOAMERICA: A BRIEF THEORETICAL REVIEW

Drawing on summaries by John Clark (2003a) and Payson Sheets (1977, 2003), this discussion traces the development of obsidian studies in relation to larger theoretical currents and changing goals through time, primarily in Americanist archaeology over the past half century or so. Rather than attempt systematic

coverage, I present a historical sketch of this work, beginning with the period just after the modernization of Americanist archaeology as a discipline.

OBSIDIAN ARTIFACTS AS CULTURAL NORMS AND HISTORICAL INDEXES

In the first half of the twentieth century, during the heyday of “cultural-historical” or “normative” archaeology (Willey and Sabloff 1993), Mesoamericanists placed little emphasis on the analysis of chipped-stone artifacts. They were preoccupied with the formidable goals of describing and defining numerous archaeological cultures and chronological sequences, and obsidian artifacts appeared to present few attributes conveying discrete cultural or temporal information. Greater attention was reserved for more conspicuous archaeological features, such as architecture, carved-stone monuments, and fine pottery (Sheets 1977). Thus, it is no wonder that systematic and comprehensive descriptions of chipped-stone material did not regularly appear in field reports until the 1950s (e.g., see Coe 1959; García Cook 1967; Kidder 1947; Lorenzo 1965; Müller 1966; Ricketson 1937; Willey et al. 1965). These early reports follow a similar format, presenting brief artifact descriptions with often vaguely defined classifications of chipped stone. The resulting artifact types were essentially treated as isomorphic with distinct archaeological cultures and useful only insofar as they reflected regional cultural histories and instances of cultural contact. William Coe (1959:18) expressed this sentiment in his excavation report from work at Piedras Negras, writing that “the quantity of flake-blades and obsidian varieties might help in culture area placement but little more.”

While utilitarian artifacts received only terse treatment, researchers paid greater attention to unusual or elaborate obsidian objects, such as those found in “ceremonial” contexts. This attraction to ritual is reflected in Alfred Kidder’s (1947) classification of chipped stone from Uaxactun, where he made a primary functional distinction between utilitarian and ceremonial artifacts (see also Coe 1959; Willey et al. 1965). Yet even those ceremonial artifacts recovered in elaborate ritual caches failed to provoke more in-depth interpretations.²

Artifact classification, of course, remains a useful heuristic tool for organizing and managing variability within artifact assemblages. Nonetheless, these taxonomies themselves have limited explanatory power and, when reified, run the risk of inadvertently eliding emic understandings that can reveal important interconnections between artifacts and people (see Meskell 2004:39–46). While archaeologists tend to categorize items by material type or function, other regimes of meaning in the past may have guided “the order of things” in

a particular time and place. It may prove useful to transcend current orthodoxies of classification (Sheets 2003) to explore other facets of meaning that reside in relationships between people and things.

FUNCTIONAL APPROACHES TO UNDERSTANDING OBSIDIAN ARTIFACTS

Gaining traction during the 1960s and 1970s, the new archaeology (Binford 1962, 1967; Flannery 1972) was a boon to obsidian studies in Mesoamerica. Around 1970, Clark (2003b:253–56) recorded a notable increase in the number of master's theses, PhD dissertations, and journal articles focusing on Mesoamerican flaked stone. The new or processual archaeology adopted methods of positivist science to query the archaeological record and sought to discover universal laws of cultural change, combining elements of systems theory, ecological theory, and neo-evolutionary theory. In Latin America, where archaeology retained a much closer disciplinary connection to history, the new archaeology made much less of a sustained impact (Gándara 2012:37; Politis 2003:249).

The stated goals of processual archaeology effectively democratized artifact assemblages. From the lowliest obsidian flake to the most exquisite eccentric, all were important insofar as they contributed to the total adaptive cultural system. In Lewis Binford's (1962:219) highly influential processual manifesto, he delineated three categories of material culture serving discrete technomic, sociotechnic, or ideotechnic functions that could be mapped onto corresponding technological, social, or ideological subsystems. When put into practice, however, researchers struggled to link artifacts with all three subsystems. Rooted in a materialist framework that advocated scientific rigor through hypothesis testing, technomic aspects were deemed the most empirically accessible, whereas sociotechnic understandings were less so and ideotechnic features were almost hopeless (Preucel 2006:115). This pattern held true for obsidian studies as well, which seldom strayed from questions concerning technology and function (but see Stocker and Spence 1973). Binford (1962:220) argued that artifact style, a valence of all material culture, played an active role in the "total cultural system," which could play a part in signaling group affiliation and identity (see also Wobst's [1977] theory of information exchange). Yet few attempted to link chipped-stone artifact style with identity, probably because of the general formal homogeneity of most common obsidian artifacts.

Experimental obsidian studies, including replication and use-wear analyses, flourished in this theoretical environment (e.g., Crabtree 1968; Lewenstein 1981; Mirambell 1964; Sheets and Muto 1972; Wilk 1978) and continue to make

important research contributions today (Aoyama, this volume; Hirth 2003b, 2006; Stemp and Awe, this volume). This era also witnessed the development of ethnoarchaeology, initially bent on developing middle-range theories to explain general patterns of cultural behavior—including those related to obsidian production and use (e.g., Clark 1989b, 1991).

At the end of the 1960s, methodological advances in adapting trace-element analyses to archaeology (Jack and Heizer 1968; Stross et al. 1968) enabled researchers to match obsidian artifacts with parent material from their respective sources (Clark 2003a:19). This breakthrough invigorated obsidian studies, especially in the area of trade and exchange. William Rathje's (1971:283) oft-cited study of exchange argued that complex society in the Maya lowlands initially developed to provision people with basic resources, such as obsidian, salt, and groundstone—all of which had to be imported from afar (but see Marcus 1983:479). Jane Pires-Ferreira's (1976) analysis, presenting a distance-decay model of Formative period exchange, also represented a functional, ecological approach (cf., Zeitlin 1982:261–65).

Processual archaeologists also investigated craft production as a means to address broader-scale questions related to the evolution of social complexity. Generally speaking, as societies grew more complex, production became progressively more efficient; workshops were larger, more concentrated, and disaggregated from the household. In Mesoamerica, large-scale obsidian production could at once signify a state-level society and be implicated in its development. "The Obsidian Industry of Teotihuacán" by Michael Spence (1967) was a landmark study of craft production and specialization. In it he argued that obsidian production at the ancient city generated enough surplus to provision the entire Teotihuacan Valley by the end of the Terminal Formative. By the Early Classic, Spence argued, Teotihuacan was exporting even farther, to regions including the eastern Maya realm. René Millon (1973:45) later asked, "Did the growth potential represented by the expansion of the craft of obsidian working play a significant role in the rise of Teotihuacan as a city?" Researchers took seriously the prospect that obsidian production and exchange could constitute "prime movers" in processes of cultural evolution and urbanization.

Expanding on Spence's work, William Sanders and Robert Santley (1983) calculated the energetic requirements of various agricultural and craft works at Teotihuacan, concluding that obsidian production and distribution was relatively cost-efficient, thus conveying an adaptive advantage to centers such as Teotihuacan that were located near sources. They argued further that Teotihuacan's state-sponsored obsidian industry generated surpluses that were

exchanged for food and used to buffer against periodic agricultural shortfalls (ibid.:284). Thus, for Sanders and Santley, political control over obsidian production and exchange was key to Teotihuacan's process of urbanization and explains why Classic Maya centers, mostly located far from obsidian sources, did not develop in the same way.

The new archaeology also stimulated a reassessment of lithic classification in Mesoamerica. Payson Sheets (1975) proposed a classification that grouped artifacts according to manufacturing behavior rather than function, and this approach continues to influence Mesoamerican lithic studies today (see also Sheets 2003).

Many of the empirical and processually minded methodologies devised for examining obsidian remain as vital as ever. They include a host of quantitative and qualitative studies of artifact patterns and distributions, experimental studies, ethnoarchaeological approaches, site formation processes, and others. Much work remains, however, in the quest to better understand obsidian tool technology and use. We still lack a comprehensive understanding of diversity in blade production strategies through space and time as well as their social and cultural contexts (Hirth 2003b; Parry 2002b; Rodríguez-Alegría 2008; Titmus and Clark 2003). Also, our inability to develop methodologies to efficiently and convincingly determine variability in obsidian tool use continues to hinder more detailed interpretations. Future obsidian research must continue to pursue functional and technological approaches while also recognizing how these studies provide opportunities to investigate cultural domains of meaning.

OBSIDIAN AND POWER: MARXIST AND STRUCTURAL INFLUENCES

In the 1970s, increasing archaeological interest in Marxist concepts generated new theoretical tools for approaching obsidian studies. Marx and Engels notably argued for the importance of social and economic relations of production and exchange and how these relations created social inequalities (Gilman 1981:4–5). Furthermore, Marxist theory held that political leaders were fundamentally self-interested and bent on exploiting the “masses.” Archaeologists were thus understandably drawn to contexts of production, especially the relationship between elites and crafters (e.g., Earle 1982). Much earlier, V. Gordon Childe had linked the “rise of civilization” with changes in the nature and development of craft production, but these ideas failed to immediately take root (Patterson 2005:308). Archaeologists in Mexico and Central America eventually embraced Marxism to a greater extent than their North American

colleagues (Gándara 2012:37). Obsidian production, whose by-products were highly visible in the archaeological record, made these contexts particularly attractive. With the convergence of Marxist and processual-fueled interests in craft production, exchange, and the development of complex societies, studies shifted to political economy to examine how political leaders were involved in the obsidian economy. The clearest route to explore these questions was through studies of obsidian exchange and production.

Marxist-inspired thinking concerning political economy and structural inequalities at the global scale also fueled the development of dependency theories (e.g., Frank 1967), including Immanuel Wallerstein's (1974) world systems theory, which was particularly influential among archaeologists (e.g., Ekholm and Friedman 1979; Kohl 1978). Obsidian and other trade goods that preserve well in the archaeological record have figured prominently in world systems interpretations. Mesoamericanists have applied Wallerstein's framework, perhaps with greater zeal than anywhere else in the ancient world, to explain how regional inequalities developed as core areas exploited and orchestrated the underdevelopment of their peripheries (e.g., Blanton and Feinman 1984; Whitecotton and Pailes 1986). The development of a world systems structure in Mesoamerica depended on the circulation of luxury goods rather than commodities as Wallerstein's original thesis had intended (Schneider 1977). Widely considered a commodity for periods postdating the Formative or Preclassic, obsidian has seldom appeared in world systems or prestige good models. Recent iterations of world systems theory, however, such as that proposed by Richard Blanton and colleagues (2005), maintain that distinctive fine green obsidian was a "bulk luxury" and indeed "system shaping" (see also Smith and Berdan 2003). Yet Blanton and his coauthors (2005:280) also concede the limitations of world systems approaches, asserting that "any study of Mesoamerican goods that aims to be more analytically satisfying . . . must find ways to better address the questions of how goods come to be endowed with meanings—for commoners as well as an elite—that flow from their uses in social life." Marxist approaches prioritize contexts of production, which remain unquestionably important, but scholars such as Daniel Miller (1998:11) point out that "the key moment in which people construct themselves or are constructed by others is increasingly through relations with cultural forms in the arena of consumption."

Structural approaches emerged in tandem with processual archaeology but took a different tack in exploring the underlying rules or codes of culture and binary oppositions that guide human behavior (Hodder 1986:35–56). These structural approaches are relevant to obsidian studies insofar as they

represent landmark attempts to address questions of meaning, symbolism, and cognition—which served as a counterpoint to materialist points of view. Though influential on Anglophone archaeological theory, explicit structural interpretations were not widespread in practice and were relatively rare in Mesoamerican archaeology.³ Nonetheless, as we shall see in the discussion that follows, efforts to approach meaning in the archaeological record owe a debt to structuralist interpretation and its influence on Marxist thinking.

By the 1980s, a number of scholars had decried the nonexistent or secondary role of ideology in explanations of cultural change rooted in ecological–systems theory frameworks (Demarest 1992). This concern stemmed in part from Marx’s explanation of how ideology effectively concealed or naturalized social inequalities but diverged from his contention that it played only a secondary role. Structural Marxist reformulations by Louis Althusser held that power could derive equally from ideological and materialist bases and that dialectical contradictions among social segments could account for structural change (cited in Preucel 2006:116). Few archaeologists attempted explicitly Marxist readings of material culture (but see Gilman 1981; Kristiansen 1984; Leone 1984; McGuire 1992; Nalda 1981), yet many Mesoamericanists tacitly accepted the top-down dominant ideology thesis as a viable theory of class relations. Marxist thinking highlighted connections between political interests and the economy, which helps to explain why obsidian studies gravitated en masse toward questions reformulated in terms of political economy in the late 1980s and the 1990s.

OBSIDIAN, POLITICAL ECONOMY, AND AGENCY

Elizabeth Brumfiel and Timothy Earle’s (1987b) edited volume, *Specialization, Exchange, and Complex Societies*, signaled a substantive shift toward political economy approaches in archaeology (see also Hirth 1984). In their introduction, they asserted that craft specialization studies could be classified into political, adaptationist, or commercialist models, based on how they conceived of elites’ relationship to the economy (Brumfiel and Earle 1987a). This classificatory scheme also provides a useful summary of archaeological studies of political economy in general (Smith 2004:76–77). Brumfiel and Earle’s “political” approaches presumed that ruling elites structured and manipulated economic apparatuses to their benefit, while “adaptationists” saw elites as more altruistic economic coordinators and regulators working for everyone’s benefit. “Commercial” approaches downplayed the roles of elites and political institutions in controlling the economy and instead paid greater attention to

the impact of market forces at multiple scales. Brumfiel's (1987) analysis of the Aztec political economy included a discussion of the production, circulation, and use of obsidian. She argued that the production of elite goods, such as obsidian jewelry, expanded as the capital grew. These elite-crafted goods marked high status, aided in cementing military alliances, were deployed as "political capital," and communicated Aztec state ideology (ibid.:111–16). This example illustrates that political economy remained processually minded and, although substituting economic for environmental systems, continued to devise explanatory frameworks that emphasized integrated functional relationships.

Growing dissatisfaction with ecosystems theory and inattention to the role of people in culture change culminated in Brumfiel's (1992) distinguished lecture to the American Anthropological Association, titled "Breaking and Entering the Ecosystem—Gender, Class, and Faction Steal the Show." In this address, Brumfiel called for greater attention to internal and dialectical sources of social change stemming from disparate groups and their conflicting interests. She also asserted that people, "not reified systems, are the agents of culture change," and thus agency-centered approaches were needed to temper ecosystems-centered analytics (ibid.:558–59). Brumfiel further advocated that archaeologists pursue studies of political economy, focusing on "variation in the intensity of household production, variation in household composition and organization, variation in demographic trends, the occurrence of enclave communities and prestige economies, and the intensity and organization of warfare and surplus extraction" (ibid.:560).

Michael Smith (2004:77) suggests that since the publication of Brumfiel and Earle's (1987b) influential volume, archaeological research on political economy has split in two directions. The first group has continued to develop materialist-based studies, while the second has branched off to pursue agency and practice theory approaches. This divergence corresponds with the more general cleavage in Americanist archaeology resulting from the post-processual critique of new archaeology.

Further development of materialist approaches, which Smith (2004:77) refers to as "archaeological political economy," shares "a global perspective on economies as open systems; attention to the economic dimensions and implications of political behavior and institutions; a concern with inequality and social classes; and a focus on processes of local historical change rather than broad processes of cultural evolution" (see also Earle 2002; Hirth 1996). Thus far, archaeological political economy has focused heavily on exchange and craft production while placing less emphasis on contexts of consumption. As of late, formalist-inspired studies of commercialization, markets, and

marketing have emerged as major research foci in Mesoamerica (e.g., Dahlin et al. 2007; Feinman and Garraty 2010; Garraty 2009; Garraty and Stark 2010; Hirth 1998; Smith 2004; Smith and Berdan 2003). Most obsidian studies carried out since the mid-1990s or so fit comfortably within the confines of archaeological political economy.

Moving in a second direction are studies of political economy that incorporate agency and practice theory—overlapping terms discussed here together. Archaeologists were attracted to practice theory as a means of theorizing a past populated with dynamic actors, drawing on the works of a number of scholars, including Pierre Bourdieu, Anthony Giddens, Michel De Certeau, and Sherry Ortner. Giddens's (1979) theory of structuration, for example, explains the duality of practice and structure: while practices are constrained by structure, they also collectively comprise structure and thus transform it as well. For Bourdieu (1977), people's actions in the world reflect their "habitus," or their internalized social dispositions, sensibilities, and practical knowledge. These regularized practices can either harmonize with or improvise upon what came before them, but people's knowledge of habitus is always incomplete and their actions may not play out as they intended. Practice theory thus offers an understanding of people as social agents whose practices occur within a sociocultural setting or structure that is also historically and environmentally contingent. While agents enact practices within a field of possibilities delimited by structure, the coalescence of these practices is what recursively constitutes structure.

Marcia-Ann Dobres and John Robb's (2000) edited volume, *Agency in Archaeology*, was a watershed moment that represented a coming of age for archaeological applications of practice theory and agency. In Mesoamerica, researchers have incorporated practice-based approaches into studies of craft production (e.g., Inomata 2001; Kovacevich 2007), exchange (e.g., LeCount 1999), and consumption, especially ritual feasting contexts (e.g., Barber and Joyce 2007; Brumfiel 2004). Though some of the agency-oriented studies cited here include obsidian data in their interpretations, few researchers have approached studies of obsidian from the perspective of practice theory (but see Hruby 2007).

A number of researchers have sought to build on practice theory approaches in constructing more comprehensive theoretical frameworks for understanding how subjects are constituted through their relationships with other people, places, and things in the world (e.g., see Hodder and Hutson 2003:106). These interactions—embedded in historical strands—are the crucible of meaning, identity, and understandings that inform practice. People come to understand the world around them and who they are themselves through interactions with objects, places, and other people. The nuts and bolts of how these interactions

are constituted, however, remain incompletely defined (Hutson 2010) and will require further adaptation for obsidian studies.

The following section segues into a discussion of related concepts that fit well under the rubric of materiality: the constitution of the material world and how objects actively engage with people on multiple levels (Meskell 2004; Miller 1998). Viewed here as complementary to theories of practice, materiality-oriented studies have spawned a number of approaches and conceptual tools that help us examine the relationship between people (subjects) and things (objects).

EMERGING DIRECTIONS IN OBSIDIAN STUDIES

Investigating the meaning of obsidian in archaeological contexts will contribute to deeper understandings of sociocultural, political, and economic life in ancient Mesoamerica. But why focus on meaning? To investigate meaning is to query obsidian's place in Mesoamerican cosmivision and ideology, how this relates to political economy, and how obsidian and people came together through embodied ritual and everyday practices (Hodder and Hutson 2003:156–57). Thus, meaning is relational and agent-centered insofar as it flows from an embodied understanding of oneself in relation to both material and ideational worlds. By approaching meaning, we can better understand the motivations and intentions underlying actions and events in the past. The pursuit of meaning must remain rooted in contextual readings of archaeological data but may also draw on the critical use of analogy, gained through ethno-historic, iconographic, and ethnographic data sets (see Wylie 1985). Recent theoretical works considering the materiality of objects represent innovative approaches that hold promise for exploring symbolic understandings of obsidian in the archaeological record.

Everywhere the lives of people and obsidian cross paths represents an entry point for studies of materiality (Buchli 2002; Meskell 2004; Miller 1987, 1998, 2005). “Materiality,” Lynn Meskell (2004:11) explains, “is our physical engagement with the world, our medium for inserting ourselves into the fabric of that world, and our way of constituting and shaping culture in an embodied and external sense.” Meskell’s definition emphasizes the agent-oriented nature of meanings in the past; they always come through someone’s point of view, so meaning cannot simply be extracted from material culture itself. Furthermore, as our interpretations approach an insider’s view in the past, we must reflect on our inability to completely escape our subjectivities in the present. Contrary to charges of attempting “paleopsychology” (Binford 1967), this view concedes that we may never pry loose singular and unadulterated understandings in and

of the past. The following subsections discuss how life history, embodiment and phenomenological approaches, and Peircian semiotics may help establish theoretical links between obsidian and meaning.

LIFE HISTORY APPROACHES

Life history or object biography approaches seek to reveal how meanings associated with obsidian artifacts emerge over the course of their “careers” (Appadurai 1986; Kopytoff 1986). This line of inquiry is predicated on the assumption that although people appear to create, manipulate, and master the use and deployment of objects, these same objects are reservoirs of meaning that can transform human thought, action, and identity (Gosden and Marshall 1999). The biographies of obsidian artifacts are enmeshed with human biographies from the day they are quarried to the day they are discarded. In fact, some may even reenter the social sphere, for instance, as heirlooms, curated ritual items (e.g., Brown 2000), or artifacts carried off for study by archaeologists.

Although life history approaches can trace the lineage of any given artifact, they may also examine broad categories of obsidian artifacts in terms of their variable origins and patterns of physical modification (see Ward 2004:12). In Mesoamerica, raw obsidian was transformed into prismatic blades through a series of variable production stages (Clark and Bryant 1997; Sheets 1975) that could occur across considerable units of space and time (see Healan 2009). While chunks of obsidian were typically reduced into macro-cores at or near the quarry, the successive steps, including further reduction to polyhedral core and actual blade making, often occurred elsewhere (e.g., Cobean 2002:151; Pastrana 2002:22–24). A finished blade therefore represented a collaborative effort of at least two or more crafters who may have never met. In this sense, these blades were “multiply authored,” and some residues of these interactions may “adhere” to the artifacts themselves (Gosden and Marshall 1999:173; see also Witmore’s [2007:557] “polychronic transactions”). Blademakers, for instance, may have distinguished exceptionally well-prepared polyhedral cores as the handiwork of a particularly skilled craftsman unknown to them. What are the social, economic, and political implications of such collective forms of production that transcend space and time?

Given that the most significant obsidian deposits are found in highland regions of Mesoamerica, did obsidian retain meaningful associations with these mountainous areas? Furthermore, as it was relayed across great distances and diverse environments, did obsidian take on additional connotations (see Helms 1993)? We can assume that Mesoamerican groups were able

to distinguish many—but probably not all—of the different types of obsidian based on their variability in color, inclusions, translucence, workability, and other characteristics (see Darras, this volume; Pastrana and Athie, this volume). It follows, then, that discernible varieties of volcanic glass may have evoked distinct meanings associated with their particular geographic origin and associated social groups. Recent studies demonstrate that color and other visual characteristics of material culture can provide important clues as to their meaning and role in ancient societies (Boivin and Owoc 2004; Gage et al. 1999; Hurcombe 2007:539–40; Jones and MacGregor 2002; Lucero 2010). Given its high quality and unusual green color, obsidian from the Pachuca source is one of the most likely to have evoked discrete meanings relative to other types (see Aoyama, this volume; Levine, this volume; Pastrana and Athie, this volume).

EMBODIMENT, OBJECT AGENCY, AND LANDSCAPE

Efforts to better understand how people come to know themselves and the physical and social worlds around them have led to archaeological theories of embodiment and landscape. Both concepts draw on phenomenology, which rejects Cartesian notions of separate mind and body—instead arguing that people move through and come to know the world through embodied, sensual experience (Hamilakis, Pluciennik, and Tarlow 2002; Hodder and Hutson 2003:106–24; Joyce 2003, 2005; Kus 1992; Meskell and Joyce 2003; Tilley 2004:1–31). This constant state of “being in the world” takes on spatial and temporal dimensions, where histories of embodied experience become rooted in memory or the landscape (Csordas 1994; see also Ingold’s [1993] concept of “dwelling” and Barrett’s [1999] “inhabitation”).

Interest in bodies is nothing new to archaeology, but as Ian Hodder and Scott Hutson (2003:113) explain, conventional “archaeology of the body” approaches conceive of the body as an object, whereas more recent “archaeologies of embodiment” make bodies the subject of culture. The former body-as-object approaches treat the body as a locus of display or as an artifact in itself (Joyce 2005:139). Obsidian ornaments such as earspools and labrets are commonly theorized in this fashion, as signs marking high-status bodies (e.g., Otis Charlton 1993). Conversely, Rosemary Joyce (2005:142–43) encourages more active readings of how clothing, ornamentation, and bodily modification transform and shape people’s experiences. From this embodied archaeological perspective, for instance, obsidian earspools might be interpreted as part and parcel of larger projects concerned with the constitution of personhood (Hutson 2010:123–26; see also Fowler 2004; Gillespie 2001; Haskell 2012).

A consideration of embodied practice may lead to deeper understandings of how people come to know themselves and obsidian through contexts of procurement, crafting, trade, and consumption. We might see obsidian in a new light through an embodied approach to obsidian mining, for instance, drawing on the experiences of workers who toiled at the extensive quarries at Pachuca and Pico de Orizaba (see Pastrana and Athie, this volume). What were the occupational hazards, and how did workers approach these challenges? How might their experiences reveal novel understandings of obsidian deposits within a larger animate and sacred landscape?

Studies that break down the crafting process into a discrete sequence of steps, or *chaîne opératoire*, have greatly clarified our understanding of how particular objects were made (Lemmonier 1992). Yet these studies tend to present a disembodied perspective insofar as obsidian is acted upon, with little consideration of how obsidian might also affect the crafter. Recent studies reveal archaeology's ocularcentric orientation to knowing the past, relying heavily on sight while seemingly indifferent to how other senses (hearing, smell, touch, taste) inform experiential knowledge (Witmore 2006). An archaeology more attuned to the senses should elicit richer and more complete appreciations of embodied human experience in the past (Day 2013; Fahlander and Kjellström 2010; Hamilakis 2002; Houston and Taube 2000; Kus 1992; Meskell 1996). In regard to obsidian production, a haptic approach may be especially promising, given that a crafter's knowledge does not come from verbal instructions alone but also through a tactile "feel" gained from repetitive physical movements. Thus, part of an artisan's practical knowledge of how to strike blades from a polyhedral core, for instance, resides in the concerted effort of his or her muscles, tendons, and bones (John Clark, personal communication, 2010). In this vein, we might ask how obsidian working may have transformed the body, such as increasing manual dexterity and strength or adversely affecting health, including joint degeneration or other ailments. Concerning the latter, how did working with obsidian provoke physical pain (Kjellström 2010) and, conversely, how did people enlist obsidian's medicinal qualities to treat pain (see Pastrana and Athie, this volume)?

At present, it is difficult to imagine how studies of smell or taste could aid obsidian studies, but an appreciation of hearing is more accessible. We can learn more about the overall experience, for instance, of obsidian crafters immersed in distinctive sonorous environments or "soundscapes" (ibid.; see also Bruchez 2007; Scarre and Lawson 2006; Witmore 2006). Considering the acoustic properties inherent to the material itself, how might the sounds of obsidian tool use or crafting, such as the ring of a freshly removed blade,

signal a correct stroke or other indexes of meaning? Mesoamericanists have scarcely begun to ruminate on the aural linkages between objects and people, yet these acoustic dimensions may broker new insights (see Barber, Sánchez, and Olvera 2009; Hosler 1994; Houston, Stuart, and Taube 2006:153–63; Sheets 2002).

At a very basic level, people used obsidian, but materiality-related approaches necessitate reflection on how these objects “acted upon” people in different ways. Formal and informal obsidian tools were enlisted for cutting, scraping, sawing, and perforating objects (and sometimes bodies). Through such acts, one would have come to know the object world in a new way. For instance, a crafter would have gained a new familiarity with different properties (e.g., hardness, texture) of trees or plants through the edge of an obsidian blade. Obsidian implements were also used in ritual practices, such as bloodletting, activating relationships with supernaturals, and fulfilling sacred obligations (García Cook and Merino Carrión 2005; Graulich 2005). Did bloodletting performed with obsidian lancets, as opposed to plant spines or bone awls, carry different connotations? These inquiries lead to fundamental issues concerning the nature of people, things, and their relationship to one another. Put simply, as Clark (2007:23) asks, “where does the individual artisan stop and the craft begin? Where are the boundaries between persons and things” (see also Malafouris 2010:14).

Scholars continue to debate the degree to which objects may be thought of as having agency, or the ability to affect outcomes in the world (e.g., Gell 1998; Gosden 2005; Latour 2005; Meskell 2004; Witmore 2007). I find myself siding with those who view objects as having limited agentic qualities activated through their relationships with people. Obsidian’s innate qualities, such as its sharp edges or ability to conduct or reflect light (Saunders 1998), establish some ground rules for these relationships (see Hendon 2010:85). Rejecting the notion that obsidian can act altogether independently, it may be helpful to imagine how obsidian’s presence may have created certain possibilities and opportunities while closing off others. For instance, in some cases the demand for obsidian may have stimulated the establishment of new trade networks, opening the door to a host of more far-reaching sociopolitical and cultural exchanges. Newfound access to obsidian tools and implements could have altered modalities of subsistence, ritual life, and crafting. To be sure, there are human intentions and motivations underlying these processes, yet obsidian itself still represents part of the equation. Imagine for a moment how the absence of geological deposits of obsidian in Mesoamerica would have altered its history.

A growing number of scholars, however, note that dualistic constructs underlying modernist thought (e.g., people/things, culture/nature) problematically discount the possibility of non-human agency, even when studying cultures where rigid boundaries between the animate and inanimate, for instance, are absent. Archaeologists participating in this “ontological turn” are rethinking western axioms of being, agency, materiality, and relations and how they may impede deeper understandings of cultures with different ontological moorings (Alberti et al. 2011). One group has rallied under the banner of “symmetrical archaeology,” arguing for the interpenetration of people and non-human entities that essentially co-create one another (e.g., Olsen 2010; Webmoor and Witmore 2008; Witmore 2007). They call for a more symmetrical consideration of people and things, which have different agentic qualities that come about through hybridized relationships. In many respects, symmetrical archaeology is an offshoot of actor-network theory (ANT), which challenges purported anthropocentric outlooks that underestimate the agency of things and their multivalent relationships with people and other things (e.g., Latour 1999, 2005; Law and Hassard 1999; see also Knappett 2005; Knappett and Malafouris 2008).

In a like-minded manner, others have rallied around “animism” as an entry point for investigating how many non-western ontologies accept the beingness of non-human entities who have spirits or other essences that confer degrees of personhood (Alberti and Bray 2009; Brown and Walker 2008; Mills and Ferguson 2008; VanPool and Newsome 2012). Animism is a well-documented feature of Mesoamerican religious belief today (Brown and Emery 2008; Monaghan 1995:98–105, this volume) and has deep roots in prehispanic times as well (Darras, this volume; Houston, Stuart, and Taube 2006:98–101; Marcus and Flannery 1994:57–60). In regard to obsidian studies, animated archaeological analysis may be particularly useful for studying ceremonial offerings, deposits, or caches. For instance, if people at ancient Teotihuacan considered obsidian figurines and eccentrics to be in some sense alive, then this could transform our understanding of symbolically charged contexts where these artifacts are found at the Feathered Serpent Pyramid, the Pyramid of the Moon, and elsewhere (cf., Sugiyama 2005:135–40; see also Parry, this volume).

Archaeological attention to landscape (e.g., Ashmore and Knapp 1999; Bender 1993; Tilley 1994) also represents entry points for studies of obsidian and meaning. As discussed earlier, the most significant obsidian deposits in Mesoamerica reside in mountainous volcanic (or once volcanic) regions that carry associations with primordial origins and powerful deities (Darras, this

volume; Levine, this volume; Pastrana and Athie, this volume; Serra Puche, Lazcano Arce, and García Méndez, this volume). How did embodied experiences of these places and deposits of volcanic stone create and transform social identity and meanings (Tilley 2004)? Furthermore, we must also rethink the degree to which obsidian artifacts, even the most mundane flake tools, may be alienated from their makers. Did any residues of meaning “travel” with obsidian itself? As traders traversed the landscape, the economic value of their obsidian cargo certainly increased, but were there other senses of value this movement fixed in the material itself? It seems premature to assume that obsidian objects, even unremarkable artifacts, would have been wholly alienated from meanings associated with different points in their social lives. Integrated studies that examine how obsidian mediated human experience and identity, especially in relation to landscape and mobility, present untapped avenues for continued research (see Van Dommelen and Knapp 2010). Increasingly sophisticated geographic information systems (GIS)-based analyses that model human movements across the landscape, in conjunction with analyses of social relationships, are poised to make important contributions to obsidian exchange studies in the coming years (White and Barber 2012; see also Carballo and Pluckhahn 2007; Golitko et al. 2012). Peircian semiotics, discussed in the following section, represents an altogether different approach to examining meaning in the archaeological record that may prove useful for the obsidian analyst.

PEIRCIAN SEMIOTICS

Robert Preucel (2006:3) defines semiotics as “the multi-disciplinary field devoted to how humans produce, communicate, and codify meaning.” Charles Peirce’s (1991) theoretical work on semiotics, completed about a century ago, is only now generating interest among archaeologists as a viable tool for broaching the material-ideal divide (e.g., Carballo, this volume; Forde 2006; Preucel 2006; Preucel and Bauer 2001). Often contrasted with Ferdinand de Saussure’s better-known work in semiotics (Hodder and Hutson 2003:59–65), Peirce maintained that each sign exists in a three-way relationship with itself, the object it refers to, and the interpretant. In this scheme, the *sign* is the signifier representing something other, that is, the *object*, which is a “real” thing or idea. The *interpretant* is the thought process that makes sense of the sign and is located in the mind of an actor linking object and sign. Thus, as James Hoopes (1991:9) explains, “the meaning of every thought is established by a triadic relation, an interpretation of the thought as a sign of a determining object.” Peirce’s theory is relational in that all signs link to other signs, objects,

and interpretants in an endless chain linking past and future. It follows, then, that signs can be viewed as generating others and therefore having some measure of agency (Preucel 2006:55–56).

Peirce's work distinguishes three different relational modes of signification: symbols, icons, and indexes.⁴ While *symbols* are signs that relate to their referent in a completely arbitrary manner, *icons* are non-arbitrary in that they actually resemble—to varying degrees—what they represent. Thus, a red octagonal sign on the roadside signifying “stop” is an example of a symbol (as is the word *stop*), whereas a road sign depicting stick figures of children “at play” is an icon resembling a particular human hazard. There can be variable levels of iconicity, such as the difference between an impressionist painting of a water lily-covered pond and a photograph of that same pond. Signs that are *indexes* have some real connection to their referents, though they may not resemble them in a direct manner. For example, Peirce explains that a weathervane points in the direction of the prevailing wind and is an *index* of that wind. Our aforementioned sign portraying children at play may also index activities at a roadside playground that could potentially spill onto the street at that particular point.

Peirce's three types of relational signs also comprise a nested hierarchy in that symbols (the most complex) include indexes (less complex) that, in turn, incorporate icons (*ibid.*:249). Without reifying a sort of semiotic “ladder of inference,” archaeological studies of obsidian will likely find icons and indexes easiest to approach, with symbols less so. When possible, comparative iconographic analysis, as well as ethnohistoric and ethnographic data, will greatly aid in this enterprise (see Carballo, this volume). At a minimum, Peirce's icons, indexes, and symbols provide a lexicon that can make interpretive chains of inference more explicit.

In the preceding discussion, I suggested that life history approaches, theories of embodiment and object agency, phenomenology and landscape, and even Peircian semiotics provide interpretive tools that may facilitate more holistic understandings of obsidian in the past. Nonetheless, this volume as a whole promotes theoretical ecumenism. Newer interpretive approaches must, of course, interdigitate with continuing advances in technological and experimental studies of obsidian, as well as broader theoretical work in political economy. The more pressing argument here is that researchers must consider obsidian's symbolic and sociocultural associations as seriously as its functional, economic, and political dimensions. Combining archaeological data with insights from critical studies of iconographic, ethnohistoric, and ethnographic information provides the most solid foundation for investigating the symbolic dimensions of obsidian in the past.



FIGURE 1.1. *Map of Mesoamerica including major obsidian sources*

ORGANIZATION OF THIS VOLUME

Rather than delve into a comprehensive treatment of any one theme, region, or place, *Obsidian Reflections* covers a variety of topics spanning the Formative to Postclassic periods and marshaling evidence from throughout Mesoamerica, including case studies from Mexico, Belize, Guatemala, and Honduras (figure 1.1). Importantly, this expansive approach highlights diversity in the ways Mesoamerican cultural groups conceptualized their relationship to obsidian and its role in their lives. These case studies collectively argue against structural interpretations of obsidian and meaning that fall back on so-called pan-Mesoamerican beliefs that ignore local cultural knowledge and historical contexts. The international cadre of authors assembled here also represents scholarship from traditions with varying methodological and theoretical approaches to obsidian studies.

Obsidian Reflections comprises chapters grouped into three sections: (I) Ethnohistorical and Ethnographic Perspectives, (II) Symbolic Dimensions of Obsidian Production and Exchange, and (III) Interpreting Obsidian in Ritual Offerings and Use. These headings give the volume a semblance of organization, yet most authors cover subject matter that crosscuts more than

one of these themes. Here, I provide a brief preview of the chapters that follow.

In the first chapter of section I, Véronique Darras utilizes ethnohistoric records, primarily the *Relación de Michoacán*, to discuss obsidian in mundane, ritual, and symbolic contexts among the Late Postclassic Tarascans of west Mexico. Her contribution illuminates obsidian's significance as expressed in Tarascan cosmology and examines how conceptions of obsidian were incorporated into narratives expressing elite ideology. In chapter 3, Alejandro Pastrana and Ivonne Athie examine Nahua conceptions of obsidian in Late Postclassic central Mexico. They draw on ethnohistoric and archaeological data sets to consider native understandings of obsidian's origin and place in the world, including its medicinal uses, sensual associations, how it was mined, how it was processed into tools and implements, and its links to powerful deities. The next chapter, by John Monaghan, provides an ethnographic perspective of the meaning of stone tools and their contemporary equivalents for Mixtec people from the village of Santiago Nuyoo in highland Oaxaca (Mexico). In contrasting these modern understandings and attitudes with depictions of stone tools in the conquest era Mixtec codices, Monaghan illustrates how ethnographically derived knowledge imbricates with codical renderings of related ideas and, by extension, how these insights may be useful in examining the symbolic dimensions of stone tools in prehispanic times. The chapters in section I demonstrate the importance and diversity of obsidian's symbolic dimensions for Mesoamerican societies today and in the recent past, providing the reader with a useful baseline of knowledge prior to delving into the more archaeologically oriented chapters that follow.

The chapters in section II address how obsidian's symbolic connotations may have come into play when making decisions concerning production and exchange. Kazuo Aoyama draws on a large bank of archaeological data from the southern Maya area (Copán, Pasión, and Petexbatun regions) to address symbolic and ritual dimensions of obsidian production, use, and exchange. His diachronic study (1400 BCE–1100 CE) highlights the prominent role of elites in exchange, production of obsidian eccentrics, ritual disposal of obsidian debris, and the deposition of obsidian in symbolically charged caches. In chapter 6, I examine the economic, political, sociocultural, and symbolic dimensions of obsidian exchange patterns at Late Postclassic Tututepec, located on the coast of Oaxaca. This effort investigates the meaning of obsidian exchange for the Mixtec of Tututepec from three overlapping registers: in terms of function and technology, in relation to culturally defined ideas and worldview, and from the perspective of how obsidian objects intersected with people's lives through daily practices.

In section III, authors focus more precisely on obsidian from ritually charged contexts, how these implements were used, and their meaningful connotations. David Carballo discusses an elaborate Terminal Formative period (100 BCE–150 CE) cache found associated with a temple structure at La Laguna, in northern Tlaxcala, Mexico. The cache presents a complex offering of large obsidian bifaces and eccentrics, in addition to shell, pyrite, and greenstone artifacts. Carballo's interpretation of this deposit draws on Peirce's semiotic framework and integrates archaeological, iconographic, and ethnohistoric data sets to render a better understanding of its significance. In chapter 8, W. James Stemp and Jaime J. Awe take readers "down under" in their examination of ritual obsidian use at caves in western Belize. Through a meticulous analysis of obsidian use-wear and artifact distribution patterns at five caves, Stemp and Awe attempt to more clearly define the diversity of ritual practices occurring in these subterranean contexts during the Late Classic (700–830 CE) and Terminal Classic (830–950 CE) periods. Chapter 9, by Mari Carmen Serra Puche, Jesús Carlos Lazcano Arce, and Mónica Blanco García Méndez, examines obsidian and ritual practices from Epiclassic period (650–900 CE) Xochitecatl-Cacaxtla, in the Mexican state of Tlaxcala. Their study focuses on excavations at two residential terraces and the discovery of a range of ritual artifactual remains, including several obsidian lancets used for bloodletting. These obsidian implements were an integral component of domestic ritual that served a number of purposes.

In William Parry's concluding chapter, he offers a commentary on the preceding chapters, nested within a broader discussion of the non-utilitarian aspects of obsidian from Classic period contexts at Teotihuacan and the Basin of Mexico. Furthermore, Parry offers a synthetic appraisal of obsidian from mortuary contexts at Teotihuacan and concludes that the meaningful associations of these artifacts most likely lie with the mourners who placed the objects with the dead rather than with the dead themselves. Finally, Parry acknowledges the need to investigate obsidian's meaningful connotations from multiple perspectives and encourages further development of holistic approaches to lithic studies in the future.

ACKNOWLEDGMENTS

This edited volume grew out of a session David Carballo and I organized for the 2010 Society for American Archaeology (SAA) meetings in St. Louis, Missouri. I want to acknowledge the valuable contributions of those who participated in the session but were unable to provide papers for this volume:

Linda Brown, Robert Cobean, Dan Healan, and Zac Hruby. I also wish to thank John Clark for serving as our session's discussant and sharing his comments. Although not an original participant in the SAA session, Bill Parry graciously accepted the invitation to write a final chapter for this volume. I wrote this introductory chapter during a postdoctoral fellowship at the Denver Museum of Nature and Science, and I thank my colleagues Steve Nash, Steve Holen, and Chip Colwell-Chanthaphonh for their generous support. The University of Oklahoma College of Arts & Sciences provided funds to prepare the index for this volume. I'm also grateful for the critical feedback on this chapter provided by David Carballo, Chip Colwell-Chanthaphonh, Jamie Forde, Arthur Joyce, and Alejandro Pastrana. I also thank the two anonymous reviewers who provided additional comments and helpful suggestions. I take full responsibility, however, for any misrepresentations, errors, or failures of logic herein.

NOTES

1. The efforts here also draw inspiration from research examining the symbolic dimensions of metallurgical technology and meaning (Hosler 1994; Lechtman 1977, 1984). In addition, a number of researchers working outside of Mesoamerica have looked into the symbolic dimensions of chipped-stone tool procurement, production, trade, and use (e.g., Brumm 2010; Taçon 1991; Ward 2004; Whittle 1995).

2. For instance, at the site of Altar de Sacrificios, Cache 6 was found under an altar in front of the tallest mound (Str. B-I). It contained 677 obsidian blades and debitage, along with 9 chert eccentrics (Smith 1972:236). Yet this cache and a litany of others were described sparingly in the site report and related appendixes (Willey 1972:214, 1973:35). Fieldwork at Altar de Sacrificios was carried out from 1958 to 1963.

3. Yet structuralist influences may be seen in later archaeological works (e.g., López Luján 2005; Pastrana and Athie, this volume).

4. Peirce later described at least ten different kinds of signs (see Preucel 2006:table 3.3).

REFERENCES CITED

KEY TO ACRONYMS

INAH Instituto Nacional de Antropología e Historia
UNAM Universidad Nacional Autónoma de México

Agbe-Davies, Anna S., and Alexander A. Bauer. 2010. "Rethinking Trade as a Social Activity: An Introduction." In *Social Archaeologies of Trade and Exchange: Exploring*

- Relationships among People, Places, and Things*, ed. Alexander A. Bauer and Anna Agbe-Davies, 13–28. Walnut Creek, CA: Left Coast Press.
- Alberti, Benjamin, and Tamara L. Bray. 2009. "Introduction to Special Section: Animating Archaeology: of Subjects, Objects, and Alternative Ontologies." *Cambridge Archaeological Journal* 19 (3): 337–43. <http://dx.doi.org/10.1017/S0959774309000523>.
- Alberti, Benjamin, Severin Fowles, Martin Holbraad, Yvonne Marshall, and Christopher Witmore. 2011. "Worlds Otherwise: Archaeology, Anthropology, and Ontological Difference." *Current Anthropology* 52 (6): 896–912. <http://dx.doi.org/10.1086/662027>.
- Appadurai, Arjun. 1986. "Introduction: Commodities and the Politics of Value." In *The Social Life of Things*, ed. Arjun Appadurai, 3–63. Cambridge: Cambridge University Press.
- Ashmore, Wendy, and A. Bernard Knapp, eds. 1999. *Archaeologies of Landscape*. Malden: Blackwell.
- Barber, Sarah B., and Arthur A. Joyce. 2007. "Polity Produced and Community Consumed: Negotiating Political Centralization through Ritual in the Lower Río Verde Valley, Oaxaca." In *Mesoamerican Ritual Economy: Archaeological and Ethnological Perspectives*, ed. E. Christian Wells and Karla Davis-Salazar, 221–44. Boulder: University Press of Colorado.
- Barber, Sarah B., Gonzalo Sánchez, and Mireya Olvera. 2009. "Sounds of Death and Life in Mesoamerica: The Bone Flutes of Ancient Oaxaca." *Yearbook for Traditional Music* 41: 94–110.
- Barrett, John. 1999. "The Mythical Landscapes of the British Iron Age." In *Archaeologies of Landscape*, ed. Wendy Ashmore and A. Bernard Knapp, 253–65. Malden: Blackwell.
- Bender, Barbara. 1993. *Landscape: Politics and Perspective*. Oxford: Berg.
- Binford, Lewis R. 1962. "Archaeology as Anthropology." *American Antiquity* 28 (2): 217–25. <http://dx.doi.org/10.2307/278380>.
- Binford, Lewis R. 1967. "Smudge Pits and Hide Smoking: The Use of Analogy in Archaeological Reasoning." *American Antiquity* 32 (1): 1–12. <http://dx.doi.org/10.2307/278774>.
- Blanton, Richard E., Lane F. Fargher, and Verence Y. Heredia Espinoza. 2005. "The Mesoamerican World of Goods and Its Transformations." In *Settlement, Subsistence, and Social Complexity: Essays Honoring the Legacy of Jeffrey R. Parsons*, ed. Richard E. Blanton, 260–94. Los Angeles: Cotsen Institute, University of California.

- Blanton, Richard E., and Gary M. Feinman. 1984. "The Mesoamerican World System." *American Anthropologist* 86 (3): 673–82. <http://dx.doi.org/10.1525/aa.1984.86.3.02a00100>.
- Boivin, Nicole, and Mary Ann Owoc, eds. 2004. *Soils, Stones, and Symbols: Cultural Perceptions of the Mineral World*. London: UCL Press.
- Bourdieu, Pierre. 1977. *Outline of a Theory of Practice*. Cambridge: Cambridge University Press. <http://dx.doi.org/10.1017/CBO9780511812507>.
- Brown, Linda A. 2000. "From Discard to Divination: Demarcating the Sacred through the Collection and Curation of Discarded Objects." *Latin American Antiquity* 11 (4): 319–33. <http://dx.doi.org/10.2307/972000>.
- Brown, Linda A., and Kitty F. Emery. 2008. "Negotiations with the Animate Forest: Hunting Shrines in the Guatemalan Highlands." *Journal of Archaeological Method and Theory* 15 (4): 300–37. <http://dx.doi.org/10.1007/s10816-008-9055-7>.
- Brown, Linda A., and William H. Walker. 2008. "Prologue: Archaeology, Animism and Non-Human Agents." *Journal of Archaeological Method and Theory* 15 (4): 297–99. <http://dx.doi.org/10.1007/s10816-008-9056-6>.
- Bruchez, Margaret S. 2007. "Artifacts That Speak for Themselves: Sounds Underfoot in Mesoamerica." *Journal of Anthropological Archaeology* 26 (1): 47–64. <http://dx.doi.org/10.1016/j.jaa.2006.02.001>.
- Brumfiel, Elizabeth M. 1987. "Elite and Utilitarian Crafts in the Aztec State." In *Specialization, Exchange, and Complex Societies*, ed. Elizabeth M. Brumfiel and Timothy K. Earle, 102–18. New York: Cambridge University Press.
- Brumfiel, Elizabeth M. 1992. "Distinguished Lecture in Archaeology: Breaking and Entering the Ecosystem—Gender, Class, and Faction Steal the Show." *American Anthropologist* 94 (3): 551–67. <http://dx.doi.org/10.1525/aa.1992.94.3.02a00020>.
- Brumfiel, Elizabeth M. 2004. "Materiality, Feasts, and Figured Worlds in Aztec Mexico." In *Rethinking Materiality: The Engagement of Mind with the Material World*, ed. Elizabeth DeMarrais, Chris Gosden, and Colin Renfrew, 225–37. Cambridge: McDonald Institute for Archaeological Research, University of Cambridge.
- Brumfiel, Elizabeth M., and Timothy K. Earle. 1987a. "Specialization, Exchange, and Complex Societies: An Introduction." In *Specialization, Exchange, and Complex Societies*, ed. Elizabeth M. Brumfiel and Timothy K. Earle, 1–9. New York: Cambridge University Press.
- Brumfiel, Elizabeth M., and Timothy K. Earle, eds. 1987b. *Specialization, Exchange, and Complex Societies*. New York: Cambridge University Press.

- Brumm, Adam. 2010. "The Falling Sky': Symbolic and Cosmological Associations of the Mt William Greenstone Axe Quarry, Central Victoria, Australia." *Cambridge Archaeological Journal* 20 (2): 179–96. <http://dx.doi.org/10.1017/S0959774310000223>.
- Buchli, Victor, ed. 2002. *The Material Culture Reader*. Oxford: Berg.
- Carballo, David M. 2007. "Implements of State Power: Weaponry and Martialy Themed Obsidian Production Near the Moon Pyramid, Teotihuacan." *Ancient Mesoamerica* 18 (1): 173–90. <http://dx.doi.org/10.1017/S0956536107000144>.
- Carballo, David M. 2011. *Obsidian and the Teotihuacan State: Weaponry and Ritual Production at the Moon Pyramid*. Pittsburgh: University of Pittsburgh, and Mexico City: UNAM.
- Carballo, David M., and Thomas Pluckhahn. 2007. "Transportation Corridors and Political Evolution in Highland Mesoamerica: Settlement Analyses Incorporating GIS for Northern Tlaxcala, Mexico." *Journal of Anthropological Archaeology* 26 (4): 607–29. <http://dx.doi.org/10.1016/j.jaa.2007.05.001>.
- Clark, John E. 1987. "Politics, Prismatic Blades, and Mesoamerican Civilization." In *The Organization of Core Technology*, ed. Jay K. Johnson and Carol A. Morrow, 259–85. Boulder: Westview.
- Clark, John E. 1989a. "Obsidian: The Primary Mesoamerican Sources." In *La Obsidiana en Mesoamérica*, ed. Margarita Gaxiola and John E. Clark, 299–319. Mexico City: INAH.
- Clark, John E. 1989b. "La Técnica de Talla de los Lacandones de Chiapas." In *La Obsidiana en Mesoamérica*, ed. Margarita Gaxiola and John E. Clark, 443–48. Mexico City: INAH.
- Clark, John E. 1991. "Flintknapping and Debitage Disposal among the Maya of Chiapas, Mexico." In *The Ethnoarchaeology of Refuse Disposal*, ed. Edward Staski and Livingston D. Sutro, 63–78. Anthropological Research Papers 42. Tempe: Arizona State University.
- Clark, John E. 2003a. "A Review of Twentieth-Century Mesoamerican Obsidian Studies." In *Mesoamerican Lithic Technology: Experimentation and Interpretation*, ed. Kenneth G. Hirth, 15–54. Salt Lake City: University of Utah Press.
- Clark, John E. 2003b. "Appendix C: Bibliography of Dissertations and Theses." In *Mesoamerican Lithic Technology: Experimentation and Interpretation*, ed. Kenneth G. Hirth, 253–62. Salt Lake City: University of Utah Press.
- Clark, John E. 2007. "In Craft Specialization's Penumbra: Things, Persons, Action, Value, and Surplus." In *Rethinking Craft Specialization in Complex Societies: Archaeological Analyses of the Social Meaning of Production*, ed. Zachary X. Hruby and

- Rowan K. Flad, 20–35. *Archaeological Papers of the American Anthropological Association* 17. Washington, DC: American Anthropological Association.
- Clark, John E., and Douglas D. Bryant. 1997. “Technological Typology of Prismatic Blades and Debitage from Ojo de Agua, Chiapas, Mexico.” *Ancient Mesoamerica* 8 (1): 111–36. <http://dx.doi.org/10.1017/S095653610001619>.
- Cobean, Robert H. 2002. *Un Mundo de Obsidiana: Minería y comercio de un vidrio volcánico en el México antiguo (A World of Obsidian: The Mining and Trade of a Volcanic Glass in Ancient Mexico)*. Pittsburgh: University of Pittsburgh, and Mexico City: INAH.
- Coe, William R. 1959. *Piedras Negras Archaeology: Artifacts, Caches, and Burials*. Philadelphia: University of Pennsylvania University Museum Monographs.
- Crabtree, Donald. 1968. “Mesoamerican Polyhedral Cores and Prismatic Blades.” *American Antiquity* 33 (4): 446–78. <http://dx.doi.org/10.2307/278596>.
- Csordas, Thomas J. 1994. “Introduction: The Body as Representation and Being-in-the-World.” In *Embodiment and Experience: The Existential Ground of Culture and Self*, ed. Thomas J. Csordas, 273–96. Cambridge: Cambridge University Press.
- Dahlin, Bruce H., Christopher T. Jensen, Richard E. Terry, David R. Wright, and Timothy Beach. 2007. “In Search of an Ancient Maya Market.” *Latin American Antiquity* 18 (4): 363–84. <http://dx.doi.org/10.2307/25478193>.
- Darras, Véronique. 1998. “La Obsidiana en la Relación de Michoacán y en la Realidad Arqueológica: del Símbolo al uso o del uso de un Símbolo.” In *Génesis, Cultura, y Espacios en Michoacán*, ed. Véronique Darras, 61–88. Mexico City: Centro de Estudios Mexicanos y Centroamericanos.
- Day, Jo, ed. 2013. *Making Senses of the Past: Toward a Sensory Archaeology*. Center for Archaeological Investigations, Occasional Paper 40. Carbondale: Southern Illinois University.
- Demarest, Arthur A. 1992. “Ideology in Ancient Maya Cultural Evolution: The Dynamics of Galactic Polities.” In *Ideology and Pre-Columbian Civilizations*, ed. Arthur A. Demarest and Geoffrey W. Conrad, 135–58. Santa Fe: School of American Research Press.
- Dobres, Marcia-Anne, and John Robb, eds. 2000. *Agency in Archaeology*. London: Routledge.
- Earle, Timothy K. 1982. “The Ecology and Politics of Primitive Valuables.” In *Culture and Ecology: Eclectic Perspectives*, ed. John G. Kennedy and Robert B. Edgerton, 65–83. Special Publication of the American Anthropological Association 15. Washington, DC: American Anthropological Association.

- Earle, Timothy K. 2002. *Bronze Age Economics: The Beginnings of Political Economies*. Boulder: Westview.
- Ekholm, Kajsa, and Jonathan Friedman. 1979. "‘Capital’ Imperialism and Exploitation in Ancient World Systems." In *Power and Propaganda: A Symposium on Ancient Empires*, ed. Mogens T. Larsen, 41–58. Copenhagen: Akademisk Forlag.
- Fahlander, Fredrik, and Anna Kjellström. 2010. "Beyond Sight: Archaeologies of Sensory Perception." In *Making Sense of Things: Archaeologies of Sensory Perception*, ed. Fredrik Fahlander and Anna Kjellström, 1–13. Stockholm: Department of Archaeology and Classical History, Stockholm University.
- Feinman, Gary M., and Christopher P. Garraty. 2010. "Preindustrial Markets and Marketing: Archaeological Perspectives." *Annual Review of Anthropology* 39 (1): 167–91. <http://dx.doi.org/10.1146/annurev.anthro.012809.105118>.
- Flannery, Kent. 1972. "The Cultural Evolution of Civilizations." *Annual Review of Ecology and Systematics* 3 (1): 399–426. <http://dx.doi.org/10.1146/annurev.es.03.110172.002151>.
- Forde, Jamie E. 2006. "Ideology, Identity, and Icons: A Study of Mixtec Polychrome Pottery from Late Postclassic Yucu Dzaa (Tututepec), Oaxaca, Mexico." MA thesis, Department of Anthropology, University of Colorado at Boulder.
- Fowler, Chris. 2004. *The Archaeology of Personhood: An Anthropological Approach*. London: Routledge.
- Frank, Andre G. 1967. *Capitalism and Underdevelopment in Latin America: Historical Studies of Chile and Brazil*. New York: Monthly Review Press.
- Gage, John, Andrew Jones, Richard Bradley, Kate Spence, E.J.W. Barber, and Paul Taçon. 1999. "What Meaning Had Colour in Early Societies?" *Cambridge Archaeological Journal* 9 (1): 109–26. <http://dx.doi.org/10.1017/S0959774300015237>.
- Gándara, Manuel. 2012. "A Short History of Theory in Mesoamerican Archaeology." In *The Oxford Handbook of Mesoamerican Archaeology*, ed. Deborah L. Nichols and Christopher A. Pool, 32–46. Oxford: Oxford University Press.
- García Cook, Ángel. 1967. *Análisis Tipológico de Artefactos*. Serie Investigaciones 12. Mexico City: INAH.
- García Cook, Ángel, and B. Leonor Merino Carrión. 2005. "Sobre Tres Elementos Líticos con Carácter Ritual: Navajas de Autosacrificio, Navajas con Cresta y Cortadores o Tranchet." In *Reflexiones Sobre la Industria Lítica*, ed. Leticia González Arratia and Lorena Mirambell, 299–323. Mexico City: INAH.
- Garraty, Christopher P. 2009. "Evaluating the Distributional Approach to Inferring Marketplace Exchange: A Test Case from the Mexican Gulf Lowlands." *Latin American Antiquity* 20: 157–74.

- Garraty, Christopher P., and Barbara L. Stark, eds. 2010. *Archaeological Approaches to Market Exchange in Ancient Societies*. Boulder: University Press of Colorado.
- Gaxiola, Margarita, and John E. Clark, eds. 1989. *La Obsidiana en Mesoamérica*. Mexico City: INAH.
- Gell, Alfred. 1998. *Art and Agency: An Anthropological Theory*. Oxford: Clarendon.
- Giddens, Anthony. 1979. *Central Problems in Social Theory: Action, Structure and Contradiction*. Berkeley: University of California Press.
- Gillespie, Susan D. 2001. "Personhood, Agency, and Mortuary Ritual: A Case Study from the Ancient Maya." *Journal of Anthropological Archaeology* 20 (1): 73–112. <http://dx.doi.org/10.1006/jaar.2000.0369>.
- Gilman, Antonio. 1981. "The Development of Social Stratification in Bronze Age Europe." *Current Anthropology* 22 (1): 1–23. <http://dx.doi.org/10.1086/202600>.
- Golitko, Mark, James Meierhoff, Gary M. Feinman, and Patrick Ryan Williams. 2012. "Complexities of Collapse: The Evidence of Maya Obsidian as Revealed by Social Network Graphical Analysis." *Antiquity* 86: 507–23.
- González Arratia, Leticia, and Lorena Mirambell, eds. 2005. *Reflexiones Sobre la Industria Lítica*. Mexico City: INAH.
- Gosden, Christopher. 2005. "What Do Objects Want?" *Journal of Archaeological Method and Theory* 12 (3): 193–211. <http://dx.doi.org/10.1007/s10816-005-6928-x>.
- Gosden, Christopher, and Yvonne Marshall. 1999. "The Cultural Biography of Objects." *World Archaeology* 31 (2): 169–78. <http://dx.doi.org/10.1080/00438243.1999.9980439>.
- Graulich, Michel. 2005. "Autosacrifice in Ancient Mexico." *Estudios de Cultura Nahuatl* 36: 301–29.
- Hamilakis, Yannis. 2002. "The Past as Oral History: Towards an Archaeology of the Senses." In *Thinking through the Body: Archaeologies of Corporeality*, ed. Yannis Hamilakis, Mark Pluciennik, and Sarah Tarlow, 121–36. New York: Kluwer Academic/Plenum. http://dx.doi.org/10.1007/978-1-4615-0693-5_7.
- Hamilakis, Yannis, Mark Pluciennik, and Sarah Tarlow, eds. 2002. *Thinking through the Body: Archaeologies of Corporeality*. New York: Kluwer Academic/Plenum. <http://dx.doi.org/10.1007/978-1-4615-0693-5>.
- Haskell, David L. 2012. "The Encompassment of Subordinate Lords in the Tarascan Kingdom: Materiality, Identity, and Power." In *Power and Identity in Archaeological Theory and Practice: Case Studies from Ancient Mesoamerica*, ed. Eleanor Harrison-Buck, 90–102. Salt Lake City: University of Utah Press.
- Healan, Dan. 2009. "Ground Platform Preparation and the 'Banalization' of the Prismatic Blade in Western Mesoamerica." *Ancient Mesoamerica* 20 (1): 103–11. <http://dx.doi.org/10.1017/S0956536109000108>.

- Helms, Mary W. 1993. *Craft and the Kingly Ideal: Art, Trade, and Power*. Austin: University of Texas Press.
- Hendon, Julia. 2010. *Houses in a Landscape: Memory and Everyday Life in Mesoamerica*. Durham, NC: Duke University Press.
- Hester, Thomas R., and Harry J. Shafer, eds. 1991. *Maya Stone Tools: Selected Papers from the Second Maya Lithic Conference*. Madison, WI: Prehistory Press.
- Heyden, Doris. 1988. "Black Magic: Obsidian in Symbolism and Metaphor." In *Smoke and Mist: Mesoamerican Studies in Memory of Thelma D. Sullivan*, ed. J. Kathryn Josserand and Karen Dakin, 217–36. Oxford: BAR International Series.
- Hirth, Kenneth G. 1996. "Political Economy and Archaeology: Perspectives on Exchange and Production." *Journal of Archaeological Research* 4 (3): 203–39. <http://dx.doi.org/10.1007/BF02228881>.
- Hirth, Kenneth G. 1998. "Distributional Approach: A New Way to Identify Marketplace Exchange in the Archaeological Record." *Current Anthropology* 39 (4): 451–76. <http://dx.doi.org/10.1086/204759>.
- Hirth, Kenneth G. 2003b. "Experimentation and Interpretation in Mesoamerican Lithic Technology." In *Mesoamerican Lithic Technology: Experimentation and Interpretation*, ed. Kenneth G. Hirth, 3–9. Salt Lake City: University of Utah Press.
- Hirth, Kenneth G. 2009. "Craft Production, Household Diversification, and Domestic Economy in Prehispanic Mesoamerica." In *Housework: Craft Production and Domestic Economy in Ancient Mesoamerica*, ed. Kenneth G. Hirth, 13–32. *Archaeological Papers of the American Anthropological Association* 19. Washington, DC: American Anthropological Association.
- Hirth, Kenneth G., ed. 1984. *Trade and Exchange in Early Mesoamerica*. Albuquerque: University of New Mexico Press.
- Hirth, Kenneth G., ed. 2003a. *Mesoamerican Lithic Technology: Experimentation and Interpretation*. Salt Lake City: University of Utah Press.
- Hirth, Kenneth G., ed. 2006. *Obsidian Craft Production in Ancient Central Mexico: Archaeological Research at Xochicalco*. Salt Lake City: University of Utah Press.
- Hirth, Kenneth G., and Bradford W. Andrews, eds. 2002. *Pathways to Prismatic Blades: A Study in Mesoamerican Obsidian Core-Blade Technology*. Los Angeles: Cotsen Institute of Archaeology, University of California.
- Hodder, Ian. 1986. *Reading the Past: Current Approaches to Interpretation in Archaeology*. Cambridge: Cambridge University Press.
- Hodder, Ian, and Scott Hutson. 2003. *Reading the Past: Current Approaches to Interpretation in Archaeology*, 3rd ed. Cambridge: Cambridge University Press. <http://dx.doi.org/10.1017/CBO9780511814211>.

- Hoopes, James. 1991. "Introduction." In *Peirce on Signs: Writings on Semiotic by Charles Sanders Peirce*, ed. James Hoopes, 1–13. Chapel Hill: University of North Carolina Press.
- Hosler, Dorothy. 1994. *The Sounds and Colors of Power: The Sacred Metallurgical Technology of Ancient West Mexico*. Cambridge: MIT Press.
- Houston, Stephen D., David Stuart, and Karl Taube. 2006. *The Memory of Bones: Body, Being, and Experience among the Classic Maya*. Austin: University of Texas Press.
- Houston, Stephen, and Karl Taube. 2000. "An Archaeology of the Senses: Perception and Cultural Expression in Ancient Mesoamerica." *Cambridge Archaeological Journal* 10 (2): 261–94. <http://dx.doi.org/10.1017/S09597743000010X>.
- Hruby, Zachary X. 2007. "Ritualized Chipped-Stone Production at Piedras Negras, Guatemala." In *Rethinking Craft Specialization in Complex Societies: Archaeological Analyses of the Social Meaning of Production*, ed. Zachary X. Hruby and Rowan K. Flad, 68–87. Archaeological Papers of the American Anthropological Association 17. Washington, DC: American Anthropological Association. <http://dx.doi.org/10.1525/ap3a.2007.17.1.68>.
- Hruby, Zachary X. 2011. "Political Economy and Beyond in Maya Lithic Studies." In *The Technology of Maya Civilization: Political Economy and Beyond in Lithic Studies*, ed. Zachary X. Hruby, Geoffrey E. Braswell, and Oswaldo C. Mazariegos, 167–72. Sheffield: Equinox.
- Hruby, Zachary X., Geoffrey E. Braswell, and Oswaldo C. Mazariegos, eds. 2011. *The Technology of Maya Civilization: Political Economy and Beyond in Lithic Studies*. Sheffield: Equinox.
- Hurcombe, Linda. 2007. "A Sense of Materials and Sensory Perception in Concepts of Materiality." *World Archaeology* 39 (4): 532–45. <http://dx.doi.org/10.1080/00438240701679346>.
- Hutson, Scott. 2010. *Dwelling, Identity, and the Maya: Relational Archaeology at Chunchucmil*. Lanham, MD: AltaMira.
- Ingold, Tim. 1993. "The Temporality of the Landscape." *World Archaeology* 25 (2): 152–74. <http://dx.doi.org/10.1080/00438243.1993.9980235>.
- Inomata, Takeshi. 2001. "The Power and Ideology of Artistic Creation: Elite Craft Specialists in Classic Maya Society." *Current Anthropology* 42 (3): 321–49. <http://dx.doi.org/10.1086/320475>.
- Jack, Robert N., and Robert F. Heizer. 1968. "'Finger Printing' of Some Mesoamerica Obsidian Artifacts." *Contributions of the University of California Archaeological Research Facility* 5: 81–100.

- Jones, Andrew, and Gavin MacGregor, eds. 2002. *Colouring the Past: The Significance of Colour in Archaeological Research*. Oxford: Berg.
- Joyce, Rosemary A. 2003. "Embodied Subjectivity: Gender, Femininity, Masculinity, Sexuality." In *A Companion to Social Archaeology*, ed. Lynn Meskell and Robert W. Preucel, 82–95. Malden: Blackwell.
- Joyce, Rosemary A. 2005. "Archaeology of the Body." *Annual Review of Anthropology* 34 (1): 139–58. <http://dx.doi.org/10.1146/annurev.anthro.33.070203.143729>.
- Kidder, Alfred V. 1947. *The Artifacts of Uaxactun, Guatemala*. Carnegie Institution of Washington Publication 576. Washington, DC: Carnegie Institution.
- Kjellström, Anna. 2010. "Tracing Pain: Identifying Suffering in Skeletal Remains." In *Making Sense of Things: Archaeologies of Sensory Perception*, ed. Fredrik Fahlander and Anna Kjellström, 51–67. Stockholm: Department of Archaeology and Classical History, Stockholm University.
- Knappett, Carl. 2005. *Thinking through Material Culture: An Interdisciplinary Perspective*. Philadelphia: University of Pennsylvania Press.
- Knappett, Carl, and Lambros Malafouris. 2008. *Material Agency: Towards a Non-Anthropocentric Approach*. New York: Springer.
- Kohl, Phillip. 1978. "The Balance of Trade in Southwestern Asia in the Mid-Third Millennium BC." *Current Anthropology* 19 (3): 463–92. <http://dx.doi.org/10.1086/202136>.
- Kopytoff, Igor. 1986. "The Cultural Biography of Things: Commoditization as Process." In *The Social Life of Things: Commodities in Cultural Perspective*, ed. Arjun Appadurai, 64–91. Cambridge: Cambridge University Press.
- Kovacevich, Bridgette. 2007. "Ritual Crafting and Agency at the Classic Maya Kingdom of Cancuen." In *Mesoamerican Ritual Economy: Archaeological and Ethnological Perspectives*, ed. E. Christian Wells and Karla L. Davis, 67–114. Boulder: University Press of Colorado.
- Kristiansen, Kristian. 1984. "Ideology and Material Culture: An Archaeological Perspective." In *Marxist Perspectives in Archaeology*, ed. Mathew Spriggs, 72–100. Cambridge: Cambridge University Press.
- Kus, Susan. 1992. "Toward an Archaeology of Body and Soul." In *Representations in Archaeology*, ed. Jean Claude Gardin and Christopher Peebles, 168–77. Bloomington: Indiana University Press.
- Latour, Bruno. 1999. "On Recalling ANT." In *Actor Network Theory and After*, ed. John Law and John Hassard, 15–25. Oxford: Blackwell.
- Latour, Bruno. 2005. *Reassembling the Social: An Introduction to Actor-Network-Theory*. Oxford: Oxford University Press.

- Law, John, and John Hassard, eds. 1999. *Actor Network Theory and After*. Oxford: Blackwell.
- Lechtman, Heather. 1977. "Style in Technology: Some Early Thoughts." In *Material Culture: Styles, Organization, and Dynamics of Technology*, ed. Heather Lechtman and Robert S. Merrill, 3–20. St. Paul: West.
- Lechtman, Heather. 1984. "Andean Value Systems and the Development of Prehistoric Metallurgy." *Technology and Culture* 25 (1): 1–36. <http://dx.doi.org/10.2307/3104667>.
- LeCount, Lisa J. 1999. "Polychrome Pottery and Political Strategies in Late and Terminal Classic Lowland Maya Society." *Latin American Antiquity* 10 (3): 239–59. <http://dx.doi.org/10.2307/972029>.
- Lemmonier, Pierre. 1992. *Elements for an Anthropology of Technology*. Anthropological Papers, University of Michigan Museum of Anthropology 88. Ann Arbor: University of Michigan Museum of Anthropology.
- Leone, Mark P. 1984. "Interpreting Ideology in Historical Archaeology: Using the Rules of Perspective in the William Paca Garden, Annapolis, Maryland." In *Ideology, Power, and Prehistory*, ed. Daniel Miller and Christopher Tilley, 25–35. Cambridge: Cambridge University Press. <http://dx.doi.org/10.1017/CBO9780511897443.004>.
- Lewenstein, Suzanne. 1981. "Mesoamerican Obsidian Blades: An Experimental Approach to Obsidian." *Journal of Field Archaeology* 8: 175–88.
- López Luján, Leonardo. 2005. *The Offerings of the Templo Mayor of Tenochtitlan*. Albuquerque: University of New Mexico Press.
- Lorenzo, José Luis. 1965. *Tlatilco, Los Artefactos, III: Investigaciones no. 7*. Mexico City: INAH.
- Lucero, Lisa J. 2010. "Materialized Cosmology among Ancient Maya Commoners." *Journal of Social Archaeology* 10 (1): 138–67. <http://dx.doi.org/10.1177/1469605309354403>.
- Malafouris, Lambros. 2010. "Knapping Intentions and the Marks of the Mental." In *The Cognitive Life of Things: Recasting the Boundaries of the Mind*, ed. Lambros Malafouris and Colin Renfrew, 13–22. Cambridge: McDonald Institute Monographs.
- Marcus, Joyce. 1983. "Lowland Maya Archaeology at the Crossroads." *American Antiquity* 48 (3): 454–88. <http://dx.doi.org/10.2307/280556>.
- Marcus, Joyce, and Kent V. Flannery. 1994. "Ancient Zapotec Ritual and Religion: An Application of the Direct Historical Approach." In *The Ancient Mind: Elements of Cognitive Archaeology*, ed. Colin Renfrew and Ezra Zubrow, 55–74. Cambridge: Cambridge University Press. <http://dx.doi.org/10.1017/CBO9780511598388.008>.

- McAnany, Patricia A. 2010. *Ancestral Maya Economies in Archaeological Perspective*. Cambridge: Cambridge University Press.
- McAnany, Patricia A., and E. Christian Wells. 2008. "Toward a Theory of Ritual Economy." In *Dimensions of Ritual Economy*, ed. E. Christian Wells and Patricia A. McAnany. Research in Economic Anthropology 27. Bingley, UK: JAI. [http://dx.doi.org/10.1016/S0190-1281\(08\)00001-2](http://dx.doi.org/10.1016/S0190-1281(08)00001-2).
- McGuire, Randall H. 1992. *A Marxist Archaeology*. New York: Academic.
- Meskel, Lynn M. 1996. "The Somatization of Archaeology: Institutions, Discourses, Corporeality." *Norwegian Archaeological Review* 29 (1): 1-16. <http://dx.doi.org/10.1080/00293652.1996.9965595>.
- Meskel, Lynn M. 2004. *Object Worlds in Ancient Egypt: Material Biographies Past and Present*. Oxford: Berg.
- Meskel, Lynn M., and Rosemary A. Joyce. 2003. *Embodied Lives: Figuring Ancient Maya and Egyptian Experience*. London: Routledge.
- Miller, Daniel. 1987. *Material Culture and Mass Consumption*. Oxford: Blackwell.
- Miller, Daniel. 1998. *Material Cultures: Why Some Things Matter*. Chicago: University of Chicago Press. <http://dx.doi.org/10.4324/9780203167014>.
- Miller, Daniel, ed. 2005. *Materiality*. Durham, NC: Duke University Press.
- Millon, René, ed. 1973. *Urbanization at Teotihuacán, Mexico*. Austin: University of Texas Press.
- Mills, Barbara, and T. J. Ferguson. 2008. "Animate Objects: Shell Trumpets and Ritual Networks in the Greater Southwest." *Journal of Archaeological Method and Theory* 15 (4): 338-61. <http://dx.doi.org/10.1007/s10816-008-9057-5>.
- Mirambell, Lorena. 1964. *Estudio Micofotográfico de Artefactos Líticos*. Departamento de Prehistoria, Publicación 14. Mexico City: INAH.
- Monaghan, John. 1995. *The Covenants with Earth and Rain: Exchange, Sacrifice, and Revelation in Mixtec Sociality*. Norman: University of Oklahoma Press.
- Müller, Florencia. 1966. "La Periodificación del Material Lítico de Teotihuacan." In *Teotihuacan: XI Mesa Redonda*, 219-23. Mexico City: Sociedad Mexicana de Antropología.
- Nalda, Enrique. 1981. "México prehispánico: origen y formación de las clases sociales." In *México, un pueblo en la historia*, ed. Enrique Semo, 45-166. Mexico City: Universidad Autónoma de Puebla, Editorial Nueva Imagen.
- Olsen, Bjørnar. 2010. *In Defense of Things: Archaeology and the Ontology of Objects*. Lanham, MD: AltaMira.
- Otis Charlton, Cynthia. 1993. "Obsidian as Jewelry: Lapidary Production in Aztec Otumba, Mexico." *Ancient Mesoamerica* 4 (2): 231-43. <http://dx.doi.org/10.1017/S095653610000924>.

- Parry, William J. 2002a. "Nonutilitarian Aspects of Obsidian Use in the Basin of Mexico." Paper presented at the 67th Annual Meeting of the Society for American Archaeology, Denver, CO.
- Parry, William J. 2002b. "Aztec Blade Production Strategies in the Eastern Basin of Mexico." In *Pathways to Prismatic Blades: A Study in Mesoamerican Obsidian Core-Blade Technology*, ed. Kenneth G. Hirth and Bradford W. Andrews, 37–45. Los Angeles: Cotsen Institute of Archaeology, University of California.
- Pastrana, Alejandro. 2002. "Variation at the Source: Obsidian Exploitation at Sierra de Las Navajas, Mexico." In *Pathways to Prismatic Blades: A Study in Mesoamerican Obsidian Core-Blade Technology*, ed. Kenneth G. Hirth and Bradford W. Andrews, 15–26. Los Angeles: Cotsen Institute of Archaeology, University of California.
- Pastrana, Alejandro. 2007. *La Distribución de Obsidiana de la Triple Alianza en la Cuenca de México. Colección Científica 517*. Mexico City: INAH.
- Patterson, Thomas. 2005. "Craft Specialization, the Reorganization of Production Relations, and State Formation." *Journal of Social Archaeology* 5 (3): 307–37. <http://dx.doi.org/10.1177/1469605305057570>.
- Peirce, Charles S. 1991. *Peirce on Signs: Writings on Semiotic by Charles Sanders Peirce*. Ed. James Hoopes. Chapel Hill: University of North Carolina Press.
- Pires-Ferreira, Jane W. 1976. "Obsidian Exchange in Formative Mesoamerica." In *The Early Mesoamerican Village*, ed. Kent V. Flannery, 292–306. New York: Academic.
- Politis, Gustavo G. 2003. "The Theoretical Landscape and the Methodological Development of Archaeology in Latin America." *Latin American Antiquity* 68 (2): 245–72. <http://dx.doi.org/10.2307/3557079>.
- Preucel, Robert W. 2006. *Archaeological Semiotics*. Malden: Blackwell. <http://dx.doi.org/10.1002/9780470754962>.
- Preucel, Robert W., and Alexander Bauer. 2001. "Archaeological Pragmatics." *Norwegian Archaeological Review* 34 (2): 85–96. <http://dx.doi.org/10.1080/00293650127469>.
- Rathje, William L. 1971. "The Origin and Development of Lowland Classic Maya Civilization." *American Antiquity* 36 (3): 275–85. <http://dx.doi.org/10.2307/277715>.
- Rice, Prudence. 2009. "On Classic Maya Political Economies." *Journal of Anthropological Archaeology* 28 (1): 70–84. <http://dx.doi.org/10.1016/j.jaa.2008.09.001>.
- Ricketson, Edith B. 1937. "Stone Objects." In *Uaxactun, Guatemala Group E 1926–1931*, Part II: *The Artifacts*, 182–97. Washington, DC: Carnegie Institute of Washington.

- Rodríguez-Alegría, Enrique. 2008. "Narratives of Conquest, Colonialism, and Cutting-Edge Technology." *American Anthropologist* 110 (1): 33–43. <http://dx.doi.org/10.1111/j.1548-1433.2008.00006.x>.
- Sanders, William T., and Robert S. Santley. 1983. "A Tale of Three Cities: Energetics and Urbanization in Pre-Hispanic Central Mexico." In *Prehistoric Settlement Patterns: Essays in Honor of Gordon R. Willey*, ed. Evon Z. Vogt and Richard Leventhal, 243–91. Albuquerque: University of New Mexico Press.
- Saunders, Nicholas J. 1998. "Stealers of Light, Traders in Brilliance: Amerindian Metaphysics in the Mirror of Conquest." *RES: Anthropology and Aesthetics* 33: 225–52.
- Saunders, Nicholas J. 2001. "A Dark Light: Reflections on Obsidian in Mesoamerica." *World Archaeology* 33 (2): 220–36. <http://dx.doi.org/10.1080/00438240120079262>.
- Scarre, Chris, and Graeme Lawson, eds. 2006. *Archaeoacoustics*. Cambridge: MacDonald Institute for Archaeological Research.
- Schneider, Jane. 1977. "Was There a Pre-Capitalist World-System?" *Peasant Studies* 6: 20–29.
- Schortman, Edward, and Patricia Urban. 2004. "Modeling the Roles of Craft Production in Ancient Political Economies." *Journal of Archaeological Research* 12 (2): 185–226. <http://dx.doi.org/10.1023/B:JARE.0000023712.34302.49>.
- Sheets, Payson D. 1975. "Behavioral Analysis and the Structure of a Prehistoric Industry." *Current Anthropology* 16 (3): 369–91. <http://dx.doi.org/10.1086/201569>.
- Sheets, Payson D. 1977. "Analysis of Chipped Stone Artifacts in Southern Mesoamerica: An Assessment." *Latin American Research Review* 12: 139–58.
- Sheets, Payson D. 2002. "The Sounds, Forms, and Colors of Nonutilitarian Obsidian Artifacts in Ancient El Salvador." Paper presented at the 67th Annual Meeting of the Society for American Archaeology, Denver, CO.
- Sheets, Payson D. 2003. "The Behavioral Model in Maya Core-Blade Technology: A Historical View." In *Mesoamerican Lithic Technology: Experimentation and Interpretation*, ed. Kenneth G. Hirth, 10–14. Salt Lake City: University of Utah Press.
- Sheets, Payson D., and Guy Muto. 1972. "Pressure Blades and Total Cutting Edge: An Experiment in Lithic Technology." *Science* 175 (4022): 632–34. <http://dx.doi.org/10.1126/science.175.4022.632>.
- Smith, A. Ledyard. 1972. *Excavations at Altar de Sacrificios: Architecture, Settlement, Burials, and Caches*. Papers of the Peabody Museum of Archaeology and Ethnology. Cambridge, MA: Harvard University.
- Smith, Michael E. 2004. "The Archaeology of Ancient State Economies." *Annual Review of Anthropology* 33 (1): 73–102. <http://dx.doi.org/10.1146/annurev.anthro.33.070203.144016>.

- Smith, Michael E., and Frances F. Berdan, eds. 2003. *The Postclassic Mesoamerican World*. Salt Lake City: University of Utah Press.
- Soto de Arechavaleta, Dolores, ed. 1990. *Nuevos Enfoques en el Estudio de la Lítica*. Mexico City: UNAM.
- Spence, Michael W. 1967. "The Obsidian Industry of Teotihuacán." *American Antiquity* 32 (4): 507–14. <http://dx.doi.org/10.2307/2694078>.
- Spielmann, Katherine A. 2002. "Feasting, Craft Specialization, and the Ritual Mode of Production." *American Anthropologist* 104: 195–207.
- Stocker, Terrance L., and Michael W. Spence. 1973. "Trilobal Eccentrics at Teotihuacan and Tula." *American Antiquity* 38 (2): 195–99. <http://dx.doi.org/10.2307/279366>.
- Stross, Fred H., J. R. Weaver, F.E.A. Wyld, Robert F. Heizer, and John A. Graham. 1968. "Analysis of American Obsidians by X-Ray Fluorescence and Neutron Activation Analysis." *Contributions of the University of California Archaeological Research Facility* 5: 59–79.
- Sugiyama, Saburo. 2005. *Human Sacrifice, Militarism, and Rulership: Materialization of State Ideology at the Feathered Serpent Pyramid, Teotihuacan*. Cambridge: Cambridge University Press. <http://dx.doi.org/10.1017/CBO9780511489563>.
- Taçon, Paul S. 1991. "The Power of Stone: Symbolic Aspects of Stone Use and Tool Development in Western Arnhem Land, Australia." *Antiquity* 65: 192–207.
- Taube, Karl. 1991. "Obsidian Polyhedral Cores and Prismatic Blades in the Writing and Art of Ancient Mexico." *Ancient Mesoamerica* 2 (1): 61–70. <http://dx.doi.org/10.1017/S0956536100000377>.
- Tilley, Christopher. 1994. *A Phenomenology of Landscape: Places, Paths, and Monuments*. Oxford: Berg.
- Tilley, Christopher, with the assistance of Wayne Bennett. 2004. *The Materiality of Stone: Explorations in Landscape Phenomenology: 1*. Oxford: Berg.
- Titmus, Gene L., and John E. Clark. 2003. "Mexica Blade Making with Wooden Tools: Recent Experimental Insights." In *Mesoamerican Lithic Technology: Experimentation and Interpretation*, ed. Kenneth G. Hirth, 72–97. Salt Lake City: University of Utah Press.
- Van Dommelen, Peter, and A. Bernard Knapp, eds. 2010. *Material Connections in the Ancient Mediterranean: Mobility, Materiality, and Mediterranean Identities*. New York: Routledge.
- VanPool, Christine S., and Elizabeth Newsome. 2012. "The Spirit in the Material: A Case Study of Animism in the American Southwest." *American Antiquity* 77 (2): 243–62. <http://dx.doi.org/10.7183/0002-7316.77.2.243>.
- Wallerstein, Immanuel M. 1974. *The Modern World System: Capitalist Agriculture and the Origins of the European World-Economy in the Sixteenth Century*. New York: Academic.

- Ward, Christine G. 2004. "Exploring Meanings of Chacoan Community Great Houses through Chipped Stone: A Biographical Approach." Unpublished PhD dissertation, Department of Anthropology, University of Colorado at Boulder.
- Webmoor, Timothy, and Christopher L. Witmore. 2008. "Things Are Us! A Commentary on Human/Things Relations under the Banner of a Social Archaeology." *Norwegian Archaeological Review* 41 (1): 53–70. <http://dx.doi.org/10.1080/00293650701698423>.
- Wells, E. Christian. 2006. "Recent Trends in Theorizing Prehispanic Mesoamerican Economies." *Journal of Archaeological Research* 14 (4): 265–312. <http://dx.doi.org/10.1007/s10814-006-9006-3>.
- Wells, E. Christian, and Karla L. Davis-Salazar, eds. 2007. *Mesoamerican Ritual Economy: Archaeological and Ethnological Perspectives*. Boulder: University Press of Colorado.
- White, Devin A., and Sarah B. Barber. 2012. "Spatial Modeling of Pedestrian Transportation Networks: A Case Study from Precolumbian Oaxaca, Mexico." *Journal of Archaeological Science* 39 (8): 2684–96. <http://dx.doi.org/10.1016/j.jas.2012.04.017>.
- Whitecotton, Joseph W., and Richard A. Pailes. 1986. "New World Pre-Columbian World Systems." In *Ripples in the Chichimec Sea: New Considerations of Southwestern-Mesoamerican Interactions*, ed. Frances J. Mathian and Randall H. McGuire, 183–204. Carbondale: Southern Illinois University Press.
- Whittle, Alasdair. 1995. "Gifts from the Earth: Symbolic Dimensions of the Use and Production of Neolithic Flint and Stone Axes." *Archaeologia Polona* 33: 247–59.
- Wilk, Richard. 1978. "Microscopic Analysis of Chipped Flint and Obsidian." In *Excavations at Seibal: Artifacts*, ed. Gordon R. Willey, 139–45. *Memoirs of the Peabody Museum of Archaeology and Ethnology*, vol. 64, no. 1. Cambridge: Harvard University.
- Willey, Gordon R. 1972. *The Artifacts of Altar de Sacrificios*. *Papers of the Peabody Museum of Archaeology and Ethnography*, vol. 64, issue 1. Cambridge: Harvard University.
- Willey, Gordon R. 1973. *The Altar de Sacrificios Excavations: General Summary and Conclusions*. *Papers of the Peabody Museum of Archaeology and Ethnography*, vol. 64, issue 3. Cambridge: Harvard University.
- Willey, Gordon R., William R. Bullard Jr., John B. Glass, and James C. Gifford. 1965. *Prehistoric Maya Settlements in the Belize Valley*. *Papers of the Peabody Museum of Archaeology and Ethnology*, vol. 54. Cambridge: Harvard University.
- Willey, Gordon R., and Jeremy A. Sabloff. 1993. *A History of American Archaeology*, 3rd ed. New York: W. H. Freeman.

- Witmore, Christopher L. 2006. "Vision, Media, Noise and the Percolation of Time: Symmetrical Approaches to the Mediation of the Material World." *Journal of Material Culture* 11 (3): 267–92. <http://dx.doi.org/10.1177/1359183506068806>.
- Witmore, Christopher L. 2007. "Symmetrical Archaeology: Excerpts of a Manifesto." *World Archaeology* 39 (4): 546–62. <http://dx.doi.org/10.1080/00438240701679411>.
- Wobst, H. Martin. 1977. "Stylistic Behavior and Information Exchange." In *For the Director: Research Essays in Honor of James B. Griffin*, ed. Charles E. Cleland, 317–42. Museum of Anthropology Anthropological Papers 61. Ann Arbor: University of Michigan.
- Wylie, Alison. 1985. "The Reaction against Analogy." In *Advances in Archaeological Method and Theory*, ed. Michael Schiffer, 63–111. New York: Academic.
- Zeitlin, Robert N. 1982. "Toward a More Comprehensive Model of Interregional Commodity Distribution: Political Variables and Prehispanic Obsidian Procurement in Mesoamerica." *American Antiquity* 47 (2): 260–75. <http://dx.doi.org/10.2307/279900>.