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Archaeology of Cuisine and Cooking

Sarah R. Graff

Barrett, The Honors College, Arizona State University, Tempe, Arizona 85287-1612, USA; email: sarah.r.graff@asu.edu

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Abstract

This review demonstrates that recent contributions by archaeologists to the study of cuisine and cooking present a new addition to the field of anthropology. Archaeologists situate their work historically and contextually by examining cuisines that are culturally constructed. Studying cooking and food preparation helps elucidate relationships among material practices, understandings of taste, identity, power, and meaning in a society. Archaeologists can not only discover specific ingredients in food, but also reconstruct recipes, decipher regional cuisines, ascertain sensory experiences, recover the tools in spatial context, recreate techniques used to prepare food in the past, and overall learn more about the social and cultural contexts of the human experience. This type of investigation is possible because archaeological work uses complementary data to explain social practices and because advances in archaeological methods make accessible previously undetectable data. Experimental archaeology focused on cooking in the past has not only revealed important social information but also captured the imagination of the public. Archaeological research on cooking and cuisine reveals social, political, religious, and economic practices in the past, and it has a unique ability to engage the present with the past through public outreach and solutions to food-related problems.

INTRODUCTION

Researchers collected dormant yeast cells from ancient ceramic vessels housed in museums and activated them to brew modern beer in Israel (Aouizerat et al. 2019) and to bake modern bread in the United States (Zhang 2019). Reviving ancient yeast from a long dormant state and consuming it may sound like a science fiction movie tagline, but it is part of new archaeological science experiments involving baking and brewing that became popularly shared and commented on via Twitter in 2019. This popularity speaks to a growing interest in connecting to the past through cooking and cuisine, which museums, educators, tour companies, breweries, and restaurants are tapping into. At the Ashmolean Museum in Oxford, England, chef Heston Blumenthal prepared a feast inspired by the well-preserved food remains from Pompeii, the Roman city buried in volcanic ash, on display at the museum (Sharma 2019). A blackened loaf of bread from the excavated remains inspired him to bake a similar loaf made with heritage flour and activated charcoal. These newly prepared foods, whether they were inspired by food that was made in the past or revived from microbes in foods prepared long ago, demonstrate the complex entanglements between people and food practices through time and across space.

Although food has been the topic of many archaeological studies over the years, only recently have archaeologists focused more attention on the preparation and cooking of food. This scholarly attention follows a trend in anthropology identified by Sutton (2016), such that food studies have grown in number but ethnographic work on cooking and preparing daily meals has been limited. Early archaeological food studies examined nutrition and food production (e.g., Dennell 1979, Gilbert & Mielke 1985), subsistence strategies (e.g., Leakey & Slikkerveer 1991), dietary quality (Stahl 1989), and food-related tools (e.g., Braun 1983). In the 1990s, a new interest in food studies emerged in anthropology (Mintz & DuBois 2002, Sutton 2016, Twiss 2012). Some archaeologists began to point out the limitations of earlier studies and look for ways to discover the culturally specific social significance and meaning of food and its related activities (Brumfiel 1991; Gifford-Gonzalez 1993; Gumerman 1997; Hamilakis 1996, 1999; Hastorf 1991; MacLean & Insoll 1999). This new focus on food emerged out of an archaeology of gender, which questioned existing archaeological practice (Brumfiel 1992) and paralleled interest in gender studies in other social science and humanist disciplines (Conkey & Gero 1991, 1997). Another parallel development was an interest in feasting as a means to explore sociopolitical power (Dietler & Hayden 2001, Hayden & Villeneuve 2011). With the publication of their landmark edited book on feasts, Dietler & Hayden (2001) found common ground on the potential offered by feasting to explore processes of social change. In addition, they suggested that feasts were often underwritten by female labor, especially food preparation, cooking, and serving (Dietler & Hayden 2001, p. 11). Their book spearheaded many archaeological studies that focused on feasting events to examine political and economic dynamics. But research on cooking, food preparation, and cuisine was less explored. There were some exceptions to this rule, such as Crown's (2000) research on changing Prehispanic Southwest cuisine and associated changes in women's food preparation labor and Franklin's (2001) foodways research establishing how enslaved Africans created their own Afro-Virginian identity through cuisine. In addition, Hastorf (2003, 2008) analyzed the connections between feasting and cuisine, and many papers in Bray's (2003a) edited volume also examined culinary equipment within the context of states and empires to explore the role of food and feasting in commensal politics. Another exception was the development of the concept of "maintenance activities" in the context of Spanish archaeology (González-Marcén et al. 2008). Maintenance activities consider regular and necessary daily life practices, including food processing. Parker Pearson (2003, p. 22) called for more research on cuisine and cooking in Neolithic and Early Bronze Age Britain but noted that archaeologists would need to

sample from "'boring' artifact categories" to gain insight into past food practices. With all this interest in food, why were there not more studies examining the practices involved in preparing meals?

One of the reasons for the lack of studies on food preparation, such as cooking, was the association between cooking and domestic work, which was viewed as less valuable by the scholarly community (Brumfiel & Robin 2008, González-Marcén et al. 2008, Graff 2018, Montón Subías 2002, Rodríguez-Alegría & Graff 2012, Twiss 2012). Cooking was viewed as something that happened out of necessity, was performed by unseen actors in private, and had little to do with the power dynamics, politics, ritual, and social distinctions involved in the consumption of food (Bray 2003b, Gifford-Gonzalez 2008, González-Marcén et al. 2008, Graff 2018, Klarich 2010a, Montón Subías 2002, Rodríguez-Alegría & Graff 2012). Making food was seen as a job performed by women, perhaps with the help of children (Crown 2000), or by slaves (Deetz 2015). In other words, cooking and preparing food were done by people that had little social standing or power in society and therefore contributed little to history. While feminist archaeology critiqued the androcentric nature of archaeological research (e.g., papers in Gero & Conkey 1991) and household archaeology helped spur research about daily life, the domestic sphere, and the role women played in the past (Hendon 1996), these ideas took time to filter into research involving cooking and cuisine. Much of the current literature has been thinking more critically about the labor and social meaning involved in creating, maintaining, and changing a cuisine (Crown 2000, Dawdy 2010, Franklin 2001, Joyce & Henderson 2007, Morrison 2016, Pezzarossi et al. 2012, Scaramelli & Scaramelli 2012), politics (Monroe & Janzen 2014, Morrison 2016), the role the cook played in these transformations (Crown 2000, Deetz 2015, Hastorf 2012, Rodríguez-Alegría 2012), and how this labor intersects with other jobs, politics, economics, religion, and social forms (Goldstein & Shimada 2010, Halperin 2017, Logan & Cruz 2014, Lyons 2007).

Archaeologists recently began to study cooking and food preparation as a window into other sociocultural practices and meanings, as well as social strategies in and of themselves. Over the last 13 years or so, several edited volumes and special journal issues focusing on archaeological investigations of past cooking practices have been published (Gokee & Logan 2014, Graff & Rodríguez-Alegría 2012, Klarich 2010a, Mee & Renard 2007, Pollack 2012, Spataro & Villing 2015). More recently, published books that focus on food-related archaeological research also explicitly address food preparation and cuisine (Hastorf 2016, Twiss 2019). This new interest in cooking and food preparation is valuable because it highlights "activity in the making" (Sutton 2016, p. 360) and the variety of social mediations that occur when people make food. The attention on meal preparation and cooking does not diminish research on food production or consumption; it adds to this more established body of research by focusing on specific actions that have the potential to reinforce or transform identities and enact social change. Studies of cooking and cuisine enhance our understanding of how human relationships are established, maintained, and broken through food and foodways.

To organize the article, I first explain how archaeologists use the terms "cuisine" and "cooking" in the literature. Then I briefly review emerging themes in the literature that are all connected by the social category of gender, including the senses, practice, learning, identity, and space. Following this review of themes, I present research using complementary data approaches and discuss how those approaches have provided new insights into cuisine and cooking and have found ways to connect the past to the present through public outreach. I conclude by pointing out promising avenues of collaborative research. This review focuses on archaeological studies of cuisine and cooking to point out how food preparation practices within their cultural contexts (i.e., cuisine) demonstrate aspects of social, cultural, religious, economic, and political life.

ARCHAEOLOGICAL DEFINITIONS OF CUISINE AND COOKING

Appadurai, in his article on the gastro-politics of the Tamil Brahmin community of South India, pointed out that a cuisine in its social context is "a highly condensed social fact" (Appadurai 1981, p. 494), and many archaeologists agree (Dietler 2001, p. 72; Hastorf 2016, p. 2; Parker Pearson 2003, p. 8). Cuisine (and food preparation such as cooking) mediates social relationships and is therefore similar to the acts of exchange described by Mauss (2000). Cuisine is a "social fact" because variegated social relationships are mediated through all the choices and actions that preparing, serving, and eating cuisine entail. Cuisine's social facts are "highly condensed" because cuisine is a society's expression of wider social, economic, religious, and political processes at work, simultaneously reflected in the choices of the cook. Cuisine's capacity to dynamically materialize, mediate, and transform social relations provides a powerful tool for anthropologists to examine human experiences.

Beyond the social fact, how do archaeologists define cuisine? Goody's (1982) anthropological research is influential for many archaeologists studying cooking. Goody links cuisine to class, arguing that a "high cuisine" is defined by multiple, specialist-prepared dishes, sometimes with rare ingredients, served in specific arrangements. Goody explains that this definition is possible because of written language to document and elaborate on recipes. In contrast, "low cuisine" is composed of staple ingredients that are not considered exotic and is often made daily. Goody uses these distinctions in cuisines to discuss the social, technological, environmental, and conceptual differences that made elite cuisine possible. Many archaeologists find Goody's observations of cuisine fruitful for identifying socioeconomic differences in the past (e.g., Bray 2003b, Craig et al. 2015, Hruby 2008, Isaakidou 2007). But since Goody's broad structural model does not address the act of cooking and preparing food in daily life, or its central social role, some archaeologists look for more nuanced definitions of cuisine. Archaeologists explain that cuisines are culturally constructed (Crown 2000, p. 225; Potter & Ortman 2004, p. 175); convey social conventions (Atalay & Hastorf 2006, p. 284); include laborers, social contexts, and tools (Mills 2008, p. 245); and involve reasoning through values connected to food (Saul et al. 2014, p. 197). Archaeologists agree that cuisine is culturally defined and that cuisine and identity are intrinsically linked because categories of belonging are attached to choices about preparing, serving, and consuming food.

The meaning of the term cooking is also not clearly defined anthropologically. Lévi-Strauss (1997, p. 28) famously linked cooking with being human. He also connected the practice of cooking to cuisine when he wrote, "In any cuisine, nothing is simply cooked, but must be cooked in one fashion or another" (Lévi-Strauss 1997, p. 29). But his "culinary triangle" did not explain or define the practice of cooking. Goody, discussed above, also did not explicitly engage with food preparation or cooking practices and often conflated the terms "cooking" and "cuisine," but he did indicate that cooking was part of a general food preparation phase of "providing and transforming food" (Goody 1982, p. 37). More recently, Wrangham (2017) has taken up Lévi-Strauss's claim, arguing that cooking is responsible for human evolution and is therefore an inextricably human act. However, his research also does not discuss the practices of daily cooking. Sutton (2016, p. 349) allows his readers to come to their own understandings of cooking through his examples from the literature. Hastorf (2016, p. 119) also explains that cooking is "more than heating" and can include different forms of food preparation procedures. Twiss (2019) uses the word "cooking" when discussing food preparation throughout her book on food. Whereas these scholars would rather define cooking more broadly to include all aspects of food preparation, I prefer to distinguish the transformative process of cooking with heat from other transformative processes that render something potentially edible (see also Wandsnider 1997). Making this distinction, we can define cooking as a food preparation strategy that involves the application of heat to raw, edible

materials using a range of techniques and tools, such as boiling, roasting, baking, frying, or smoking (Rodríguez-Alegría & Graff 2012, p. 2). It is analytically useful to make this distinction because the specific setting for food preparation may vary, which can have physical and social effects on the cook, and the tools and techniques used may be different from those used for non-heat-treated food preparation. Defining cooking as a heat-treated food preparation strategy does not limit how we might understand foodways practices in the past. Instead, it creates food preparation categories that can be overlapped with cuisine. To understand cuisines, it is important to consider other processes that transform ingredients into food that do not involve the application of heat. For my own purposes, these non-heat-related processes are subsumed under "food preparation," which is why in my own writing I tend to discuss both cooking and food preparation while maintaining an analytical distinction (Graff 2018, Rodríguez-Alegría & Graff 2012).

In a similar way, Crown (2000) explains that there are different definitions for diet, cuisine, preparing food (which includes cooking), and presenting food, and these distinctions have analytical value. Diet is the food that people actually eat, the amount they consume, and the nutritional value it contains, whereas cuisine focuses on culturally constructed rules for food preparation. She notes that distinguishing diet from cuisine is useful for research. While all members of the community might agree on what constitutes their shared cuisine, not everyone in the community might have access to certain foods, or enough food, for a variety of reasons (Crown 2000, p. 225). Crown also argues that both diet and cuisine are "conservative" or resistant to change because of taste perceptions, concepts of value, understandings of health, and views on taboos and because they play a significant role in social interactions (Crown 2000, pp. 226–27). Researchers should also consider the preparation of food as distinct from diet and cuisine (Crown 2000, p. 227). The daily making of food could be considered a habitual technical act (e.g., Dobres 1999, p. 129) where socially meaningful transformations take place (Hamilakis 1999, p. 39). The individuals who are preparing food are at the center of this transformation process. They may organize the larder, the tools, the work spaces, and the timing of the work. This role has power not only in the context of orchestrating the production of meals or what will go into people's bodies, but also in how cooks contribute to perceptions of taste (Brooks Hedstrom 2017) or to teaching the next generation the sociocultural, ideological, and religious knowledge attached to food preparation activities and cuisine (Crown 2000). Considering food preparation activities distinctly can also highlight the identities of cooks; whether they were treated differently from those eating the food; and their ability to define, express, and negotiate their identities (Twiss 2012). The identity of those making the food provides a window into social life that may not be documented in other ways. Since food preparation, such as cooking, is an activity that is embedded in all aspects of society, studying food preparation can elucidate social organization in the household and in the community, the organization of production, economic practices, ritual practices, gendered practices, identities, politics, taste, and power (Crown 2000, Graff 2018, Sutton 2016).

APPROACHES AND THEMES IN THE LITERATURE OF CUISINE AND COOKING

Several approaches and themes in archaeological theory emerge in the literature on cuisine and cooking. Although space considerations do not permit me to explore all relevant themes and their component parts, I have chosen a few key ideas to review here that are all connected by the most popular theme: gender. Food preparation requires daily labor, and questions about that labor, and the people performing it, lead (often uncritically) to discussions about gender. Cooking specifically tends to focus on women's work (though this rigid, binary division of labor should be demonstrated rather than assumed), and the recent literature on cuisine and cooking demonstrates a concerted

effort on the part of researchers to take women's work seriously and treat it as a prominent part of social, economic, and political life. This effort makes women's experiences, choices, skills, and agency visible. Where culinary work is performed can also be tied to gender categories. So, while women were not the only ones preparing and cooking food in the past, archaeological research on cuisine and cooking provides a way to discover new data on women's roles, contributions, knowledge, and experiences.

THE SENSES

Sensory archaeology has increasingly become a part of archaeological thinking, challenging archaeologists to question long held ways of practicing archaeology by asking researchers to interpret the experiences of the individuals they study, especially taking into account sensory engagements with materials (Hamilakis 2014). Sensory experiences are filtered through human bodies that experience things differently. A person's gender, race, age, ability, social status, and health have an effect on how they experience the world around them. A case study by Minkoff (2017) of domestic Irish and African American servants in Alexandria, Virginia, during the nineteenth and twentieth centuries explores how these women may have experienced daily work, such as preparing cooking stoves, cooking meat, making lard, and canning and preserving fruits and vegetables. Minkoff discusses memories that would be associated with things such as cooking aromas. Hopwood (2013) also explores the creation of memories connected to sense experience. At the Halaf Period site of Fıstıklı Höyük in Turkey, Hopwood identifies a significant difference in how cooks would experience the look, feel, and sound of the coarse ware containers used for cooking versus those sensorial experiences of the fine ware, painted serving vessels. She explains that food preparation, like consumption, involves memories evoked through sensory experiences. Similarly, Hamilakis describes how many food preparation practices were designed to "enhance the sensorial experience of eating, to heighten its bodily-sensual effects, heightening at the same time its affective and mnemonic force" (Hamilakis 2014, p. 84). An example of this concept can be found in a chapter by Rowan (2019), which discusses intentionally distinct sensory experiences for the elite at Pompeii. She explains that private houses had kitchens located further away from those who were eating, so the act of cooking, including its sights, sounds, and smells, was, by design, not part of the dining experience for wealthy Romans. In contrast, those who did not own a private house often ate their dinner at a public *taberna*, similar to a bar or restaurant, where one could go and purchase food. The diners were in close contact with the cooks and the smoky air (since most of the *taberna* did not have evidence of chimneys). The sounds and scents of cooking food would have been inescapable. Rowan (2019, p. 308) argues that wealthy Romans would have had very different sensory experiences from those of non-elite Romans and that these sensorial distinctions were designed to establish social hierarchy.

PRACTICE

Practice and agency play a crucial role in the way many archaeologists theorize cuisine. Some archaeologists have found Bourdieu's (1977) concept of *habitus* to be a fruitful way to explore the practices involved in cuisine (Atalay & Hastorf 2006, Hastorf 2012, Jaffe et al. 2018, Pezzarossi et al. 2012, Sunseri 2015). For example, the cooks can express identity through variability in the food served (Urem-Kotsou & Kotsakis 2007), through preparation and presentation of dishes representing cuisine (Lyons 2007), through resistance by poisoning food (Deetz 2015), or through forging ties within pluralistic settings by sharing what they cooked with others (Smith 2003, Sunseri 2015). Archaeologists also analyze the individual technical choices made by those

preparing the cuisine using the *chaîne opératoire* concept [Lemonnier 1993, Leroi-Gourhan 1993 (1964)], often translated in English as "operational sequence" or "operational chain." The sequence of steps a cook performs with known tools, gestures, timing, and ingredients reproduces cuisine and in turn reproduces social categories. Those who prepare and cook food learn, and subsequently teach, how to make dishes that are part of a cuisine within their community, so each choice they make in the sequence of steps is socially grounded. Some researchers study these culinary choices to identify social distinctions or identity (Arthur 2014, Hamon & Le Gall 2013, Primavera et al. 2019, Russell & Bogaard 2010, Winther-Jacobsen 2015), or communal identity (Carroll 2005, Hopwood 2013), whereas others study the choices of artisans who make the tools associated with cuisine to understand more about the marginalization of certain groups (Lyons 2014). Another way to think about practice in the context of cuisine is to use a relational approach linking related social actions that may share practices such as craft production and cuisine (Gokee & Logan 2014, Goldstein & Shimada 2010, Stahl 2014).

LEARNING

An interesting avenue of research is using "technological style" (e.g., Lechtman 1977, Lemonnier 1993) to explore teaching and learning cuisine. Crown (2000, p. 227) argues that cuisines reflect the community's technological style (see discussion above). The techniques cooks use, she argues, and their knowledge about cuisine were valued and passed on to the younger generation. An example of this practice can be found at Neolithic Çatalhöyük. Atalay & Hastorf (2006, p. 293) describe how children learned specific food preparation tasks and recipes from their parents and relatives. Viewed in this way, cooking, like craft production, involves labor and socially grounded knowledge. Learning to successfully cook the dishes of a specific cuisine means learning embodied actions with social significance (Crown 2014). As a result, reconstructing the operational chains of cuisine might also make it possible to infer teaching cultural traditions. Crown explains that learning how to prepare foods, such as *piki* bread, was an important part of becoming a woman in Pueblo society in the southwestern United States, and garnering the skills to prepare certain foods may have been one way to increase one's status in the community (Crown 2000, p. 266). In Ethiopia, Lyons (2014) points out that girls learn to cook and pound food from their mothers, and they must master these skills before they can be considered adults. This learning is part of what she called "gendered technological practice" (Lyons 2014, p. 184).

IDENTITY

Counihan (1999, p. 46) notes that women's power and identity have often come from their ability to produce food. As discussed above, Crown (2000) and Lyons (2014) have identified the practice of successful culinary skills as a source of gender identity and, in some cases, power. A study by Deetz (2015) on slaves trained as cooks to work on Virginian plantations demonstrates how cooking in this context was both oppressive and powerful. Cooks were often female slaves working in an inherently unjust situation, but Deetz argues that the cook was in a position to negotiate beneficial social relationships with fellow slaves and with her mistress because the mistress relied on the cook for her reputation as a great hostess in the plantation community. Other thought-provoking studies include women in ancient Honduras creating cacao drinks through performance to gain credit for their work (Joyce & Henderson 2007), wives and concubines cooking together in nineteenth century Oman while negotiating power (Croucher 2011), cooking practices of the Maya emphasizing complementary instead of hierarchical gender roles (O'Connor 2010), Hispanic women on the borderlands in nineteenth-century Colorado creating new identities through their cuisine

(Clark 2005), and evidence of cooking and serving revealing that ancient Nubians and Egyptians were working together and intermarrying despite written, ideological accounts of strict social boundaries (Smith 2003).

Some historical archaeologists study cuisine and cooking to critically examine changing constructions of identity and forms of resistance for people of African descent (Battle-Baptiste 2011, Brunache 2019). Franklin (2001) argues that enslaved communities in Virginia, made up of Africans from different regions and ethnic groups as well as American-born people, used culinary knowledge and resourcefulness to create their own unique cuisines. She also demonstrates that to maintain power, white Virginians vilified certain foods associated with the enslaved black communities to create racial boundaries, a practice that unfortunately has not gone extinct. In her research on slavery at a Cuban plantation, Singleton (2015) writes about how some slave food was prepared in central kitchens by order of the enslaver, but the enslaved people also prepared their own, supplemental foods communally, sometimes in the same kitchen, improving the taste, variety, and access to foods, even under strict constraint.

Paleozoological data analyses have been used to investigate how social differences and distinctions are actualized through cuisine. Some ways to accomplish these analyses are to use butchering techniques as markers for identity (Atici 2014, Chase 2012, Stein 2012); to examine butchering and bone-grease processing as separate, gendered tasks (Russell & Martin 2012); to evaluate particular animals or animal parts to reveal social status (Kirch & O'Day 2003, Redding 2014, Thomas 2007); to look at starvation based on the overprocessing of bones to extract marrow (Novak 2014); or to consider religious beliefs. Kosher butchering and food preparation techniques, for example, have been discerned archaeologically in combination with ethnohistoric documentation (Bouchnik 2016, Cope 2003, Greenfield & Bouchnik 2011, Valenzuela-Lamas et al. 2014). As these examples show, archaeologies of cuisine and cooking have the potential to show food preparation's relationship to identity and power (see Twiss 2012, 2019 for a thorough treatment of this topic).

SPACE

Locating different types of food preparation tasks, their relationship to other activities, and how those relationships might reveal new social information are key elements of spatial analysis concerning cuisine. González-Marcén et al. (2008) explain that spaces need to be conceptualized in flexible ways when considering daily maintenance activities because not all maintenance work takes place in a domestic space. Battle-Baptiste (2011) uses the term "homespace" to describe an outdoor location with a cooking pit between the dwellings and the yards, where enslaved people on Andrew Jackson's Hermitage Plantation prepared and cooked food, played music, completed necessary chores, and ate together as a community. Another concept that has been used by archaeologists studying cuisine and cooking is Ingold's (1993) "taskscape," specifically to think flexibly about the use of space in the past. The concept illustrates how specific tasks that an agent does regularly are related to other tasks that they perform, as well as tasks performed by others. These different, related tasks are embedded in social understandings, and Ingold refers to these as "taskscapes" (Ingold 1993, p. 158). Farahani et al. (2017) use the concept of "taskscapes" to examine activity spaces mapped with geographic information systems (GIS) software at Joya de Cerén in El Salvador. The research team found discrete locations for grinding with metates that included handled jars containing maize within reach of the person who was grinding. They conclude that there were specific understandings of the proper culinary equipment for the task, the physical actions required to perform the task, and the placement of the necessary equipment within the structure. Logan & Cruz (2014) analyze what they called "gendered taskscapes" in Ghana to highlight relationships among the use of space in daily life, technologically similar

tasks such as food preparation and ceramic production, gender relations, and the political economy.

Culinary spaces have also been discovered through different methods of analysis. Wells (2004) identified locations of food and possibly beverage preparation within the plaza of El Coyote in Honduras using chemical tests of soil samples. Comparing locations that had elevated levels of phosphorus with food processing tools, such as grinding stones and pots with exterior sooting, Wells determined that food processing had taken place in specific locations within the plaza, as well as in the domestic contexts outside of the plaza. King (2008) was also able to use soil chemistry to identify different types of food preparation in interior structures and outdoor spaces in Oaxaca, Mexico. At Arslantepe in Turkey, Restelli (2015) identified a shift in the arrangement of spaces for cooking activities by examining fire installations and their placement after a period of site abandonment and a possible resettling by foreigners. Finally, Biskowski (2017) analyzed the spatial distribution of grinding stones, manos, and comales used at Teotihuacan during the Classic Period (AD 170–650) and found that entire barrios may have specialized in making tortillas and other maize-based foods for exchange.

COMPLEMENTARY DATA APPROACH TO COOKING AND CUISINE

Researchers studying cooking and cuisine take advantage of multiple lines of evidence, often combining methods and data sets by collaborating with different specialists. This approach makes it possible to find evidence of past practices that might have been previously invisible or accomplished by people who were previously unknown. Archaeologists often employ a combination of some of the following to complement recovered organic and inorganic materials analysis: organic residue analysis, ethnoarchaeology, ethnohistory, and experimental archaeology.

Organic Residue Analysis

Organic residue analysis (ORA), included in biomolecular analysis (see Brown & Brown 2013), is a robust method for identifying food remains that would otherwise have been invisible in the archaeological record. It is often combined with relevant archaeological data to reconstruct cuisines. ORA examines the remains of organic compounds left visibly on or embedded inside the surface of artifacts such as cooking pots, serving vessels, storage containers, or food preparation tools. In the most elementary sense, scientists match the chemical components contained in the organic residue with what is known on the organic materials available at the site. Organic food residues are found archaeologically in ceramic containers as either visible "foodcrusts" (Heron et al. 2015) on the interior of a vessel, calcified deposits (Hendy et al. 2018), or invisible absorbed residue that must be extracted from the vessel walls. Residue analysis can identify the specific tasks for which ceramic culinary equipment was used. For example, it can help identify vessels used to brew beer (Perruchini et al. 2018). It can also be used to identify which foods were cooked (Barker et al. 2012, Craig et al. 2015, Pecci et al. 2015, Roumpou et al. 2007) or processed (Hendy et al. 2018) inside a ceramic vessel. Tools used to process food are another source of organic residues (McGovern & Hall 2015, Pearsall et al. 2004, Roffet-Salque et al. 2007) as are soils associated with food preparation and cooking activities (Evershed 2008). Archaeologists have also used ORA to examine how cooking practices changed over time (Cramp et al. 2011, Heron et al. 2015).

Despite the insights offered by ORA, there are also potential problems. Evershed (2008) explains that organic materials found in archaeological contexts are complex mixtures of different substances. Using prepared food as an example, identifying a residue that contains vegetables, grains, and meat requires differentiating between the different chemical components. In

addition, the individual ingredients were changed when they were prepared and combined by human processing and then altered again over the time spent buried. Evershed (2008, p. 913) also notes that most organic residue analysis focuses on identifying the presence of specific materials, and he calls for "stronger connections between the residues that we observe and the cultural and social attributes of the individuals and communities that produced them" (Evershed 2008, p. 917). An example of research that has accomplished this work successfully is the paper by Craig et al. (2015) on food preparation and consumption at Stonehenge. They conducted lipid analysis on pottery from four different contexts at the site then compared these data to the specific architecture and activities with which they were associated, along with faunal and plant remains. They found both that dairy products were consumed in the public monumental spaces and also that the people working to build Stonehenge had a shared understanding of cuisine, even among a diverse group of people.

Ethnoarchaeology

Ethnoarchaeological and ethnographic research[1] on cuisine and cooking has examined a broad range of human experiences. Some interesting examples of this work highlight the social relationships revealed by specific food preparation equipment, preparation techniques, foods that are cooked, and the identities of the cooks. For example, Arthur (2014) writes about how the Gamo in Ethiopia use a diverse set of culinary tools to prepare different foods, indicating socioeconomic variation within communities, including the caste hierarchy. Logan & Cruz (2014) demonstrate that the same people were making pottery and preparing food in Banda, Ghana, and were likely sharing techniques, gestures, and tools. Jones (2009) found in Fiji that men and women had different food preparation tasks, but both participated regularly.

Ethnohistory

Many researchers use ethnohistorical texts in combination with archaeological data to gain more insight into culturally situated cuisines of the past. Brooks Hedstrom (2017) complements archaeological data from different monastic residences with historical texts describing monastic rules for cuisine and cooking practices in Byzantine Egypt. Her research shows that despite the monastic aesthetic of limiting pleasure, monks were preparing a wide range of foods in their kitchens. Her study demonstrates how cooks and bakers contributed to the taste perceptions of those for whom they were cooking. Turning to an earlier period, Bottéro (2004) describes how some of the oldest written recipes have come from translated cuneiform tablets that originated in the Mesopotamia region detailing sophisticated techniques for elaborate dishes with a variety of ingredients. Barjamovic et al. (2019) explain that the texts describe a cuisine that placed little value on distinctions such as savory or sweet but high value on the form and appearance of food, which is corroborated by excavations that have found many types of utensils and molds for visual display.

Experimental Archaeology

Experimental archaeology has become an important way to learn more about past cooking- and cuisine-related activities. Recreating the tools used in cooking, and practicing how they were used,

[1] Ethnoarchaeology is not just a method, nor is it a simple supplement to archaeological work; however, researchers have debated about its production and use. All anthropologists should pay attention to these debates (e.g., Chirikure 2016, Hamilakis 2016, Lyons & Casey 2016), noting especially that engaging with people about their material lives can be done without silencing them.

helps archaeologists fill in the gaps of practical knowledge concerning ancient practices (Carretero et al. 2017, Djordjević 2016, Thoms 2008). For example, Morrison and her collaborators (2015) recreated Minoan-style cooking pots and cooked meals over a hearth to learn more about Minoan cooking practices. They learned that timing was a very important factor for a successful meal and that cooking pots, even when used repeatedly, might not become sooted at the bottom. These observations are important because timing food preparation is one way to structure a cook's, and by extension a family's, daily routines. The lack of sooting on cooking pots is significant because many archaeologists have used a blackened exterior surface to identify cooking pots in excavations, and this research calls this practice into question.

Public Outreach

Experimental archaeology connected to cooking and cuisine has also become a way to bring archaeology to the general public. Recreating foods from long ago and allowing nonspecialists to have access to them provide a new way for people to become interested in engaging with the past. The example I gave in the introduction of "reviving" ancient yeast illustrates this well. Using social media to expose such a large number of people to archaeological work has the potential to spread informative research to a wider audience. Other experiments that have reached the public include reconstructing the recipe, and subsequently bottling for sale, the ancient Phrygian beverage from the Midas tomb at Gordion in Turkey (McGovern 2000, 2017), interpreting translated Babylonian recipes published by Jean Bottéro (Kelly 2012), and recreating food prepared and eaten by seventeenth-century English sailors (Mejia 2017). Other academics have created interactive exhibitions for public audiences, which include seeing artifacts used to cook food, learning about particular cuisines from the past, and getting the chance to taste the food (Patania & Jaffe 2018). Exhibitions such as these engage the senses, creating a memorable and educational experience for the attending public while also encouraging collaborations between archaeologists and chefs. Some academics have capitalized on the public's curiosity for ancient cuisine and created hands-on culinary experiences for a fee, including Morrison's Minoan Tastes (Morrison 2018) or Monaco's "The Old School Kitchen" Etruscan and Roman culinary retreats (Monaco 2019). Other scholars have used past foodways for social justice activism. Brunache (2019) created an interactive lecture about British involvement in the Atlantic slave trade by focusing on the cuisines of enslaved people from her archaeological research. Hosting the presentation in a Jamaican restaurant in Scotland, Brunache offered her audience African diasporic dishes while discussing how each food reflects enslaved African identity and resistance and the wider impacts of the slave trade. Her approach actively engages the public to learn about its past to encourage social change.

CONCLUSIONS

In November 2016, Navajo chef Brian Yazzie, also known as Yazzie the Chef, cooked meals for thousands of protestors at Standing Rock Indian Reservation who were fighting the construction of the Dakota Access Pipeline (Godoy 2016). Though mainly focused on feeding people, Yazzie was also interested in cooking healthy, indigenous foods such as bison, wild rice, beans, and blue hominy rather than processed foods. Part of his own activism involves using indigenous food preparation techniques and ingredients to reclaim Native American identity and cultural heritage. Could collaborative engagements between archaeologists studying cuisine and cooking, descendant communities, and local communities inform experimental archaeology and public outreach while simultaneously producing equitable cultural heritage management practices (Croes 2010)? Going forward, archaeologists might consider expanding ideas about who might

be a project collaborator. Collaborations with specialists both inside and outside the scientific and academic communities will provide additional complementary methods and perspectives to examine human experiences, which can influence present-day policies (Hegmon 2016). Archaeologists interested in social change for the better might also take an intersectional and reflexive approach to their research, teaching, and collaborations following Black feminist theory (Battle-Baptiste 2011, Brunache 2019, Franklin 2001). Similarly, solutions to urgent climate change concerns facing societies in the present, such as food (in)security, require collaborative, interdisciplinary work that includes archaeological data (Gaillard et al. 2015, Logan 2016, Spielmann & Aggarwal 2017, VanDerwarker & Wilson 2015). The archaeology of cuisine and cooking has the ability to bridge the past and the present in many productive ways. As it highlights "activity in the making" (Sutton 2016, p. 360), it continues to expand our views and knowledge about past social lives, challenging our assumptions and providing glimpses of real people's lived experiences.

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