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Divine CONSUMPTION

Sacrifice, Alliance Building, and Making Ancestors in West Africa

Stephen A. Dueppen

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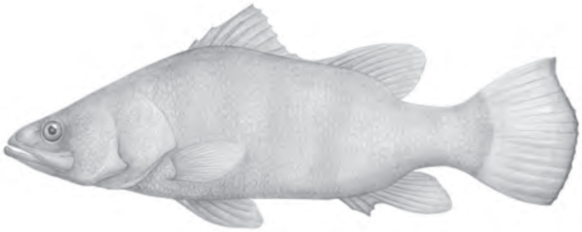

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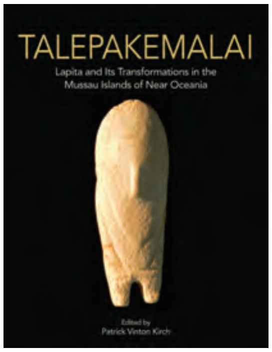

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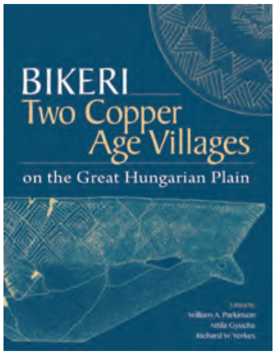

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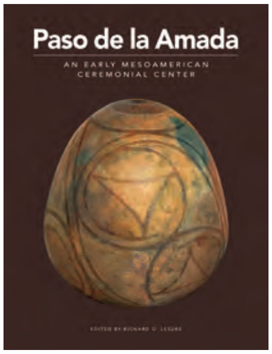

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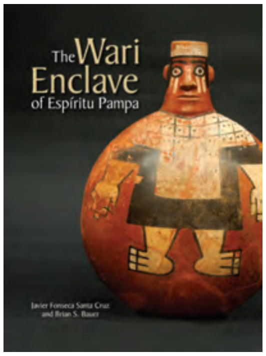

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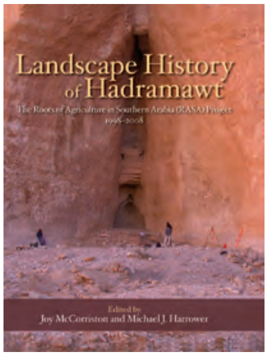

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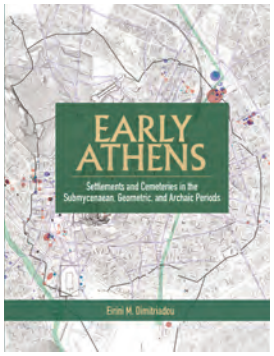

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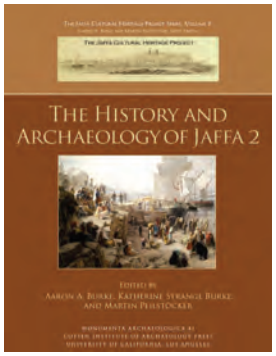

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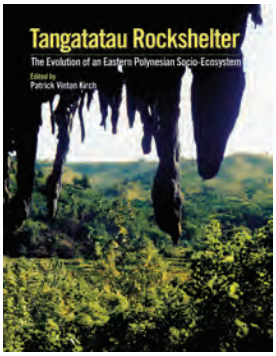

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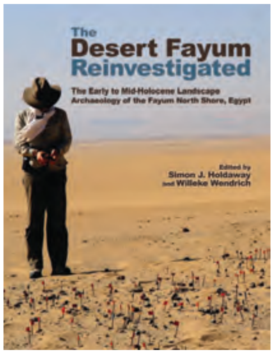

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Sacrifice, Alliance Building, and Making Ancestors in West Africa

Stephen A. Dueppen

Monumenta Archaeologica 48
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To the memory of
Kenneth August Dueppen

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CHAPTER 1

ARCHAEOLOGY AND SACRIFICE IN CENTRAL WEST AFRICA

Domestic animal sacrifice is a central feature of ethnohistoric religious practice in central West Africa due to its role as a mechanism for creating and maintaining relations with ancestors and divinities. The question of what is sacrificed is deeply interconnected with broader ontological beliefs about humans, animals, divinities, substances, locations, material culture, and local concepts of human, animal, divine, and material agencies. I argue that in central West Africa sacrifice is often rooted in processes of objectification that in different ways make both domestic animals and material culture suitable for sacrifice. This stands in contrast to the rarely (if ever) sacrificed wild animals and nonculturally modified materials and objects, which function as points of interaction with a potent world of emplaced divinities.

Sacrifice in central West Africa is part of a complex material landscape of divine communication, in which ancestors and divinities are accessed in emplaced locations in the landscape, at prepared shrines (for example, tombs and houses) and even on roads or pathways leading to a divine location. Relationships are further materialized through substances connected to particular forms of divinity and talismans (such as objects from divine locations or animal parts) that serve as portable conduits for communication and/or association with particular divinities. Health, well-being, fertility, and many other effects on human lives are connected to a complex world of divine entities, and causality is deeply intertwined with success or failure in these ritually oriented relationships. Sacrifice links these elements of the ritual system and its integration into rituals and custodial relationships with particular forms of divinity that inform on social beliefs, political economies, economic histories, status roles, and political resistance.

In this book I use sacrifice as a window to understand the deeper histories of ritual practice in central West Africa. My analysis of archaeological data reveals the antiquity of this ritual framework as well as the diverse and dynamic ritual choices individuals, families, and societies make in the context of changing goals, political realities, and circumstances. My archaeological analyses center on the

37.5 ha site of Kirikongo, which is comprised of 13 mounds of accumulated architectural remains, four iron furnace installations, and three quarries (Figure 1.1 and Figure 1.2).

Kirikongo was established at latest by the second century AD and abandoned ca. AD 1650. The community grew from its origins as an early iron-using farming community (ca. AD 100–700) and developed a centralized political system with clear evidence of inequality (ca. AD 700–1150). In the twelfth century AD, an egalitarian revolution decentralized power sources and led to an even larger settlement community with a specialized interdependent economy (ca. AD 1150–1350). In the fourteenth century AD, a population crash, likely related to the Black Death, reduced the community. The subsequent arrival and influence of Mande commercial diasporas shortly thereafter (ca. AD 1380–1450) led

Figure 1.1. Map of West Africa showing the location of Kirikongo.
Cartography by InfoGraphics Lab, Department of Geography, University of Oregon.

Figure 1.2. Excavation at Mound 1, Kirikongo. Mounds 4, 3, and 2 are visible in the background.

to further cultural changes prior to site abandonment. Previous publications (Dueppen 2008, 2011, 2012a, 2012b, 2012c, 2015, 2019a, 2019b; Dueppen and Gallagher 2016; Gallagher and Dueppen 2018, 2019; Gallagher et al. 2016) outlining the stratigraphic material culture and political histories have created a strong foundation for the analysis of religion, ritual, and animal sacrifice at the site.

This book focuses on the large identified faunal assemblage from Kirikongo, of which only preliminary identifications have been previously published. The relational approach, through which fauna is analyzed with significant attention to context, incorporates refinements in the site chronology based on both new radiocarbon dating and an accompanying reanalysis of the site stratigraphy. These reveal that the fauna recovered from excavation was not casually discarded waste but instead derived from agentive and purposefully constructed contexts. These contexts, many of which are in association with mortuary deposits, combine parts of sacrificed domestic animals, sacrificed material culture, and even sacrificed architecture, along with remains of wild animals and nonculturally modified materials and objects. These share many features with ancestor shrines documented in the ethnohistoric record of the region. Ritual accumulations are fundamental to understanding the depositional histories at the site and the social processes that built deep mounds through repeated construction and destruction events over a millennium and a half. I argue that the spatial segregation and creation of mounds at Kirikongo was likely based upon the sequential creation and maintenance of different house ancestors through rituals of attachment and detachment, and that the nature of changing mortuary and other rituals reflects a landscape of divine substances, entities, places and materials, and agentive cultural practices. Through the lens of sacrifice, the rich social and political history of Kirikongo is revealed in the rituals related to making and maintaining ancestors, changing alliances with divine entities, and transforming roles and divine associations for different houses and the community. Moreover, the content and nature of ritual processes at Kirikongo relate to deeper ontologies in central West Africa and reveal Kirikongo's broader relationships in cultural interaction zones to the south, north, east, and west.

Religion, Ritual, and Historical Ontologies

Archaeologists have always studied religious practice to some degree, although many early scholars were skeptical of the ability to study religion from material analysis alone without writing (see discussions in Fogelin 2007, 2008; Insoll 2001, 2004a, 2004b, 2011b; Kyriakidis 2007; Renfrew 1985; Steadman 2009). In the mid-twentieth century, processual archaeologists following Binford (1965) called for a more systematic and less text-based approach to the archaeology of religion, with one of the most explicit methodological approaches developed by Renfrew (1985). Explorations of religion in the later twentieth and early twenty-first centuries took diverse approaches grounded in symbolic views of religion as primary to shaping contrasting agentive practices (often rooted in case studies where ethnohistoric connections were strong), structuralist and functionalist views of religion (including those rooted in political economy), and practice-based methods that emphasized the rituals themselves, with symbolic dimensions of lesser concern (see discussions in Fogelin 2007 and Insoll 2004a, 2011b, as well as particularly diverse examples in Fogelin 2008).

Over the past decade, archaeologists have increasingly relied on relational and ontological approaches and have attempted to bridge analytical categories and theoretical perspectives (ideological, symbolic, materialist) previously considered more distinct (Alberti 2016; Antczak and Beaudry 2019; Baires 2017; Boyd 2017; Carballo 2016; Fogelin 2015; Gavua 2015; Hodder 2012; Insoll 2015; Joyce 2017; Pauketat 2013; Robb 2015; Robb and Pauketat 2013; Watts 2013). These studies have reminded scholars that religion is not a separate realm of phenomenon; nor is its study limited to particular types of sites (for example, temples), as daily practices and beliefs can materialize in myriad ways. This move beyond systems of logic and symbolism to incorporate a focus on religious phenomena and practice and how they play roles in the lives of individuals has moved definitions of religion far from simple divisions between the sacred and profane (Durkheim 1912). I argue that these analytical shifts have allowed for a better understanding of how people conceptualize causality, control (degree and nature of agentive action), and personhood in different societies and localized settings.

Religion plays a central role in contemporary archaeological scholarship on West Africa, where researchers employ postcolonial intellectual frameworks tied to the expansion of archaeological work with a strong focus on heritage and community engagement. Current Africanist archaeological theory emphasizes bridging the temporal divisions created by chronological typologies (such as history/prehistory, Stone Age/Iron Age) that have disconnected contemporary and historic practices (including religious practices) from their deeper histories, a position well argued by scholars such as Andah (1995), Ogundiran (2013), Thiaw (2010), and Anquandah (2014). As a result, building on early work by scholars such as Anquandah (1987), studies with a focus on ancestors and mortuary rituals but also on other ritual and religious practices are extremely common throughout the region (e.g., Anquandah et al. 2014; Apoh and Gavua 2010; Chouin 2002; Dueppen 2012a, 2015; Gavua 2015; Gavua and Apoh 2011; Holl and Bocoum 2017; Holl et al. 2007; Insoll 2010, 2013; Insoll et al. 2009, 2013; Kankpeyeng and Nkumbaan 2008, 2009; Kankpeyeng et al. 2013; Laporte et al. 2012; MacDonald et al. 2018; Norman 2009; Stahl 2008; Takezawa and Cissé 2017). In francophone scholarship of West Africa, religion is also frequently studied through the *chaîne opératoire* approach to material culture analyses by incorporating analyses of ritual practice within studies of technological action (Coulibaly 2006; Kiénon-Kaboré 2012, 2017; Kiéthega 2009). Archaeological research has explored the long histories of Islamic adoption and practice in the region (Insoll 2003; Takezawa and Cissé 2017; Genequand and Apoh 2017; Nixon 2017), as well as modeled the materiality of Christian practice (Gavua 2015). This combined scholarship has significantly advanced our understanding of the historical dynamism of religious practice in the region. It has also substantially altered the static structuralist views of religion presented in colonial-era ethnography. Postcolonial approaches, with a more dynamic perspective, have exposed the fact that in practice, ritual systems and local beliefs are extremely dynamic in the ethnohistoric record and are influenced by the omnipresence and heterogeneity of divine entities and custodial relationships and heterogeneous ontological concepts of self and other entities and substances.

My work on religion at Kirikongo is guided by the extensive ethnohistoric documentation of religion and the contemporary cultural practices of central West Africa, cognizant of the ways in which heterogeneity provides constant choices through ritual action that cannot be viewed as conservative, particularly when one considers the extraordinary cultural diversity of the region. At their core, these dynamic practices invoke what is true of religious practice more generally, a sense of emplacement and confidence in causality, rooted in faith. As will be seen below, successes and failures in central West Africa are manifestations of the actualization of divine presence, with causality rooted in materialized ritual practice by human communities. Scholars must consider that divine entities and substances make effects on the world in perceivable ways and that this is at the core of the logic of religious practice in the region. My analyses are consequently based on the premise that both the structure and practice of religious experiences are historically relational and can reveal elements of personhood through the nature of the interface between humans and other entities and substances. While it is impossible to avoid anthropocentrism completely, analytically unpacking anthropocentrism to consider the entities themselves opens analysis to thinking of a world where living humans may not consider their power as primary.

The decentering of the individual is intricately linked with nuanced understandings of the concept of personhood, as advanced over the past several decades by anthropological research on kinship (e.g. Carsten 2000; Helms 1998; Joyce and Gillespie 2000; Sahlins 2013; Stasch 2009; Strathern 1999). As will be discussed in detail below, in many societies in central West Africa, humans may not be considered discrete embodied entities, as dividuality, individuality, and partibility intersect with complex concepts of the soul. This is further complicated in many cases by the fact that humans, animals, and entities can have multiple dimensions of soul, some corporeal or noncorporeal, depending upon context and circumstance. The relationship between these complex personhoods and other entities (both living and divine) is central to understanding agency and causality. Similar concepts of the diversity of forms of personhood and mutualities with other entities are found in ontological approaches, which have explored, for example, diversity in cultural views of sharing or differentiating between the interiorities (essence) of entities (see Descola 2013a, 2013b).

In West Africa, the power of emplaced divinities, who have complex partible souls tied to substances or the animals or plants that inhabit their locations, often are connected to substances and natural materials that become vital themselves and never lose their divine power. Divinities can therefore be attached to places or to objects and animals derived from those places. Similarly, the souls of makers and owners can be connected to cultural objects through interactions such as creation and use. This is commensurate with recent material culture scholarship elsewhere in the world that has examined the ways materials influence agentive action and has increasingly acknowledged this key component of ritual and religious practice (Hodder 2012; Knappett and Malafouris 2008; Malafouris 2013; Robb 2015).

Social and political histories in central West Africa are intertwined with ritual foundations that both underwrite agentive action and views of causality and place limitations on social and political domination. Individuals, leaders, and rulers use the practice or performance of sacrifice to mediate relations with ancestors and divinities as part of sociopolitical webs, and political legitimacy is reinforced by beneficial outcomes (or undermined by negative ones). This fundamental possibility of failure results in a dynamic system in which levels of agentive control are highly nuanced and in which the probability of success increases with proper maintenance of relations through performance. The complexity of these systems is such that centralized political power has tended to be rare, as localized autonomies are rooted in complex articulations and historical accumulations of sometimes diffuse divinely articulated positions. Even where more centralized power relations have been practiced, the origins and nature of statecraft can be illuminated through unpacking similar ritual dynamics. For example, custodial relations, or pacts, with potent protective talismans underwrote power in the ethnohistoric Mossi states and some neighboring Nouna communities (Duperray 1984; Duval 1985; Izard 2003; Simporé 2009; Skinner 1989), while the origin story of the Mali Empire emphasizes the divine pacts of Sunjata's ancestors and culminates in a battle with a king who controls custodial relations with divinities related to iron-working (Conrad and Condé 2004; MacDonald et al. 2018).

In this book, I use the archaeological record of Kirikongo to explore forms of relatedness rooted in associations of mutuality, mediated by sacrificial rituals rooted in the co-presence of people, ancestors, and divinities in locations or with particular materials from a particular place and/or substance. Some of these relationships have deeply institutionalized associations (for example, earth shrine or furnace), but all need to be maintained, and the same is true of relations within houses and families. Following Şaul (1991), I attempt to neither underestimate nor overestimate the strength of lineal relationships, whose meanings require negotiation and renegotiation within historical dialogues. At Kirikongo, forms of mutuality underpinning strong identities of relatedness between houses, ancestors, and divinities; within houses; and between houses transformed significantly over the course of the site's occupation. These mutualities are materialized in ritual practices, and unpacking these local ontologies, which are related to "rights" to access resources, including protection during dangerous activities, and are necessary (for example, adequate harvest) outcomes in fundamental and circumstantial activities, serves as a foundation point from which to understand the histories of complex articulations of political formations.

Leadership and Cultural Mosaics in Western Burkina Faso

Kirikongo is located in western Burkina Faso, which is historically an area of extraordinary ethnic, linguistic, religious, and political diversity where the majority of residents speak Gur and/or Mande languages (Capron 1973; Coulibaly 2006; Diarra 2007; Gallais 1960; Millogo 1990; Şaul and Royer 2001; Traoré 2007) (Figure 1.3). As I have argued in previous works, the region has long been deeply connected with the broader Voltaic and Mande regions, which are home today to an incredible diversity of societies, with different foci for ritual action. For example, in Nouna, Kassena, and Lela communities of central and southern Burkina Faso, ritual practices are rooted in strong multifamily houses and long-lived communities but less extensive civic organizations than societies to their west (Duval 1985; Duperray 1984; Hahn 2003; Liberski-Bagnoud 2002). In southwestern Burkina Faso and adjacent northern Ghana, societies within the Lobi and Dagari language groupings tend to have strong ancestral belief systems, high levels of household autonomy, and less economic integration and collectivist religious practice while varying in the degree of local anchoring and the size of resident houses/households (Dacher 1997a, 1997b; Goody 1962; Kuba 2006; Kuba and Lentz 2002; Labouret 1931; Tengan 1991). Farther to the east, in central and eastern Burkina Faso, are the kingdoms of the Mossi and Gulmance (also spelled Gourmantché), both speakers of Gur languages, where important studies of sacrifice have been undertaken, including those that underwrite social classes (Cartry 1987a; Izard 2003).

To the north and west of the Voltaic region is the Mande core, whose diaspora has deeply shaped religious and cultural practice in western Burkina Faso. According to oral histories, in the fourteenth and fifteenth centuries AD, representatives of Muslim Mande trading diasporas moved into the region to create trade routes to the Mouhoun (western Burkina Faso) and Akan (Ghana) gold sources (Capron 1973; Kiéthega 1983, 2009; Kone 2018; Insoll 2003; Philiponeau 2009; Posnansky 2015; Sanogo and Pageard 1964; Somé and Simporé 2014; Traoré 2007). These populations both settled in existing communities and founded new villages, and their Islamic beliefs influenced local religious practices, reflecting the incorporative, accumulative nature of religious and political practice typical of the region prior to and after their arrival. In areas where higher-density Mande populations established new communities (for example, Dafina), social dynamics resembled the more vertical caste system practiced in Malian states. The Voltaic region is also home to nomadic and semisedentary Fulani herders, thought to have arrived in the past few centuries, who have their own complex histories of Islamic conversion. Long inhabited archaeological sites like Kirikongo are likely connected in different ways to various elements of this broader setting, even if the Mouhoun Bend region today is primarily home to Bwa, Marka, Mossi, and Fulani inhabitants.

Prior to the colonial era, the region remained outside of direct state control; instead, communities exercised localized autonomy while being embedded in complex regional commercial and social networks. Central components of the social landscapes of western Burkina Faso are the diverse, nonvertically stratified societies

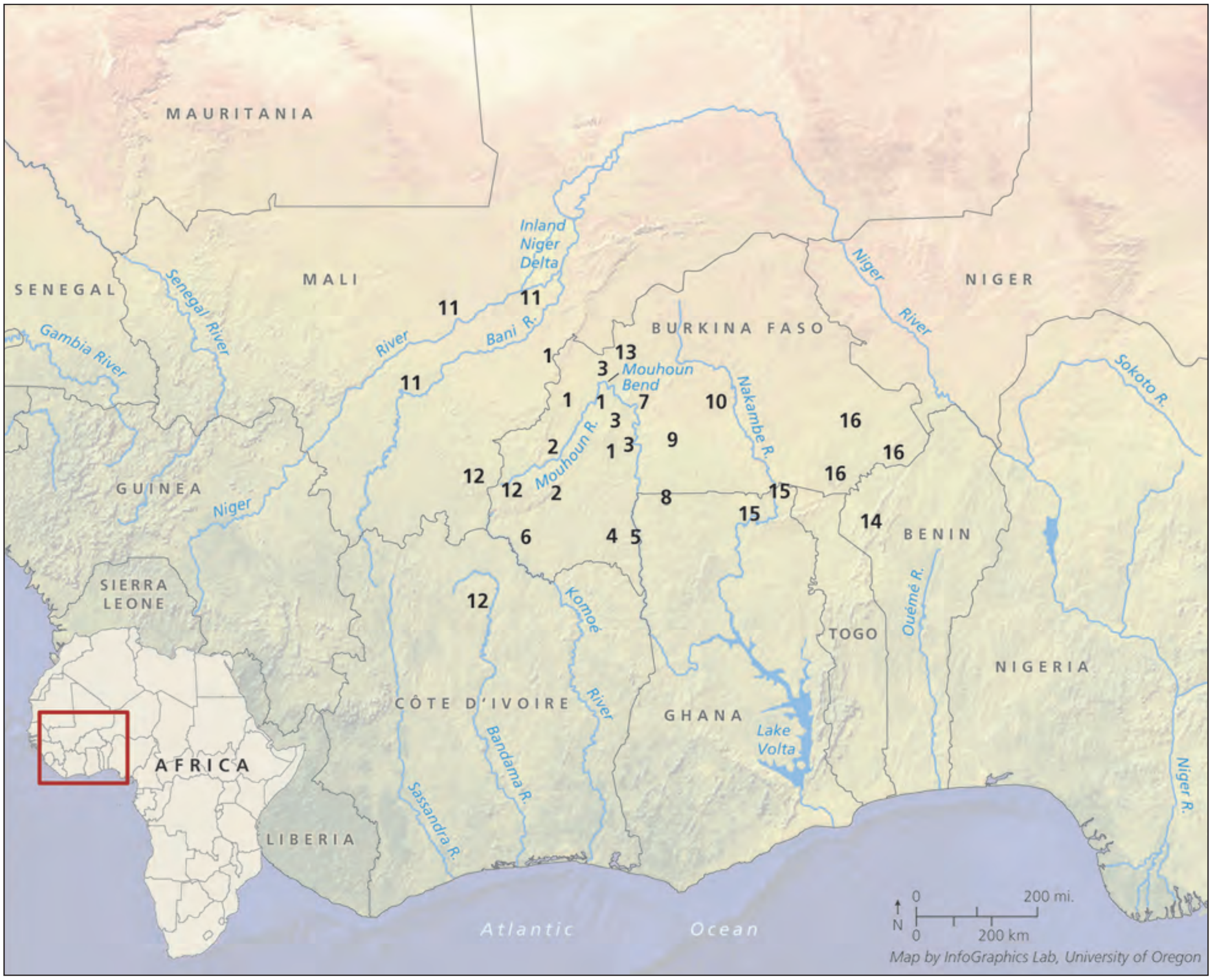

Figure 1.3. Locations of ethnographic studies cited in the text. (1) Bicaba 1975; Capron 1973; Coulibaly 2006; Cremer 1924, 1927; Diarra 2007; Domboue 2002; Dugast 2009, 2016; Guébhard 1911; Kiéthéga 2009; Manessy 1960; Nebie 1988; Șaul and Royer 2001; Traoré 2007. (2) Dibloni et al. 2013; Ferrarini 2016; Jespers 1987; Le Moel 1981; Șaul 1991; Șaul and Royer 2001. (3) Kone 2018; Philiponeau 2009; Sanogo and Pageard 1964; Traoré 2007. (4) Gundlach 2012; Kiéthega 1983; Kuba and Lentz 2002; Labouret 1931; Lentz 2000, 2006, 2009; Lentz and Sturm 2001; Sanou 2018; Somé and Simporé 2014. (5) Goody 1962; Saako 2009, 2017; Saako et al. 2014. (6) Dacher 1997a, 1997b. (7) Barral 1968; Pecquet 2004. (8) De Carbo 1977; Smith 1989; Tengan 1991. (9) Duperray 1984; Duval 1985; Liberski-Bagnoud 2002. (10) Izard 2003. (11) Cissé 1964, 1987, 1994; Conrad and Condé 2004; Kedzierska-Manzon 2014; Kone 2018. (12) Diamitani 2011; Gagliardi and Biro 2019; Kiénon-Kaboré 2017. (13) Heritier 1973; Hubbell 1997. (14) Blier 1987. (15) Dawson 2009; Fortes 1945, 1949, 1987; Insoll 2010; Insoll et al. 2013; Kröger 1982; Mather 2018. (16) Cartry 1976, 1978, 1981, 1987, 2009; Kaboré 2018; Korbéogo 2013. *Cartography by InfoGraphics Lab, Department of Geography, University of Oregon.*

(for example, Senoufo, Bwa, Bobo, and Samo), often residing in large communities (of up to several thousand occupants). The individual settlements of these "village societies" (Capron 1973; Gallais 1960; Holas 1957) are composed of large multifamily houses that are integrated horizontally through cross-cutting mechanisms, including group activities and collectivist religious practice, and that have interdependent economies rooted in hereditary specialists (farmers, smith/potters, griots). Residents can be ethnically and linguistically diverse, and in many cases multiple religions are practiced within the same community. The heterarchical organization disperses political authority and power between houses based upon a variety of ascribed positions (for example, those held by first-occupant farming families, smiths, and griots) and achieved positions (typically those associated with the practice of collective activities).

Ethnohistorically, many political and social roles in western Burkina Faso are tied to custodial positions that are maintained through caring for potent objects and offering animal sacrifice at a variety of shrines and with potent objects. For example, in many Bwa communities, the founding house acts as custodian of the village earth and ancestral shrines and often serves as village chief, while blacksmiths are allied with subterranean divinities, from which they derive legal and judicial power in the community (Capron 1973; Cremer 1924, 1927). Large multifamily, multigenerational corporate houses anchored by ancestors with associated shrines are a fundamental social element and the primary economic unit of Bwa communities. In practice, despite being rooted in particular ancestral relations, these houses often utilize a heterogenous concept of kinship and may be better characterized as collectives of diverse allied families. A similar model at the village level facilitates the incorporation of people with different ethnic, linguistic, and/or religious identities into communities. Cross-cutting activities integrate the diverse parts of Bwa communities. These include shared activities (for example, collective hunts and fishing expeditions, also heavily ritualized) and a collectivist religious system, the Do (also spelled Dô and Dwo), through which a shared initiation system is rooted today.

Sacrifice and the Status of Domestic and Wild Animals in Central West Africa

Ritualized forms of sacrifice have been theorized in the social sciences since the nineteenth century, as sacrifice was thought to encapsulate generalized cosmologies and even psychologies (Hubert and Mauss 1981). More recent work has tended to avoid such generalizations and instead recognizes the significant diversity in the nature and meaning of sacrificial traditions (e.g., Boddy and Lambek 2013; Govindrajan 2015, 2018; Murray 2016; Schwartz 2017). As will be seen below, the centrality of sacrifice in many religious traditions in western Burkina Faso has been of particular interest to scholars in a multitude of fields, as has the materiality and diversity of shrines at which sacrifices occur.

While many definitions for sacrifice have been invoked, Fortes's (1987:96) characterization of sacrifice as "a special ritual procedure for establishing or mobilizing a relationship of mutuality between the donor (individual or collective) and the recipient" is appropriate for the West African context. (See further discussions on definitions in Bourdillon and Fortes 1980; de Heusch 1985; Insoll 2011a.) Fortes captures the essence of sacrifice in a region where divinities and ancestors are neither good nor bad but are entities with whom relationships need to be established, maintained, and monitored. The degree of control, or the outcome, is not guaranteed, as detailed by Carty (1976, 1978, 1981, 1987a, 1987b) and expanded upon by Kaboré (2018), who advance that sacrifice is necessary to attract the possibility of the desired outcome but cannot be conceived of as a contract with a determined outcome (see Cremer 1924, 1927 for similar descriptions).

Here I explore some of the basic features and variations of sacrificial practices in western Burkina Faso and adjacent areas and document the ways in which they may produce archaeologically visible signatures. These characterizations are drawn primarily from twentieth century scholarship, and while they are influenced by the particular concerns of the observers, it is possible to identify patterns of practice and areas of divergence. These practices are potentially recognizable through detailed zooarchaeological studies examining the life histories, taxonomic associations, and specific archaeological contexts of sacrificed and non-sacrificed animals. Moreover, exploring the ontological foundations of animal sacrifice also reveals the more specific circumstances and rationales in which material culture can also be sacrificed.

What Is Sacrificable?

Animal sacrifice in central West Africa primarily utilizes domestic animals. Rooted in an ontological division between natural and cultural contexts or spaces and entities, the division of animals into domestic (sacrificable) and wild is broadly fundamental to religious practice. The difference is based upon the way domestic animals live with people in culturally sanctioned places, a point emphasized by Cartry (1976) in his examination of cattle sacrifice in the Gobnangou region of southeastern Burkina Faso. He recorded an origin story in which cattle were originally aquatic and mystical until, of their own volition, they allowed themselves to be captured by people. It is this divine pre-domestic power, forgotten in everyday life, that is released upon the sacrifice of cattle. Stories recorded by Cremer (1924:21) indicate that in Bwa communities of the Mouhoun Bend in Burkina Faso, cattle likewise have divine origins and were made by a creator god (rather than local divinities). However, by their own agency, they choose to be associated or not with humans. Cartry invoked Bataille's (1973) definition of sacrifice in suggesting that in order to be sacrificed, an ensouled entity had to be objectified through association with people, which then allows its alienation as sacrifice. In these settings, only domestic animals can be considered enculturated, associated exclusively with people, and lacking connection to local divinities. They are considered to have been made in the deep past and are not imbued with the soul of the herder or a local divinity but rather are simply associated of their own volition, allowing easy alienation despite their internal power.

Moreover, as will be expanded on throughout this chapter, domestic animals are typically some of the only entities that are solely associated with people throughout their life histories. Unlike domestic animals, substances, other living entities, the earth, and landscape features are initially connected to noncultural divinities and must undergo transubstantiation to become the things made, used, or owned by people (such as metals, pots, wood carvings, and architecture), often with required ritual practices. For example, a widely shared belief in much of the region is that material culture made by people (such as a pot or a wood carving) is attached to the soul through creative processes, and things that are used by people are attached through interaction, making them sometimes difficult to alienate and different in sacrifice (see Cremer 1924, 1927; Goody 1962:199–205; Pecquet 2004). While a similar view of association is invoked for the association between humans and animals through close interaction as part of ownership (see Goody 1962), a fundamental distinction can be made between material culture that is created and used by people, and domestic animals that are not created but are used by people (see discussions on creation in Dugast 2009).

Which domestic animals are sacrificable varies in different cultural settings in central West Africa. Overall, the most commonly sacrificed animals are chickens, sheep, and goats, which are the mainstays of religious practice. Chickens in particular are part of daily ritual practice and are also sacrificed in combination with larger animals in many rituals, as they are considered the baseline sacrificial entity. In Bwa communities, chickens, guinea fowl, dogs, sheep, and goats are routinely sacrificed; cattle are only rarely sacrificed, as they are infrequently kept; and donkeys, horses, and cats are generally not sacrificed (Capron 1973; Cremer 1924, 1927; Manessy 1960). Dogs feature prominently in Bwa sacrificial systems, deriving potency from their intimate relationship to humans. They are considered witnesses to daily life, as evidenced by the parables cited by Cremer (1924:12–16, 1927:24–25, 53–54), which, among other stories of dogs, describe dogs as central moral characters in domestic life. Guinea fowl are sacrificed in contexts gendered female, while cats have an ambiguous and particularly powerful status and are sacrificed only in particularly rare and defined contexts (Cremer 1924).

The sacrificial practices of Bobo communities near Solenzo documented by Le Moel (1981) have many similarities to those of the Bwa. Sheep are always killed in sacrifices and are classified as the quintessential sacrificial animals, while goats can be sacrificed but are occasionally butchered outside ritual contexts (Le Moel 1981). Chickens here are still the most commonly sacrificed animals but also can be killed outside ritual contexts. Guinea fowl are substitutable for chickens in this system, while dog sacrifices, also due to dogs' close proximity to people, are performed only in particularly powerful, although not particularly rare, contexts. Cats are rarely sacrificed, although there are records of black cats being sacrificed on war altars in Bobo communities (Le Moel 1981).

Cartry's (1976, 1978, 1981) detailed studies of sacrifice among the Gulmance of southeastern Burkina Faso demonstrate how similar logics can lead to different sacrificial traditions. For example, here dogs are also considered "witnesses" of human life due to cohabitation but for that reason are not sacrificed; nor are guinea fowl. Cartry's analysis (1976) invokes a similar rationale for cats, horses, and donkeys—that they are witnesses to everyday life (and are not objects), so they cannot be sacrificed. Cattle sacrifice (Cartry 1987a) plays a significant role in larger-scale Gulmance sacrificial events tied to chiefly rituals, as cattle are co-opted as symbols of political power and rank.

In some Nouna communities in central Burkina Faso, cattle sacrifice is a central part of rituals performed at the *kwara* shrine, a protective divinity associated with extractive economies controlled by chiefs (Duperray 1984; Duval 1985). However, cattle sacrifice is not confined to chiefly contexts; in parts of northern Ghana and southwestern Burkina Faso, cattle play a central role in ancestral sacrifices (Dacher 1997b; Goody 1962; Labouret 1931). However, cattle are not the primary sacrificial animal. Chickens are again central, along with sheep and goats, with domestic guinea fowl associated with sacrifices related to women. The variable use of guinea fowl may derive from their later appearance in this part of West Africa, perhaps arriving from areas to the west, since they are common sacrificial animals in western Burkina Faso, are less frequently sacrificed in central Burkina Faso and northern Ghana, and are not considered sacrificial in eastern Burkina Faso. Horses are more infrequently sacrificed in the region, as they have historically been rare and valuable, although donkeys are sacrificed in some areas, including the Tong Hills in northern Ghana (Insoll 2010), where they constitute potent offerings. Lastly, cats are extremely powerful but are not considered domestic and therefore are not sacrificable in Lodaaga communities in northern Ghana (Goody 1962:250).

The sex, size, color, and reproductive status of animals are central components of sacrifice (e.g., Capron 1973; Cartry 1976, 1978, 1981, 1987a, 1987b; Cremer 1924, 1927; Fortes 1987; Goody 1962; Insoll 2010; Insoll et al. 2013; Kondombo et al. 2003). Male and female animals are specified throughout the region depending on the particular gendering of divinities, nature of power, political events, desired outcomes, and more. The individual physical characteristics of animals are primary selection criteria, as animals are coded (either individually based on coat or plumage color or as a class based on inherent traits) according to color systems in the region (see also discussions in Gavua 2015). Colors are often linked to forms of power (see Gavua 2015), with common associations including white with purity, black with evil, and red with power or unpredictable power. Individual sacrificial animals, or even entire taxa (sheep as black animals), can be grouped together in formulas for sacrifices (for examples from Bwa, Bobo, Lodaaga, and Tallensi, see Cremer 1924, 1927; Dugast 2009; Fortes 1987; Goody 1962; Le Moel 1981).

A central criterion of Gulmance sacrifice is the reproductive status of animals (Cartry 1976, 1978, 1981, 1987a), with individuals in reproductive stages of life classified as sacrificable (with special or powerful rites surrounding rarer sacrifices of animals not able to reproduce); similar conditions are common elsewhere in the region but are often less codified. Younger goats in the Gulmance system are occasionally sacrificed, but due to their potential for reproduction they are associated with rituals connecting to lineages. The sacrifice of chicken eggs is similar ideologically and occurs in similar contexts; it is of particular power due to the potential of reproduction. In northern Ghana (Goody 1962), egg sacrifice in ancestral rituals is similarly connected symbolically to reproduction.

Wild animals are commonly referred to in both western and eastern Burkina Faso as the livestock of the divinities. Interestingly, wild animals are also denoted as white or black in some settings (see Goody 1962), connecting the livestock associated with people and those associated with divinities. Their souls are most often connected to the divine entities found in the places where they live or connected to what they eat (for example, termite dens, trees, rivers, and swamps) (Cartry 1976; Cremer 1924, 1927; Goody 1962; Guébhard 1911). Prior to, during, and upon the death of a particular wild animal, sacrifices and prayers may need to be made to shrines or objects related to their associated divinities for protection from the vengeance of the living and then dead animal. Wild animals can have partible souls in much the same way as people (see below), so there is a danger in the disembodied soul not being ritually tied to a place (that is, a shrine or divine location). Consequently, their skeletal parts may be inserted in shrines to enable those divinities or ancestors (who were allied with the divinities) to constrain the power of a wild animal's soul (Cremer 1927:180). As suggested above, it is the lack of association with local divinities that allows domestic animals to be sacrificed, and the close association of wild animals with these divinities makes them more difficult to alienate.

Whether wild animals can be sacrificed or classified as sacrificable is discussed in several ethnographic works (e.g., Cartry 1976; Le Moel 1981), without a consensus on whether this constitutes true sacrifice. True sacrifice frequently requires killing the animal in a controlled context, which would require the live capture of wild animals, many of which are hunted with poison in western Burkina Faso. Le Moel (1981) mentions the capture of small wild antelopes and wild guinea fowl for use in ceremonies related to initiation in Bobo cultural contexts and differentiates those rare instances from the use of the blood of already killed wild animals, such as porcupines or aardvarks, on shrines. It is notable that Cremer (1924, 1927) does not document any stories of wild animal sacrifice.

To Whom Does One Sacrifice?

In central West Africa, a primary function of sacrifice is the maintenance of relationships with the many divinities found dispersed through the landscape, who play a role in influencing the occurrence of events, such as good or bad harvests, safe or dangerous hunts, sickness or health. Earth shrines created at the time of initial settlement materialize the initial pact that a founder (most often a hunter or a smith) made with the local divine earth and serve to ritually anchor communities (Capron 1973; Cremer 1924, 1927; Insoll et al. 2013; Jespers 1987; Kaboré 2018; Kuba 2006; Lentz 2000, 2006, 2009; Lentz and Sturm 2001; Saako et al. 2014). These shrines are marked by a particular landscape feature (such as a tree or forest, water source, or escarpment), and their locations receive cyclical and circumstantial sacrifices over time. Features of the landscape are generally home to diverse divine entities that may influence events, and while earth shrines represent a particularly important pact, they are only one element of a landscape of shrines or ritual bundles at which sacrifices are made. The nature of these divinities varies, but some are discussed as similar to elven communities (resembling humans), and others as simply divine essence (Cremer 1927). Connections to these divinities can be maintained through sacrifice in the landscape or within the community itself by finding stones or other materials in particular locations in the landscape and using them to construct shrines where sacrifices can occur and protective talismans can be kept (Cartry 1976, 1978, 1981; Cremer 1924, 1927; Dugast 2015, 2016; Fortes 1945, 1949; Insoll et al. 2013; Kröger 1982; Saako et al. 2014; Mather 2018). Invisible entities make themselves visible through these objects as well as through masks (Dugast 2015, 2016).

Individual divinities and specific types of wild animals are often linked due to their common localization (habitat in the case of animals) in a potent landscape, and the role of wild animals in social systems is influenced by alliances with their related divinities. For example, Cremer (1924, 1927:26–33, 67–71, 92–95) recorded multiple stories that invoke the power of animals inhabiting dens in the earth due to their ties with strong earth-based divinities in local religions of the Mouhoun Bend. The divine potency of termites derives from the same beliefs and was the subject of great interest in some early twentieth century accounts of cultural practices in western Burkina Faso (Guébhard 1911; see also van Huis 2017). Wild animals, often conceptualized as the livestock of divinities, may produce materials that are imbued with divine essence (for example, a common story describes a stone in an animal's stomach as a gift of the divinities), and wild animal parts are often incorporated in shrines and in divination bags, which contain combinations of potent elements used to determine to whom and in what quantities sacrifices should be made (Cartry 1976, 1978, 1981; Cissé 1987; Cremer 1924, 1927; Dugast 2015, 2016; Fortes 1987; Goody 1962; Kaboré 2018; Kedzierska-Manzon 2014; Lentz 2009; Mather 2018; Saako et al. 2014).

Throughout western Burkina Faso, divine entities may reveal a particular material or combination of materials that may then receive sacrifices similar to more codified shrines and divine locations (Cremer 1924, 1927; Dugast 2015, 2016). Individuals and houses can become custodians of these accumulations, and control of these potent talismans can be a basis for political action. For example, the *kwara* shrine controlled by elites in some Nouna communities provides protection but requires cattle sacrifice, and the control of *kɔnɔ* shrines is the subject of competition among Bobo houses (Duperray 1984; Duval 1985; Şaul 1991). Divine objects are common elements in stories of individuals who mysteriously receive divine favor, the source of which they are unable to reveal lest misfortune occur (see Cremer 1927; Dugast 2015, 2016).

The divinities discussed thus far are distinct from creator gods, who play complex and highly variable roles in many local religious systems. Interaction with creator gods is often indirect, and many of these gods do not actually receive sacrifices, acting as more remote creative powers to both divinities and humans. For example, in western Burkina Faso, sacrifices are often made directly to divinities and only very rarely to creator gods (Capron 1973; Cremer 1924, 1927). In the Gobnangou, ancestors are invoked as intercessors with the *buli* (divinities), but in fact, sacrifices to the *buli* are actually to be ultimately delivered to the creator god. Consequently, the *buli* are also intercessors, a hierarchy that evokes that of the political structure (Cartry 1987a).

Overall, a primary ontological component of human relations with nature is rooted in the fact that humans do not have a privileged cosmological position in relation to divinities and natural substances. In many regards, the nature of divinities actually resembles that of humans, as both were made by creator gods, who also designed the worlds in which they reside. For this reason, living humans are not more potent than divinities and must maintain good relations with them or suffer sickness or other problems. This nonhierarchical view of relations with nature infuses an ethos of balance and nonexploitation in interactions in the divine landscape.

Rooted in the same complex and fluid divisions and interfaces between culturally sanctified and nonhuman spaces discussed above (see discussions in Capron 1973; Dugast 2015, 2016), ancestors play a significant role in sacrificial practices throughout the region. However, the manner with which they articulate with sacrifice varies according to broader ontological and ideological views of time, space, and social roles. In most societies, not everyone can become an ancestor, and the status is often limited to individuals with descendants who conform to typical societal practices and status systems—that is, what Fortes (1965:124) termed a "named, dead forebear" (see discussions in Fortes 1965; Goody 1962; Insoll 2011b, 2016; Saako et al. 2014; see also more general discussions in Hill and Hageman 2016).

In many Bwa and Bobo communities in western Burkina Faso and eastern Mali, ancestors play an important long-term role as anchors for multifamily houses and communities (Bicaba 1975; Capron 1973; Cremer 1927; Jespers 1987; Le Moel 1980, 1981). They are recognized for many generations by name (and in some cases longer) and may be buried in houses and courtyards, merging the architectural unit with the social group. Ancestors play a fairly active role in ritual practice, with sacrifices made directly to them, often in specific house shrines called ancestor houses. If a community or family moves, bricks from the ancestor house that connect to this deep history must be moved as well to retain the link (Capron 1973, Domboue 2002). Ancestral sacrifices are made to an unpaved area within the ancestor house, since architectural units are themselves mortuary deposits where ancestors are interred. Similarly strong and long-term ancestral veneration is typical of neighboring societies to the east with multifamily houses (such as the Nouna, Lela, and Kassena) (Barral 1968; Duperray 1984; Duval 1985; Hahn 2003; Liberski-Bagnoud 2002; Tengan 1991). In our archaeological work at Kirikongo, it will be seen that while "named" ancestors may last only a few generations, the ground sanctified by many generations connecting long series of named and forgotten ancestors can connect social groups to much longer histories and result in the buildup of considerable archaeological deposits.

In southwest Burkina Faso and across the border in Ghana, ancestors play potentially even more diversified roles, with direct sacrifices in some cases to both matrilineal and patrilineal ancestors. In contrast with the diverse set of broadly responsible divinities and ancestors in western Burkina Faso, Goody (1962) suggests that significant causality in life is rooted in ancestors (see also Saako et al. 2014). The greater mobility (moving every few generations or even with generational shifts) of the extended family households in this region as opposed to the long-lived anchored houses discussed above is reflected in the way ancestors are remembered. In Lodaaga households, named ancestors are venerated for three generations (Goody 1962). Goody (1962:389) highlights that ancestor shrines composed of wooden carvings are ephemeral, degrading over time, similar to the name and memories of the ancestor (see also discussions in Saako et al. 2014). A similar time-depth of three generations is invoked in extended family compounds elsewhere in the region (Mather 2018). However, there are exceptions, as highly durable long-lived ancestor shrines are a key feature of direct sacrifice in the sometimes large houses of Lobi communities (Gundlach 2012; Labouret 1931; Sanou 2018), and the deep-time anchoring of social groups in the landscape is materialized by ancestors and their shrines in the Tale Hills (Fortes 1945, 1949; Insoll et al. 2013).

An alternative perspective on ancestors in a ranked society is present in the Gobnangou region, where Gulmance chiefly families employ particular ancestral sacrifices (Cartry 1987a). For the typical Gulmance house, ancestors are part of many sacrifices, as they are a crucial link between the lineage and a particular *buli*, or localized (emplaced) divinity. In other words, one does not sacrifice directly to ancestors but invokes them to help with sacrifices to divinities. Diviners often play a role in structuring the nature of the sacrifice, adding another layer between most individuals and their ancestors (Cartry 1976, 1978, 1981). The ancestors of ranked elites anchor the overall relations between humans and divinities, and the community in space, through particular shrine locations, where elaborate ceremonies take place. Thus the greater transient nature of non-ranked households (those practicing generational mobility; see Gallagher 2021) is made manifest around a more residentially stable elite house (Korbéogo 2013; see also discussions on chiefly succession and the ancestors in Cartry 1987a).

Why and When Does One Sacrifice?

As described in Fortes's definition, sacrifices are about establishing or maintaining relations with divine entities. Entities in general, while varying in divine potency, require maintenance, and bad occurrences are caused by the lack of proper maintenance in existing relations, the lack of a protective relationship with a divine entity, or even the failure to properly transfer a person to the afterlife. Sacrifices occur in a variety of contexts but often prior to dangerous activities (hunting, fishing), when help is needed (lack of rainfall, sickness, infertility), in thanks after a positive outcome, and to mark cyclical and common events (planting, harvest, marriages, funerals).

Cartry (1976, 1978, 1981, 1987a, 2009) recorded two general categories of sacrifice distinguished by Gulmance communities that are useful in unpacking sacrificial practice more broadly in the region. Sacrifices of attachment are circumstantial sacrifices that occur when an individual or family has a need outside of the ritual cycle, while institutional sacrifices are predictable with known requirements (type, size, divinity). In the latter category are the many cyclical communal events that require sacrifices, such as the opening of the fields, the harvest, funerals, or succession events. For sacrifices of attachment, one visits the diviner, who reads the sands and inscribes a calabash fragment with a liturgical formula for a sacrifice that involves both text (calabash) and spoken words (prayer). The diviner identifies which entity (*buli*) the sacrificer needs to sacrifice to for their given problem, hope, or desire as well as the type and size of sacrifice demanded. In Gulmance society, the diviner is a particular named position. However, elsewhere in the region, a broad range of people practice divination, employing instruments such as diviner bags with talismans and potent objects to diagnose problems, define the sacrifice, and sometimes identify which divinity or ancestor to invoke (Cremer 1927; Dugast 2015, 2016; Fortes 1945, 1949, 1987; Goody 1962, 1981; Insoll et al. 2013).

Activities such as hunting and fishing receive large numbers of sacrifices and sometimes require the use of diverse talismans. For example, in Mande Dafi communities in western Burkina Faso, extensive sacrifice in the form of animals offered to the water occur during fishing expeditions, which are known to be quite dangerous (Sanogo and Pageard 1964). Mande hunting practices similar to those known for the Dafi are well documented in Bamana and Malinké-speaking areas, where Mande hunters employ divine talismans (*bulo*) and sacrifice for protection during highly ritualized and dangerous events (Cissé 1964, 1987, 1994; see also Ferrarini 2016). *Bulo* are made in part from a material (such as metal or stone) charged with *nyama* (divine potency), and their power is tied to diverse divinities inhabiting the landscape, including mythical entities. Although different in specific beliefs, talismans and shrines made of similar materials are used by hunters from non-Mande groups throughout the region, who employ objects derived from different divine entities (for example, the stones found in the stomach of an antelope or earth from a termite den) (Cartry 1976; Cremer 1924, 1927; Goody 1962). Collective fishing events in Bobo communities in southwestern Burkina

Faso involve sacrifices afterward as thanks for the positive outcome (see Dibloni et al. 2013).

Ritually potent and dangerous technological activities, such as iron smelting and smithing, require extensive and highly codified sacrifices involving known entities and associated colors and types of animals (Coulibaly 2006; Cremer 1927; Kiénon-Kaboré 2017; Kiéthega 1993a, 2009). As will be seen in discussions below, transubstantiation of substances into objects is highly ritualized, as it involves changing divinely potent materials and the mobilization of the soul. Smiths in this area also dig graves and transform other potent substances (woodworking, ground stone tool production). The power of creation is also invoked in shrines connected to chameleons, who can change their color (see Dugast 2009; Saako et al. 2014).

Sacrifices are common in communal events and processes, ranging from cyclical events (harvest, feasts) to initiation systems. These involve more codified or prescribed sacrifices within the annual agricultural cycles as well as divination and more variant sacrifices tailored to divinities related to fields near particular landscape features (see Capron 1973; Cremer 1927), spanning Cartry's division of institutional sacrifices and attachment sacrifices. While in western Burkina Faso the earth shrine is central to sacrifices related to agriculture (see Capron 1973; Cremer 1924, 1927; Kuba 2006; Lentz 2000, 2006, 2009; Lentz and Sturm 2001), sacrifices also take place at the fields themselves (Cremer 1924, 1927; Nebie 1988). Another frequent context of sacrifice is rituals related to rain, in a region where agriculture is dependent on adequate and well-timed rainfall (see Cremer 1927; Capron 1973; Fortes 1945, 1949). Sacrifices for rainfall occur in a variety of locations, including the earth shrine, the furnace, or, if divination suggests that a transgression of another emplaced divinity is responsible, other shrines in the landscape (Capron 1973; Cremer 1924, 1927).

Many sacrifices take place in the context of the Do religious system, which anchors communal relations in Bwa and Bobo communities (Capron 1962, 1973; Cremer 1927; Dugast 2015, 2016; Le Moel 1981, 1987; Şaul 1991). The creator gods do not receive direct sacrifice, but sacrifices are made within the Do more generally to maintain relationships with the greater system at the interface of nature and culture. The significance of the forest is clear in the associated leaf masks of the Bwa in the Mouhoun Bend; only dogs and goats are sacrificed within Do here, with non-forest grazers (sheep and cattle) classified as unsacrificable in this context (see Cremer 1927). In addition, forest associations are found in initiation events in some Bobo communities, where initiates must live off wild animal hunting for several days (Dibloni et al. 2013). In neighboring societies in western Burkina Faso, initiation societies related to masquerade traditions, often with animal masks, invoke the powerful interface between nature and culture, and involve communal-level sacrifices (Diamitani 2011, Gagliardi and Biro 2019).

Funerals are a key point of sacrifice in the region and can involve significant animal sacrifice (Bicaba 1975; Cremer 1924, 1927; Fortes 1945, 1949; Goody 1962; Saako 2017; Saako et al. 2014; Tengan 1991). Sacrifice ensures recognition of the deceased individual's contributions, feeds the many visitors, and most importantly facilitates the proper transfer of the individual into the afterlife. Which animals with which characteristics (color symbolism, physical traits) are sacrificed in funerals varies in the region, with cattle restricted to elite contexts in some areas (Cartry 1987a) but essential to creating ancestors more broadly elsewhere (Goody 1962). Historically, weddings have also involved significant feasting and sacrifices at diverse locations within the community.

Religious traditions also frequently require sacrifice at divine locations to maintain the well-being of the community as a whole. In many societies in western Burkina Faso, including the Mouhoun Bend, two rights ritually sanction a community. The first is the earth shrine (natural right), the foundation of which initiates a relationship between the community and local divinities at a potent landscape location (such as a grove or landform). The second, cultural right establishes an ancestral relationship for the community by connecting it to the village founder (who established the earth shrine); this right may be held by one house, or in some cases this right is distributed throughout multiple houses in the community (see Barral 1968; Capron 1973; Dacher 1997b; Duperray 1984; Kuba 2006; Lentz 2000, 2006, 2009; Lentz and Sturm 2001; Tengan 1991). Relations with local divinities and with ancestors spiritually anchor a community, and these loci enable attachment rituals and more institutional rites. Initiation groups, such as the Do, invoke elements of these two divine sanctions in rites of passage (Capron 1962, 1973; Jespers 1987; Labouret 1931; Şaul 1991). Even where people have moved (Domboue 2002) or were relocated due to the creation of national parks (Kaboré 2018), potent locations at their origins continue to be accessed by descendants.

As will be seen in the archaeological case study of Kirikongo, Cartry's (1987a) distinction between sacrifices related to establishing relationships and those rooted in institutional practice (an already existing relationship) is a significant element in the dynamics of political action in the region. Establishing new relationships of attachment through sacrifice with potent divinities (often initially mysterious) has been a mechanism by which potential elites institutionalize power by successfully transforming an individual custodial relationship into an institutionalized practice to which they are central.

Landscapes, Shrines, Substances, and the Manner of Sacrifice

Sacrifices occur in a variety of contexts. As divinities tend to be emplaced in particular locations in the landscape, sacrifices are often made to and in landscape features, whether with a constructed shrine or marker (with clay, pottery, iron, or other materials) or simply to the earth, water, a boulder, a hole in the ground, a cave, or a sacred grove (Capron 1973; Cartry 1976, 1978, 1981, 1987a, 1987b; Cremer 1924, 1927; Dawson 2009; Dugast 2015, 2016; Fortes 1945, 1949; Gavua 2015; Goody 1962; Insoll et al. 2009, 2013; Kaboré 2018; Lentz 2009; Mather 2003, 2018; Pecquet 2004; Saako et al. 2014; Stahl 2008). Defining shrines is complicated, as divine locations can be broadly spatial (a forest, escarpment, or river) and practice may be individualized rather than take place at a highly codified location (see discussions in Insoll 2004a). However, there tend to be particular access points where ritualized practices accumulate due to a particular feature (Goody 1962:223, 239; Kaboré 2018). In the Gobnangou region, where 331 divinities are discussed by Cartry (1976, 1978, 1981, 1987a), it is common to sacrifice on pathways or roads leading to a location connected to the divinity. Similar practices of sacrifice on pathways are associated with funeral rituals in northern Ghana (Saako 2009; Smith 1989) or divorce in western Burkina Faso (Cremer 1924:52–54). Divine substances tied to divine landscape emplacements (talismans such as stones or parts of linked wild animals), brought to communities, and placed in shrines act as conduits for sacrifice to protective powers. Materials may also be combined in powerful ways. For example, in the earth shrines of western Burkina Faso, clay is combined with potent iron, symbolizing the pact between local earth and farmers (Capron 1973; Cremer 1924, 1927). Also combining earth and iron, when major problems (rain, infertility) occur, sacrifices may take place at iron smelting furnaces, as they are implanted in the earth, within the realm of powerful divinities (Capron 1973; Cremer 1927; Coulibaly 2006; Kienon-Kaboré 2017). Farther south, stones play an important role in anchoring earth shrines (see Lentz 2009).

Ancestor shrines can take many different physical forms and are often distributed throughout communities as well as in the broader landscape (Cremer 1924; Capron 1973; Fortes 1945, 1949; Mather 2003, 2018). Clay, as a potent substance, can be constructed into markers of various forms, including balls representing ancestors (Blier 1987), constructed altars (cones, platforms) (Capron 1973; Mather 2018), pots (Dawson 2009; Lentz 2009), broken pots (Smith 1989; see Figure 4), and houses themselves (Blier 1987; Pecquet 2004). Clay may also be combined with other materials. In northern Ghana and southwestern Burkina Faso, wooden representations of ancestors are constructed and through complex mortuary rituals of attachment are connected with their souls (Goody 1962:199–205; Gundlach 2012; Labouret 1931; Saako et al. 2014; Sanou 2018). In societies that have greater mobility of households over time, the less durable material of wood provides a physical reminder of the greater importance of recent ancestors (up to three generations) (Goody 1962:389). Practices recognizing deeper time-depth of ancestors (beyond those named) are found in western Burkina Faso, where in places like the Mouhoun Bend, ancestral sacrifices are made in ancestor houses to the earth itself rather than on constructed altars or to figurines. Here, burials occur within architectural units, leading to the development historically of large tell (mound) formations that materialize the histories of these highly emplaced, socially anchored communities. If a community needs to move, potent clay bricks from the ancestor house are brought to the new location (Capron 1973; Domboue 2002).

Substances play a strong role in materializing the ritual process, transferring divine potency. Most sacrifice involves the killing of an entity over a shrine, ritual object, or place. The blood of the animal transfers the potency (see discussions of the soul below) by sticking (attaching) to the shrine or ritual object. Since most sacrificial events involve fowl (even when larger livestock will also be sacrificed), the attachment is often emphasized by feathers stuck into the coagulating blood. Egg sacrifice, involving another sticky substance, is commonly practiced in the region and often involves the breaking of the shell and mixing of the contents prior to pouring over the shrine; shea butter can also be used for attachment (Cartry 1976, 1978, 1981, 2009; Goody 1962). As material indicators of sacrifice, part of sacrificial processes can be the ritualized washing of shrines with water or millet beer to purify the emplacement if it becomes too difficult to properly attach the sacrifice, and shrines sometimes require annual cleaning (see Goody 1962). Associated with all the above are often codified words and actions that indicate the purpose and goals of the ritual, and in the Gulmance case even a liturgical written language (Cartry 1976, 1978, 1981). Proof of acceptance of the sacrifice by the divine entity is accorded by the way the animal falls—in the case of fowl, for example, whether the animal falls on its shoulder.

Part of the establishment of attachments or the maintenance of relations with divine entities is the commensal nature of sacrifice, resembling a collective meal signifying mutuality. Sacrificed animals are processed through butchering and cooking, which often takes place near the shrine, facilitating the later placement of designated skeletal and soft tissue parts upon the shrine (Cartry 1976, 1978, 1981). Animals are also divided, depending upon the nature of the sacrifice and the size and characteristics of the animal (e.g., Insoll 2010), and distributed in a manner reinforcing social relations (Cremer 1927; Goody 1962). The manner of sacrifice indicates that at its core, sacrifice here is about sharing a meal with an ancestor or divinity in a divine commensality of co-presence in a place. That is why locations, altars, houses, and particular locations of emplacement are of great importance, even if broadly spatial. Acceptance of the meal represents a successful relationship of mutuality and, as mentioned earlier, the possibility of a desired outcome.

Certain animal parts (often cranial or mandibular parts, claws, talons, or horns) can be incorporated into shrine locations, diviner bags, or elsewhere to mark that the proper sacrifices have been done (Cremer 1927; Fortes 1987; Goody 1962; Insoll 2010; Insoll et al. 2013; Mather 2018). Insoll (2010) records the burying of chicken parts in pits in the ground at the earth shrine. Sacrificial events often involve other foods; parts of millet cakes (*gateau, beignets*), *tô*, libations of beer, and wild animal resources can also be included and left at the shrine location (Bicaba 1975; Capron 1973; Cremer 1924, 1927; Goody 1962). Returning to a concept of attachment, the practice of sacrifice often involves the literal creation of physical attachment with the application of sticky substances to the location—for example, coagulating blood, shea butter, eggs, or beer, to which feathers or animal parts are attached. Depending upon their nature, many sacrificial locations then accrete over time, while others are ritually washed, sometimes referred to as being "swept" (see Goody 1962; Fortes 1987).

Personhood, Souls, Material Culture, and Sacrifice

An exploration of concepts of the soul is essential to understanding sacrifice, since they expose ontological dimensions of humans in relation to other living and divine entities. For some societies in the region, human essence is rooted in multiple souls that are embodied and disembodied in complex manners. For example, in Samo society, different dimensions of the soul are associated with bodily fluids and with structures (Héritier 1973), while in the Mouhoun Bend, many of the stories recorded by Cremer (1927) involve discussions of different souls of individuals, including descriptions of souls that became disembodied and cause sickness until reunited with divine help and sacrifice.

Souls' detachment and attachment in funerary rites are central to beliefs about the afterlife (see Cremer 1927:166–80). In death, an individual's ancestor shrine or tomb can become a foundation for attachment of their soul, which will play a role in the ancestral community influencing the lives of the living (Bicaba 1975; Cremer 1927; Fortes 1945, 1949; Goody 1962; Labouret 1931; Mather 2018; Saako et al. 2014). If funerary rituals are not properly executed, then a person's soul will neither be anchored in the ancestor shrines (attachment) nor properly transitioned to the afterlife, and it can become a harmful ghost (Cremer 1927).

Souls can be partible while people are living, and they can be attached to objects that are created, touched, and/or used. When someone creates an object out of a material, they are transforming a divinely potent substance (clay, wood, metal) into something through the partitive power of their soul (and often with the blessing of allied divinities through animal sacrifice) (see Cremer 1924; Goody 1962; Pecquet 2004). The resulting objects are attached to dimensions of their soul. As a result, for example, some wood-carvers need to formally desanctify objects in order to alienate (transfer) them, and masons may need to be ritually detached from houses to allow others to "own" them (Pecquet 2004). The interaction of one's soul in processes of transubstantiation, and the potency of the act when encountering the co-presence of potentially dangerous divinities, is at the core of understanding the differential status of blacksmiths, as they are frequently considered different kinds of people in western Burkina Faso due to both their creative powers and their close relationships with deep earth divinities (Coulibaly 2006; see Dugast 2009 for discussions on the power of creation). Even when not created by a person, objects that are used become attached to their soul to create what Goody (1962:200) terms an "inclusive unity" between people and things. A similar connection of souls to materials, such as objects or masks, is how invisible divinities can become visible to people (Dugast 2015, 2016).

Since it is attached to potent elements of people's souls, material culture that has been either produced or used by a person can be sacrificed (Cremer 1924; Goody 1962; Saako 2009; Saako et al. 2014; Smith 1989). However, its sacrifice has a very different meaning than the sacrifice of animals (which have their own agentive souls). Since the ensoulment of material culture is tied to individual histories of creation and ownership, the sacrifice of material culture is less about a commensal meal experience and is instead about mobilizing elements of the soul in the creation of ancestors. Ethnohistorically, the sacrifice of objects occurs primarily during funerary rituals to facilitate the detachment from life and movement to the afterlife for the soul through breakage and in some cases subsequent attachment through inclusion of the broken pieces as part of the mortuary deposits (De Carbo 1977; Goody 1962, Saako 2009; Saako et al. 2014; Smith 1989). The breakage of pottery is a central feature of mortuary rituals in parts of northern Ghana (see discussions in De Carbo 1977; Saako 2009; Smith 1989). However, it also occurs at other times that require similar detachments. For example, object sacrifices are made by the Bwa at the time of divorce, as the process involves moving and detachment from a place and materials (Cremer 1924).

In contrast to material culture, as discussed above, domestic animals have their own souls (creative power derived from cosmological pre-domestic origins). While they are associated with people through attachments somewhat similar to material culture (see discussions on objectification in sacrifice above) and have strong symbolic importance, their ownership is more superficial due to their ultimately nonlocal origins (and lack of historic connection to local divinities), and domestic animals are more easily transferable than material culture since they are entities not created by people and have chosen to be associated with us. The significant economic mobilization of domestic animals in some societies in the region may be linked to the fact that livestock are a more alienable form of wealth than material culture, such that there are stronger incentives for their accumulation. If this is the case, it enriches our understandings of wealth, accumulation, and power in central West Africa (see Guyer 1995; Guyer and Belinga 1995).

Like humans, animals can have partible souls, and the movement of those souls to and from the body is central to both animal sacrifice and hunting rituals. Domestic animals can be considered sacrificable since they are objectified in the cultural context and are associated primarily with people (although are not fully owned, as their souls have agency). However, domestic animals fundamentally differ from objects in that their sacrifice releases the potency of an agentive entity rather than an extension of a partible person. Due to their partible souls, elements of sacrificed domestic animals are often incorporated in (attached to) shrines and diviner bags. These parts of the body contain attached aspects of the soul, and their incorporation in these ritual spaces associates that potency with a divine entity.

Related logics apply to interactions with wild animals, which also have their own souls and agentive action but are associated with the divinities that reside in the locales they inhabit. When hunting, humans interact with divine elements of the landscape. For this reason, hunters need extensive protection from and/or alliances with the relevant divinities (Cremer 1927). These typically take the form of shrines and powerfully imbued talismans that enable the hunting of specific types of animals (Cremer 1927; Goody 1962; Labouret 1931). Talismans can be incorporated into a hunter's clothing to provide divine protective power in the hunt (see Cissé 1994; Ferrarini 2016; Kedzierska-Manzon 2014). Hunters must also help wild animals transfer to death without becoming vengeful, a process that often requires conceptually similar, although ritually differentiated, simultaneous attachment and detachment of souls. This process is completed through the offering of sacrifices after the hunt and through the inclusion of wild animal parts in shrines to divinities and ancestors, which also provide ongoing protection to hunters (Cremer 1927:180). Even when proper ritual actions are taken, divinities can become angry at people for hunting animals and may not accept the sacrifices, as described in Bwa stories about conflicts with divinities of the deep earth regarding hunting in termite dens (Cremer 1927:32–33).

Divine Consumption: Animals and the Creation of a Shared Meal of Alliance

Animal sacrifice in the diverse cases referred to above tends to result in a joint meal between person(s), ancestor(s), and/or divinit(ies) rooted in their co-presence either at a shrine or with a divine material or object imbued with the power of the emplaced divine entity. Sacrificed animals are typically just one component of these ritualized meals (and in some cases may be entirely absent). Other foods consumed include common staples such as sorghum or millet beer, porridge, *tô*, or fried dough (*beignets*), and these may be offered/incorporated into shrines as well. Regardless of whether the sacrifice is initiated by the advice of a diviner, a personal decision to ally with a particular divinity, an expectation of daily interaction with an ancestor, a decision to hunt, or a cyclical institutionalized practice, sharing a meal with the divine presence creates or maintains attachment, similar to how one maintains relationships with living people. In this sense, mutuality is built through commensality.

Given the daily frequency of sacrifice in some cases, some ethnographers have argued that all meat consumed may be sacrificial (Manessy 1960, in his discussion of the Bwa). By the same token, if sacrifices are part of normal consumption, the majority of sacrifices are not considered feasts and feasts must be considered as their own unique events within a broader context of sacrificial meals. Definitions for what constitutes a feast and typologies of varieties of feasts have been explored extensively in archaeology drawing from ethnohistoric practices, with implications for politics (see Dietler 2001; Dietler and Hayden 2010; Hayden and Villeneuve 2011; Kassabaum 2019). Feasts in central West Africa most frequently occur alongside sacrifices tied to larger-scale problems or cyclical and/or important events (funerals, weddings, agricultural rituals). Or they may be connected to the status of the sacrificer and/or the divinity being accessed and involve groups larger than that in which everyday consumption occurs. However, in this region, while sacrifice is tied to particular physical emplacements, butchering, distributions of food, and consumption events can be spatially extensive due to complex systems of ethnoanatomical divisions and the potentially diverse ritual roles of various leadership positions in the community and relations to the individuals at the center of the ritualized event. Whenever cattle or even sheep and goats are sacrificed, one could invoke the idea of feasts. The important point is that feasts bring larger groups of people together, but the meanings are diverse. Almost all the sacrificial events discussed archaeologically later in the book are funerary and could be considered feasts.

Toward an Archaeology of Attachment and Detachment

When viewed through a material lens, the above-described modes of human/animal relations would result in clear archaeological signatures, as animal remains would be found in context with other substances and materials.

In this book I have taken a systematic approach centered on the archaeofaunal assemblage to argue for a sacrificial system with continuities to that documented in the ethnohistoric record. The analysis considers the following:

- The relative frequencies of domestic and wild animal species and their associations with each other and with material culture
- The age and sex of animals, as well as broader evidence for seasonality in their deaths
- The location and methods of cooking activity
- Patterns in body part distributions
- Deposition locales and contextual associations, including repeated combinations of particular species, body parts, material culture, and natural objects

Based on the results of these analyses, I argue that most of Kirikongo's archaeological deposits are sequential ancestor shrines formed as the result of agentive actions that materialize associations to the living community and to divinities in the broader landscape through the process of making and maintaining ancestors in a culturally sanctified space.

Repeated actions created discrete, spatially emplaced accumulations of domestic and wild animal remains, material culture, and natural objects, indicating that complex rituals surrounded the creation of ancestors, and there is evidence for the veneration and maintenance of ancestral monuments and shrines. The making of ancestors can involve the slaughter of many animals, hunting events, other food offerings, the breaking of material culture, and ritualized creation of the tomb over the course of sometimes many days. Material culture recovered from the site was almost always fragmented or partial, even in the case of durable materials, valuable objects, and architecture that might have been expected to remain intact. I suggest that this systematic breakage is at least in part the result of the need to both attach and detach souls through the ritual destruction of objects as part of funerary ritual. Patterns in the archaeological deposits indicate that sacrificed domestic animals and possibly other foods were central to the creation of commensal co-presence either in making an attachment to ancestors or interacting with them. These associations materialize in contextual relationships among representative parts of bodies of sacrificed animals, as well as the less easily visible blood, eggs, shea butter, and alcohol, as well as other food offerings.

While they were likely not sacrificed, the distribution of wild animal parts varied significantly, as only highly potent parts were recovered from some contexts while in others, larger portions of the skeleton, including more meaty elements, were present. The use of wild animals informs on the divine associations of the dead (their social group or even individual ritualized attachments) and materializes the maintenance of attachments of ancestors in the divine landscape. Natural materials and nonculturally modified objects (including ancient stone tools) were unbroken and likely non-sacrificed, and their spatial origins provide complementary perspectives to alliances within a divine landscape.

Outline of the Book

In this book, I use animal sacrifice as an entry point to understanding ritual practice at the site of Kirikongo. The relational analysis of animal bones from 48 excavated contexts, spread across four mounds and six phases of occupation, reveals insights into how people were attached to other people, how people were attached to and maintained ancestors, how people became ancestors through simultaneous attachment and detachment, and how people, houses, and the community were attached to divinities found throughout the landscape, including the shallow and deep earth, forests, and water. Analysis of the nature of these contexts reveals the ritualized processes by which mounds formed at the site and enables a rich view of sociopolitical events and broader processes in this long-lived community.

This introductory chapter has reviewed the ethnohistoric context that provides both a regionally appropriate foundation and a point of comparison for the archaeological study of ritual at the site of Kirikongo.

Chapter 2 presents an overview of the results of my previous research at the site of Kirikongo and contextualizes the site within the central West African archaeological record. I outline the growth and co-option of power by the village founding house over the course of the first millennium AD; the decentralization of power in the twelfth century AD that separated iron-working and potting from the founding house and other hierarchies leading to a larger, more communalistic community; and evidence for plague epidemics in the mid- to late fourteenth century AD and the subsequent arrival of Mande trading diasporas in the fifteenth century AD. This chapter incorporates several previously unpublished revisions to the site sequence, including stratigraphic reanalysis and the results from a suite of new AMS dates.

Chapter 3 reviews the histories of human/animal relations in central West Africa with a focus on animals that play a role in ritual practices involving sacrifice. For domestic animals, I consider the pathways, timing, ecological settings, and social contexts in which domestic animals were adopted into the region, as well as their roles in sacrifice, economies, and politics. I argue that in the wetter savanna and forest environments of West Africa, where domestic bovids are less productive, they were initially adopted to use as a transferable resource to enable relations between increasingly sedentary communities in this zone. In contrast, I suggest that the subsequent adoption of chickens in this zone was not only part of a more comprehensive use of domestic animals as both a food and a transferable resource but also a key element in the development of more common sacrificial practices. For wild animals, I examine current understandings of the diverse social and economic roles that hunting, fishing, and fowling have played in agricultural communities. My research shows that while wild animals in West Africa have long been connected to divine landscapes, there is regional evidence for an increase in hunting focused on the production of animal-based commodities (leather, fur, ivory) in the early second millennium AD. Overall, I argue that the ritual role and significance of animals has not been adequately emphasized in archaeological research in West Africa.

Chapter 4 holistically summarizes the Kirikongo faunal assemblage from the early first millennium AD through AD 1500. It includes at least 59 different taxa, including mammals, birds, reptiles, amphibians, and fish. Compared to other archaeological sites in West Africa from the same era, the Kirikongo assemblage had an extraordinarily high identification rate, a very high number of chicken bones, an unusually large amount of eggshell, a notable lack of cattle from the mid-twelfth century onward, and a high proportion of wild animals. This chapter discusses the implications of the assemblage for paleoclimatic and environmental reconstructions and explores the butchering, food preservation, and cooking practices in use at the site. It highlights the ways in which the Kirikongo assemblage advances regional knowledge of the introduction and incorporation of domestic animals, as well the site's contributions to our understanding of the role of wild animals in agricultural economies.

While the approach in chapter 4 is centered on the diverse taxa identified at Kirikongo, chapter 5 explores the relational contexts in which these animal remains and other materials were deposited. The chapter discusses each of the 50 well-preserved contexts (48 of which contained animal bone) from site excavations and establishes the existence of specific recurring patterns in the species and body part composition of faunal assemblages, the treatment of animal bones, and their associations with material culture (including architecture). I demonstrate that trash was typically deposited off-mound or on the mound talus slope (away from excavated areas) and that the faunal and material culture remains from most excavated contexts were found in discrete concentrations (accumulations) created by specific ritual activities. These loci of ritual deposits were typically associated with funerary monuments, burials in houses and courtyards, and pyrotechnological activities. These patterns indicate that tell (mound) formation was the result of particular practices that resulted in a well-stratified deposition of finite contexts related to ritual events and processes.

Chapter 6 synthesizes the results of the contextual analysis and describes a standard ritual process (ritual meal), the core of which, domestic animals and fish from the river, is in use for the entire sequence. It then explores the dynamic components of rituals over space and time, as new element restrictions and animal associations appear and disappear in rituals at different houses. I compare the archaeological animal associations with those documented in the ethnohistoric record to outline cultural classifications of animals that likely represent alliances between houses and classes of divinity. Finally, the chapter assesses the implications of the contextual analysis for environmental reconstructions, suggesting that understanding cultural context is essential to understanding changing environments.

Chapter 7 expands on the discussions of animal sacrifice through a detailed consideration of material culture sacrifice at Kirikongo that draws from previous publications that have examined the diverse material culture record at Kirikongo, and contextualizing these within the new faunal and stratigraphic framework presented in preceding chapters. Contexts contained a repeated core standard diversity of primarily fragmented material culture in good condition that indicates an intentionality of deposition. I explore material culture variance over time and space in nonstandard components by the location of material origin and by object type, indicating differential access by different houses and likely reflecting alliances with divinities. I suggest that locally made material culture was intentionally broken while unmodified natural materials, nonculturally created objects, long-distance trade items made of materials unknown locally were not broken. Assembling what is broken and unbroken, intact and destroyed in the 50 contexts indicates that repeated decisions rooted in the creation and maintenance of ancestors led to the formation of deep deposits at different mounds. The chapter ends by assembling the pieces of the contextual analysis to revisit Kirikongo's history.

Finally, the concluding chapter 8 returns to the central theme of sacrifice to explore how concepts of the soul regarding humans, wild and domestic animals, divinities, material culture, and place influenced the nature of choices in the social, political, and economic history of Kirikongo. Both the longer-term processes and the significant transformations in society were materialized in changes in rituals of attachment and detachment over time in the sequential creation of ancestor shrines. I examine the divine alliances to which different houses were attached during the rise of inequalities, the revolution that ritually diversified the community, and the attachment of the founding house to new associations after the revolution. Understandings of the subsequent plague era and the new value systems and economic practices that followed are enriched by considering them in the context of a potential loss of faith and transformation of religious practice more generally. Consequently, this study not only enriches our knowledge of the archaeology of western Burkina Faso but also enables reconsideration of regional archaeological cultures ranging from second millennium BC Kintampo to second millennium AD Mali. Indeed, the focus on materializations of beliefs and ritual practice helps us understand the very reasons why mounded sites developed in the region.

CHAPTER 2

KIRIKONGO IN HISTORICAL AND SOCIAL CONTEXT

The research program at Kirikongo aimed to investigate the deep history of the local sociopolitical mosaic. Kirikongo is a well-preserved settlement composed of 13 house mounds with up to 4 m of archaeological deposits. The mounds combine to cover between 5.6 and 8 ha within the 37.5 ha site, an area that also includes four iron-smelting locations, three quarries (for iron ore and crushed rock used to make pavement floors and roofs), and two water wells. The site can be divided into a 20 ha core of nine mounds centered on Mound 4 and an exterior house mound on the northern edge of the community (Mound 11). The four iron production areas are located on the western edge of the site (likely due to prevailing wind patterns); quarries are distributed along the western, eastern, and northern edges of the site; and the identified wells include one in the northern part of the central core adjacent to Mound 12 and another directly on top of Mound 9. A set of three north/south-oriented mounds set along the eastern border of the village postdate the period examined in this book.

Over the course of two seasons of archaeological fieldwork at Kirikongo, in 2004 and 2006, we conducted a comprehensive program of investigation at the site (Figure 2.1). We mapped the site topography and made systematic surface collections at each mound and feature. Excavation focused on five mounds, including three in the central core, Mound 11 on the northern edge, and Mound 9 from the later settlement, as well as a unit at one iron production area. Excavations were divided into 608 stratigraphic units that followed cultural layers in strata of no more than 10 cm. Large objects and radiocarbon samples were collected in situ, as were systematic 2 liter flotation samples for macrobotanical analyses. All deposits were screened through 2 mm mesh. A set of nine 50 x 50 cm excavations were distributed systematically in spaces between mounds (likely plaza areas) to investigate site formation and the use of spaces between mounds. Finally, we recorded the stratigraphies of three mounds cut by road construction. These full mound cross sections (one on an excavated mound, two on unexcavated mounds) provided an important perspective on use of

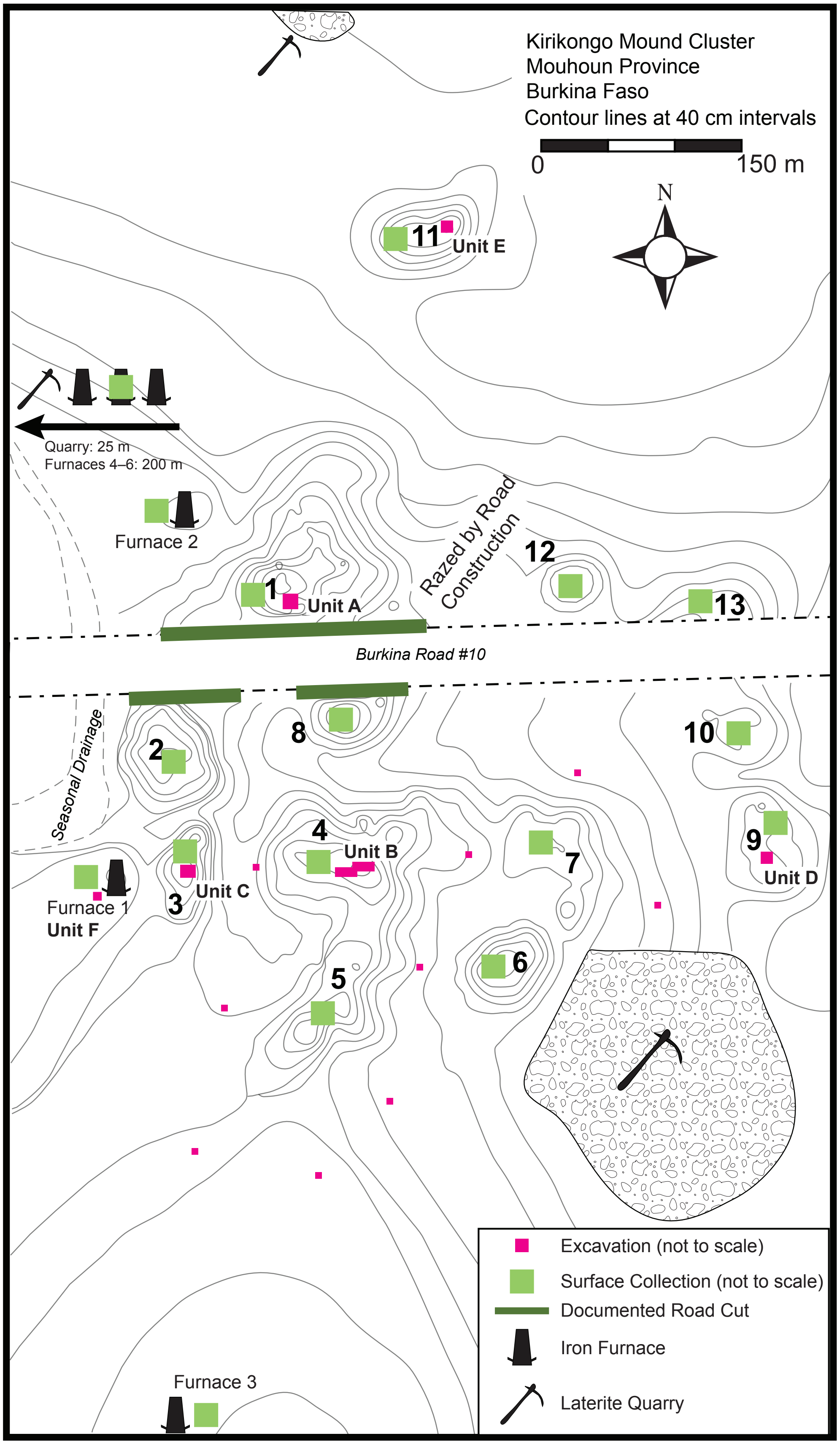

Figure 2.1. Map of Kirikongo showing archaeological investigation at the site

space. To date, research at Kirikongo has yielded a series of overviews and more targeted studies, notably on chickens, cattle, ceramics, and shea (Dueppen 2011, 2012a, 2012b, 2012c, 2015, 2019a, 2019b; Dueppen and Gallagher 2016; Gallagher and Dueppen 2018, 2019; Gallagher et al. 2016). In addition, a 2011 regional survey project around Kirikongo provided a broader understanding of the landscape and resource distributions in the Mouhoun Bend.

Archaeologically, the chronology at Kirikongo is divided into two architecturally defined phases: the Yellow Phase, characterized by coursed earth with pounded yellow clay floors, and the Red Phase, characterized by earthen brick with pounded red laterite pavement floors (Dueppen 2012a). These broader phases are subdivided, based upon changes in pottery form and decoration, into seven subphases (Yellow I and II, Red I, II, III, IV, V), not including a post–Red V occupation in the eastern settlement (Mounds 9, 11, and 13). These well-defined subphases allow for close comparisons across the site, even in areas for which no radiometric dates are available (Dueppen 2012a; 2015; Dueppen and Gallagher 2016) (Table 2.1). The accuracy of this chronology has since been refined with the addition of 25 new AMS dates (wood, seeds, and animal bone) that combined with additional ceramic studies have resulted in a more precise understanding of stratigraphic contexts and depositional histories (Figure 2.2).

The most significant discovery, implicit in previous analyses due to the clarity of the ceramic sequence and other stratigraphic patterns, is that material culture and organic remains at Kirikongo are found in highly discrete contexts. The cleanliness of the stratigraphies, and the stylistic and temporal coherence of material culture in these contexts, reinforces that they derive from particular choices within events. Based on their locations and contents, they are difficult to interpret as accumulative waste disposal or midden. Consequently, there is a strong basis for a relational analysis of animal bones, objects, and architecture. Many of these discrete contexts are mortuary deposits, and in some cases these deposits are associated with particular burial pits in abandoned architectural spaces. The more precise dating from expanded AMS studies has clarified the repeating sequential nature of abandonment, transition to mortuary space, and reoccupation within mounds. While this book is centered on fauna, the incorporation of this stratigraphic reanalysis, and its presentation in detail in chapter 5, is a significant component of the argument, allowing for the relational analyses of contexts.

The focus of this book is on the fully analyzed first six subphases of occupation (AD 100–1500), during which Kirikongo grew from an early homestead to a small relatively equitable hamlet to a centralized large village community with evidence of social ranking. In the twelfth century AD, an egalitarian revolution transformed the community into a more complex heterarchical polity. In the late fourteenth century AD, lifeways and cultural practice changed further as the site was heavily impacted by plague and increased its engagement in interregional processes. Red V and the later occupation at Mounds 9, 11, and 13 (which collectively span the sixteenth and seventeenth centuries AD) are currently in analysis and will be presented in future publications. In this chapter, I introduce the Mouhoun Bend region and summarize previous archaeological work in the greater region. I then provide an overview of the state of knowledge of the archaeology of Kirikongo, which draws on a preliminary analysis of faunal remains. Finally, I identify specific questions that the full analysis of the fauna presented in the book will address.

Table 2.1. Occupation phases at Kirikongo

Phase	Dates
Yellow I	AD 100–500/550
Yellow II	AD 500/550–700/750
Red I	AD 700/750–1025
Red II	AD 1025–1200
Red III	AD 1200–1400
Red IV	AD 1400–1500

Geology and Ecology of the Mouhoun Bend

The archaeological site of Kirikongo is located in the Mouhoun Bend of what is today western Burkina Faso, a mosaic landscape that includes lateritic plateaus and small basins with deep soils and occasional small tributaries (Figure 2.3). The northern edge of the region is defined by the U-shaped curve in the perennial Mouhoun River as it shifts from a northward flow toward Mali to a southward flow toward Ghana, ultimately becoming the Black Volta in Ghana.

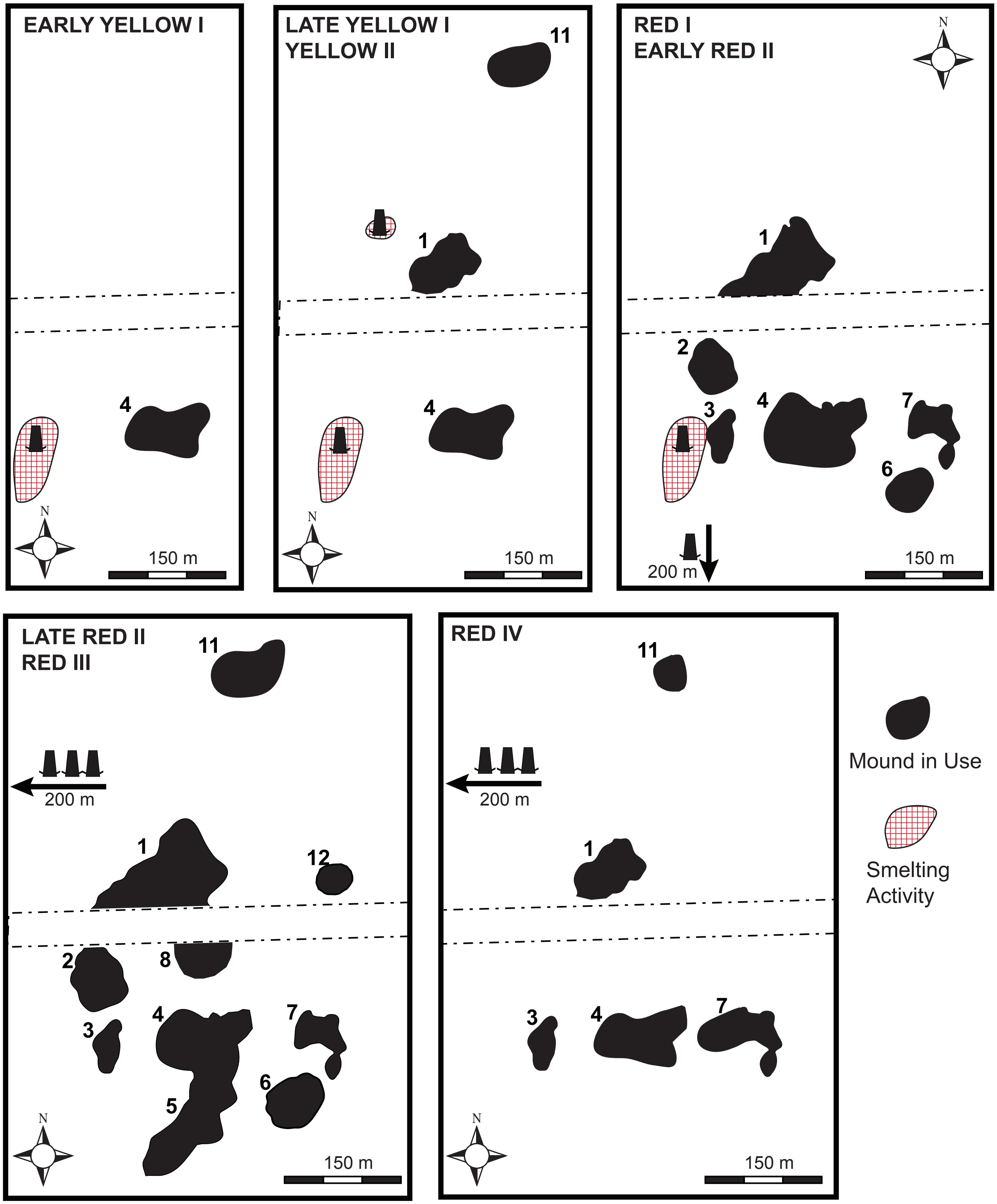

Figure 2.2. Growth of Kirikongo over time

Figure 2.3. West Africa showing location of Mouhoun Bend.
Cartography by InfoGraphics Lab, Department of Geography, University of Oregon.

The Mouhoun Bend is set on the edge of the Taoudenni Basin sedimentary matrix, and the sharp curve in the Mouhoun River's course is in part influenced by the transition to the central plateau of Burkina Faso, a metamorphic geologic system with northeast/southwest-oriented ridges that include Birimian greenstone deposits, basalt, and granite (Augustin and Gaboury 2017; Grove 1985b; Huot at al. 1987; Pigeonnière and Jomni 1998; Sattran and Wenmenga 2002) (Figure 2.4). Kirikongo is located in the eastern half of the bend in the sedimentary basin but only 15–20 km from the Birimian sequence to the east.

This ecotonal location enabled easy access to a wide variety of raw materials. Sandstone and abundant and extensive deposits of high-quality iron ore in the lateritic basement are found in the immediate vicinity of the sedimentary matrix (Coulibaly 2006). Exposed laminated sandstone for grinding implements is only 1 to 2 km to the west of Kirikongo, while multiple mines at Kirikongo indicate the presence of iron ore within the site complex itself. Moreover, the region contains many undated subterranean mines, including a particularly large complex just north of the Mouhoun River at Tissi; given the scale of mining, it is likely that ore or iron was exported at some point in the past. Clay is also common in sedimentary deposits, with dense pure yellow clay forming the basement under the northern portion and to the east of Kirikongo. The slightly more distant Birimian strata were primarily used at Kirikongo as a source of granite, which is useful

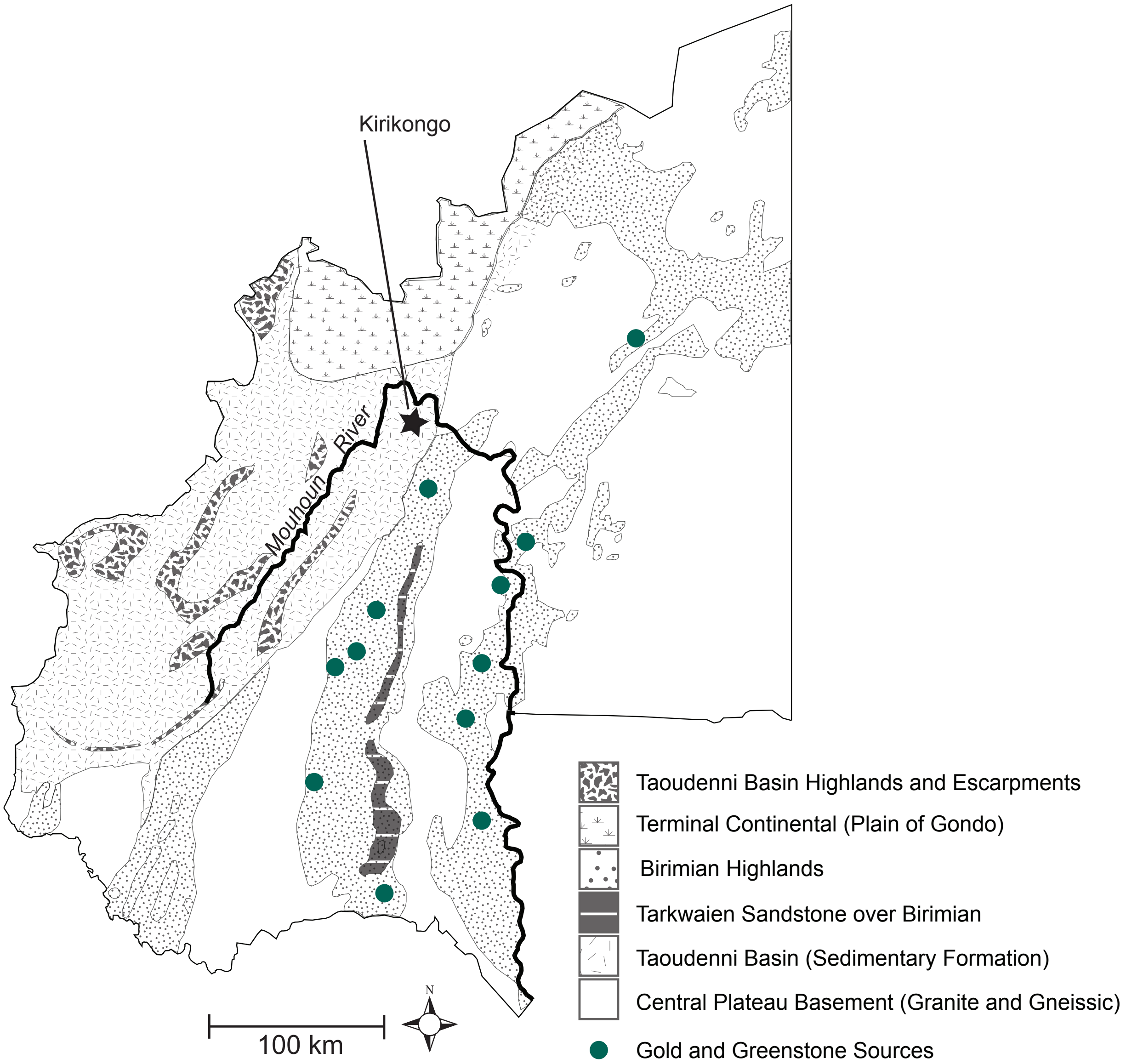

Figure 2.4. Geological map of western Burkina Faso. Adapted from Pigeonnière and Jomni 1998:11, 13, with additional data from Augustin and Gaboury 2017; Huot et al. 1987; Sattran and Wenmenga 2002.

for grinding and crushing more durable materials, and occasional greenstone, dolerite, and basalt objects. These same Birimian strata have been a focus of alluvial gold mining both in the past and today (see Kiéthéga 1983; Werthmann 2007), and while less is known about gold deposits in the northern sections of the Houndé Greenstone Belt, it is possible that gold was available within 15–20 km of Kirikongo. For example, Huot et al. (1987) discuss known gold deposits near Tienzan, about 35 km southeast of Kirikongo, in strata that extend farther north.

The Mouhoun River is deeply incised in its bed as it flows through the bend, and as a result it has a very small floodplain, although small areas of shallow water to either side of the main channel may become swampy during floods (see Capron 1973; Pigeonnière and Jomni 1998; Sattran and Wenmenga 2002). The exception is the rich agricultural floodplain of the Sourou Basin, a former Pleistocene river course extending north from the peak of the Mouhoun Bend that previously drained into the Niger River system (Chisholm and Grove 1985; Grove 1985a;

Lowe-McConnell 1985). The Sourou catchment basin captures a significant amount of Mouhoun floodwaters, with only a small percentage returning to the Mouhoun channel when the flow reverses course after the floods (Forbes 1932).

Today, Kirikongo is situated squarely within the forested savanna ecological zone, and during the twentieth century, rainfall averaged between 900 and 1000 mm annually (Capron 1973). While the region generally receives less rainfall than areas to the south, the rainfall is significantly more regular and predictable than in surrounding areas, with only about 200 mm of variability from year to year. Vegetation includes dense gallery forest for a few hundred meters to either side of the Mouhoun River and along its major tributaries, forest and thickets—some quite dense—along the smaller tributaries and in areas away from settlements, and sparser trees and more open grassland on the thinner soils atop the lateritic plateau in the interior. Areas with deeper soils have generally been brought into cultivation (millet, sorghum, and fonio are the main staple crops) and have fewer trees, most of which are from economically significant species such as shea, baobab, tamarind, locust bean, and the nitrogen-fixing acacias. Shea in particular thrives in western Burkina Faso, which is even today considered a heartland of shea butter production for use and trade. Given the dense vegetation found in old fallows, the Mouhoun Bend would likely have been more heavily forested in the past. Even with vast areas cleared due to increasing population, the Mouhoun Bend harbors a significant tsetse presence for such a northerly location (likely due to its relatively stable rainfall regime), which has drawn extensive research (Bouyeret et al. 2013; Koné et al. 2011; Sow et al. 2013).

The richness, diversity, and climatic regularity of the natural setting, close proximity to a perennial river, and abundant raw materials would have made the Mouhoun Bend an attractive locale for early farmers. It is unsurprising that settlements and iron metallurgy in the region date to the mid- to late first millennium BC and that communities experienced consistent growth until the fourteenth century AD. Prior to the impacts of plague, which decimated local communities, the region was home to a dense network of settlements, with larger communities such as Kirikongo likely populated by more than a thousand residents.

Western Burkina Faso and Adjacent Regions Prior to Iron

The origins of farming communities in the Mouhoun Bend is based in millennia of social and economic experiments in western Burkina Faso and adjacent parts of Mali and Ghana. Pottery appears by the early Holocene near the Bandiagara Escarpment, about 100 km north of Kirikongo (Huysecom et al. 2009b), and was possibly found in western Burkina Faso by the mid-Holocene, based on finds of pottery and microlithic tools recovered from the Sourou Basin (Fontana et al. 2010). No comparable ceramic-using LSA sites have been identified within the Mouhoun Bend itself, where the only documented LSA sites are a series of lithic production areas (Kebe-Sira-Kan-Tomo) distributed along the Mouhoun River near the contemporary village of Kerebé that lack pottery and therefore likely date to the early Holocene (Holl 2014:17–21; Koté 2007) (Figure 2.5).

While there are no known second millennium BC sites in the Mouhoun Bend, evidence from neighboring regions suggests that this was a period of agricultural experimentation and increasing sedentism (decreasing logistical mobilities). Domestic livestock and millet had arrived on the margins of the Niger Bend by the mid-third millennium BC and begun spreading farther south by the late third millennium BC (Finucane et al. 2008; MacDonald 1996a, 1996b; MacDonald et al. 2017; Manning 2008; Manning and Fuller 2014; Ozainne 2013). In the savanna and forest zones, societies in the second millennium BC experimented with adapting these imported domesticated resources while simultaneously intensifying their use of local domesticates and cultivars (notably oil palms and the likely already domesticated yams) to support higher degrees of sedentism.

The most well-studied of these second millennium BC farming societies is the Kintampo complex. Although the Kintampo is documented throughout Ghana, the full spatial extent of the complex is unknown, since only limited archaeological research has been carried out in Ivory Coast and southern parts of Burkina Faso (although a few Kintampo sites have been identified in the former). Some Kintampo complex sites are large open-air sites with evidence for high levels of sedentism, including wattle and daub architecture, pits, material culture, and multiple occupation strata, while others are rockshelter sites that may represent seasonal camps and/or activity

Figure 2.5. Archaeological sites mentioned in chapter 2.
Cartography by InfoGraphics Lab, Department of Geography, University of Oregon.

areas, perhaps connected to the more sedentary adjacent settlements (Agorsah 1986; Anquandah 1993; Casey 2000; Chenorkian 1983; Davies 1964, 1973, 1980; Gavua 1985; Logan and D'Andrea 2012; Posnansky 1984; Shinnie and Kense 1989; Stahl 1985, 1986; Watson 2005, 2010). Economically, Kintampo sites have evidence for resource intensification (large densities of ceramics, extensive use of ground stone technologies, stone points but few geometric microliths, investment in architecture). Arboricultural practices (canarium and oil palm) were widespread in the forest zone (Logan and D'Andrea 2012), and significant use of riverine resources has been identified at Ntereso and Daboya (Davies 1973; Shinnie and Kense 1989). Use of domestic resources, including black-eyed peas, pearl millet, goats, and cattle, has been identified at some sites and was likely widespread, although argued to be variable in its importance (D'Andrea and Casey 2002; D'Andrea et al. 2007; Gautier and Van Neer 2005). Characteristic objects such as polished ground stone, jewelry, and the enigmatic rasps common at Kintampo sites may indicate the formation of new identities. As discussed in chapter 8, purposeful house destruction by fire may have been a widespread cultural practice in Kintampo settlements (Casey 2000; Davies 1973; Sawatzky 1998).

Previous research on the Kintampo has assumed that the complex was largely confined to the second millennium BC. However, I will argue in more detail in chapter 8 that some open-air Kintampo sites have occupations that may extend into the first millennium BC. The Kintampo dates taken as nonproblematic have tended to be derived from rockshelter sites with strong stratigraphic context, locations that may disproportionately represent the early period of transition into the Kintampo. Despite being common in the region, first millennium BC dates from open-air sites have tended to be dismissed, as they do not align with the rockshelter dates (Casey 2000; Davies 1980; Quickert et al. 2003; Watson 2010). For example, at Birimi, close to the border with Burkina Faso, thermoluminescence dates on ceramics as well as burned daub extend into the mid-first millennium BC (Casey 2000; Quickert et al. 2003). This interpretation of Kintampo dating closes the temporal gap between the Kintampo complex and the early evidence for iron smelting at sites such as Birimi (Casey 2000), Ntereso (Davies 1973, 1980), and Daboya (Shinnie and Kense 1989) and in the Mouhoun Bend itself (see below).

Excavations at Rim II in Yatenga, Burkina Faso, while lacking some distinctive elements of the Kintampo (notably rasps), indicate that largely similar farming economies were likely found more broadly in the second millennium BC (Andah 1978). Rim II is an open-air site with clay floors that may be the remnants of coursed earth structures, dense and diverse ceramics with roulette decorations, extensive ground stone industries, and, notably, a lack of microlithic technologies for hunting. While no organics were recovered, it is likely that the inhabitants had access to millet and domestic animals. Even farther afield, Nok sites (Breunig 2014; Breunig and Rupp 2016; Franke 2016; Franke et al. 2020; Junius 2016) also resemble those from the Kintampo and Rim II in many respects. Like Kintampo, Nok sites have possible evidence of the purposeful destruction of houses and the interment of broken contents in pits (including terra-cotta figurines), and I argue that there are clear ceramic affinities between the two, particularly in the second millennium BC.

There are therefore significant similarities in the broader region prior to and during the transition to iron-based economies, which viewing second millennium BC developments as discrete temporal and spatial entities has obscured. I suggest that while local variability should not be ignored, there is evidence for regional interaction and certain commonalities in cultural practices as societies transitioned to farming in the second millennium BC and then added iron metallurgy to their economies in the first millennium BC. The latter is well established for the Nok (see Breunig 2014) and in western Burkina Faso (Dueppen 2012a) and is likely the case in the Kintampo zone as well (see chapter 8).

In the Mouhoun Bend region, Holl and Koté identified evidence of iron-smelting furnaces and low-density

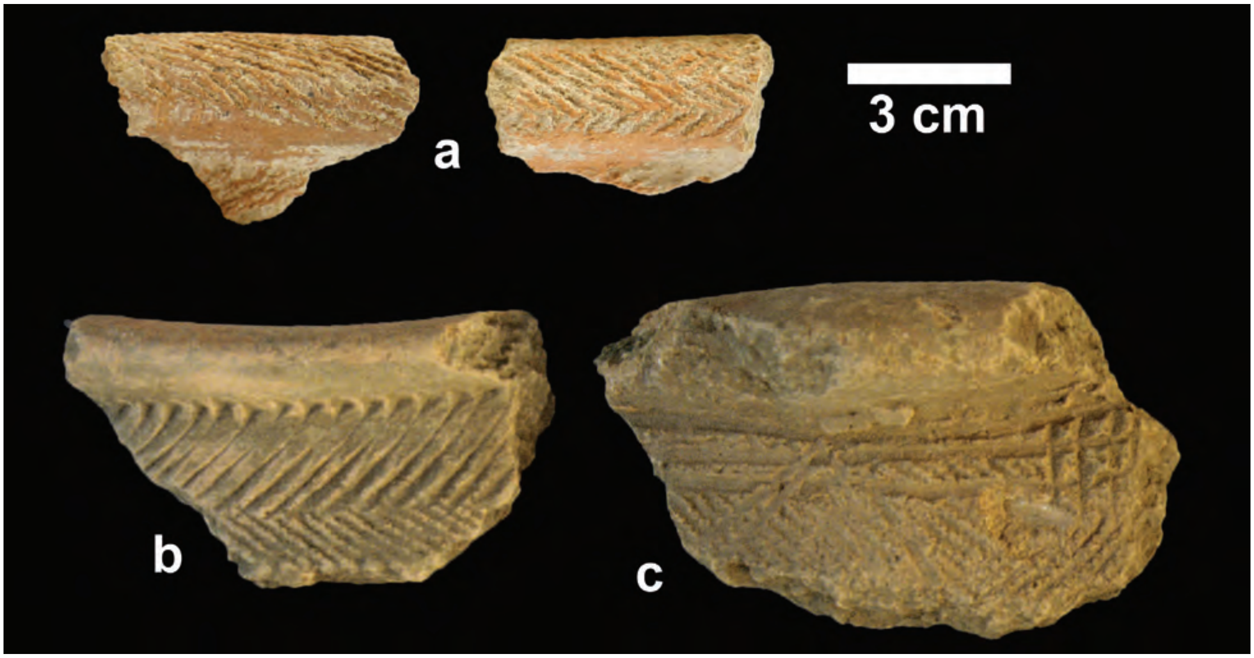

Figure 2.6. Yellow Phase rounded and thickened rim forms from Kirikongo with similarities to Kintampo jar forms. (a) Compare rounded form with Davies 1973; Shinnie and Kense 1989; Stahl 1985; Watson 2005; compare decoration location (with different techniques) with Watson 2005:Figure 10; Davies 1973:Figure 20b (among many); Shinnie and Kense 1989:Figures 35a, 35c. (b) Compare oblique spatulate marks with Stahl 1985; Davies 1973; Watson 2010:Figure 3; Shinnie and Kense 1989:Figure 35b. (c) Compare ledged handle (protuberance on rim) with Watson 2005:Figure 10 and Davies 1973:Figures 17, 68, 73, 81; note also similarities to contemporary pottery from the early first millennium AD at Daboya (Shinnie and Kense 1989, Tradition II, Ware B1; see discussions in Dueppen 2012a).

habitation dating to the mid- and late first millennium BC (Holl 2009, 2014; Holl and Koté 2000; Koté 2007). By the early first millennium AD, several sites had been founded, including Kirikongo (Dueppen 2012a). Based on published drawings of ceramics from some of the dated early (late first millennium BC) sites identified by Holl and Koté, these communities used pottery similar to the Yellow I subphase I defined in the lowest levels of Kirikongo. I have previously argued that Kirikongo's early pottery (Yellow Phase) has strong affinities with Kintampo ceramic traditions (Figure 2.6) (e.g., Dueppen 2008, 2012a), and in this book I expand upon these arguments to explore continuities in cultural practices that may have spanned the shift to iron-based economies in this part of West Africa and that help us understand the historical dialogues foundational to dynamic changes in societies over time by reconnecting the LSA to later periods of time.

Founding and Early Growth of Kirikongo

Kirikongo was established by at latest ca. AD 100 as a single economically generalized house at Mound 4 that produced pottery (pounded in a concave form with mat impressions and braided strip roulette); farmed millet and fonio; kept domestic livestock, dogs, and fowl; hunted and fished; produced shea butter; and smelted iron at furnaces using ore likely obtained adjacent to the site (Figure 2.7). Like all houses throughout Kirikongo's occupation, this was likely a large multifamily, multigenerational social unit (see discussions in Dueppen 2012a, 2015, 2019a, 2019b). There is a strong possibility that Kirikongo's occupation predates the second century AD, as the earliest 50 cm of cultural deposits are currently undated. A long early occupation is also supported by the extensive deposit found along the drainage to the west of the mound containing large amounts of Yellow I pottery mixed with furnace walls, tuyère fragments, and slag (about 0.75 ha; also possibly extending under Mound 3). Given that only one house at the site was occupied, this eroded deposit likely represents the buildup of metallurgical debris over a considerable time.

The house at Mound 4 was alone for at least several hundred years, and based on the sparse data for other early first millennium AD sites in the Mouhoun Bend, it is likely that it was typical of a regional settlement pattern of dispersed homesteads. Around AD 350–450, a second economically generalized house (Mound 1) was founded 150 m to the north of Mound 4, with its own iron furnace located to the west along the seasonal drainage and with agricultural land to the east (Figure 2.8). Initially, the pottery of the two houses was very similar. However, within 100 years it began to diverge.

Shortly thereafter, at the start of the subsequent subphase (Yellow II, ca. AD 500/550), a third area was established 150 to 200 m to the north of Mound 1 at Mound 11, creating a linear spatial pattern stretching 300 to 400 m north/south and at least 200 m east/west. In previous publications, I have described Mound 11 in Yellow II as a third economically generalized household. However, Mound 11 differs from Mounds 1 and 4 in fundamental ways. Pottery, fauna, and other finds were lower in density, and the mound lacked an external smelting furnace. The pottery at Mound 11 most closely resembles that from Mound 4's tradition, which had by that point diverged significantly from Mound 1 (see particularly Dueppen 2015), and the possibility that Mound 11 initially served as an activity area must be considered. By early Yellow II, the iron furnace at Mound 1 had ceased to be active, beginning a process of co-option of iron metallurgy, first with smelting during this era. Starting in late Yellow II (ca. AD 650–700), significant changes occurred at Kirikongo. The residents of Mound 4 founded a cemetery for their dead at Mound 3, and two new mounds that clustered near Mound 4 were established. While coursed earth techniques remained common, earthen brick construction began to be used in increasing numbers of structures. Ceramic decoration and form began to diversify, including the incorporation of carved wooden roulettes.

Around AD 700 to 750 (Red I), Kirikongo transformed further, with technological changes and increasing evidence of the consolidation of power by the founding house (Mound 4) (Figure 2.9). Earthen brick construction became common, and there developed a new flooring technique that combined crushed laterite with clay to make a hard red pavement. In some places, there was evidence for multistory structures and/or diverse activities on terraced rooftops. At the same time, potters began using kilns to produce a denser, more durable ware (see Dueppen 2012a, 2015). Extremely diverse pottery decoration techniques (both wooden and twine/strip roulettes) were employed, and ceramic traditions of Mounds 4 and 1 became increasingly divergent, with Mound 1's house investing heavily in an independent identity.

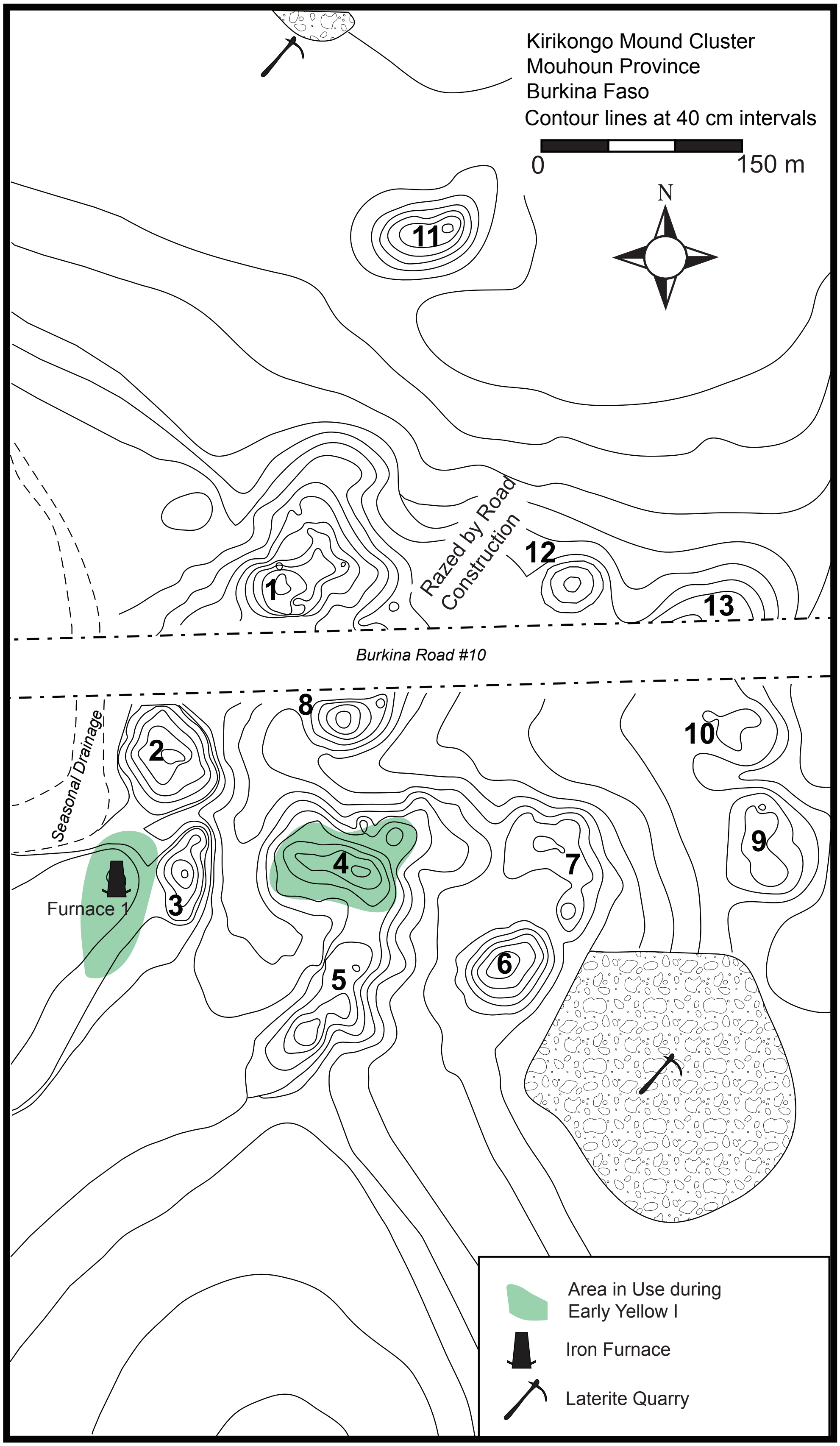

Figure 2.7. Kirikongo in early Yellow I

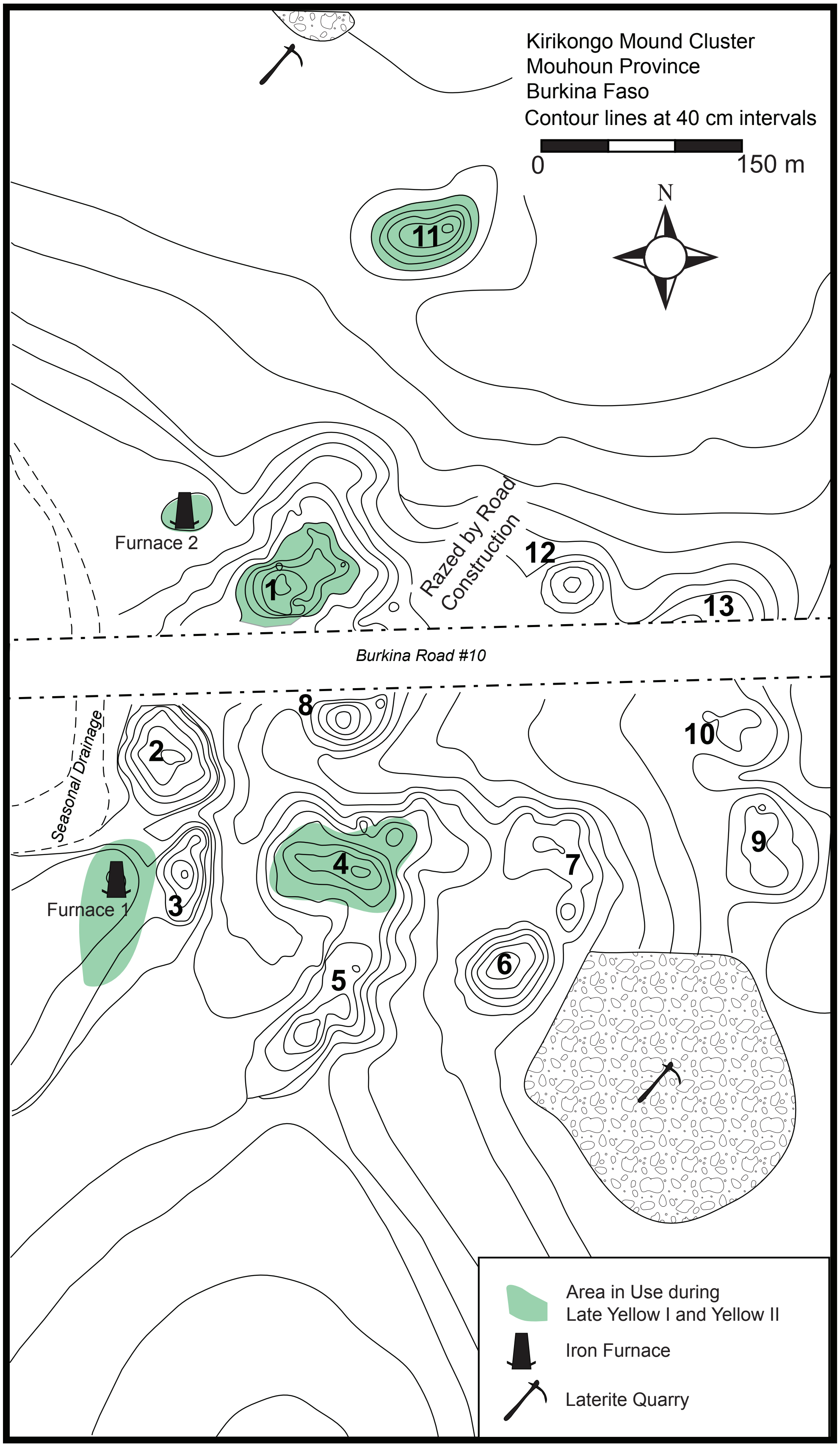

Figure 2.8. Kirikongo in late Yellow I and Yellow II

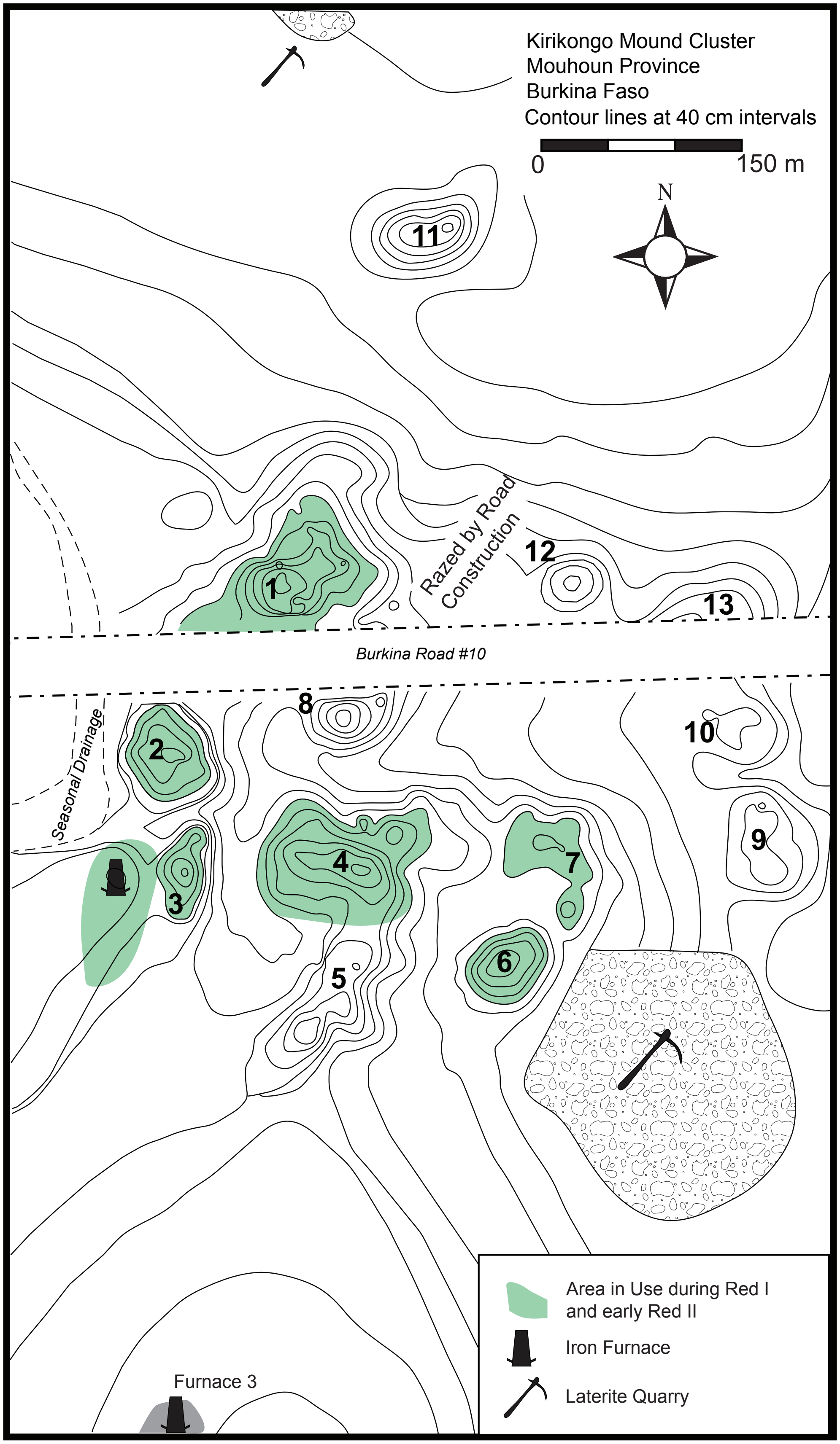

Figure 2.9. Kirikongo in Red I and early Red II

Mound 1's growing emphasis on its ceramics may have been in response to the increasing centralization of the site around Mound 4. As four additional mounds were founded in Red I, they clustered near Mound 4, and with the possible temporary abandonment of Mound 11 at this time, Kirikongo became a circular settlement with Mound 4 at the center. This growth was typical for the region, as multiple neighboring settlements also grew to a fairly large size (Holl 2014; Holl and Koté 2000). Mound 4's central location at Kirikongo was reinforced by the construction of a multistory ritual complex atop its high point. The residents of the founding house also co-opted two economically and symbolically potent resources: iron and cattle. Smelting activity at Mound 1 ceased in early Yellow II, and evidence for forges had ceased by late Yellow II, while dense ore and slag deposits were found at Mound 4 and a new furnace was constructed in Red I at a southern location away from other mounds. Similarly, cattle had previously been found at Mound 1, but the only cattle from the early second millennium AD occurred in the cemetery monument and in the ritual complex. By the start of the second millennium AD (Red II), the cemetery had become elaborated, with sacrificed livestock and cowrie shells accompanying the burials of infants and children. In contrast, the burials of adults at other mounds were afforded less intensive treatment.

Later Kirikongo: Revolution, Plague, and Interregional Exchange

In the mid-twelfth century AD, a series of fundamental changes at Kirikongo distributed and transformed the power held by Mound 4 and reorganized the community around a more communal structure. The cemetery monument was paved over, iron smelting was removed from mound 4's control, and cattle keeping was generally abolished, with one significant exception (Figure 2.10). The architectural pattern of closed compounds shifted to open room blocks, resulting in reorganizations of space on mounds and grinding installations moved from the interiors of structures to exterior spaces. A new emphasis on collective hunts accompanied by feasts was representative of the increasing commensalism in the community. However, Mound 4 did retain a significant role, as the ritual complex remained in place. I have argued that the periodic destruction of this structure (Dueppen 2012a) and of central structures at neighboring sites (Holl 2014; Holl and Koté 2000; Koté 2007) during the late thirteenth and early fourteenth centuries AD may have been the result of collective action and a symbolic expression of communal solidarity against neighboring sites (Dueppen 2012a, 2012b, 2019a, 2019b; Dueppen and Gallagher 2016).

Central to this new complex heterarchical social formation was an economic shift from dependence to interdependence. Notably, iron smiths and potters took up residence at Mound 11 on the edge of the community (in a manner similar to the smith/potter hereditary occupation groups of the ethnohistoric record). The foundation deposits from the reoccupation of Mound 11 contained a burial feature that included a horse tooth and, significantly, the last identified cattle bones at Kirikongo. Mound 11 was a pyrotechnic production locale, with evidence for kilns, pottery production tools, and smithing activity (with the highest density of metallurgical debris outside of smelting locations recovered at the site). New iron-smelting furnaces were constructed 250 m to the west of Mound 11, and these specialists likely served the entire community. For the first time, all houses shared the same pottery assemblage, with the use of identical vessels throughout the settlement visually reinforcing the communal ethos.

From Red II through Red III, the settlement core became even denser, with growth continuing until, in the mid-fourteenth century AD, Kirikongo reached a population peak of likely 1,000–1,500 residents. In the second half of the fourteenth century AD, the size of the settlement decreased rapidly (late Red III), likely due to plague epidemics (Dueppen and Gallagher 2016; Gallagher and Dueppen 2018) (Figure 2.11). By the turn of the fifteenth century AD, only Mounds 1, 3, 4, 7, and 11 remained occupied or in use, and the spatial extent of occupation on these mounds had shrunk. By the second decade of the fifteenth century AD, Mound 1 had been abandoned as well, and it is possible that Mound 11 and all smelting locations were also abandoned at this point or shortly thereafter. Recent scholarship throughout West Africa has increasingly invoked the likelihood of plague epidemics during this era, with site abandonments, shifts in occupation within areas, reduction in industrial activities, and widespread cultural changes (see Chouin 2013, 2018; Chouin and DeCorse 2010; Dueppen and Gallagher 2016; Gallagher and Dueppen 2018; Green 2014, 2018; Huysecom et al. 2015; McIntosh 1998; Posnansky 1987).

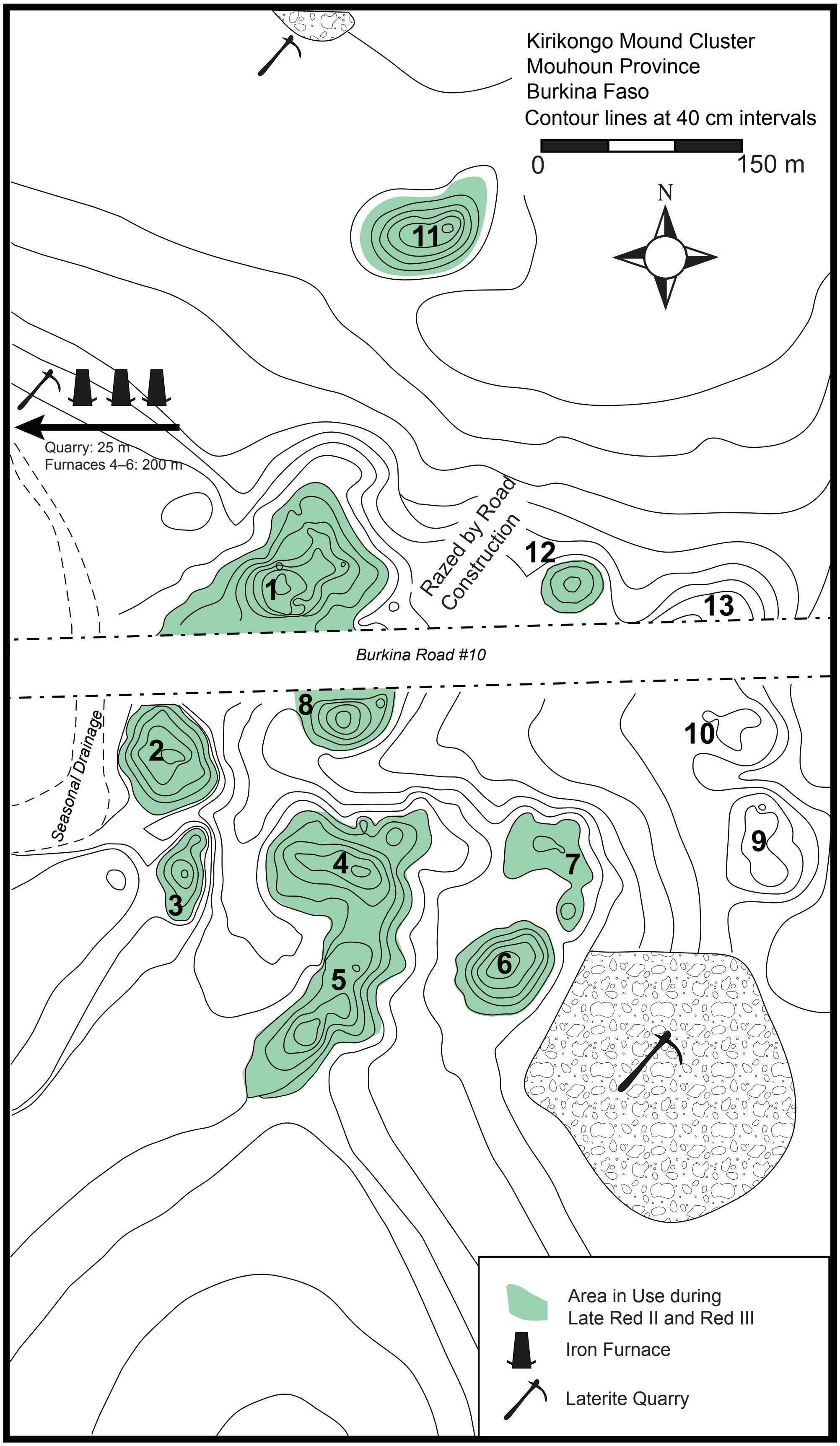

Figure 2.10. Kirikongo in late Red II and Red III

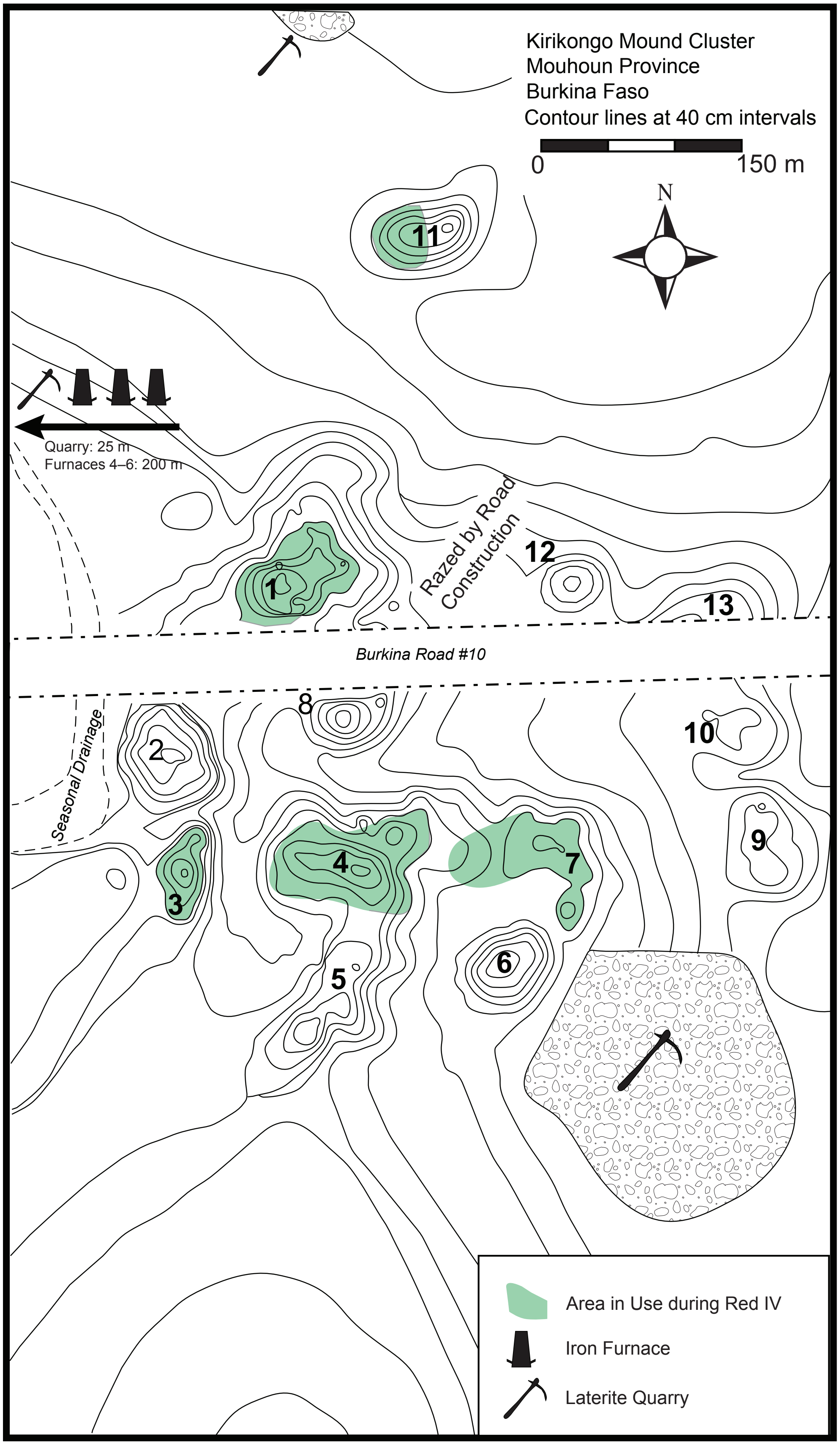

Figure 2.11. Kirikongo in Red IV

The impacts of this population loss on Kirikongo were significant. Notably, material culture (pottery, tools, and architecture) became more poorly made, and pottery decorations became significantly less elaborate. At the same time, residents in the late fourteenth and early fifteenth centuries AD intensified their engagement in cloth production, indigo dying, and leather production. This investment in new economic activities coincided with the likely arrival in the region of Mande traders from the Mali Empire or its immediate successors, as evidenced at Kirikongo by the incorporation and interpretation of ceramic forms and decoration techniques from the Mande heartland within local ceramic traditions (see Dueppen and Gallagher 2016).

Divine Power at Kirikongo

My previous publications on Kirikongo have explored concepts of divine power related to legitimizing economic control and leadership structures. It is likely that residents of Mound 4, as village founders, held the equivalent of an earth priest role. In local religious practice ethnohistorically, iron-working is viewed as a particularly potent and dangerous practice, associated with divinities of the deep earth, that affords practitioners privileged (although often separated) positions (Coulibaly 2006; Cremer 1924, 1927; Kiéthéga 1993b, 2009). By combining the categorically distinct compact with the earth shrine with control over iron-working, as well as potential support from ancestors maintained in the exclusive cemetery, the residents of Mound 4 created a diverse ritualized legitimization for the power they held. These combined elements may have underpinned the described evidence for increasing social ranking throughout the first millennium AD.

After the revolution, iron-working was detached from the founding house and so too were clear symbols of inequalities, such as cattle keeping and the cemetery. It is likely that the earth shrine and ancestral associations of the founding house remained, as the ritual complex persisted. However, the understandings or roles of ancestors may have shifted. The transition from closed compounds, which may have reflected more discrete house identities that ultimately allowed social ranking, to more open room blocks suggests a move following the revolution toward concepts of house identity (and community identity) that allowed incorporation of diverse residents. A central feature of decentralized political structures in the region historically are multifamily houses that have heterogeneous memberships even if generally rooted in ancestors from a patrilineal group (Capron 1973; Şaul 1991). As explored elsewhere (Capron 1973; see discussions in Dueppen 2019a), houses can combine if demographically necessary, and in the local region they are not necessarily coresidential. These same processes facilitate ethnic and religious diversity at the settlement level. Finally, the more open houses at Kirikongo were bound by new communal activities. Historically, similar activities are deeply integrated into initiation and local egalitarian religious practice at the core of the Do religious system (Capron 1973; Cremer 1924, 1927), and it is likely that at Kirikongo, communal activities would have been similarly ritualized.

The plague era could have destabilized political power rooted in maintenance of human–environmental relations (notably that of the earth shrine). By the fifteenth century AD, this may have undermined both specialists and the founding house and influenced the development of even more equitable social relations between houses. The new economic practices of the post-plague era may have reflected changing cultural values around specialization, trade, and animal products.

Animals at Kirikongo

Animals have figured prominently in my research on Kirikongo. Domesticates such as dog, chicken, sheep/goat, and cattle were present from the foundation of the site. Throughout the sequence, diets were supplemented by fishing and hunting of animals likely to raid fields. In the latter part of the sequence, the residents of Kirikongo stopped keeping cattle and began participating in collective hunts that targeted a wide range of animals.

Cattle at Kirikongo were likely of greater sociopolitical than subsistence value, as they are nonnomadic small breeds adapted to a wet savanna locale and typically kept in small numbers (Dueppen 2012c). The use of cattle in burial monuments is one line of evidence that suggests that the early sedentary community may have employed cattle wealth as a mechanism to connect families in a dispersed social landscape and later within the growing community of Kirikongo itself. Cattle could have been used for bridewealth at the time of marriage and/or consumed in funerary feasts. The co-option of cattle by the founding house would have contributed to their centralization of power by privileging them in both marriage relations and at prestigious events. The rejection of cattle husbandry was critical for decentralization, as it eliminated an easily inheritable and transferable form of wealth (Dueppen 2012a, 2012b). In the ethnohistoric record of the Mouhoun Bend, marriage was frequently enabled through light bride service rather than cattle bridewealth (Capron 1973; Cremer 1924, 1927).

Kirikongo's chickens are the earliest identified in sub-Saharan West Africa (Dueppen 2011). In contrast to cattle, which require a significant investment of resources in a wet savanna environment, chickens were a more equitable and accessible component of local economies. Not only could all houses in a community keep them, but their rapid reproduction meant that all houses could sacrifice them with some regularity. This not only enabled more frequent meat consumption but also allowed for more widespread and active participation in ritual life.

Lastly, large collective hunts occurred for the first time after the revolution (Dueppen 2012a). These strategies, in which large circles of people drive animals toward the center, resulting in a diverse set of hunted fauna, require communal effort and downplay individual prowess. This type of cross-cutting activity may have been critical for establishing a communal ethos at Kirikongo.

The recent completion of a full analysis of the faunal assemblage from Kirikongo has provided an opportunity to explore a wider range of questions. As described in chapter 1, domestic and wild animals are a critical component of interactions between people, ancestors, and divinities in central West Africa. Domestic animals create a sense of commensality with divine entities, while wild animals represent alliances made between people, communities, and a landscape of power. While the ethnohistoric record certainly differs from past practice, it establishes that ritual practices create patterned assemblages. Consequently, the identification of patterns in animal use and deposition at Kirikongo has the potential to illuminate ritual practice and provide insight into a range of open questions regarding lifeways at Kirikongo.

This book explores the evidence for sacrifice at Kirikongo. To address this issue, I analyze the composition and nature of animal bone concentrations within contexts, as well as consider taphonomy and the very nature of mound formation processes at Kirikongo. Insoll and colleagues (Insoll 2010; Insoll et al. 2013) have suggested that in the Tong Hills of northern Ghana, sacrificial systems may be able to be identified by the lack of animal remains discovered archaeologically, since slaughter at shrines and potent locations and the subsequent distribution of parts disperses bones and leads to a lack of interment. In contrast, Kirikongo had exceptional preservation of animal bones within the occupied interior of mounds, with very little preservation in the talus slopes and abandonment levels. Bones at Kirikongo were preserved because they were associated with mound formation processes related to ancestral rituals that resulted in the quick sealing of bones in relatively protected pockets. These spaces likely had different soil chemistry and were rarely exposed to bioturbation. The very preservation of bone therefore provides an interpretive anchor and will be discussed extensively in later chapters.

Once the case for sacrifice is established, I then examine the continuities and transformations in the use and ritual associations of wild and domestic animals in the archaeological and ethnohistoric records. At Kirikongo, did leaders maintain relationships with divinities through rituals of attachment and sacrifice? Were funerals accompanied by rituals of attachment and detachment? Were domestic animals the focus of these sacrifices, and were particular sexes or ages of animals favored? Were wild animals associated with emplaced divinities, and do the contexts at Kirikongo indicate spatial and ecological associations among various types of wild animals? Since animals mediate divine relations and sacrifice is inherently related to health and well-being, what can animal uses tell us about the plague era? Was there an increase or change in the nature of sacrifice during this time, or the undermining of particular animal associations and by extension relations with particular divinities?

These same discussions will provide insights into political, social, and economic transformations at Kirikongo. Beyond the co-option of cattle by Mound 4, are there other differences in domestic animal uses (such as taxa distributions, quantities, and ages of individuals) that could shed light on political developments? Can animal uses tell us more about cultural changes during the rise of inequalities and the decentralization of power in the twelfth century AD? How did the arrival of Mande diasporic populations in western Burkina Faso affect economic relationships, including domestic animal production and hunting practices?

Lastly, animals have been underused in reconstructions of environmental histories in West Africa. In a region where choices in wild animal hunting and collection are deeply intertwined with access to particular ecological settings, can faunal remains be used to reconstruct general ecosystems, and if so, how? I supplement consideration of the wild fauna with an examination of taxonomic distributions and domestic animal breed characteristics to develop a detailed ecological context for Kirikongo's occupation.

However, animal remains were never found in isolation, and fauna was analyzed within a relational dialogue with spaces, places, and contexts. The answers to the above questions are enriched by exploring the interface between the divine nature and associations of living entities like domestic and wild animals and those of materials, objects, and places. The addition of faunal data from Kirikongo therefore enables, through comparison and context, a better understanding of the creative power of material culture and of agentive practices in the creation of mounded settlements.

CHAPTER 3

ARCHAEOLOGY OF ANIMALS IN WEST AFRICA

Sacrificial systems in central West Africa developed over millennia. Here I explore archaeological evidence for the arrival (or development) and inclusion of various domestic animals within the general context of human–animal relations in the savanna region (Figure 3.1). In particular I highlight the differences between adoption histories in the savanna and savanna/forest zones as compared to the much better understood Sahelian zones.

Domestic goats and cattle were adopted into emerging sedentary farming societies in the savanna and savanna/forest of West Africa in the second millennium BC despite their lower productivity in these wetter settings. Their social and possibly religious uses likely outweighed their subsistence roles in communities whose economies were primarily based in grains or yams, vegetal fats, and wild resources. A second regional economic transformation occurred in the first millennium BC with the addition of iron metallurgy and the likely arrival of chickens and dogs in the region. The impact of chickens may have been profound, as they are domestic animals of tropical origin well adapted to humid environments. They therefore functioned as a commonly consumed low-investment resource and enabled the development of everyday sacrificial systems as we know them. Lastly, domestic equids were introduced to West Africa during the first and early second millennia AD, an era of increasingly complex societies and specialized economies. This period may have also seen an increase in hunting tied to communal identities and in some cases to the production of animal products for regional and interregional trade.

The broad regional trends outlined above incorporate significant variability in animal use. For example, while aquatic resources were important in Sahelian and savanna economies wherever lakes and rivers were accessible, the economic contribution of hunting may have varied with the local availability of fish and domestic animals (particularly the chicken). At the same time, chickens may have been slightly later arrivals in areas where fish were particularly abundant, such as the Inland Niger Delta, and in northern

Figure 3.1. Archaeological sites referenced in the text.
Cartography by InfoGraphics Lab, Department of Geography, University of Oregon.

areas, where livestock husbandry was ideologically central. As previewed in chapter 2, Kirikongo's faunal remains were impacted by practices linked to all three of these eras, and the nature of domestic and wild animal use at the site was both the result of these accumulated regional histories and shaped by the local ecological and cultural setting.

Early Domestic Animals in West Africa (Goats, Sheep, and Cattle)

The arrival and incorporation of domestic cattle, sheep, and goats into societies in West Africa was a complex process involving the availability of livestock along the northern margins of the zone by the mid-Holocene, the concomitant development of diverse broad-spectrum foraging adaptations throughout West Africa's savannas and forests, the impact of the domestication and cultivation of plants (yams, millet, cowpea), and the challenges of the humid tropical ecological setting of West Africa for Near Eastern– and North African–adapted livestock.

Over the last two decades, our knowledge of the origins and development of agropastoral communities on the southern margins of the Sahel has expanded significantly. Pastoral societies with cattle, sheep, goats, and dogs were distributed throughout the Sahara by the fifth millennium BC, creating an inscribed cultural landscape incorporating rock art, tumuli, cemeteries (with human and domestic animal burials), stone circles, and rockshelter sites (Brass 2019; Byrnes 2019; Clark, Agrilla et al. 2008; Di Lernia 2006; Di Lernia et al. 2013; Dunne et al. 2018; Garcea 2013; Holl 2004; Holl and Dueppen 1999). While these societies incorporated sheep, goats, and dogs into their economies, social investments and values may have been deeply engrained in cattle, as ratios of cattle to small stock tended to be high, a pattern substantiated in both mortuary assemblages and iconographic evidence that even suggests cattle as beasts of burden.

Over the course of the third millennium BC, domestic animals spread to the southern margins of the Sahara; they have been recovered at sites in the Aïr Mountains of Niger (Clark, Agrilla et al. 2008; Garcea 2013), the Tilemsi Valley of Mali (Finucane et al. 2008; Manning 2008; Manning and Fuller 2014), and the Tichitt-Walata region around the Aoukar Lake basin in southeastern Mauritania (Amblard 2006; Holl 1985; MacDonald 2011; MacDonald et al. 2003, 2009) (Figure 3.2). Sites from the mid- to late third millennium BC have evidence for increasing sedentism and consequent creation of deeper cultural deposits, perhaps stimulated by economic shifts to cultivation of domestic millet. For example, in the Tilemsi Valley, recent research at Karkarachinkat indicates that by the mid-third millennium BC, pearl millet was part of an agropastoral economy where cattle were the primary domestic animals, and sheep, goats, and dogs were minor components of the faunal assemblage (Finucane et al. 2008; Manning 2008; Manning and Fuller 2014, Manning et al. 2011, see also Smith 1974, 1975). Interestingly, the wide range of sizes of cattle found in sites of the Tilemsi Valley in the later third millennium BC into the early second millennium BC may mark the presence of more sedentary dwarf breeds (disease tolerant) and larger more transhumant breeds in the same area, perhaps indicating societies with diversified mobility strategies.

As domestic animals spread into the Sahel, savanna, and forests of West Africa in the second millennium BC, there was significant regional diversity, affected in part by the fact that domestic animals spread via both diffusion processes and actual migration events, some of which were tied to increasing aridity. Current data indicate that in northern areas such as the Senegal River basin and the Inland Niger Delta, domestic stock may have been both a central economic and a sociopolitical resource. In comparison, dwarf breeds adopted by sedentary farming communities in the savanna and forest zones may not have

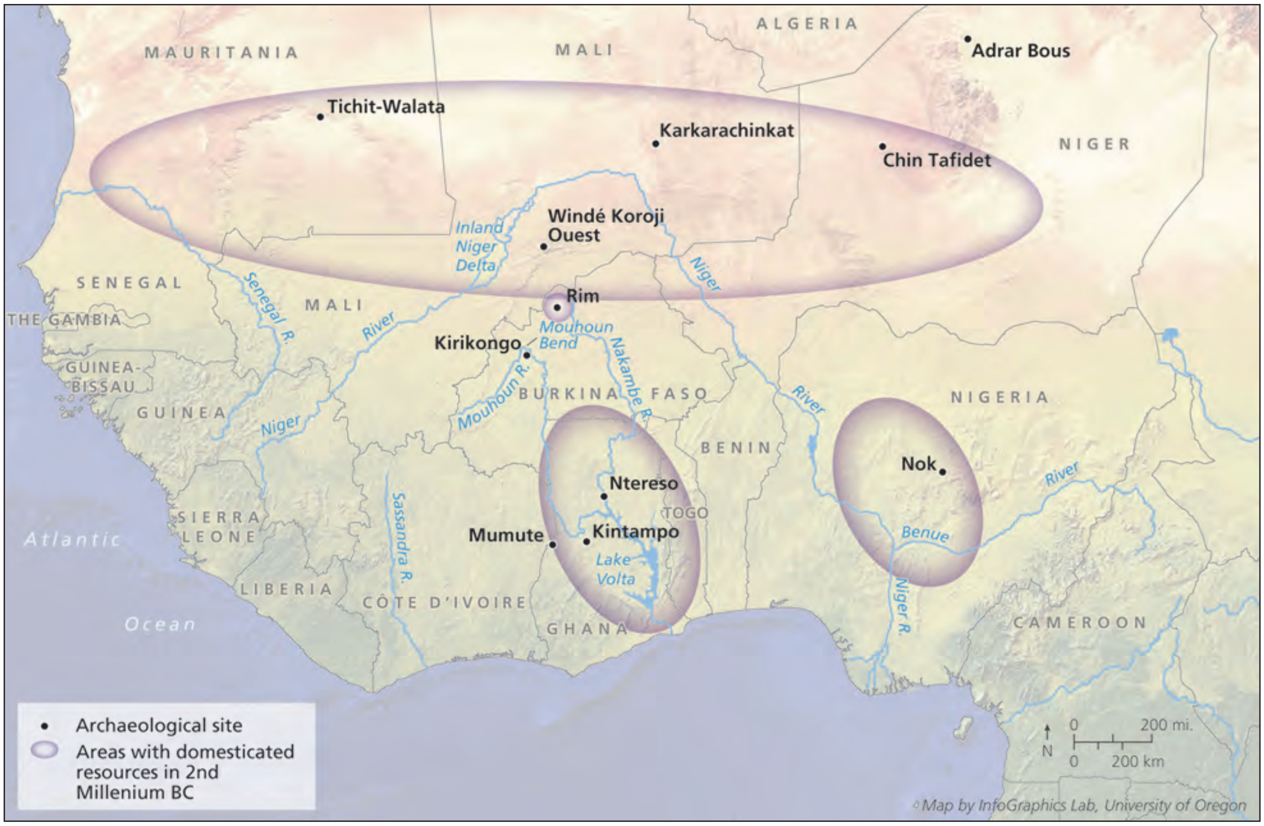

Figure 3.2. Selected sites with evidence for confirmed or probable domestic animal use in the second millennium BC. Data from Amblard-Pison 2006; Andah 1978; Carter and Flight 1972; Clark et al. 2008; Dombrowski 1976; Finucane et al. 2008; Gautier and Van Neer 2005; Holl 1985; MacDonald 1996a, 2011; MacDonald et al. 2003; Manning 2008; Manning et al. 2011; Paris 2000; Smith 1974, 1975; Stahl 1985. *Cartography by InfoGraphics Lab, Department of Geography, University of Oregon.*

been a critical subsistence resource but rather functioned as an important social valuable for connecting newly sedentary communities (at weddings and funeral rituals) and possibly for their role in enriching soils for cultivation (see Dueppen and Gallagher 2013).

The northern trajectory is particularly well described in the Aoukar Basin, where populations leaving the Tichitt-Walata region due to increasing aridification may have reverted to largely pastoral lifeways and eventually reached the Mema and Inland Niger Delta in the early to mid-first millennium BC (MacDonald 2011; MacDonald et al. 2009). By the time they settled in these locations, recently made accessible for occupation due to the reduction of floods and likely somewhat resembling the Saharan aquatic environments of previous eras farther north, they had added domestic African rice, dwarf goats, and iron production to their economic systems (Bedaux et al. 2005; McIntosh 1995; Murray 2005). It is this economic foundation that laid the way for the subsequent development of urbanism at Dia (Bedaux et al. 2005) and later Jenne-jeno (McIntosh 1995) starting in the latter centuries BC. In the Inland Niger Delta, societies utilized intricate herding strategies to continue their production of cattle breeds in a more humid location (MacDonald 1995; Stone 2018). Similar movements out of Mauritania may have led to the development of agropastoral communities along the Senegal River, where early experiments with copper-based economies occurred in the second and first millennia BC (Coutros 2017; Deme and McIntosh 2006). MacDonald and MacDonald's (2000, 2016) preliminary analyses of age profiles on slightly later non-dwarf cattle and sheep/goats along the Senegal River suggest that in these early periods, livestock production may have followed a herd-maximization strategy that involved infrequent liquidation of younger individuals.

The adoption and incorporation of domestic animals and plants into societies in the savanna and forest/savanna within the Niger Bend is less well understood due to a lack of faunal and botanical preservation at many sites as well as limited archaeological research in wetter parts of West Africa (see Dueppen 2012a; Dueppen and Gallagher 2013). Humidity-related diseases had significant influence on the adoption of domestic animals in these regions. Areas of West Africa with more than 500 mm of annual rainfall and adequate brush are home to tsetse fly–transmitted sleeping sickness (trypanosomiasis), as well as a variety of other endemic diseases that affect livestock and dog production (see discussion below). The maintenance of stable breeding populations of domesticates therefore required the development of disease-tolerant (commonly mislabeled as disease-resistant) breeds to mediate the ecological conditions.

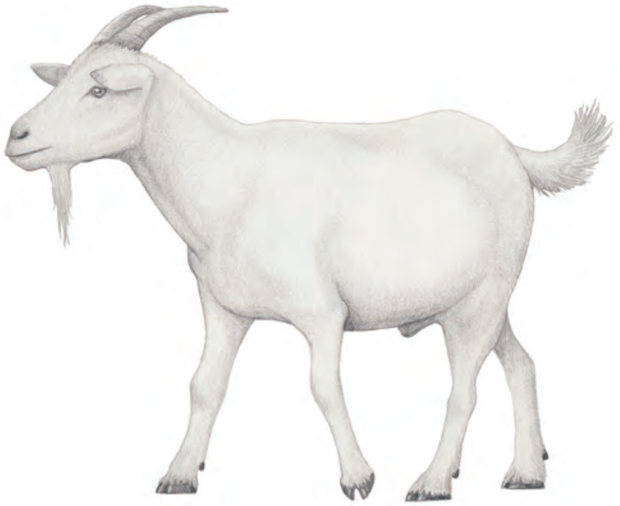

Figure 3.3. Dwarf goat (*Capra hircus*). *Illustration by Ethan Schmunk.*

Today, areas of West Africa with endemic sleeping sickness are home to small (West African shorthorn) and medium-size (N'dama) taurine cattle breeds thought to derive from ancient stock used by populations throughout the region (see discussions in Dueppen 2012a, 2012c; Linseele 2007; MacDonald and MacDonald 2000) (Figure 3.3). Tsetse-tolerant sheep and goat breeds also tend to be small in size (for example, the West African dwarf goat) and associated with the wetter parts of West Africa. The humidity of these zones affects the ability of large-bodied livestock to remain cool in tropical heat, such that the consistent clinal variation in cattle, sheep, and goat size from south to north may be related to a poorly understood combination of temperature maintenance and the characteristics of disease-tolerant breeds (Figure 3.4).

Given dynamic shifts in rainfall zones throughout the Holocene that saw savanna animal distributions extend quite far north into the Sahara, it is likely that selection for some of the livestock adaptations associated with disease

Figure 3.4. Selected sites with evidence for domestic sheep. Data from Gestrich and MacDonald 2018; Huysecom et al. 2009a, 2015; Linseele 2007; MacDonald 1995b; MacDonald and MacDonald 2000, 2016; MacDonald et al. 2009, 2017; Manning 2008; Togola 2008. *Cartography by InfoGraphics Lab, Department of Geography, University of Oregon.*

tolerance had begun during the mid-Holocene. Fairly small cattle are already found at Adrar Bous by the third millennium BC (Clark, Carter et al. 2008; Gifford-Gonzalez and Parham 2008), and, as mentioned, in the Tilemsi Valley, humid conditions that also allowed the presence of cane rats may have led to the use of disease-tolerant breeds in the third and second millennia BC (Finucane et al. 2008; Manning 2008; Manning and Fuller 2014). The question then is not necessarily the development of disease-tolerant breeds, which was likely an extension of a long-term process of selection spanning thousands of years, but rather the variable productivity of said breeds toward the wetter, more humid parts of West Africa, which may have influenced decisions around adoption.

Disease-tolerant breeds are less likely to be the primary focus of subsistence economies as they tend to have lower reproduction rates and low milk yield, resulting in extremely limited to nonexistent dairy today. Consequently, in the ethnohistoric accounts of the southern savanna and forest/savanna margins (see chapter 1), livestock have tended to play less direct subsistence roles, primarily limited to consumption in a few large-scale events each year and use to generate fertilizer for gardens and agricultural fields (Capron 1973; Cremer 1924, 1927; Nebie 1988; Savonnet 1959, 1976), although the importance of fertilizer should not be underestimated. However, despite their different subsistence contributions in societies where grain or yam production is economically and ideologically central, livestock frequently held a significant social role (Cremer 1924, 1927).

On the northern margins of what is today the savanna, local diversity and flexibility indicating differences in the nature and focus of livestock production typify second millennium BC economic strategies. The first evidence for domestic livestock within the Niger Bend is found at Windé Koroji Ouest, a site complex that contained material culture broadly similar to the Tilemsi Valley assemblages at Karkarachinkat (MacDonald 1996a; MacDonald et al. 2017). Here, on the interstices of the Inland Niger Delta and interior plateau of central West Africa, a community had settled, at least seasonally, by the end of the third or start of the second millennium BC. The occupants initially kept sheep, and later cattle and goats, and cultivated domestic millet in a woodland/savanna landscape, as indicated by the hunting of animals such as the cane rats and forest duikers typical of wetter regions today. The local landscape may have posed challenges for a community heavily invested socially and economically in animal husbandry (including large cattle). Consequently, the seasonality of Windé Koroji Ouest's occupation may reflect the use of transhumance to mediate the potential difficulties of a setting with endemic livestock diseases. Excavations in the extreme north of Burkina Faso at Tin-Akof and Dori indicated that in the second millennium BC, millet was incorporated into economies. But if livestock were present, they could have been transhumant, as no confirmed remains have been identified at these sites (Breunig and Neumann 2002; Linseele 2007; Neumann et al. 2000).

In many of the above cases, populations with livestock and millet likely migrated southward from the Sahara as environments increasingly aridified in the third and second millennia BC. However, farther south, adoptions were more limited and need to be contextualized with the agentive practices of local populations of farmers and foragers in the savanna and forest/savanna margins. These communities had already begun experimenting with broad-spectrum economic adaptations involving new technologies (pottery, ground stone) and likely domestic plant cultivation and management (millet, yams, oil palm, shea), and they were well positioned to add new livestock resources to their diversified economies (see Dueppen 2012a). While it is possible that occasional migrations of agropastoral societies into deeper parts of the savanna occurred, the difficulties of livestock husbandry in the zone would have conflicted with and necessitated changes in long-held pastoral ideological beliefs.

The presence of cattle and goats at Kintampo culture sites of central and northern Ghana makes it clear that disease-tolerant livestock hardy enough to live in wet savanna and forest regions were available by latest the mid-second millennium BC. While the presence of goats (but not sheep) is widely accepted, the identification of Kintampo cattle has been debated heavily. Some scholars (e.g., Gautier and Van Neer 2005; Stahl 1986; see also Carter and Flight 1972) have recognized domestic cattle bones based on context and morphometrics, while others (e.g., Watson 2005, 2010) have questioned identifications of cattle. Watson (2010) suggests that cattle cannot be definitely identified as present in Ghana until the early first millennium BC. Morphometric comparisons (Dueppen 2012c) between Kintampo cattle, cattle from first and second millennium AD sites in Ghana, and cattle from Kirikongo found that some Kintampo bones compare favorably with later archaeological cattle found in the general region, strengthening the likelihood of their presence. It would be unsurprising if cattle were present in some Kintampo sites, as the Kintampo was a time of economic and social experimentation, with substantial open-air sites with wattle and daub architecture, material culture densely deposited in many locations, at least millet cultivation, and likely also yams (Agorsah 1986; Anquandah 1993, Casey 2000; Davies 1964, 1973, 1980; Gavua 1985; Logan and D'Andrea 2012; Shinnie and Kense 1989; Stahl 1985, 1986; Watson 2005, 2010). However, due to a variety of factors, including continued use of rockshelter sites and low frequencies of domestic animals relative to wild resources, most scholars agree that Kintampo economies emphasized hunting, fishing, and wild plant management, with livestock husbandry and cultivation playing secondary roles. As discussed in detail in chapter 8, Kintampo sites are relatively poorly dated, and if cultural practices of deposition were similar to those at Kirikongo (that is, rituals with a hunting component), I suggest that we may be underestimating the role of domesticates at Kintampo sites. The presence of even a few identified livestock suggests sustainable local breeding populations, and the social or religious roles of these animals may have been significant.

Given the data from the northern Niger Bend and the Kintampo, there is a high probability that cattle and small stock may have been in use at second millennium BC sites where the fauna did not preserve. Rim II in Yatenga, Burkina Faso, is a deeply stratified site containing extensive ground stone and ceramic industries resembling those of farmers

(Andah 1978). Interestingly, microliths are absent from the assemblage, and the lack of hunting tools may suggest a focus on livestock in the site economy. A similar situation exists more broadly in the Nok region of Nigeria, where settlement patterns may indicate dispersed farming homesteads, possibly with livestock, from the second and first millennia BC (Breunig 2014; Breunig and Rupp 2016).

Recent analyses from the Gobnangou region of southeastern Burkina Faso examining late integration of domesticated animals reveal some of the potential rationales for adoption and provide insights relevant to modeling earlier adoption events (Dueppen and Gallagher 2013). The Gobnangou region contains a unique 4,000-year record of faunal and botanical remains, primarily from Pentenga Rockshelter (3000 BC–AD 500), and two late first millennium AD stratified early agricultural sites along the Koabu seasonal drainage that extends southward from the escarpment (Dueppen and Gallagher 2013; Frank et al. 2001); there is also a small rockshelter faunal assemblage from Yobri (Millogo 1993). Pentenga's fauna indicates that the site was likely a rainy season camp that was part of a highly mobile foraging system with a broad-spectrum adaptation. These microlith- and ceramic-using groups collected and hunted both aquatic and terrestrial resources, with a potentially significant investment in aquatic resources. The first evidence for the use of domesticates in this region dates to the second half of the first millennium AD at two small mounded sites of iron-using populations away from the escarpment in the adjacent plain.

Current data suggest that these late first millennium AD households were likely sequential occupations. The household at the earlier site (MAS541) adopted millet and chickens and maintained long-distance logistical expeditions for hunting and fishing. Shortly thereafter, inhabitants at MAS502, a few kilometers away, adopted livestock (cattle and sheep/goats) and reduced logistical expeditions to fairly localized circumstances. I and Gallagher (2013) argued that at MAS541, logistical expeditions served to maintain social connections in a newly sedentary landscape of highly dispersed farming compounds. These became less necessary with the adoption of livestock and their potential use for maintaining connections at ceremonies (weddings, funerals) and other rituals that brought people together. Consequently, while sedentary life in the Gobnangou was not economically dependent on livestock, the new social dynamics of sedentary societies were facilitated through their inclusion.

Overall, livestock facilitate complexity in communities with diverse social and political relationships, similar to the roles they play in ethnohistoric social systems. As exemplified by the Gobnangou data, reliance upon grain or yam agriculture fundamentally changed logistical organization and the ability to maintain social relations seasonally through shared activities. The role of livestock in maintaining social relations likely inevitably led to their deployment as a political tool, as is the case at Kirikongo. While not yet the subject of extensive archaeological scholarship, ritual roles for livestock may also have deep roots in central West Africa, as indicated by figurines, ritualized burials (Takezawa and Cissé 2017), the use of cattle buccrania in tombs at Bandiagara, Mali (Huizinga et al. 1979), and the evidence for domestic animal sacrifice at Kirikongo discussed in this volume.

Animal Adoptions and Changing Economies in Early Iron-Using Communities (Chickens and Dogs)

Throughout this book, I argue that chickens were present in West Africa by at latest the early first millennium AD and likely by the late first millennium BC. In most areas, chickens would have been quickly adopted, as they enabled frequent ritual sacrifice, diverse economic transactions, and daily meat consumption in sedentary farming communities. The ritual importance of chickens in the ethnohistoric record may be rooted in these historic roles, which built on deeper histories of what would have been highly sociopolitically charged sacrifices of bovids, which given their low productivity in the savanna can be inferred as occurring infrequently and only at the time of important events.

Chickens are different from other domestic animals such as livestock or dogs due to their small size, low labor investment, and high fecundity in the tropical regions of West Africa. Chickens are unique among the domestic animals of sub-Saharan Africa as they are the only non-African-derived domesticates that were already adapted to the humid tropical zone upon arrival. This ecological adaptation may have allowed a rapid adoption process, and the ease of chicken adoption as an economic base in wetter West Africa may have substantially changed lifestyles. Unfortunately, the history of chickens in sub-Saharan Africa, and indeed their general domestication history, remains poorly understood. Current scholarship believes that chickens may not have been domesticated until the late third or early second millennium BC; they rapidly expanded across Eurasia in the mid- to late second millennium BC, eventually reaching Europe during the first millennium BC and/or AD (Eda et al. 2016, 2019; Huang et al. 2018; Pitt 2017; Redding 2015). While it is known based upon iconographic evidence that chickens were available in New Kingdom Egypt as an exotic animal, until recently, more substantial evidence for African chickens was lacking (see Dueppen 2011; MacDonald 1992, 1995a). New research indicates that domestic chickens were kept in the highlands of Ethiopia by the early first millennium BC and may have played a role in changing northeastern African economies at this early date (Woldekiros and D'Andrea 2017; Woldekiros et al. 2019).

Evidence for early chickens in Africa outside of northeastern areas bordering on Eurasia is scarce (Figure 3.5). The earliest sub-Saharan African chickens outside of Ethiopia are those uncovered at Kirikongo, where probable bones and eggshell date from the start of the first millennium AD, with confirmed elements by the mid-first millennium AD (Dueppen 2011). It is therefore probable that chickens were available to some communities in West Africa starting in the early first millennium AD, and since eggshell and bones occur in the undated lowest levels at Kirikongo, chickens could in fact date to the last centuries BC. From current archaeological data, historical linguistics (Williamson 2000), and emerging evidence for extensive connections between savanna and savanna/forest farmers from Burkina Faso to Nigeria (see discussions in chapter 8), it is likely that chickens in the Mouhoun Bend did not derive from the north but rather had their origin in east–west interaction zones south of the Sahara that ultimately extended to Ethiopia.

Chickens share with dwarf livestock a tendency to be kept in sedentary communities, and unlike bovids, they are consumed more frequently in everyday life. In the Gobnangou adoption case above (Dueppen and Gallagher 2013), chickens may have been a simpler domestic animal to adopt once available, as they not only served as a common food source (and a more frequently available sacrificial animal) but also did not create inequities as easily as cattle and goats. Chickens arrived after the widespread shift to metallurgical economies and likely enabled more complex economic transactions as a smaller-value transferable resource in new and larger settlements. Moreover, they have played a significant role in the emergence of religious systems in which sacrifice is a constant central practice beyond important events. Archaeological data from throughout Kirikongo's occupation (Dueppen 2011, 2012a, 2012b) and from other first millennium AD sites, such as Tongo Maaré Diabal (Gestrich and MacDonald 2018), support common chicken sacrifice.

Unlike earlier evidence that suggested chickens arrived in the densely populated urban environments of the Inland Niger Delta first (MacDonald 1992, 1995a, 1995b), there is a possibility that chickens were initially adopted in the more rural surrounding regions of western Burkina Faso or areas of Mali. This potentially slightly delayed adoption could be related to an ideological focus on cattle (with deep roots; see MacDonald 1998) or to the extreme abundance of fish as an everyday food source. I would suggest that the eventual adoption of chickens and dwarf cattle in the late first millennium AD at Jenne-jeno may reflect the strengthening of interactions with areas to the south and east and possibly changing ideologies surrounding domestic animals in the Inland Niger Delta (see also Dueppen 2012c).

The history of dogs in sub-Saharan Africa is not well understood, in part due to the difficulties in separating the bones of domestic dogs from those of wild jackals. Peter Mitchell (2015) has recently synthesized the available evidence and argues that due to the presence of diseases (that is, sleeping sickness and diseases shared with wild canids), dogs may not have been adopted in savanna and forest environments until the first millennium BC. While I argue that chickens likely arrived from east–west connections, dogs may have entered central West Africa from the north and west.

Dogs were present in the third and second millennia BC in drier areas like the Tilemsi Valley (Manning 2008) and the Aïr, where there is a series of famous dog burials (Clark, Agrilla et al. 2008; Gifford-Gonzalez and Parham 2008; Paris 2000) (Figure 3.6). However, they have not been recovered from contemporary sites within the Niger Bend such as Windé Koroji Ouest (MacDonald et al. 2017)

Figure 3.5. Selected sites with evidence for domestic chickens. Data from Bedaux et al. 1978; Bouchud 1983; Dueppen 2011; Dueppen and Gallagher 2013; Gestrich and MacDonald 2018; Huysecom et al. 2015; Linseele 2007; Linseele and Wouters 2019; MacDonald 1992, 1995a, 1995b; Manning and MacDonald 2005; Shinnie and Kense 1989; Thiaw 1999; Togola 2008; Watson 1999. *Cartography by InfoGraphics Lab. Department of Geography, University of Oregon.*

or Corcoba (Linseele 2007), nor in the Kintampo sites (Watson 2010). Beginning in the mid-first millennium BC, dogs are found in northern parts of central West Africa, including central and eastern Mali (MacDonald 1995b; Ozainne 2013), and they likely spread quickly to neighboring regions, such as the Mouhoun Bend, where dogs are found at Kirikongo by the early first millennium AD. The early focus on dogs near the Inland Niger Delta may be related to their use facilitating seasonal transhumance of cattle. At Nin-Bere, a mid-first millennium BC iron-using site in the Seno Valley of Mali near Bandiagara, there is similar evidence for livestock and dogs (Ozainne 2013). In these regions, dogs were integrated into ritual systems based on recent data for ritual deposition of dogs during the first millennium AD at Tongo Maaré Diabal in Mali (Gestrich and MacDonald 2018). At Kirikongo, dogs were likely sacrificed and consumed from the start of the first millennium AD and clearly played a role in funerary traditions. Ritual use of dogs and dog parts is also known from mid-second millennium AD contexts in central Ghana at Banda, where they appear in pits (Stahl 1999, 2008).

There is potentially significant variability in dog use across the region. In the eastern Niger Bend, dogs are not confirmed in northern Burkina Faso until the late first millennium AD (Linseele 2007) and are absent from first and second millennium AD sites in the Gobnangou and Mekrou regions (Dueppen and Gallagher 2013; Linseele 2017). The links between different ecological and social settings and the role of dogs, which typically contribute labor and protection (guarding) and in some cases are consumed, is poorly understood. It is possible that in the eastern Niger Bend, dogs were not needed due to a lack of transhumant livestock, and dogs at Kirikongo and in Ghana would likely not have been used primarily in this fashion.

Figure 3.6. Selected sites with evidence for domestic dogs. Data from Deme and McIntosh 2006; Gestrich and MacDonald 2018; Huysecom et al. 2015; Linseele 2007; Linseele and Wouters 2019; MacDonald 1992, 1995b; MacDonald and MacDonald 2000, 2016; MacDonald et al. 2009; Ozainne 2013; Paris 2000; Shinnie and Kense 1989; Thiaw 1999; Togola 2008; Watson 1999. *Cartography by InfoGraphics Lab. Department of Geography, University of Oregon.*

By the turn of the first millennium AD, domestic animal–based economies are found throughout large areas of central West Africa, although livestock uses varied depending upon cultural and environmental settings. Most of our case studies are from mounded tell sites with extensive evidence for agriculture, earthen architecture (shifting from wattle and daub in the south), and iron-based technologies. For societies in the savanna regions, sacrificial systems as we know them may have emerged at this time due to the arrival of the chicken. However, in some highland zones of West Africa, societies didn't adopt domesticate-based economies until the mid- to late first millennium AD. For example, data from the Monts Manding of Mali (MacDonald 1997) and the Gobnangou (Dueppen and Gallagher 2013; Frank et al. 2001; Gallagher 2010, 2021) attest to the persistence of broad-spectrum foraging adaptations even as these groups interacted with the expanding populations of farmers.

Despite the increasing emphasis on domestic animals, hunting and fishing persisted as culturally and calorically significant components of economies in central West Africa, although not much is known about specific practices during the first millennia BC and AD. In some parts of the savanna, hunting may have become less important after the adoption of the chicken, as indicated in the first millennium AD Gobnangou and Mouhoun Bend regions (Dueppen 2012a; Dueppen and Gallagher 2013). In contrast, in the Inland Niger Delta at Jenne-jeno, hunting seems to have been relatively important until game became scarce (whether due to ecological change or overhunting) (MacDonald 1995b). In northern Burkina Faso, where both hunted animals and fish were less commonly available, first millennium AD economies may have been more focused on domestic sheep, goats, and cattle, with chickens also possibly adopted later than farther south, perhaps due to an ideological focus on seasonally mobile cattle (Linseele 2007).

In the Inland Niger Delta and more broadly in floodplain and riverine environments, fish may have been common and more central economically than domesticates in sedentary economies. As mentioned above, in the Inland Niger Delta, the high abundance of fish may have facilitated sedentary economies (along with rice cultivation), rendering the chicken relatively less attractive initially and slightly delaying its adoption. At Kirikongo, fish were symbolically and economically central throughout the occupation, and Kirikongo has evidence for the smoking of particular taxa. However, the lack of extensive Mouhoun floodplains could have limited the scale of fish preservation in comparison to the Inland Niger Delta. Overall, I suggest that the role of preserved fish storage has been underestimated for many early sedentary West African communities and may have been relatively more important than hunting in the first millennium AD.

To summarize, the role of domestic animals in sedentary farming life in the first millennia BC and AD may have varied significantly in central West Africa. In the northern Niger Bend, pastoral products may have been more central, as herds of large livestock could be maintained without employing transhumant strategies. The Inland Niger Delta was quick to incorporate dogs but possibly slower to adopt chickens and small cattle due to the predominance of fish and a historically situated ideological focus on prior breeds of cattle maintained through complex mobilities. Finally, in the Voltaic drainages, an early adoption of chickens and dwarf bovids (in some areas in combination with preserved fish) resulted in heavy reliance on domesticates and lower frequencies of hunting.

Changing Interregional Economies and New Domesticates in the Late First Millennium and Early Second Millennium AD (Horse and Donkey)

By the late first millennium and early second millennium AD, most societies in central West Africa had incorporated a full suite of domestic animals, including chickens, dogs, cattle, sheep (including dwarf varieties in the south), and goats. As a result, regional differences in breed distributions observed earlier decreased. For example, chickens were now widely available throughout the northern parts of West Africa, Jenne-jeno adopted dwarf cattle, and Kirikongo's first evidence for sheep, a dwarf variety, appeared during this era. To these fundamental resources were added new domesticates (horse, donkey), whose uses supported economic intensification and demonstrations of status and power.

The earliest horse in West Africa was identified at Akumbu in the Mema region of Mali and dates to the mid- to late first millennium AD (Togola 2008). In the early second millennium AD, both donkeys and horses become more widely distributed in northern parts of West Africa, although they never occur in large numbers (see discussions in MacDonald and MacDonald 2000, 2016). Some scholars (see discussions in MacDonald and MacDonald 2000) believe that domestic equids may have greater antiquity than indicated archaeologically, invoking the possibility of a small disease- and heat-tolerant horse breed developed by the first millennium AD. However, the poor faunal preservation in wetter parts of West Africa hinders visibility.

Peter Mitchell (2017, 2018) has explored the environmental (including epidemiological), constraints on equid production in sub-Saharan Africa. Horses had shortened life spans from disease, and while donkeys fare better than horses in the local environments, they are by no means more numerous in archaeological sites. The timing of the arrival of horses and donkeys corresponds to a period of population growth and the establishment of larger communities and polities in West Africa. Horses were closely tied to prestige, and Mitchell argues that it is likely that part of the social value of ethnohistoric equids is derived from the exotic origins of imported stock as a symbol of status and power (see also Law 1980). Donkeys would have expanded the ability to move goods away from the riverine transport systems that likely had great antiquity in the region. It seems likely that donkeys would have been adopted widely for their economic utility, which makes it possible that their low archaeological visibility is the result of formation processes, as donkeys may not have been frequently consumed.

Hunting patterns changed as well during this period, with an increase in hunting due to changing social dynamics and possibly a shift toward new hunting goals beyond primarily local consumption of meat and secondary products. Economies were more specialized in places by the late first millennium AD, with simultaneous labor tasks relieved through interdependent economies. For example, specialists were likely responsible for increasingly large-scale metal production in central Burkina Faso (Serneels 2017; Simporé 2009), specialized iron production at Kirikongo (see below) and perhaps Tongo Maaré Diabal (Gestrich and MacDonald 2018), a variety of tasks in urban environments in Mali (R. McIntosh 2005; S. McIntosh 1995), and highly complex artistic and industrial activities developed around metals and glass in Nigeria (Babalola 2017; Babalola et al. 2017). An element of the social landscape that may have emerged in the second millennium AD within the contexts of specialized economies is mobile pastoralists (Linseele 2010, 2013).

Within this regional context, whole communities may have specialized in wild animal products. For example, from the eleventh through the fourteenth centuries AD, at the site of Diouboye on the Faleme River of eastern Senegal, inhabitants specialized in game hunting with a clear focus on producing coveted animal products such as skins, ivory, and leather (Dueppen and Gokee 2014; Gokee 2016). The specialized nature and large scale of these economic practices included the preparation of skins and leather, as evidenced by tanning pits and production and use of a lithic assemblage for scraping hides. In central West Africa, animal products may have been traded through Gao, Mali (Insoll 1995), and the broader demand for animal products may have led to the first hunting of animals that had previously not been targeted, such as crocodiles and possibly elephants, at the sites of Oudalan in the early second millennium AD (Linseele 2007). Some of the hunted animals in the Gobnangou region (such as the serval) may have been targeted for trade (Dueppen and Gallagher 2013), and it is possible that the long duration of foraging populations

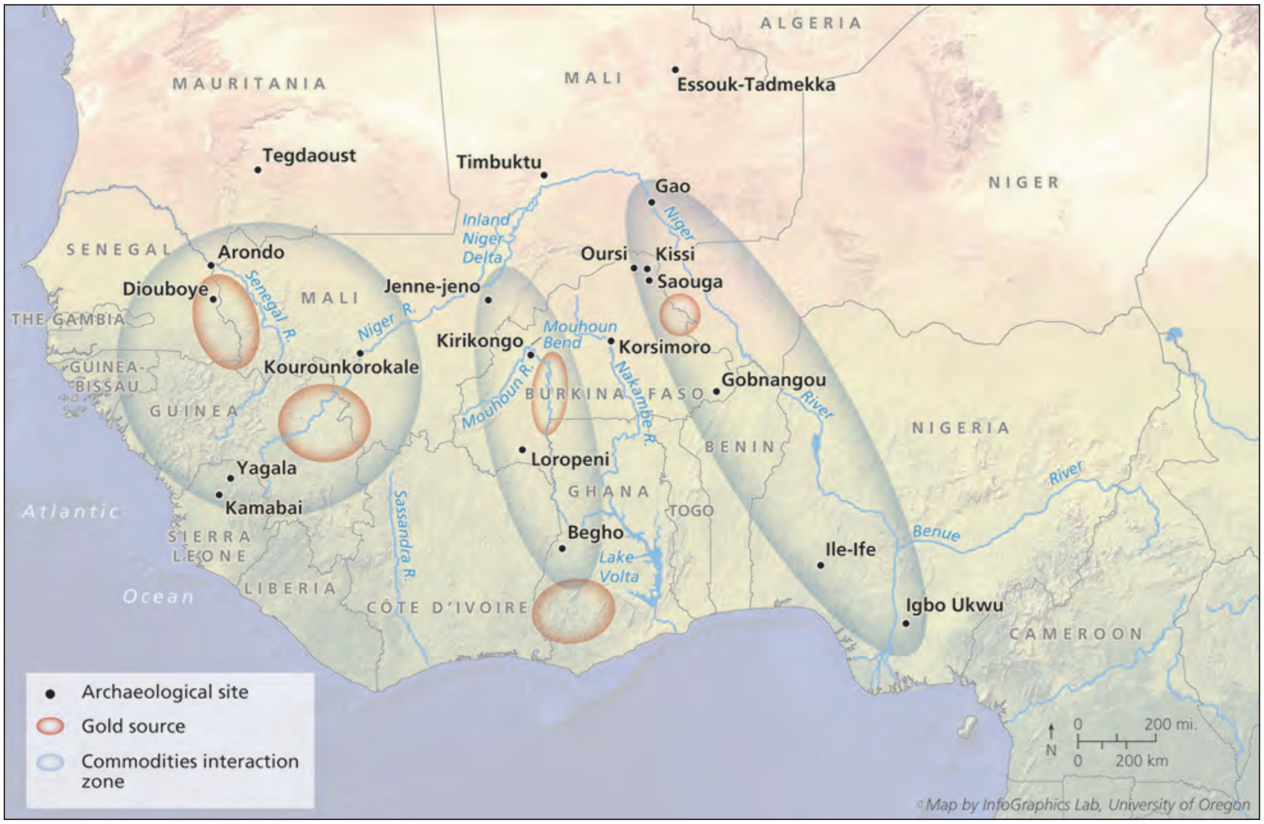

Figure 3.7. Selected interregional commercial interaction zones in West Africa ca. AD 900–1500. *Cartography by InfoGraphics Lab. Department of Geography, University of Oregon.*

in highland zones more generally was related to production of desired products. At Kirikongo, large-scale hunting occurred only after the decentralization of power and was used to create and reinforce new collective identities, similar to ethnohistoric accounts where the scale and nature of hunts reflect social divisions, communal identities, and even political dynamics. In the fifteenth century AD, these hunts changed to more closely resemble practices at sites like Diouboye, and there was evidence for increased production of animal products, possibly related to the arrival of trading diasporas in the region (Figure 3.7).

Fishing likely remained a primary economic practice throughout the region, and it is possible that with the increasing interconnections between the Inland Niger Delta and other savanna areas, preserved fish was among the traded commodities. Ethnohistorically, preserved fish is an important trade item (see Essuman 1992), and its trade volume from particular areas of West Africa may have been higher in the past, since many of the reservoirs used for fishing throughout the savanna region were constructed in the twentieth century.

Enigmas (Guinea Fowl and Cats)

Two significant domestic animals, the cat and the guinea fowl, were not included in the discussions above due to the poor evidence for the timing and processes of their domestication and/or introduction to and adoption in central West Africa.

Today, domestic guinea fowl typically live alongside domestic chickens in central West African communities and are integrated into local economies and sacrificial systems. However, little is known of their domestication history. Separating domestic from wild guinea fowl in the archaeological record is complicated, since the natural habitat of the wild species is distributed widely in the region. Domestic individuals are quite distinct from their wild counterparts due to their distinctive plumage and higher rate of egg production, but morphological studies are yet to be done to distinguish osteological features that can be used to definitively identify them from archaeological remains. Guinea fowl are only rarely found in archaeological sites, and their low frequency may indicate that the majority of these remains are from wild species (Figure 3.8). One possible exception is along the Middle Senegal River Valley, where MacDonald and MacDonald (2000) mention evidence for eggshell in the thickness range of guinea fowl from the first millennium AD. This could indicate the hatching of chicks in the community but may also be a result of raiding wild bird nests. At Kirikongo, guinea fowl first appear in the assemblage in the second quarter of the second millennium AD. I argue that the possible arrival of domestic guinea fowl in this area occurred during a time of increasing interaction with neighboring Mali and may support a western origin for domestic guinea fowl in West Africa, as they may have been domesticated in the Middle Senegal River Valley.

As with guinea fowl, domestic cats are very common in West Africa today (see Happold 1987), yet their history is very poorly known and is complicated by difficulties in distinguishing domestic cats from wild cats. While wild cats are not generally hunted for food (although some ritual consumption occurs), they have historically been targeted for their furs, and wild cats do occur in archaeological assemblages. The origins of West Africa's domestic cats may date to expansions in sedentary life and more substantial settlements after the second millennium BC (with increasing intensification after the onset of iron-working) due to the presence of grain storage and the creation of commensal spaces. Alternatively, domestic cats may have been introduced from North Africa through trans-Saharan trade in the first or early second millennium AD, in which case they would appear first at trade entrepôts and cities. Assessment of their histories waits for the development of clear osteological criteria to separate domestic from local African wild cats, the use of aDNA on archaeological specimens to see if local cats have exotic origins, and/or the possible use of isotopic techniques on cat remains from archaeological sites to determine if they were hunting within human settlements.

Situating Kirikongo in Broader Savanna Traditions

In conclusion, an overarching theme in this chapter is that the savanna region of West Africa was a rich environmental zone resulting in a variety of potential choices to societies over time. The environmental richness may have shaped the nature of domestic animal adoptions and historic uses, as it simultaneously harbored endemic illnesses affecting

Figure 3.8. Selected sites with evidence for guinea fowl. Data from Deme and McIntosh 2006; Dueppen and Gokee 2014; Gestrich and MacDonald 2018; MacDonald and MacDonald 2016; Linseele 2007; Stahl 1985. *Cartography by InfoGraphics Lab. Department of Geography, University of Oregon.*

livestock productivity and dogs precisely *because* of the taxonomic richness that provided societies many subsistence options. Consequently, domestic taxa were likely adopted despite lower productivity as they provided social and political options to communities that wild animals did not, as they were transferable, storable, and sacrificable resources. What is generally clear from ethnohistoric cases is that subsistence in the wetter savannas was largely rooted in staple grains and yams, with animal uses reflecting dynamic social, economic, and political choices over time. It is with this focus on choice that I situate the zooarchaeological analysis at Kirikongo, where there were dynamic transformations in domestic and wild animal uses over time. These are not easily explained by simplistic environmental explanations and rather reflect choices among a range of potential options in a rich ecosystem. However, the social and economic roles of wild animals, as points of intercession with divinities, as the locus of collective labor cross-cutting communities, and as valued commodities in local and interregional systems have yet to be explored due to the focus in previous studies on documenting domestic animal histories in the region.

CHAPTER 4

THE ANIMALS OF KIRIKONGO

The zooarchaeological record of Kirikongo is fairly unique in source, context, and characteristics. It represents one of the largest assemblages excavated in the wetter savanna region of West Africa (between the 900 and 1,200 mm rainfall isohyets), and it is one of the few savanna faunal assemblages within the Niger Bend from a site not in the Niger River catchment. Consequently, Kirikongo complements other well-studied assemblages from West Africa and provides a different perspective on ecology and potential cultural options. Like assemblages from Jenne-jeno and sites in northern Burkina Faso, Kirikongo's assemblage spans almost a millennium and a half, allowing long-term views of the community. The characteristics of the assemblage itself indicate that it derives from a very different set of cultural and natural formation processes. At many excavated sites in West Africa, the rate of identifiable bone is typically between 5 and 20 percent (e.g., Linseele 2007; Stahl 1999). In contrast, at Kirikongo, long bone fragments and bones identifiable only to the level of mammal/bird/fish constituted only 39.7 percent of the assemblage (1,646 out of 4,149 fragments).

As discussed throughout the book, this high identification rate is the result of a cultural formation process that created the patterned nature of recovered remains. Fauna in general was recovered from discrete contexts, in specific clusters of diverse bones that in some cases were even spatially arranged. Overall, architectural units were kept quite clean during use, a pattern also seen in flotation, and preserved fauna derived from events that took place either at the end of use of an architectural unit or in association with the construction of mortuary monuments. At these events, people slaughtered and/or butchered animals in a location, cooked and consumed *some* parts, and deposited them in the concentrations. However, the majority of the carcass was distributed from the locus, and certain nonfood parts may have been removed for additional ritual purposes. Consequently, the leftover parts interred (and recovered in archaeological excavation) were often related to initial dismemberment and/or resulted from consumption of a limited set of parts. There were very few of the unidentifiable bone splinters that characterize faunal assemblages at other sites. (For a contrasting example, see my current work at Diouboye, Senegal [Dueppen and Gokee 2014].)

Given the small fragment size, the rate of identifiability varied according to the size of the animal, with smaller taxa (for example, rodents and small bovids) having higher identification rates than larger animals. The distribution of certain parts of the carcass affected the low percentage of nonidentifiable bone fragments. For example, throughout all taxa (including mammals, fish, birds, and reptiles), the non-cranial axial skeleton (ribs, vertebrae, and so forth) was highly underrepresented, and the nonidentifiable bone was largely derived from fragments and chips of appendicular skeletal elements, in particular parts of the upper appendages. These patterns were not due to preservation, as faunal remains throughout the site were in excellent condition, with fragile avian elements, including 229 fragments of eggshell, recovered from most contexts. The excellent preservation was aided by recovery from discrete contexts with little bioturbation and minimal attrition due to the construction of strong pavements that sealed strata throughout excavations and were likely constructed shortly after deposition of the bones. Even where carnivore or rodent damage affected bones, it was minimal and of short duration. That the underrepresentation of vertebrae and ribs did not derive from taphonomic processes is further suggested by the presence of a limited number of contexts in which these elements did appear in excellent condition.

The Kirikongo faunal assemblage is one of the most diverse assemblages ever analyzed in West Africa, spanning at least 59 taxa and categorized as 59.2 percent mammal (n = 2,458), 18.2 percent avian (n = 757), 16.2 percent fish (n = 672), 3.1 percent reptile and amphibian (n = 127), 2.6 percent freshwater bivalve (n = 108), and 0.6 percent terrestrial mollusk (n = 27) (Figure 4.1 and Table 4.1). As described below, Kirikongo's assemblage has strong representation of humid savanna taxa but lacks Sahelian taxa such as red-fronted gazelle, foxes, and so forth. Domestic animals likely represent around half, or slightly less than half, of the entire faunal assemblage, as domestic sheep and goats comprised two-thirds of the small bovid size class that represents close to a third of the mammalian remains. In addition, the majority of avian remains were likely derived from domestic chicken from the start of the site occupation, and dogs and cattle were also present. However, it is clear that wild resources played a large role in the community and, as I will argue, in the ritual and symbolic lives of Kirikongo's occupants.

The majority of animal remains were identified while I was a predoctoral fellow at the Smithsonian Institution's Archaeobiology Program (National Museum of Natural History) with use of its comparative collections. Additional identifications were made using collections housed at the University of Michigan's Museum of Anthropological Archaeology and Museum of Zoology, and the Field Museum of Chicago. In addition, in conjunction with comparative collections I employed published works that have established identification criteria for specific families, genera, and species (Bochenski and Tomek 2009; Gayet and Van Neer 1990; Hanot and Bochaton 2018; Linseele 2007; MacDonald 1992; Peters 1986a, 1986b; Van Neer 1989; Zeder and Lapham 2010; Zeder and Pilaar 2010). Of particular note, domestic sheep and goats were analyzed in the lab, where Melinda Zeder and Suzanne Pilaar were concurrently testing criteria to differentiate sheep and goat mandibular dentition.

Bones were recorded individually, and care was taken to assess the level of preservation, evidence for burning (including color), presence of cut marks, and carnivore or rodent gnawing marks. All measurable elements were measured. In addition, for all but one excavation unit, individual fragment size was measured. Larger bone fragments clearly derived from upper appendicular elements (radius, humerus, femur, tibia) but unable to be identified to a specific element were designated to a size class according to curvature and cortex thickness (for example, small bovid long bone fragment) (Figure 4.2 and Table 4.2). Although the fragments are quantitatively discussed as nonidentifiable bone, patterns in this parallel data set concur extremely well with those in the identifiable bones and are included as an additional data point in some discussions, as they are relevant to understanding some very generalized (lower-precision but still of use) patterns in body part distribution. As detailed in discussions by Gifford-Gonzalez (2018), the specificity of identification required to answer zooarchaeological questions depends

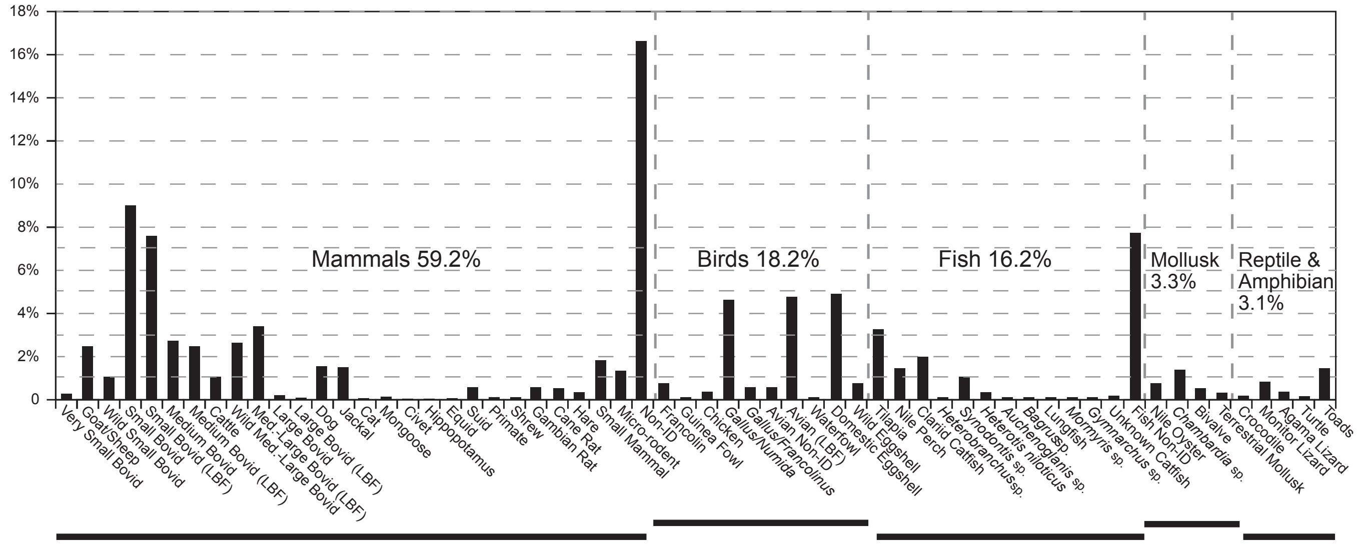

Figure 4.1. The Kirikongo faunal assemblage (n = 4,149)

Table 4.1. The Kirikongo faunal assemblage

English Common Name	Taxonomic Identification	Unit A	Unit B	Unit C	Unit E	Yellow I	Yellow II	Red I	Red II	Red III	Red IV	Total
Maxwell's duiker	*Philantomba maxwelli*	0	0	1	0	0	1	0	0	0	0	**1**
Red-flanked duiker	*Cephalophus rufilatus*	0	1	0	0	0	0	0	0	0	1	**1**
	very small bovid	0	4	6	0	0	4	2	0	4	0	**10**
Sheep	*Ovis aries*	2	2	0	2	0	0	1	0	4	1	**6**
Goat	*Capra hircus*	8	8	0	3	1	4	1	0	6	7	**19**
Sheep/goat	*Ovis/Capra*	21	38	10	12	2	20	8	10	26	15	**81**
Common duiker	*Sylvicapra grimmia*	1	9	1	0	3	1	1	0	2	4	**11**
Oribi	*Ourebia ourebi*	13	6	0	1	0	1	0	0	8	11	**20**
Duiker/oribi	*Sylvicapra/Ourebia*	0	8	2	0	0	3	0	0	3	4	**10**
	fetal bovid	8	0	0	0	0	0	0	0	8	0	**8**
	small bovid	76	197	52	39	28	43	26	30	130	107	**364**
	small bovid LBF	108	148	38	25	24	70	17	20	66	122	**319**
Kob	*Kobus kob*	6	3	2	0	0	0	1	0	5	5	**11**
Reedbuck	*Redunca redunca*	3	3	0	0	0	0	0	0	2	4	**6**
Bushbuck	*Tragelaphus scriptus*	0	1	0	0	0	0	0	0	1	0	**1**
Sitatunga	*Tragelaphus spekii*	0	1	0	0	0	0	0	0	1	0	**1**
	medium bovid	16	70	2	8	0	3	2	5	51	35	**96**
	medium bovid LBF	52	42	1	2	2	9	8	1	34	43	**97**
Cattle	*Bos taurus*	7	1	7	2	4	8	0	5	0	0	**17**
Hartebeest	*Alcelaphus buselaphus*	6	3	1	0	0	0	0	0	6	4	**10**
	medium-large bovid	29	61	16	4	4	10	2	9	54	31	**110**
	medium-large bovid LBF	35	89	10	7	7	18	5	6	52	53	**141**
Roan antelope	*Hippotragus equinus*	0	9	0	0	0	0	0	0	2	7	**9**
	large bovid	0	11	2	0	0	1	1	0	6	5	**13**
	large bovid LBF	0	3	0	0	0	0	0	0	0	3	**3**

Table 4.1. The Kirikongo faunal assemblage *(continued)*

English Common Name	Taxonomic Identification	Unit A	Unit B	Unit C	Unit E	Yellow I	Yellow II	Red I	Red II	Red III	Red IV	Total
Horse	*Equus caballus*	0	0	0	1	0	0	0	1	0	0	**1**
Donkey	*Equus asinus*	2	0	0	0	0	0	0	0	2	0	**2**
Dog	*Canis familiaris*	1	3	0	0	2	1	0	0	0	1	**4**
Side-striped jackal	*Canis adustus*	0	1	0	0	0	0	0	0	0	1	**1**
Canid	*Canis* sp.	23	72	0	10	12	10	8	5	22	48	**105**
	medium carnivore	1	20	0	1	8	0	1	1	8	4	**22**
	medium carnivore LBF	2	36	0	1	1	1	3	0	1	33	**39**
African wildcat	*Felis sylvestris*	0	2	0	2	1	2	0	0	0	1	**4**
Serval cat or caracal	*Leptailurus serval/ Caracal caracal*	0	1	0	0	0	0	0	0	0	1	**1**
Civet	*Civettictis civetta*	0	1	0	0	0	0	0	0	0	1	**1**
Banded mongoose	*Mungos mungo*	0	1	0	0	1	0	0	0	0	0	**1**
Marsh or white-tailed mongoose	*Atilax paludinosus/ Ichneumia albicauda*	0	1	0	0	0	0	0	0	0	1	**1**
Slender mongoose	*Herpestes sanguinea*	0	1	1	0	0	0	0	1	0	1	**2**
	small mongoose	0	1	0	0	1	0	0	0	0	0	**1**
White-toothed shrew	*Crocidura* sp.	0	4	0	0	1	0	0	1	2	0	**4**
Hippopotamus	*Hippopotamus amphibius*	0	3	0	0	0	0	0	0	0	3	**3**
Warthog	*Phacochoerus africanus*	0	23	1	0	0	0	0	1	7	16	**24**
	suid LBF	0	2	0	0	0	0	0	0	0	2	**2**
Patas monkey	*Erythrocebus patas*	0	4	0	0	1	0	0	0	0	3	**4**
Green monkey	*Chlorocebus sabaeus*	0	1	0	0	0	0	0	0	1	0	**1**
Gambian rat	*Cricetomys gambianus*	0	9	7	10	1	3	1	4	13	4	**26**
Cane rat	*Thyronomys swinderianus*	0	12	7	0	0	3	1	5	6	4	**19**
	Lepus victoriae	3	4	8	0	1	4	8	0	2	0	**15**
	small mammal (large rodent size)	2	39	22	6	0	7	3	18	22	19	**69**
	small mammal LBF	0	0	3	1	0	0	0	1	3	0	**4**
	micromammal	8	29	9	9	11	7	4	11	10	12	**55**
	mammal (unidentified)	177	284	110	111	27	98	37	67	250	203	**682**
Chicken	*Gallus gallus*	0	11	3	1	0	2	1	3	7	2	**15**
Guinea fowl	*Numida meleagris*	0	3	0	0	0	0	0	0	1	2	**3**
Francolin	*Francolinus* sp.	3	20	4	0	1	5	1	0	4	16	**27**
Chicken/guinea fowl	*Gallus/Numida*	38	111	27	12	10	14	22	24	72	46	**188**
Chicken/francolin	*Gallus/Francolinus*	4	20	3	0	3	5	3	0	10	6	**27**
Galliform	Galliform	12	16	2	0	2	3	3	0	15	7	**30**
Galliform	Galliform LBF	38	129	20	6	14	14	22	17	79	47	**193**
Spur-winged goose	*Plectropterus gambensis*	2	0	0	0	0	0	2	0	0	0	**2**
Comb duck	*Sarkidiornis melanotos*	0	2	0	0	0	0	0	0	1	1	**2**
	avian (unidentified)	3	32	5	1	0	8	2	0	13	18	**41**
Chicken	avian eggshell (chicken)	6	132	44	19	13	61	13	55	42	17	**201**
	avian eggshell (non-chicken)	9	9	9	1	0	8	0	1	10	9	**28**

English Common Name	Taxonomic Identification	Unit A	Unit B	Unit C	Unit E	Yellow I	Yellow II	Red I	Red II	Red III	Red IV	Total
Tilapia	Tilapiini	8	97	25	2	23	7	0	21	46	35	**132**
Clariid catfish	*Clarias* sp.	5	63	8	1	23	21	3	2	24	4	**77**
Nile perch	*Lates niloticus*	7	45	2	1	31	6	2	4	9	3	**55**
	Synodontis sp.	3	33	5	1	21	7	3	2	4	5	**42**
	Heterotis niloticus	2	12	0	0	13	0	1	0	0	0	**14**
	Bagrus sp.	0	1	2	0	0	1	1	0	0	1	**3**
	Mormyrus sp.	0	2	1	0	0	0	0	1	2	0	**3**
	Heterobranchus sp.	0	2	0	0	1	1	0	0	0	0	**2**
	Gymnarchus niloticus	0	2	0	0	0	0	0	0	2	0	**2**
	Auchenoglanis sp.	0	0	1	0	0	0	0	1	0	0	**1**
Lungfish	*Protopterus annectens*	0	1	0	0	1	0	0	0	0	0	**1**
Tilapia/Nile perch	Tilapiini/*Lates niloticus*	14	0	1	0	0	0	0	1	14	0	**15**
Catfish	Siluridae	1	5	1	0	0	1	2	0	3	1	**7**
	fish (unidentified)	14	298	6	0	277	17	1	5	15	3	**318**
	Chambardia sp.	1	27	18	9	4	11	10	5	14	11	**55**
Nile oyster	*Etheria elliptica*	25	4	1	0	2	9	12	0	5	2	**30**
	bivalve	0	15	2	6	2	6	1	4	6	4	**23**
	terrestrial mollusks	14	0	13	0	0	0	0	2	25	0	**27**
Monitor lizard	*Varanus* sp.	0	19	12	2	2	0	1	13	13	5	**33**
Crocodile	Crocodylidae	0	5	0	0	0	0	0	0	0	5	**5**
Agama lizard	*Agama* sp.	0	0	14	0	0	7	0	2	5	0	**14**
Likely African bullfrog	order Anura	0	31	28	0	0	27	1	0	6	25	**59**
West African mud turtle	*Pelusios castaneus*	0	0	5	1	0	5	0	0	1	0	**6**
Senegalese flapshell turtle	*Cyclanorbis senegalensis*	0	3	2	0	0	0	1	0	2	2	**5**
	small lizard	0	4	0	1	2	1	0	0	0	1	**5**
Total		**819**	**2426**	**583**	**321**	**588**	**579**	**249**	**365**	**1270**	**1098**	**4149**

on the questions themselves, and what is considered "identified" cannot be limited to simply species identification. Data tables specify the different levels of identification in size-classed bones within an order.

Bones derive from a highly detailed excavation strategy in which all excavation deposits were screened through a 2 mm mesh regardless of deposit type. The units were excavated according to cultural levels, resulting in more than 608 stratigraphic units, and stratigraphic integrity was maintained by differentiating 10 cm–thick layers if a cultural level exceeded 10 cm.

The highly precise excavation strategy resulted in excellent contextual information on co-associations of bones and material culture in clusters. The methodological aim of faunal analyses was no different than that characterizing ceramic analyses at the site, with a goal toward discerning the *chaîne opératoire* of animal procurement, use, distribution, consumption, and discard to uncover cultural choices on particular moments and over time. This has resulted in identification of codified ways in which animals were used, as well as particular contexts where different choices were made.

Figure 4.2. Approximate relative size of taxa illustrated in this chapter. (1) bushbuck, (2) reedbuck, (3) Maxwell's duiker, (4) roan antelope, (5) serval cat, (6) West African mud turtle, (7) cane rat, (8) Gambian rat, (9) red-flanked duiker, (10) marsh mongoose, (11) warthog, (12) dwarf goat, (13) white-toothed shrew, (14) banded mongoose, (15) agama lizard, (16) white-throated francolin, (17) double-spurred francolin, (18) sitatunga, (19) hartebeest, (20) common duiker, (21) Nile monitor lizard, (22) kob, (23) slender mongoose, (24) Senegalese flapshell turtle, (25) oribi, (26) civet, (27) crocodile. *Illustrations by Ethan Schmunk.*

Table 4.2. Typical weight ranges for mature adults of wild mammal species identified at Kirikongo

Common Name	Scientific Name	Weight	Size Class
Maxwell's duiker	*Philantomba maxwelli*	6–10 kg	very small bovid
Red-flanked duiker	*Cephalophus rufilatus*	6–14 kg	very small bovid
Common duiker	*Sylvicapra grimmia*	12–25.5 kg	small bovid
Oribi	*Ourebia ourebi*	12–22 kg	small bovid
Reedbuck	*Redunca redunca*	35–65 kg	medium bovid
Kob	*Kobus kob*	60–121 kg	medium bovid
Bushbuck	*Tragelaphus scriptus*	24–80 kg	medium bovid
Sitatunga	*Tragelaphus spekii*	40–130 kg	medium bovid
Hartebeest	*Alcelaphus buselaphus*	116–218 kg	medium/large bovid
Roan antelope	*Hippotragus equinus*	233–300 kg	large bovid
Side-striped jackal	*Canis adustus*	7.3–12 kg	medium carnivore
Serval cat	*Leptailurus serval*	6–18 kg	medium carnivore
Caracal	*Caracal caracal*	8–19 kg	medium carnivore
Civet	*Civettictis civetta*	7–20 kg	medium carnivore
African wildcat	*Felis sylvestris*	3–6.5 kg	small carnivore
Banded mongoose	*Mungos mungo*	1.5–2.25 kg	small carnivore
White-tailed mongoose	*Ichneumia albicauda*	2–5.2 kg	small carnivore
Marsh mongoose	*Atilax paludinosus*	2.2–5 kg	small carnivore
Slender mongoose	*Herpestes sanguinea*	0.35–0.8 kg	small carnivore
White-toothed shrew	*Crocidura* sp.	0.011–0.04 kg	micro-carnivore
Hippopotamus	*Hippopotamus amphibius*	510–3200 kg	
Warthog	*Phacochoerus africanus*	45–150 kg	
Patas monkey	*Erythrocebus patas*	7–25 kg	
Green monkey	*Chlorocebus sabaeus*	2.5–9 kg	
Gambian rat	*Cricetomys gambianus*	1–1.4 kg	
Cane rat	*Thyronomys swinderianus*	2.6–7.5 kg	
Savanna hare	*Lepus victoriae*	1.5–4.5 kg	

Note: Weight data from Kingdon (1997).

Taphonomy and Methodology

Body part distributions can indicate whether animals arrived complete in a location or were already processed when they arrived. Most deposits at Kirikongo suggest that animal carcasses were complete but that they were butchered, cooked, partially consumed, and partially removed from the context, with the remains of multiple stages of preparation interred in the deposit. Consumption debris largely constituted appendages, with the vertebrae, rib cages, and often crania removed (although in some cases cranial parts were arranged in particular loci). Small elements (carpals, tarsals, metapodials, phalanges, tails) along with crania were either completely absent, indicating systematic removal, or were the only parts of certain animals found, suggesting purposeful inclusion.

Burning was recorded by color and location on individual elements. It indicates roasting of mammal, avian, and reptilian meat (in some cases prior to distribution of the parts of the carcass) and either smoking or grilling of fish, depending on taxon. Overall, 19 percent of mammal, 11 percent of bird, 55.3 percent of fish, 10 percent of reptile and amphibian, and 2 percent of freshwater bivalves were burned. In mammals, burning was most commonly identified on epiphyses or areas of the carcass (ribs, vertebrae) where meat was thin, typical of roasting patterns. Many burned mammal bones had a gradation from black to dark brown, which commonly occurs during grilling as result of differential exposure due to meat presence. Lower appendicular elements (for example, phalanges, metapodials) were less commonly burned (although in some contexts appendages may have been burned complete), and rates of burning in the unidentifiable long bone fragments, largely derived from mid-shaft, were particularly low. Avian bones were burned at a lower rate than mammalian bones, and burning tended to affect the exposed areas of the skeleton (wings and legs) at joints or where thin distributions of meat (pectoral girdle) are found. Burning was relatively more common in large reptiles. Burning was not universal. For example, small carnivore taxa tended to be unburned, and across all categories larger animals tended to have higher frequencies of burning, perhaps due to longer roasting time.

As will be detailed below, burning in fish yielded interesting results that indicate differential preparation of taxa—that is, some fish were roasted while others were smoked. While contexts often included both smoked fish and grilled fresh fish, suggesting preparation preferences by taxon, preserved fish may also have been used as an economic resource beyond seasons when fresh fish were commonly available. Overall, 55.3 percent of fish remains were burned, with *Clarias* sp. catfish and tilapia showing primarily a reddish or reddish-brown color that occurs as a result of low-grade burning, such as that associated with common ethnohistoric fish smoking techniques from western Burkina Faso (Figure 4.3). Moreover, perforated pots with soot-coated base sherds, similar to those used in twentieth century fish smoking (e.g., Bourdier and Minh-Ha 1985), were recovered from excavation. Meanwhile Nile perch, a fish often consumed fresh, has an entirely different burn pattern, as does *Synodontis* sp. catfish, with both taxa having either unburned or highly burned (black and even blue) bones. (See Kabré et al. 2003 for an ethnographic study of taxon differences in fish cooking and preservation.)

Diverse cut and chop marks made by metal tools were systematically recorded. They occurred mostly on mammalian bone, where marks were identified on 6 percent of the assemblage. In general, cut marks and chop marks were relatively more common on larger taxa, as the force required to dismember the carcass is greater. In mammals, cut marks were most common near joints and likely related to dismemberment. However, cut marks and chop marks were also very common on vertebral and rib fragments, including transverse chops on vertebrae that indicate the division of the carcass into left and right portions and cuts on ribs from the separation of upper and lower parts of the rib cage. A few cut marks on metapodial fragments suggest skinning. Cut marks in birds were less common (about 1 percent) and largely indicate the separation of the pectoral girdle (scapula and coracoid) and the leg (femur from the pelvis) from the axial skeleton. The only cut mark on a fish was from the head of a large *Clarias* sp. catfish and may have been the result of gutting a particularly large individual.

Fragment size was systematically measured for bones from Units B, C, and E (Mounds 4, 3, and 11, respectively), and a general picture, less detailed, of fragmentation of bones at Unit A (Mound 1) was obtained from photographs and measurements on the many identifiable bones. In general, fragments varied between 1.3 and 4.5 cm in average length, depending slightly upon phase and excavation unit. The largest average sizes derive from levels with extensive hunting and feasting.

As mentioned above, bones were exceptionally well preserved, with minor carnivore bite or chewing marks on only 2 percent of mammal bones, most of which were concentrated in a few contexts. Carnivore chewing may be an indicator of interior versus exterior spaces, as the contexts where chewing was identified were in abandoned parts of the site and/or locations (a mortuary monument) outside the domestic space. Bird bone was extensively affected by human consumption patterns, as the fragile bones often lacked epiphyses but were in otherwise excellent condition. Bioturbation of deposits was very low due to the practice of paving over faunal accumulations shortly after deposition, with rodent gnawing, often on the interior of domestic spaces, identified on only 0.3 percent of mammal bones and 0.7 percent of bird bones. Once again, this chewing was fairly minor, with often only a single, but distinctive, mark.

Aging was assessed on all bones and teeth based upon tooth eruption, tooth wear, and epiphyseal fusion sequences. Silver's (1963) baseline study of eruption and fusion was referenced for cattle and dogs, although for sheep and goats I employed Zeder's (2006) rigorous analysis reconciling epiphyseal fusion, tooth eruption, and tooth wear to provide

Figure 4.3. Examples of burning in fish bone at Kirikongo. Top: Clariid catfish pectoral spine, minimal burning. Middle: Clariid catfish pectoral spine, low-temperature burning (smoked). Bottom: Nile perch dorsal spine, burned at high temperature.

more precise estimates of age. Tooth wear was recorded for bovids following the systems provided by Grant (1982), and specifically for goats and sheep I employed Grant (1982), Payne (1973), and Zeder (1985, 1991), with the sequence here based upon Zeder's (2006) reconciling of these studies to create more consistent dental aging groups. As studies specific to aging in West African breeds are currently lacking, while the relative sequences are likely accurate, age estimates are included only to provide a sense of the possible range. Bones and teeth were measured employing von den Dreisch (1976) (Table 4.3). Given the small numbers of measured bones from comparable archaeological specimens in West Africa, I followed Linseele (2007) in employing logarithmic size indices (LSI) for cattle, goats, sheep, and chickens. This method enables comparisons of bones in relation to a series of measures on a standard reference animal or animals (see Meadow 1999), and I followed the standards provided by previous studies to ensure easy comparability of results. For cattle, like Linseele (2007) I followed Grigson (2000) in comparing to a standard based upon a Holocene aurochs skeleton from Denmark. For sheep and goats, like Linseele (2007) I employed standard measurements from Uerpmann and Uerpmann (1994). For chickens and other gallinaceous birds, while Linseele (2007) created a standard based upon a wild guinea fowl from northern Burkina Faso, I chose to use Woldekiros et al.'s (2019) more recent measurements, which they used to create a standard from a museum collection of multiple individuals of jungle fowl.

Kirikongo Taxonomic Description

Of the 4,149 faunal remains recovered from Kirikongo, analyses identified at least 33 different mammal species, six bird taxa, two bivalve groups, 11 fish taxa, six reptile and amphibian taxa, and at least one terrestrial mollusk. In this section, I provide a systematic introduction to the different wild and domestic taxa, including assemblage characteristics, animal ecologies, and the nature of their use and deposition. These discussions serve as a foundation for the spatial, temporal, and relational analyses of particular depositional contexts in chapters 5, 6, and 7.

Table 4.3. Measurements on archaeological bones from Kirikongo

Taxon	Context	Element	Measurements (mm)	
Goat (*Capra hircus*)	A-YII-d	metacarpal	Bd = 18.4	
Goat (*Capra hircus*)	B-RIII-a	first phalanx	Bd = 9.4	
Goat (*Capra hircus*)	B-RIII-b	first phalanx	Bd = 9.7	
Goat (*Capra hircus*)	E-RIII-b	first phalanx	GLpe = 35.1	Bp = 10.5
Sheep (*Ovis aries*)	B-RIII-b	radius	Bp = 29.2	
Sheep (*Ovis aries*)	B-RIII-f	tibia	Bd = 18.6	
Sheep (*Ovis aries*)	B-RIV-b	metatarsal	Bd = 17	
Sheep (*Ovis aries*)	A-RIV-b	first phalanx	Bd = 11.8	
Dog (*Canis familiaris*)	B-YI-d	mandible A	#1 = 118.8	#2 = 117
Dog (*Canis familiaris*)	B-YI-d	mandible A	#3 = 111.2	#4 = 111.9
Dog (*Canis familiaris*)	B-YI-d	mandible A	#5 = 94.8	#6 = 110.9
Dog (*Canis familiaris*)	B-YI-d	mandible A	#7 = 66.5	#9 = 60
Dog (*Canis familiaris*)	B-YI-d	mandible A	#10 = 30.5	#12 = 30
Dog (*Canis familiaris*)	B-YI-d	mandible A	#13 = 18.3	#14 = 18
Dog (*Canis familiaris*)	B-YI-d	mandible A	#17 = 10.5	#18 = 47
Dog (*Canis familiaris*)	B-YI-d	mandible A	#19 = 20.7	#20 = 16.3
Dog (*Canis familiaris*)	B-YI-d	mandible A (m1)	L = 18.3	B = 7.3
Dog (*Canis familiaris*)	B-YI-d	mandible A (m2)	L = 7.1	B = 5.3
Dog (*Canis familiaris*)	B-YI-d	mandible B (m1)	L = 18.7 (est.)	B = 7.1 (est.)
Dog (*Canis familiaris*)	B-RIV-b	mandible	#20 = 16.95	
Dog (*Canis familiaris*)	A-YII-d	mandible	#19 = 19.3	
Side-striped jackal (*Canis adustus*)	B-RIV-c	mandible	#8 = 56 (est.)	#10 = 30.9
Side-striped jackal (*Canis adustus*)	B-RIV-c	mandible	#14 = 16.2 (est.)	#20 = 12
Donkey (*Equus asinus*)	A-RIII-a	metacarpal	Bd = 38.4	
Chicken (*Gallus gallus*)	B-RIII-b	scapula	Dic = 10.5	
Chicken (*Gallus gallus*)	B-RIII-b	scapula	Dic = 9.4	
Chicken (*Gallus gallus*)	C-RII-a	radius	Bd = 5.3	
Chicken (*Gallus gallus*)	B-RIV-c	radius	GL = 58.7	Bd = 6.2
Chicken (*Gallus gallus*)	C-RII-a	coracoid	GL = 54.26	
Chicken (*Gallus gallus*)	E-YII-a	carpometacarpus	GL = 33.7	Bp = 8.6
Chicken (*Gallus gallus*)	B-RIII-a	carpometacarpus	GL = 33.8	Did = 7.1
Chicken (*Gallus gallus*)	B-RIII-a	tibiotarsus	GL = 117	Bd = 11.1
Chicken (*Gallus gallus*)	B-RIII-b	coracoid	BF = 10	
Francolin (*Francolinus* sp.)	B-YII-b	scapula	Dic = 9.7	
Francolin (*Francolinus* sp.)	B-RIV-c	radius	GL = 48	Bd = 4.2
Francolin (*Francolinus* sp.)	B-RIV-c	radius	Bd = 3.4	
Francolin (*Francolinus* sp.)	B-RIV-c	radius	Bd = 4.5	
Francolin (*Francolinus* sp.)	B-RIV-c	coracoid	BF = 7.5	
Guinea fowl (*Numida meleagris*)	B-RIV-c	coracoid	GL = 50.6	BF = 9.1
Guinea fowl (*Numida meleagris*)	B-RIII-b	carpometacarpus	Did = 8.5	

Note: Measurement codes from von den Dreisch (1976); Cattle bone measurements available in Dueppen 2012c:96.

Domestic Cattle (*Bos taurus*)

Excavations at Kirikongo yielded a total of 45 cattle bones distributed across all four excavation units (Table 4.4). Seventeen were positively identified as cattle, and the remaining 28 were size-classed bones consistent with domestic taxa that occurred in contexts without wild medium/large bovids. All identified elements dated to between Yellow I and Red II, and there was a significant spatial concentration at Unit C (Mound 3). Not a single cattle bone was identified in Red III and IV despite the large volume of those excavation deposits. Domestic cattle were the only medium/large or large bovid taxon identified before Red III at Kirikongo. Consequently, most size-classed large bovid bone from Yellow I through Red II likely derived from cattle.

As discussed in chapter 3, cattle in central West Africa in areas with precipitation over 500 mm are significantly impacted by sleeping sickness, and ethnohistoric societies have either maintained seminomadic lifeways (for example, Fulani herders) or kept breeds that are more disease tolerant. Sleeping sickness is highly endemic in the Mouhoun Bend, and the region has been the subject of extensive veterinary and agricultural research on the disease, as today, despite the expansion of tsetse-free zones due to the large-scale removal of brush in large parts of Burkina Faso, the dense gallery forest along the Mouhoun River provides a favorable habitat (Bouyeret et al. 2013; Koné et al. 2011; Sow et al. 2013). Tsetse-tolerant breeds are taurine cattle varieties adapted to the humid tropical setting, with the most historically common in savanna and savanna/forest West Africa being the very small West African shorthorn and medium-size N'dama breeds (Epstein 1971). N'dama are kept in the western parts of West Africa, while the shorthorn is more common in southern, central, and eastern West Africa.

Figure 4.4. *Bos taurus* first phalanx from Kirikongo (A-YII-d)

Kirikongo's cattle are quite small, as measurements on a first phalanx and a second phalanx indicate (Figure 4.4 and Figure 4.5). Based upon the difference in relative size of the two animals represented, one may have been male and the other female. All non-measurable fragments were from small-size cattle, consistent with the measured elements. As described in detail in Dueppen (2012c), Kirikongo's cattle are similar in size to confirmed archaeological cattle from Ghana and may represent a breed with an adaptation similar to the West African shorthorn, although no horn cores were recovered from Kirikongo. The cattle are also similar in size to the probable cattle from K6 (Carter and Flight 1972), providing additional support for the use of cattle in Kintampo economies. Studies of cattle bone measurements from archaeological sites generally indicate clinal variation in cattle from south to north in central West Africa, with medium-size cattle in northern Burkina Faso and smaller cattle in the Seno Plain of Mali, western and southeastern Burkina Faso (including Kirikongo), and northern Ghana,

Table 4.4. Cattle summary

		Total	Head	Axial Postcrania	Upper Appendage	Lower Appendage
N identified	cattle	45	15 (33.3%)	14 (31.1%)	11 (24.4%)	5 (11.1%)
N identified	cattle + LBF	76 (45 + 31 LBF)	15 (19.7%)	14 (18.4%)	11 (14.5%) + 31 LBF (40.8%)	5 (6.6%)
N burned	cattle + LBF	6 (7.9%) + 12 LBF (15.8%)	1 (6.66%)	2 (14.3%)	2 (18.2%) + 6 LBF (19.4%)	1 (20%)
N cut marks	cattle + LBF	11 (14.5%) + 0 LBF (0%)	2 (13.3%)	3 (21.4%)	3 (27.3%)	3 (60%)

Forelimb to hind limb ratio: 9:6 (60%/40%)

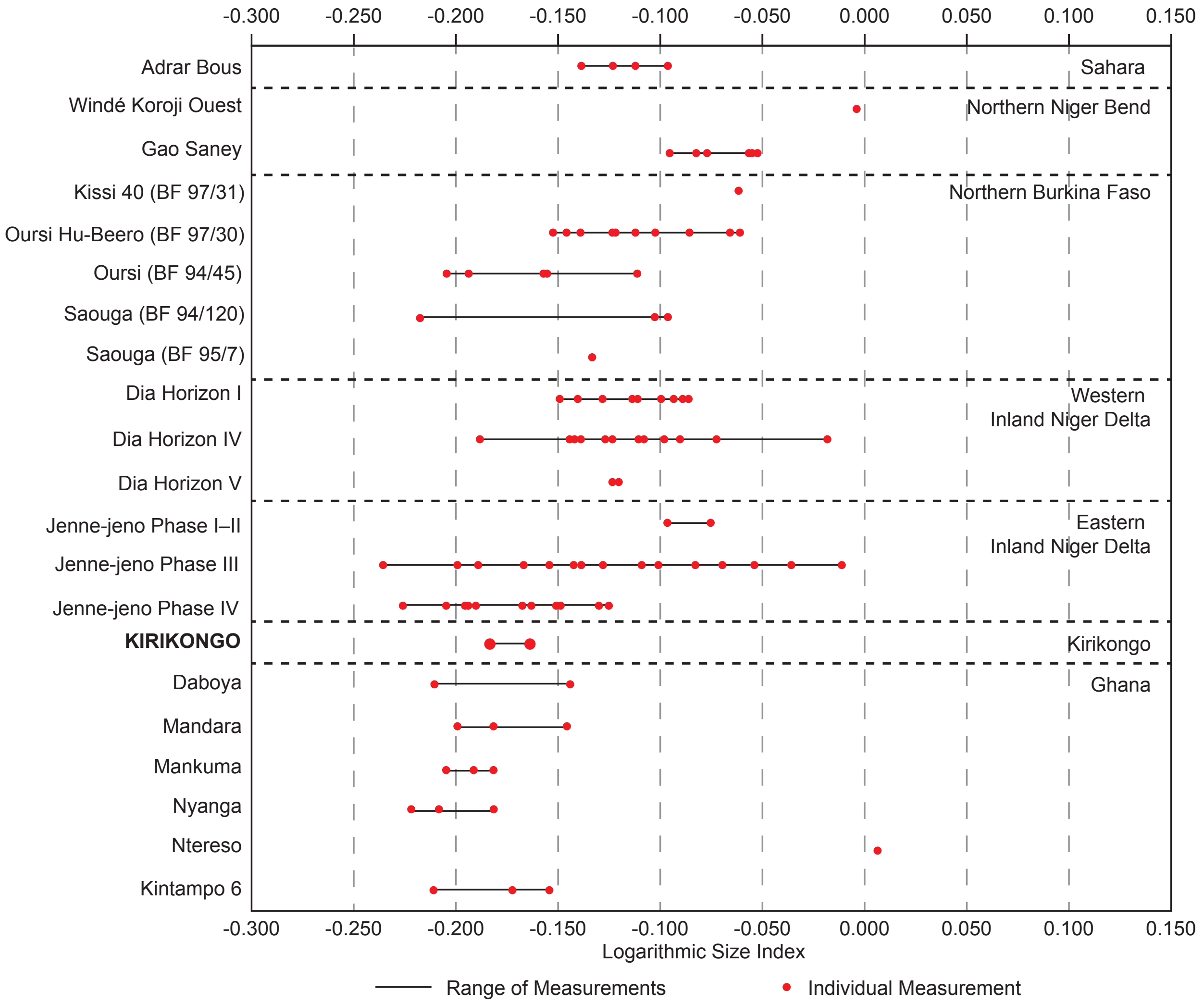

Figure 4.5. Logarithmic size index of archaeological cattle phalanges from central West Africa. Adapted from Dueppen 2012c:Figure 7. Incorporates data from Carter and Clark 1976; Carter and Flight 1972; Clark, Carter et al. 2008; Gautier and Van Neer 2005; Linseele 2007; MacDonald 1995b; MacDonald and MacDonald 2000; Manning and MacDonald 2005.

with the smaller cattle all derived from contexts where tsetse and humidity were elevated. The smaller breed of cattle may have been adopted later at Jenne-jeno during Phase III (MacDonald 1995b), where it joined a larger cattle breed with a longer history of use at the site (see discussions in Dueppen 2012c). As parts of the second half of the first millennium AD may have been quite humid, adoption of these cattle may have been for ecological reasons. As discussed in chapter 3, disease-tolerant cattle like the West African shorthorn tend to be less prolific and are kept in smaller numbers. They also do not do well at transhumance in comparison with the larger breeds more common to the north.

All parts of the body are present in the cattle assemblage, although cranial fragments are slightly overrepresented and parts of the lower appendages are underrepresented but systematically present. The majority of fragments were likely from upper appendages, as 31 long bone fragments were found in association with identified cattle bones from the upper limbs. With the exception of one context, all upper extremity cattle elements were from the forelimb, with multiple humeri, scapuli, and radii identified, while parts of the posterior limbs were limited to tibiae fragments from an early deposit and occasional phalanges. Parts of the axial skeleton tend to be small fragments of ribs or vertebrae that could derive from division of the carcass, a point substantiated by cut mark data.

Twenty-five percent of identified cattle elements had cut or chop marks. These include extensive cut marks likely associated with dismemberment or detachment on a distal humerus, around the glenoid facet of a scapula, on a mandible, and on a first phalanx (perhaps for the disarticulation of hoofs). Chop marks from division of the carcass occur on the glenoid facet of a scapula, on a proximal tibia, and on cervical and lumbar vertebrae, suggesting partition of the carcass into left- and right-sided portions. No cut marks were found on shaft fragments.

Cattle bones were burned in similar frequency to other mammal bones. Burning was found on mandibular elements, ribs, scapuli, and one metacarpal. The burned mandible and metacarpal were found in a context associated with iron-working, while the ribs and scapuli were from funerary contexts. Light but distinctive carnivore chewing, likely by a dog, was identified on several bones from Unit A (Mound 1) and possibly on one bone from Unit C (Mound 3). The low incidence and level of damage suggests that dogs had access to these bones for only a very short time.

Age determinations were possible on 19 cattle elements and were made on the basis of tooth eruption, tooth wear, and epiphyseal fusion stages (Figure 4.6). Cattle were slaughtered at widely varying ages at Kirikongo. There was a clear preference for juvenile or prime-age individuals at Units B and C (Mounds 4 and 3), where all remains were from cattle less than three years of age and in several cases less than two years old. At Units A and E (Mounds 1 and 11), slaughtered cattle were prime age or potentially much older, as permanent dentition had extensive wear and all postcranial bones were well fused. Overall, most cattle at Kirikongo were likely slaughtered at prime age, similar to the patterns identified in northern Burkina Faso and possibly at Jenne-jeno, where only one of 15 first phalanges was unfused (Linseele 2007; MacDonald 1995b). However, Kirikongo does include a significant frequency of very young cattle, all of which were associated with the founding house and/or its funerary deposits. This suggests a survivorship curve in which slaughter may have started at younger ages than in other parts of central West Africa. As is discussed further below, cattle were likely less directly a subsistence resource (meat and dairy) and more of a social valuable and for agricultural fertilizer in the Mouhoun Bend given issues of productivity and a rich local wild animal biomass.

Small Bovids

Small bovids constitute the largest group of mammalian faunal remains by number and represent about 20 percent of all the fauna at Kirikongo (519 bones identified to element; 319 long bone fragments) (Table 4.5). This size class contains about 30 percent wild small bovids (*Sylvicapra grimmia* and *Ourebia oribi*) and 70 percent dwarf breeds of domestic sheep and goats, both of which were recovered from diverse contexts. Of the 838 total small bovid fragments, two-thirds were likely from the appendicular skeleton. The systematic removal of domestic and particularly wild bovid crania and of the tarsals, carpals, and phalanges of both domestic and wild small bovids affected identification rates to taxon. Consequently, only 28.3 percent of the 519 fragments identified to element were diagnostic to a specific taxon (mostly epiphyses, lower appendages, pelvises, and cranial elements, including dentition).

Sheep/Goats

Of the 147 small bovid bones identified to taxon, 106 (70.1 percent) were attributable to sheep or goats, although based upon their general robusticity, it is likely that a significant proportion of the size-classed bones are sheep or goat as well. Domestic caprines are one of the two most common animal groups in number and distribution at Kirikongo. (The other is domestic fowl.) Distinction of sheep from goats was enabled by published works, extensive use of comparative specimens, and the resources of the Smithsonian Archaeobiology Laboratory, where Melinda Zeder and Suzanne Pilaar were testing identification criteria at the time I was identifying Kirikongo's fauna (Zeder and Pilaar 2010; see also Zeder and Lapham 2010). Only 25 sheep/goat bones (23.6 percent) were identifiable to a specific taxon; of these, 76 percent were attributable to goats and only 24 percent to sheep.

While goats were identified in the earliest levels at Kirikongo, sheep did not appear until the last two centuries of the first millennium AD, during Red I. In general, sheep do not occur in any contexts in which cattle are

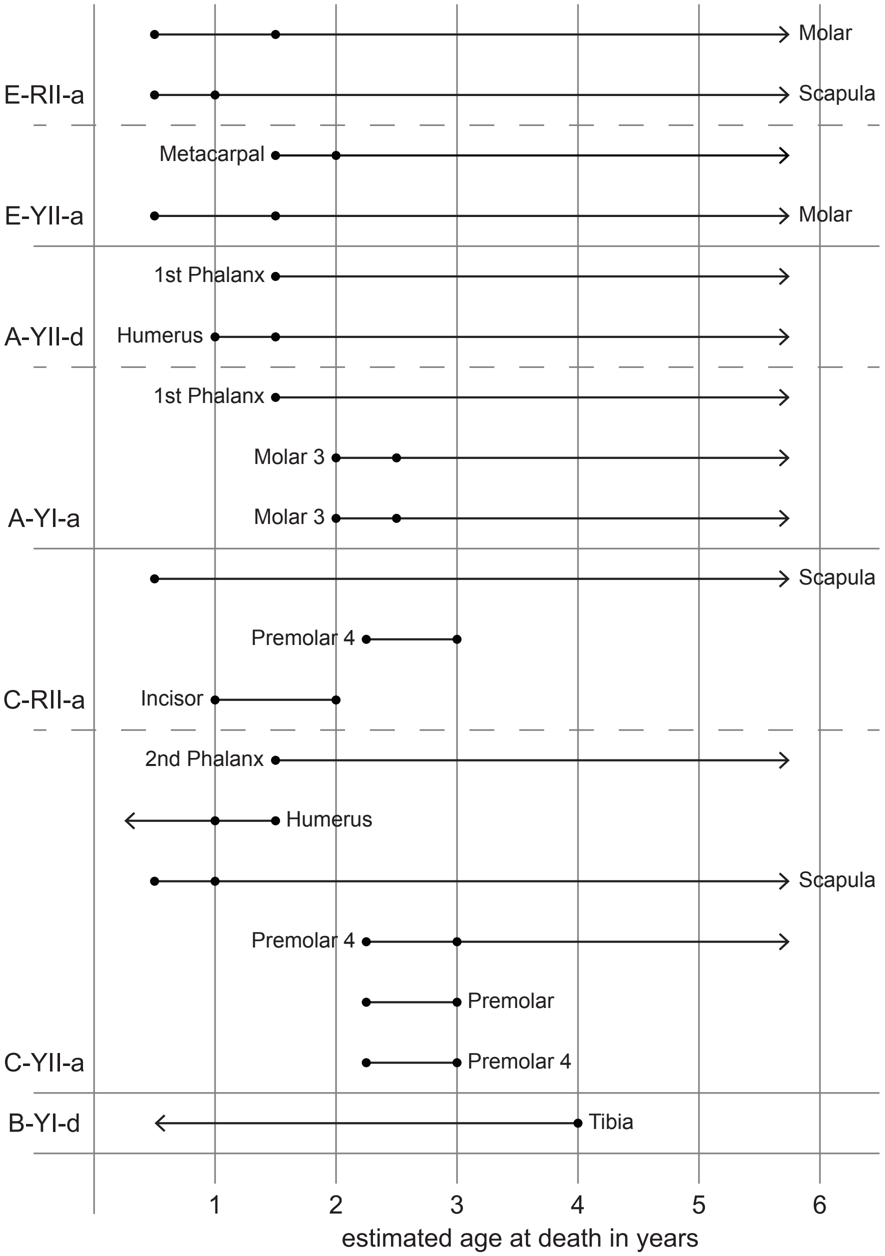

Figure 4.6. Estimated age at death for Kirikongo cattle (n = 19)

also found, which may provide insight into their history in the region and why they are sometimes culturally classified as substitutable (see chapter 1). As discussed later, the Mouhoun Bend was likely fairly forested in the early sequence, but by the time sheep were adopted, increased population density had resulted in more cleared land and young fallows. Cattle and sheep have similar grazing requirements, and in the early sequence, when grazing land was more limited, herding strategies may have favored the complementary grazer/browsing adaptations of cattle and goats and avoided sheep, as they would have competed with cattle. A similar circumstance is found in northern Burkina Faso, where sheep constitute a very small percentage of domestic livestock until the early second millennium AD, when cattle frequencies became lower (Linseele 2007). In addition, heat-, humidity-, and disease-tolerant goat breeds may have been developed more rapidly than sheep breeds with the same qualities.

Table 4.5. Small bovid summary

		Total	Head	Axial Postcrania	Upper Appendage	Lower Appendage
N identified	domestic sheep/goat	106	51 (48%)	3 (2.8%)	27 (25.5%)	25 (23.6%)
N identified	oribi/common duiker	41	5 (12.2%)	5 (12.2%)	10 (24.4%)	21 (51.2%)
N identified	small bovid + LBF	683 (364 + 319 LBF)	57 (8.3%)	196 (28.7%)	82 (12%) + 319 (46.7%)	29 (4.2%)
N identified	all small bovid + LBF	830 (511 + 319 LBF)	113 (13.6%)	204 (24.6%)	119 (14.3%) + 319 LBF (38.1%)	75 (9%)
N burned	domestic sheep/goat	18 (17%)	7 (13.7%)	0	6 + 1 LBF (25.9%)	4 (16%)
N burned	oribi/common duiker	3 (7.3%)	0	0	2 (20%)	1 (4.8%)
N burned	small bovid + LBF	157 (23%)	10 (17.5%)	56 (28.6%)	15 (18.3%) + 72 LBF (22.6%)	4 (13.8%)
N burned	all small bovid + LBF	178 (21.4%)	17 (15%)	56 (27.5%)	96 (21.9%)	9 (12%)
N cut marks	domestic sheep/goat	9 (8.3%)	1 (2%)	0	3 (11.1%)	5 (20%)
N cut marks	oribi/common duiker	8 (19.5%)	0	2 (40%)	3 + 1 LBF (40%)	2 (9.5%)
N cut marks	small bovid + LBF	33 (4.8%)	0	10 (5.1%)	11 (13.4%) + 8 LBF (2.5%)	4 (13.8%)
N cut marks	all small bovid + LBF	50 (6%)	1 (0.9%)	12 (5.9%)	17 (14.3%) + 9 LBF (2.8%)	11 (14.7%)
Forelimb to hind limb ratio	domestic sheep/goat	19:24 (44.2%/55.8%)				
Forelimb to hind limb ratio	oribi/common duiker	10:12 (45.5%/54.5%)				
Forelimb to hind limb ratio	small bovid	39:59 (39.8%/60.2%)				
Forelimb to hind limb ratio	all small bovid	68:95 (41.7%/58.3%)				

Like cattle, sheep and goats in areas of West Africa with higher humidity and endemic sleeping sickness tend to be smaller, with a general clinal trend toward reduced size from north to south. Breeds from the forest zone tend to be the smallest (for example, Nigerian dwarf goat) (Epstein 1971; Oseni et al. 2017). Goats tend to be more productive (hardier) generally than sheep in humid West Africa, and this may account for the tendency to favor goat production in this zone, although the browsing adaptation and dietary flexibility of goats may also be a factor. Archaeologically, the clinal variation in size, and presumably in adaptation, can be seen in bone measurements. Only four sheep and four goat bones from Kirikongo could be used for comparative size measurements (LSI) due to a cultural practice of removing the often complete small, dense elements of the appendicular skeleton; there is not a single talus from Kirikongo, and phalanges are rare. These results were compared with LSI measurements on bones from a north/south transect of sites: Gao Saney (MacDonald and MacDonald 2000), Windé Koroji Ouest (MacDonald et al. 2017), diverse sites in northern Burkina Faso (Linseele 2007), and sites in the Gonja and Asante regions of Ghana (Gautier and Van Neer 2005) (Figure 4.7 and Figure 4.8).

The results indicate that Kirikongo's goats and sheep are quite small. For goats, evidence suggests use of a dwarf breed with measurements similar to, if not smaller than, published measurements on a contemporary Cameroon dwarf goat (Brink and Holt 1992) and similar in size to goats from the Kintampo (Carter and Flight 1972; Gautier and Van Neer 2005). In general, sites to the north tend to have larger goats, although at certain times and places, when humid environmental zones are farther north, dwarf livestock can be found—for example, in second millennium BC Windé Koroji Ouest or late first millennium

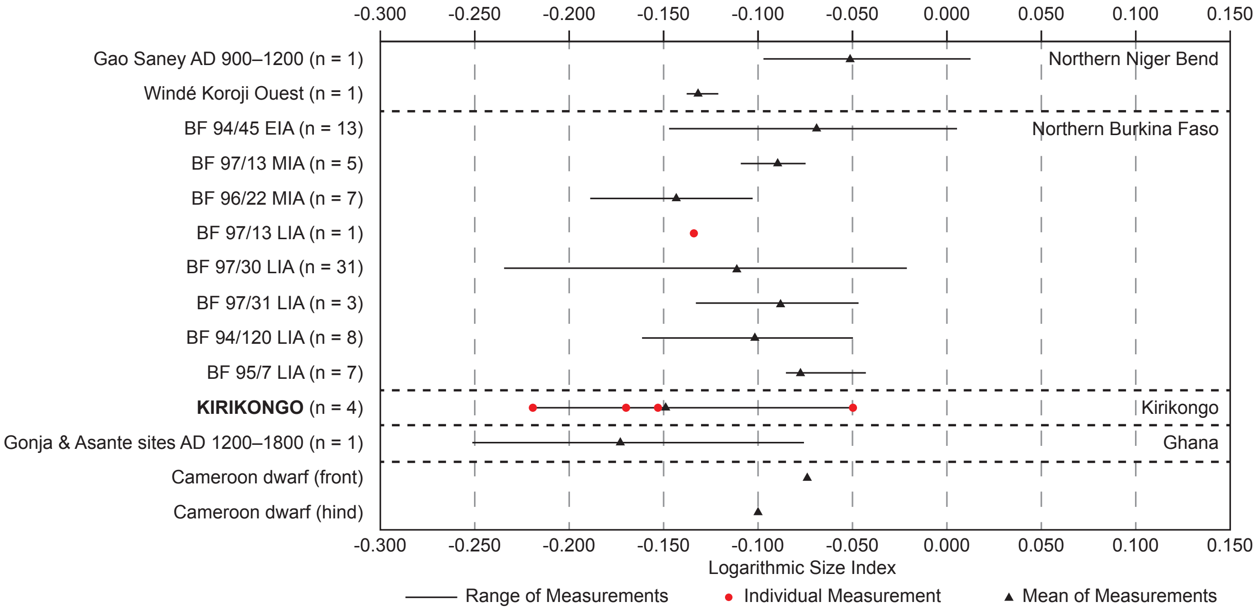

Figure 4.7. Logarithmic size index of archaeological goats from central West Africa. Adapted from Linseele 2007:131. Incorporates data from Brink and Holt 1992; Gautier and Van Neer 2005; Linseele 2007; MacDonald and MacDonald 2000; MacDonald et al. 2017.

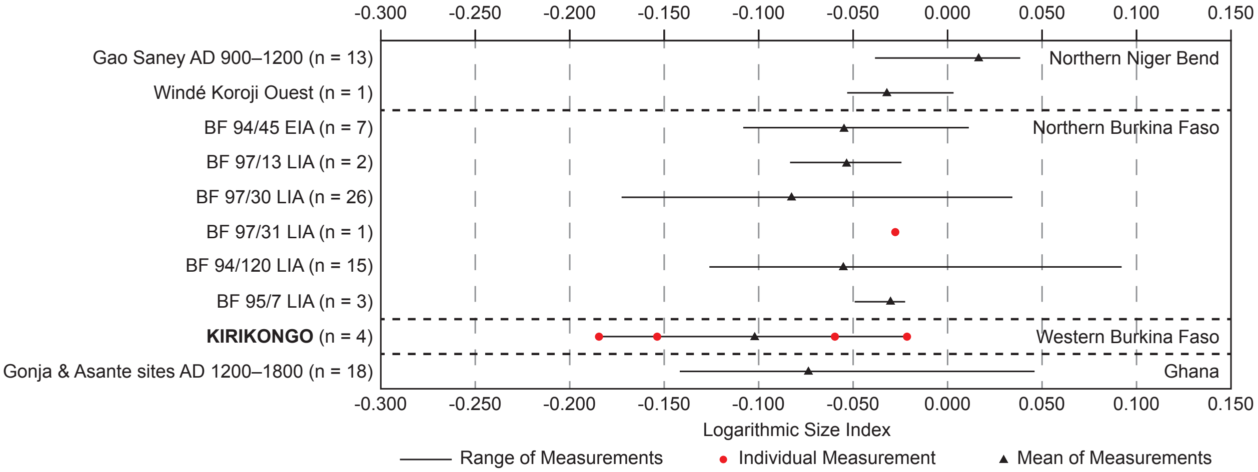

Figure 4.8. Logarithmic size index of archaeological sheep from central West Africa. Adapted from Linseele 2007:130. Incorporates data from Gautier and Van Neer 2005; Linseele 2007; MacDonald and MacDonald 2000; MacDonald et al. 2017.

AD BF 96/22 (Linseele 2007; Macdonald et al. 2017). The use of dwarf goat breeds at Kirikongo is further supported by non-LSI measurements on other elements—for example, an extremely tiny third phalanx from Red IV. In addition, two goat horn cores clearly represent a dwarf goat breed similar to those kept in southern Burkina Faso and northern Ghana today. LSI measurements on sheep indicate that Kirikongo's sheep are on average the smallest so far analyzed in central West Africa; they are even smaller than the extensive assemblage of second millennium AD sheep from Ghana (Gautier and Van Neer 2005). As with other sites throughout West Africa, Kirikongo's sheep appear to be slightly larger in size than the goats (see MacDonald and MacDonald 2000). Comparisons of Kirikongo's sheep and goats with indeterminate caprine measurements from Jenne-jeno suggest a dwarf breed of similar size (MacDonald 1995b). As with cattle, small sheep and goats suggest that livestock were largely local and sedentary, as dwarf breeds do not engage commonly in transhumance.

Body Part Distributions

The analysis of the distribution of sheep and goat elements was heavily affected by a significant underrepresentation of the postcranial axial skeleton, since ribs and vertebrae are difficult to assign to taxon, as well as the underrepresentation of highly diagnostic elements, including carpals, tarsals (including the talus), and phalanges, as these were systematically removed from carcasses. Fortunately, these same patterns were found in wild small bovids, so the body part data are relatively comparable between them. Cranial elements of sheep and goats were much more common than those of wild small bovids, representing 48 percent of the elements identified to domestic taxa, while parts of the lower appendage of domesticates were relatively less common. Given their low frequency generally, the contexts within which sheep and goat cranial fragments are deposited may be significant and are explored in chapter 5. In most contexts, elements from throughout the skeleton are present, indicating slaughter and butchering activity, and there is evidence for consumption of meat from upper appendicular elements and distribution of most (but not all) other sections of the carcass. When one views the body part distribution of small bovids overall, it is clear that cranial, postcranial axial skeletal, and lower appendicular elements are highly underrepresented in comparison to upper appendicular elements, which likely constitute more than 50 percent of the total small bovid remains. Lastly, the ratio of forelimb to hind limb elements in sheep and goats is 44.2 percent to 55.8 percent and increases to approximately 40 percent to 60 percent in small bovids overall. This pattern is in part influenced by the relatively high numbers of proximal tibia fragments (a primary butchering point on small bovids) and the fact that hind limbs are longer than forelimbs, but it could indicate that parts of forelimbs were distributed from the locus at a slightly higher rate.

Age of Sheep/Goats

Sixty-one elements had evidence for age, either from dental eruption, dental wear, or epiphyseal fusion (see Zeder 2006 for developmental equivalencies between dental wear and fusion) (Figures 4.9–4.12). The most extensive understandings of age at death were derived from 36 teeth, which were used to construct an estimated survivorship curve (Figure 4.13). This is a relative curve based upon estimations of tooth eruption and wear, and the calendar dates should be viewed as a rough approximation since there have been few studies on the developmental timing of dwarf breeds. More accurately, it represents the relative sequence from juvenile to young adult to full adult. Based on dentition, sheep and goats were primarily killed as young (prime) adults, with a sub-peak of juvenile individuals and fewer older and middle-aged (older prime) individuals. In general, only 38 percent of sheep and goats lived beyond three years of age, typical in meat production systems where the goal is to balance both slaughter of young animals and meat per animal. Interestingly, 25 percent of sheep and goats were killed before they reached one year of age, which suggests a focus on tender meat in particular situations. Temporal and contextual analyses indicate that the slaughter of older individuals was a relatively rare occurrence in the early part of the sequence and became more common in Red III and IV. The epiphyseal fusion data were more limited and produced lower resolution results. However, the seven unfused elements generally match the patterns from dentition, with few animals older than prime age and some individuals slaughtered as juveniles or young adults.

Figure 4.9. Young goat mandible from Kirikongo (A-YII-a)

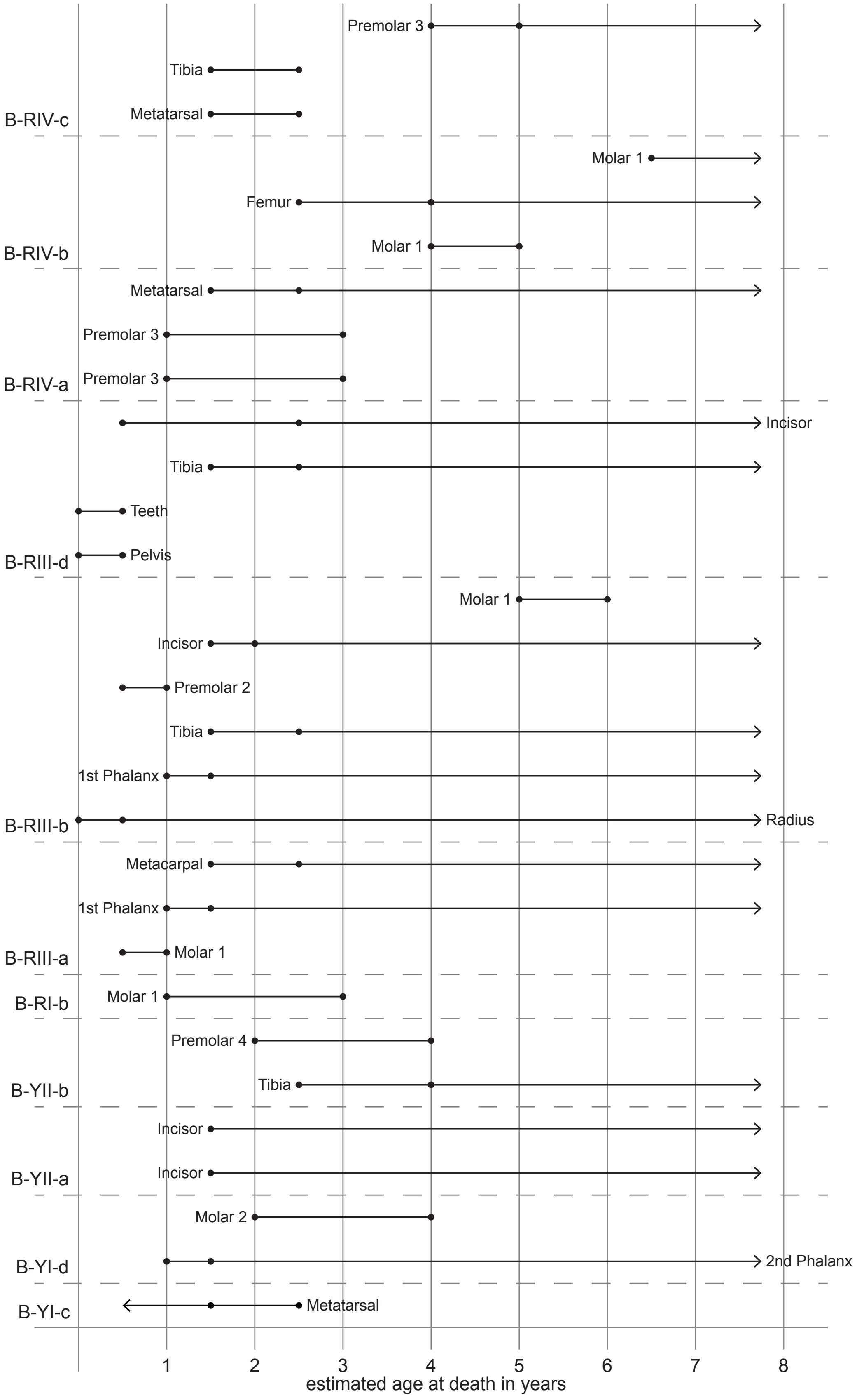

Figure 4.10. Estimated age at death for Kirikongo sheep/goat, Unit B

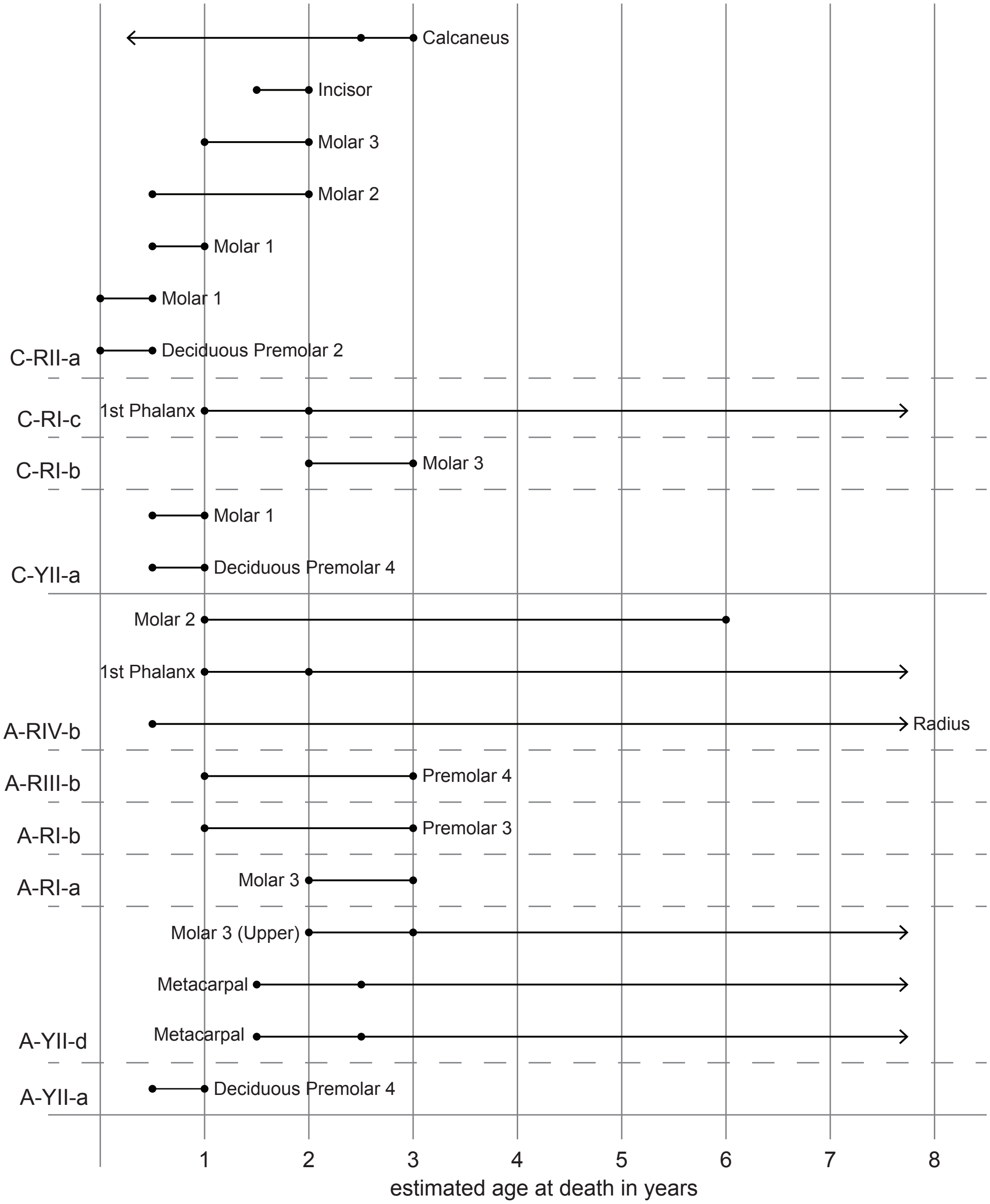

Figure 4.11. Estimated age at death for Kirikongo sheep/goat, Units A and C

To contextualize the results from Kirikongo, I compared the survivorship curve I constructed to fusion data published by Linseele (2007). In northern Burkina Faso, slaughter was much more systematized and occurred during the optimal period in meat production systems: ages 1.5–2.5 years. In contrast, Kirikongo's profile has an emphasis on these prime-age young adults but represents a more fluid system, with the slaughter of older and particularly younger animals occurring more frequently. The differences between the profiles, both variants of a meat production system, may relate to the economic and social contexts of production. In northern Burkina Faso, livestock production may have been more central economically and consequently more codified. At Kirikongo, where fauna is derived from funerary contexts and other ritual settings, choices when slaughtering small stock vary highly

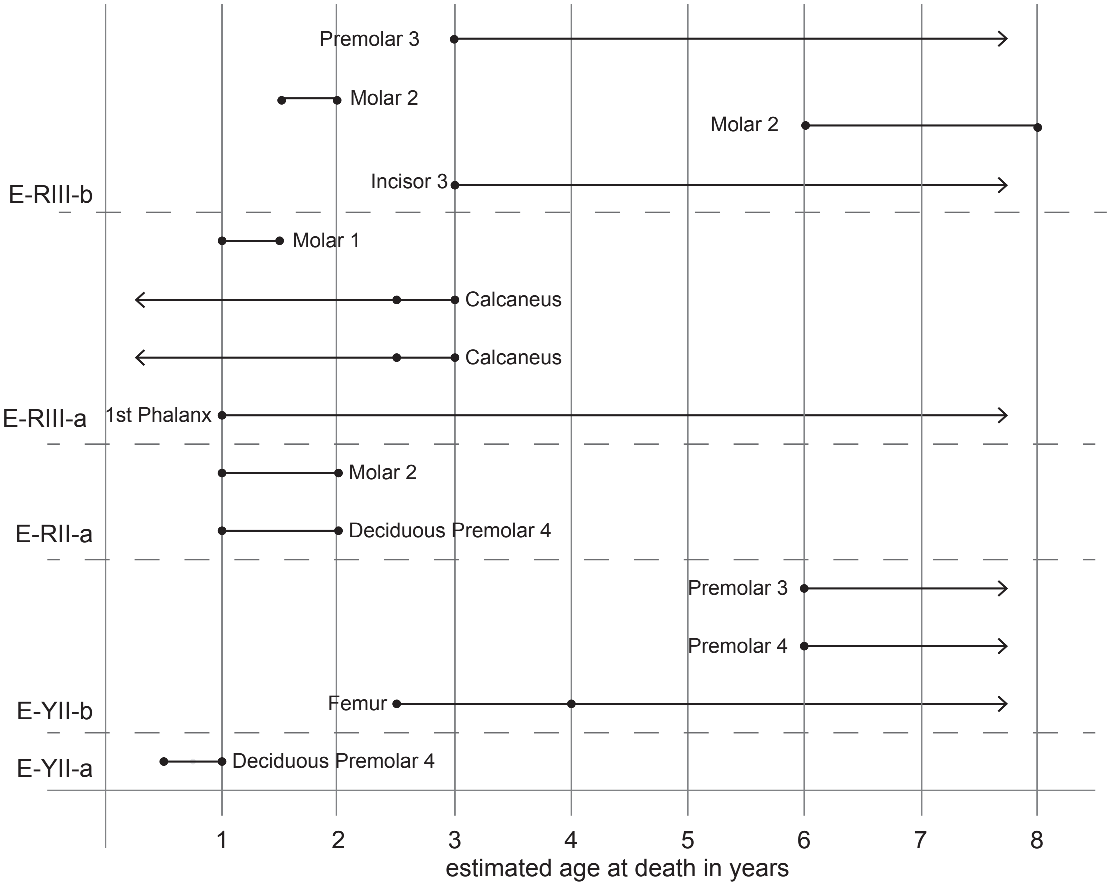

Figure 4.12. Estimated age at death for Kirikongo sheep/goat, Unit E

based upon the circumstances. This has similarities to the ethnohistoric systems discussed in chapter 1, where the age, sex, color, and other aspects of the animal are chosen based upon the nature of the sacrifice. Neither system has evidence for the retention of large numbers of older individuals toward a strategy of maximizing herd size, as is documented for the Middle Senegal River Valley during the early first millennium AD (MacDonald and MacDonald 2000, 2016).

Taphonomic Characteristics

Cut marks occurred on 8.3 percent of sheep and goat bones, a lower frequency than was identified on cattle. With the exception of one chop mark on a goat second phalanx and a sheep first phalanx that was broken for marrow, cut marks largely indicate dismemberment of the body (radius, femur) or possibly skinning (metatarsals). Cut marks and chop marks are also quite rare on the small bovid size-classed elements, although quite a few chop marks are found on proximal tibiae and radii from removal of the lower legs and on small bovid vertebrae and ribs due to division of the main carcass. As skeletal element distributions indicate that carcasses were heavily divided after cooking, the lower numbers of cut marks likely derive from the lesser force needed to disarticulate smaller animals.

Burning on sheep/goat bones was fairly common (17 percent) and occurred in similar frequencies as on cattle bones. Burning was primarily found on the postcranial axial skeleton and upper appendages; however, lower frequencies of burning do occur on the cranium and lower appendages, suggesting occasional roasting of entire animals, either whole or segmented into parts. In the small bovid size-classed bones, burning is widely distributed over the bodies of the animals, with a particular emphasis on areas with thin meat (rib cage) and exposed portions of the upper extremities where bones had been cut prior to roasting (for

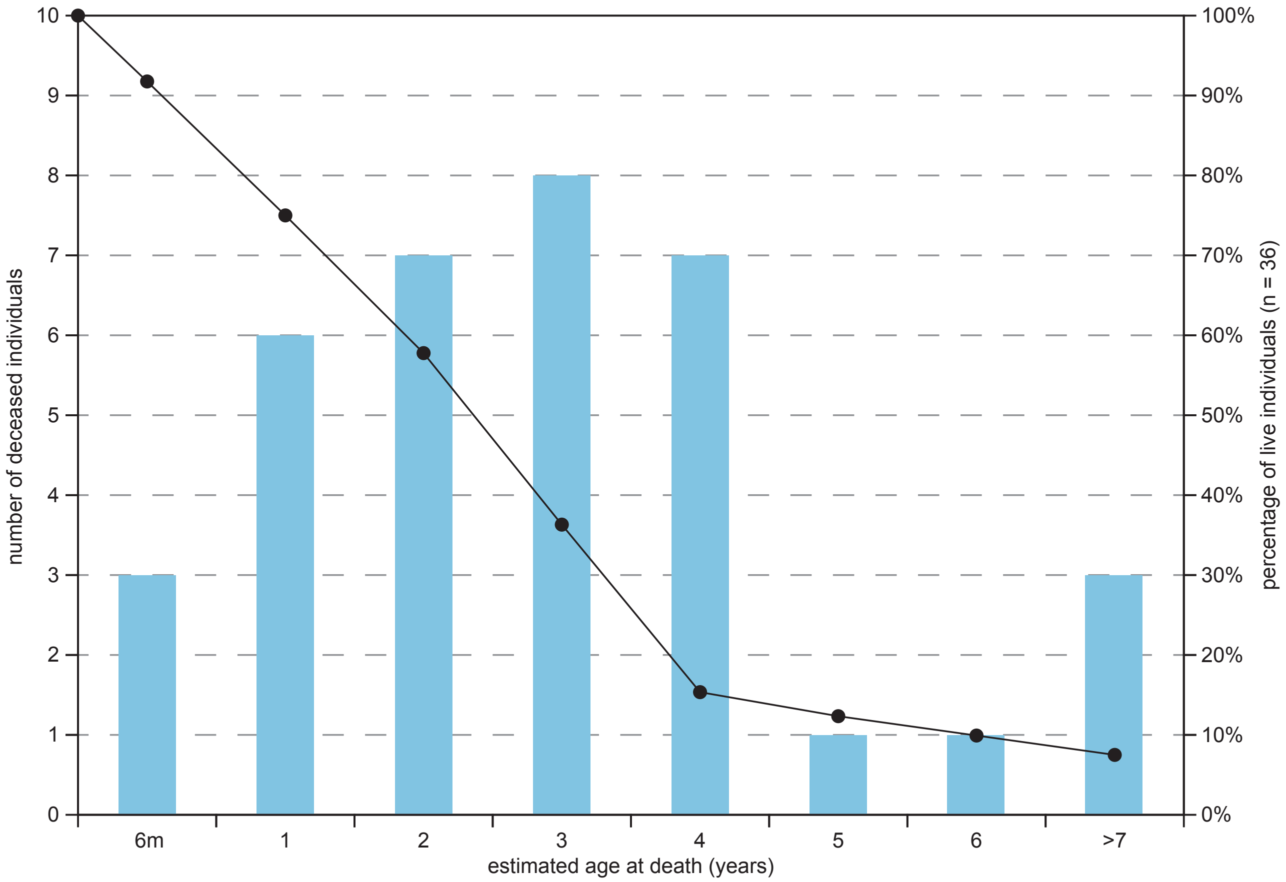

Figure 4.13. Survivorship curve for sheep/goat from Kirikongo based on dentition

example, the tibia and radius). Carnivore damage was rare in sheep/goat and small bovid bones and, as with cattle, was found at Units A, B, and C (Mounds 1, 4, and 3) in contexts to the exterior of occupied space. Rodent damage to small bovid bones was also extremely rare and limited to Units A and B (Mounds 1 and 4).

Wild Small Bovids

Sylvicapra grimmia and *Ourebia oribi* are the two wild small bovids identified in Kirikongo's assemblage. *Sylvicapra grimmia* (common duiker) (Figure 4.14) has a very generalized habitat and requires only adequate brush or other cover within which to hide. (They tend to avoid open plains.) They consume a broad range of foods (both grazing and browse), can survive on water from foods if lush, and can sustain high hunting pressures as they breed twice a year. As a result, common duikers are widely distributed and historically common throughout West Africa south of the Sahel, including in highly populated areas (Abu Baker and Brown 2014; Estes 1991; Kingdon 1982, 2015; Oualiou et al. 2007; Spinage 1986). In contrast, *Ourebia oribi* (Figure 4.15) is an open plains grazer. It is adapted to well-watered grassland environments with seasonal fires and requires access to surface water (Arcese et al. 1995; Estes 1991; Kingdon 1982, 2015; Spinage 1986). The ecological preferences of oribi are similar to those of hartebeest, and both taxa occur in association in repeated contexts at Kirikongo. The distributions of oribi and common duikers overlap significantly, although the range of oribi is slightly smaller, as they tend to avoid more forested locations. Both duikers and oribi are known to raid crops, although given their diverse diets (including browse) and the willingness to live near or within human settlements, common duikers are considered more damaging garden pests.

Forty-one elements could be identified as common duiker or oribi. They occur throughout the entire sequence

Figure 4.14. Common duiker (*Sylvicapra grimmia*). *Illustration by Ethan Schmunk*.

Figure 4.15. Oribi (*Ourebia oribi*). *Illustration by Ethan Schmunk*.

from Yellow I onward. However, as with most hunted taxa at Kirikongo, there is an increase in their frequency during Red III and IV. Utilizing criteria developed by Van Neer (1989) and tested against comparative specimens in multiple collections, in most cases the taxa could be distinguished (20 oribi, 11 common duiker). However, 10 elements were identified as sylvicapra/oribi following conventions used at other archaeological sites. It is likely that a large proportion (perhaps more than one hundred) of the small bovid size-classed bones from Red III and IV were derived from either of these wild animals. Only one confirmed oribi was identified prior to Red III and IV at Kirikongo. It is interesting that the occurrence of oribi, a grazer, follows a pattern similar to that identified for sheep. Its frequency may have increased in later periods due to a combination of the lack of cattle grazing competition and opening of the landscape as a result of the growth of human communities. However, the shift could also simply reflect the preferences of social groups at Kirikongo.

Identified common duiker and oribi elements represent most parts of the skeleton, with an emphasis on appendages. Interestingly, with the exception of several horn cores from specific contexts early in the sequence, few cranial remains of wild small bovids were recovered; almost all small bovid crania and dentition that could be identified to taxon was from domestic sheep or goat, such that size-classed small bovid cranial elements are likely also domestic. If so, crania of wild small bovids were systematically removed. Aging the wild small bovid remains was difficult, as teeth were limited to two broken examples from adult animals. Fusion data indicate that most animals were at least young adults. (There are a few unfused tibiae of small bovids in layers associated with wild small bovids.) However, based upon the fact that oribi tend to reproduce in the rainy season, there is some evidence for multiple seasons of hunting. For example, a humerus and possibly a pelvis from oribi less than one year old suggest that hunting occurred during the immediate dry season after their birth. Conversely, there is evidence for a rainy season hunt in Unit A (Mound 1), where the remains of a fetal bovid with an adult oribi were excavated together.

Cuts and chop marks on wild small bovid remains reflect the dismemberment and division of the carcass. For example, cut marks on the pelvis and proximal femur, scapula, proximal tibia, and first phalanx are from detaching the hind leg, forelimb, lower appendage, and hoof, respectively. Only the cut marks on the metatarsal are likely derived from skinning. Burning of wild small bovid and size-classed small bovid bones is rare except in the Red III and IV layers from Unit B (Mound 4) that may have been produced by larger feasting events. Across three contexts, three leg bones from wild small bovids were burned. They include a femur, a tibia, and a metapodial fragment that may indicate a different cooking strategy, as metapodia were almost always detached prior to cooking.

Medium Bovids

The Kirikongo assemblage included 105 wild medium-size bovid remains, with 19 elements identified to four different wild bovids: bushbuck or dewal (*Tragelaphus scriptus*), sitatunga or marshbuck (*Tragelaphus spekii*), Bohor reedbuck (*Redunca redunca*), and kob (*Kobus kob*) (Table 4.6). In addition, 83 long bone fragments with curvature and cortex indicating wild medium-size bovids were identified, most likely derived from the upper appendages. Given the small size of domestic livestock and the fact that unidentifiable medium-size bovid elements were almost always associated with identified wild taxa, almost all medium-size bovid bones represent wild taxa. A small number of medium size-classed bovid bones could derive from larger sheep or goat individuals and are excluded from this discussion.

As is to be expected given the fragmentation of the assemblage, the rate of taxonomic identification of medium-size bovids was lower (18 percent) than for small bovids (29 percent); however, the wild taxa diversity was greater. Overall, six reedbuck, 11 kob, and one each of bushbuck and sitatunga elements were definitively identified. The 105 elements were found in at least 15 different contexts, some of which had multiple taxa or individuals, and while the minimum number of individual animals is 25, this could be an underestimate. Most medium-size bovid remains were found in Red III and IV deposits and were from contexts with other diverse wild animals.

Medium-size wild bovids inhabit a range of environmental contexts. Bushbucks (Figure 4.16) are solitary antelope restricted to habitats near water with thick vegetation (forests and thickets) (Happold 1987; Kingdon 2015; Spinage 1986). They primarily browse along forest edges and occasionally graze, and their diet includes seasonally available fruit. Due to their diverse dietary preferences, like common duikers, bushbucks can be a garden pest. In comparison, reedbucks are grazers inhabiting plains prone to flooding, droughts, and fires (Happold 1987; Kingdon 2015; Spinage 1986). These unstable environments provide them with grass to consume and hide in, and if green grass is available they don't need access to surface water. Reedbucks (Figure 4.17) tend to live in groups and can be found in large clusters near water sources in the dry season. Kobs (Figure 4.18) are also grazers but live in more stable plains environments near water sources, as they need to drink regularly (Happold 1987; Kingdon 2015; Spinage 1986). They are highly territorial, are group-living, and do not require cover within which to hide. Reedbucks and kobs are both known to raid crops, although they do so more rarely than bushbucks. Sitatunga (Figure 4.19) are a specialized

Table 4.6. Medium bovid summary

		Total	Head	Axial Postcrania	Upper Appendage	Lower Appendage
N identified	wild medium bovid	105	9 (8.6%)	65 (61.9%)	19 (18.1%)	12 (11.4%)
N identified	wild medium bovid + LBF	188 (105 + 83 LBF)	9 (4.8%)	65 (34.6%)	19 (10.1%) + 83 LBF (44.1%)	12 (6.4%)
N burned	wild medium bovid + LBF	32 (17%) + 27 LBF (14.4%)	2 (22.2%)	25 (38.5%)	4 (21.1%) + 27 LBF (14.4%)	1 (8.3%)
N cut marks	wild medium bovid + LBF	21 (11.2%) + 0 LBF (0%)	0 (0%)	10 (15.4%)	6 (31.6)%	5 (41.7%)

Forelimb to hind limb ratio: 12:14 (46.2%/53.8%)

Figure 4.16. Bushbuck (*Tragelaphus scriptus*). *Illustration by Ethan Schmunk.*

Figure 4.17. Reedbuck (*Redunca redunca*). *Illustration by Ethan Schmunk.*

Figure 4.18. Kob (*Kobus kob*). *Illustration by Ethan Schmunk.*

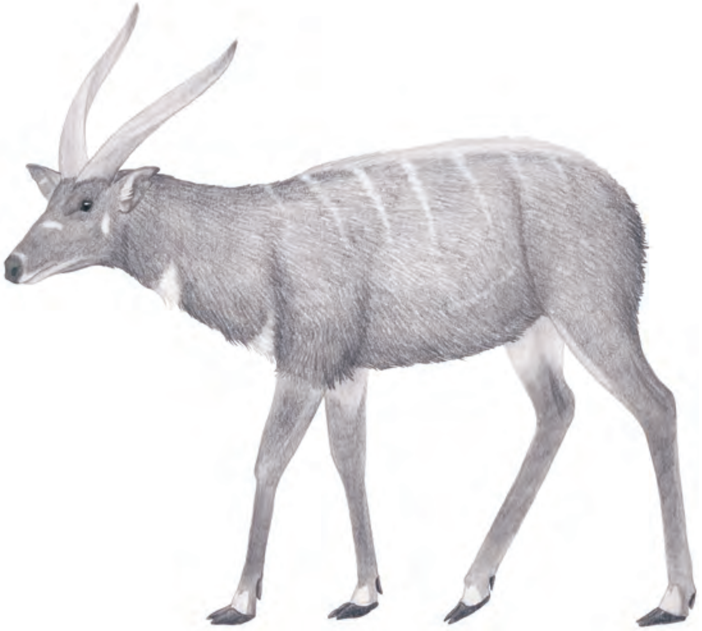

Figure 4.19. Sitatunga (*Tragelaphus spekii*). *Illustration by Ethan Schmunk.*

antelope inhabiting permanent marshes or swamps, where they both graze and browse in (submerged) and around water (Kingdon 2015). They are considered semi-social, sometimes living in small groups. Sitatunga are rare given their very specific habitat requirements and are not historically known to live in Burkina Faso. Kobs and reedbucks, both grassland animals, were more common than the more secretive bushbucks and sitatunga. However, this may be influenced by the particular nature of the contexts, as discussed in chapter 6. Significantly, no elements of the Sahelian red-fronted gazelle were identified at Kirikongo. These are the most common wild medium-size bovid in archaeological sites in northern Burkina Faso, and their absence suggests that the rainfall regime likely remained above 600 to 700 mm throughout the occupation.

Medium-size bovid bones represented most parts of the skeleton. However, cranial elements and those from the lower appendages were rare, indicating likely removal. In one case, the occipital and paraoccipital with preserved foramen magnum of a kob were found with a breakage pattern resulting from removal of the skull. Aside from this and a few loose teeth, the crania and mandibles were missing. The vast majority of recovered remains derive from the upper appendages and the postcranial axial skeleton of the animals, with extensive evidence that some parts were likely butchered and consumed in situ while the majority of the carcass was distributed for consumption elsewhere. Forelimb to hind limb ratios (46 percent to 54 percent) were fairly similar to what would be expected based upon the differential size of limbs. The systematic removal of lower appendages resulted in few remains, most significantly the recovery of only one talus, which was found in a topsoil layer. With very few teeth, little age information is available, although one reedbuck and two kobs from three different contexts had advanced wear on their dentition and likely were older individuals. Fusion data also indicate primarily adult animals, as the two unfused elements were late fusing.

Medium-size bovid bones were extensively burned, with 30 percent of identified and 33 percent of long bone fragments charred. Some contexts had particularly high burning rates and were likely associated with feasting following large-scale hunting events. While burning was largely restricted to the non-cranial axial skeleton and upper appendages, in these contexts there is some evidence for roasting large sections of animals whole, with burning on the few cranial remains and lower appendages (including toes). Burning was frequent at Unit B (Mound 4), as this is where the larger feasting events were localized. Similarly, cut and chop marks were identified at high frequencies on medium-size bovid skeletons. However, this may also be a function of the concentration of this assemblage in larger feasting contexts. Cut marks occurred on 20 percent of identified elements and were almost exclusively found at articulations (often identified in proximity to distinctive epiphyseal morphologies). These locations generally indicate dismemberment (femoral head, proximal tibia), but there is also evidence for the chopping of vertebrae to divide the left and right sides of the carcass and for sectioning the rib cage. A few cut marks on metapodia may indicate skinning marks. Not a single long bone fragment (mostly mid-shaft) had cut marks. Minor carnivore chewing was found on several elements.

Wild Medium-Large and Large Bovids

The assemblage included 113 identified elements of wild large and medium-large bovids (Table 4.7). All identified elements were from non-bovine (cattle or African buffalo) bovids that have more gracile limbs. Nineteen elements could be assigned to a taxon, with the only medium-large taxon, the hartebeest (*Alcelaphus buselaphus*), represented by 10 elements and a large bovid, the roan antelope (*Hippotragus equinus*), represented by nine elements. Hartebeest and roan antelope were recovered only in layers that postdated cattle at Kirikongo, and all the wild large and medium-large bovid elements discussed in this section are likewise from Red III and IV. As would be expected, the identification rate of these larger bovids is lower (17 percent) than that for small and medium-size bovids and even lower when one considers that seven of those elements are from a roan antelope cranium in a single Red IV context. In addition to identified elements, 110 long bone fragments are from contexts that postdate cattle husbandry and likely derive primarily from the upper appendages of wild large and medium-large bovids.

Roan antelope (Figure 4.20) are adapted to the more humid wooded savanna region, where they live in small herds with seasonal aggregations within 15 km of

Table 4.7. Medium-large and large bovid summary

		Total	Head	Axial Postcrania	Upper Appendage	Lower Appendage
N identified	wild medium-large and large bovid	113	20 (17.7%)	48 (42.5%)	27 (23.9%)	18 (15.9%)
N identified	wild medium-large and large bovid + LBF	224 (113 + 111 LBF)	20 (8.9%)	48 (21.4%)	27 (12.1%) + 111 LBF (49.6%)	18 (8%)
N burned	wild medium-large and large bovid + LBF	23 (10.3%) + 39 LBF (17.4%)	2 (10%)	15 (31.3%)	4 (14.8%) + 39 LBF (35.1%)	2 (11.1%)
N cut marks	wild medium-large and large bovid + LBF	38 (17%) + 6 LBF (2.7%)	2 (10%)	14 (29.2%)	13 (48.1%) + 6 (5.4%)	9 (50%)

Forelimb to hind limb ratio: 17:23 (42.5%/57.5%)

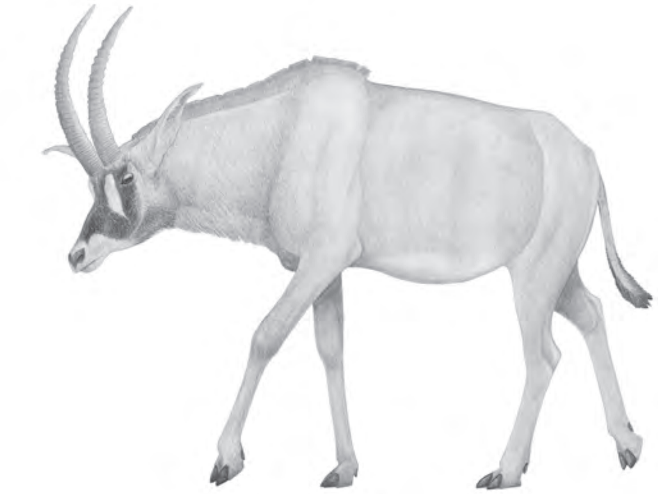

Figure 4.20. Roan antelope (*Hippotragus equinus*). *Illustration by Ethan Schmunk.*

Figure 4.21. Hartebeest (*Alcelaphus buselaphus*). *Illustration by Ethan Schmunk.*

permanent water (Havemann et al. 2016; Kingdon 1997, 2015; Poché 1974; Schuette et al. 1998; Spinage 1986). In addition to browsing, they are highly selective grazers of particular grasses that grow on nutrient-poor soils and consequently tend to prefer locations on the woodland edge with low productivity and little feeding competition. While roan antelope favor smaller clearings in wooded landscapes, hartebeest inhabit the edges of larger grassland areas, where they have the option of entering neighboring woodland and thickets. Hartebeest (Figure 4.21) are specialized grazers of perennial grasses (their elongated snouts are an adaptation), and they avoid areas with cattle due to competition (Estes 1991; Kingdon 2015; Schuette et al. 1998). When surface water is available, they drink regularly, but they are fairly resilient to environments with limited water. It is interesting that both taxa dislike competition with cattle (Djagoun et al. 2013, 2014) and appear at Kirikongo for the first time in Red III following the rejection of cattle husbandry.

At Kirikongo, hartebeest were identified in at least four different contexts. However, as this is the only taxon identified in this size class, and since similarly sized wild bovid remains were recovered in several more contexts, it is possible that hartebeest were frequently hunted. One context had the same carpal bone from two differently sized individuals, perhaps reflecting the hunting of a herd. As mentioned above, hartebeest share environmental preferences with oribi and were commonly recovered in contexts yielding oribi bones. Roan antelope was positively identified in two contexts at Unit B (Mound 4), and there are several other contexts in which a wild bovid larger than hartebeest was found.

Elements from throughout the body were identified, with lower frequencies of cranial elements and lower appendages and more common occurrence of the non-cranial axial skeleton and upper appendages. This pattern becomes even stronger when the roan antelope cranium is taken into account. As with small and medium-size bovids, crania and lower appendage elements may have been systematically removed. Aging of the identified medium-large and large bovid elements was limited due to a lack of dentition and epiphyses. However, the roan antelope cranium had extensive wear on both the upper and lower dentition, and the individual was clearly quite old when killed. Most postcranial elements were fused, although younger, prime-age individuals may be marked by an unfused distal tibia and an unfused calcaneus in different Red III contexts in Unit B (Mound 4).

Around a third of elements were marked by cut or chop marks, with both found in similar frequencies. In general, the cut marks indicate dismemberment of joints (for example, carpals with cut marks from disarticulation of lower appendages), while the chop marks indicate division of the carcass, with several vertebrae suggesting the partition of the carcass into left and right portions. Burning was fairly common on large and medium-large bovid bones, once again primarily on the postcranial axial skeleton and upper appendages. Both cranial elements burned were from one context, as were the two lower appendicular elements; the latter came from a context that may have had animals roasted whole in a feasting event. What is clear is that parts of the animals were butchered and cooked in situ, with some parts consumed and others likely distributed. A few elements attested to minor carnivore chewing.

Figure 4.22. Maxwell's duiker (*Philantomba maxwelli*). *Illustration by Ethan Schmunk.*

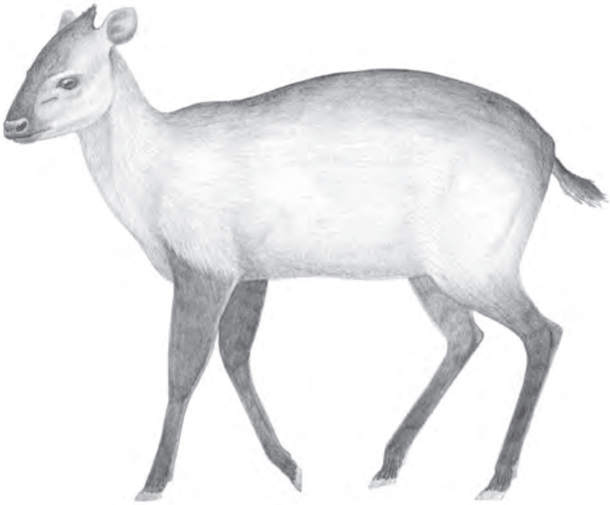

Figure 4.23. Red-flanked duiker (*Cephalophus rufilatus*). *Illustration by Ethan Schmunk.*

Very Small Bovids

Twelve elements were identified as very small bovids. Most of the bones are likely from the red-flanked duiker (*Cephalophus rufilatus*). However, one context contained an even smaller bovid that was most similar in size and morphology to Maxwell's duiker (*Philantomba maxwelli*) (see Hofmann and Roth 2003; Kingdon 2015). Maxwell's duiker (Figure 4.22) is a forest frugivore that prefers locations where there is little undergrowth below trees. They consume occasional foliage and animal matter, depending upon the season. Their distribution is primarily in rain forest contexts, but they also inhabit gallery forest in wetter savanna regions. Today, their distribution is to the south of Burkina Faso. The red-flanked duiker (Figure 4.23), as a forest relict and riverine gallery forest taxon, is a specialist in wet savannas and still lives in southern Burkina Faso today. It consumes fruits, flowers, and foliage. Forest duikers were identified in four different contexts starting in Yellow II but were found only in Units B and C (Mounds 4 and 3).

More than half of the remains derived from the postcranial axial skeleton, with several lower appendicular fragments, a fairly large number of vertebrae compared to larger taxa, and only one upper appendage and mandibular fragment. The lack of upper appendages could imply that entire legs were distributed with less processing due to their size. A mandible with a deciduous pm2 that had extensive wear is the only aging data available, indicating a younger prime adult individual, and other bones were all fused. No burning is indicated, but a cut mark on a red-flanked duiker third phalanx in Red IV suggests hoof removal.

Canids

The 132 canid bones identified in excavations at Kirikongo are attributable to either domestic dog or jackal, most likely the side-striped jackal (*Canis adustus*) given the humid savanna environment (Table 4.8). As described in chapter 3, domestic dogs were a later arrival than livestock into the savanna region of West Africa, with the earliest evidence from the Seno Plain site of Nin-Bere in the mid-first millennium BC (Ozainne 2013). Little is known about the uses of the earliest dogs in savanna West Africa, whether for hunting, herding, guarding, companionship, food, sacrifice, or a combination of uses. Distinction between dog bones and those of indigenous African canids such as jackals and the African hunting dog is currently limited to morphometric features of the cranium, mandibular robusticity, and dental size and features (Linseele 2007; MacDonald and MacDonald 2000). Tests of these criteria against archaeological assemblages have generally confirmed their utility. However, as is to be expected given the phenotypic plasticity of dogs, it is clear that there is quite a bit of variability in archaeological African dog populations. While large dogs have been identified in the Middle Senegal River Valley, those in northern Burkina Faso are smaller and overlap with jackals, particularly *Canis adustus* (Linseele 2007; MacDonald and MacDonald 2000). However, even in the best of cases, very few recovered canid remains can be positively identified given that cranial and mandibular elements are often only a small percentage of assemblages. For postcranial elements, it is possible only to determine which indigenous canids dogs may overlap with. (For example, large dogs are generally indistinguishable from *Lycaon pictus*, while small ones are similar to *Canis adustus* or *Canis aureus.*) As will be described for Kirikongo's assemblage, large-scale hunting of jackals cannot be discounted for West African assemblages, and Linseele's (2007) argument that the large numbers of canid bones in Middle and Late Iron Age contexts in Oudalan are likely to be domestic dog based upon this criterion should be reconsidered. A common additional line of evidence for dog presence is carnivores chewing on bones.

The canid remains from Kirikongo included an extensive assemblage of cranial and postcranial elements distributed widely throughout the sequence. According to both the established cranial criteria and contextual evidence, the Kirikongo assemblage contains both domestic dogs and jackals (likely *Canis adustus*) (Figures 4.24–4.26). Dogs were present and likely consumed from the start of the sequence in the early first millennium AD, and there is a strong likelihood that extensive jackal hunting began in Red III and IV. Kirikongo's dogs are some of the oldest identified in West Africa, only a few centuries after those from Jenne-jeno and contemporary with those from northern Burkina Faso. Confirmation of domestic dog presence at Kirikongo is available through

Table 4.8. Canid summary

		Total	Head	Axial Postcrania	Upper Appendage	Lower Appendage
N identified	canid	132	24 (18.2%)	40 (30.3%)	25 (18.9%)	43 (32.6%)
N identified	canid + LBF	171 (132 + 39 LBF)	24 (14%)	40 (23.4%)	25 (14.6%) + 39 LBF (22.8%)	43 (25.1%)
N burned	canid + LBF	26 (15.2%) + 8 LBF (4.7%)	4 (16.7%)	12 (30%)	4 (16%) + 8 LBF (20.5%)	6 (14%)
N cut marks	canid + LBF	2 (1.2%) + 0 LBF (0%)	0 (0%)	1 (2.5%)	0 (0%)	1 (2.3%)

Forelimb to hind limb ratio: 18:28 (39.1%/60.9%)

three mandibular fragments, including one complete mandible (Figure 4.27) from the earliest subphase (Yellow I) that clearly derives from domestic dog and one each from Yellow II and Red IV. Dentition closely resembling that in the complete dog mandible was also found in Red I and from another individual in Yellow I. In addition, there was consistent minor dog chewing on bones in contexts at Kirikongo, in spaces outside the interior of architectural units, implying that dogs were kept in exterior areas. A jackal mandible that plots clearly with the side-striped jackal (*Canis adustus*) was identified in Red IV (Figure 4.25). The existence of two populations is supported by measurements of postcranial elements, with the smaller one appearing along with the aforementioned jackal mandible and in another context likely containing jackal.

While diverse parts of canids were identified in the earliest subphase at Kirikongo, after Yellow I there was an emphasis on cranial elements and paws in most contexts. In Red III and IV, when the smaller canid appeared, crania become less common and paws are joined by increasing numbers of upper appendages and parts of the axial skeleton. As a result, parts of lower appendages, particularly metapodia, were highly represented in comparison to bovids throughout the sequence, while crania were overrepresented until Red III and IV, where frequencies are similarly low, indicating the removal of the cranium. In these contexts there is more evidence for in situ canid consumption, with higher frequencies of upper appendages and long bone fragments. Interestingly, the jackal mandible from Red IV had its teeth systematically removed. Forelimb and hind limb frequencies were around 39 percent and 61

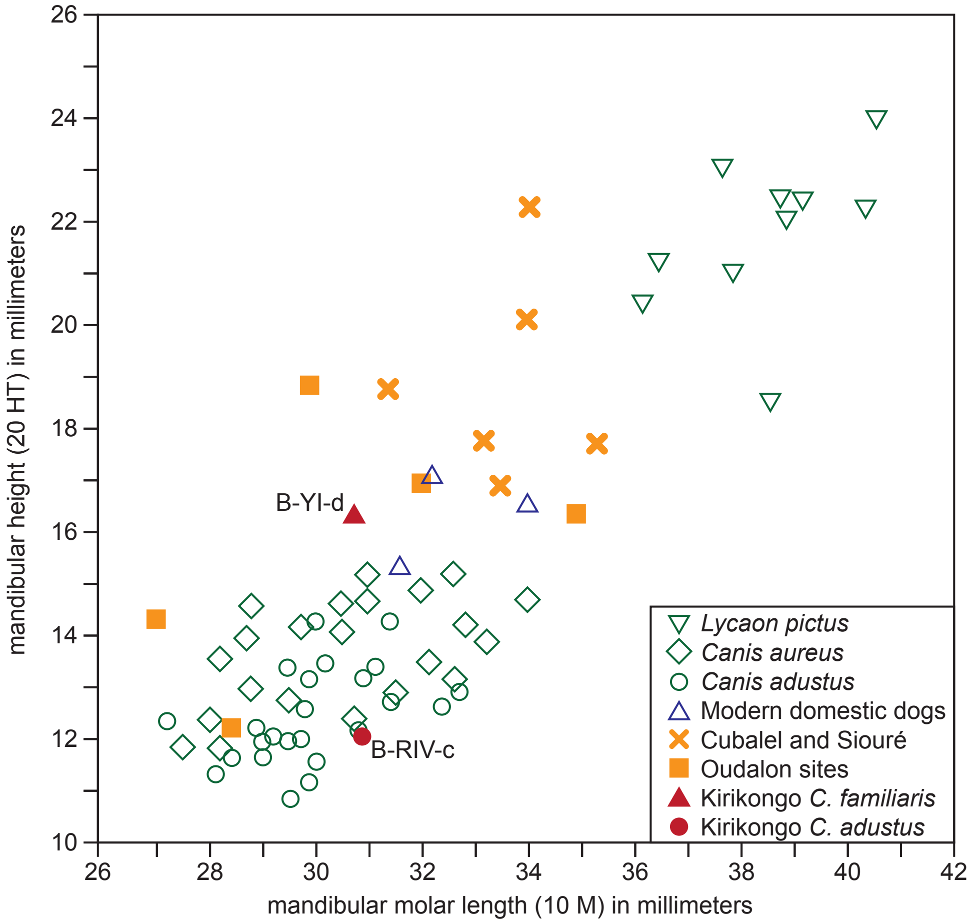

Figure 4.24. Mandibular height (20 HT) and mandibular molar length (10 M) of domestic dogs and jackals. Adapted from Linseele's 2007:60 adaptation of MacDonald and MacDonald 2000:138.

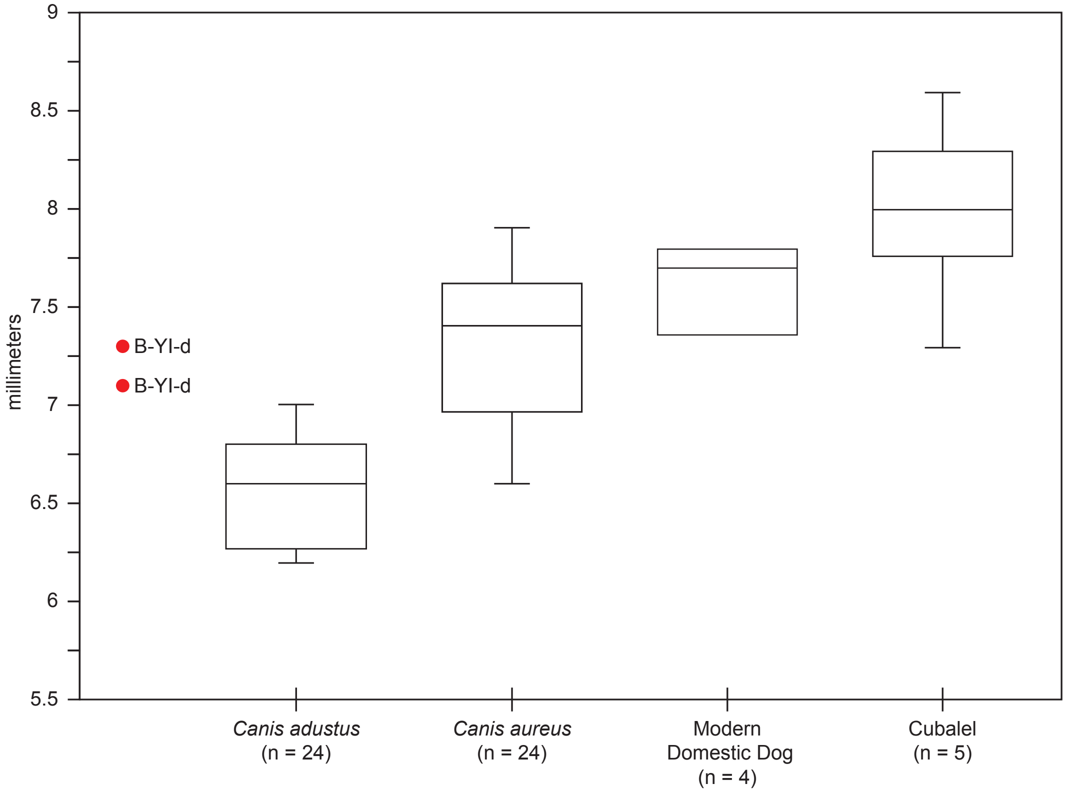

Figure 4.25. Breadth of first mandibular molar in African canids. Adapted from MacDonald and MacDonald 2000:137, after von den Driesch 1976.

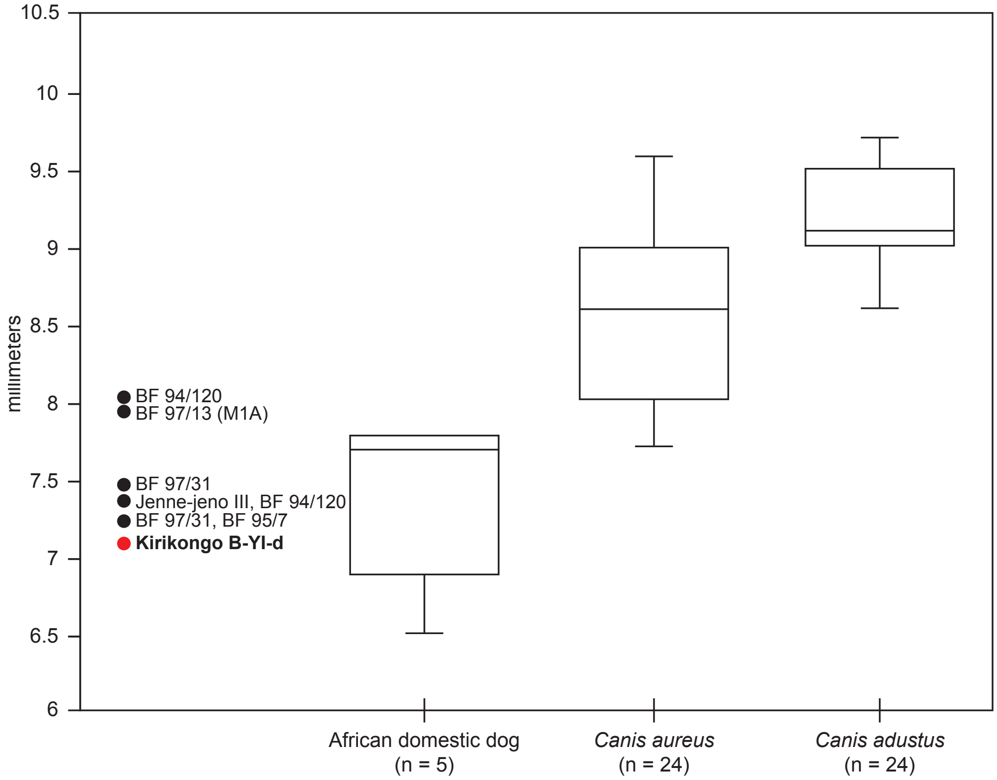

Figure 4.26. Length of second mandibular molar of domestic dogs and jackals. Adapted from Linseele's 2007:60 adaptation of MacDonald 1995b:318.

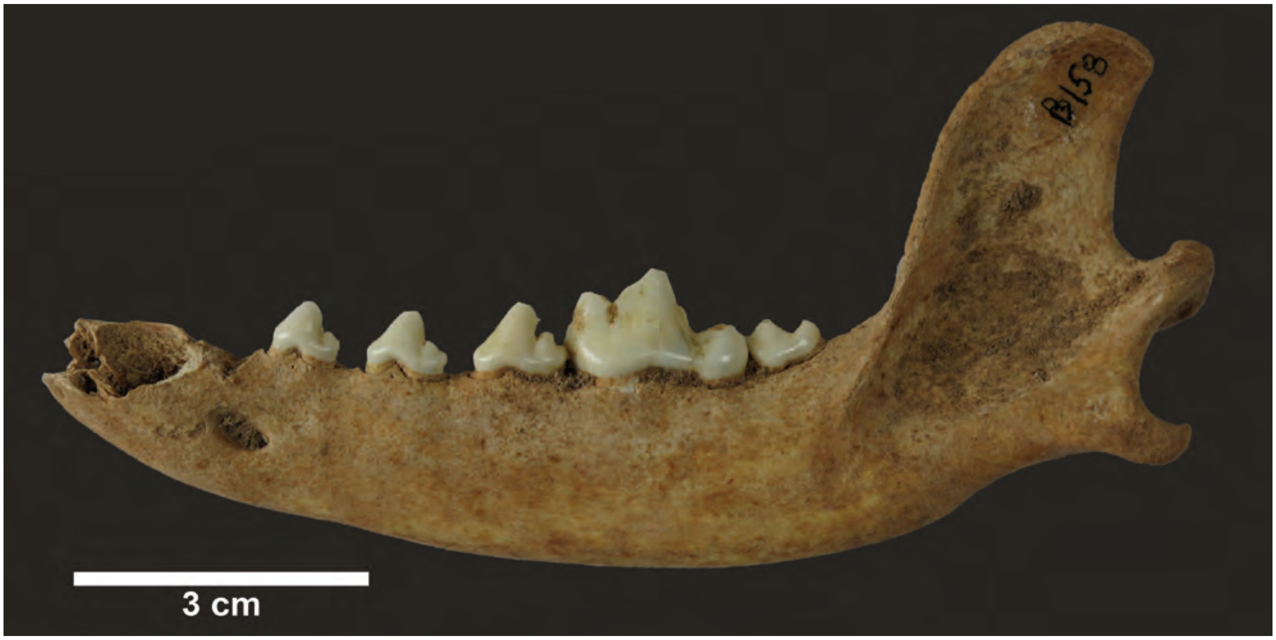

Figure 4.27. Dog mandible from Kirikongo (B-YI-d)

percent, slightly overrepresented on rear limbs, which, due to their longer length, would be expected to be found in higher frequency. Notably missing in almost all contexts were phalanges, tarsals, and carpals.

Aging of canid dentition is difficult, and there is no standard coding system. However, all identified canid teeth were from adults, with permanent dentition and active wear. While fusion data are limited for the early sequence, most remains derived from adult animals (Figure 4.28). In contrast, the expanded data set in Red III and IV from Unit B (Mound 4) includes a large number of partially fused and unfused canid elements. Many of the unfused elements are metapodia that fuse between eight and 10 months in dogs; they consequently represent puppies in their first year of life. While it is possible that these remains derive from domestic dogs, there is strong circumstantial evidence that they belong to jackals. The pits in which they were found included diverse wild animals from extensive collective hunts, the positively identified jackal mandible is associated with these remains, and the mixed-age canid population in the pits resembles zoological data regarding the social practices of side-striped jackal families.

The side-striped jackal is a humid woodland/savanna canid and the only jackal known to inhabit the forest/savanna mosaic on the edge of the forest (Kingdon 1997, 2015). They eat a highly diversified diet of fruits, small mammals, insects, and occasional carrion (Atkinson et al. 2002). They live in monogamous mating pairs that create family units after producing puppies in the rainy season. At this point they inhabit dens excavated into termite mounds, aardvark holes, or hillsides until late in the dry season, when puppies become more mobile (Kingdon 1997, 2015). The remains from Red III and IV resemble what one would expect from the hunting of a jackal group near its den, as the metapodia were not close to fusing and likely represent an early or mid–dry season hunt.

Canids throughout the occupation were likely consumed, as many bones were burned in ways that indicate roasting (for example, charred epiphyses and uncharred long bones shafts). Data suggest that in some cases animals may have been roasted whole, as crania, metapodia, limbs, and the axial skeleton have evidence for burning. Burning was particularly high in Red III and IV from the contexts where the jackal family was identified; 26.6 percent of canid bones from those layers were burned as opposed to 12 percent elsewhere. Cut marks and chop marks were identified on only two canid elements from Red III and Red IV. However, cut marks are more common at Kirikongo

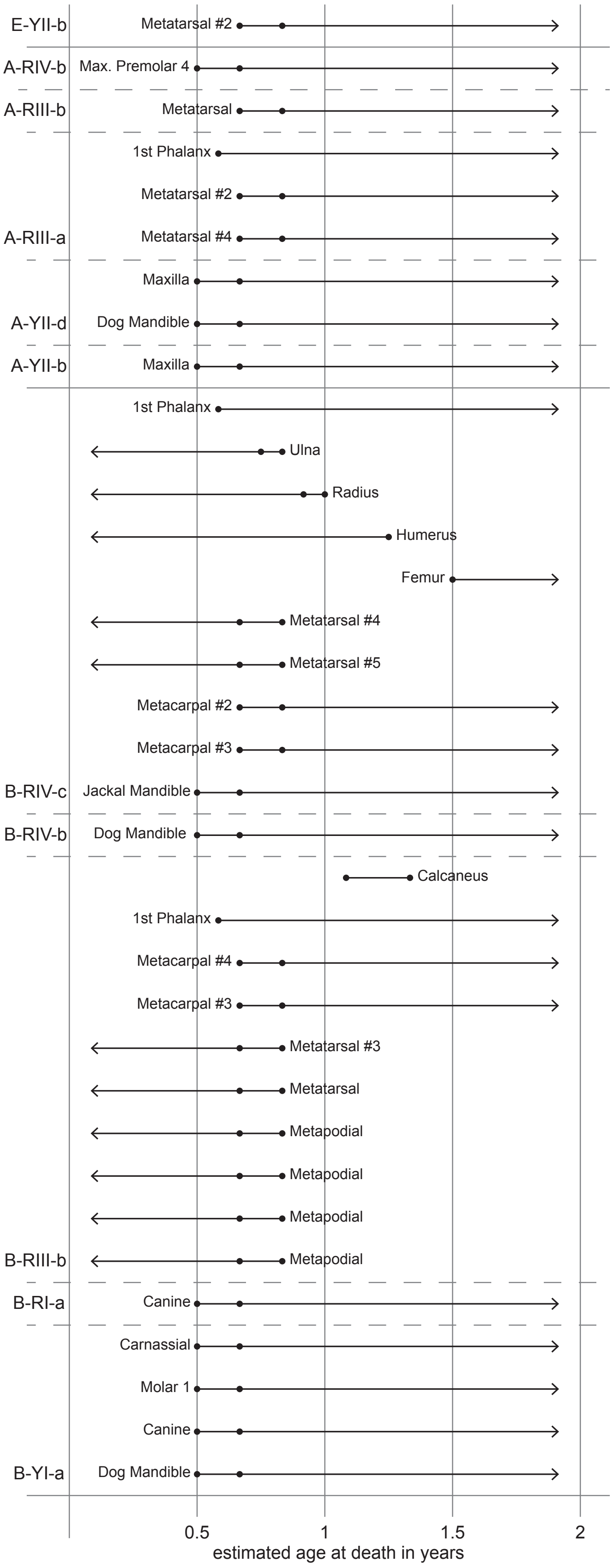

Figure 4.28. Estimated age at death for Kirikongo canids

as animal size increases (likely requiring more force to disarticulate), and the levels of cut marks on canids are not significantly lower than those on small bovids, which have a larger body size.

In summary, Kirikongo contains some of the oldest positively identified domestic dog remains in savanna West Africa. From the morphological and aging data, it would seem that adult domestic dogs were present from the founding of the site and that they were joined in the faunal assemblage by hunted juvenile and adult jackals in Red III and IV. The likelihood that large-scale jackal hunts produced 56 percent of canid remains at Kirikongo raises the possibility that a similar increase in canids in northern Burkina Faso could likewise derive from new hunting practices.

Cats

Four elements were identified as domestic cat or African wildcat (*Felis sylvestris*) (Table 4.9). As discussed in chapter 3, the history of cats in sub-Saharan Africa is poorly understood. Means of reliable distinction between domestic and wild cat skeletons are currently limited (O'Connor 2007), and the presence of domestic cats is therefore primarily argued on the basis of contextual information such as biogeography (cats found on islands; Vigne et al. 2004), cultural treatments that imply human–cat relationships (mortuary use, iconography, mummification, and evidence for care; Malek 1997), or probabilistic reasoning due to the existence of sedentary contexts and favorable habitat. The latter has not been fully theorized.

Domestic cats are fundamentally a sedentary commensal taxon that has many different cultural roles throughout the planet but is tied to the development of human communities and settlement ecologies. Consequently, local histories of cat use are intricately intertwined with changes in human mobility strategies and the creation of hamlets and village settlements, or urban contexts. In the African context, as in other parts of the world, the presence of cat bones in archaeological sites (e.g., Jousse 2017; MacDonald and MacDonald 2000) is not necessarily indicative of domestic animals, as hunting wild felids for skins and ritual uses of cats are known ethnohistorically (see Dueppen and Gokee 2014). More detailed localized morphometric studies of cat remains

Table 4.9. Small carnivore summary

		Total	Head	Axial Postcrania	Upper Appendage	Lower Appendage
N identified	small carnivore	15	8 (53.3%)	1 (6.7%)	3 (20%)	3 (20%)
N burned	small carnivore	2 (13.3%)	1 (12.5%)	0 (0%)	1 (33.3%)	0 (0%)
N cut marks	small carnivore	0				

Forelimb to hind limb ratio: 3:2 (60%/40%)

coupled with isotopic analyses of diets or ancient DNA could potentially provide more substantial evidence for the presence of domestic cat in sites. African wildcats live in the abandoned dens of other animals and, like domestic cats, eat a wide range of foods, including insects and small vertebrates (Kingdon 2015).

At Kirikongo, the domestic or wild status of the four cat elements is uncertain. The two early contexts were highly ritualized (Yellow I atop a pit deposit and a Yellow II iron-working forge) and contained a mix of domestic and wild taxa, including many wild carnivores atop the pit context. The Red IV context similarly contained a variety of domestic and wild taxa. Cat elements were either mandibular or metapodial, similar to patterns found in canid and small carnivore distributions. The teeth were slightly worn permanent dentition, and the metapodial was fused, indicating that the animals were adults. No taphonomic damage or cut marks were found on the bones.

In addition to the small cats, one first phalanx from Red IV is attributable to a medium-size felid, either a caracal (*Caracal caracal*) or a serval (*Leptailurus serval*). Serval cats (Figure 4.29) have historically been hunted for their skins (see Dueppen and Gokee 2014) and possibly for protection of domestic fowl. Serval cats inhabit grassland savanna on the edge of gallery forests and primarily eat small rodents and birds. Caracals, which are less frequently hunted, inhabit more forested contexts and rocky outcroppings, eating similar prey (Kingdon 2004). The element derives from a context with many other animals hunted for commodity production and therefore may be from a serval cat.

Figure 4.29. Serval (*Leptailurus serval*). *Illustration by Ethan Schmunk.*

Figure 4.30. Civet (*Civettictis civetta*). *Illustration by Ethan Schmunk.*

Civets

Civets (*Civettictis civetta*) are represented by a single unfused calcaneus. Civets (Figure 4.30) are large solitary carnivores found throughout sub-Saharan Africa (Kingdon 2004). Their wide distribution is enabled by an almost omnivorous diet ranging from vertebrates to insects, fruits, and vegetables, and breeding patterns that allow them to breed up to three times a year. Historically civets were hunted for their furs and for their musk, which was used as a main ingredient in perfume recipes. The civet element is from Red IV at Unit B (Mound 4), in a pit that contained many animals typically hunted for commodity production.

Mongooses

At least three mongoose taxa were identified at Kirikongo in contexts ranging from Yellow I to Red IV (Table 4.9). These include *Mungos mungo*, *Herpestes sanguinea*, and a larger mongoose that is either *Ichneumia albicauda* or *Atilax paludinosus*. *Mungos mungo* (Figure 4.31) is a small gregarious mongoose that inhabits the wooded savanna, as it does not prefer thick forest but needs undergrowth to hide in and often lives in termite mounds in proximity to water (Kingdon 2015). Its main prey is insects, including beetles, ants, and termites. At Kirikongo, one mandible from Yellow I with deciduous dentition is identified to *Mungos mungo*, and a nearby unfused pelvis from the same context may be from the same individual and/or taxon.

The slender mongoose (*Herpestes sanguinea*) (Figure 4.32) is also a small, solitary mongoose that inhabits savannas in locations where there is adequate cover (Kingdon 2015). They tend to live in termite mounds, rock piles, or crevices. Their prey includes a greater proportion of small vertebrates, including rodents, snakes, and birds. *Herpestes sanguinea* was identified in two different contexts: a fused humerus in Red IV and a mandible with permanent dentition from Red II.

The larger mongoose represented by a humerus from Red IV may be a white-tailed mongoose (*Ichneumia albicauda*), a solitary savanna animal that hunts small vertebrates and insects, including termites, or a marsh mongoose (*Atilax paludinosus*) (Figure 4.33), which resides in close proximity to water, including swamps, and consumes snails and aquatic resources (Kingdon 2015). Marsh mongoose may be the more likely identification given that the associated fauna derives from riverine aquatic habitats and the adjacent gallery forest. The humerus was burned, and this taxon may have been consumed.

Figure 4.31. Banded mongoose (*Mungos mungo*). *Illustration by Ethan Schmunk.*

Figure 4.32. Slender mongoose (*Herpestes sanguinea*). *Illustration by Ethan Schmunk.*

Figure 4.33. Marsh mongoose (*Atilax paludinosus*). *Illustration by Ethan Schmunk.*

Mongooses are remarkably common in archaeological assemblages in central West Africa and have been found at multiple sites in northern Burkina Faso (Linseele 2007), at Jenne-jeno in Mali (MacDonald 1995b), and in early agricultural settlements in the Gobnangou region of southeastern Burkina Faso (Dueppen and Gallagher 2013). At Kirikongo, they are associated with ritual deposits, but at least the larger taxon, if not all mongooses, may have been hunted for its fur as well (Figure 4.34). The association between termites, subterranean environments, and mongooses will be explored in chapter 6.

Figure 4.34. Slender mongoose mandible, C-RII-a

Micro-Carnivores (Shrews)

White-toothed shrews (*Crocidura* sp.) (Figure 4.35) are widespread throughout the African continent (Dubey et al. 2007; Kingdon 2015). They consume a wide array of small insects (including termites) and very small vertebrates. Three different contexts at Kirikongo yielded four shrew elements, all cranial fragments except one humerus. A shrew mandible was identified in Yellow I from Unit B (Mound 4) in a context with the mandible or cranial fragments of multiple wild and domestic carnivores, suggesting that the shrew was not intrusive. Similarly, a complete shrew head (cranium and mandible) and a maxillary of a shrew were found in the burned Red III ritual complex at Unit B (Mound 4) (Figure 4.36). The context in which they were found suggests that these too may not have been intrusive commensals, as only the cranial fragments were identified. Had the animal been killed during the destruction of the architectural unit, one would expect to have recovered multiple body parts. In addition, the humerus of a shrew was identified in Red II at Unit B. All of the identified elements were similar in size to *Crocidura olivieri* comparative specimens, although positive identification to a particular taxon was not possible.

Figure 4.35. White-toothed shrew (*Crocidura* sp.). *Illustration by Ethan Schmunk.*

Figure 4.36. Shrew cranium from Kirikongo (B-RIII-a). Note red color from low-temperature burning.

Primates

Excavations yielded five elements from monkeys, spanning Yellow I to Red IV. Two taxa were positively identified: the patas monkey (*Erythrocebus patas*) and the green monkey (*Chlorocebus sabaeus*), both of which are typical savanna primates. Patas monkeys are group-living omnivores that inhabit open savanna environments (Ginn and Nekaris 2014; Kingdon 1971, 2015; Menbere 2016). Their diet is a mix of fruits, insects, vegetables, leaves, roots, and animal matter (eggs, small animals), and they are a common garden pest due to a strong preference for vegetables. The green monkey is more linked to trees than the patas monkey, as it is less adapted to terrestrial locomotion (Haus et al. 2013; Kingdon 2015). They are common in riverine forests within the savanna and tend to forage on the edges of more open areas. Like the patas monkey, they are omnivorous, consuming everything from insects to herbs, but food derived from trees is the primary component of their diet. They are also known to raid crops.

The patas monkey was represented by a maxillary fragment with two fragmented incisors from Yellow I. A mandible with teeth removed and a humerus fragment from Red IV were identified as green monkey. Two fragmented monkey canines recovered from Red III and Red IV could be from either taxon. The Red III canine is burned, perhaps suggesting that the animal was cooked. Overall, four of five monkey elements are cranial or mandibular, similar to a pattern found in carnivores.

Warthogs

Twenty-four suid bones were recovered from excavations at Kirikongo (Table 4.10). All suid dentition was positively identified as warthog (*Phacochoerus africanus*). Little is known of the history of domestic pigs (*Sus scrofa*) in sub-Saharan West Africa, as identifications of pigs in archaeological assemblages all date to within the last 500 years (see MacDonald and MacDonald 2000). While it is theoretically possible that some of the suid remains are domestic pig, the presence of warthog teeth in almost all levels with other suid elements supports the attribution of all suid bones at the site to warthog. Warthogs (Figure 4.37) are suids that tend to avoid dense brush and forests, making them well adapted to savanna environments (Happold 1987; Hema et al. 2017; Kingdon 2015). They are gregarious and live in groups of varying size, depending on the time of year. Warthog diets are seasonally variable, as they consume primarily grass in the rainy season and tubers and rhizomes in the dry season. They require access to surface water and tend to wallow during the dry season.

Warthog elements were found at Units C and B (Mounds 3 and 4), mostly from Red III and IV, with the exception of a burned incisor from Red II at Unit C. The warthog assemblage included primarily parts from the cranium, postcranial axial skeleton, and upper appendages; only one element was identified from a lower appendage. Interestingly, only parts of the forelimb of warthogs were recovered from excavations. This may indicate that the hind limbs were distributed and forelimb meat was consumed in situ.

Based upon dentition, warthogs of different ages were hunted and sometimes were found within the same context, suggesting that a family group had been targeted. For example, a Red IV context contained a deciduous warthog premolar and an extensively worn permanent suid incisor. In a different Red IV context, an impressively large adult warthog cranium and mandible with a third molar in active wear (Figure 4.38) were found alongside a much smaller warthog with an unfused metacarpal. Finally, an unfused

Table 4.10. Suid summary

		Total	Head	Axial Postcrania	Upper Appendage	Lower Appendage
N identified	warthog	24	7 (29.2%)	10 (41.7%)	6 (25%)	1 (4.2%)
N identified	warthog + LBF	26 (24 + 2 LBF)	7 (26.9%)	10 (38.5%)	6 (23.1%) + 2 LBF (7.7%)	1 (3.8%)
N burned	warthog + LBF	10 (38.5%)	2 (28.6%)	6 (60%)	2 (33.3%)	0 (0%)
N cut marks	warthog + LBF	1 (3.8%)			1 (16.7%)	

Forelimb to hind limb ratio: 7:0 (100%/0%)

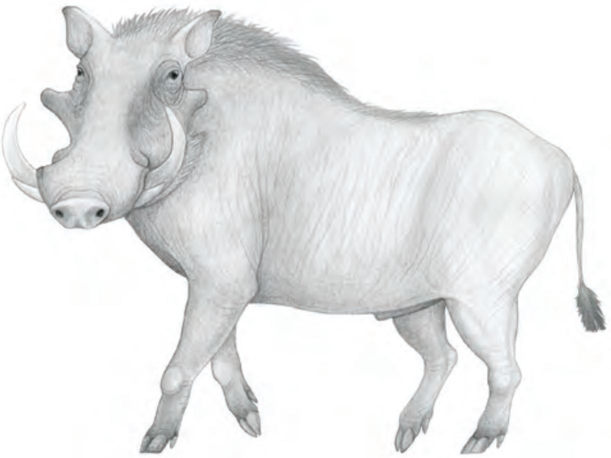

Figure 4.37. Warthog (*Phacochoerus africanus*). *Illustration by Ethan Schmunk*.

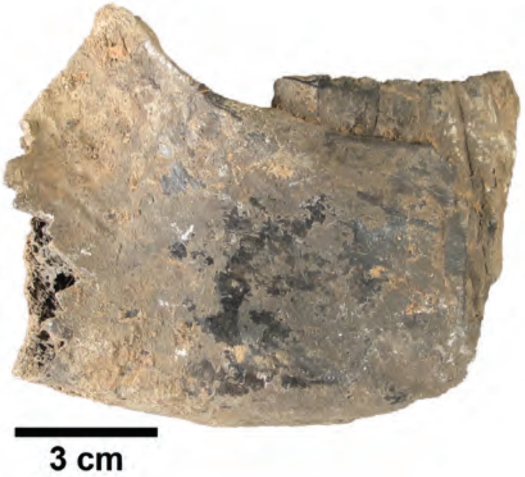

Figure 4.38. Warthog mandible with third molar from Kirikongo (B-RIV-c)

ulna was identified in Red III deposits that also contained the ribs of a much larger suid. Particularly regarding the Red IV large individual, warthogs may have also been hunted for ivory.

Around one-third of suid bones were burned, a high frequency that may speak to the nature of the contexts in which warthogs were consumed. While the nature of burning is less clear in Red III, it is possible that in Red IV warthogs were roasted whole, as burning extends from the mandible to pelvis, down the front appendage, and onto the ribs. One warthog radius had several cut marks on the distal shaft, perhaps related to skinning. Two warthog bones had evidence of carnivore chewing.

Hippopotami

Two identifiable elements (a first phalanx and a metapodial fragment) attributable to hippopotamus and a megafaunal long bone fragment were identified in one Red IV deposit in Unit B (Mound 4). Hippopotami are very large grazers that inhabit waterways throughout sub-Saharan Africa (Dibloni et al. 2012; Kingdon 2015). Highly territorial and gregarious, hippopotami require deep water in which to submerge during the day and extensive stands of grass near the river to graze on at night. Hippopotamus hunting is extremely involved and dangerous, and their remains are not very common at archaeological sites in West Africa. In general, it is thought that hippos were primarily hunted for ivory, although they also produce large amounts of meat and their tough hides were historically used for shields or armor (see Dueppen and Gokee 2014). The metapodial was chopped in half laterally, perhaps from extraction of marrow.

Equids

Two equid elements were identified at Kirikongo, one from Red II and another from Red III, dating to the twelfth and thirteenth centuries, respectively. Partial fragments of domestic equids are often difficult to distinguish to a specific taxon, but equid remains in West Africa do provide positive evidence of domestic stock, as unlike in East Africa, there are no wild equids known from the region. Kirikongo had elements attributable to the horse (*Equus caballus*) and the donkey (*Equus asinus*). As discussed in chapter 3, while horses have been used as a symbol of prestige, they do not typically fare well in heat or humidity or with tropical diseases (Law 1980; Mitchell 2017, 2018). In contrast, donkeys are a more arid-adapted hardy equid indigenous to African ecosystems (Kingdon 2015), although they too have problems in the more humid regions of West Africa (Mitchell 2017, 2018).

Of the equid elements at Kirikongo, the first is a highly worn probable horse incisor from Unit E (Mound 11) from a fairly large individual (Figure 4.39). The Red III element is a metacarpal of a medium-size equid, likely donkey (Hanot and Bochaton 2018; measurements place it as slightly larger than the archaeological donkey from Senegal measured by MacDonald and MacDonald 2000). This element, in two refitting fragments, was chopped dorsally/ventrally for marrow and was found in a layer with animal butchering and consumption debris, suggesting that it was likely consumed.

Figure 4.39. Probable horse incisor from Kirikongo (E-RII-a)

Large Rodents and Lagomorphs

At Kirikongo, 129 elements were attributable to large rodents, lagomorphs, or small mammals (Table 4.11). Some of these could also be from small carnivores, but most were recovered from contexts lacking mongooses or shrews and more likely derive from rodents within the same contexts. Three primary taxa constitute the majority of the rodent/lagomorph assemblage at the site: the marsh cane rat (*Thyronomys swinderianus*, n = 19), the Gambian rat (*Cricetomys gambianus*, n = 26), and the African savanna hare (*Lepus victoriae*, n = 15).

The marsh cane rat (Figure 4.40) is a very large gregarious rodent that grazes, consuming dominant grasses in wetter savanna locations (Kingdon 2015; van der Merwe 2007; Van Zyl and Delport 2010). They tend to inhabit burrows near rivers or waterlogged locations such as marshes and are widely known as a major garden pest (so much so that they can be used as an indicator of farming economies; see Dueppen and Gallagher 2013). Cane rats were found at Kirikongo throughout the occupation but were restricted to Units B and C (Mounds 3 and 4). There is a high frequency of cranial elements, particularly in early levels. While several elements were unfused, marsh cane rats have a four- or five-month gestation and can breed twice a year, making it difficult to assign dates to the hunt (although there is a breeding peak in the rainy season). Marsh cane rat bones from Red III, along with small mammal ribs and vertebrae in the same context, were burned, indicating that at least in these layers, they were roasted.

The Gambian rat (Figure 4.41) is a widely distributed omnivorous large rat that inhabits most of sub-Saharan Africa (Ajayi 1975; Blench 2000; Kingdon 2015). They live in extensive subterranean burrows and eat seeds, fruits, nuts, roots, and insects (including termites). They are common garden pests and can live in close proximity to human settlements. Gambian rat remains were found in several units in almost all layers, with the notable exception of Unit A (Mound 1), where no elements were recovered. Gambian rat remains were sometimes burned, and one scapula of a very young Gambian rat was recovered in Unit C (Mound 3). Like marsh cane rats, they can breed several times a year, but they have a breeding peak in the rainy season.

The African savanna hare was also commonly recovered and is known from all units except Unit E (Mound 11). Definitive separation of the remains of the African savanna hare from the cape hare (*Lepus capensis*) is only possible based on dentition. However, the African savanna hare was the only species positively identified at Kirikongo and is a better ecological fit for the region. Savanna hares are solitary woodland savanna animals that prefer green grass and leaves but sometimes eat bark and stems (Happold 1987; Kingdon 1974, 2015). They are common garden pests that breed throughout the year, and rather than inhabiting burrows, they create depressions in the ground during the day that they lie in to blend into the landscape. Burning evidence was limited to one pelvis from Yellow II in Unit C (Mound 3).

Table 4.11. Large rodent and lagomorph summary

		Total	Head	Axial Postcrania	Upper Appendage	Lower Appendage
N identified	large rodents and lagomorphs	129	24 (18.6%)	64 (49.6%)	31 (24%)	10 (7.8%)
N identified	large rodents and lagomorphs + LBF	133 (129 + 4 LBF)	24 (18.1%)	64 (48.1%)	31 (23.3%) + 4 LBF (3%)	10 (7.5%)
N burned	large rodents and lagomorphs + LBF	22 (16.5%) + 2 LBF (1.5%)	3 (12.5%)	11 (17.2%)	8 (25.8%) + 2 LBF (40%)	0 (0%)
N cut marks	large rodents and lagomorphs + LBF	2 (1.5%)		1 (1.6%)	1 (3.2%)	

Forelimb to hind limb ratio: 21/17 (55.3%/44.7%)

Figure 4.40. Cane rat (*Thyronomys swinderianus*). *Illustration by Ethan Schmunk.*

Figure 4.41. Gambian rat (*Cricetomys gambianus*). *Illustration by Ethan Schmunk.*

Micromammal Rodents

A total of 55 micromammal rodent remains were recovered from excavations at Kirikongo. Remains were almost exclusively derived from the upper appendages and the pelvis, with occasional cranial and mandibular fragments. This body part distribution was likely influenced to some degree by screen size, as all deposits were screened at 2 mm and smaller elements (such as vertebrae and distal limbs) may not have been collected. Provisional identifications on the few specimens with preserved dentition suggest the presence of at least two taxa: *Mastomys natalensis* (multimammate rat) and *Arvicanthis niloticus* (unstriped grass rat). These are both extremely common rodents and are found as commensal animals in human settlements (Kingdon 2015; Monadjem et al. 2015).

Birds

In comparison to other sites in West Africa, Kirikongo's avian fauna is quite distinctive. Bird remains, including bones (n = 528) and eggshell fragments (n = 229), constitute 18.2 percent of the total faunal assemblage and are one of the most widely distributed classes of faunal remains at the site. Overall, almost all the remains are likely of gallinaceous birds, with only four elements positively identified to other birds, all waterfowl. The ubiquity of fragile avian remains attests to the high degree of preservation of fauna at Kirikongo.

Galliforms (Wild and Domestic Fowl)

Of the 290 elements attributable to gallinaceous birds at Kirikongo, 15 were attributable to chicken (*Gallus gallus*), three to guinea fowl (*Numida meleagris*), and 27 to at least two species of francolin (*Francolinus* sp.) (Table 4.12). Following established conventions, unassignable elements were size-classed into two groups, as chickens overlap in size with the indigenous fowl varieties francolins (small) and guinea fowl (large). Twenty-seven elements were designated as *Gallus/Francolinus*, while 188 elements were designated as *Gallus/Numida*. An additional 30 elements,

Table 4.12. Galliform summary

		Total	Head	Axial Postcrania	Upper Appendage	Lower Appendage
N identified	galliform	290	6 (2.1%)	60 (20.7%)	134 (46.2%)	90 (31%)
N identified	galliform + LBF	483 (290 + 193 LBF)	6 (1.2%)	60 (12.4%)	134 (27.7%) + 193 LBF (40%)	90 (18.6%)
N burned	galliform + LBF	63 (13%) + 14 LBF (2.9%)	0 (0%)	5 (8.3%)	37 (27.6%) + 14 LBF (7.3%)	21 (23.3%)
N cut marks	galliform + LBF	11 (2.3%)	2 (33.3%)	1 (1.7%)	3 (2.2)%	7 (7.8%)

Forelimb to hind limb ratio: 134/90 (59.8%/40.2%)

while identified to galliform birds, were unable to be classified to a size grouping. This galliform assemblage is unusually large for the region. As an example, there are more galliforms from Kirikongo than have been identified at all the excavated sites at Kissi, Saouga, and Oursi in northern Burkina Faso combined (Linseele 2007). While eggshell is not attributable to taxon, it is very likely that the majority of the eggshell is from gallinaceous birds. The eggshell assemblage is described separately later in this chapter.

As discussed in chapter 3, Kirikongo's chickens are currently the oldest recovered remains in sub-Saharan West Africa (Dueppen 2011), and it is clear that not only were chickens used early at Kirikongo but also that chickens were a particularly important component of the socioeconomic and religious practices of the community from its establishment. Probable chicken eggshell and bones were recovered below the earliest datable levels in Yellow I. Overall, it is highly likely that chickens constitute the largest part of the gallinaceous remains at Kirikongo from the start of the sequence. Positively identified chickens were widely and routinely distributed in contexts where size-classed bones were found.

The study of domestic chickens in sub-Saharan Africa is complicated by the presence of indigenous fowl that overlap in size and generally have similar bone morphologies due to shared adaptation (see discussions in Dueppen 2011; MacDonald 1992), which necessitates the use of the overlapping *Gallus/Numida* and *Gallus/Francolinus* designations. The larger galliform, the guinea fowl, is found in both domestic and wild forms throughout the continent. Wild guinea fowl tend to inhabit more open spaces, feeding in grasslands and cultivated fields. They are highly gregarious, with sometimes very large groupings, and their diets include primarily seeds and insects (del Hoyo et al. 1994: 554–65). They tend to roost in trees at night near the edges of more open areas. The domestic form is widely kept in western Burkina Faso, with many households keeping both chickens and guinea fowl. However, very little is known of their domestication history, since, as discussed in chapter 3, morphological studies to distinguish wild from domestic have yet to be done despite the domestic form being quite distinct from its wild counterpart (see MacDonald and MacDonald 2000). It is unlikely that guinea fowl were a significant feature of the galliform assemblage at Kirikongo prior to Red III, as prior to that point there is a complete absence of confirmed guinea fowl and routine identification of chicken.

The smaller wild francolin taxa vary significantly by region, and different species tend to be found in particular ecological settings (del Hoyo et al. 1994:489–504; Urban et al. 1986). Based on characteristics of bones and biogeographic distributions, Kirikongo's confirmed francolin remains are likely derived from the widely distributed double-spurred francolin (*Francolinus bicalcaratus*; 381–507 g) (Figure 4.42) (del Hoyo et al. 1994:497) and the white-throated francolin (*Francolinus albogularis*; 263–284 g) (Figure 4.43) (del Hoyo et al. 1994:490). Both species have a diet of seeds and insects, and favor disturbed habitats. However, the former is still locally available in the Mouhoun Bend, while the latter, a much smaller francolin, is found in more forested contexts in the southern savanna. At Kirikongo, the white-throated francolin was identified in contexts alongside diverse forest taxa (for example, forest duikers), substantiating this identification. In addition to meat, as discussed in chapter 1, bird feathers are a common

Figure 4.42. Double-spurred francolin (*Francolinus bicalcaratus*). *Illustration by Ethan Schmunk.*

Figure 4.43. White-throated francolin (*Francolinus albogularis*). *Illustration by Ethan Schmunk.*

and important component of domestic and wild animal use, as feathers of domestic birds are often incorporated into shrines (stuck with blood as indicators of sacrifice); wild bird feathers may have been used locally and/or traded.

Positive separation of gallinaceous birds based upon morphological criteria is possible due to an important foundational study by MacDonald (1992); however, only a limited number of skeletal features can be reliably used. In Kirikongo's assemblage, positive identification was limited due to taphonomic processes, as the vast majority of the bones were shafts whose epiphyses had been destroyed due to chewing, likely during consumption (Figure 4.44). While it is difficult to estimate what percentage of the assemblage was affected, only 10 percent of bones had intact epiphyses. Despite this taphonomic process, birds from throughout the sequence were identifiable to taxon, and the eggshell analyses discussed later provided an additional complementary perspective on avian use that reinforced the results of the skeletal studies. At Kirikongo, the majority of the *Gallus/Numida* and a good proportion of the *Gallus/Francolinus* groups can likely be attributed to domestic chicken, as there is not a positive identification of guinea fowl until the second quarter of the second millennium AD, when they appear coincident with a shift in hunting patterns and an opening of the landscape. Francolin identification rates are higher than those for chickens or guinea fowl because they could also be positively identified by their epiphenomenally small size (smaller than any known chicken) in addition to morphological features.

Measured galliform remains from both extant breeds and archaeological sites in West Africa are currently rare, although research by MacDonald (1992) and Linseele (2007) provides some point of comparison for Kirikongo's remains (Figure 4.45). MacDonald measured a series of extent wild and domestic galliform birds and archaeological specimens from Mali to provide general ranges, and Linseele more recently added measured archaeological material from northern Burkina Faso. To create a baseline LSI rooted in the average size of wild junglefowl with which to compare the size of archaeological populations, I utilized Woldekiros and colleagues' analysis of extant and ancient chickens in Ethiopia and their analysis of crossbred junglefowl specimens (see Woldekiros and D'Andrea 2017; Woldekiros et al. 2019).

The measurable group of Kirikongo's galliform remains included confirmed examples of francolins, guinea fowl, and chickens. Measurements on francolins indicated a wide variance in size for Kirikongo's francolins. While several matched well with MacDonald's measurements on double-spurred francolins, Kirikongo's francolins also included some much smaller individuals, which, as I have suggested above, may derive from the white-throated francolin. Measures on two guinea fowl specimens from Kirikongo did not overlap with francolin measures and align with both MacDonald's size distribution for the taxon and Linseele's (2007) measurements on an extent guinea fowl from northern Burkina Faso. The nine measurable chicken elements supported a discrete size grouping for chickens, with slight overlaps with the larger francolins and with guinea fowl, with the average chicken size set between these two other taxa. Compared to MacDonald's data on extant West African chickens, Kirikongo's population is much more consistent, as contemporary chickens vary greatly in size, extending from almost smaller than double-spurred francolins to larger than guinea fowls. MacDonald's

Figure 4.44. Galliform bones from Unit A, Kirikongo. Note the consistent damage on the epiphyses.

measurements on chickens from archaeological sites in the Inland Niger Delta and the Mema region of Mali more closely resemble the size range of Kirikongo's chickens. In northern Burkina Faso, archaeological chicken specimens are more variable in size than those from Kirikongo, but on average they may be very slightly smaller (Linseele 2007). Linseele's unidentified large galliform category includes many individuals that would be typical for francolin (although some could be small chickens) and a central group that could be either chickens or guinea fowl.

Ethiopian archaeological specimens from the first millennium BC are on average smaller and more variable than the chickens from Kirikongo (Woldekiros and D'Andrea 2017; Woldekiros et al. 2019). These chickens may represent some of the earliest stock to arrive on the continent and could be ancestral to chickens kept by West African societies. Chickens may have become larger over time due to better poultry-raising techniques and breeding practices. Extant West African and Ethiopian chickens are both larger and more diverse in size than any of the archaeological populations.

The apparent larger focus on fowl may have been influenced by better conditions for their production. Although more research is needed on the differences in chicken health and productivity in the wetter savanna as opposed to more arid northern zones, wild junglefowl are adapted

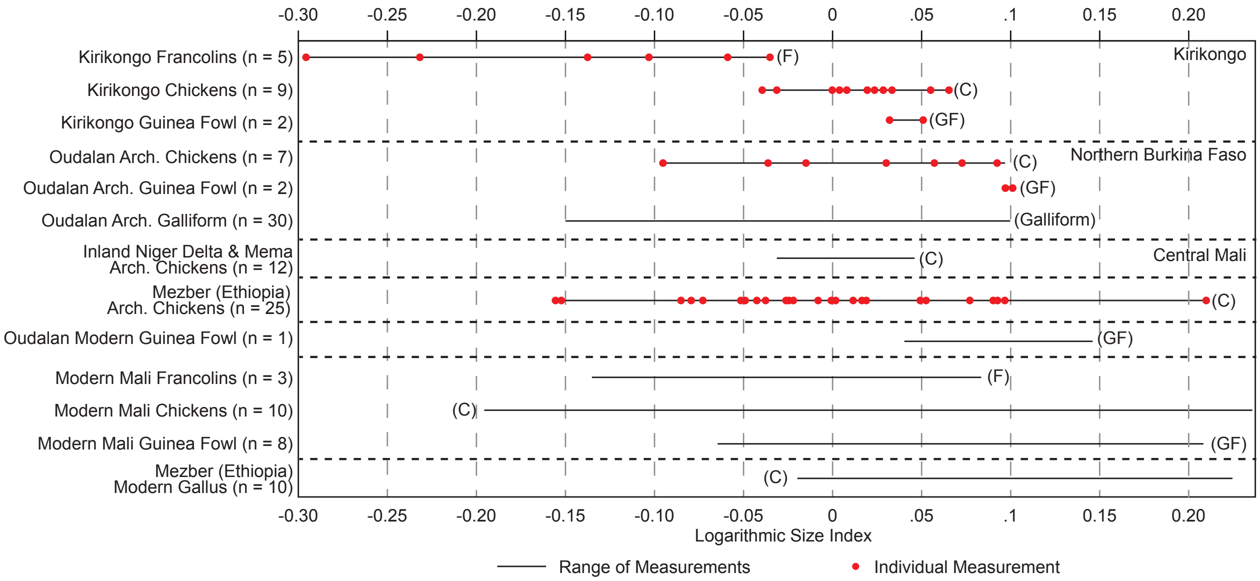

Figure 4.45. Logarithmic size index of archaeological galliforms from central West Africa. For modern comparatives, n indicates number of individual animals not number of elements measured. Incorporates data from Linseele 2007; MacDonald 1992; Woldekiros and D'Andrea 2017; Woldekiros et al. 2019.

to wetter forest and savanna tropical zones (del Hoyo et al. 1994:529–30), and the ecological zone around Kirikongo may have provided chickens with more abundant food resources (seeds and insects) due to the more humid setting. Chickens may have generally played a more significant role in early sedentary life in wetter savanna settings than farther north, particularly given the challenges of livestock production in these zones. Future research with measurements of galliform birds in diverse ecosystems may shed light on differential health of domestic fowl in particular settings. Linseele's (2007) galliform measurements could indicate that northern chickens were in fact smaller than those in humid zones.

Galliform bird elements from throughout the skeleton were recovered. Appendages constituted the vast majority of the assemblage. The entire axial skeleton, including the cranial remains and the core (sternum, pelvis, synsacrum, ribs), was underrepresented, and vertebrae were notably completely absent. This pattern likely reflects real body part distribution practices and was not the result of preservation biases, as highly fragile fragments (for example, small sternal fragments and an occasional rib) were routinely found in excellent condition. Only six cranial fragments were recovered, suggesting systematic removal of the head, and the underrepresented core indicates that these meat-bearing parts of the carcass were distributed from the location of slaughter, occasionally leaving a small splinter of bone from dismemberment. The limbs were overrepresented in archaeological deposits, and they were more likely to be burned, often with the epiphysis charred and the central shaft unburned, reflecting grilling processes. A lower percentage of bones from the core were burned, although this is to be expected given the large deposits of meat in the pectoral girdle and thighs. From consistent burning and body part distributions, it would appear that birds were grilled and then divided, with at least some limbs consumed and the rest of the birds removed from the context. It is unknown when heads were removed; however, it is notable that rare avian cranial remains were found in a ritual complex that burned down, in an area that contained ritual objects. The claws of galliform birds were completely missing, and toes were very rare, perhaps indicating systematic removal of the feet as well. Interestingly, wing elements were more common than leg elements, which is likely a combination of a larger set of longer wing bones and a few contexts in which wings were particularly dominant (including a context in which francolin feathers may have been harvested).

Aging of fowl is complicated by their lack of dentition and the fact that epiphyseal fusion occurs quite quickly in these small animals. While data are limited given the lack of epiphyses generally, where present, most avian appendages were fully fused, indicating adult animals. However, a few unfused elements were identified primarily in Red III and Red IV contexts with large numbers of wild birds. Given the rapidity with which bird bones fuse and the commonality of indigenous fowl egg-laying in the rainy season, these could be derived from rainy season or early dry season fowling practices. Alternatively, hunts could have taken place in the dry season, and laying in the past occurred throughout the year, as it does in wetter forested parts of West Africa. Very few bones of chickens provided evidence for sexual differentiation (for example, tarsometatarsus spurs); however, given the variance in chicken size, it is likely that the recovered remains include both female and male individuals.

As a general rule at Kirikongo, cut marks are less frequent on smaller animals, and the same holds true for galliform birds. As it is clear that birds were consumed (bite marks, burning, distribution of carcasses), these patterns likely derive not from a lack of processing techniques or practices but simply from the lack of force needed to disarticulate a smaller animal. Most cut marks were found on appendages associated with removal of meat and/or the limb in Red III and IV feasting contexts, for which animals may have been more quickly butchered. Bird bones from a few contexts had some rodent damage, which is often more visible on the surface of avian bone as compared to mammal bone.

Anatidae

Four elements attributable to waterfowl were identified in excavations. These derive from two different taxa: the spur-winged goose (*Plectropterus gambensis*; 4,000–6,800 g) and the comb or knob-billed duck (*Sarkidiornis melanotos*; 1,230–2,610 g) (del Hoyo et al. 1992:593–94). The spur-winged goose is a very large goose that inhabits rivers, lakes, and swamps and eats diverse foods, including those found in gardens, while the comb duck inhabits lakes and swamps within reach of trees, or ponds and lakes in open savanna woodlands (del Hoyo et al. 1992:593–94). The three comb duck elements date to Red II, III, and IV in Units A and B (Mounds 1 and 4). The spur-winged goose is found in Red I at Unit A (Mound 1). The comb duck element from Red III is an unfused tibiotarsus, suggesting that the hunt was likely in the dry season, assuming that breeding took place in the rainy season. This matches with the general pattern of fowling in the dry season, when the floodplain is reduced and birds are more accessible.

Eggshell

Avian eggshell was common at Kirikongo, with 229 fragments recovered from contexts spanning the sequence, from the earliest layers of Yellow I to Red IV. Positive identification to a specific taxon is not possible for most avian eggshell except through aDNA testing; however, eggshell does vary between taxa in thickness, egg size, texture, and color, and these variables were recorded systematically for all fragments. Among gallinaceous birds of West Africa, chickens tend to have the thinnest eggshell, while guinea fowl eggshell is almost twice as thick (see Keepax 1981; Schönwetter 1967, 1992). Francolin taxa vary significantly in thickness due to laying adaptations (including whether the eggs drop far in the laying process), with double-spurred francolin around the same thickness as guinea fowl and many other francolins, including forest taxa, which have much thicker eggshell that can reach 0.8 mm (Schönwetter 1967, 1992). Bird eggshell also varies by color, although there is quite a bit of variability in chicken eggshell color throughout the world, so this criterion is regionally and breed variant. Eggshell from ducks and geese can overlap in thickness with that from galliform birds, often on the thinner end. Given the very high frequency of gallinaceous birds in the skeletal record and the paucity of ducks and geese, most eggshell is likely derived from one of the species of gallinaceous birds.

Eighty-seven percent of Kirikongo's avian eggshell measured between 0.25 and 0.35 mm in thickness, with a single peak around 0.3 mm thickness (Figure 4.46). The statistically normal distribution indicates that most of this eggshell likely derives from one population of birds. Eggshell in this range is consistently white in color and has a very consistent marble-like surface when put under high magnification. This thickness range is consistent with that for domestic chicken (see Keepax 1981:322; Schönwetter 1967, 1992), an identification further supported by the identification of domestic chicken skeletal

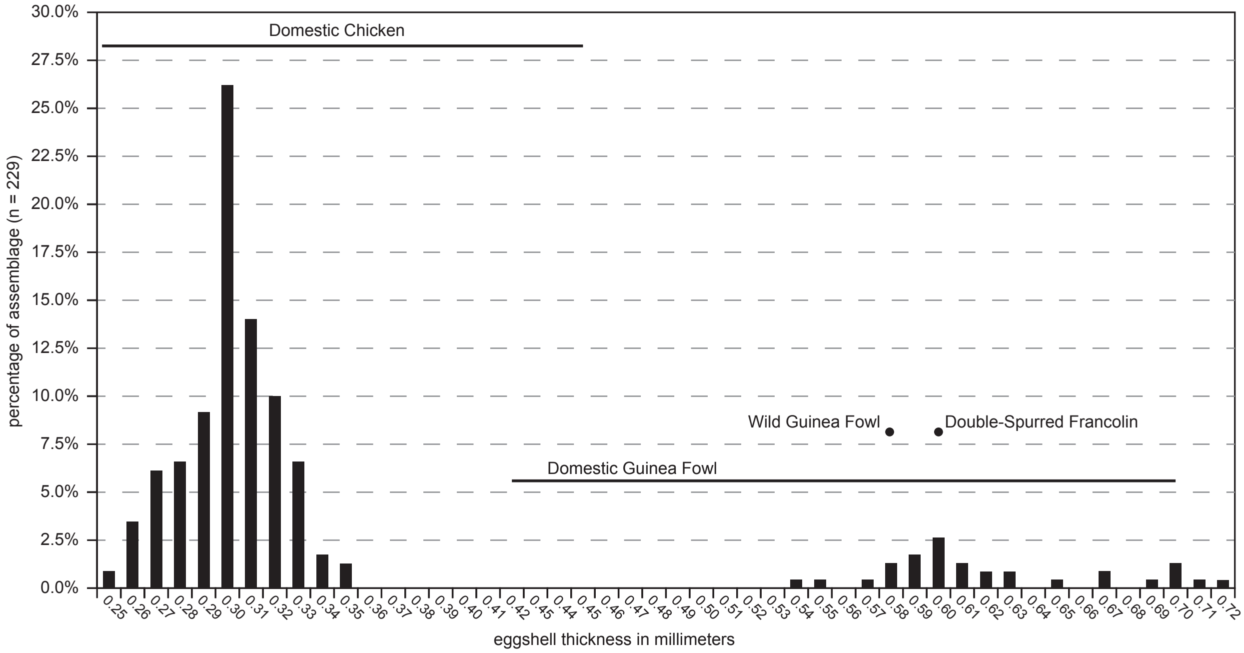

Figure 4.46. Thickness measurements on eggshell from Kirikongo. Adapted from Dueppen 2011. Reference data from Keepax 1981; Schönwetter 1967.

elements throughout the sequence and the common presence of eggshell in contexts that lack diverse wild animal resources. A second smaller peak in eggshell thickness occurs between 0.58 and 0.63 mm and falls distinctly within the thickness range of both guinea fowl and the double-spurred francolin, both present at Kirikongo (Keepax 1981:322; Schönwetter 1967:272–73, 288). The color of this eggshell was tannish brown or brown, with the diversity perhaps relating to the inclusion of multiple bird taxa. Under high magnification, eggshell thickness was less regular and smooth, with the increased thickness more open to irregularities. An even thicker 0.65 to 0.72 group matches better with other francolin groups. This eggshell, also brown in color, was found in contexts with humid-forest taxa, including the white-throated francolin.

While positive identification of skeletal elements was not possible due to the lack of epiphyses on gallinaceous bird bones, evidence that the larger *Gallus/Numida* size class bones from Yellow I likely belong to chickens is further strengthened (beyond the complete lack of identified guinea fowl bones in early phases) by the presence in some of the earliest layers of Yellow I of eggshell in the group tentatively assigned to chicken. If this is so, the presence of chickens at Kirikongo from the start of the site occupation in the early first millennium AD supports a model in which chickens spread across the savanna in the first millennium BC, mirroring historical linguistic data indicating shared linguistic terms across this ecological zone (Dueppen 2011; Williamson 2000). As chickens were available in Ethiopia by at latest the first millennium BC (Woldekiros and D'Andrea 2017), it would be unsurprising if they had arrived in West Africa by the early first millennium AD or even a few centuries earlier.

The cultural practices that produced the avian eggshell assemblage were also investigated, particularly whether the eggs had been hatched, indicating general refuse, or whether they were unhatched, suggesting either consumption and/or ritual use of eggs. In central West Africa historically, chicken eggs are not routinely consumed in rural areas, although they are occasionally mentioned as food for children, as there is a greater emphasis on hatching to increase flock size (Manessy 1960). Chicken egg production is seasonally variable, and at many times of the year, obtaining eggs can be difficult. Ethnohistorically, unhatched eggs are a type of sacrificial animal, and egg sacrifice is a central feature of the sacrificial systems of some voltaic societies, such as the Gulmance of southeastern Burkina Faso (Cartry 1976, 1978, 1981) and the Lodaaga of northern Ghana (Goody 1962).

To determine whether an egg has been hatched, the interior surface of avian eggshell can be assessed to see if calcium has been absorbed completely over the course of embryo development or if the egg was broken prior to full development (see Beacham and Durand 2007). I conducted a preliminary analysis of six samples: three likely domestic chicken and three likely francolin and/or guinea fowl (Figure 4.47). All three chicken samples were unhatched, as were two of the three francolin and/or guinea fowl samples. The probable chicken eggs, from Yellow I, Yellow II, and Red IV, were therefore likely not simply refuse from hatched birds nearby, and it is possible that like the many domestic animals in the same contexts (often funerary), these were sacrificed. The two thicker fragments of unhatched eggshell included one Yellow II sample in the thickness range for the white-throated francolin and a Red II sample of the medium-thickness group that could be double-spurred francolin or guinea fowl. The only avian eggshell sample that had hatched was a medium-thickness sample from Red IV, a pit with a very different context (see discussions below). Hatching of this fifteenth century AD sample could be evidence for the keeping of domestic guinea fowl at Kirikongo. The first positively identified guinea fowl at the site dated to Red III in late thirteenth century layers (even though wild guinea fowl would have been available throughout the sequence). It is possible that guinea fowl appear only in domestic form at Kirikongo.

If that is the case, this important domesticate may have been adopted at the site in the thirteenth century AD. This timing coincides with evidence for the arrival of or increased connections with Mande diasporic traders in western Burkina Faso (see Dueppen and Gallagher 2016), and domestic guinea fowl may have been introduced at this time. Earlier use of domestic guinea fowl has been suggested from the first millennium AD to the west in the Middle Senegal River Valley (MacDonald and MacDonald 2000). While it is difficult to draw conclusions from so few sites, it is possible that guinea fowl spread from west to east. Alternatively, domestic guinea fowl may have been known in western Burkina Faso but not utilized at Kirikongo due to the focus on chickens.

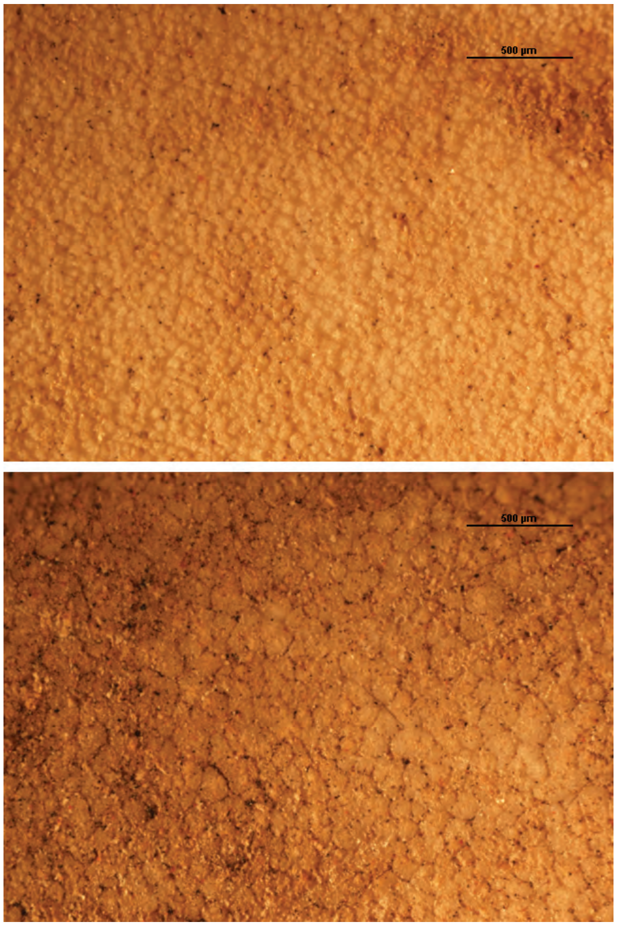

Figure 4.47. Eggshell interior surfaces. Top: unhatched chicken eggshell from B-YI-d. Note bumpy texture created by calcium deposits. Bottom: hatched guinea fowl eggshell from B-RIV-c. Note smooth surface due to calcium absorption.

Fish

Of the 672 fish bones recovered at Kirikongo, 354 were identifiable to 11 different fish taxa. Fish remains were found in the majority of deposits at the site. While each usually contained a small number of bones of multiple taxa, roughly half of the fish assemblage was recovered from a single early first millennium AD Yellow I context. In general, the recovered fish remains were brought to the site complete, cooked, and processed. As with other animals, they were primarily distributed elsewhere for consumption but were partially consumed in situ. That fish arrived complete is indicated by the diverse body parts found in contexts. Parts that either are removed prior to consumption or that fall off during cooking (for example, those that protrude from the skeleton, such as pectoral, dorsal, and other spines) were overrepresented (36.3

percent), crania were present but not overrepresented (18.1 percent), and vertebrae (13.6 percent) and ribs (32 percent) were heavily underrepresented. Moreover, these patterns are even stronger when one removes the unique large Yellow I context, in which a larger portion of the bodies of fish were consumed in situ than at all other contexts. Without this context, spines constitute 51.7 percent and crania 24 percent of the assemblage, and the levels of vertebrae and ribs fall to only 14.6 percent and 9.7 percent, respectively. As with mammals and birds, preservation bias is unlikely to have affected body part distributions.

Burning was identified on 55.3 percent of all fish bone and was fairly frequent across the skeleton, although vertebrae (from the interior of the fish and surrounded by meat) had the lowest burning frequency at 43.2 percent. In the only context with significant ribs, almost all ribs were burned to some degree, as skin and meat are thin on that section of the body. The crania and spines were also commonly burned—52 percent and 58.4 percent, respectively—as they are completely exposed to flame and/or heat. The routine burning of most parts of the skeleton indicates that spines and heads were not removed prior to cooking, but at least some parts were either removed or fell off the body prior to consumption.

As discussed at the beginning of this chapter, burning patterns indicate that different taxa may have been cooked using particular methods, suggesting that certain taxa were targeted for preservation (Figure 4.48). Fresh roasting was evidenced by blackened bones, while lower-temperature smoking resulted in a reddish-brown bone color. The direct associations of fish consumed fresh (for example, *Lates niloticus*) and preserved (for example, *Clarias* sp.) in some contexts suggest that for certain taxa, smoking was the preferred preparation, even when fish was not necessarily being stored for the future. Overall, these diverse cooking practices resulted in 55.3 percent of all fish bone being burned to varying degree. Pottery vessels similar to vessels used for fish smoking in twentieth century Burkina Faso and northern Ghana (Bourdier and Minh-Ha 1985) were recovered from several different levels of the site. These vessels had perforations of about 1 cm distributed along the bases and sides and had heavily sooted bases.

Fish would have been locally available, as Kirikongo is located near the largest perennial river in Burkina Faso. However, several characteristics of the Mouhoun Bend region need to be considered before interpreting the diversity and distribution of identified fish remains. The region has a complicated hydrology, as the Mouhoun River receives a major tributary, the Kossi, right before some of its waters seasonally flood into the Sourou Basin to the north. The Mouhoun River is in a deeply incised channel through the bend, and the Sourou floodwaters expand north during the floods and subsequently return to the Mouhoun channel in the dry season. The incised Mouhoun turns southward, receiving multiple additional tributaries on its path to Ghana. For both contemporary residents of the region and those in ancient settlements, the characteristics of this setting likely influenced aquatic resource distributions and fishing/collecting strategies. As floodplains are fairly limited in the Mouhoun Bend due to the incision of the channel, vast floodplain environments for spawning are less common than elsewhere within the Mouhoun drainage, and most contemporary fishing tends to occur in the main river channel. Shallow-water habitats are present in a few locations along the river, and during floods, many local tributaries, such as the Koyaré, located 5 km south of Kirikongo, have extensive shallow-water habitats. Due the location of Kirikongo and its local setting over lateritic basement, shallow-water habitat would not have been abundant directly adjacent to the site.

Fish taxa inhabit different parts of the main river channel, including shallow areas near riverbanks or toward the river bottom, and some taxa prefer adjacent marshy locations along the river with dense vegetation (Figure 4.49). For analytical purposes, scholars have divided up the river fish of West Africa according to habitat preference, although, as discussed below, the size of an individual fish also plays a role in where they prefer to live. These major divisions follow these basic preferences and below are discussed as shallow-water, swamp/marsh, and deepwater taxa, and particular species even within the same family may prefer different aquatic habitats. Ethnohistoric fishing strategies enable fishers to maximize these different habitats and seasonal variability in fish distributions: early flood season and flood recession fishing in floodplains and seasonal channels, and dry season fishing in the main river channel. The techniques employed vary by season, as do the targeted taxa. As mentioned above, 11 fish taxa have been identified at Kirikongo, spanning these ecological preferences.

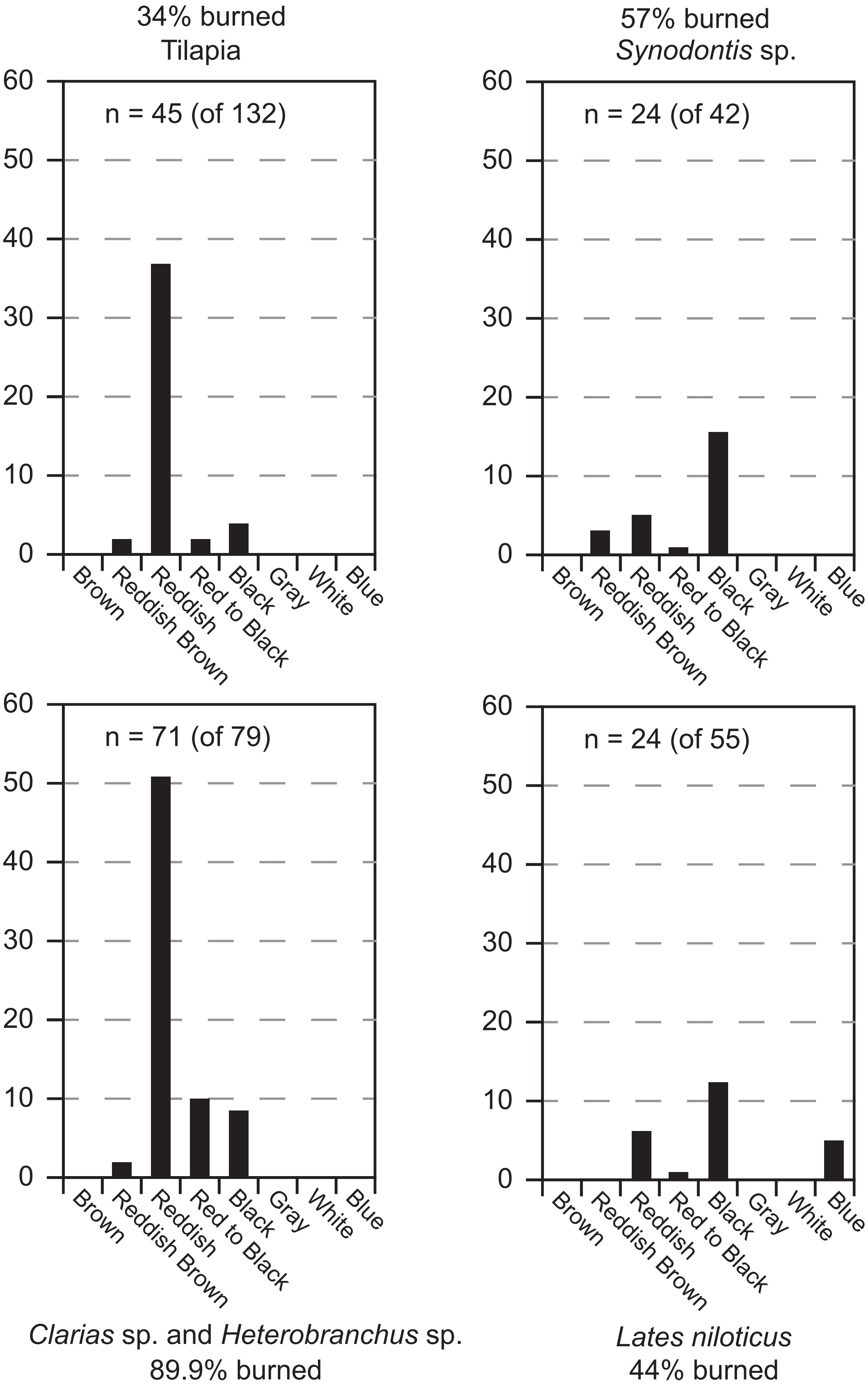

Figure 4.48. Distribution of burning by fish taxon at Kirikongo

Figure 4.49. The Mouhoun River in February. Note steep banks and vegetated shallow-water habitat in left foreground.

Shallow-Water Fish

Three of the identified fish taxa are considered shallow-water taxa: tilapia, clariid catfish, and the African lungfish. The first two collectively constitute almost two-thirds of the Kirikongo fish assemblage, while the African lungfish is rare.

Tilapia (Figure 4.50) is the most common fish identified at Kirikongo, constituting 42 percent of the fish faunal assemblage. Tilapia (tribe Tilapiini) are a group of multiple taxa of hardy cichlid fish that are particularly resistant to low oxygen in the water and can consequently live in a wide range of settings (Bruton and Bolt 1975; Daget 1954; Duponchelle and Panfili 1998; Mano et al. 2019; Moritz and Lalèyé 2018; Philippart and Ruwet 1982), with the larger taxa, Nile tilapia (*Oreochromis niloticus*) and blue tilapia (*Oreochromis aureus*), common in Burkina Faso. Tilapia tend to prefer shallow-water locations in the main river channel and are also frequently identified in other shallow-water habitats, like the edges of swamps and in tributaries, including small temporary streams. They are commonly found in the floodplain and expand significantly spatially during floods, when they reside in the floodplain, are repeat breeders, and frequently end up in residual pools. They are commonly caught during the floods, and in the dry season they can be fished near the surface of rivers and lakes.

At Kirikongo, tilapia are identified throughout the sequence but become more common over time. Spines comprised almost two-thirds of the recovered tilapia remains, although elements from throughout the tilapia skeleton were identified, including smaller numbers of cranial bones and heavily underrepresented examples of vertebrae and ribs. Consequently, consumption may have occurred away from the studied contexts. The treatment of tilapia bones indicates that these fish were sometimes preserved, as the many burned tilapia remains tended to be red to brown in color (82 percent of burned bones were red), reflecting the low-grade charring typical of fish smoking activities. One hundred and seven tilapia elements could be attributed to a size class based upon comparisons to comparative specimens, and most were between 10 and

20 or between 20 and 30 cm, typical for a fish that reaches only 40 cm in size. Regarding age of the fish at the point they were caught, tilapia taxa that reach the 20 to 40 cm range tend to take several years to reach that point, and tiny tilapia were generally lacking.

Clariid catfish (Figure 4.51) are the second most common fish group at Kirikongo, constituting 22 percent of the assemblage. Clariids are difficult to identify to genus, although *Clarias* sp. and *Heterobranchus* sp. can be distinguished on the basis of their pectoral spines. Of the 23 pectoral spines in the Kirikongo assemblage, only two were identified as *Heterobranchus* sp. *Heterobranchus* sp. prefers marsh or swamp environments, and their low rate of identification is consistent with the rarity of these environments in the region. The majority of the clariid catfish group are therefore likely *Clarias* sp., although some *Heterobranchus* sp. elements are probably included. The definitively identified *Heterobranchus* sp. elements are discussed with the marsh/swamp taxa below.

Figure 4.50. Blue tilapia (*Oreochromis aureus*). *Illustration by Ethan Schmunk.*

Even more than tilapia, clariid catfish are extremely hardy and resistant to low-oxygen conditions in water, as clariids can breathe air due to an external brachiatory apparatus (Brummett 2008; Bruton 1979a, 1979b; Daget 1954; Mano et al. 2019; Moritz and Lalèyé 2018; Teugels 2003; Welcomme and de Merona 1988). Moreover, clariids can dig into mud and aestivate during dry spells in a cocoon while waiting for waters to return, and they can also move across land over short distances using their pectoral spines to travel from pool to pool at the end of the dry season. Clariids occasionally attain very large sizes, in some cases more than 1 m in length, and they vary in habitat based on size and season. They are one of the most commonly caught fish in Burkina Faso today. Medium-size and large clariids are vulnerable to predation at the start of the floods as they migrate into floodplains, while mixed size groups with a majority of very small individuals are easily caught in residual pools during flood recession. After spawning, clariids return to permanent rivers and lakes and are frequently fished in these locations during the dry season. In these water bodies, larger individuals reside in the deepest areas, while medium-size and small clariid catfish are more flexible and live closer to the shore. Clariids are particularly suitable for preservation due to their high oil content and are the main preserved fish in Burkina Faso today. Clariid catfish are often smoked whole if small and are divided into sections if larger; preserved clariid catfish are traded over large areas of West Africa (Kabré et al. 2003).

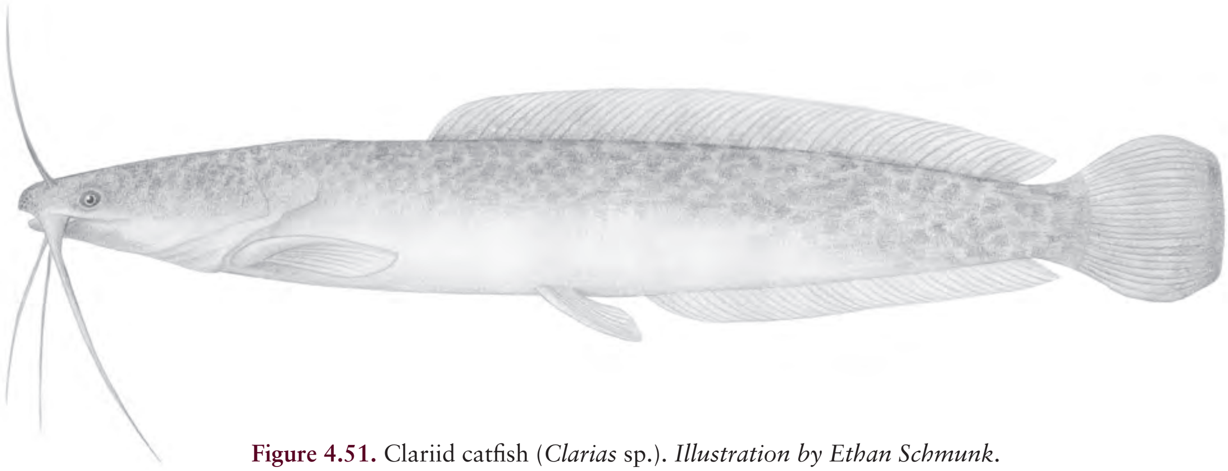

Figure 4.51. Clariid catfish (*Clarias* sp.). *Illustration by Ethan Schmunk.*

Clariid remains were underrepresented in the vertebral column, core, and tail of the body (21.8 percent), with bones from the pectoral girdle (34.5 percent) and head (43.7 percent) occurring in the highest frequencies. As mentioned above, this distribution is not due to preservation bias, as very fragile bones were preserved in many contexts in very good condition. Similar to tilapia, it seems that the fish were cooked and processed, but the main body was perhaps not eaten in situ. As is true in the ethnohistoric record, there was a strong preference for preserving clariid catfish. At Kirikongo, 89 percent of clariid catfish remains were burned, and 88.7 percent of burned bones exhibited the reddish color associated with fish smoking. Very few bones were burned black at higher temperatures.

Clariid size has two main peaks, at 20 to 40 cm and at 60 to 70 cm in standard length, with the two size classes often co-occurring in contexts (Figure 4.52). Larger clariids can be considered a deeper-water taxon given their need for more substantial bodies of water, and this group would have been caught either as fish entered the floodplain or in the main river channel during the dry season. Clariids between 20 and 40 cm are popular today, both in fishing and farm raising, as individuals in this size range are two to four years old and have gone through the most rapid period of their growth, reaching maturity. There is no evidence that residents of Kirikongo trapped clariid catfish in residual pools at the end of the rainy season, as very small clariids were uncommon.

The last shallow-water taxon identified was a single specimen of the African lungfish (*Protopterus annectens*). They inhabit the inundation plain and live in temporary lakes (Adeyemi 2010; Jorgensen and Joss 2011; Lévêque et al. 2003). After the recession of the river, they bury themselves into burrows to await the next floods. Lungfish tend to be more common in the fish fauna of more arid locations in West Africa. For example, sites in northern Burkina Faso, an area with primarily seasonal water sources, contained high frequencies of lungfish in addition to a tilapia- and clariid catfish–dominant fish fauna complex (Linseele 2007). Their rarity at Kirikongo reflects both the wetter climate and the more limited distribution of inundation plains due to the more deeply incised river course in the Mouhoun Bend.

Marsh or Swamp Fish

Unsurprisingly given the limited floodplain and marsh environments in the Mouhoun Bend, marsh or swamp taxa comprise only 5.4 percent of the Kirikongo fish assemblage. Those caught may live in the small marshy areas on the edges of the main channel or in spawning locations around tributaries during floods. The primary taxon identified is 14 bones of *Heterotis niloticus*, a fish that is commonly found in waters with abundant aquatic vegetation and muddy bottoms (Daget 1954; Van Neer and Guyet 1988; Welcomme and de Merona 1988). It can live in deoxygenated conditions of marshes and can breathe air for short periods due to an auxiliary breathing apparatus. Fairly large fish, they are most easily caught when spawning in the floodplain when they are well exposed in nests. Several sizes were identified at Kirikongo, ranging from very small to larger mature individuals. One cranial element of *Heterotis* was burned, reflecting preservation or cooking practices. Several elements were identified as *Gymnarchus niloticus*, an eel-like fish that inhabits swamps, where it builds floating nests (Daget 1954; Reed et al. 1967). They are also commonly caught in more exposed nests during floods.

As mentioned above, two pectoral spines, including one from a very large individual, were attributable to *Heterobranchus* sp., a clariid catfish that prefers swampy settings (Daget 1954; Moritz and Lalèyé 2018). In addition to *Heterobranchus* sp., a single element of another marsh catfish, *Auchenoglanis* sp., was also identified (Daget 1954; Reed at al. 1967). Both genera inhabit swamps, inundation zones, and parts of the main river that have muddy bottoms. Like the other marsh taxa, they were quite rare, likely indicating the limited nature of appropriate habitat.

Deepwater Fish

Deep water is the second most frequent habitat preference for fish recovered from Kirikongo, and the deepwater assemblage included Nile perch, *Mormyrus* sp., and two types of catfish.

The Nile perch (*Lates niloticus*) (Figure 4.53) is a large perciform that primarily inhabits the main river channel. Smaller individuals, up to 35 cm in length, will enter the floodplain during floods, but Nile perch are negatively impacted by deoxygenated conditions (Daget 1954; Moritz and Lalèyé 2018). Consequently, medium-size and large Nile perch, which can sometimes reach 1 to 2 m in length,

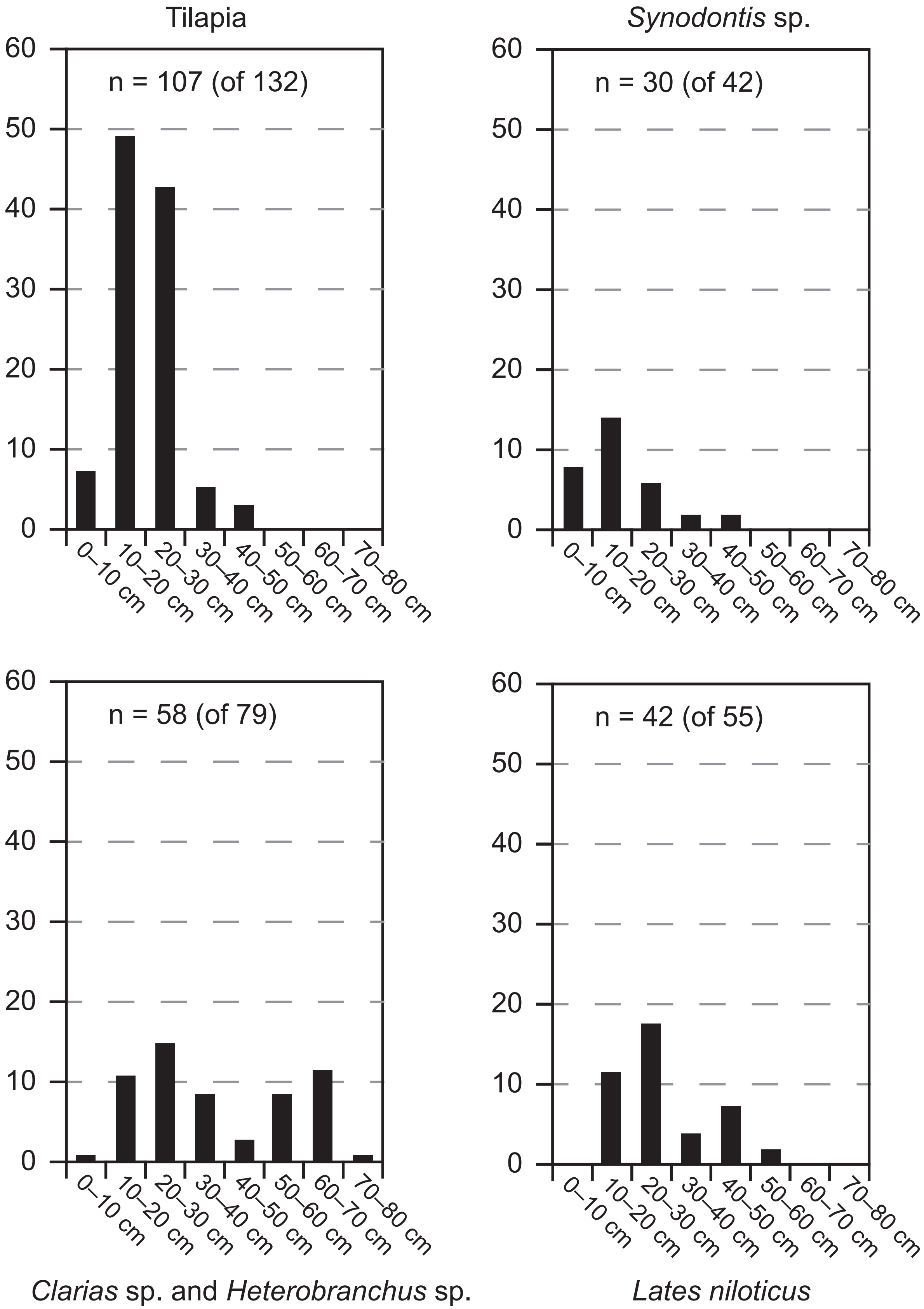

Figure 4.52. Fish size at Kirikongo by taxon

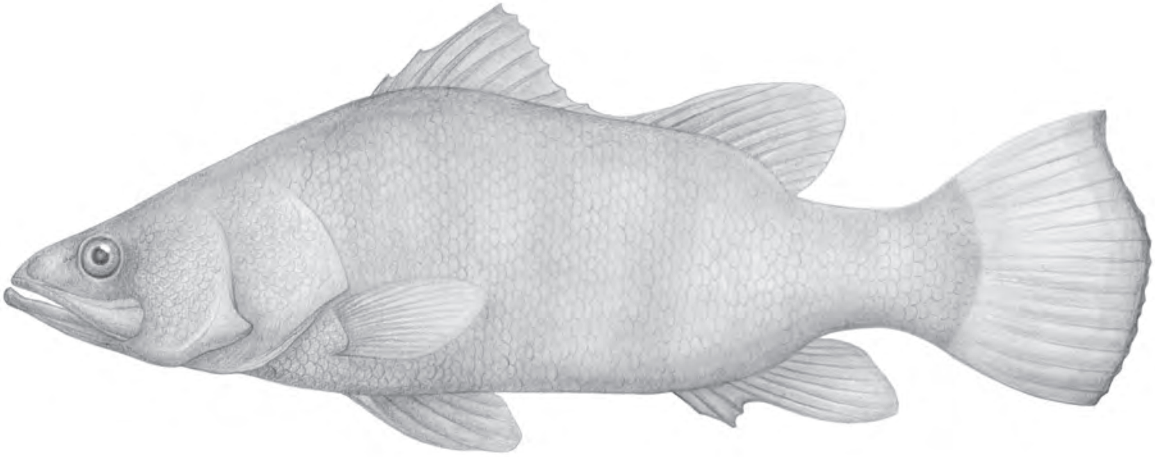

Figure 4.53. Nile perch (*Lates niloticus*). *Illustration by Ethan Schmunk*.

are often fished in their deepwater habitats using baited hooks. Ethnohistorically, while river channel fishing is a year-round activity, it is significantly more common in the dry season, when the main channel is more accessible and fish are not distributed in the floodplain.

Kirikongo's Nile perch were predominantly smaller in size, although a third of individuals reached 35 cm in length. The two peaks in the Nile perch size distribution occurred at 20 to 30 and 40 to 50 cm. Based on current growth-rate data, this indicates fish at one and two years of age, the latter group reaching maturity (Montcho et al. 2009). The large individuals could have been fished only in deepwater habitats (including larger tributaries; see Daget 1954), while smaller individuals may have been fished elsewhere. However, even small Nile perch are consistently found in association with other main river channel taxa, such as *Synodontis* sp. and Nile oyster. Combined with age data that suggest seasonal fishing, it is likely that Nile perch at the site were fished in the Mouhoun River during the dry season, when the small fish would have been present rather than distributed in tributaries.

Body part data on Nile perch suggest a wider distribution of parts than for other fish species, although spines from throughout the body, and particularly dorsal spines, constituted a large proportion of remains. Vertebrae were a little more common than in other taxa (although still underrepresented), likely due to dividing these larger fish before or after cooking, leaving behind the occasional vertebra. Nile perch are predominantly consumed fresh today and are not preserved and traded like other fish (Kabré et al. 2003). At Kirikongo, the burning data likewise suggest a preference for roasting the fish fresh. Only 44 percent of Nile perch bones were burned, with 50 percent of burned bones blackened and 21 percent exposed to very high temperatures that produce blue and white bone. Exposed parts were more heavily burned from roasting, while interior parts were often completely unburned.

Another relatively common deepwater taxonomic group at Kirikongo is *Synodontis* sp. (Figure 4.54) catfish from the Mochokidae family, which were often found in contexts with Nile perch. *Synodontis* is an extremely diverse and poorly studied genus that may contain as many as 30 species in West Africa (Daget 1954; Moritz and Lalèyé 2018; Reed at al. 1967; Welcomme and de Merona 1988). In general, they tend to prefer the well-oxygenated water of the main channel, and they enter seasonal tributaries and the floodplain only during floods. The larger species of *Synodontis* attain a maximum size around 40 cm. Almost 75 percent of *Synodontis* sp. bones at Kirikongo were from the pectoral girdle or dorsal spines, with a low number of cranial elements and very rare vertebrae comprising the remainder of the assemblage. Burning on *Synodontis* sp. bones closely resembled that on Nile perch, as burning occurred at a similar rate

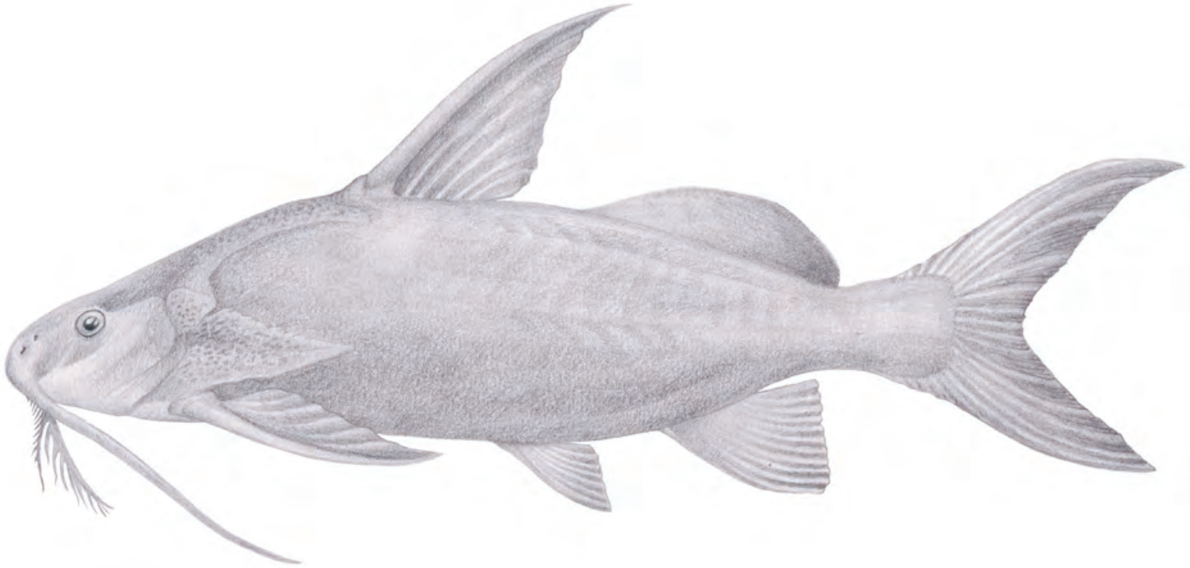

Figure 4.54. *Synodontis* sp. *Illustration by Ethan Schmunk*.

(57 percent) and 62.5 percent of burned elements were charred to a high temperature. While *Synodontis* sp. is occasionally preserved today, it is more often consumed fresh (Kabré et al. 2003). *Synodontis* sp. remains were generally from small fish of less than 20 cm in length, which is typical for many *Synodontis* taxa. Some larger individuals that were likely several years old were occasionally identified.

Bagrus sp. catfish are another main river channel taxon preferring deep waters (Reed at al. 1967, Welcomme and de Merona 1988, Daget 1954, Moritz and Lalèyé 2018). They also enter the floodplain for spawning and occasionally live in swamps. Bagrus were quite rare at Kirikongo, and several individuals attained fairly large sizes, at 40 to 60 cm standard length. Burning on the few remains included both low-grade charring and burning at high temperatures, and it is unclear whether they would be preserved like clariids. Several remains attributable to mormyrids (Mormyridae) were recovered as well. Mormyrids are exclusively deepwater taxa, preferring the river bottom and deep rocky pools. They were, like *Bagrus*, a rare fish at Kirikongo, although they do tend to be found in association with other deep-water taxa (Moritz and Lalèyé 2018).

Discussion

As will be more extensively discussed in chapter 6, contexts with fish frequently contained diverse taxa deposited together as an event or over a very short period. Consequently, there is a strong likelihood that diverse fish with different habitat preferences were obtained together. The preservation of shallow-water taxa complicates timing arguments on this basis alone, but the lack of very small fish despite systematic 2 mm screening of all deposits suggests that shallow-water floodplain fishing may have been rare. It is likely that fishing occurred during the recession period at the end of the floods in deeper tributaries of the Mouhoun River, or during the same period or later in the dry season in the Mouhoun River itself. Bivalve, reptile, and amphibian remains from the same excavated contexts similarly indicate a focus on tributaries or main river contexts that clearly had some deeper-water environments in addition to marshy areas and shallow-water fish residing nearer the surface. That said, the excavated contexts represent a very particular set of activities and may not encompass all fishing practiced in the community. However, if fishing in flood recession pools or floodplains during spawning did occur, remains must have been deposited in different contexts elsewhere, as excavated samples to date are not consistent with this practice.

Bivalves

Freshwater bivalves were found in low frequencies throughout all excavation units. Two different groups of bivalves were identified: the distinctive Nile oyster (*Etheria elliptica*) and *Chambardia* sp. from the freshwater mussel family Irinidae (Akelé et al. 2017; Ampofa-Yeboah and Owusu-Frimpong 2014; Moritz and Lalèyé 2018; Ouadraogo et al. 2018; Van Damme 1984).

Nile oyster is a large bivalve limited to main river channels of perennial rivers and lakes in Africa. These oysters have a distinctive form, and their fragments are easily separated from other bivalves that occur in the Mouhoun River. They are commonly collected during the dry season at low water, when they are accessible, and today small mounds of shucked Nile oyster shells are commonly found along the river (Figure 4.55). The flesh of Nile oyster is often smoked and the meat is traded in a dried form to be used in sauces. At Kirikongo, Nile oyster typically occurred in contexts with evidence for dry season fishing and may reflect a particular practice of expeditions to the Mouhoun River.

Chambardia sp. bivalves inhabit both perennial rivers and seasonal tributaries, where they dig into the mud to survive the dry season (Ouadraogo et al. 2018). Compared to Nile oyster, these mussels can be easily collected at any time of year, as they can frequently be reached in shallow-water contexts even during floods.

As a food source, bivalves were of fairly minor significance, particularly given that they leave behind high frequencies of debris for very small amounts of meat. However, given their very common occurrence and the fact that they were brought back to the site (rather than eaten on the spot), they clearly were of social importance.

Terrestrial Mollusks

Fragments of terrestrial mollusk shell were identified in Unit A during Red III and Unit C during both Red II and III. In size and characteristics, these compared favorably with medium-size *Limicolaria* sp. land snails within the family Achatinidae (Crowley and Pain 1970). *Limicolaria* sp. snails are found in moist and disturbed soils, including in farmland, where they are garden pests, and near human settlements. The specific contexts within which they occurred may indicate that they are nonintrusive in the deposits, as they were found in contexts likely formed during the harvest season.

Figure 4.55. Nile oyster shells on the banks of the Mouhoun River

Reptiles and Amphibians

Diverse remains attributable to reptiles and amphibians were identified at Kirikongo, including monitor lizards (n = 34), agama lizards (n = 14), crocodiles (n = 5), turtles (n = 5), terrapins (n = 6), and frogs (n = 59) (Table 4.13). These were not evenly distributed across the site, as most derive from Units B and C (Mounds 4 and 3). There are no recorded herpetological remains from Unit A (Mound 1).

The most common reptile remains were those of monitor lizards, most likely the Nile monitor lizard (*Varanus niloticus*) (Figure 4.56), which was positively identified at the site based on several cranial elements and frequently found in contexts with other aquatic resources. Nile monitor lizards prefer habitats with rich plant cover close to water, and they tend to live in burrows, including abandoned termite nests (Bayless 2002; Böhme et al. 1996; Mertens 1942). Eggs laid in burrows at the end of the rainy season take around 10 months to hatch, and from that point lizards grow slowly to fairly large sizes. The developmental cycle of Nile monitor lizards also involves the consumption of different prey as they grow. Young lizards with thin, sharp teeth consume insects, while larger individuals with more robust, peg-like teeth pursue more substantial prey. Monitor lizard remains at Kirikongo included some large individuals, likely several feet in length, as well as some smaller individuals that may be quite young. The cranial features of these younger monitor lizards are distinguishable from smaller lizards such as agama (*Agama* sp.) (Figure 4.57), which tend to have a much wider face. Many of the large varanid remains were burned, suggesting consumption. Agama lizards (Böhme et al. 1996; Mediannikov et al. 2012) are widespread inhabitants in the savanna, requiring simply spaces within which to hide and insects to eat, and they are quite common in villages of the Mouhoun Bend today. They commonly live in subterranean contexts (crevices, former dens). The postcranial remains of some smaller lizards, such as a pelvis found in Red II at Mound 11, could be either agama lizards or young monitor lizards. Alternatively, these smaller lizard fragments are also in the size range of chameleons such as the slender chameleon (*Chameleo gracilis*) or the Senegal chameleon (*Chameleo senegalensis*), both of which primarily consume insects (Trape et al. 2012).

Figure 4.56. Nile monitor lizard (*Varanus niloticus*). *Illustration by Ethan Schmunk.*

Table 4.13. Reptile and amphibian summary

		Total	Head	Axial Postcrania	Upper Appendage	Lower Appendage
N identified	monitor lizard + LBF	35 (34 + 1 LBF)	6 (17.6%)	26 (76.5%)	1 (2.9%) + 1 LBF (2.9%)	
N identified	agama lizard	14	4 (28.6%)	7 (50%)	2 (14.3%)	1 (7.1%)
N identified	crocodile + LBF	5 (2 + 3 LBF)	2 (40%)		3 LBF (60%)	
N identified	turtles	11	1 (9.1%)	6 (54.5%)	4 (36.4%)	
N identified	toads	59	1 (1.7%)	16 (27.1%)	39 (66.1%)	3 (5.1%)
N burned	monitor lizard + LBF	5 (14.7%)	1 (16.7%)	3 (11.5%)	1 LBF (100%)	0 (0%)
N burned	agama lizard	0				
N burned	crocodile + LBF	5 (100%)	2 (100%)		3 LBF (100%)	
N burned	turtles	3 (21.4%)	0 (0%)	2 (33.3%)	1 (25%)	
N burned	toads	0				

Note: No cutmarks were identified on reptile or amphibian bone.

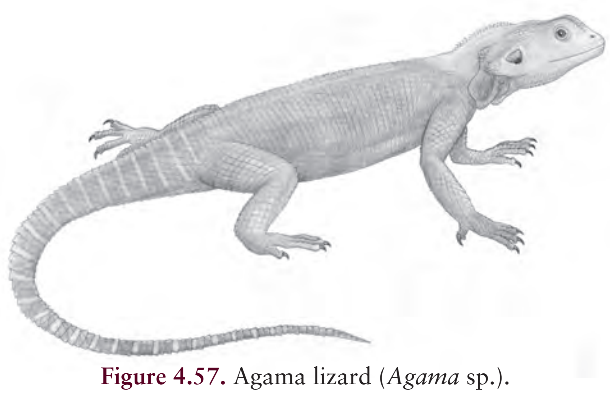

Figure 4.57. Agama lizard (*Agama* sp.). *Illustration by Ethan Schmunk.*

Crocodiles are uncommon at Kirikongo, consistent with their more limited distribution in archaeological sites in West Africa. A mandible of a large crocodile (with teeth removed) and several postcranial elements were identified in Unit B (Mound 4). This individual was more than 5 feet in length, and the remains were extensively burned, indicating consumption. This individual is from one of several possible crocodile taxa, particularly given the extremely humid environment indicated by other remains from the same context. These include the dwarf crocodile (*Osteolaemus tetraspis*), the slender-snouted crocodile (*Mecistops cataphractus*), and the West African crocodile (*Crocodylus suchus*; previously thought to be the Nile crocodile) (Figure 4.58). Give the size of the recovered mandible, the individual was likely from either of the latter two species. Crocodiles inhabit diverse environments, as they require simply year-round water and adequate food, primarily fish (Eaton 2010; Philippart and Ruwet 1982; Villiers 1958; Waitkuwait 1985). Historically, crocodiles were hunted for meat but primarily were targeted for their skins, which were a traded commodity.

The Kirikongo assemblage included at least two turtle/terrapin species. The West African mud turtle (*Pelusios castaneus*) (Figure 4.59) was identified in several contexts. Mud turtles are semiaquatic terrapins that are active during floods. As habitat dries, they dig into the mud to await the next rainy season (Villiers 1958). Both carapace and some postcranial remains from this terrapin were recovered, with multiple elements burned. Several carapace fragments attributable to softshell turtle were also recovered. Based upon textural differences on the carapace (see, e.g., Linseele 2007), these likely derive from the Senegalese flapshell turtle (*Cyclanorbis senegalensis*) (Figure 4.60), a widely distributed taxon that lives in very diverse water bodies (including deeper-water contexts) and also will bury itself in the mud during the dry season to await the next rainy season (Villiers 1958). Softshell turtles were mainly identified toward the end of the Kirikongo sequence, while terrapins were more common early. Several softshell turtle carapace fragments were burned, indicating consumption.

Figure 4.59. West African mud turtle (*Pelusios castaneus*). *Illustration by Ethan Schmunk.*

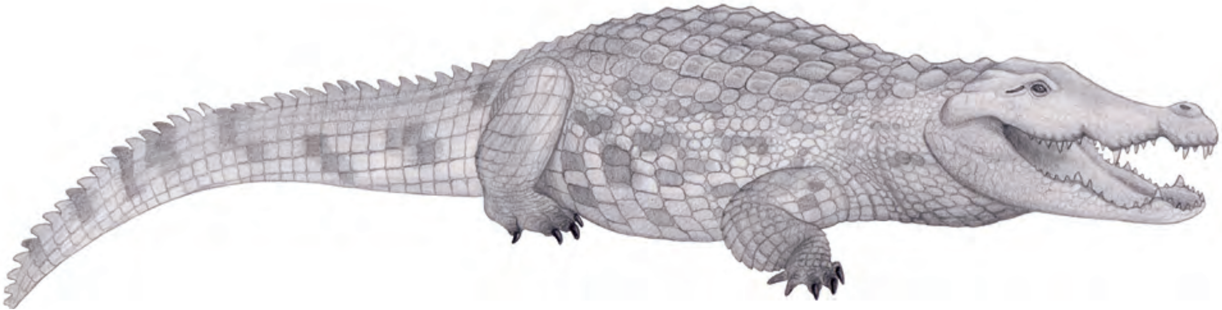

Figure 4.58. West African crocodile (*Crocodylus suchus*). *Illustration by Ethan Schmunk.*

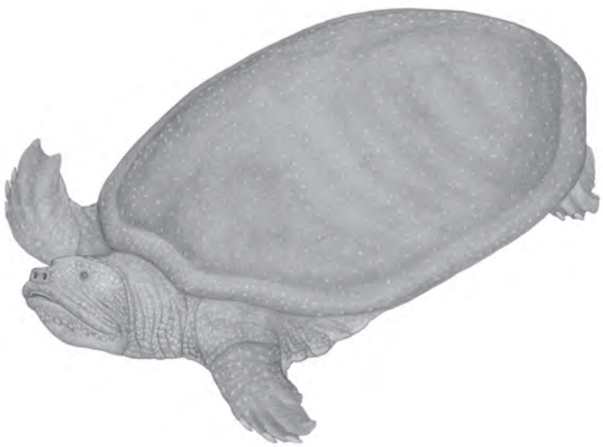

Figure 4.60. Senegalese flapshell turtle (*Cyclanorbis senegalensis*). *Illustration by Ethan Schmunk*.

Frogs or toads are found in several different contexts, with multiple individuals sometimes occurring in the same context. None were burned, and as many small frogs tend to dig into humid deposits during the dry season to hibernate, some may be intrusive animals. However, they were not found in Unit A (Mound 1) and appear in contexts with animals from swamps and marshes. Since occupation spaces were otherwise kept quite clean and there is minimal evidence of bioturbation, it is probable that many, if not all, are actually derived from cultural practices. The specific taxa are unknown, but in one case the cranial case was textured, similar to a bullfrog of the genus *Pyxicephalus*. Whether this element could represent the edible bullfrog (*Pyxicephalus edulis*) or the African bullfrog (*Pyxicephalus adspersus*) is difficult to discern, particularly given the lack of information on the distribution of frogs and toads in Africa. Bullfrogs are relatively large animals that are commonly consumed in the region today (see Nago et al. 2006).

Fifteen Hundred Years of Mouhoun Bend Fauna

Overall, Kirikongo produced a highly identifiable faunal assemblage, in part due to the nature of deposition rooted in repeated cultural practices that removed many of the nonidentifiable fragments of skeletons over time. Domesticates played an important role in Kirikongo's economy, with sheep/goats and chickens found in most contexts, and cattle and dogs present from the start of the sequence. Domestic livestock were dwarf breeds that generally are found in highly sedentary contexts in parts of West Africa with endemic tsetse today. Wild mammals, including diverse bovids, suids, primates, and carnivores, were identified, with a notable increase in diversity and scale of exploitation starting in Red III, upon a decline in cattle at the site.

The avian species distribution at Kirikongo is very different from contemporary archaeological sites in West Africa, with a strong focus on chicken from the beginning of the sequence, as evidenced by the unusually large skeletal and eggshell assemblages. There is a strong possibility that domestic guinea fowl were present at Kirikongo starting in Red III, and francolins were important wild birds. Fish were almost as common as chickens and may have been of great symbolic importance, as they appear in low frequencies in almost all deposits. Particular fish taxa were smoked or eaten fresh, and the assemblage suggests that fishing took place at the start of or later in the dry season. Distributions of freshwater bivalves indicate similar practices, as do the reptiles and amphibians, which are diverse and common.

During the occupation of the site, the Mouhoun Bend appears to have been a wooded savanna environment with occasional dense forested areas. The Mouhoun River had adequate water and floods that reached at least the minimum levels documented historically for the region. Livestock were adapted to this humid savanna context, domestic fowl were particularly important, and riverine resources and diverse mammals were widely available. Temporal patterns include the rejection of cattle husbandry in Red II, an increase in large-scale hunting in Red III, and a reorientation of hunting objectives in Red IV, when many dangerous taxa appear and animals known for traded products became common. However, the meaning of the assemblage patterns and our ability to use faunal remains for economic, political, and environmental reconstructions require a deeper understanding of the contexts within which they are found, including the relations of fauna with material culture and architectural loci.

CHAPTER 5

DEPOSITIONAL CONTEXTS AND RELATIONAL ASSOCIATIONS

Recent advances in material culture theory in archaeology have advocated for a broader view of how things articulate with other things in time and space to provide contextualized meanings. Social worlds are relational, with people, materials, and places interacting with one another, influencing agency through exerting pushes and pulls in various directions (e.g., Antczak and Beaudry 2019; Gavua 2015; Hodder 2012; Malafouris 2013; Robb 2015; Watts 2013). Just as meanings of material objects are not solely discernable in isolation, fauna is also best analyzed in relation to place and other material classes, since it is likewise embedded in relational fields of agency and meaning. Assessing what, where, and in which associations and conditions faunal remains appeared at Kirikongo was critical to advancing insights into broader issues in the community's history.

Apparent during excavation and analysis, Kirikongo's faunal remains were recovered in discrete spatial and temporal concentrations. These concentrations were often found in abandoned house interiors or courtyards (marked by preserved wall foundations), pits, or depressions in the ground and were always associated with material culture, primarily broken. Faunal remains in each individual assemblage were diverse taxonomically and tended to pattern both in the identified animal parts and in species composition. A total of 50 contexts were identified in the reanalysis of the four Kirikongo excavation units presented here. These are an update of the stratigraphic episodes initially published in 2012 (Dueppen 2008, 2012a) and are based upon 25 additional AMS dates and the associative study of fauna, architecture, macrobotanics and material culture. As will be described throughout, many contexts can be interpreted as either dedicated mortuary monuments or as residences that became tombs after abandonment. Many faunal/material culture concentrations were found adjacent to burial pits that after deposition were paved over to construct a new architectural layer.

The fauna and material culture sealed within these layers were extremely well preserved. That they were placed as part of fairly quick processes, likely events, is reinforced by the extremely discrete temporality of ceramics (sometimes multiple vessels of transitional form between a subphase) and minimal evidence for damage associated with exposure (trampling, carnivore chewing, rodent gnawing); this indicates a short period between interment and sealing of deposits. Despite the systematic removal of the dense elements such as the talus that tend to preserve better in archaeological sites, the excellent level of preservation yielded a very high identifiability rate on fragile bones. The regular presence of these fragile elements further supports the argument that body part representations reflect cultural practice rather than preservation bias. That these deposits may have been intentional associations of materials and bones is also indicated by the systematic repeated diversity of material culture and its good condition in deposits. For example, most concentrations contained very high frequencies of broken small vessels with elaborate decoration (including serving and consumption forms, as well as tripod ritual vessels). Ceramics are often accompanied in these diverse concentrations by parts of beads, iron objects, and groundstone implements. Most of these had been broken prior to deposition, and it is possible that breakage was intentional given the lack of wear. Intentionality is also reflected in the fact that the concentrations rarely included multiple parts of a vessel or objects despite the evidence for these being primary deposition locations. Fragments of animals, pots, and other material culture strongly resemble the assembled concentrations of associated objects and sacrifices that constitute shrines in ethnohistoric practice in the region (see chapter 1). The regularity in the nature and diversity of contents in these 50 contexts created a strong pattern present throughout the sequence.

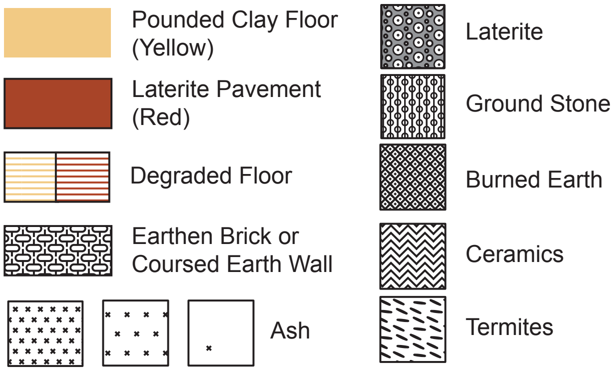

Figure 5.1. Key to fills used in excavation maps. *Custom fills created by Samantha McGee.*

Given the systematic nature of these deposits in relation to architectural practice, to understand the very nature of the buildup of mounds required a view and comparison of individual contexts and the relational networks of their contents (whether animal or material culture) and comparisons between contexts in the site (Figure 5.1). Consequently, as with the material culture, for which objects were individually analyzed from all contexts yet not dissociated from other materials and place, fauna was analyzed within a *chaîne opératoire* framework to examine what stages of each animal's death, butchering, and distribution were identifiable in an individual context; whether there were any associations between particular taxa and processing techniques; with what kinds and conditions of material culture the fauna was deposited; and in which architectural settings the deposits occurred. The results of these relational analyses of contexts allow us to view similarities and differences in how different animals intersected with particular materials, adding deeper understandings of the constitutive parts of the context.

Understanding the contexts also yields insights into site formation processes, helping explain why spatially segregated deep tells developed at Kirikongo. Ultimately, these concentrations more strongly resemble agentive practices and nonrandom associations than would be expected if inhabitants were dumping trash to stabilize deposits prior to construction events. In cases where units contained true abandonment layers, these deposits lacked preserved faunal remains and other material culture likely as the combined result of the taphonomic impacts of exposure and the maintenance of areas adjacent to living spaces. Analyses of the road cuts of mounds (up to 80 m long) (Figure 5.2) indicated that trash was deposited on the talus slopes of mounds rather than used as leveling fill within occupied spaces. Documentation of talus slope stratigraphy in the road cuts showed that they were very different in composition than the excavated deposits. For example, multiple fragments of the same broken cooking vessel regularly occurred in close proximity.

In this chapter, I describe the 50 contexts in detail to provide a basis for understanding general cultural processes and spatial and temporal differences. As the excavated fraction of different deposits varied, some contexts are better

Figure 5.2. Profile of Mound 2. Note the architectural elements, including the protruding durable floor fragments in the center of the profile, and the more homogenous talus slope deposits, which are most clearly visible at the left side of the image.

understood than others. Each context has an abbreviated context designation. The first component refers to the excavation unit letter, the second to the assigned phase, and the third to the specific context within that phase and unit. For example, A-RIII-a represents Unit A, the Red III phase, and the context a. It is important to note that context letters are referential to particular spaces and features within only a single excavation unit—that is, A-RIII-b is not necessarily occupied at the exact same time as B-RIII-b and may actually align better temporally with a different B-RIII context.

Unit A (Mound 1)

Mound 1 is set on the northern edge of the central cluster at Kirikongo. The preserved area of the mound today is between 0.6 and 0.75 ha in size (depending upon inclusion of the entire talus slope), although it is truncated by Burkina Route 10 over an 80 m–long area on its east end and is also graded on the north end due to road construction. In the past, it was likely at least 0.9 to 1.0 ha in size. A 3 x 3 m excavation unit was placed at the summit of Mound 1, located on the center/west of the mound. The size of the unit was diminished with increasing depth, initially in half to 3 x 1.5 m at 2 m and to 1.25 x 1.5 m at 3.1 m. The cultural deposits were 3.3 m deep, with a pit excavated through the lateritic bedrock to 3.8 m. The total excavated volume was 22 m^3, and during excavation 181 separate stratigraphic units were recognized. Based upon material culture and 11 AMS dates for the unit, the earliest deposits likely date to the late fourth or early fifth centuries AD (ca. AD 350–450), and the mound was abandoned in the first few decades of the early fifteenth century (ca. AD 1420), totaling around 1,000 years of occupation (Figure 5.3 and Table 5.1).

Unit A, Yellow I, Context a (A-YI-a), Estimated Date Mid-Fourth to Mid-Fifth Century AD

The earliest deposits from Mound 1 consist of a clayey matrix that contained fragments of diverse ceramics (including possible brewers, jars, and serving vessels), broken iron objects (two broken points, one broken knife, a rod fragment), slag, and animal bones. At this depth, the size of the unit and the occurrence of discrete, intruding pits (see below) prevented the identification of any specific features. Given the small area and sample size, the diversity of fauna recovered is remarkable. Cattle, small bovid, canid, chicken/francolin, fish, and Nile oyster remains were each represented by a few specimens. The cattle remains, including molars and a first phalanx, are from an older individual and are of a size consistent with a dwarf breed. There is no evidence that these parts were roasted, and one bone had very minor carnivore damage. In contrast, the small bovid remains (likely from dwarf domestic sheep/goat) are largely from an upper limb and have significant evidence of burning, suggesting that the limb may

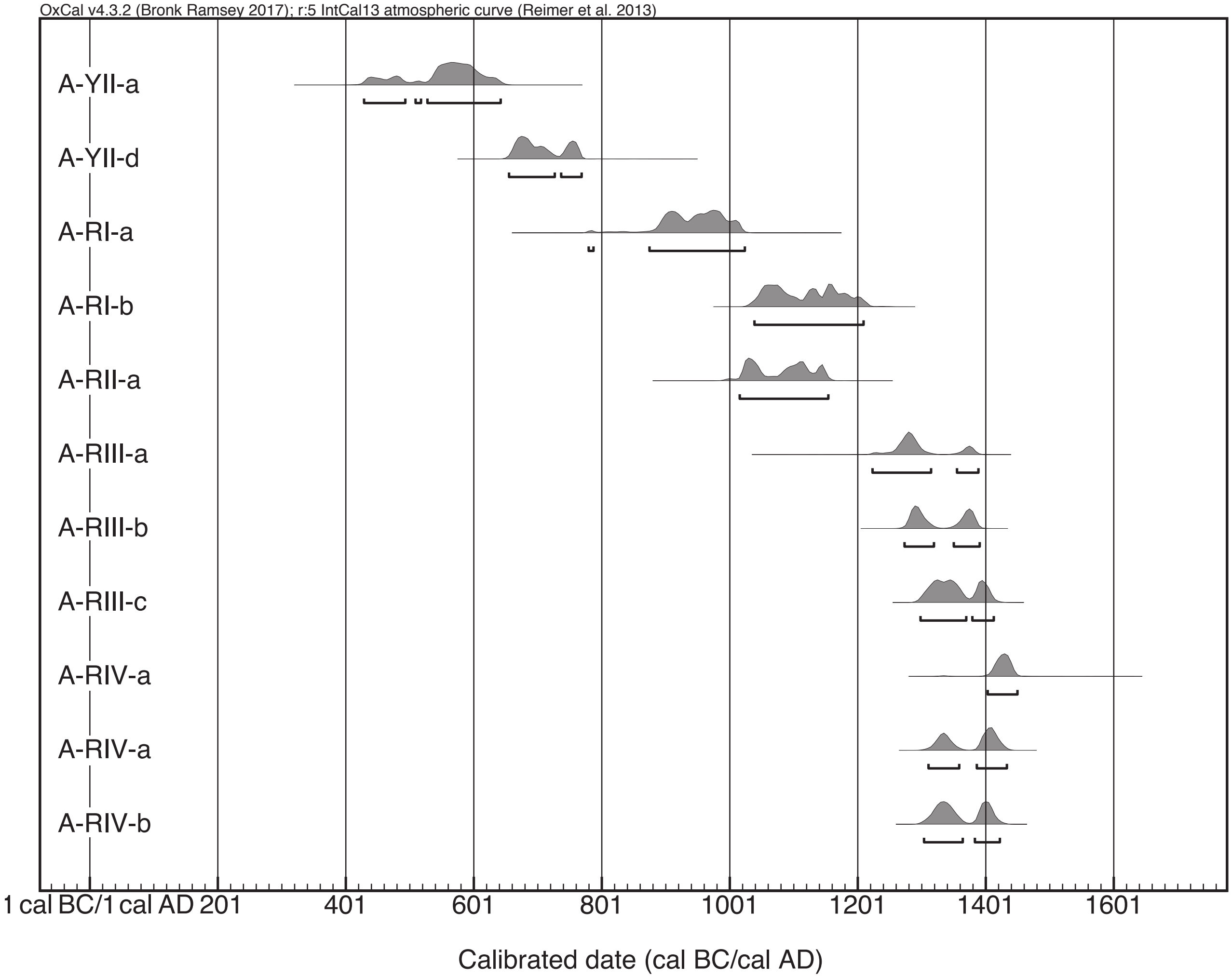

Figure 5.3. Unit A calibrated AMS dates (two sigma range)

have been roasted. Fish (clariid catfish; *Heterotis niloticus*) and Nile oyster could indicate a dry season expedition to the Mouhoun River. This rich set of evidence provides insights into the early occupation at Mound 1. Residents had access to dwarf livestock and possibly domestic fowl. They fished and collected aquatic resources. The bones were well preserved. They included fragile elements and had non-eroded surfaces, indicating little exposure.

Unit A, Yellow II, Context a (A-YII-a), Estimated Date Sixth to Seventh Century AD

In Yellow II, the excavated area continued to be composed of a clayey matrix with diverse contents, similar to those from Yellow I, and there was a coursed earthen structure (10 to 15 cm of wall preserved) with a pounded clay floor in the south of the excavation area. The material culture assemblage was more diverse, with a broken iron spear point and rod fragment, a fragment of a broken lower grinding stone, slag fragments, and a small dolerite sphere (polished; possibly a hammerstone), in addition to the ceramic assemblage, which contained a large number of small serving vessels along with a possible brewer. The faunal assemblage was similar to A-YI-a, with goat, sheep/goat, small bovid, chicken/guinea fowl, fish, and Nile oyster remains all identified, and the body part distribution across taxa is concentrated on limbs and crania. Several long bone elements of a cattle-size animal were also recovered. The goat was a prime-age adult, and the accompanying sheep/

goat and small bovid bones (potentially from the same individual) had evidence of burning on a mandible and a long bone fragment, suggesting that it may have been roasted whole or that the waste was burned following consumption. Notably, the domestic and unidentified small bovid elements indicate very small animals. One mammalian bone fragment had minor rodent gnawing. The fish taxa (larger clariid catfish; Nile perch) and Nile oyster are indicative of continued dry season expeditions to the Mouhoun River.

Unit A, Yellow II, Contexts b and c (A-YII-b, A-YII-c), Estimated Date Sixth to Seventh Century AD

The A-YII-a context was subsequently cut by two pits. The largest (A-YII-b) was 50 to 60 cm in diameter and 50 cm deep and was cut through a low-walled coursed earthen structure (Figure 5.4). The contents of the pit appear to have been dumped while hot, as it was filled with ash that burned the adjacent earth orange in places, and there was a cap of clay sealing a large section of the top. The pit contained fauna but fewer material remains: fragments of an iron bloom and an iron rod fragment, slag, and a small number of pottery fragments (including a jar). The distribution of animals remained largely consistent (small bovid, canid, chicken/francolin, chicken/guinea fowl, fish, and Nile oyster). Postcranial elements of a small bovid (similar in size to dwarf livestock) were identified and had cut marks, and a few long bone fragments were burned, indicating roasting. A long bone fragment of a cattle-size animal was also recovered. The head of a dog, represented by a large maxillary fragment with teeth and a smaller mandibular fragment, was also present in the pit. One mammalian fragment had very minor carnivore damage, and two had minor rodent gnawing. Wing and leg parts of two galliform bird individuals (one each of chicken/francolin and chicken/guinea fowl), one slightly burned, were recovered. Lastly, as with previous contexts, fish and Nile oyster, the latter collected at low water, indicate a dry season expedition to the Mouhoun River

The second, northern pit (A-YII-c) was much thinner (5 to 10 cm deep) and smaller (about 50 cm in diameter) and contained no material remains. It is possible that this is the base of a pit cut during later mortuary events in A-YII-d. Despite its ephemeral nature, A-YII-c contained a radius of a cattle-size bovid, long bone fragments of sheep/goat and cattle-size animals, and a metacarpal of a canid.

Unit A, Yellow II, Context d (A-YII-d), Estimated Date Seventh Century AD

The later Unit A, Yellow II deposits form a much larger mortuary feature, comprising a 50 to 60 cm–deep deposit underneath a 1.5 m–diameter coursed earthen structure with a low wall (15 to 20 cm tall) and a pounded clay surface on the interior (Figure 5.5). Multiple pits were dug in the area around this structure, with two adult burials identified in excavations. Due to the potential for many other burials in the space, recovered fauna and material remains could not be tied to specific burials. However, in general, materials and faunal remains were found dispersed over the space, likely the result of similar choices over multiple events. As with previous contexts, diverse broken material culture was recovered, including almost 3 kg of slag, six iron fragments (five rods from broken implements, one bent, and a broken iron rod with a barb), three lower grinding stone fragments, and a very diverse array of ceramics, including some possible brewers, various jars, and a large proportion of elaborately decorated serving vessels, among them many beakers. Some transitional Yellow II/Red I sherds were recovered from near the upper surface of the deposit. To the north of the mortuary monument, a small portion of a highly burned surface in the northwest corner of the unit extended into the profile, along with a ceramic waster (broken during firing) and tuyère fragments. This area was likely used for pyrotechnic purposes, possibly pottery open-firing or metal forging.

The identified animals included cattle, goat, sheep/goat, common duiker, small bovid, canid (likely domestic dog), galliform-size bird, Nile oyster, and fish. The assemblage was comprised almost exclusively of crania and limb fragments. The domesticated bovids were all adult (fully fused) individuals, and the cattle were from a dwarf breed similar to the remains from A-YI-a. Four exhibited cut marks and three minor carnivore damage, but none were burned. The common duiker horn core had both a cut mark and carnivore damage. In contrast, the dog mandible was extensively burned, perhaps suggesting that it was grilled. The fish (a large clariid and *Synodontis* sp. catfish) were likely caught in the Mouhoun River, and river expeditions are also supported by the presence of Nile oyster.

Table 5.1. Fauna from Unit A contexts

Taxonomic Identification	A-YI-a	A-YII-a	A-YII-b	A-YII-c	A-YII-d	A-RI-a	A-RI-b
Philantomba maxwelli							
Cephalophus rufilatus							
Very small bovid							
Ovis aries						1	
Capra hircus		1			1	1	
Ovis/Capra		3			6	3	1
Sylvicapra grimmia					1		
Ourebia ourebi							
Sylvicapra/Ourebia							
Fetal bovid							
Small bovid	4	3	3		3	4	4
Small bovid LBF	9	12	13		10	6	3
Kobus kob						1	
Redunca redunca							
Tragelaphus scriptus							
Tragelaphus spekii							
Medium bovid						2	
Medium bovid LBF	2	1	3	2	3	7	1
Bos taurus	3				4		
Alcelaphus buselaphus							
Medium-large bovid				1			
Medium-large bovid LBF	2	5	1	1	1	3	1
Hippotragus equinus							
Large bovid							
Large bovid LBF							
Equus caballus							
Equus asinus							
Canis familiaris					1		
Canis adustus							
Canis sp.	1		2	1	2	3	2
Medium carnivore							
Medium carnivore LBF	1						
Felis sylvestris							
Leptailurus serval/Caracal caracal							
Civettictis civetta							
Mungos mungo							
Atilax paludinosus/Ichneumia albicauda							
Herpestes sanguinea							
Small mongoose							
Crocidura sp.							
Hippopotamus amphibius							
Phacochoerus africanus							
Suid LBF							
Erythrocebus patas							
Chlorocebus sabaeus							
Cricetomys gambianus							

A-RI-c	A-RII-a	A-RIII-a	A-RIII-b	A-RIII-c	A-RIII-d	A-RIV-a	A-RIV-b	A-RIV-top	**Total**
									0
									0
									0
							1		**2**
							1	4	**8**
				5			3		**21**
									1
		2	5			4	2		**13**
									0
			8						**8**
		9	6	11		9	11	9	**76**
		5	1	9		12	8	20	**108**
		4					1		**6**
				1			1	1	**3**
									0
									0
		4		3		2	1	4	**16**
		2		3	1	8	10	9	**52**
									7
		3				3			**6**
		18	1	7		1	1		**29**
	1	10		2		1	3	4	**35**
									0
									0
									0
									0
		2							**2**
									1
									0
		4		3			2	3	**23**
				1					**1**
				1					**2**
									0
									0
									0
									0
									0
									0
									0
									0
									0
									0
									0
									0
									0
									0

Table 5.1. Fauna from Unit A contexts *(continued)*

Taxonomic Identification	A-YI-a	A-YII-a	A-YII-b	A-YII-c	A-YII-d	A-RI-a	A-RI-b
Thyronomys swinderianus							
Lepus victoriae						1	
Small mammal (large rodent size)							
Small mammal LBF							
Micromammal						4	
Mammal (unidentified)	3	9	9	1	6	12	6
Gallus gallus							
Numida meleagris							
Francolinus sp.							
Gallus/Numida		1	1			5	5
Gallus/Francolinus	1		2			1	
Galliform						1	
Galliform LBF		2	1		1	8	4
Plectropterus gambensis							2
Sarkidiornis melanotos							
Avian (unidentified)							2
Avian eggshell (chicken)							
Avian eggshell (non-chicken)							
Tilapiini							
Clarias sp.	1	1			2		
Lates niloticus		1				1	1
Synodontis sp.					1		
Heterotis niloticus	1						1
Bagrus sp.							
Mormyrus sp.							
Heterobranchus sp.							
Gymnarchus niloticus							
Auchenoglanis sp.							
Protopterus annectens							
Tilapiini/*Lates niloticus*							
Siluridae							
Fish (unidentified)	1	2	2				
Chambardia sp.							
Etheria elliptica	2	2	5		1	5	6
Bivalve							
Terrestrial mollusks							
Varanus sp.							
Crocodylidae							
Agama sp.							
Order Anura							
Pelusios castaneus							
Cyclanorbis senegalensis							
Small lizard							
Total	**31**	**43**	**42**	**6**	**43**	**69**	**39**

Note: A-RIII-e and A-RIII-f contained no fauna.

A-RI-c	A-RII-a	A-RIII-a	A-RIII-b	A-RIII-c	A-RIII-d	A-RIV-a	A-RIV-b	A-RIV-top	**Total**
									0
1		1							**3**
		2							**2**
									0
		1	3						**8**
	1	34	10	8	2	29	19	28	**177**
									0
									0
		1	1			1			**3**
	3	10	5	5		2	1		**38**
									4
		5	3			3			**12**
	3	5	8	2		4			**38**
									2
									0
			1						**3**
		3	2	1					**6**
			9						**9**
		4	4						**8**
		1							**5**
	1			2		1			**7**
	1			1					**3**
									2
									0
									0
									0
									0
									0
									0
		4	10						**14**
			1						**1**
		5	2	1	1				**14**
				1					**1**
1				2		1			**25**
									0
		2		12					**14**
									0
									0
									0
									0
									0
									0
									0
2	**10**	**141**	**80**	**81**	**4**	**81**	**65**	**82**	**819**

Figure 5.4. Unit A showing A-YII-b pit

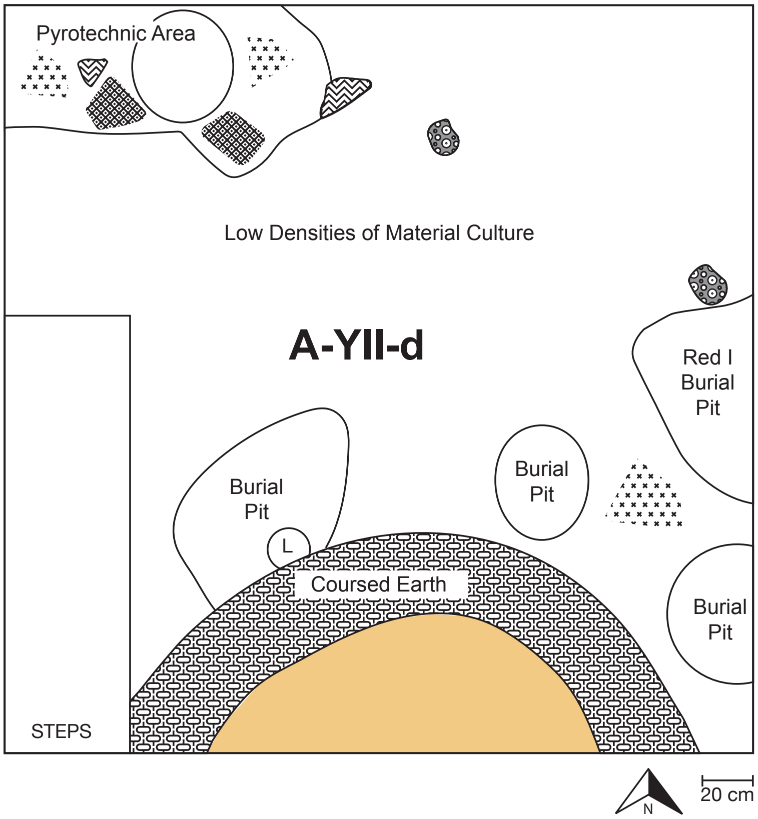

Figure 5.5. Unit A excavation map, context A-YII-d

The combination of only one unidentifiable bird bone and one freshwater bivalve fragment may indicate that this context was more exposed, and the area may have shifted function for at least a short time and been used for other activities (such as pottery firing). However, the general pattern of primarily domestic animals with a river expedition is consistent with earlier contexts. The taphonomic characteristics of this level indicate that fragile faunal remains such as birds would likely not preserve, and even mammalian bone would be heavily affected if layers were exposed for decades due to a combination of soil chemistry, trampling, and carnivores. The smaller fauna assemblage from this context supports the interpretations that fauna in most contexts was buried quickly and that the mixed contexts created soil chemistry amenable to bone preservation.

Unit A, Red I, Contexts a, b, and c (A-RI-a, A-RI-b, A-RI-c), Estimated Date Eighth to Eleventh Century AD

The Red I deposit represents a significant shift in the use of space and is characterized by the construction of a complex architectural compound (Figure 5.6 and Figure 5.7). The beginning of Red I was marked by a very thick (up to 20 cm) laterite pavement flooring sequence covering the excavated area. The unevenly distributed layers of floor replasterings suggest several rebuilding episodes, but only the last structures constructed on this flooring sequence had surviving standing walls, 15 to 20 cm tall. These structures consisted of a large circular structure in the northwest, the very edge of a rounded structure in the northeast, and a much smaller circular structure in the southwest that opened onto the paved courtyard area. Based upon abandonment dates for different areas, the compound likely had a very complex internal organization, perhaps indicating that two different cells within a larger architectural unit were exposed. For example, the courtyard area (A-RI-a) was abandoned during the middle of Red I according to the associated ceramics and AMS dates, while the northwestern structure (A-RI-b) was abandoned near the Red I/Red II boundary, perhaps as much as 100 to 150 years later. Stratigraphically, the northeastern structure (A-RI-c) appears to have been abandoned between these two. The courtyard and northwestern structure both became burial locations upon abandonment,

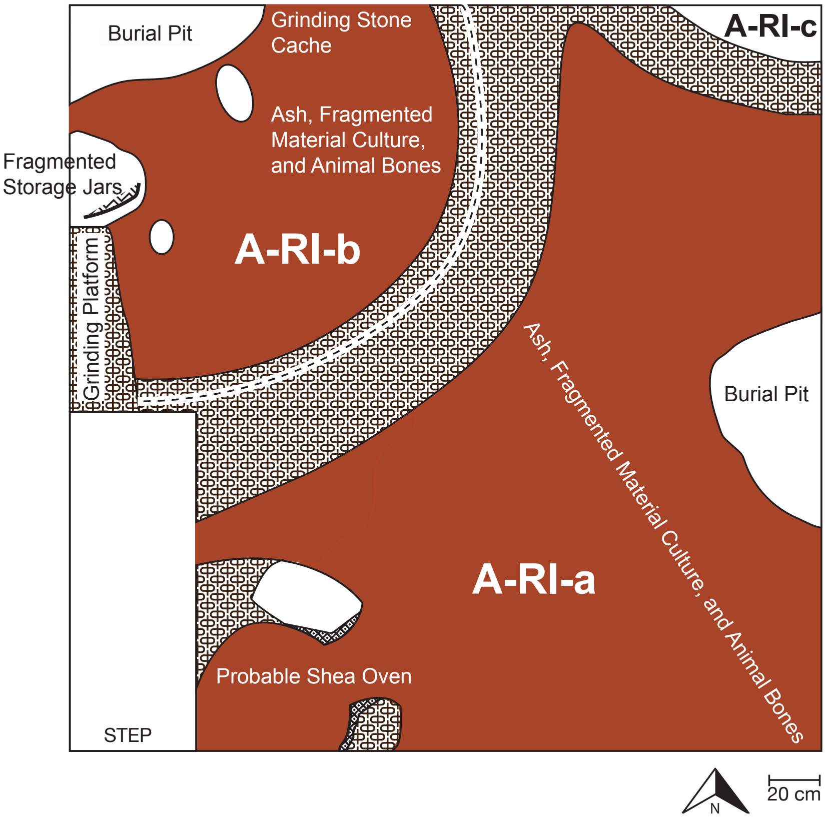

Figure 5.6. Unit A excavation map, contexts A-RI-a, A-RI-b, and A-RI-c

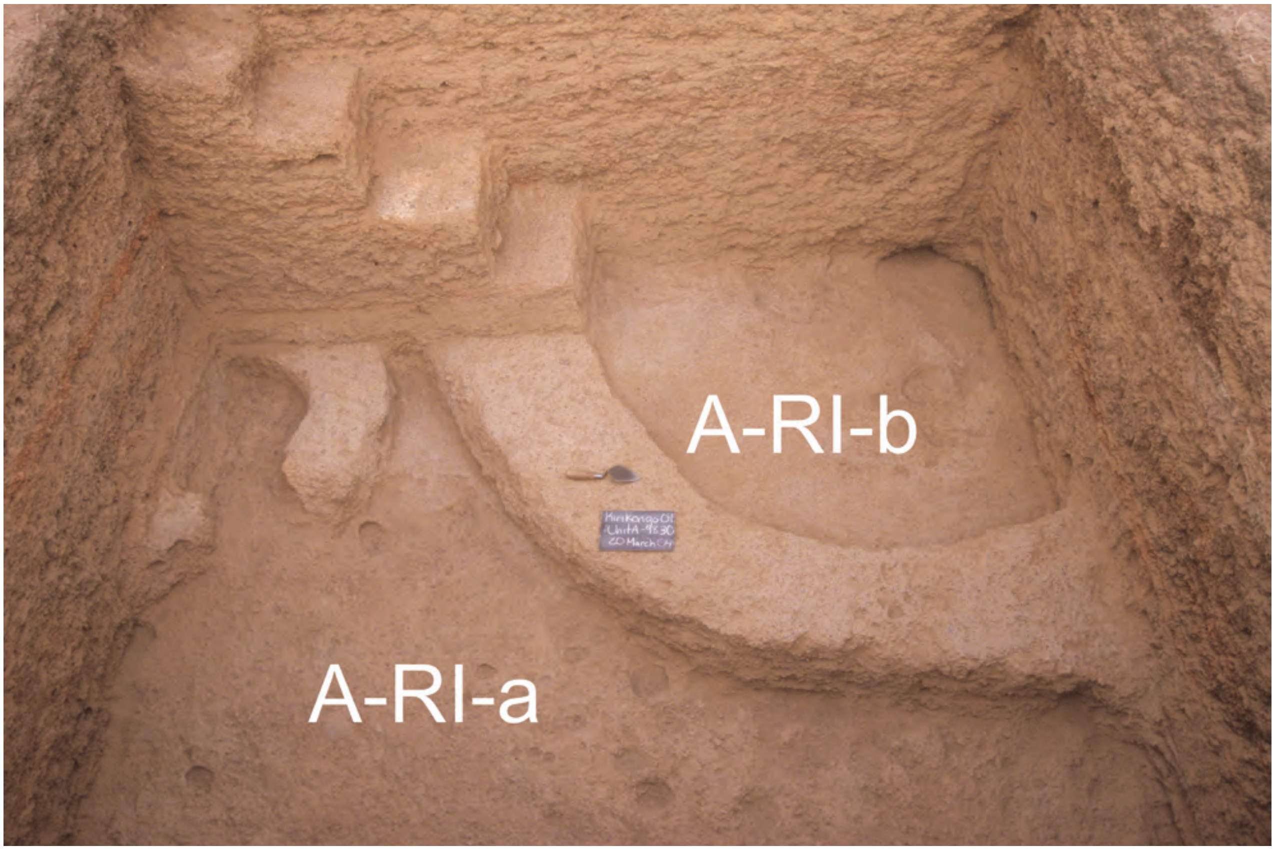

Figure 5.7. Unit A showing A-RI-a and A-RI-b

with associated material culture. In general, the architecture indicates a complex evolving compound in Red I and II, as the structures and courtyard were constantly maintained through refloorings, and walls appeared to be replastered. These transitioned to burial places, and actively used spaces were located close to tombs for periods of time.

The courtyard space (A-RI-a) contained no features aside from the very small structure (also with 20 cm–tall walls) interpreted as a probable shea parching oven (see Gallagher et al. 2016). However, the deposits overlaying the floor included a rich array of cultural material in a cluster adjacent to a burial pit. Among the material culture finds were numerous broken pots (including possible brewers, jars, diverse serving vessels, a possible fish smoking vessel, and legs from tripod vessels), two broken hand stones, a sandstone fragment, half of a broken iron bracelet, and a broken hoe fragment. The faunal assemblage was equally rich, with dwarf goat, sheep, sheep/goat, kob, small and medium bovid, canid, hare, small rodent, chicken/francolin, chicken/guinea fowl, Nile perch, and Nile oyster. The domestic animals (a female dwarf goat and prime-age sheep) were represented by crania, upper appendages, and metapodials, while the older kob was represented by a tooth and ribs and long bone fragments from a kob-size animal. Kobs favor riverine environments, and hunting for them near the Mouhoun is likely a practice also suggested by the presence of riverine fish and oyster. All the bovids had burning and cut marks suggesting butchery and roasting or burning of food waste. The guinea fowl/chicken bones are also burned. The canid was represented by a paw (metatarsal, metapodial, and phalanx) and the hare by a pelvis. Three bones had minor rodent gnawing, but no carnivore damage was indicated, likely because this space was on the interior of the compound.

The large northwestern structure (A-RI-b) appears, prior to its use as a burial monument, to have been in part a locus for food preparation, with an interior grinding installation that consisted of a low bench extending into the middle of the structure. Next to this, the base of a large jar was inset in the floor. Parts of the broken storage vessel were found, including fragments of a lid. The structure was likely abandoned in the eleventh or early twelfth century AD, at which point a burial pit was cut in the center of the space. To the east of the burial pit was a second small pit, within which two broken hand stones were interred. Atop and around the burial pit was an extremely diverse array of material culture fragments, including a lower grindstone and two sandstone fragments, two iron rods, and an extremely diverse set of pottery, with a broken tripod vessel, a possible broken strainer/fish smoker, possible brewers, many different jars (all late Red I and very early Red II), and small serving vessels. The animal bones recovered from the structure (prime-age sheep/goat, small bovids, canids, chicken/guinea fowl, spur-winged goose, Nile perch, *Heterotis* sp., and Nile oyster) were localized around the burial and likely associated with that event rather than the structure's occupation. None of the bones had evidence of burning, cut marks, or carnivore damage, although one had minor rodent gnawing. The large goose (represented by a coracoid) would likely have been hunted near the Mouhoun, an interpretation reinforced by the presence of oyster and main channel river fish.

The small excavated space in the northeastern corner (A-RI-c) was filled after abandonment with a small amount of slag, a dolerite sphere, a fragment of sandstone, and two faunal elements: a Nile oyster shell and a metatarsal of a hare.

Unit A, Red II, Context a (A-RII-a), Estimated Date Eleventh to Mid-Twelfth Century AD

Following the interment in the northwest structure, almost the entire unit was paved, with a laterite floor sealing the previous deposits, except for the northwestern corner and a small space in the southeast (Figure 5.8 and Figure 5.9). Two structures were constructed on this floor: a small 2 m–diameter structure in the northeast and center of the unit that contained an inset simple open bowl in the floor, and a much larger 2.5 to 3 m–diameter structure in the southwestern unit that had a grinding platform and an associated jar on the interior (similar to the structure

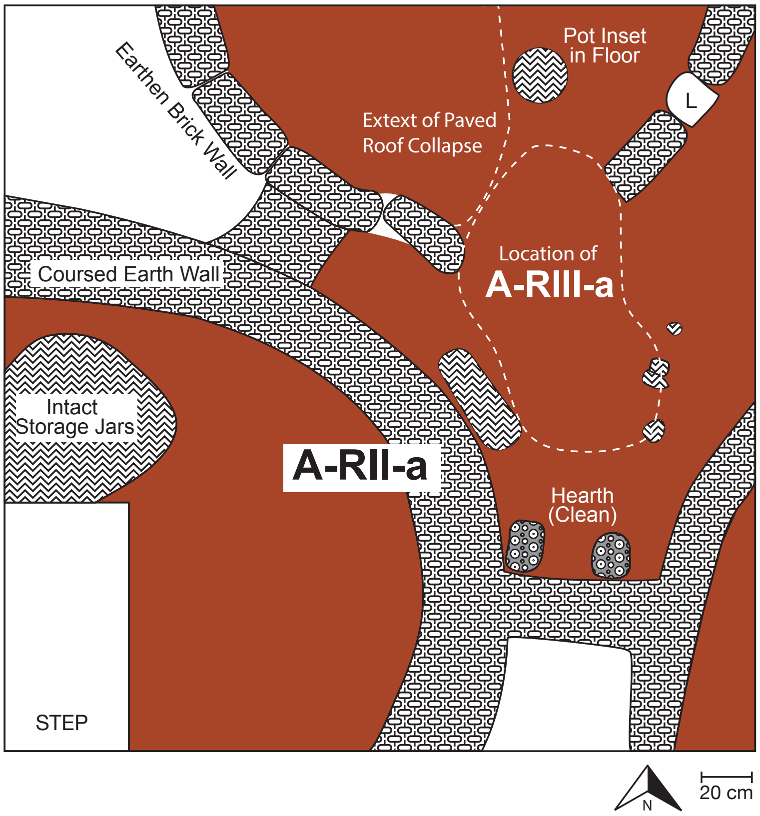

Figure 5.8. Unit A excavation map, contexts A-RII-a and A-RIII-b

Figure 5.9. Unit A showing A-RII-a

in A-RI-b). In the southern center of the unit, to the east of the large structure, a small assemblage of bones and material culture, and a possible associated burial pit, was located along the southern profile. Despite having only a small portion of the feature in the unit, the assemblage contained 230 g of slag, one dolerite sphere, and a broken iron rod fragment, as well as ceramics suggestive of the Red I/Red II boundary, including a broken tripod vessel, serving vessels (diverse bowls), and jar fragments. The few preserved animal bones included main river fish (*Synodontis* sp. and Nile perch), chicken/guinea fowl remains (one with very minor rodent gnawing), and mammalian fragments. Atop this cluster a wall was constructed, connecting the large southwest structure to a new rounded structure in the southeast, the third structure in the final abandoned level, also likely fairly large in size.

The Red II compound was abandoned and was not used for burials. The northern structure was clean on the interior aside from the inset bowl, and after abandonment the wall and a terrace roof fell inside. Similarly, the grinding jar left intact in the large southwestern structure was inset in the floor in an otherwise clean room, and the walls fell in with fragments of the terrace roof. The courtyard floor had a few broken ceramic fragments, as well as two laterite blocks that were set atop the area where the accumulation of fauna and material culture was found, perhaps representing a small shrine location. The abandoned compound contained no preserved faunal remains, indicating that either the space was fairly clean upon abandonment or that taphonomic conditions (soil chemistry, trampling, carnivores) destroyed bones during the abandonment period. Walls were left standing 20 to 25 cm tall in all three structures.

Unit A, Red III, Context a (A-RIII-a), Estimated Date Late Thirteenth Century AD

The excavated area was abandoned until the middle of Red III (likely late thirteenth century AD), although analysis of the road-cut stratigraphy indicates that other parts of the mound were occupied during this period. In the late thirteenth century, a pit was excavated into the abandoned Red II deposits and a dense assemblage of animal bones with material culture was deposited (Figure 5.8). Ceramics, lower in frequency than in earlier deposits, included a broken tripod vessel, small serving vessels, and some jars. However, a large number of broken iron fragments, including part of a likely hoe blade, an iron rod with a barb (harpoon), and four iron rod fragments, were laid atop a pile of diverse animal bones. The fairly large assemblage of bones included wild and likely domestic small bovids, a kob, a hartebeest, a donkey, canids, a hare, wild and likely domestic fowl, fish, and a terrestrial mollusk. Small bovids included the oribi (positively identified and also likely represented in associated small bovid remains), possible sheep/goat, and small bovid bones from throughout the body, including a burned humerus. Cranial and postcranial fragments of a large kob were recovered. The anterior portion of the skull with horns had been removed, leaving the back of the skull. In addition, diverse elements from a very large hartebeest, ranging from parts of the mandible to a carpal and tarsal, were recovered; many of them were covered in cut marks, indicating extensive dismemberment. For example, thoracic and lumbar vertebrae were chopped vertically and horizontally for removal of sections of the rib cage and division of the left and right carcass. The femur and tibia had cuts, likely indicating removal of the leg, as did cuts on the glenoid facet of the scapula. Removal of the lower appendages is indicated by cut marks on a carpal and tarsals. Minor carnivore damage on two medium-large bovid elements was identified.

A chopped distal metacarpal of a donkey was positively identified, likely indicating removal of marrow. The rear paw of a dog was found, as was the tibia of a hare, the scapula and metapodial of a probable hare, and micro-rodent remains. Avian fauna included a femur from a francolin and wing and leg bones from chicken/guinea fowl, with at least a scapula identified as probable guinea fowl. Probable chicken eggshell and large land snail shell fragments were also recovered. Shallow-water fish taxa were identified (clariid catfish and tilapia); the latter is the first tilapia identified in this excavation unit. A new compound was constructed atop A-RIII-a shortly after its deposition, and these remains could constitute a ritual foundation deposit, possibly anchored by a burial outside the excavated area.

Unit A, Red III, Contexts b, c, d, e, and f (A-RIII-b, A-RIII-c, A-RIII-d, A-RIII-e, A-RIII-f), Estimated Date Fourteenth Century AD

In late Red III, the previous residential structures were replaced by entirely new construction. The living space shifted slightly such that only the edges of paved interior space (two circular structures connected by a wall segment with an interior courtyard area) extended into the unit in the south and east, with walls standing 15 to 20 cm tall (Figure 5.10). The majority of the excavated area was an unpaved courtyard with grinding installations in two locations over time, with a wall extending north–south along the western edge of the unit (15 cm tall) bounding this area on one side. The majority of the material culture and faunal remains derive from the exterior courtyard and the southern interior courtyard area on the other side of the wall, the latter associated with a burial pit.

The interior courtyard area (A-RIII-b) contained hot ashy debris (which burned two earthen walls) mixed with animal bones, a hand stone fragment, slag, and a ceramic assemblage, including small and large jars, serving bowls and bases, and a fragment of a tripod ceramic vessel, all deposited next to a burial pit in the interior courtyard. The rich faunal assemblage included a pregnant oribi, a young adult wild medium-large bovid (unfused proximal humerus), medium bovid, francolin, chicken/guinea fowl, tilapia, catfish, and wild and domestic avian eggshell. Given the occurrence of parts from throughout the skeleton and the presence of the fetal bovid remains, the oribi was likely butchered nearby. Parts from throughout the body of the probable chicken were recovered.

The exterior courtyard (A-RIII-c) appears to have been an active space, with evidence for a grinding installation. Like the interior courtyard, there were deposits of hot ash and animal bone, in this context augmented with metal fragments (two iron rods, one bent), slag, a lower grinding stone and multiple fragments of broken sandstone, and sherds of serving vessels, such as small jars and bowls, bases and rims of broken larger jars, a tripod handle, and multiple burned fragments of fish smoking pots. The rich and varied faunal assemblage—sheep/goat, multiple sizes of bovids (medium-large bovids similar in size to hartebeest and medium-size reedbuck), canids

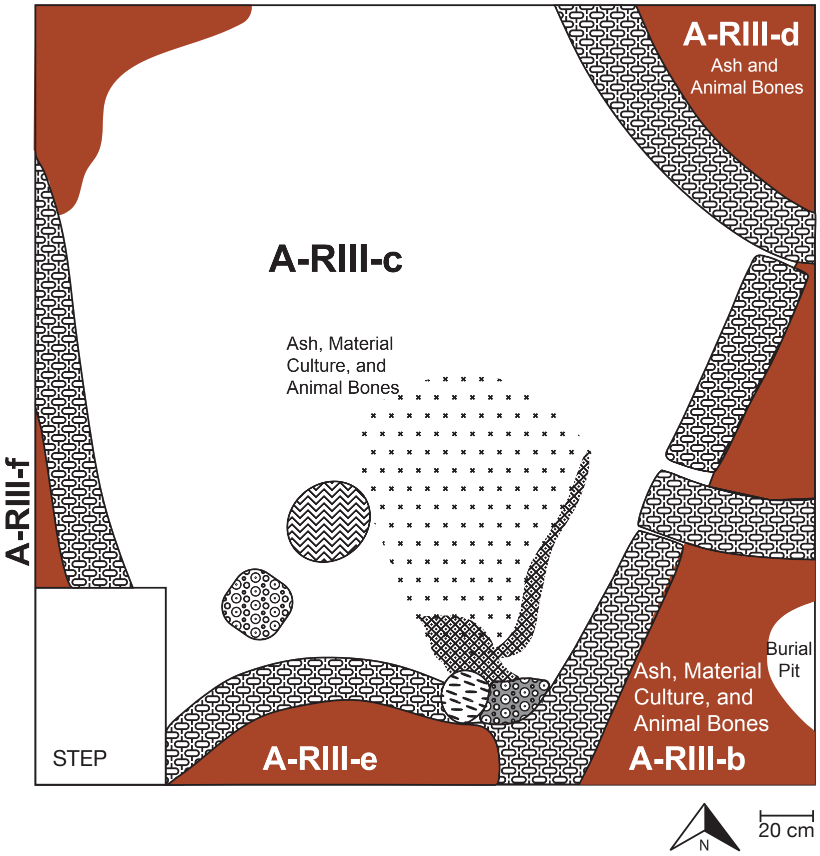

Figure 5.10. Unit A excavation map, contexts A-RIII-b, A-RIII-c, A-RIII-d, A-RIII-e, and A-RIII-f

(possibly domestic based on maxillary teeth), chicken or guinea fowl, a likely chicken eggshell fragment, main river fish (Nile perch, *Synodontis* sp., and clariid catfish), and Nile oyster as well as the more environmentally flexible *Chambardia* sp.—differed significantly from the assemblage found in the interior courtyard. For many of the animals, roasting is indicated by body part distributions, evidence of burning, and cut marks. For example, the medium-large bovid remains, which, as mentioned, were likely derived from a wild animal in the size range of the hartebeest, included segments from along the vertebral column that had been chopped (indicating carcass division, as in A-RIII-a) and frequently burned. Similar patterns were seen in the medium-size bovids, one of which was identified as reedbuck (with a tibia exhibiting cut marks from dismemberment). A more comprehensive assemblage of bones from throughout the skeleton was identified for the sheep/goat and unidentified small bovids (most of which likely are also sheep/goat). Of these, the tibia and radius had cut marks from dismemberment, and several elements were burned. There are at least two individuals represented, including dentition from an adult and two small, possibly unfused pelvis fragments (one noted as similar in robusticity to sheep/goat). Similar to the likely sheep/goat remains, the chicken/guinea fowl elements were drawn from both the wing and legs. It is likely, given the diversity of parts, that butchering took place in close proximity to this location.

Only a small portion of the northeast structure (A-RIII-d) extended into the unit. The space contained no materials but did yield a long bone fragment of a medium-size mammal, nonidentifiable mammal bone, and a fish cranial fragment. The southern structure (A-RIII-e) contained a bowl fragment and a metal point with a barb in a pit dug into the floor, similar to known mortuary deposits at Kirikongo. Interestingly, the earliest spindle whorl at Kirikongo was recovered from behind a wall on the west side of the unit (A-RIII-f) near the Red III/Red IV boundary; it was not broken. For the interior structure (A-RIII-b), the combined presence of the fetal bovid (oribis can breed throughout the year, but with a peak in the rainy season), shallow-water fish, and wild eggshell could imply that the hunt took place during the rainy summer months. In contrast, in the exterior courtyard (A-RIII-c), the consumption of main river fish (clariid catfish, Nile perch) and bivalves likely represents dry season fishing along a permanent river. The exterior courtyard bovid remains had evidence of minor carnivore damage on several specimens, and the interior on one, while minor rodent gnawing was identified on one element in each. In general, the faunal remains from these deposits were once again well preserved and untrampled, with fragile elements preserved. They appear to have been deposited in abandoned spaces along with other fragmented materials for only a brief time prior to sealing the deposits with another architectural layer.

Unit A, Red IV, Context a (A-RIV-a), Estimated Date Late Fourteenth to Early Fifteenth Century AD

A short-lived poorly built architectural layer was constructed in early Red IV. There was significant continuity in the organization of space in the excavated area, with an unpaved courtyard in the center of the unit bounded by a wall to the west and structures with laterite pavement floors to the south and southeast (Figure 5.11 and Figure 5.12). However, the two round structures had a new wall arrangement, and the courtyard space was reorganized with a horseshoe-shaped hearth adjacent to the north wall of the eastern structure. The hearth contained no animal bone and almost no wood charcoal but rather was filled with burned seedpods of *Piliostigma* sp. (Gallagher and Dueppen 2019). These produce a benzoic smoke and may have been burned for ritual or fumigation purposes. While the structures yielded no faunal remains, the center of the courtyard contained ashy deposits with a large animal bone assemblage and a small yet diverse ceramic assemblage with

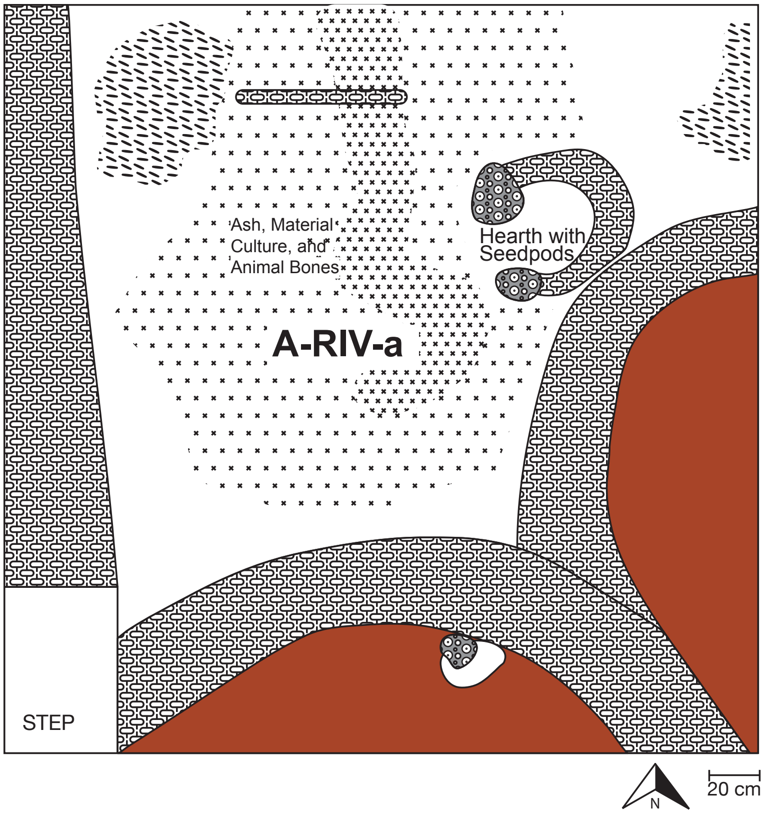

Figure 5.11. Unit A excavation map, context A-RIV-a

Figure 5.12. Unit A showing A-RIV-a

jars, brewers, bowls and bases, and a leg of a tripod vessel. In addition, a hand stone fragment and part of a likely lower ground stone were recovered, as well as multiple iron implements, including two iron hooks (possibly for fishing), two iron rods, and an iron bar. Lastly, a medium-large bovid scapula fragment had been modified for use as a scraper.

The faunal assemblage contained no confirmed domesticated bovids and instead was dominated by the remains of wild bovids in multiple size classes, 40 percent of which had evidence of burning or cut marks. These included at least two hartebeest, represented by differently sized specimens of the same carpal bone, and a substantial portion of an oribi (scapula, pelvis, metapodial, and first phalanx). The presence of extremities, limbs, and axial skeletons in the identified and unidentified bovid bone reflects a less distinctive processing process than in previous layers, as both primary processing and consumption debris are present. It is possible that *Piliostigma* sp. pods were burned in the context of butchering activity to dampen smells or keep insects away, although they may also have been used to smoke the roof of the adjacent structure. Galliform birds, including a francolin and two unspurred tarsometatarsi from a chicken or guinea fowl, were also present, as were Nile perch and Nile oyster, indicating main river channel fishing. The combined fauna indicate dry season activities. Once again, the assemblage was extremely well preserved, with only one element each with minor carnivore and rodent damage, and no trampling. The new flooring sequence above this context was likely constructed shortly after its deposition.

Unit A, Red IV, Context b (A-RIV-b), Estimated Date Early Fifteenth Century AD

The new flooring sequence consisted of three laterite pavements that indicate possible structures in the northwest, northeast, and southeast quadrants of the unit. The unpaved courtyard in the center of the unit contained the burial of an infant. The deposit contained slag, a hand stone fragment, and an extensive array of iron implements, including a broken iron spear, an iron rod with a barbed point, seven iron fragments, and a much reduced set of poorly decorated pots, with a focus on consumption vessels (some with bases) and only a single jar. Notably, this level lacked a tripod vessel. The animal remains included a diverse array of mammals (medium-large bovid, kob, reedbuck, oribi, sheep, goat, and canid) but only one bird bone (chicken/guinea fowl).

Wild medium-size and large bovid remains were limited in number in comparison to A-RIV-a. For example, the medium-large bovid was represented only by a tibia and long bone fragments (one burned), the kob by a third molar from an older individual, and the reedbuck by a second phalanx. The only other medium-size bovid bones were a rib and several long bone fragments. Cut marks on the second phalanx and rib are from dismemberment and division of the carcass. An ulna and a first phalanx of an oribi were also recovered, the latter with cuts from dismemberment. Goat was identified from a radius, sheep from a first phalanx that had been cracked for marrow, and prime-age sheep/goat dentition could come from either or both taxa. The size-classed small bovid bones included a wider array of body parts than for other animals, with cranial, rib, vertebra, and femur fragments and eight long bone fragments. The canid fragments were from the cranium (maxillary) and metatarsal. Burning was found only on two mammal bones, but cut marks were common, particularly on the wild bovids. Minor carnivore chewing was found on several elements, but no rodent damage. The small number of preserved avian bones (chicken/guinea fowl were represented by a single tarsometatarsus) and the complete absence of fish and aquatic taxa distinguish A-RIV-b from earlier contexts. However, this may be the result of taphonomic processes related to exposure, as A-RIV-b is the last confirmed cultural context in unit A.

Topsoil (A-RIV-top)

The churned topsoil extends through the top 25 to 30 cm of deposits at the mound. No fauna was preserved on the surface, but a fairly large assemblage was present beginning at 10 cm. These materials were not associated with preserved architecture and were heavily mixed and highly fragmented, although there were a couple of large ceramic sherds. Material culture and animal remains strongly resemble those from A-RIV-b. As these remains were from unsealed deposits, they were deeply affected by taphonomic processes. Thirteen bones had evidence of carnivore damage, some of which was quite extensive, and the assemblage favored dense, easily preserved bones. Fragile bones from birds and aquatic taxa were absent. Taxa present included goats, wild small bovids (sylvicapra/oribi), reedbucks, canids, and, due to the effects of trampling, a large number of unidentifiable mammalian fragments.

Unit A Overview

The contextual analysis combining architecture, deposition histories, material culture, and faunal remains reveals that fauna was mainly deposited in highly structured ways with other materials during discrete events that resulted in well-preserved assemblages with at most only minor carnivore and rodent damage. In many cases, deposits were interred within the preserved foundations of walls and sealed by subsequent construction levels, and material culture tends to be stylistically constrained to specific chronological moments. Continual use of the mound is indicated with two periods of lessened use/disuse of the excavation area. The first was at the Yellow II/Red I boundary but only for a few decades at most. A longer break occurred in mid-Red II, when abandoned buildings collapsed; these contained some of the only complete material culture recovered from the site. Representative of the effects of exposure on preservation, neither of these contexts contained preserved fauna. Similarly, the topsoil contained fauna only below 10 cm.

Two different formation processes characterize the Yellow and Red phases at Unit A. During Yellow I and II, the excavation area contained a series of pits with layers of ash, animal bones, and material culture surrounding them. In at least two cases, coursed earthen structures with low walls were identified, one from early Yellow II and the other from late Yellow II (both about 2 m in diameter). That these layers, pits, and walls may derive from mortuary rituals is suggested by the large number of burial pits in the late Yellow II deposits, with two confirmed adult burials in the sampled area under the structure. These mortuary monuments may have been located outside the residential architecture. Minor carnivore chewing on bones occurred, there is more evidence for seeds from weedy plants than in later habitation spaces, and the area in late Yellow II became a pyrotechnic location, which, given the winds, likely would be located to the west of habitation.

Starting in Red I the area appears to have shifted to use as the interior of a compound. From Red I to Red II, structures were built with multiple adjacent rooms. Upon their abandonment, courtyard spaces and structures became tombs with burial pits and adjacent depositions of fauna and material culture. The 15 to 20 cm–tall wall foundations were left in place before being sealed by repaving and construction of a new architectural layer. In comparison, the compound in mid-Red II, which was abandoned without the use of architecture for burials, was very different in character. Terrace roofs collapsed into the structures, crushed whole jars were found in the interiors, and there was a complete lack of both animal bone and concentrations of fragmented material culture. Construction throughout Red I and II utilized earthen brick and coursed earthen techniques, with terrace roofs and floors composed of strong pavements made of crushed red laterite pounded with clay. Activities in Red I and II occurred in interior paved courtyards (shea parching) and in the interior of structures (grinding of grain). Prior to abandonment, structures were constantly refloored and replastered with great care. Dogs appear to have been kept on the exterior of these closed compounds due to a complete lack of carnivore damage, while minor rodent gnawing was primarily identified in the interior spaces.

Upon reoccupation in mid-Red III, a similar deposition of well-preserved animal bones and material culture was interred in the space prior to the construction of a new architectural level. The new constructions maintained a combination of earthen brick and coursed earth techniques with laterite pavement roofs and floors. Activities such as grinding grain moved to the exterior in unpaved areas, and architectural syntax shifted to more elongated and open forms covering larger areas. The initial Red III architecture (late thirteenth century) was of similarly high quality to Red I and II; however, in the latter half of the fourteenth century, buildings became more poorly constructed and were inhabited for shorter periods, with a very quick buildup of a meter of cultural deposits in only a 50-year period. As in Red I and II, during Red III, at least some courtyard and structure areas were used for burial upon abandonment and deposits of fauna and material culture were well preserved and sometimes located adjacent to burial pits. The mound was ultimately abandoned in the early fifteenth century AD, a few decades after the likely plague-related large-scale depopulation of the settlement that began in the mid-fourteenth century AD. The fauna from the last architectural layer was more poorly preserved, despite being deposited in a concentration, due to the lack of a pavement sealing the deposits. Much of the fauna and material culture at Mound 1 was consequently derived from short-term events that quickly sealed fauna with fragmented material culture.

The fauna in these contexts patterned internally in ways that indicate repeated intentionality of process. A fundamental component of all deposits was a core assemblage of domestic animals and aquatic taxa that resulted in a comparable baseline diversity score for all deposits regardless of the assemblage size (see chapter 6). Most deposits tended to follow a formula, with greater skeletal representation and burning in domestic animal remains (bovid, canid, and fowl) and strong representation of main river body aquatic resources (fish and bivalve) collected in the dry season. Hunted animals increased in importance over time. Most of the sheep and goats were killed at prime age, with small parts from different sections of the body found in most archaeological deposits. However, the remains of much of the appendicular skeleton and most of the axial carcass (ribs, vertebrae) were deposited elsewhere. The same is true in domestic fowl, where the axial skeleton was highly underrepresented while wings and legs were more common. Some elements are entirely missing (carpals and tarsals of small and medium-size bovids and smaller mammals; crania, vertebrae, and torsos of birds). Dogs were treated differently, with only cranial fragments and paws recovered; dog crania were found within many pit contexts. Larger animals tended to be more heavily divided due to their size and also tended to have higher frequencies of cut marks. With the exception of A-RIII-c, all the events that created these assemblages likely took place in the dry season, as the targeted fish, game, and bivalves are all available at that time together in close proximity.

Over the course of the occupation, distinctive changes occurred within this general program. For example, early assemblages tended to contain primarily domestic animals, including cattle, with only occasional wild mammals in addition to low numbers of fowl, fish, and bivalves. The loss of cattle in Red I resulted in much smaller amounts of meat represented in deposits despite the increasing addition of hunted game. For example, in A-RI-b, the assemblage of dog, sheep/goat, domestic fowl, and goose, along with the small number of aquatic resources, together constituted less meat than an individual cow. The deposit in A-RIII-a, which marked the reoccupation of the space, differs significantly from the Red I and II assemblages, as there was a large increase in both hunted and domestic animals, with the assemblage reflecting a potentially larger social event. In this case, the combination of a donkey, large hartebeest, kob, oribi, likely domestic sheep/goat, dog, and hare, along with wild and domestic birds and a small number of fish, indicates remains combining to more than 400 kg of animal-based food. The complex carcass division systems that left behind many chopped and cut bone fragments may reflect wide distribution of the meat. In addition, feasts for a short time during Red III also involved egg sacrifice, which, as seen below, was much more common at Mound 4, where the founding house lived. Throughout Red III and IV, larger-scale hunting continued to be represented in assemblages along with the core of domestic animals and aquatic fauna. Some changes may have occurred during the plague era in the second half of the fourteenth century AD, when a rainy season hunt and fishing expedition and the slaughter of younger livestock represent fundamental differences with previous assemblages.

Fauna was not recovered in isolation, and all contexts with concentrations of faunal remains also contained diverse material culture that due to patterning in diversity and condition (treatment) substantiates an argument for intentionality in assemblage construction and associations between classes of archaeological material. Particular materials appeared to have been assembled throughout the sequence. Contexts contained limited numbers of fragments of diverse ceramic vessels, and there was a very high frequency of small consumption and possibly ritually related, highly decorated vessels in each assemblage; these may constitute representative parts of ceramic vessels in the same way that faunal taxa were represented by certain, often identifiable parts. Nonrandom patterns occur in ceramics over time, as all contexts between Red I and early Red IV contained broken fragments of tripod vessels. Ceramics within an assemblage also were temporally discrete, with only parts of vessels from the same subphase present. Only in the abandonment layer of Red II were large portions of or multiple sherds from vessels recovered, and these did not occur in association with other material classes.

In most assemblages, ceramic fragments and fauna were associated with fragments of ground-stone implements that were not worn out, with many lower grinding stones having significant intact depth of grinding surface. Intentionality of association within contexts is also indicated by the interment in Red I of two finely made hand stones that had small chips taken off their ends but otherwise were in excellent, still usable condition. In no cases within a context were there fragments that constituted a whole object. Most contexts also had fragments of iron objects, including knives, spears, barbed points, and bracelets, that were all either bent intentionally or broken cleanly (for example, the iron bracelet in A-RI-a), and many rods from the hafts of tools were recovered. Like other material classes, these fragments never constituted an entire object, although in Red IV some metal objects were almost intact. While almost all objects and animals found in assemblages in Unit A were fragmentary, three dolerite spheres, possible hammerstones or simply rounded natural stones, were intact, as was a spindle whorl from A-RIII-f.

Overall, in Unit A, accumulations of animal remains and material culture were associated throughout the sequence with structures, including accumulations from the early layers that appear to have been emplaced atop tombs and in pits and accumulations in Red I and II closed compounds and Red III open architectural contexts adjacent to burials in abandoned houses and in courtyards. To these should be added accumulations associated with abandoned architectural units that may also be related to mortuary events, despite the actual burial pit likely being located outside the excavation space and/or accumulations that may have served as foundational deposits for new building sequences (for example, A-RIII-a). Throughout, the intentionality of accumulations is indicated by stratigraphic, temporal, taphonomic, and internal patterning in the nature and condition of contents and is tied to architectural construction and deconstruction processes, many of which are related to burial events.

Unit B (Mound 4)

Mound 4 is set in the center of the central cluster at Kirikongo. The preserved area of the mound today is 0.9 to 1.2 ha in size. However, the talus slope is extensive, and this is a conservative estimate. In addition, Mound 5 extends north–south from Mound 4 and may in fact be part of the same mound that expanded in Red II.

An initial 2 x 4 m excavation unit was placed at the summit of Mound 4, located on the center/west of the mound, and excavated to a depth of 1 m, where a large well-preserved architectural complex was uncovered. Due to finds at 1 m in the main unit, a 3 m^2 extension (first extension) was placed around the southwestern corner of the unit. Based upon architectural finds in the first extension, a 2 x 2 m second extension was added slightly offset 50 cm south and directly west of the first extension. In total, excavations covered 15 m^2 at Mound 4. The first and second extension were both excavated to 2 m in depth, where a preserved ritual complex was exposed. To examine the broader sequence, excavation continued in the first extension in an area with minimal effect on the ritual complex architecture. This 1.25 x 1.25 m excavation extended to the bottom of the cultural sequence (lateritic bedrock) at 4.1 m in depth, by which point the unit had been slightly reduced in size to 1.1 x 0.8 m. The total excavated volume of the unit was 23 m^3, and 216 separate stratigraphic units were recognized during excavation. Based upon material culture and 15 AMS dates for the unit, the earliest deposits likely date to at latest the second century of the early first millennium AD and possibly the last centuries BC. The mound was abandoned in the final decades of the fifteenth or early sixteenth century AD, totaling around 1,500 years of occupation (Figure 5.13 and Table 5.2).

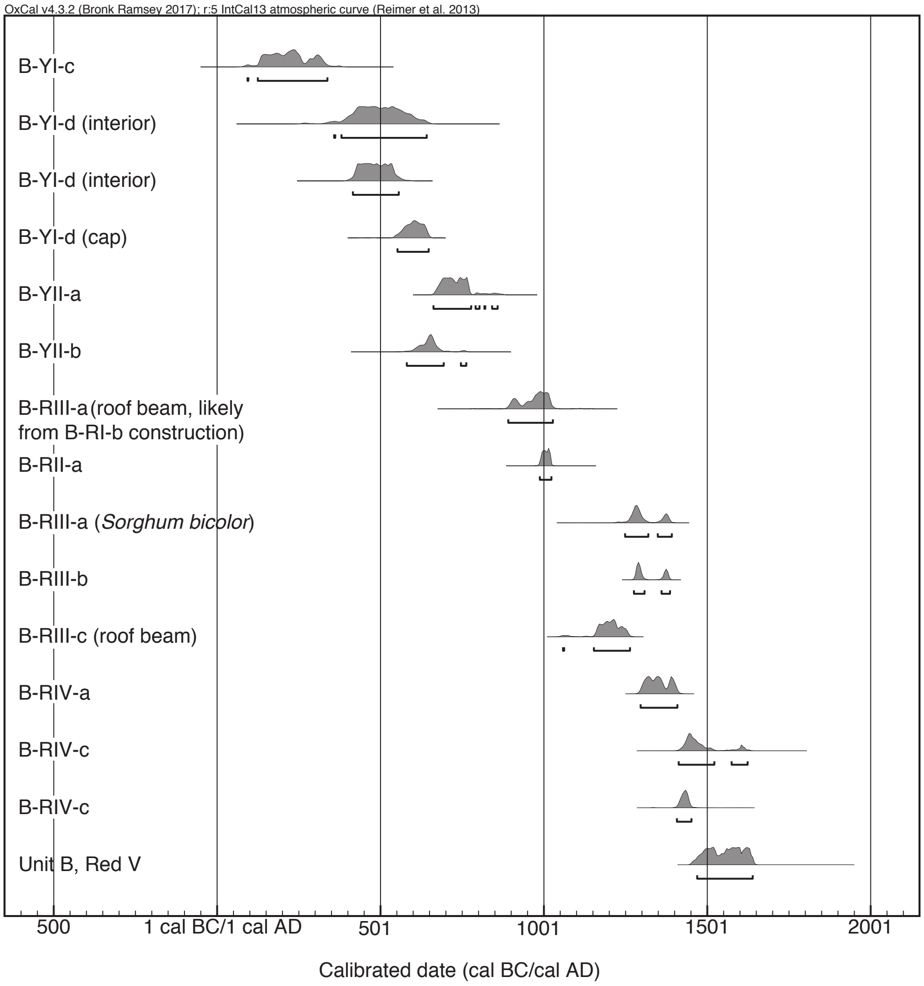

Figure 5.13. Unit B calibrated AMS dates (two sigma range)

Unit B, Yellow I, Context a (B-YI-a), Estimated Date Prior to Second Century AD

The earliest deposits at Kirikongo were excavated in Unit B at Mound 4 between 4.1 and 3.7 m in depth. The clayey matrix underneath a pounded clay floor extended down to sterile laterite basement rock that had four postholes dug into it, perhaps indicating the presence of a platform or structure. In addition to animal bones, this deposit contained a broken vitrified tuyère fragment and a white quartz bead broken cleanly in half, as well as a small closed bowl and several broken jars of different sizes. Despite the small number of fragments, the faunal assemblage included elements attributable to small bovid (likely sheep/goat), canid, micromammal, chicken/guinea fowl, tilapia, and *Chambardia* sp.

The mammalian bone assemblage included fragments of a canid paw, the mandibular teeth of a small bovid of advanced age (likely domestic), several micromammal elements, and unidentified burned bone fragments, including three long bone splinters from a small bovid-size animal. Parts of a wing and a leg of chicken/guinea fowl were recovered, as well as a *Chambardia* sp. bivalve shell fragment and a tilapia dorsal spine. Body part representation likely reflects both primary processing (butchering) and then cooking prior to deposition, given the presence of the unburned paw and mandibular teeth, along with burned appendicular fragments of mammals. The other parts of the skeletons (including the entire axial skeleton) are missing and may have been removed. The aquatic taxa suggest shallow-water exploitation, and the tilapia had been burned. The advanced age of the possible sheep/goat could indicate different slaughter strategies than later contexts, which tended to have the remains of prime-age individuals. The fauna was well preserved, with no carnivore or rodent damage.

Unit B, Yellow I, Context b (B-YI-b), Estimated Date Prior to Second Century AD

This context is a 5 cm–thick layer of ash and clayey deposits directly below a degraded yellow floor. This small context yielded no material culture but, like B-YI-a, contained a remarkably diverse faunal assemblage. Medium-large bovid, small bovid, micromammal, chicken/guinea fowl, eggshell, and Nile perch were identified.

The medium-large bovid element was a fragment of the frontal bone, most similar to that of cattle, while small bovids were represented only by long bone fragments. The avian fauna included part of the wing of chicken/guinea fowl and a galliform pelvis, possibly from the same individual. Their identification as chicken is supported by the presence of eggshell in the thickness range for chicken. Three elements from the dorsal region of Nile perch were identified, representing individuals between 40 and 50 cm in standard length. These fish would likely have been caught in the Mouhoun River. Overall, preservation was excellent, with no rodent or carnivore damage.

Unit B, Yellow I, Context c (B-YI-c), Estimated Date Second and Third Century AD

This context consists of 15 cm of ash and clay deposits found above the degraded floor and below a floor upon which a large smashed pot (42 to 46 cm rim diameter) and a broken small jar were recovered. Only mammalian bones were recovered from this small space, including an unfused metatarsal of a prime-age sheep or goat, 1.5 to 2.5 years old. The accompanying distal portion of a tibia, missing its epiphysis, had a cut mark from dismemberment. In addition, bones of micromammals and nonidentifiable mammalian fragments were recovered.

Unit B, Yellow I, Context d (B-YI-d), Estimated Date Fifth to Sixth Century AD

The final Yellow I context at Unit B was a complex feature centered on an ash-filled inverted bell-shaped pit 50 to 60 cm in diameter and 80 cm deep. A 20 to 30 cm layer of ash and clay capped the feature. Detailed stratigraphic analysis during excavation revealed a highly complex, clearly laid-out internal stratigraphy. As discussed below, there are major differences between the fauna recovered at different depths in and around the pit. The pit extended into the north and eastern profiles of the unit, and after excavation and recording the unit profile, the remainder of the pit was collected, as it would not have remained intact. This feature had one of the highest densities of animal bone recovered anywhere at Kirikongo and accounted for 56.4 percent of the fish excavated at Kirikongo.

Table 5.2. Fauna from Unit B contexts

Taxonomic Identification	B-YI-a	B-YI-b	B-YI-c	B-YI-d	B-YII-a	B-YII-b	B-RI-a	B-RI-b	B-RII-a
Philantomba maxwelli									
Cephalophus rufilatus									
Very small bovid									
Ovis aries									
Capra hircus				1					
Ovis/Capra			1	1	2	5		2	
Sylvicapra grimmia				3					
Ourebia ourebi									
Sylvicapra/Ourebia						1			
Fetal bovid									
Small bovid	2		2	20	2	6	1	6	
Small bovid LBF	3	1		11	2	4	1	3	
Kobus kob									
Redunca redunca									
Tragelaphus scriptus									
Tragelaphus spekii									
Medium bovid									
Medium bovid LBF									
Bos taurus				1					
Alcelaphus buselaphus									
Medium-large bovid		1		3					1
Medium-large bovid LBF				5					
Hippotragus equinus									
Large bovid									
Large bovid LBF									
Equus caballus									
Equus asinus									
Canis familiaris				2					
Canis adustus									
Canis sp.	2			9			1	2	
Medium carnivore				8				1	
Medium carnivore LBF							1	2	
Felis sylvestris				1					
Leptailurus serval/Caracal caracal									
Civettictis civetta									
Mungos mungo				1					
Atilax paludinosus/Ichneumia albicauda									
Herpestes sanguinea									
Small mongoose				1					
Crocidura sp.				1					
Hippopotamus amphibius									
Phacochoerus africanus									
Suid LBF									
Erythrocebus patas				1					
Chlorocebus sabaeus									

B-RII-b	B-RIII-a	B-RIII-b	B-RIII-c	B-RIII-d	B-RIII-e	B-RIII-f	B-RIV-a	B-RIV-b	B-RIV-c	**Total**
										0
									1	**1**
					4					**4**
		1				1				**2**
	1	3				1			2	**8**
	6	3				6	4	4	4	**38**
		1			1			2	2	**9**
		1					2		3	**6**
					2	1			4	**8**
										0
1	12	61		2	4	2	17	18	41	**197**
	6	30		2		5	10	14	56	**148**
		1					1	1		**3**
		1					1	1		**3**
						1				**1**
						1				**1**
	1	36	1	1		3	5	3	20	**70**
		22		1		3	3	2	11	**42**
										1
		3								**3**
		24		3		1	5	5	18	**61**
	1	38			1			7	37	**89**
		2							7	**9**
		4		1		1	2		3	**11**
									3	**3**
										0
										0
								1		**3**
									1	**1**
		14				1	1	3	39	**72**
	1	6					1		3	**20**
								1	32	**36**
								1		**2**
									1	**1**
									1	**1**
										1
									1	**1**
									1	**1**
										1
1	2									**4**
									3	**3**
		7					1	2	13	**23**
									2	**2**
								1	2	**4**
		1								**1**

Table 5.2. Fauna from Unit B contexts *(continued)*

Taxonomic Identification	B-YI-a	B-YI-b	B-YI-c	B-YI-d	B-YII-a	B-YII-b	B-RI-a	B-RI-b	B-RII-a
Cricetomys gambianus				1					
Thyronomys swinderianus						2		1	
Lepus victoriae				1		1		1	
Small mammal (large rodent size)							1		
Small mammal LBF									
Micromammal	3	1	2	5	1	2			
Mammal (unidentified)	4		5	15	4	2	6	5	
Gallus gallus						1	1		
Numida meleagris									
Francolinus sp.				1		2			
Gallus/Numida	2	1		7		3	1	8	3
Gallus/Francolinus				2			1	1	
Galliform		1		1		1	1	1	
Galliform LBF				14			1	9	
Plectropterus gambensis									
Sarkidiornis melanotos									
Avian (unidentified)						4			
Avian eggshell (chicken)		1		12		54		13	
Avian eggshell (non-chicken)									
Tilapiini	1			22		1			
Clarias sp.				22	2	12			
Lates niloticus		3		28		5			
Synodontis sp.				21		3	1	1	
Heterotis niloticus				12					
Bagrus sp.									
Mormyrus sp.									
Heterobranchus sp.				1		1			
Gymnarchus niloticus									
Auchenoglanis sp.									
Protopterus annectens				1					
Tilapiini/*Lates niloticus*									
Siluridae							2		
Fish (unidentified)				276		13			
Chambardia sp.	1			3		3		1	
Etheria elliptica									
Bivalve				2	2	2	1		
Terrestrial mollusks									
Varanus sp.				2					
Crocodylidae									
Agama sp.									
Order Anura									
Pelusios castaneus									
Cyclanorbis senegalensis									
Small lizard				2		1			
Total	**18**	**9**	**10**	**520**	**15**	**129**	**20**	**57**	**4**

B-RII-b	B-RIII-a	B-RIII-b	B-RIII-c	B-RIII-d	B-RIII-e	B-RIII-f	B-RIV-a	B-RIV-b	B-RIV-c	**Total**
	2	2					1		3	**9**
		5					1	1	2	**12**
		1								**4**
	1	16	1		1		3	6	10	**39**
										0
		1				2	4	1	7	**29**
	8	90	5	2	4	9	12	40	73	**284**
	1	5				1			2	**11**
		1							2	**3**
		2					2		13	**20**
1	12	22	2		2	4	6	4	33	**111**
	2	6		1		1	1	1	4	**20**
	2	5					1		3	**16**
	30	27				5	12	3	28	**129**
										0
		1					1			**2**
		10					5		13	**32**
9	4	13	4			5	6		11	**132**
									9	**9**
	5	25	3			5	13	4	18	**97**
	3	19				1	3		1	**63**
		7							2	**45**
	1	1					5			**33**
										12
							1			**1**
		2								**2**
										2
		2								**2**
										0
										1
										0
		1	1				1			**5**
		5	1						3	**298**
1	1	1		2	1	2	1	2	8	**27**
		3							1	**4**
		1	2	1			2		2	**15**
										0
1		11						1	4	**19**
									5	**5**
										0
		2				4	24		1	**31**
										0
				1			1		1	**3**
							1			**4**
14	**102**	**546**	**20**	**17**	**20**	**66**	**160**	**129**	**570**	**2426**

In addition to fauna, the feature contained a diverse set of broken pottery, including jars, bowls, and large basins similar to ethnohistoric beer brewing vessels. The interior of the pit contained two metal objects: a complete iron spear point, 21 cm long, with its tip slightly bent, and a small hooked metal wire. The pit also contained a very small, roughly made terra-cotta figurine of a quadruped that had its legs and head broken off. It most closely resembled a bovid. Lastly, the cap deposit included a broken fragment of ground stone and 559 g of accumulated slag and ore. Overall, the feature contained 91 mammal bones (cattle, goat, sheep/goat, common duiker, small bovid, cat, banded mongoose, probable slender mongoose, patas monkey, Gambian rat, scrub hare, shrew, micromammal), 37 avian elements (chicken/guinea fowl, chicken/francolin, francolin, eggshell), five bivalve fragments, four monitor lizard bones, and 383 fish remains (clariid catfish, *Heterobranchus* sp., *Synodontis* sp., Nile perch, tilapia, *Heterotis niloticus*, and lungfish). Carnivore damage was identified on two bones and rodent gnawing on three bones, all of which were from the cap deposit.

The bovid assemblage included a mix of domestic and wild taxa. Part of the lower forelimbs and hind limbs of domestic cattle were identified within the pit, including an unfused tibia likely from a prime-age individual. These were accompanied by a variety of bone fragments from a cattle-size animal, many of which were burned. The domestic goat had a fused second phalanx, and possibly related prime-age sheep/goat dentition was recovered. In contrast, the extensive wear on the mandibular teeth of a common duiker (also represented by a first phalanx) indicated an older individual. Diverse small bovid (either domestic or wild) elements and long bone fragments were also identified, distributed from throughout the axial and appendicular skeletons. Axial elements are comparatively poorly represented given that the assemblage includes at minimum two individual animals (the goat and the duiker). Burning on small bovid bones is less extensive than on cattle but likely also indicates roasting. A fused metatarsal is consistent with age estimates for either the domestic stock or duiker. However, an unfused calcaneus suggesting an age younger than 30 to 36 months is more consistent with the domestic goat.

Cranial and mandibular elements of at least two domestic dogs were identified (including a positively identified complete dog mandible), along with remains of the lower extremities of hind and forelimbs, pelvis, and ribs. Two differently aged dogs were indicated by dentition, one a young adult and the other much older. Dog elements from throughout the postcranial skeleton were burned, suggesting that the dogs had been roasted. Notably, dog mandibular dentition and elements were the only cranial or mandibular elements recovered from the interior of the pit.

A variety of small mammal bones (carnivores, rodents, hares) were recovered, including a mandible of a banded mongoose and an unfused pelvis of a smaller mongoose, likely the slender mongoose. A premolar of a wild or domestic cat was also recovered, as was a mandible of a white-toothed shrew. All the dentition had minor wear, indicating younger or prime-age individuals. A maxillary fragment with incisors of a female patas monkey was also found, as were the pelvis of a Gambian rat and the tibia of a hare. In general, these animals were represented by a few or single elements, a pattern distinct from that described previously for dogs. In addition, almost all were recovered from the cap of the pit and seem to have been assembled there intentionally in a cluster.

At least two avian taxa were identified, including the carpometacarpus of a francolin, additional wing and leg elements of a chicken/francolin, and a broader range of elements, including wings, legs, and the axial skeleton, from a larger chicken/guinea fowl. The latter included burned elements, while the smaller galliform elements were not burned. Avian eggshell fragments from a wild gallinaceous bird and probable domestic chicken were identified. Like mammalian remains, the wild birds (francolin or other wild bird remains and thicker eggshell) were atop the pit cap, while the likely domestic larger galliform bones and eggshell were found in the pit interior.

Aquatic fauna constitutes the bulk of the assemblage. The vast majority of the fish remains were fragmented spines and ribs of fish of varying sizes that could not be identified. Of the identified bones, there were relatively similar frequencies of the main taxa: clariid catfish, *Synodontis* sp., Nile perch, and tilapia; smaller numbers of *Heterotis niloticus*, and only a single African lungfish element. These taxa span shallow-water (clariid catfish, tilapia, African lungfish), swamp/marsh (*H. niloticus*), and deepwater (*Synodontis* sp., Nile perch) ecological preferences. However, with the exception of the clariid catfish population, which included some very large individuals, most of the fish were of average size, including Nile perch that reached a maximum of only 50 cm standard length. Given the limited floodplain environments near Kirikongo, if these fish were derived from a single fishing event, it would likely have taken place on a major tributary of the Mouhoun River or a slower section of the Mouhoun itself, where there would have been adequate aquatic vegetation for *H. niloticus* and protected places for some of the smaller fish, yet adequate oxygen for Nile perch.

Evidence for burning was present on 57 percent of fish remains. However, variability in treatment suggests differential processing based upon taxon. For example, almost two-thirds of clariid catfish remains were reddish in color, indicating the low-grade charring associated with fish smoking. In contrast, the bones of Nile perch, *Synodontis* sp., and tilapia were either not burned or were burned at higher temperatures that created black, white, and even blue elements, suggesting that the fish were prepared by grilling or by roasting them fresh. In the nonidentifiable remains, reddish bones were extremely common, although lower frequencies of blackened elements were present. The high frequency of reddish ribs in the nonidentifiable elements could derive from either type of preparation, as ribs are protected by the body and tend to be burned at lower temperatures, whether by grilling or smoking. As discussed in chapter 4, these burning patterns resemble ethnohistoric fish cooking and preservation techniques and match the preparation preferences documented in Burkina Faso for particular taxa.

Consistent with a shallower fishing context, *Chambardia* sp. freshwater mussels were recovered. One fragment from the pit interior was burned reddish in color, perhaps from smoking, while others were unburned. A pelvis and vertebra of a monitor lizard and ribs of a smaller lizard were also identified. If it was a Nile monitor lizard, its presence would also be consistent with fishing in shallow water with aquatic vegetation. The lack of Nile oyster yet presence of deepwater fish may suggest that the expedition was carried out to the Mouhoun River or a large tributary before water levels had dropped significantly (prior to December along the Mouhoun).

Animal remains were not evenly distributed between the lip of the pit and layers within the pit; nor does their distribution reflect the movement of larger and heavier fragments toward the bottom over time. Consequently, the deposit may have been actively constructed and may reflect complex choices by the makers. For example, almost all fish remains were found in the interior of the pit and were concentrated toward the bottom. The pit interior also contained the postcrania of domestic goat and cattle, along with both the complete dog mandible and mandibular dentition and the remains of the probable chicken bones and chicken eggshell. In contrast, the cap deposit contained upper dentition and a cranial fragment of dog, upper dentition of sheep/goat, lower dentition of a duiker, and the diverse remains of small mammals (often dentition), including mongooses, cats, monkeys, rodents, and hares, as well as wild bird eggshell, all of which were lacking on the pit interior. Given this extremely strong pattern, the duiker phalanx, shrew mandible, and francolin bone may also be from the cap deposit, although these were recovered from the profile collection at lower resolution.

To summarize, the cap deposit included cranial elements of domestic animals and most if not all of the nonaquatic wild animals, which had a more limited element distribution. In contrast, the pit interior contained fish and other aquatic species as well as domestic livestock, canids, and fowl, which had much wider body part distributions, perhaps reflecting inclusion of representative parts of the body. Notably, the only teeth or mandibular fragments identified in the pit were a complete mandible of a prime-age dog and a lower molar of another, older dog individual.

The diverse fish, bivalve, and reptilian taxa were derived from a large water body, either the Mouhoun River or a major tributary with a complex aquatic environment and permanent water. The sole presence of a single African lungfish is insufficient to argue for a drier environment, but it is interesting that this is the only lungfish identified in excavations at Kirikongo. The mammalian taxa are generally indicative of a riverine context in a savanna environment, with no taxa clearly derived from a drier savanna context. The small carnivores, primate, rodents, and francolin all tend to be found in the forest adjacent to a tributary or main river channel, and the assemblage lacks larger taxa that are frequently encountered in more open spaces (such as medium and large wild bovids). Consequently, all the recovered wild aquatic, avian, and mammalian taxa could have been obtained during hunting and fishing expeditions around the Mouhoun or a large tributary.

As mentioned above, it is possible that the fish fauna could be indicative of flood recession fishing in the late rainy season or early dry season, which may be substantiated by the presence of wild eggshell of proper thickness for francolin, as they tend to lay in the rainy season. Similarly, the unfused pelvis of a small mongoose may indicate an individual of a few months in age. As mongooses tend to breed in the rainy season, it is possible that this animal was killed near the end of the rainy season and the start of the dry season.

Radiocarbon dates from the interior and cap deposits may indicate that the pit interior was derived from an event slightly earlier in time, while the accumulation of dispersed wild animals and perhaps additional domestic animals was an additive process that occurred over a longer period (Figure 5.13). If the pit interior and cap deposit represent different processes, with the pit forming during an event and the latter being a gradual accumulation, this could be evidence for subsequent rituals conducted in this location. Both indicate similar seasonality.

This feature has fundamental similarities to deposits before and after, as the pit interior contains the fundamental components of a faunal deposit at the site (domestic animals and aquatic taxa), although on a more elaborate scale. The cap deposit, however, is quite different from Yellow I contexts at Mound 1, as it contains a variety of small wild animal parts, many cranial, along with elements of domestic animal crania, which, as discussed in chapter 1, are highly potent elements in relation to animal souls. As discussed in chapter 6, all the taxa from the cap deposit inhabit dens in the earth (including termite dens) and/or consume termites, some of the most sacred of animals in the region due to their deep-earth associations. This realm of divinity today has historically been associated with blacksmiths. It is possible that the cap deposit may have been part of a more open display context, since although the bones were very well preserved, there was some very minor evidence for carnivore and rodent damage. This is one of the only contexts in Unit B in which it occurs.

Unit B, Yellow II, Context a (B-YII-a), Estimated Date Seventh Century AD

Above the B-YI-d pit feature, a small coursed earthen structure (Structure 1) was built. It had a pounded clay floor that had been burned in places. Twenty cm below the center of the floor, an infant was buried. The materials associated with the context were more limited than in other deposits and included a fragment of a broken ledge-handled jar and a few broken jars. The faunal assemblage was diverse, including sheep/goat, small bovid, micromammal, bivalve, and clariid catfish.

The faunal assemblage included two permanent incisors of a young adult sheep or goat, two ribs possibly from the same animal, and a micromammal femur. None of the mammal bone was burned or cut; none had discernable taphonomic processes. In contrast, clariid catfish elements were burned red, possibly from smoking. Freshwater bivalve (likely *Chambardia* sp.) was also present. Despite being a small assemblage, the accumulation included domestic stock and aquatic resources, similar to earlier contexts.

Unit B, Yellow II, Context b (B-YII-b), Estimated Date Seventh Century AD

The next structure in Unit B was a large round structure (Structure 2) with the earliest laterite pavement at Kirikongo and a coursed earthen wall. Beneath the floor was a burial pit surrounded by a ring constructed of slag and iron ore (iron-rich laterite nodules) mixed with the remains of material culture and animal bones. All materials associated with this context derive from this feature, even though only a very small portion of it extended into the unit. Only about one-third of the ore and slag could be brought back to the field lab for processing (transportation was by bicycle), but that alone weighed 5.16 kg. In addition, there was a very rich assemblage of associated materials, including two torqued pieces of iron, two ground hand stones, a flake of granite, and a diverse set of well-decorated ceramics, including transitional Yellow II/Red I jars and smaller vessels with fancy bases. Three more unusual objects were recovered from this area: an unbroken ocher crayon with the point intact from drawing, a block of reddish-brown chert weighing 441 g that did not appear broken, and a large polished red jasper bead, broken cleanly in half, like the quartz bead from B-YI-a. The faunal assemblage itself was very diverse, containing sheep/goat, common duiker/oribi, small bovid, cane rat, hare, micromammal, chicken, francolin, clariid catfish, *Heterobranchus* sp., Nile perch, *Synodontis* sp., tilapia, small lizard, and *Chambardia* sp. Bones were extremely well preserved, as they had been sealed by the laterite pavement after deposition, with only extremely minor rodent damage on one bone.

Mammalian remains included parts of a fore- and hind limb of an adult sheep or goat, with a radius, ulna, fused proximal tibia, and metatarsal fragment, in addition to an upper premolar in active wear. The ulna, tibia, and radius were all lightly burned. Aside from the unburned pelvis of a common duiker or oribi, the remaining small bovid bones (two radii, two ribs, a thoracic vertebra, and a permanent third incisor) could not be attributed to domestic or wild taxa. The burning patterns on the small bovid bones likely indicate roasting, assuming that extremities and cranial elements were removed prior to cooking. Burning was found on almost all remaining elements (as well as four long bone fragments) in patterns that align with the variable thickness of meat along the shaft. Two sections of a cane rat cranium and the tibia of a hare were identified; these were not burned like the small bovid bones. Lastly, the tibia and pelvis of a micromammal were identified, as well as two unburned nonidentifiable mammalian bone fragments.

The avian fauna included a confirmed chicken coracoid, which was variably burned black and dark brown, likely from roasting, and had light rodent gnaw marks on the shaft. The francolin, represented by a scapula and coracoid, had also been roasted, with one tip of the scapula burned. A tarsometatarsus (deeply burned), first phalanx, and coracoid (lightly burned) attributable to guinea fowl/chicken, the sternum (heavily burned) of a gallinaceous bird, and four nonidentifiable avian bones (one burned) were also recovered, providing further evidence for avian roasting. Notable was the large number of probable chicken eggshell fragments (n = 54). The eggshell assemblage was very homogenous in color (white) and surface texture and had a narrow thickness range of 0.28 to 0.33 mm.

Similar to B-YI-d, aquatic fauna constituted a significant proportion of recovered remains. The largest number of elements derived from clariid catfish, with at least four individuals ranging in size from less than 10 cm to 60–70 cm standard length, represented by parts from throughout the skeleton; all were burned either reddish, black, or both, reflecting perhaps a mix of smoking and roasting, since smoked fish assemblages in other contexts have almost no blackening. The cleithrum of a 20 to 30 cm *Heterobranchus* sp. was also burned red and black. Five Nile perch elements representing at least a small (10 to 20 cm) and large (40 to 50 cm) individual were burned at high temperatures, likely from grilling, as were the few elements from a small *Synodontis* sp. catfish. The single bone of tilapia was burned at a lower temperature. Four of the 12 nonidentifiable fish ribs were burned to high temperatures. Lastly, the rib of a small lizard was recovered, as well as three large fragments (one an entire half shell) of *Chambardia* sp. and two nonidentifiable bivalve shell fragments.

This assemblage is broadly comparable to that from B-YI-d, with a similar faunal spectrum (although missing the carnivores), a relatively high frequency of fish remains, and seasonality data indicating late rainy season/early dry season activities. The primary difference is the absence of carnivores and high rates of burning on non-fish remains.

Unit B, Red I, Context a (B-RI-a), Estimated Date Eighth Century AD

A burial monument composed of a 2 m–diameter structure with obliquely set earthen bricks (20 x 35 cm each) and a pounded yellow clay floor was constructed above B-YII-b (Figure 5.14). Below the floor was a burial pit that, similar to B-YII-b, was surrounded by a 40 cm–deep ring of ore and slag mixed with clay and ash and containing fragmented material culture and animal bones. The slag and ore were quite dense, with a one-third sample from the small portion of the feature that extended into the excavation unit weighing 2.21 kg. The deposit contained a naturally rounded polished gray granite nodule and a diverse set of ceramics, including fancy bowls and jars of varying size and decoration. Faunal remains were very diverse; the 20-fragment assemblage included small bovid (likely sheep/goat), canid, small mammal, chicken, chicken/francolin, chicken/guinea fowl, *Synodontis* sp., and unidentified bivalve.

The mammalian faunal assemblage included a probable domestic small bovid male pelvis and a leg and rib of a dog-size canid. A rib of a small mammal (large rodent or hare-size) was recovered, as were several nonidentifiable mammal bone fragments, one of which was burned. Avian

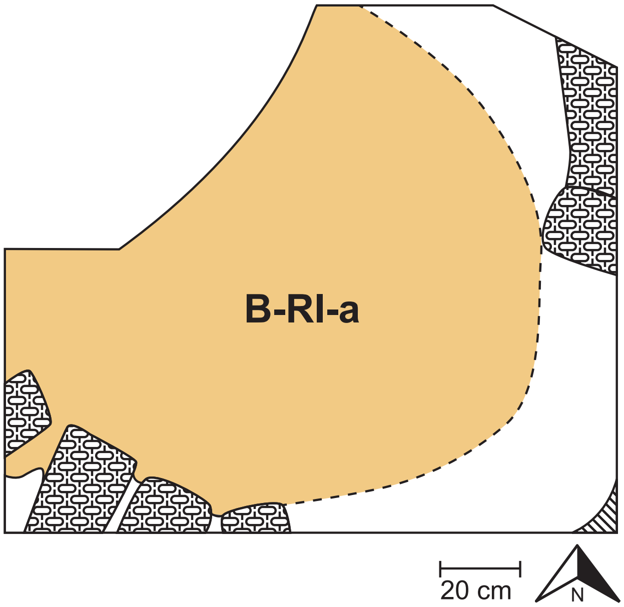

Figure 5.14. Unit B excavation map, context B-RI-a

bones were represented by a positively identified sternum of domestic chicken as well as a radius of chicken/francolin, sternum of chicken/guinea fowl, and unidentifiable galliform elements (one burned). Lastly, the deposit contained bivalve and main river fish (10 to 20 cm *Synodontis* sp.). Burning was not as common as in B-YII-b, but the assemblage was very well preserved, with no carnivore or rodent damage, as the deposit was sealed by a floor after deposition.

Unit B, Red I, Context b (B-RI-b), Estimated Construction Date Early Tenth Century AD

In the latter half of Red I, an architectural complex was constructed; it was used for about 300 to 400 years before being destroyed by fire in B-RIII-a. As described in greater detail in the B-RIII-a section below, the complex contained fired-brick walls, still standing as high as 80 cm, and excavations revealed three interconnected semi-subterranean rooms that were possibly part of an even larger complex located to the east. Leaving intact these walls, excavations were carried out in the largely unpaved sacrificial room (Room 3) to examine the building sequence of the complex and earlier eras at the mound (the contexts described above). The basal levels of the architectural complex included multiple reflooring events of laterite pavements in Red I. Based on AMS dates on the roof beams from the later destruction of this complex (see below), it was likely constructed during the tenth century AD. Based on excavations, it is likely that the walls of the ritual complex were in the same location over time. If so, the fired-brick construction dates also to the tenth century AD.

Also consistent over time was a carefully maintained bare patch used for sacrifice in Room 3 of the otherwise thickly paved architectural complex. This spot contained a stratified deposition of fragmented material culture and faunal remains that accumulated until the Red III destruction event. Red I layers (those discussed here as context B-RI-b) contained a fragmented knife-sharpening stone, other ground-stone fragments, and a ceramic assemblage that included fragments of fancy serving vessels and jars and a broken tripod vessel. Faunal remains continued to be dense and diverse in the small space. B-RI-b included sheep/goat, small bovid, canid, cane rat, hare, chicken/guinea fowl, chicken/francolin, eggshell, *Synodontis* sp., and *Chambardia* sp. All were well preserved; only one bone had extremely minor rodent damage. Preservation was likely aided by protection of the interior space, later sealed by hot collapse.

Two elements attributable to domestic sheep or goat were identified, including a metacarpal fragment and permanent upper first molar with moderate wear from a prime-age individual. In addition, several small bovid elements included a thoracic vertebra, scapula, rib, radius, two metacarpal fragments, and three long bone fragments. The rib was burned mostly red with black on the tip, likely indicating roasting, and one distal metacarpal fragment was also slightly burned. Elements from throughout a canid body (tibia, rib, and canine) were recovered from a more robust individual than the B-YI-d canids, and one of two long bone fragments of a medium carnivore was burned from roasting. A largely complete cranium of a savanna hare (*Lepus microtis*) and tibia of a cane rat were identified, in addition to several nonidentifiable mammalian remains.

Avian elements include the wing, legs, and pelvis of chicken/guinea fowl, the sternum of a chicken/francolin, the pelvis of a gallinaceous bird, and nine avian long bone fragments (one lightly burned). Rodent gnawing was identified on one chicken/guinea fowl tibiotarsus. The 13 fragments of avian eggshell were all similar to chicken eggshell in surface texture and in thickness (0.25 to 0.32 mm). Aquatic fauna included the main channel *Synodontis* sp. and the shallow-water bivalve *Chambardia* sp.

Unit B, Red II, Context a (B-RII-a), Early Eleventh Century AD

Stratified above B-RI-b in Room 3 was a thin 10 cm context with Red II material culture and faunal remains. The deposit included a small amount of slag and small jars in addition to likely cattle and chicken remains. The fauna included a large rib fragment of a cattle-size animal (comparable in size to a West African shorthorn) that was direct-dated to a 30-year period straddling the first and early second millennium AD. Parts from throughout the body of chicken or guinea fowl (leg, pelvis, scapula) were recovered, and the scapula had a cut mark from the removal of the wing.

Unit B, Red II, Context b (B-RII-b), Estimated Date Eleventh or Early Twelfth Century AD

This context is located to the east of the area discussed thus far and is the lowest excavated layer of the 2 x 4 m primary excavation unit (Figure 5.15). During Red I and II, a larger compound (at least 30 to 40 m in diameter) surrounded by a thick circular wall was located to the east of the ritual complex. The space to the interior (east) of the wall did not contain any architectural features in the excavated area and may have been part of the entrance. The 2 to 3 m–wide area between the compound and destroyed ritual complex contained one small structure (Structure 4) from early Red II. Structure 4 was a coursed earthen wall extending southward off the compound wall in the central excavation unit, creating a small enclosed area. Notably, Structure 4 and the adjacent compound have floor levels 85 to 100 cm above the Red II layers in Room 3 of the ritual complex (B-RII-a), indicating that either the ritual complex was purposefully inset in the earth or that other areas of the mound built up rapidly while the ritual complex was simply refurbished (repaved and plastered) (Figure 5.16).

Excavations in Structure 4 (context B-RII-b) recovered fragments of a large jar and other Red II pottery (including an elaborate base), in addition to diverse well-preserved faunal remains: small bovid, shrew, chicken/guinea fowl, eggshell, monitor lizard, and *Chambardia* sp. Recovered elements comprised an incisor of a prime-age small bovid (probable sheep/goat), the humerus of a white-toothed shrew, the burned coracoid of chicken/guinea fowl, and probable chicken eggshell. Aquatic fauna included a *Chambardia* sp. bivalve fragment as well as the preserved mandible of a small Nile monitor lizard.

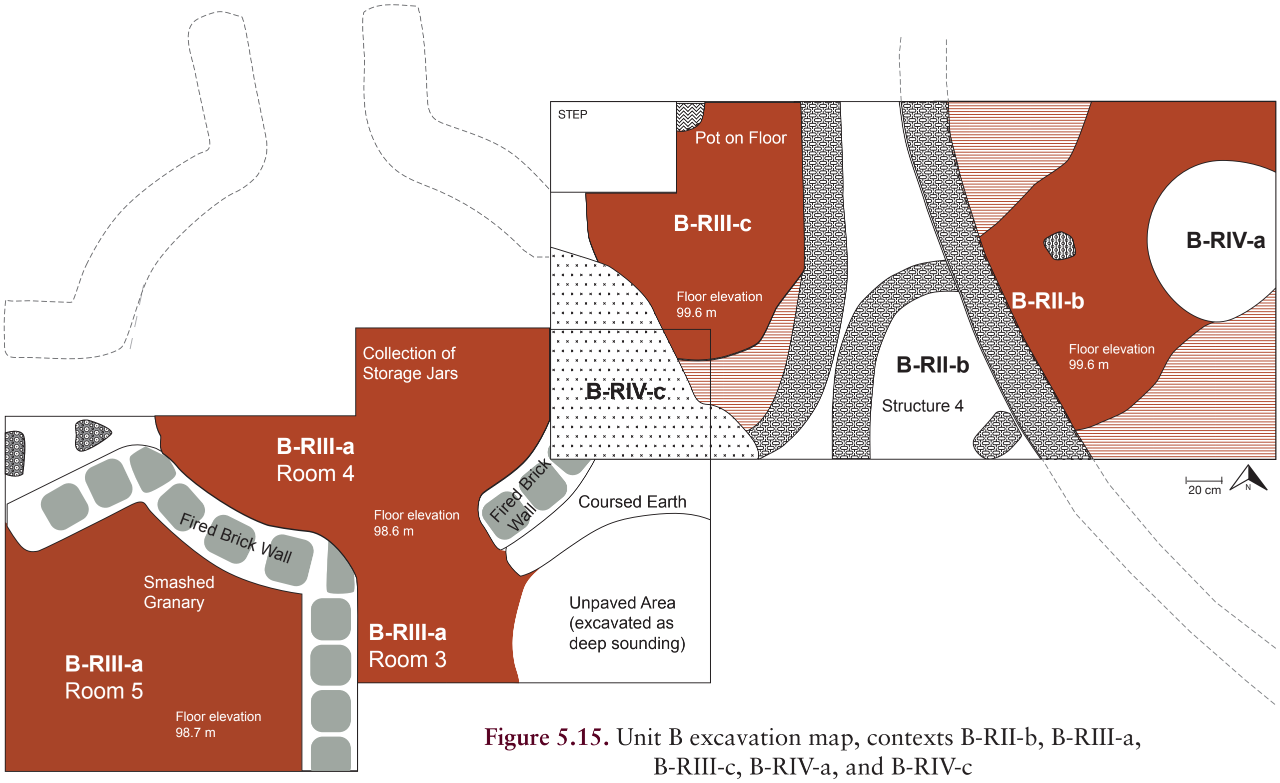

Figure 5.15. Unit B excavation map, contexts B-RII-b, B-RIII-a, B-RIII-c, B-RIV-a, and B-RIV-c

Figure 5.16. Unit B ritual complex (B-RIII-a). Area at lower right excavated to sterile.

Unit B, Red III, Context a (B-RIII-a), Estimated Destruction Date Late Thirteenth Century AD

The architectural complex originally built in B-RI-b was destroyed by fire in the late thirteenth century, leaving standing 80 cm–tall wall stubs and floor contents intact due to the collapse of the terrace roof, atop which stood a second story. The excavated area was part of a larger destroyed space that included at least three rooms (Figure 5.17). The use of space was very codified from room to room, with particular activities or material clusters occurring in specific locations and very distinct room-to-room assemblages. Faunal remains were from discrete locations and well preserved, lacking any carnivore or rodent damage. Burning primarily affected the roof and upper parts of walls, with items on the floor largely uncharred or slightly charred except where burning roof beams collapsed inward. The lower parts of walls also appeared only slightly burned in comparison, with extremely good preservation of the standing architecture due mostly to the initial construction methods (Figure 5.18). The bricks used to construct the complex were extremely regular square-shaped fired bricks, unlike the rectangular unfired bricks or coursed earthen techniques used in all other structures at Kirikongo. The bricks were a consistent gray-blue color and are clearly identifiable in relation to the clay mortar and plastered walls (Figure 5.19). Given their size and color, they could have been fired in Kirikongo's potting kilns. Based on analyses of Red I to Red III ceramic wares, these kilns likely reached the upper temperature thresholds of earthenware firing methods with the complex atmospheres to create regular blue bricks. Fired bricks are very rare in precolonial West Africa, and Kirikongo's bricks are of equal age or possibly older than those previously excavated at Gao (Cissé et al 2013; Flight 1975, 1979; Takezawa and Cissé 2012, 2017).

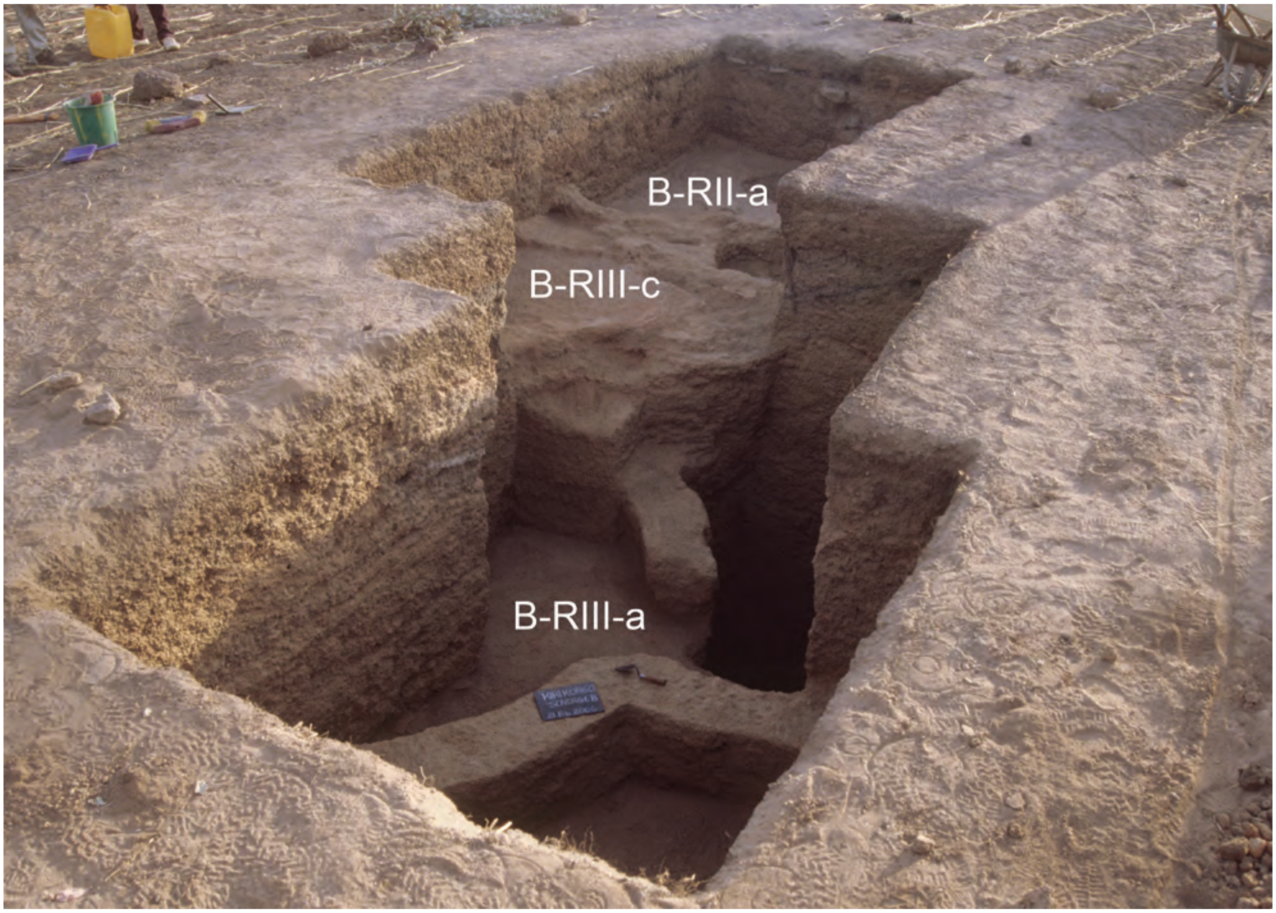

Figure 5.17. Unit B showing elevation difference between floors of B-RII-a compound, B-RIII-a ritual complex, and B-RIII-c ritual complex

The architectural complex is centered on a circular room (Room 4) with at least two and likely four doors, similar to ethnohistoric "vestibule" rooms. This room was filled with elaborately decorated pottery vessels (mostly uniquely decorated jars), and near the doorway to Room 3 was a concentration of animal bones and a single iron wire fragment. The contents of Room 4 were crushed as the roof fell in, but all the pots had been intact when smashed. A carbonized head of sorghum that was likely hung in the roof prior to collapse was found among the jars and illustrates the greater impact of the fire on roof structures. Pot contents did not carbonize, very few seeds and fruits were recovered from floor samples, and bones recovered from the space had normal burning patterns. The western portal of the vestibule extended out to an unpaved area with a surface 20 cm above the floor of Room 4. This may have been the doorway out of the complex.

Through the southern door was a second room (Room 3) that contained a maintained unpaved area surrounded by fragmented materials. The dense material remains included the largest concentration of animal bones identified in the complex (particularly when those from Room 4 near the entrance are included) along with diverse ceramics, an unfired clay ball, two cowrie shells, a fragment of greenstone, a tripod vessel fragment, an iron wire, and a semicircular piece of iron. Excavations in the unpaved area exposed the building sequence (as described for B-RI-b and B-RII-a) and, from Red III yielded additional fragmented material culture and animal bones. The materials and bones in this space strongly suggest that it was used as a sacrificial activity area.

A third paved room (Room 5) was located to the southwest of the vestibule and western portal entrance. It contained a large terra-cotta tripod granary (about 60 cm

Figure 5.18. Burned wall, southwest interior wall of B-RIII-a Room 3

in diameter and likely 1 m tall); no other objects or features were identified on the floor surface. A second story with carbonized roof beams, a laterite pavement floor, and a limited number of faunal remains, jars, and iron fragments had collapsed into the space, smashing the granary (Figure 5.20). The lack of other material within the room created a cleanly stratified collapse layer in comparison with Rooms 3 and 4.

Across all three rooms, 43 mammalian bones (goat, sheep/goat, medium-size carnivore, Gambian rat, white-toothed shrew, small mammal), 52 avian elements (chicken, chicken/guinea fowl, chicken/francolin, eggshell), nine fish (clariid catfish, *Synodontis* sp., tilapia), and one *Chambardia* sp. fragment were identified. This was one of the most highly avian-focused assemblages at Kirikongo, perhaps reflecting that, as in the ethnohistoric record, fowl were the most frequently sacrificed animal in everyday life.

The vast majority of fauna in the ritual complex was recovered from a discrete space in Room 3 and adjacent Room 4 surrounding the bare patch in the floor. Small fragments from throughout the entire body of domestic sheep or goat were identified, including the cranium, ribs (including one stained by red ocher), pelvis, and forelimbs (two humeri, metacarpal), with the metacarpal, some ribs, and additional long bone fragments burned. A dog-size carnivore rib, also ocher-stained and burned, was found, and the area contained parts of the head and forelimb (humerus) of a Gambian rat as well as a complete head of a white-tailed shrew (cranium and attached mandible). The Gambian rat humerus was likely roasted, while the shrew cranium was reddish from low-grade charring.

The remains of at least five individual galliform birds were discovered in the area, including two confirmed

Figure 5.19. Cross section of fired brick wall in B-RIII-a ritual complex. Note color differentiation between bricks and mortar, as well as burned plaster on the edge of the wall.

chickens, a large amount of chicken/guinea fowl, and a few chicken/francolin remains (Figure 5.21). The confirmed chickens included a very large rooster and a more typically sized individual. A few remains were burned, including a femur, coracoid, and humerus, one nonidentifiable long bone fragment, and the large rooster tarsometatarsus. The burning patterns in the galliform remains closely match those in other contexts and likely reflect cooking practices rather than burning during destruction of the complex. Single elements of *Synodontis* sp. and clariid catfish, both burned from grilling, were recovered, in addition to the unburned remains of tilapia.

A more restricted range of faunal remains derived from above the terrace roofs of Rooms 3, 4, and 5. In Rooms 3 and 4, the assemblage included the cranium, mandible, and mandibular dentition of at least one prime-age goat, along with a few small bovid long bone fragments. All except one mandibular fragment were burned either red or black. An avian appendicular bone fragment and clariid catfish dentary were burned red. Eggshell fragments likely attributable to chicken, a thicker eggshell fragment attributable to a guinea fowl (possibly domestic) or francolin, and a *Chambardia* sp. fragment were unburned. Like the roof assemblages from Rooms 3 and 4, the three elements from the Room 5 roof contexts were burned, including a chicken/francolin femur and bones from a clariid catfish and tilapia. The tilapia bone was one of only two fish bones with cut marks at Kirikongo. The overall higher rate of burning in the terrace fauna likely reflects the fact that these remains were much closer to the burning roof beams.

Figure 5.20. Collapsed burned roof in B-RIII-a Room 5. Note carbonized roof beam fragments and fractured laterite pavement roof.

Unit B, Red III, Context b (B-RIII-b), Estimated Date Late Thirteenth Century AD

After the collapse of the architectural complex, a 40 to 50 cm–thick deposit of fauna and largely fragmented material culture was created in a depression within the architectural debris. The exceptional preservation of bones and materials was aided by the construction of a new laterite pavement flooring sequence (Structure 10) directly above this ash layer, sealing the deposit. An AMS date on mammalian bone from the deposit overlapped almost exactly with one on the charred sorghum head from Room 4 in B-RIII-a. The deposit at B-RIII-b followed the burning of B-RIII-b by at most 30 years and may have been a direct response to the destruction.

The dense, ashy deposits of B-RIII-b contained one of the largest and most elaborate faunal assemblages of hunted animals recovered from Kirikongo as well as diverse material culture, including the only occurrences of glass and copper at the site. The scale and diversity of activities involved in the creation of this deposit suggest that it was a collective endeavor. The objects found included cowrie shells, 280 g of slag, iron wire, a small iron earring, a complete copper earring, and a glass bead, in addition to a diverse set of fragmented pottery, including serving vessels, cooking pots, a brewer, and bases. Lastly, the deposit contained two tripod vessel legs, each decorated with a different carved roulette. Faunal taxa identified in this large accumulation include goat, sheep, oribi, common duiker, kob, reedbuck, hartebeest, roan antelope, jackal, warthog, vervet monkey, Gambian rat, cane rat, hare, micromammal, chicken, guinea fowl, francolin, spur-winged duck, eggshell, clariid catfish, *Synodontis* sp., tilapia, Nile perch, *Gymnarchus niloticus, Mormyrus* sp., monitor lizard, toad, *Chambardia* sp., and Nile oyster. Diversity seems to have been a goal of this accumulation, as many of the taxa, save those that live in family groups, such as jackal and warthog, were likely represented by one individual animal.

Figure 5.21. Galliform bones from in and around unpaved area in B-RIII-a Room 4. Note that bones are unburned.

One hundred fragments of domestic and wild small bovids were recovered. Goats were represented by burned mandibular dentition with extensive wear, a fused first phalanx, and a complete horn core of a female; the fused radius of a much larger sheep was recovered as well. Additional bones attributed to domestic taxa included a radius, a fused metatarsal, a fused tibia, and an incisor with extensive wear that was likely associated with the identified goat. A femur of an oribi and metatarsal fragment of common duiker were also identified, as were 62 fragments of size-classed small bovid bones, most likely wild due to their gracility. With the exception of the goat horn core, not a single element from a small bovid cranium was recovered, although several mandible and mandibular tooth fragments were identified. Unusual for assemblages at Kirikongo, cervical, thoracic, and lumbar vertebrae and a larger number of rib and pelvic fragments were present. Appendicular elements were found in lower frequencies than in previous levels, but both forelimb and hind limb elements were recovered, including a few metapodial fragments. Humeri were completely missing, as were carpals, tarsals, and sesamoids. Thirty long bone fragments, likely attributable to small bovids, suggest extensive processing. Almost half of the small bovid assemblage was burned. Burning patterns on individual elements, ranging from the mandible to lower appendages, indicate roasting, as some have variable burning related to depth of meat or exposure of bone near epiphyses. A cut mark on a vertebral fragment indicates division of the carcass into left and right sections, a chop mark on a rib indicates a separation of the upper and lower rib cage, and one on the pelvis indicates detachment of the leg.

Among the medium-size bovids, kob was represented definitively by a burned third phalanx and reedbuck by a lower premolar. The remaining 58 fragments could not be identified to taxon but likely derive from these two individuals. As with small bovids, crania had been mostly removed, although a mandible and two incisor fragments were recovered. Vertebrae and ribs were common, and parts of forelimbs and hind limbs were present. With the exception of the third phalanx, lower appendages of medium-size bovids, including their carpals and tarsals, were missing. Twenty-two long bone fragments likely attributable to medium-size bovids suggest extensive processing. At least one of the individuals was young, based on an unfused humerus and minor wear on the incisors. Almost half of medium-size bovid bones were burned, similarly distributed over the body from the mandible to appendages. Two thoracic vertebrae had chop and cut marks from separating the left and right carcass, and a rib had a cut mark from separating the upper and lower rib cage. A femur had both chop and cut marks from dismemberment.

Twenty-seven medium-large and six large bovid elements consistent with wild taxa were identified. These likely derive from the two identified taxa: the medium-large hartebeest and the large roan antelope. Three elements of hartebeest were identified, including an unfused distal tibia and fused first and second phalanges; the first phalanx was chopped off. Two elements of the roan antelope were identified: a metatarsal and a second phalanx. Both were fused and burned completely black. A likely associated tibia fragment was identified, as well as two heavily burned cervical vertebrae and a rib fragment.

Although the size classes were generally quite discrete, these particular individuals were relatively close in size, and some of the medium-large size-classed bones could be associated with the roan antelope. With the notable exception of the cranium (represented by only a single fragment of a temporal bone), a diversity of parts of the skeleton were recovered for medium-large bovids, including cervical and lumbar vertebrae, ribs, a pelvis, and fore- and hind limbs. Carpals, tarsals, and sesamoids were entirely missing. Thirty-eight long bone fragments likely attributable to medium-large bovids suggest extensive processing. Once again, a little less than half of the bones were burned, including the vertebrae, ribs, pelvis, and long bone fragments, and chop marks from dismemberment were found on a tibia, humerus, radius, and metacarpal. A cut mark was identified on the pelvis.

Twenty-one elements attributable to dog-size canids were recovered. The presence of only two small cranial fragments limited positive osteological identification to taxon, but there is a strong circumstantial argument, introduced in chapter 4, that many if not all of these bones are jackals, based upon the presence of a family group. Elements from throughout the canid skeleton were identified, including a maxillary fragment, lumbar vertebrae, a caudal vertebra, and five rib fragments. Forelimb elements include a humerus and radius, as well as metacarpals, while hind limbs were represented by a calcaneus and a metatarsal; three metapodial fragments could come from either. Based upon fusion data, there are multiple ages of canids represented, including young animals with highly undeveloped metapodia and adults of varying ages (fused metapodia, fusing calcaneus). The presence of adults and puppies together strongly suggests a jackal family, perhaps hunted near their dens. After giving birth, jackals keep their puppies in close proximity to a den until they are old enough to leave in the late dry season. Given the hunted context and family characteristics from one kill event, as well as the positive identification of a family of jackals in a similar later context (B-RIV-c), these are most likely jackals. Interestingly, while teeth and cranial elements are common in earlier layers with positively identified domestic dog, these are completely lacking in this deposit. Canid remains were extensively burned all over the body, including blackened maxilla, metacarpals, and lumbar vertebra, matching the roasting patterns in bovids.

The seven suid bones included one fragmented tooth (premolar) positively identified as warthog. Like other animals in this context, parts from throughout the warthog body were present, including a vertebra, ribs, and forelimbs (ulnae). As with the probable jackal remains, there were two differently sized warthogs present, perhaps reflecting the hunting of a family group. The recovery of the burned canine of a vervet-size monkey was highly unusual. In the savanna, vervets (*Chlorocebus* sp.) tend to cluster near riverine forest trees.

Several large rodent and hare taxa were identified, including a complete mandible of a savanna hare, rare in a deposit with limited cranial elements. The pelvis and a metapodial fragment of a Gambian rat were identified, along with a more diverse set of bones from the larger cane rat, including a lumbar vertebra and parts of two hind limbs and a forelimb, with a tibia and ulna both having burned tips. Sixteen elements that could be attributable to any of these three taxa were recovered, including mostly ribs but also vertebrae and several cranial fragments. Of these, a vertebra, several ribs, and a cranial fragment were burned. A single femur of a micromammal was recovered. However, rodent gnawing was not recorded on a single element in this large assemblage.

B-RIII-b contained an unusually large number of nonidentifiable mammalian bone fragments, around half of which were burned. This further reinforces the evidence for intensive processing and cooking in this deposit.

The avian assemblage was also diverse, with at least two individual chickens of varying size, two francolin elements (wing and leg), and a wing element of guinea fowl. Several elements from wings and legs are attributable to chicken/francolin (representing at least two individual birds), and a much larger set of elements from chicken/guinea fowl included a range of body parts from at least four individual birds. Vertebrae, pelvises, heads, and feet were notably absent from the avian assemblage, and pectoral and wing elements were overrepresented in comparison to legs. The wings and legs of the galliform birds were extensively burned from roasting, as were the extremely numerous avian appendicular fragments that resulted from extensive processing. A tibiotarsus of a young knob-billed duck and avian eggshell in the thickness range of domestic chicken were recovered as well.

B-RIII-b contained one of the largest and most diverse assemblages of fish bones since B-YI-d, with at least six taxa representing deepwater, shallow-water and marsh contexts. At least five sizes of clariid catfish (less than 20 cm to more than 60 cm), four sizes of Nile perch (less than 20 cm to more than 60 cm), and four sizes of tilapia (less than 10 cm to more than 30 cm) were found, along with a large *Synodontis* sp. (30–40 cm) and two rare taxa at Kirikongo, *Mormyris* sp. and marsh-dwelling *Gymnarchus niloticus*. Given the diverse habitats and large sizes of several fish (particularly the deepwater taxa like Nile perch and *Synodontis* sp.), this assemblage was likely caught in the Mouhoun River. Extensive burning (including low-grade charring) on clariid catfish and tilapia bones indicates smoking, while other fish taxa were likely cooked fresh, as their bones were either rarely burned or not burned at all. (For example, only one of eight Nile perch elements was burned.) In comparison with B-YI-d, there were only a few nonidentifiable fragments and rib elements and an underrepresentation of vertebrae, likely derived from distribution of meat from this location. Lastly, also rare for Kirikongo is the combined presence of the shallow-water *Chambardia* sp. bivalve and the deepwater Nile oyster.

Elements from throughout the skeleton of a Nile monitor lizard over 60 cm long, including maxillary, vertebra, rib, and femur, were identified; several elements were burned from roasting. Nile monitor lizards can be caught in the same riverine conditions where marsh fish taxa are caught. Lastly, two elements of a toad were identified, from an individual in the size range of African bullfrog.

Overall, B-RIII-b constitutes one of the most diverse faunal assemblages at Kirikongo, with a single individual or family group present from a wide range of taxa. Despite this diversity, there was a great deal of consistency in how the animals were treated. This is one of the few contexts at Kirikongo in which sheep and goats were identified together. Domestic animals (including chickens) were butchered and roasted (likely whole). Heads and small elements were removed and then distributed, with only certain parts remaining in the assemblage. Among the wild taxa (which derived from riverine, forest, and plains habitats), there is similar evidence across all body sizes, from cane rat to hartebeest, for butchering, removal of heads and small elements, and roasting of the animals whole. However, larger portions of the bodies were represented in the recovered fauna, and they don't appear to have been distributed as widely as in earlier contexts. Fish were prepared for consumption differently by taxon, and their meat after cooking may have been distributed given the lack of ribs and vertebrae. It is notable that despite the diversity, this deposit completely lacks the small and medium-size carnivores (mongooses, cats) that appear in other deposits at Kirikongo.

A variety of lines of evidence indicate that these animals were acquired during the dry season. These include the ages of young wild animals (jackal puppies, duck), the presence of chicken eggshell but not wild bird eggshell, and the presence of bivalves from deepwater contexts. In addition, the aquatic and wild mammals identified live in widely dispersed habitats during the rainy season. However, in the dry season, shallow-water, deepwater, and marsh fish collect in main channels and wild mammals cluster around perennial water sources.

The hunting, consumption, and assemblage of this deposit represent activity at a different scale than identified previously in Unit B. The acquisition of such a diverse set of animals would have likely required communal effort, and the scale of consumption is consistent with feasting activity. The unique nature of this deposit is reinforced by the inclusion of exotic materials such as cowrie, copper, and glass.

Unit B, Red III, Context c (B-RIII-c), Estimated Date Early Fourteenth Century AD

Following the destruction of the B-RIII-a architectural complex, a new structure (B-RIII-c) with similar dimensions to the vestibule (Room 4), coursed earthen walls, and a well-made laterite pavement floor was constructed roughly atop the footprint of the vestibule (Figure 5.22). This structure burned down shortly after construction in a similar manner to the previous complex, with the terrace roof collapsing inward. A roof beam yielded a date of 1154–1264 cal AD, suggesting that this structure was built in the same 30-year period at the end of the thirteenth century as the burning of B-RIII-a and the deposit of B-RIII-b. Based upon the associated ceramics, its destruction likely occurred in the late thirteenth or very early fourteenth century AD.

A cowrie shell, several large complete pots, and a small jar were sitting on the floor of the structure when it burned; the ceramics were destroyed by roof fall. It is not clear whether the structure had a second story, as the amount of collapsed debris was much less than in the destruction of the previous burned structures. Despite the small exposure, the diversity of fauna was similar to B-RIII-a, with

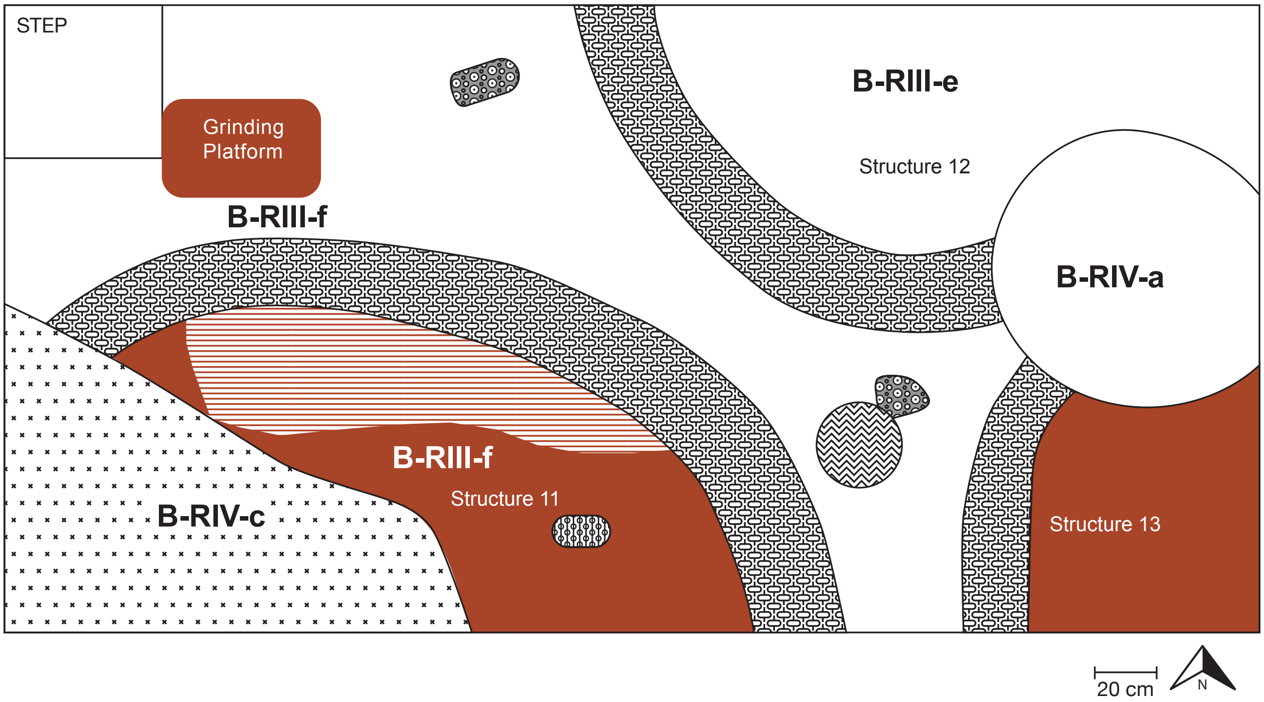

Figure 5.22. Unit B excavation map, eastern half of unit, contexts B-RIII-e, B-RIII-f, B-RIV-a, and B-RIV-c

small-medium bovid, large rodent, chicken/guinea fowl, eggshell, tilapia, and clariid catfish. Identified elements included a rib similar in size to that of a large sheep or goat, a probable cane rat tibia, two chicken/guinea fowl bones—one each from the leg and wing—and probable chicken eggshell. Tilapia bones from throughout the skeleton were recovered, as was a catfish spine.

As with the earlier burned architectural complex, bones on the floor of the structure were not necessarily burned, as the primary destruction occurred in the burning of roof beams. Consequently, burning patterns more closely resembled cooking and food processing techniques noted elsewhere in the site, with the mammal bones unburned, the galliform elements burned consistent with roasting, and the tilapia and catfish bones burned at low temperatures, reflecting a smoked preparation. Only one bone had extremely minor rodent damage. Notable in this deposit was the treatment of the cowrie, which was the only complete cowrie without its dorsal side removed recovered from Kirikongo.

Unit B, Red III, Context d, (B-RIII-d), Estimated Date Early Fourteenth Century AD

After the destruction of B-RIII-c, a deposit of animal bones and material culture was laid atop the remains of the structure in a slight depression prior to the construction of a new building (Structure 11), itself slightly offset to the south. This assemblage was likely larger than the recovered sample, as it was cut through by the creation of the large pit described in B-RIV-c. Despite its small size, the deposit contained iron wire and a diverse assemblage of pottery. Like many other deposits at Kirikongo, bones were well preserved, with no apparent taphonomic damage, and were sealed by subsequent construction.

The animal bone assemblage contained small, medium, medium-large, and large bovid; chicken/francolin; softshell turtle; and *Chambardia* sp. The mammalian fauna included ribs and unidentifiable long bone fragments of likely small and medium-size bovids. In addition, two calcaneus bones, one each from a medium-large bovid (similar in size to hartebeest) and a large bovid (similar in size to roan antelope), were recovered. The former was chopped in half, and the latter was unfused. Scapula and ribs of medium-large bovids were also recovered. A carpometacarpus of a chicken/francolin, fragments of *Chambardia* sp., and a carapace fragment of a large softshell turtle were also identified. The overall distribution resembles that from B-RIII-b, despite the smaller size of the assemblage.

Unit B, Red III, Contexts e and f (B-RIII-e, B-RIII-f), Estimated Date Fourteenth Century AD

B-RIII-e and B-RIII-f are two assemblages deposited in abandoned structures in late Red III (Figure 5.22). During Red III, four structures, in addition to the ritual structures, were built in the excavated area. Structure 10 was on the western edge of the unit in the second extension, Structure 11 was to the south of the second burned ritual structure (B-RIII-c), and Structures 12 and 13 were located to the northeast and east of Structure 11.

The relative chronology of the construction of these structures is not entirely clear. Structure 11 is the best understood, as it was clearly built after the destruction of the second ritual structure (B-RIII-c) and its foundation is dated through the deposit in B-RIII-d to the first half of the fourteenth century AD. In contrast, Structures 12 and 13 may have been built earlier in Red III, but they had no foundation deposits and their precise dating and relationship to either the burned structure B-RIII-c or Structure 11 are unclear. These structures were unaffected by the destruction associated with either B-III-a or B-III-c. Finally, Structure 10, which was likely constructed in the late thirteenth or early fourteenth century, was separated from the other structures by a large Red IV pit feature (B-RIV-c) that cut through the Red III deposits. As a result, it was difficult to link spatially to the other later Red III structures.

The northeastern structure, Structure 12, was abandoned in the second half of the fourteenth century, at which point it was filled with a small amount of material culture, including a metal wire fragment, bases from broken bowls, and a small number of animal bones (context B-RIII-e). These deposits were sealed by the subsequent Structure 14. Once again, this process resulted in well-preserved bones, with little to no damage. The animal bone assemblage included forest duiker, common duiker, duiker/oribi, small bovid, chicken/guinea fowl, and a fragment of *Chambardia* sp. The deposit comprised several thoracic vertebrae from a bovid in the size range of red-flanked duiker, a common duiker pelvis, a probable duiker pelvis and forelimb (from at least two individuals), and unidentifiable small bovid elements from throughout the body, including a vertebra, pelvis, rib and metapodial. Of these, only a rib was burned. A rib of a very small mammal was also recovered, either from a large rodent or possibly the forest duiker. Two elements from either chicken or guinea fowl were recovered, with burning on the sternum and cut marks along the shaft of a femur. Confirmed or probable domestic sheep and goats were notably absent from the deposit, although domestic chicken was likely present.

After the abandonment of the southern structure, Structure 11, in the late fourteenth century AD, a rich concentrated assemblage of materials and objects (B-RIII-f) was deposited inside the structure. This extended over the wall to a grinding installation to its north, on the site of the former second ritual structure (B-RIII-c). The assemblage included two fragments of iron wire, a large assemblage of broken ground-stone tools, and diverse pottery, including small and large jars, a brewer, bases, and broken tripod vessels. One of the broken lower ground-stone fragments was on the floor of the structure. Two unbroken bone beads made from metapodials of a carnivore larger than a dog were identified as well. These beads compare best in size and structure with larger felids, such as the serval, and both had multiple cut marks along the shaft, similar to those left from skinning. Faunal remains included goat, sheep, duiker/oribi, bushbuck, sitatunga, medium/large bovid, large bovid, canid, micromammal, chicken, chicken/francolin, chicken/guinea fowl, probable chicken eggshell, clariid catfish, tilapia, toad, and *Chambardia* sp. The assemblage was well preserved, with only minor rodent damage and carnivore damage on one element each.

Domestic animal remains included parts of a goat less than a year old (upper and lower dentition, unfused pelvis) and a prime-age but very small sheep (upper dentition and hind leg). A metacarpal fragment of common duiker or oribi as well as two nonidentifiable rib fragments from small bovids (one burned) were identified, as were several long bone fragments (one burned) likely from small bovids. The forelimb (distal humerus, ulna) of a very large bushbuck with extensive cut marks from dismemberment was recovered, as was the distinctive first phalanx of a sitatunga. Rib fragments and long bone fragments of a medium-size bovid, one of which was burned, likely derive from one of these animals. A rib of a medium-size to large bovid and a large bovid tooth fragment attest to the presence of at least one larger animal. Lastly, a pelvic fragment of a dog-size canid was recovered, as were several elements from micromammal rodents and nonidentifiable mammal bones.

Both wing and leg bones of chicken or guinea fowl were identified, including a confirmed large rooster tarsometatarsus with spur that had a cut mark opposite the spur. Part of a wing of a chicken or francolin was likewise recovered, as were fragments of probable chicken eggshell. B-RIII-f also contained smoked clariid catfish, diverse parts of an unburned tilapia, and several fragments of *Chambardia* sp. Several elements of a toad in the size range of African bullfrog were also present.

Unit B, Red IV, Context a (B-RIV-a), Estimated Date Early Fifteenth Century AD

After the deposition of B-RIII-e and B-RIII-f into the abandoned Structures 11 and 12, a new round building (Structure 14) was constructed in the north-central unit, accompanying Structures 13 and 10, both of which continued to be occupied. This new building had very thick walls and a poorly made thin laterite pavement floor and was in use for only 10 to 20 years before both it and Structure 13 were abandoned. After their abandonment, a burial pit was cut through the exterior walls of both structures and the context under discussion, a dense pit deposit immediately south of the burial pit, was filled with material culture, ash, and a rich deposit of bones (Figure 5.23).

Materials in the B-RIV-a pit included slag, iron wire, flat bent iron, a bent iron arrow, and fragmented ground-stone implements in granite and sandstone, among them two identifiable hand stones. The ceramic assemblage included a large brewer, jars of multiple sizes, and many bowls and bases but was notably missing evidence of tripod vessels. The animal bone assemblage was both large and rich, including remains of sheep/goat, oribi, small bovid, reedbuck, kob, medium/large bovid, large bovid, canid, warthog, cane rat, Gambian rat, micromammal, francolin, chicken/guinea fowl, chicken/francolin, knob-billed duck, eggshell, softshell turtle, lizard, toad, clariid catfish, *Bagrus* sp., *Synodontis* sp., tilapia, and *Chambardia* sp. The bones were well preserved, with no carnivore or rodent damage.

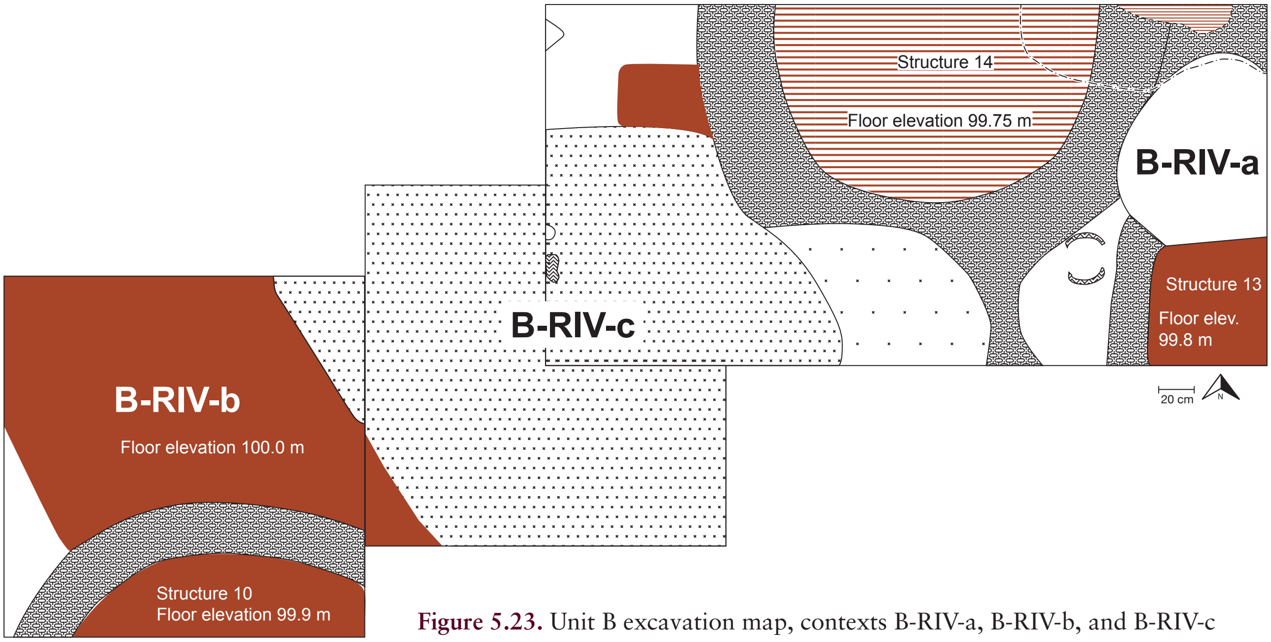

Figure 5.23. Unit B excavation map, contexts B-RIV-a, B-RIV-b, and B-RIV-c

At least three individual sheep or goats were identified, including a very young individual with an unfused pelvis, and a very old individual and a prime-age individual based on the wear on two upper premolars. The metatarsal of an adult sheep/goat that had been burned from roasting was also identified, as was the metatarsal and centrotarsal from an oribi. Centrotarsals had been systematically missing in earlier deposits. Unidentifiable small bovid elements were recovered from throughout the body, with cranial, mandibular, vertebral, costal, and forelimb and hind limb fragments, including a metatarsal, as well as 10 long bone fragments. Fairly extensive burning was identified on these small bovid elements, from the cranium to ribs to tibia. A lumbar vertebra was chopped, indicating the division of the carcass into left and right portions, while a tibia and metatarsal were chopped from dismemberment.

Among the medium-size bovids, the first phalanx of a kob had been chopped in half cleanly and had possibly decorative cut marks (perhaps it was used as a tool or talisman), while the metacarpal of a reedbuck had cut marks on the shaft from skinning. A humerus, ribs, and long bone fragments of a medium-size bovid were recovered, with a rib and fragment burned and a possible cut mark on the rib, as was a chopped scapula, pelvis, and several ribs (one burned) of a medium-large bovid. A single vertebra and heavily worn molar of a much larger bovid, likely the roan antelope, rounded out the bovid assemblage.

The unfused humerus and rib of a canid indicated the presence of an individual less than one year old. Based on the argument regarding the puppy remains in B-RIII-b, this could be jackal (although in this case no adult was present). A single rib of a suid was also identified, as were several elements from large rodents, including a burned femur of a Gambian rat, a radius of cane rat, and several ribs of a cane rat–size mammal. Elements of micromammal rodents were recovered, in addition to a few nonidentifiable mammal remains.

A francolin coracoid and burned ulna were recovered, possibly related to a burned and unfused chicken/francolin radius, which could indicate a late rainy or early dry season hunting event. Diverse remains of chicken/guinea fowl included two elements that were extremely rare (furcula and lumbosacral region). A sternum, femurs, and humeri were identified, with burning on a humerus and sternum, and dismemberment-related cut marks on a femur. The unfused pelvis of a galliform, possibly the francolin, was also recovered, as was probable chicken eggshell. A humerus of a knob-billed duck was identified. The context contained many unidentifiable avian fragments, some of which were burned.

Aquatic remains, if derived from one event, also indicate an early dry season expedition. These include *Bagrus* sp., multiple sizes of *Synodontis* sp., a large and small clariid catfish, and several sizes of tilapia. Many of the elements of clariid catfish and tilapia had evidence for being smoked, while it is possible that *Bagrus* sp. and *Synodontis* sp. were roasted while fresh. The carapace fragment of a softshell turtle would also be consistent with a river expedition. Lastly, a rib of a small lizard (agama size) was recovered, along with 24 elements from four toad individuals.

Unit B, Red IV, Context b (B-RIV-b), Estimated Date Early Fifteenth Century AD

The context is located in Structure 10 at the western end of the unit, cut through and separated from B-RIV-a by the later large pit B-RIV-c. Structure 10 was built over B-RIII-b and was refloored multiple times over the course of the fourteenth and fifteenth centuries AD. Upon the abandonment of this structure in the first half of the fifteenth century AD, ash, fragmented material culture, and animal bones were deposited atop the remains in a slight concavity.

The accumulation, B-RIV-b, included two iron wire fragments, a broken barbed iron point, and a hilt of a broken iron knife with blade missing, as well as a sandstone fragment from a ground-stone implement and a small polished quartz nodule. Ceramics included a variety of jars, well-decorated bowls, lids, and plates, some with fancy bases. A large and diverse assemblage of animal bones was recovered, including sheep/goat, common duiker, small bovid, kob, reedbuck, medium-large bovid, dog, probable jackal, wild or domestic cat, patas monkey, warthog, cane rat, chicken/guinea fowl, chicken/francolin, monitor lizard, tilapia, and *Chambardia* sp. Very minor carnivore damage was identified on only a single element.

A proximal femur with cut marks and the upper dentition of a sheep or goat of advanced age were recovered, as were phalanges from a common duiker. Diverse elements attributable to small bovid included parts from throughout the body, with cranium, mandible (including a likely domestic incisor and likely wild mandibular fragment), vertebrae, ribs, pelvis, forelimbs and hind limbs (ulna, femur, tibia), and metapodials represented. A cranium, ulna, and tibia were burned on protruding parts, including epiphyses from roasting, while a thoracic vertebra had cut marks on the spinous process from removal of meat. A proximal tibia, possibly derived from the duiker, was unfused. A fairly large number of long bone fragments were recovered, including one from an unfused element and another with cut marks.

The medium bovid assemblage included a kob metatarsal with skinning marks and the posterior phalanx of reedbuck. Three rib fragments, one chopped from division of the rib cage, were identified, as were two long bone fragments, one of which was burned. Elements from a medium-large bovid included large fragments of a mandible with a chop mark and a cut mark near the premolar row (possibly from tongue removal), a metatarsal with two skinning marks, two ribs, and several long bone fragments, some burned.

A confirmed dog mandible was identified, as were several other canid remains, including an ulna, metatarsal, and unfused metapodial fragment. Based on the finds in B-RIII-b and B-RIV-c, this deposit may contain both a dog and jackals. The ulna and metatarsal were burned from roasting, as was a likely associated long bone fragment. The teeth of an older suid and a younger warthog perhaps indicate the hunting of family groups as well. The metatarsal of a wild or domestic cat was recovered in this context, one of only a few cat elements identified at Kirikongo, as was the lower canine of a female patas monkey. Rodents were represented by the atlas of a cane rat and other axial skeletal parts likely of cane rat (cranial, vertebral, rib), along with a single element of a micromammal rodent.

The radius of chicken/francolin and humerus and all but one tibiotarsi of chicken/guinea fowl were burned, as was one of several avian long bone fragments. Shallow-water taxa included two different tilapia, *Chambardia* sp., and a vertebra of a large monitor lizard. Based on the association of diverse taxa and the age of young animals, this hunt likely took place in the late rainy season or early dry season.

Unit B, Red IV, Context c (B-RIV-c), Estimated Date Mid-Fifteenth Century AD

After the abandonment of all structures in the excavated space, a very large pit—2 m in diameter, 80 cm deep, and with a volume of 1.2 m^3—was dug. It was filled with an ashy deposit that contained material culture and the largest and most diverse faunal assemblage excavated at Kirikongo.

The pit was located to the southwest of Structure 14 and cut through the edge of that structure, displacing some of its bricks, as well as through part of the pavement of Structure 10. It extended into the upper levels of the destruction debris from B-RIII-a. After the deposition of materials and animal bone into the pit, it was sealed by a laterite pavement. As a result, the contents of the pit were well preserved.

B-RIV-c contained a very diverse assemblage of materials, including 686 g of slag, two iron wire fragments, two iron arrows, one iron harpoon, a hook-shaped flat piece of iron, a polished and smoothed natural quartz nodule, many ground-stone fragments, a cowrie shell, and a broken stone bead. Interestingly, this bead was made of an auriferous (gold-flecked) greenstone, similar visually to greenstones from the Birimian geologic strata to the south and east of Kirikongo (at nearest 15 km away). The Birimian strata extend through west and southwest Burkina Faso, and the precise locations of fifteenth-century exploitation of gold deposits are not well understood, although it is now known that some of the stone enclosures of Loropeni have fifteenth-century layers (Koté 2013) and the ceramics have similarities to Red IV pottery. The pit also contained an unbroken spindle whorl, indicating cloth production.

The pit contained the largest and most diverse faunal assemblage excavated at Kirikongo, with 406 mammal fragments (red-flanked duiker, goat, sheep/goat, oribi, common duiker, medium bovid, medium-large bovid, roan antelope, warthog, hippopotamus, jackal, civet, serval, water or Egyptian mongoose, slender mongoose, patas monkey, cane rat, Gambian rat, micromammal rodent), 118 avian fragments (chicken, two francolin species, guinea fowl, two types of eggshell), 11 reptiles and amphibians (crocodile, monitor lizard, softshell turtle, toad), 24 fish fragments (clariid catfish, Nile perch, tilapia), and 11 bivalves (*Chambardia* sp., Nile oyster). Minor carnivore chewing (often a single tooth impression) was present on nine bones, indicating that dogs were present during processing and/or consumption. Rodent gnawing occurred on one element.

Several domestic sheep or goat individuals were identified, including the third phalanx of a very small dwarf goat and the mandible of an older goat. At least two other individuals were represented by an unfused proximal tibia, two metatarsi (one unfused), and a third phalanx, which was burned from roasting. The tibia, centrotarsal, and second phalanx of an oribi and a separate tibia and metatarsal of a common duiker were identified, with the metatarsal slightly burned and with skinning marks. In addition, a metatarsal and three metacarpal fragments of common duiker/oribi were identified. The large assemblage of small bovid elements, the majority of which resembled wild bovids, included parts of crania, mandibles, a vertebra, ribs, a pelvis, forelimbs (ulna, metacarpal), and hind limbs (tibia, femur). A mandible, dentition, a scapula, several ribs, and a metacarpal were burned, and a scapula and femur had cut marks from dismemberment. In addition to the identified elements, a very large number of long bone fragments were recovered, a quarter of them burned. Similarly diverse elements from at least one medium-size bovid were present in the deposit, including fragments of the cranium, vertebrae, ribs, and fore- and hind limbs. A cervical vertebra, both femurs, several ribs, and several long bone fragments were burned, and one rib was chopped from division of the rib cage into dorsal and ventral portions.

A medium-large bovid was similarly represented in the deposit, as elements from at least one individual included parts of the cranium, vertebrae, ribs, and parts of fore- (scapula, radius) and hind limbs (femur, tibia, metatarsal). Burning was recorded on a tooth and ribs. Similar to many other contexts, the medium-large bovid bones were extensively cut and chopped, with a cervical vertebra chopped to separate the right and left carcass. There were multiple chop marks on a radius proximal shaft, scapula, proximal tibia, and metapodial, and cut marks on a proximal tibia shaft. A femoral head was chopped off entirely. Of the notably large number of fragments of unidentifiable long bone, a third had been burned. Finally, the upper and lower dentition from a single roan antelope was identified; all of it had extensive wear. A single mandibular pm4 had been burned near the root. This was accompanied by a cranial fragment, tooth, scapula, and several long bone fragments comparable in size to roan antelope.

B-RIV-c contained the largest assemblage of suid bones at Kirikongo, including cranial fragments, ribs, pelvis, and forelimb elements, as well as two long bone fragments most closely resembling suid. The mandible, pelvis, radii, ribs, and long bone fragments were burned, and a radius fragment had cut marks along the shaft that most closely resemble marks from skinning. One warthog was very large. Another, with an unfused metacarpal, was much smaller. A significant proportion of the cranium and mandible of the larger individual was recovered, including a completely intact third molar (Figure 4.38). However, its large tusk (4.3 x 5.8 cm socket) had been removed, likely for use as ivory. The context also attests to another ivory-bearing animal, as elements from the forelimb of a hippopotamus, including a first phalanx, radius fragment, and a possible metapodial fragment, were recovered, with the radius burned from grilling. This was the only hippopotamus recovered in excavations at Kirikongo. The hippopotamus is a generally rare find in West African archaeological sites.

The pit contained a similarly large assemblage of canids. The only positive identification was the mandible of side-striped jackal with its adult permanent dentition purposefully removed. However, the characteristics of the assemblage strongly suggest that a family of jackals was hunted, and it is not clear if any dogs are present. Parts from multiple canids of different ages were recovered, including multiple crania, a mandible, vertebrae (including caudal vertebrae), ribs, pelvises, and fore- and hind limb elements. Unfused elements were common, with a humerus, radius, ulna, metatarsals, metapodial, and a fusing first phalanx, in addition to multiple well-fused and larger metapodials and a fused femur. Extensive burning on two mandibles, a cervical vertebra, lumbar vertebra, multiple caudal vertebrae, pelvis, femurs, metatarsals, and an unidentified metapodial suggests that these individuals were roasted. A metatarsal had cut marks mid-shaft from skinning. Similar to the pattern in bovid assemblages, there was a large number of long bone fragments from medium-size carnivores in the size range of jackals; several of these were burned to varying degrees. Given the context with extensive roasting, these are more likely to be jackals, but it cannot be ruled out that some of these appendicular fragments could belong to the other carnivores (civet, serval) identified in this deposit.

The calcaneus of a civet cat and a phalanx of a medium-size felid similar in size to a serval or golden cat were identified. Humeri of two different mongooses were recovered, including a burned large humerus (likely *Atilax peludinosus*), as well as an unburned humerus from the slender mongoose. Notably, a patas monkey (humerus, mandible) had the mandibular dentition extracted, similar to that of the jackal and warthog.

At least one cane rat and one Gambian rat were recovered, with a mandible and metapodial of the former and a mandible, tibia, and radius of the latter. Cranial fragments and several ribs were also identified as small mammals. At least two of the ribs were from a Gambian rat–size mammal (likely rodent, but mongoose cannot be ruled out). Lastly, a few elements of micromammal rodents were recovered. A large number of nonidentifiable mammalian bone fragments, several burned, were also recovered from B-RIV-c, supporting an interpretation for the inclusion in this context of intensive processing remains from most animals represented.

Four different types of galliform birds were identified in B-RIV-c, including chicken, guinea fowl, and two types of francolin (distinguished based on size). The two elements attributable to chicken were part of a sternum and radius, while the coracoids (one unfused) established the presence of at least two different guinea fowl individuals, the older with cut marks indicating detachment of the wing. An unfused radius and femur from the guinea fowl/chicken assemblage may be related to the young guinea fowl. Francolin elements were all derived from the wings, with the exception of one femur. A humerus, radius, and ulna had evidence for burning, perhaps reflecting grilling, and the femur had cut marks, likely from meat removal. An ulna and a radius were unfused. Several elements were identified as chicken/francolin, including radii and sternum fragments (some burned) and a burned tarsometatarsus. The emphasis on francolin wings could be evidence for the collection of feathers.

Numerous large galliform elements attributable to chicken or guinea fowl were identified, including some elements that have not previously been recovered at Kirikongo. Cranial bones and mandibles from two different birds were present, as well as the rarely recovered furculum, sternal fragments (in large numbers), and part of a pelvis. Vertebrae and the synsacrum were systematically missing. This assemblage had balanced representation of wing and leg parts, perhaps reflecting a differential pattern of usage than francolins. Cut marks were found on three leg elements (femur, tibiotarsus, tarsometatarsus) and four wing elements (coracoids, scapuli), perhaps suggesting butchering rather than tearing for wing removal. Several leg elements and a coracoid were burned. A few galliform bones (sternum fragment, ribs) could not be size-classed. The deposit also contained a large number of nonidentifiable avian bone fragments; several of the long bone fragments in this group were burned. The presence of unfused bird bones supports a late rainy season/early dry season estimate for this event.

At least three different avian taxa are represented by eggshell: probable chicken; a medium thickness group that could match guinea fowl/double-spurred francolin; and a very thick group that compares well with white-throated francolin, a forest taxon that is also suggested by the smaller-size francolin group of skeletal elements. Interestingly, the middle-thickness shells were hatched, perhaps indicating the presence of domestic guinea fowl and chicken at the site. The very thick shell could be evidence for the collection of francolin eggs.

A large crocodile cranial fragment and a mandible fragment with its teeth removed were found in the pit, along with three fragments of large reptile long bones. The crocodile was larger than the 150 cm standard-length comparative crocodile it was identified against and was likely an adult West African crocodile. The Nile monitor lizard (represented by maxilla, vertebra, and pelvis) was also large, with an estimated standard length over 60 cm. All the large reptile and crocodile remains were intensively burned.

The fish assemblage included medium tilapia and medium to large clariid catfish and Nile perch. Regular low-temperature burning patterns may indicate that all three were smoked prior to consumption, including, unusually, the Nile perch. Bivalves included both *Chambardia* sp. and Nile oyster, perhaps indicating a dry season visit to the river, which would also be consistent with the fish assemblage. A carapace fragment of a softshell turtle and a single element of a toad were recovered as well.

B-RIV-c differs in fundamental ways from other contexts with rich, diverse faunal assemblages at Kirikongo. Many of the taxa overlap with those found in earlier contexts (wild antelopes, suids, jackals, fowl) but were processed differently. While the removal of certain elements, such as carpals and tarsals, bovid teeth, tails, and chicken vertebrae, continued (albeit much less systematically), there was new evidence for skinning of bovids, systematic removal of teeth from wild taxa, and perhaps even extraction of feathers from francolins. In addition, there were several new taxa (cat, hippopotamus, crocodile) that are more typically hunted for the commodities they produce (skins, ivory) than for their meat.

Unit B Overview

As with Unit A, the contextual analysis of architecture, material culture, and faunal remains revealed that fauna primarily occurred in highly structured deposits with other materials. In many cases, the assemblages were likely created during discrete events in which they were interred within the preserved foundations of structures and shortly thereafter sealed by a subsequent construction level. As a result, material culture tends to be stylistically constrained to specific chronological moments and fauna is well preserved, with even less carnivore and rodent damage than was identified in Unit A. The excavated area was in continual use for at least 1,500 years, although mound formation processes varied, with three different major patterns observed: one in Yellow I, II, and early Red I; another spanning Red I, Red II, and the first half of Red III; and the last from Red III to Red IV.

During Yellow I, the excavated area contained a series of discrete layers and a structured pit of ash, animal bones, and material culture. Strata included pounded clay surfaces, perhaps suggesting that, as in subsequent levels, these layers and the pit feature were associated with constructed monuments with coursed earthen architecture. From Yellow II through early Red I there was a series of three constructed mortuary monuments employing varying combinations of architectural techniques, including coursed earth, earthen brick, and either pounded clay or laterite pavement floors. The late Yellow II and early Red I monuments (B-YII-b, B-RI-a) both included a burial pit surrounded by metallurgical debris, material culture, and fauna, capped by an architectural marker with low walls. The earlier Yellow II monument (B-YII-a), associated with an infant skeleton, was similar in structure but less elaborate and lacked metallurgical debris. Faunal remains throughout this early period were extremely well preserved, with only one instance of minor carnivore gnawing, on bones in the cap deposit of the B-YI-d pit. These mortuary monuments do not resemble habitation spaces. If household locations were stable, residences may have been farther to the east, as they are later in the sequence.

Starting in the second half of Red I, an architectural complex of at least three rooms was constructed directly atop these tombs (B-RI-b, B-RII-a, B-RIII-a). Roof beams and direct dating of both earlier and later layers suggest construction in the early tenth century, and the complex was well maintained for several hundred years. The structure was abandoned in the late thirteenth century following a fire, during which the burning roof collapsed into the building, sealing activity areas within the complex. The floor of this complex was close to 1 m below the residential floor of a large Red II compound (at least 30 to 40 m in diameter) to the east (B-RII-b), and a step up out of the complex also indicates an adjacent higher surface to the west. Consequently, the complex may have been semi-subterranean. The central room (Room 4) of the exposed architecture was constructed of special square fired earthen bricks and contained a dense assemblage of well-decorated storage jars. The adjacent Room 3 was likely a sacrificial area, with ritual objects and sacrificed animals around an unpaved portion of the floor. Finally, Room 5, while otherwise clean, contained a large tripod granary composed of coiled clay construction that was smashed when the second story above this room collapsed. The accumulation of fragmented objects, sacrificed domestic animals, and wild animal parts in the preserved sacrificial location strongly resembled accumulations elsewhere at Kirikongo. A second iteration of this building was constructed atop the remains. It was also burned down in the late thirteenth or early fourteenth century AD.

Starting in Red III, there was a shift to a more open spatial syntax of distributed structures. Upon abandonment, accumulations of fauna and material culture were placed in these structures. In at least one case, a burial pit was dug as well. As at Mound 1, with 20 to 30 cm of wall foundation left in place, the deposit was sealed with a new laterite pavement floor, atop of which new structures were built. This practice may have also occurred after the abandonment of both the first and second burned ritual complexes, as each had similar accumulations deposited in depressions atop their remnants before subsequent construction. Like Red I and II, most Red III architecture consisted of well-made earthen brick or coursed earth structures with laterite pavement roofs and floors. However, as was the case in Unit A, in the latter half of the fourteenth century, structures were built more rapidly and inhabited for shorter periods, with a very quick buildup of 1 m of deposit in 50 to 75 years. By the mid-fifteenth century AD, the occupied space atop the mound was much reduced (likely due to the impacts of plague). However, a large pit with accumulated materials was created prior to a last building sequence (which dated to Red V in the late fifteenth century, outside the scope of this volume), indicating that the same pattern continued until the ultimate abandonment of the mound.

The fauna in these depositions patterned internally and indicates repeated intentionality of process. A fundamental component of all contexts was a core of domestic animals and aquatic taxa that resulted in a comparable baseline diversity score regardless of the assemblage size. Most early deposits tended to follow a formula of well-represented and frequently roasted domestic animals (bovids, dogs, and chickens) accompanied by common aquatic resources (fish, bivalves). Hunted animals, including some carnivores that would not have been eaten, increased in importance starting with B-YI-d. Throughout the sequence, assemblages were likely acquired during the late rainy season or early dry season, when the targeted fish, game, and bivalves would all have been available in close proximity.

Most of the sheep and goats were killed at prime age, and while much of the appendicular skeleton and most of the axial carcass (ribs, vertebrae) were deposited elsewhere, small parts from different sections of the body were found in most archaeological deposits. The same is true of chickens, which were primarily represented by wings and legs. Some elements were almost entirely missing (carpals and tarsals of small and medium-size bovids and smaller mammals; crania, vertebrae, and torsos of birds). Dogs were treated differently, as a significant number of cranial and mandibular fragments and paws were recovered; a mandible and lower dentition from multiple dogs were found in the B-YI-d pit alone. Larger animals tended to be more heavily divided due to their size and also tended to have higher frequencies of cut marks.

Over the course of the occupation, residents changed and innovated on this core practice. Through early Red III, accumulations tended to be composed of domestic animals (cattle, sheep, goat, dogs, chickens), diverse fish and bivalves (with the former occasionally in large numbers), and a limited number of wild mammals. With the combined sacrifice in some cases of cattle, goats, dogs, chickens, occasional wild mammals, and fairly large numbers of fish, these may represent events involving large amounts of meat. The evidence of daily sacrificial practices identified in Room 3 of the ritual complex (B-RI-b, B-RII-a, B-RIII-a) resembled these earlier faunal patterns, with an emphasis on domestic goats and chickens; regular occurrence of fish, probable dog, and occasional wild animals (in this case Gambian rat and white-toothed shrew); and a single likely cattle element in early Red II. The rooftop assemblage from the second story over Room 5 contained similar remains.

From Red III through early Red IV, the foundational livestock, fowl, and aquatic resources remained present but declined as an overall percentage of the faunal assemblage as a result of a fundamental shift in wild animal usage. Wild taxa became both more common and more diverse, and larger proportions of their skeletons were found in these deposits, suggesting communal consumption rather than distribution of parts. Interestingly, these contexts rarely contained more than one individual of a particular taxon, with the exception of dangerous animals that live in family groups (jackals, warthogs). In several contexts, these deposits included a large amount of meat. For example, B-RIII-b had evidence for the roasting of a roan antelope, a hartebeest, and families of warthogs and jackals, in addition to a diverse array of medium-size and small animals. Practices around domestic animals shifted as well. In addition to the absence of cattle, age at death of sheep and goats becomes more diverse, with occasional old and young individuals represented. Finally, these contexts lacked the evidence for small carnivores found in both earlier and later deposits.

Beginning in mid-Red IV, there is evidence for changing values toward and treatment of animals. Increased engagement with animal commodity production was reflected in both the targeting of particular taxa appropriate for the production of commodities and the processing of both them and commonly hunted taxa to produce furs, musk, leather, ivory, and more. For example, B-RIV-c contained animals whose processing suggests they were likely hunted at least in part for their furs/skins (serval-size cat, civet, mongoose, jackal, crocodile), musk (civet), teeth and ivory (warthog, hippopotamus, crocodile, monkey, jackal), and feathers (francolin). Unlike in earlier contexts, a large number of wild bovid lower appendages had cut marks associated with skinning animals for rawhide or leather production. Despite these changes, the removal of certain skeletal elements continued, albeit in a less systematic fashion. Fish, while present, constituted a much smaller part of these deposits.

Fauna was not recovered in isolation, and all contexts with concentrations of faunal remains also contained diverse material culture that, due to patterning in diversity and condition (treatment), substantiates an argument for intentionality in assemblage construction and purposeful associations between classes of archaeological material. As in Unit A, contexts contained limited numbers of fragments from diverse ceramic vessels, which may represent particular parts of the pot. There was a very high frequency of small consumption and possibly ritually related, highly decorated vessels in each assemblage, and certain vessel types, such as tripod vessels, recurred regularly. Aside from what appeared to be a large part of an intentionally smashed vessel in B-YI-c, the only near complete vessels recovered were from Room 4 of the burned ritual complex, and these did not occur in association with other material classes.

Other classes of material objects were similarly broken or fragmented. Many broken lower grinding stones had significant intact depth of grinding surface, and hand stones often had small chips taken off their ends. In no cases could ground-stone fragments be refitted to constitute a complete object. Most contexts had fragments of iron objects as well, including knives, spears, barbed points, hafts, and bracelets. These tended to be either bent intentionally or broken cleanly. As with other material classes, these fragments rarely constituted an entire object, although in Yellow I and Red IV some metal objects were almost intact. Two stone beads were broken cleanly in half, and all but one cowrie shell (from the second burned architectural compound, B-RIII-c) had their backs removed.

While not common, Mound 4 accumulations had a wider range of seemingly intact objects than was identified in Unit A. These included an ocher crayon, a chert block, polished quartz nodules, a glass bead, and a copper earring. In Red IV, possible hammerstones or simply rounded dolerite stones were intact, as was a spindle whorl. These were likely either nonlocally produced or fairly unmodified natural objects that may have been classified differently in the way they were incorporated into the deposits.

Overall, accumulations of animal remains and material culture were typically associated with structures, including those from the early layers (Yellow I through Red I) that appear to have been found alongside tombs in constructed monuments and those from Red III onward, where deposits occurred within recently abandoned architectural units, some with burial pits, prior to the subsequent construction of new structures. From Red I to Red III, the pattern is slightly different, as excavations focused on a ritual complex that included sacrificial locations. Throughout, the intentionality of accumulations is indicated by stratigraphic, temporal, taphonomic, and internal patterning in the nature and condition of contents and is tied to architectural construction and deconstruction processes, many of which are related to burial events.

Unit C (Mound 3)

Mound 3 is set on the western edge of the central cluster at Kirikongo. The preserved area of the mound today is between 0.2 to 0.25 ha in size (depending upon inclusion of talus slope). A 3 x 2 m excavation unit was placed at the summit of Mound 3, near the center of the mound. The size of the unit was diminished slightly with increasing depth. At 1.5 m it was cut down to a 0.85 x 1.05 m unit. It diminished to 0.8 x 0.83 m when sterile was reached at 2.9 to 3 m. The total excavated volume was 9.2 m^3, and 107 stratigraphic units were recognized during excavation. Based on material culture and four AMS dates, the mound was initially founded in the seventh or early eighth century AD and was used for 700 to 800 years until abandonment in the mid-fifteenth century (ca. AD 1450) (Figure 5.24 and Table 5.3). From its initial layers through Red III, all deposits at Mound 3 were likely derived from mortuary rituals, with around 20 identified burials in the excavated space. It is notable that Mound 3 was established to the west of Mound 4 at a time when an area at that mound devoted to mortuary monuments shifted to use as a ritual architectural complex (B-RI-b, B-RII-a, B-RIII-a). Ceramics from Mound 3 strongly resembled those from the production tradition of Mound 4, and it is likely that the two mounds were associated.

Unit C, Yellow II, Context a (C-YII-a), Estimated Date Late Seventh or Early Eighth Century AD

The earliest cultural deposits in Unit C included three separate pits extending through a clay deposit with occasional laterite pebbles. The first pit was excavated into laterite bedrock on the west side of the excavated area and included the burial of an adult human. To the southeast was an adjacent pit reaching bedrock filled with material culture and animal bones, and to the northeast a third pit contained half a fragmented pot. All three pits were likely sealed by the mounding of earth over the burial.

The southeastern pit contained diverse material culture, including slag, ore, a teardrop-shaped tapered iron wire, a second piece of iron wire, and a complete lunate microlithic tool in brown chert that strongly resembles Late Stone Age microliths in the greater region. Ceramics included a likely brewing vessel, well-decorated bowls and jars, and a jar with a ledged handle. The large and diverse animal bone assemblage included cattle, sheep/goat, Maxwell's duiker, common duiker/oribi, small bovid, medium bovid, cane rat, Gambian rat, hare, micromammal rodent, chicken/guinea fowl, francolin, chicken/francolin, eggshell, mud turtle, agama lizard, African bullfrog, clariid catfish, *Bagrus* sp., *Synodontis* sp., tilapia, *Chambardia* sp., and Nile oyster. Faunal remains were very well preserved, likely due to the subsequent sealing of these layers, and only a single bone had minor carnivore marks.

Two cattle individuals of different age were identified from two permanent lower pm4, one with no wear (likely erupting) and the other with visible but minor wear. An additional fragment of a large bovid premolar likewise exhibited no wear. Elements from a cattle forelimb, including a scapula, humerus, and radius, as well as rib fragments, were recovered, with the humerus unfused, likely matching the younger cattle individual. The scapula was burned from roasting on the caudal border. Lastly, a complete fused posterior second phalanx was recovered, indicating a very small individual, likely female, from a dwarf cattle breed (see Dueppen 2012c). Further evidence of processing was provided by the presence of several long bone fragments from a large bovid-size animal.

A molar and premolar from a very young sheep or goat were recovered, as were parts of a forelimb of common duiker

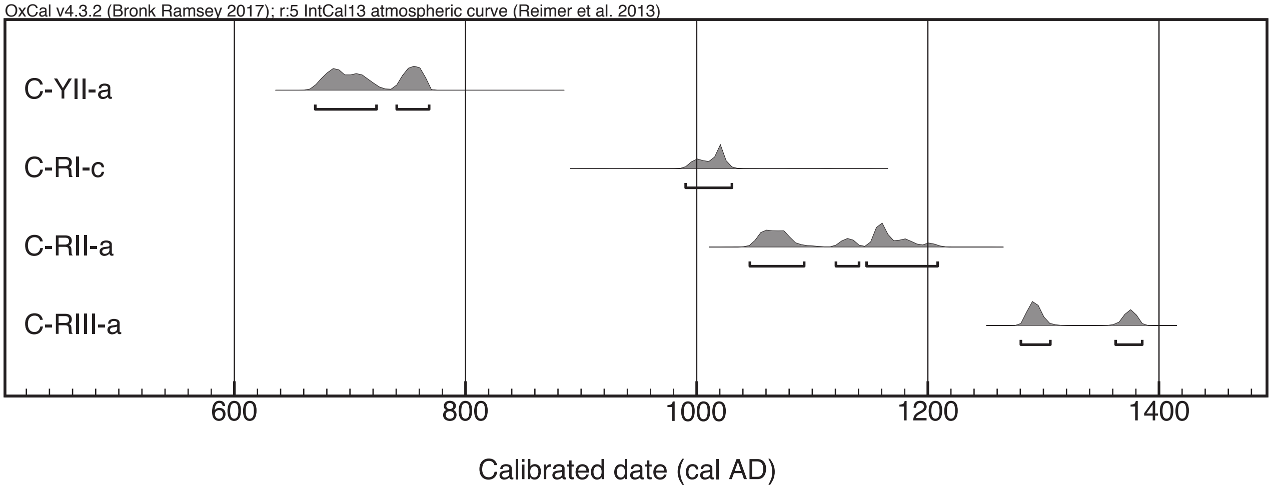

Figure 5.24. Unit C calibrated AMS dates (two sigma range)

or oribi, including a metacarpal and second phalanx. Small bovid elements (many likely domestic due to robusticity) included parts of the forelimb, ribs, and hind limb, as well as likely associated unidentifiable long bone fragments. Vertebral columns (including tails), tarsals, carpals, crania, and mandibles were missing. Burning from roasting was found on a scapula, rib, and several long bone fragments. A proximal tibia had cut marks, and chop marks were present on a metacarpal at mid-shaft and one long bone fragment. A medium-size wild bovid pelvis was also recovered, the only element from this size class. Particularly interesting was the presence of a very small forest duiker (Maxwell's duiker), represented by a mandibular fragment with a very worn deciduous pm2 (young adult), rib, and hind limb fragments (tibia, metatarsals). This animal today inhabits gallery forest in places above 1,200 mm annual rainfall, likely indicating a fairly humid setting in Yellow II.

Remains of three large rodent/lagomorph taxa were identified, including a tooth of a cane rat, an ulna of a Gambian rat, and a scapula and ulnae fragments of a hare. Several similarly sized elements included a cranial fragment, vertebral fragments, and a rib, with a lumbar vertebra charred from roasting. A small micromammal rodent, *Mastomys natalensis*, was indicated by both a mandible and a pelvis. In addition, a sizable number of nonidentifiable mammalian bone fragments were recovered, some burned.

A very small francolin taxon (likely the white-throated francolin) was identified from two tibiotarsi and a humerus, with both tibiotarsi burned slightly from roasting. A coracoid fragment and pelvis fragments of a chicken or francolin were also recovered, as were a second phalanx and a burned coracoid of a larger chicken or guinea fowl. These were accompanied by a rib and pelvis fragment of an unknown galliform, with the rib red from roasting, in addition to several avian long bone fragments and nonidentifiable avian remains. A diverse set of avian eggshell fragments was recovered, with a thinner group likely derived from domestic chicken and a very thick group that occurs at Kirikongo only in association with remains from the white-throated francolin.

Clariid catfish and *Synodontis* sp. fish occurred in a wide range of sizes. Both small and medium-size tilapia and large *Bagrus* sp. were also present. In comparison to other contexts, burning on fish bone was rare and occurred on only a few elements of *Bagrus* sp. and clariid catfish. Two taxa of bivalve were identified, including several fragments of *Chambardia* sp. and a large fragment of Nile oyster that had evidence of being smoked, a common preservation technique that today makes Nile oyster a trade item in the region. Parts of the head and body of an agama lizard were recovered, with limbs missing, and several elements from a small mud turtle, including carapace, mandible, and fore- and hind limb fragments. Lastly, several African bullfrog elements were found in the pit. While it is possible that the toads are intrusive, given their association with other shallow-water animals, it is more likely that they were collected. This taxon is large in size and consumed frequently in the region.

Table 5.3. Fauna from Unit C contexts

Taxonomic Identification	C-YII-a	C-RI-a	C-RI-b	C-RI-c	C-RII-a	C-RIII-a	C-RIII-b	C-RIV-a	Total
Philantomba maxwelli	1								**1**
Cephalophus rufilatus									**0**
Very small bovid	4			2					**6**
Ovis aries									**0**
Capra hircus									**0**
Ovis/Capra	2		1	1	6				**10**
Sylvicapra grimmia				1					**1**
Ourebia ourebi									**0**
Sylvicapra/Ourebia	2								**2**
Fetal bovid									**0**
Small bovid	14	3	2	6	18	4	3	2	**52**
Small bovid LBF	16	1	1	2	12	2	2	2	**38**
Kobus kob								2	**2**
Redunca redunca									**0**
Tragelaphus scriptus									**0**
Tragelaphus spekii									**0**
Medium bovid	1				1				**2**
Medium bovid LBF					1				**1**
Bos taurus	3				4				**7**
Alcelaphus buselaphus								1	**1**
Medium-large bovid	6		1	1	7			1	**16**
Medium-large bovid LBF	5		1		3			1	**10**
Hippotragus equinus									**0**
Large bovid	1			1					**2**
Large bovid LBF									**0**
Equus caballus									**0**
Equus asinus									**0**
Canis familiaris									**0**
Canis adustus									**0**
Canis sp.									**0**
Medium carnivore									**0**
Medium carnivore LBF									**0**
Felis sylvestris									**0**
Leptailurus serval/Caracal caracal									**0**
Civettictis civetta									**0**
Mungos mungo									**0**
Atilax paludinosus/Ichneumia albicauda									**0**
Herpestes sanguinea					1				**1**
Small mongoose									**0**
Crocidura sp.									**0**
Hippopotamus amphibius									**0**
Phacochoerus africanus					1				**1**
Suid LBF									**0**
Erythrocebus patas									**0**
Chlorocebus sabaeus									**0**

Taxonomic Identification	C-YII-a	C-RI-a	C-RI-b	C-RI-c	C-RII-a	C-RIII-a	C-RIII-b	C-RIV-a	**Total**
Cricetomys gambianus	1			1	3	1	1		**7**
Thyronomys swinderianus	1				5	1			**7**
Lepus victoriae	3		2	3					**8**
Small mammal (large rodent size)	5		2		15				**22**
Small mammal LBF					1	2			**3**
Micromammal	2				4	3			**9**
Mammal (unidentified)	35			8	22	25	18	2	**110**
Gallus gallus					3				**3**
Numida meleagris									**0**
Francolinus sp.	3			1					**4**
Gallus/Numida	2	1		2	14	5	3		**27**
Gallus/Francolinus	3								**3**
Galliform	2								**2**
Galliform LBF	8				11	1			**20**
Plectropterus gambensis									**0**
Sarkidiornis melanotos									**0**
Avian (unidentified)	4					1			**5**
Avian eggshell (chicken)	4				30	10			**44**
Avian eggshell (non-chicken)	8				1				**9**
Tilapiini	5				20				**25**
Clarias sp.	3		3		2				**8**
Lates niloticus					2				**2**
Synodontis sp.	3		1		1				**5**
Heterotis niloticus									**0**
Bagrus sp.	1		1						**2**
Mormyrus sp.					1				**1**
Heterobranchus sp.									**0**
Gymnarchus niloticus									**0**
Auchenoglanis sp.					1				**1**
Protopterus annectens									**0**
Tilapiini/*Lates niloticus*					1				**1**
Siluridae	1								**1**
Fish (unidentified)			1		5				**6**
Chambardia sp.	3	4	3	2	4	2			**18**
Etheria elliptica	1								**1**
Bivalve					1	1			**2**
Terrestrial mollusks					2	11			**13**
Varanus sp.		1			11				**12**
Crocodylidae									**0**
Agama sp.	7				2	5			**14**
Order Anura	27		1						**28**
Pelusios castaneus	5								**5**
Cyclanorbis senegalensis			1				1		**2**
Small lizard									**0**
Total	**192**	**10**	**21**	**31**	**216**	**74**	**28**	**11**	**583**

The presence of multiple cattle alongside other livestock makes this context unique in Yellow II. The aquatic fauna, francolin eggshell, and presence of Maxwell's duiker indicate hunting in a forest and fishing in a large water body and adjacent shallows, likely during the early dry season or late rainy season.

Unit C, Red I, Context a (C-RI-a), Estimated Date Ninth Century AD

In early Red I, a clay deposit was laid atop those from C-YII-a and capped with a small, 50 cm–diameter earthen brick structure with a laterite pavement floor (Figure 5.25). The associated clay deposits surrounding the feature included a fragment of a broken bowl and Red I jars. Despite being a very small assemblage, the C-RI-a fauna exhibits similar diversity to other contexts at Mound 3, with small bovid, chicken/guinea fowl, monitor lizard, and *Chambardia* sp., all of which were well preserved. Mammalian fauna included a radius, ulna, rib, and small appendicular fragment of a small bovid, the latter burned from roasting. A chicken or guinea fowl tibiotarsus was recovered, in addition to several fragments of *Chambardia* sp. and a burned pelvis of a small monitor lizard.

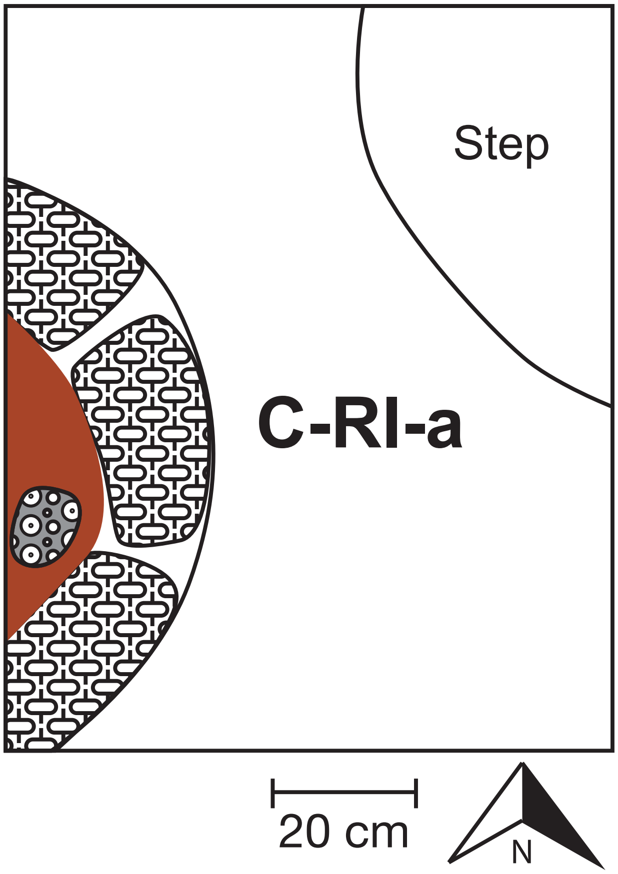

Figure 5.25. Unit C excavation map, context C-RI-a

Unit C, Red I, Context b (C-RI-b), Estimated Date Ninth or Tenth Century AD

In mid-Red I, a larger clay burial monument was constructed in the center of the excavation unit, topped by a 2 m–diameter earthen structure with a coursed earthen and pounded clay floor (Figure 5.26). The structure had an adjacent hearth/shallow pit with a burned wall directly to the south, and a large adult person was buried 40 cm beneath the floor. The individual was accompanied by a broken quartz bead, a fragment of ground stone, and a wide variety of ceramics, including small serving vessels and several fine small jars. The faunal assemblage was larger and more diverse than C-RI-a, with sheep/goat, small bovid, medium-large bovid, hare, turtle, toad, clariid catfish, *Bagrus* sp., *Synodontis* sp., and *Chambardia* sp. present. Fragments were well preserved, with no carnivore or rodent damage.

The rib of a cattle-size animal, a molar of a prime-age sheep or goat, and a cervical vertebra fragment, humerus, and appendicular fragment of a small bovid were identified, with the vertebra and appendicular fragment burned. The pelvis of a hare and a maxillary fragment and rib of a small mammal were recovered. Elements from clariid catfish, *Synodontis* sp., and a very large *Bagrus* sp. indicate a likely visit to the Mouhoun River, and the burning pattern on all three taxa is suggestive of grilling. In contrast, *Chambardia* sp. (fragments), likely mud turtle (burned humerus), and toad (forelimb) are all found in shallow-water contexts. Combined, these suggest an expedition in the early dry season/late rainy season.

Unit C, Red I, Context c (C-RI-c), Estimated Date Early Eleventh Century AD

The late Red I layers in Unit C were disturbed by multiple burial pits from C-RII-a that extended through the deposits and impacted most C-RI-c features. However, several wall stubs indicate that in late Red I, a larger, 3 to 4 m–diameter coursed earthen monument, likely with pounded clay floors, was constructed. Materials and animal bones were

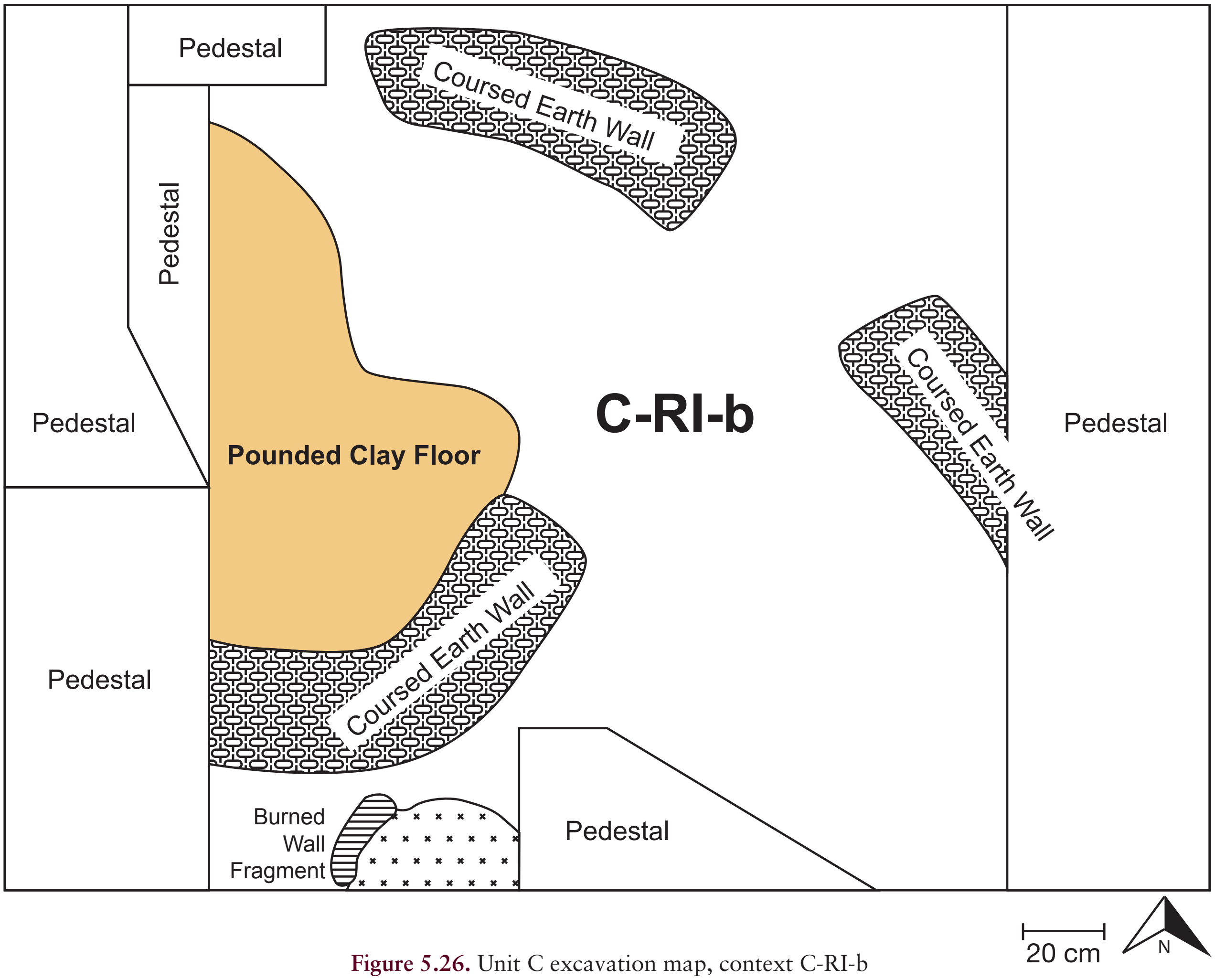

Figure 5.26. Unit C excavation map, context C-RI-b

distributed throughout this deposit, and due to the disturbances, it was difficult to identify localized accumulations. Material culture was diverse, with a fragment of iron wire, an iron dart, a large triangular basalt axe, a large broken polished sandstone bead, and sandstone fragments. The ceramics included probable brewers, elaborately decorated jarlets and serving vessels, and jars of varying size, some with bases. A diverse animal bone assemblage included probable cattle, sheep/goat, common duiker, small bovid, forest duiker, hare, Gambian rat, chicken/guinea fowl, francolin, and *Chambardia* sp. Preservation of bones was excellent.

A molar of a cattle-size bovid and a likely associated rib fragment were identified, in addition to the phalanx of a sheep or goat, a common duiker horn core, and small bovid elements from the cranium, pelvis, ribs, and hind limb. A rib and a tibia fragment were burned, as were both recovered nonidentifiable long bone fragments. A pelvis and thoracic vertebra from a very small bovid, too small for common duiker and likely from a forest duiker, were identified. Several elements of a savanna hare, including a mandible, teeth, and a tibia fragment, as well as the atlas of a Gambian rat, were also identified. In avian fauna, a burned tarsometatarsus of a francolin and burned coracoid and tibiotarsus of a chicken or guinea fowl were also recovered. Lastly, although fish were notably absent, several fragments of *Chambardia* sp. were identified.

Unit C, Red II, Context a (C-RII-a), Estimated Date Eleventh to Mid-Twelfth Century AD

C-RII-a was a very complex context consisting of at least four different monument structures constructed over a period of 100 to 150 years (Figure 5.27 and Figure 5.28).

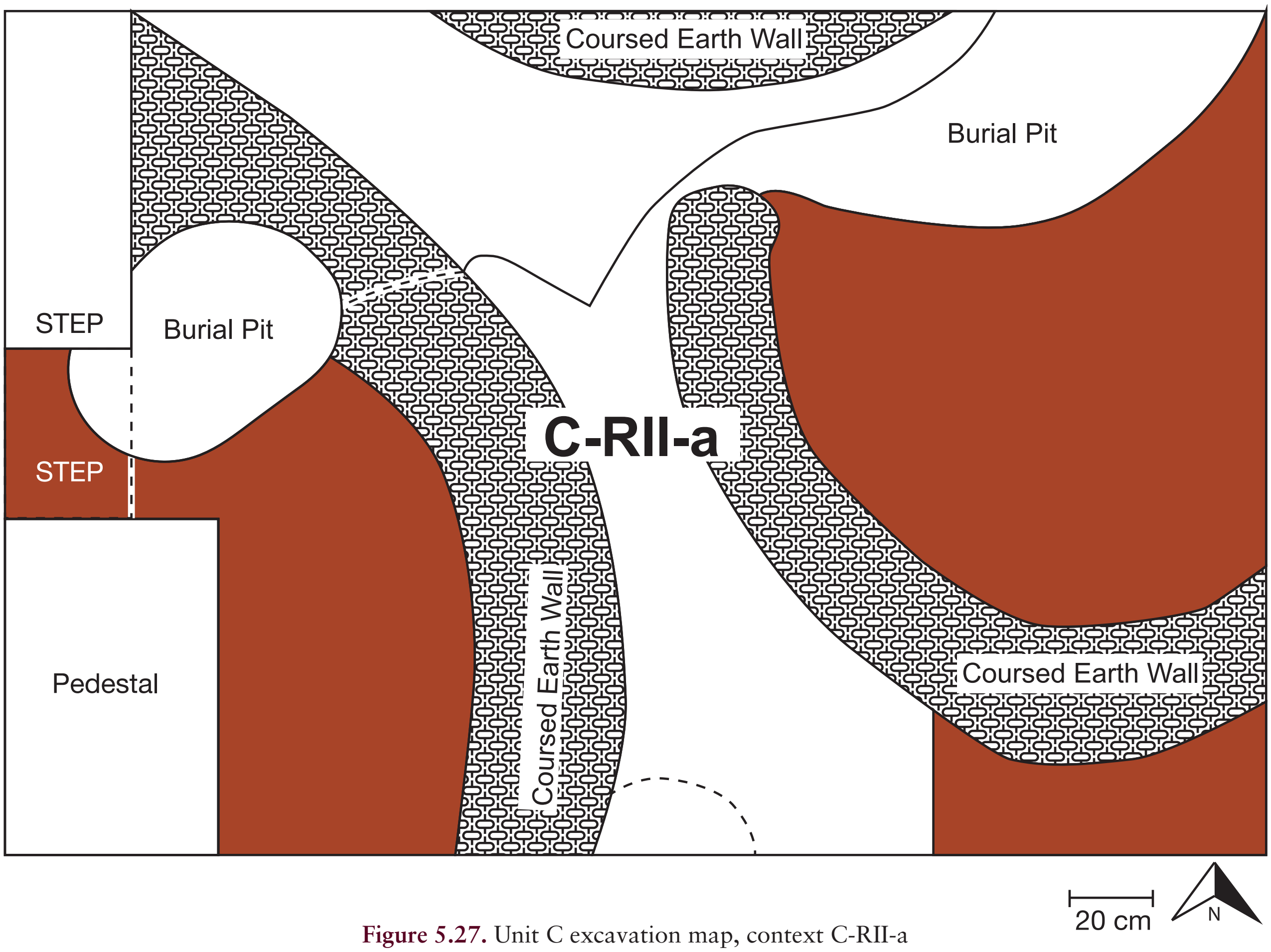

Figure 5.27. Unit C excavation map, context C-RII-a

These monuments were associated with multiple infant and small child burials distributed over the center and eastern part of the excavation unit. The first two structures were adjacent round buildings with coursed earthen walls and laterite pavements. Both structures were over multiple infant and/or small child burials, and in the larger structure to the west, a burial pit for an older child was cut through the floor. A third very similar round structure was constructed 20 cm above the eastern structure. The third structure had a hearth or deposit of hot ash near its southwestern wall. Lastly, a large burial pit was dug through all three former structures in the northern half of the unit. This pit was capped by a laterite pavement and a small coursed earthen structure.

Material culture and fauna were regularly recovered throughout the deposits, with fauna in particular evenly distributed around the large number of burials interspersed with architecture. Due to the complexity of the deposit and the very active processes around its formation, separation of the individual burial depositions (nodes) within the spatial continuum of the deposit was difficult. Given that no significant differences could be identified between the fauna spectrum at different monuments, there was likely significant similarity in the formation processes (cultural choices) that created these assemblages, and any differences were subtle enough to be obscured by the number of interments. For these reasons, the fauna of C-RII-a will be considered collectively.

The pottery assemblage distributed throughout the deposits included a special class of very small, thin-walled, highly decorated jars, along with diverse jars and bowls. Eight cowrie shells, all with backs (dorsal side) removed, were likewise scattered throughout the deposit. These constitute one of the earliest and largest assemblages of cowries known from West Africa. Among the other materials, it was possible to associate several finds, including the one identified fragment of a tripod vessel, multiple ground-stone tools,

Figure 5.28. Unit C showing C-RII-a

iron wire, a polished quartz nodule, a tuyère fragment, and a possible shell tool with the last burial monument, and some ground stone with the monument in which the older child was buried. Other finds, including ground stone and slag, could not be associated with any monument and may be from mixing with B-RI-c, as they were found at the transition with that deposit. It is possible that the funerary rituals of infants and small children incorporated ornate materials (small jars, cowries) but that the diversity of material objects increased with age. The age of the individual(s) buried in the final monument is unknown, but the size and depth of the burial pit and the diversity and richness of the associated materials could suggest one or more adults.

Animal bones were widely distributed throughout these deposits, and no differences were noted in the animal bones potentially associated with the final monument and those from elsewhere in the context. The identified taxa included cattle, sheep/goat, wild medium-size bovid, small bovid, warthog, slender mongoose, cane rat, Gambian rat, chicken, chicken/guinea fowl, eggshell, monitor lizard, agama lizard, clariid catfish, Nile perch, tilapia, *Synodontis* sp., *Auchenoglanis* sp., *Mormyris* sp., *Chambardia* sp., and terrestrial mollusk. All fauna was well preserved, with only one element exhibiting carnivore damage.

Even accounting for the combination of multiple features, this context contained an unusually large assemblage of cattle bones. Elements from the cranium, mandible, vertebral column, ribs, and forelimbs were recovered, as well as several long bone fragments. Based on the dentition, there are likely multiple younger cattle present. A scapula and a long bone fragment were burned from roasting. A chopped scapula, lumbar and cervical vertebrae, and rib indicate dismemberment and partitioning of the body into right and left sections. A cut mark on the mandible could be from removal of the tongue. An extensive assemblage of sheep or goat cranial and mandibular fragments represented at least three individuals ranging from less than a year old to prime age. Additional small bovid elements, likely from sheep or goat, included cranial fragments, ribs, and parts of the forelimbs and hind limbs (including an unfused calcaneus), as well as numerous long bone fragments. Several cranial and a mandibular fragment were burned, as was a tibia, several ribs, and some appendicular bone fragments. A tibia and a long bone fragment were chopped, and cut marks appeared on a rib and a calcaneus.

The burned radii of two different medium-size bovids were recovered—similar in size and morphology to reedbuck and a large kob—along with a single long bone fragment from a medium-size mammal. The burned incisor of a sizable warthog and the complete mandible of a slender mongoose were also found. Large rodents were well represented, with Gambian rat vertebrae and forelimbs, and cane rat forelimbs, pelvis, and hind limbs, including an unfused femur. Large rodent/lagomorph elements were also represented by crania, vertebrae, ribs, and forelimb fragments. Of these, a cranial fragment, radius, and several ribs were burned, and the radius had been chopped. Several micromammal rodent long bone fragments were recovered. The large assemblage of nonidentifiable mammalian bone fragments further supports the processing of carcasses.

A radius (burned), coracoid, and tarsometatarsus were identifiable as domestic chicken, in addition to a wide range of either chicken or guinea fowl elements from at least three individual birds (and likely more), including parts of the wings, legs, sternum, and one pelvic fragment. To these are added several fragments of avian long bone. Eggshell included probable chicken in addition to a single probable francolin/guinea fowl fragment, all of which seemed to be associated with the last monument. A few shell fragments of terrestrial mollusk were also recovered.

Aquatic taxa were diverse yet had a similar pattern to previous contexts in that the combination of species and size classes (including the deepwater Nile perch and *Mormyrus* sp. and the shallow-water *Chambardia* sp.) would most likely be found together in the mixed water environment of the Mouhoun River or a large tributary. The clariid catfish, *Synodontis* sp., and Nile perch all had burning patterns typical of roasting, while the other fish were not burned. The marsh habitat is substantiated by the presence of not only *Auchenoglanis* sp. but also several sizes of Nile monitor lizard cranial and mandibular elements, vertebrae, pelvis, and rib, with some remains from very large individuals. Lastly, the deposit contained elements of a smaller lizard, the agama.

Unit C, Red III, Context a (C-RIII-a), Estimated Date Late Thirteenth Century AD

No individuals were buried in the excavated space at Mound 3 after Red II. However, throughout Red III, people visited the cemetery monuments to carry out ritual practices on a more limited scale, and they constructed and maintained a series of pavements upon which burning features and ash were distributed (Figure 5.29). In the southeastern corner of the unit, a very small part of a burned structure with 25 to 30 cm of standing wall was uncovered. Given the intensity of firing, it may not have had significantly taller walls at the time it was burned. The timing of this burning event, in the late thirteenth century AD, aligned closely with the burned architectural layers in Unit B (B-RIII-a, B-RIII-c), as well as those excavated at neighboring sites.

Despite evidence for continual use, over the course of 200 years, these less intensive practices produced only 15 to 20 cm of cultural deposits. These layers contained lower densities but regular inclusion of distributed material culture, with small amounts of slag, iron wire, a quartzite nodule, and a diverse set of pottery, including a possible beer brewer, small serving vessels, larger jars and lids, and evidence for tripod vessels. The faunal assemblage was likewise less dense and more distributed than in previous levels. Taxa identified include small bovid, cane rat, Gambian rat, micromammal rodent, chicken/guinea fowl, probable chicken eggshell, *Chambardia* sp., terrestrial mollusk, and small lizard. The high level of preservation and lack of carnivore damage was notable given the slow accumulation of deposits.

Mammalian fauna included a small bovid molar, ribs, and pelvis, as well as an unidentifiable long bone fragment of similar size, in addition to the burned unfused scapula of a Gambian rat, a radius of a cane rat, and two long bone fragments of large rodent-size mammals (one burned). Several elements from micromammal rodents were recovered, in addition to a much larger percentage of nonidentifiable mammalian remains than was usually recovered at Kirikongo. Several wing (radius, ulna) and leg (femur, tibiotarsus, tarsometatarsus) elements of chicken or guinea fowl were recovered, in addition to a couple of unidentifiable avian fragments. Probable chicken eggshell, terrestrial land snail shell, and *Chambardia* sp. bivalve were recovered, as were multiple parts of small lizard (fore- and hind limbs, ribs).

Unit C, Red III, Context b (C-RIII-b), Estimated Date Early Fourteenth Century AD

The gradual buildup of deposits during C-RIII-a ended in the fourteenth century, and it was possible to isolate the last layer of material culture and faunal remains. The limited array in C-RIII-b may provide insight into individual events or short-term processes that comprise C-RIII-a.

Material culture included an irregular fragment of iron, upper and lower grinding stones, and a small broken bowl. Faunal remains comprised small bovid, Gambian rat, chicken/guinea fowl, and softshell turtle. The small bovid bones included a vertebra and rib fragments, the former burned from grilling, along with a few nonidentifiable long bone fragments. Another radius of a Gambian rat was recovered, in addition to numerous nonidentifiable mammal bone fragments. A humerus, ulna, and femur with cut marks from chicken or guinea fowl were identified, once again with both wing and leg bones. Lastly, the carapace fragment of a softshell turtle was burned.

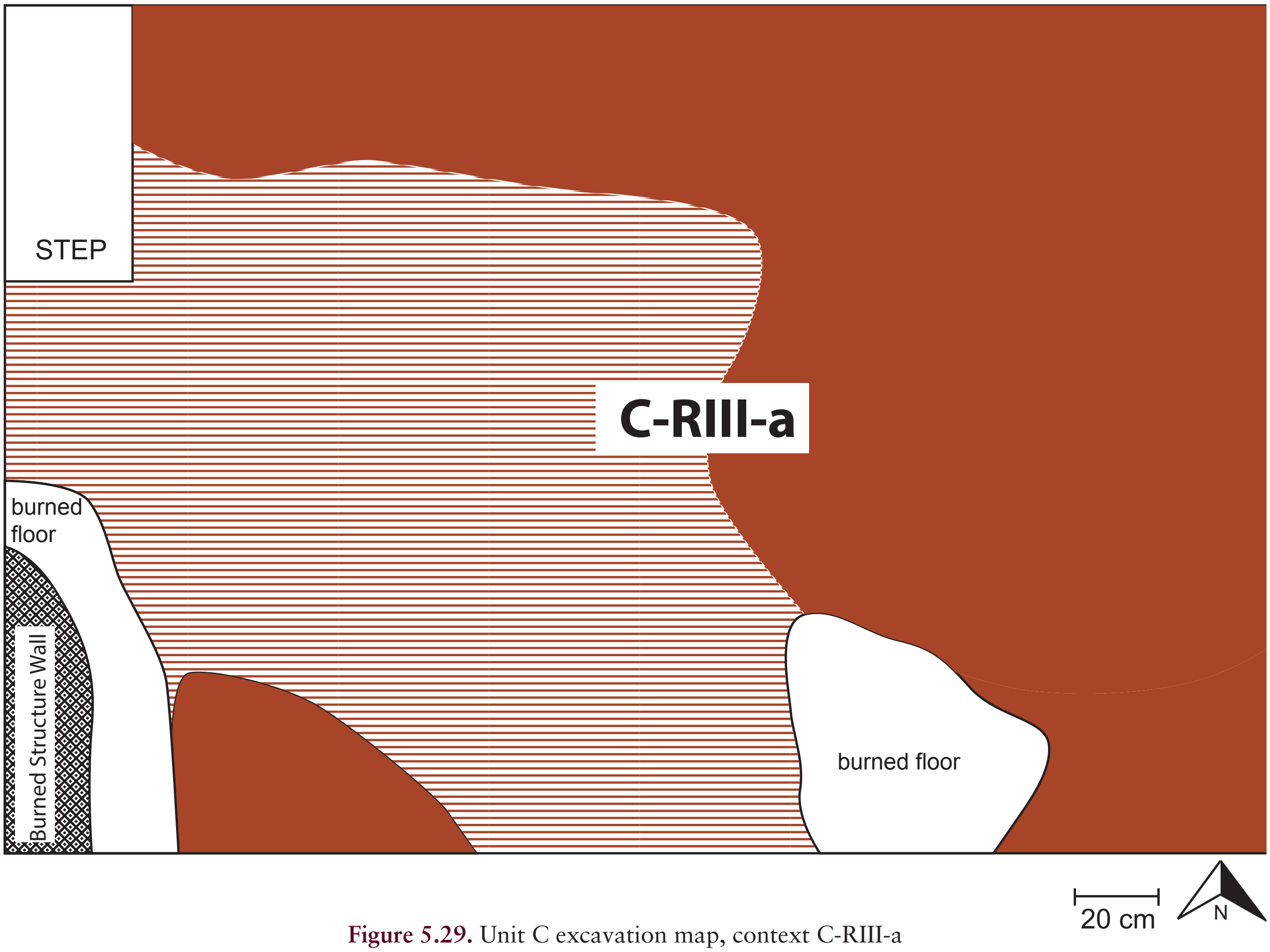

Figure 5.29. Unit C excavation map, context C-RIII-a

Unit C, Red IV, Context a (C-RIV-a), Estimated Date Early Fifteenth Century AD

The excavated area of Mound 3 did not have any accumulation of cultural deposits from the late fourteenth century through the early fifteenth century AD. By the mid- to late fifteenth century AD (Red IV), the excavated space had become an industrial activity area focused on large-scale production of leather. The main feature was the remains of 17 complete jars with technological characteristics (wide mouth, moderate depth) for soaking skins during tanning (see Dueppen and Gallagher 2016) (Figure 5.30). This installation, excavated just below the surface of the mound, spread over the entire unit and likely extended beyond the area excavated. Tanning is a pungent process, and Mound 3 was located on the western side of the settlement, where winds would carry smells away from residences. Other material culture found in the unit included a small bowl, some ground-stone implements, a small iron dart with square cross section, iron wire, and an iron hook. The faunal assemblage was composed entirely of mammals and included remains of hartebeest, kob, and small bovids. A hartebeest tarsal as well as a likely hartebeest carpal and appendicular fragment were recovered, as was the femur of a kob with cut marks and hind leg elements from a small bovid. These may have been parts that arrived with the skins at the unit for processing.

Unit C Overview

The contextual analysis combining architecture, material culture, and faunal remains was more challenging for Unit C, given the complexities of the stratigraphy. However, there was strong evidence that, as in other units, fauna was primarily interred as part of discrete events and highly structured deposits. Despite the impacts of the burial pits cutting through and in places mixing deposits, the faunal assemblages were well preserved, with no rodent damage

Figure 5.30. Unit C showing C-RIV-a

identified and only two bones with minor carnivore damage. This area of Mound 3 was in continual use from ca. AD 700 to 1350, with a short hiatus before a final period of use in the mid- to late fifteenth century AD. Three basic formation processes were identified: one from late Yellow II to mid-Red II, another from mid-Red II to late Red III, and the short reoccupation in mid-Red IV.

The early deposits at Mound 3 were mortuary features. The earliest identified feature in Yellow II was an adult burial with two adjacent pits, one containing material culture and fauna and the other a broken pot (C-YII-a). In Red I, burials continued with at least three sequential structures (C-RI-a, C-RI-b, C-RI-c) over adult-size burial pits accompanied by deposits of fauna and material culture. These structures grew larger over time and appeared to be accompanied by increasingly elaborate deposits. In Red II, the program of structures and accumulations remained the same but the burials increased in number and shifted to infants, small children, and in one case an older child (C-RII-a). While it was difficult to distinguish individual accumulations, the distribution of fauna and material culture across the unit suggested fairly consistent practice between features. The last structure in C-RII-a was associated with an adult-size burial pit surrounded by diverse material culture and faunal remains. With cessation of new interments at Mound 3 in mid-Red II, activities in the excavated space shifted to frequent repaving interspersed with lower-density material culture and faunal remains. There is little evidence of the structures associated with these floors, although a small portion of a burned structure was identified (C-RIII-a). Lastly, following a gap in occupation of at least 50 to 75 years, the excavation area transitioned to use as a leather tanning workshop, with at least 17 soaking vessels found largely intact directly below the mound surface.

The fauna in these depositions patterned internally in ways that indicate repeated intentionality of process. A fundamental component of the deposits is a core of domestic animals and aquatic taxa that resulted in a roughly comparable baseline diversity score for all deposits regardless of the assemblage size and diversity of wild resources incorporated. Deposits tended to follow a formula, with domestic animals (bovids and fowl) well represented and frequently roasted; diverse aquatic resources suggestive of late rainy season or early dry season fishing in the Mouhoun River; and small to medium-size wild animals, including carnivores that may not have been eaten. Cattle were slaughtered young or at prime age, and while they were generally represented from parts throughout the body, hind limb appendicular elements were notably absent. Like cattle, sheep or goats were killed at prime age or even younger, with small parts from different sections of the body and heavier representation of forelimbs. However, the remains of much of the appendicular skeleton and most of the axial carcass (ribs, vertebrae) were deposited elsewhere. The same is true in domestic fowl, where the axial skeleton was highly underrepresented while wings and legs were more common; there is also evidence throughout for egg sacrifice. There was a tendency toward forelimb elements of wild medium-size bovids as well, and cranial components of some wild animals were common. Throughout the deposit, carpals and tarsals of small to medium-size bovids and smaller mammals, and crania, vertebrae, and torsos of birds were absent, as were dogs; not a single canid element was identified in Unit C.

Temporal patterning was identified within this generalized program. In the first part of the sequence, accumulations tended to be composed of domestic animals (including chickens) with regular wild mammals, fowl, bivalves, fish, reptiles, and amphibians. Given the regular sacrifice of cattle accompanied by diverse domestic animals and wild resources, these represent events involving large amounts of meat. The occurrence of forest francolins and forest duikers in C-YII-a, and the latter in C-RI-c, may indicate that the local region was particularly humid in the late first millennium AD. After active interments ceased in Red III, there was a repeated but reduced set of accumulated fauna, with domestic sheep or goat, domestic fowl (including eggshell), and a continuation of shallow-water aquatic taxa, although deeper-water fish were no longer present. The fauna from the leather tanning installation is likely activity waste rather than an intentional accumulation. It contained only bovid elements commonly removed with the animal skin.

Fauna was not recovered in isolation, and all contexts with accumulations of faunal remains also contained diverse material culture that due to patterning in diversity and condition (treatment) substantiates an argument for intentionality in assemblage construction and purposeful associations between classes of archaeological materials. The intentionality of ceramic inclusions is suggested by nonrandom patterns in ceramics, as all deposits from late Red I to Red II contained fragments of a small ornate vessel class, while other vessel classes, such as tripod vessels, seem to have been age-related in deposition, as none were found among the mostly infant and small child burial monuments. As with other units, vessels were fragmented and mostly incomplete, with the exception of the leather production activity area and the half vessel in the C-YII-a pit.

While ceramics were found throughout the unit, there were some spatial patterns in the other materials. Unit C contained the largest assemblage of cowries at Kirikongo, all found in C-RII-a in multiple monuments. All had their backs removed. While it is difficult to be certain given the complexities of these deposits, it is very likely that no other material culture beyond the ceramics and cowries occurred in association with the monuments related to children. In contrast, the other material classes were recovered with either insecure contexts or in clear association with likely adult burial monuments.

Fragments of ground-stone implements and iron were most common, with slag and broken stone beads occasionally present but rare. While not common, a few objects were found intact at Mound 3, including a microlithic crescent in C-YII-a, a basalt axe in C-RI-c, and a polished quartz nodule from C-RIII-a. These were likely either nonlocally produced or fairly unmodified natural objects that may have been classified differently in the way they were incorporated into the deposits.

Unit C contained no clear evidence for residential activity, and mortuary features appear to have been constructed as part of funerary rites. Fauna was preserved in part, since it was included in either discrete pits or as part of deposits surrounding the burials, sealed on top by architecture. Monuments were likely short-walled if the burning pattern in the destroyed example from Red III is typical, but a similarity of process is invoked in this unit where only the foundations of walls were left intact upon the use of the area for new structures. Whereas in Units A and B, accumulations were linked in many cases with occupied structures (some of which transitioned to use as burial monuments), here accumulations were tied to architectural construction and deconstruction processes related exclusively to burial monuments.

Unit E (Mound 11)

Mound 11 is located on the northern edge of Kirikongo and is separated from the main cluster by at least 150 m. The preserved area of the mound today is between 0.32 and 0.5 ha (depending upon inclusion of the talus slope). A 2 x 2 m excavation unit was placed at the eastern summit of Mound 11. The size of the unit was reduced with increasing depth. In particular, it was cut at 1 m to a 1 x 2 m excavation; that diminished to 0.75 x 1 m by the time it reached sterile yellow clay at 3.15 m. The total excavated volume was 6.4 m^3, and 64 separate stratigraphic units were recognized during excavation. Based upon material culture and four AMS dates for the unit, the earliest deposits likely date to the mid-sixth century, with the excavated area ultimately abandoned in the mid-fourteenth century (ca. AD 1350), although there is evidence for continued occupation in the surface ceramics on other parts of the mound (Figure 5.31 and Table 5.4). Unlike other areas at Kirikongo, the use of Mound 11 was not continuous, with a long gap in use between the eighth and twelfth centuries AD, and upon reoccupation the mound may have grown spatially. Unit E has significant evidence for pyrotechnic activities, and many deposits were hardened by continual burning events.

Unit E, Yellow II, Context a (E-YII-a), Estimated Date Late Sixth Century AD

Mound 11 was established atop a layer of pure yellow clay. The basal cultural deposits were composed of mixed ash and clay with occasional highly burned patches and dispersed iron ore nodules, over 4 kg of slag, and a fragmented tuyère. The base of a shea parching oven was directly atop the metallurgical deposit, complete with charcoal from burning and fragments of shea shell that fell from a circular chimney. This deposit was in some ways unique at Kirikongo, as despite evidence for intensive use, it contained no ground stone or metal and the ceramic assemblage was unusually sparse, including only a few early Yellow II jars, a water jar, and a few closed bowls. These ceramics closely resemble those produced at Mound 4 at this time, although they tend to be more conservative in form and decoration, perhaps related to the tasks for which they were used. The fauna and material culture were concentrated in the area underneath the shea parching oven with the mixed metallurgical production debris and may be related to this pyrotechnic activity. The faunal assemblage strongly resembles patterns seen at Mound 4, with diverse taxa, including cattle, sheep or goat, oribi, canid, cat, Gambian rat, chicken, chicken/guinea fowl, clariid catfish, tilapia, and *Chambardia* sp., identified.

Multiple elements were attributable to cattle, including an upper molar, a cranial fragment, and metacarpal and tibia fragments. The metacarpal was burned with cut marks, while the tibia had been chopped off right on the proximal shaft below the ridge. One of the several associated long bone fragments was burned. The upper premolar of an older adult sheep or goat was identified, along with the mandibular dentition, ribs, scapula, tibia, and first phalanx of a small bovid, similar in robusticity to domestic stock. The tibia was chopped in the same manner as the cattle element, suggesting a similar approach to dismemberment, and several of the 11 long bone fragments were burned. Wild bovids were represented solely by an oribi horn core with an attached orbital fragment. A radius, femur, tibia, and two metapodial fragments from a dog-size canid were identified, as was an intact mandible of a wild/domestic cat with a probable cat cranial fragment. A burned radius and a metatarsal of a Gambian rat were recovered, as well as two ribs, one burned, and an appendicular fragment of small mammal. A relatively large number of nonidentifiable mammalian bone fragments were found in the deposit, likely related to the high frequency of crania in the assemblage.

A chicken carpometacarpus from this deposit is one of the oldest positively identified chickens in sub-Saharan Africa outside of Ethiopia. It substantiates the likelihood that the probable chicken bones and eggshell from the second century AD and earlier undated levels are the oldest

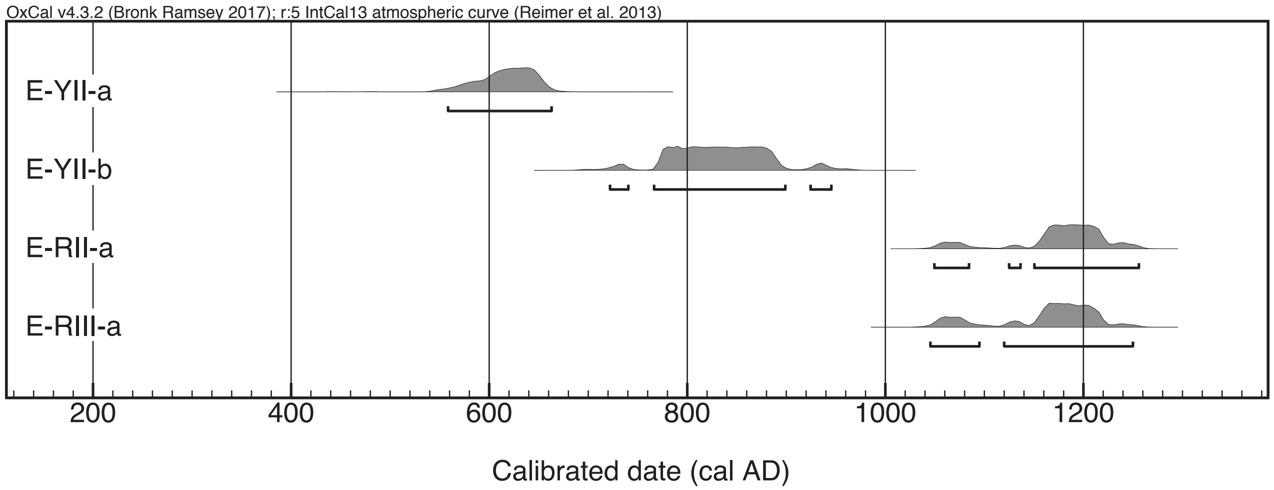

Figure 5.31. Unit E calibrated AMS dates (two sigma range)

evidence in the region. In addition, other wing (carpometacarpus, radius) and leg (femur) elements attributable to chicken or guinea fowl were recovered. Identifications also included aquatic resources from a shallow-water context, including one element each from a small clariid catfish and tilapia and a *Chambardia* sp. bivalve fragment.

Unit E, Yellow II, Context b (E-YII-b), Estimated Date Eighth Century AD

In late Yellow II, several pounded clay floors were built and hardened by fire, with the last floor a transitional Yellow Phase/Red Phase laterite pavement with 2 m–diameter coursed earthen walls on the final surface (Figure 5.32). Due to extensive burning that strongly resembled later confirmed kilns, this was likely an early pottery kiln structure, as the Yellow II/Red I transition was a period of major technological transformation in ceramic firing. As with previous pyrotechnic layers in Unit E, the contents of this level were minimal. In this case they derived almost entirely from a deposition underneath the structures. They comprised one fragment of curved iron wire and a low frequency of pottery that matched that used at both Mounds 3 and 4. A large fragment of a broken bowl was left atop the surface of the otherwise clean last layer within the probable kiln. A small faunal assemblage, primarily domestic, was recovered. It included goat, sheep or goat, small bovid, chicken/guinea fowl, probable chicken eggs, and *Chambardia sp.*

Premolars of a goat of advanced age were recovered, as was the femur of a sheep or goat and a burned metatarsal and rib of a small bovid. Two additional ribs of a medium-size bovid were recovered. However, these were small enough that they could be from a larger domestic sheep or goat individual. Several long bone fragments of an animal similar to a medium-large bovid may indicate the continued presence of cattle. A micromammal rodent bone was recovered, as were a few nonidentifiable mammal remains. The burned radius and three tibiotarsi of at least two individual chicken/guinea fowl were recovered, as was an avian long bone fragment. The eggshell fragments were likely from chicken. A single *Chambardia* shell fragment was the only evidence of aquatic resources.

Unit E, Red II, Context a (E-RII-a), Estimated Date Late Twelfth Century AD

Following E-YII-b, this area was then abandoned for almost 400 years before reoccupation in Red II. In late Red II, a burial was interred in the southeastern corner of the excavation unit and an adjacent pit containing material culture and faunal remains was dug 60 cm into the remains of the E-YII-b kiln. Directly atop these features, a new architectural complex that served as a potting workshop was constructed. The northern pit contained diverse material culture, including more than 1 kg of slag and ore; several fragments of broken iron objects (wire, rod, long shaft); sandstone fragments, including one from a grinding

Table 5.4. Fauna from Unit E contexts

Taxonomic Identification	E-YII-a	E-YII-b	E-RII-a	E-RIII-a	E-RIII-b	Total
Philantomba maxwelli						**0**
Cephalophus rufilatus						**0**
Very small bovid						**0**
Ovis aries				1	1	**2**
Capra hircus		2		1		**3**
Ovis/Capra	1	1	4	3	3	**12**
Sylvicapra grimmia						**0**
Ourebia ourebi	1					**1**
Sylvicapra/Ourebia						**0**
Fetal bovid						**0**
Small bovid	10	2	11	12	4	**39**
Small bovid LBF	11	2	8	3	1	**25**
Kobus kob						**0**
Redunca redunca						**0**
Tragelaphus scriptus						**0**
Tragelaphus spekii						**0**
Medium bovid		2	4	1	1	**8**
Medium bovid LBF				2		**2**
Bos taurus	1		1			**2**
Alcelaphus buselaphus						**0**
Medium-large bovid	3		1			**4**
Medium-large bovid LBF	2	3	2			**7**
Hippotragus equinus						**0**
Large bovid						**0**
Large bovid LBF						**0**
Equus caballus			1			**1**
Equus asinus						**0**
Canis familiaris						**0**
Canis adustus						**0**
Canis sp.	5		5			**10**
Medium carnivore			1			**1**
Medium carnivore LBF	1					**1**
Felis sylvestris	2					**2**
Leptailurus serval/Caracal caracal						**0**
Civettictis civetta						**0**
Mungos mungo						**0**
Atilax paludinosus/Ichneumia albicauda						**0**
Herpestes sanguinea						**0**
Small mongoose						**0**
Crocidura sp.						**0**
Hippopotamus amphibius						**0**
Phacochoerus africanus						**0**
Suid LBF						**0**
Erythrocebus patas						**0**
Chlorocebus sabaeus						**0**

Taxonomic Identification	E-YII-a	E-YII-b	E-RII-a	E-RIII-a	E-RIII-b	**Total**
Cricetomys gambianus	2		1	3	4	**10**
Thyronomys swinderianus						**0**
Lepus victoriae						**0**
Small mammal (large rodent size)	2		3	1		**6**
Small mammal LBF					1	**1**
Micromammal	1	1	7			**9**
Mammal (unidentified)	29	3	44	27	8	**111**
Gallus gallus	1					**1**
Numida meleagris						**0**
Francolinus sp.						**0**
Gallus/Numida	3	4	3	2		**12**
Gallus/Francolinus						**0**
Galliform						**0**
Galliform LBF	1	1	3	1		**6**
Plectropterus gambensis						**0**
Sarkidiornis melanotos						**0**
Avian (unidentified)				1		**1**
Avian eggshell (chicken)		3	16			**19**
Avian eggshell (non-chicken)				1		**1**
Tilapiini	1		1			**2**
Clarias sp.	1					**1**
Lates niloticus			1			**1**
Synodontis sp.				1		**1**
Heterotis niloticus						**0**
Bagrus sp.						**0**
Mormyrus sp.						**0**
Heterobranchus sp.						**0**
Gymnarchus niloticus						**0**
Auchenoglanis sp.						**0**
Protopterus annectens						**0**
Tilapiini/*Lates niloticus*						**0**
Siluridae						**0**
Fish (unidentified)						**0**
Chambardia sp.	4	1		4		**9**
Etheria elliptica						**0**
Bivalve	2		3	1		**6**
Terrestrial mollusks						**0**
Varanus sp.					2	**2**
Crocodylidae						**0**
Agama sp.						**0**
Order Anura						**0**
Pelusios castaneus					1	**1**
Cyclanorbis senegalensis						**0**
Small lizard			1			**1**
Total	**84**	**25**	**121**	**65**	**26**	**321**

tool; and, notably, a complete chipped quartz point. The faunal assemblage was extremely rich, containing horse, cattle, sheep/goat, canid, Gambian rat, micromammal rodents, chicken/guinea fowl, eggshell, lizard, Nile perch, and tilapia.

The pit contained the lower incisor of an adult individual horse of advanced age. A cattle molar also came from an individual of advanced age and was accompanied by a scapula fragment and long bone fragments from a cattle-size bovid. This was the only horse and the latest cattle remains identified at Kirikongo. Two sheep or goat individuals of different size were identified from upper dentition, a burned tibia, and a first phalanx, with at least one of prime age and one quite large spanning into the small-medium size class. Small and small-medium bovid remains were likely domestic due to robusticity and included cranial fragments, a humerus, ribs, tibia fragments (one with a chop mark from dismemberment), and long bone fragments.

Parts of the mandible, vertebrae and ribs, and radius, ulna, and metatarsal of a dog-size canid were identified, as were a metatarsal of a Gambian rat with cranial fragments and an ulna of probable Gambian rat. Micromammal rodent elements were recovered as well. A particularly large proportion of nonidentifiable mammalian bone fragments, two burned, one with cut marks, likely reflects the large number of small bovid cranial bones identified. The sternum, coracoid, and tarsometatarsus (burned) of a chicken or guinea fowl were identified, as were several avian long bone fragments and probable domestic chicken eggshell fragments. The deposit also contained the pelvis of a small lizard and aquatic taxa, including a burned dorsal spine of a small Nile perch and a smoked cranial fragment of tilapia.

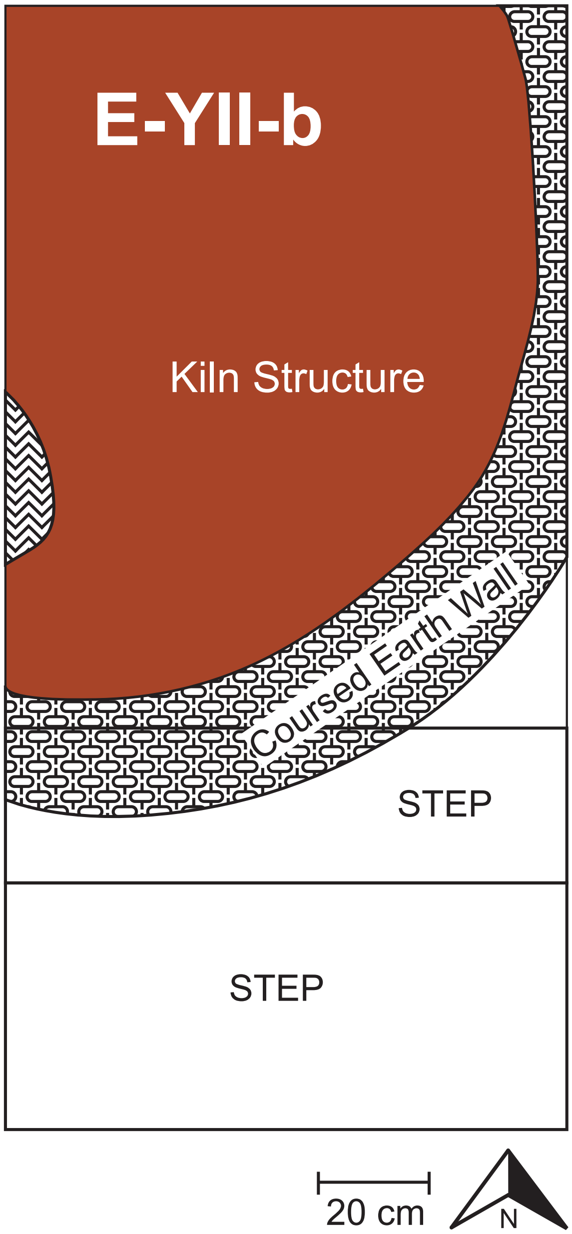

Figure 5.32. Unit E excavation map, context E-YII-b

Unit E, Red III, Context a (E-RIII-a), Estimated Date Thirteenth Century AD

In late Red II/early Red III, the excavation space became a pottery production area. A 1 m–diameter potting kiln made of earthen brick with laterite pavement was built directly over the burial pit from Red II (Figure 5.33). The kiln was in use for some time, as indicated by 15 to 20 sequential floors, each separated by 1 cm ash layers (Figure 5.34). Its walls still stood 60 cm tall. Like the floors, they were hardened by the firing events. A 2 m–diameter structure, likely used as a potting workshop, was constructed directly to the north of the kiln. Both structures were abandoned by mid-Red III.

Following the abandonment of the workshop, a space was prepared, damaging the north side of the kiln, and an assemblage of faunal remains and materials, many evoking ceramic production, was deposited. This assemblage was capped by two vessels, a medium-size jar and a small, well-decorated pot, both placed upside down (Figure 5.35). The

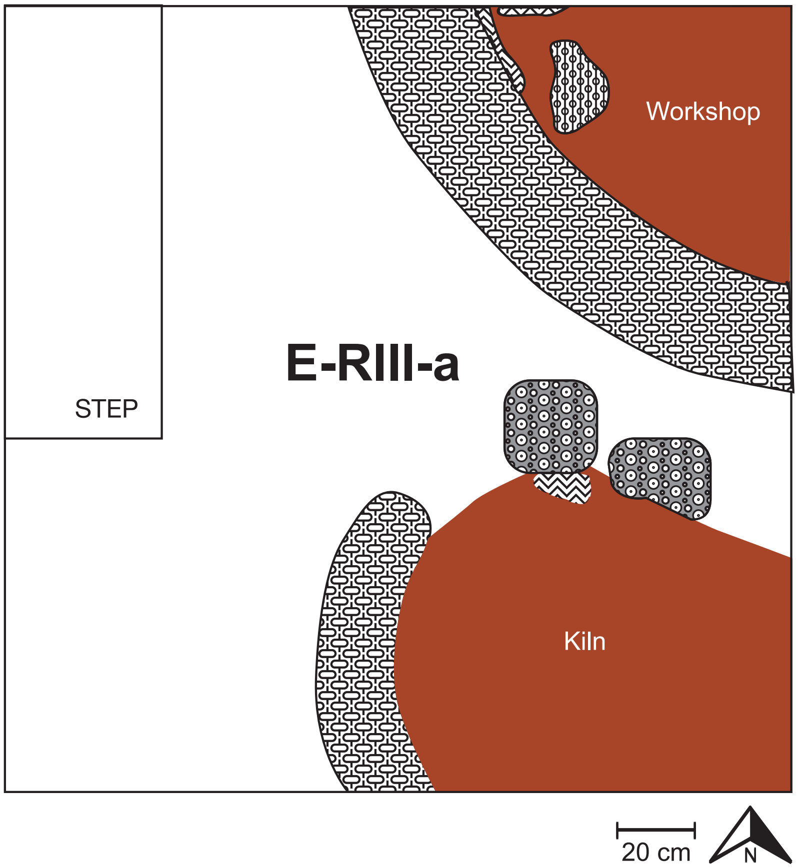

Figure 5.33. Unit E excavation map, context E-RIII-a

matrix of this deposit contained high quantities of grog, and among the finds were a fragment of a round large sherd with smoothed edges (used as a base and slow wheel for the punch and draw pottery formation technique), an ocher crayon with a wide rounded edge from production of red slip, a smoothed quartz pebble (possibly for smoothing pot surfaces), and a large, 5 kg block of chert, likely used for starting fires. Ground-stone fragments, 0.5 kg of slag, several broken iron tools, and pottery, including a broken small jar and a tripod vessel fragment, were also found. The faunal assemblage comprised sheep, goat, small bovid, Gambian rat, chicken/guinea fowl, eggshell, *Synodontis* sp., and *Chambardia* sp.

The goat was a prime-age individual of very large size (on the cusp of medium bovid), based on its first phalanx. Larger (humerus and two long bone fragments, one burned) and younger sheep/goat elements (two unfused calcanei, a premolar fragment) may have been associated with this individual. In contrast, the sheep was a smaller individual with extensive wear on a lower molar, indicating that it was older. A third incisor with extensive wear and a humerus and radius were likely from the sheep as well. The remaining small bovid elements, including three cranial elements, several ribs, a cervical vertebra, and several long bone fragments, could belong to either. The only wild mammal in the deposit was the Gambian rat, identified by a scapula, ribs, pelvis, and notably the tail. There was a relatively large number of nonidentifiable mammal bone fragments as well.

Avian remains included the humerus and tarsometatarsus of chicken or guinea fowl and two additional avian fragments, one from a long bone. Avian eggshell in the thickness range of guinea fowl or francolin was recovered. Lastly, a visit to the margins of the main river channel is suggested by the recovery of several *Chambardia* sp. shell fragments and a medium-size *Synodontis* sp. dorsal spine.

Figure 5.34. Unit E south profile showing context E-RIII-a kiln. Note the many thin laterite pavement levels, with kiln wall at right.

Unit E, Red III, Context b (E-RIII-b), Estimated Date Mid- to Late Fourteenth Century AD

The final preserved architectural level at Mound 11 consisted of two floors, one over the E-RIII-a kiln and one just to the north of the upside-down pots in E-RIII-a, as well as a new kiln constructed near the center-west profile. The kiln was used and refloored several times before abandonment in late Red III, likely during the mid- to late fourteenth century AD. Following the abandonment of the complex, a late Red III medium-size jar was laid upside down in the kiln, and material culture and faunal remains were deposited 1 m to the southeast in a shallow pit. Material culture from the deposit included a sandstone fragment, small amounts of slag, iron objects (a spoon-like tool with blunted edge, rods, wires), and a fragmented ceramic assemblage of small and medium-size jars and small bowls. The deposit notably lacked tripod fragments. Faunal remains were almost identical to E-RIII-a, with sheep, sheep/goat, small bovid, Gambian rat, mud turtle, and monitor lizard.

A sheep with extensive wear on a lower molar, indicating an older individual, was identified, as were an upper premolar and molar of a sheep or goat, also with extensive wear, with the molar burned as well. A premolar fragment of sheep or goat that may have had only minor wear and a burned radius from a larger individual may suggest that, as in E-RIII-a, two individual animals of different age and size were present. In addition, two cranial fragments, a tibia, and a long bone fragment of small bovid were recovered. The Gambian rat was identified from a femur, three caudal vertebrae, and a likely associated appendicular fragment of a small mammal. Several nonidentifiable mammalian bone fragments were also recovered. Hunting in a shallow-water habitat on the margins of a large water body was attested by the presence of burned mud turtle carapace fragments and two vertebrae from a very large monitor lizard.

Unit E, Red III, Topsoil (E-RIII-top)

After the events of E-RIII-b, there is no clear evidence for continued occupation of this section of Mound 11, with the exception of one possible floor in very poor condition 20 cm below the surface. In the Unit E topsoil levels, the sparse finds included highly fragmented eroded pottery sherds and two iron wire fragments; no fauna was recovered. Surface collections on Mound 11 identified later ceramics on the western half of the mound, and it is likely that occupation continued in that area.

Unit E Overview

The contextual analysis of architecture, material culture, and faunal remains reveals that fauna was primarily deposited in highly structured ways with other materials as the result of discrete events that resulted in well-preserved assemblages; there is no evidence for carnivore or rodent damage in this unit. The excavated area of the mound was active from ca. AD 550 to 700 and again between ca. AD 1150 and 1350, although it is possible that active use continued during the gap and afterward on other parts of the mound. Two basic formation processes were identified: one from Yellow II to very early Red I and another during the reoccupation from mid-Red II to late Red III.

The early sequence in Unit E was characterized by a series of diverse pyrotechnic activities, including iron smelting or, more likely, smithing (E-YII-a), shea parching, and

Figure 5.35. Intact pots from context E-RIII-a

pottery firing (E-YII-b). Although material culture was limited in diversity and quantity, fauna was found in association with the metallurgical and pottery activity areas, with the accumulation associated with the furnace/forge being particularly diverse. After a 400-year gap, this became a pottery production area built over a foundational burial (E-RII-a). The foundational burial for this reoccupation and the adjacent pit with material culture and fauna were excavated into the prior E-YII-b kiln; the new kiln was constructed directly over the burial in the same location. The pottery workshop was in active use and the kiln was fired frequently enough to necessitate multiple reflooring events. When the workshop was abandoned in mid-Red III, material culture (including pottery production tools) and fauna mixed with large quantities of grog were deposited into a prepared depression and capped with two pots. A second kiln was then constructed in a slightly different location. After a few repavings, the kiln and adjacent paved area were abandoned in the mid-fourteenth century. At this point, a whole jar was placed upside down in the abandoned kiln, and material culture and fauna were deposited in the paved area to the east, roughly following the same pattern as observed earlier.

The fauna in these depositions patterned internally in ways that indicate repeated intentionality of process. A fundamental component of the deposits is a core of domestic animals (bovids, fowl) and aquatic taxa, albeit in more limited numbers than observed in other units. This resulted in a roughly comparable baseline diversity score for all deposits regardless of the assemblage size and variety of wild resources incorporated. Deposits tended to follow a formula, with greater skeletal representation of domestic animal remains (bovids, fowl), presence of aquatic resources (fish and bivalve) collected at the end of the rainy season and in the early dry season, and scarce representation of small and medium-size hunted mammals. Small parts from different sections of bovids were found in most archaeological deposits; however, the remains of much of the appendicular skeleton and most of the axial carcass (ribs, vertebra) were deposited elsewhere. Similar patterns are found in domestic fowl, where the axial skeleton was highly underrepresented in comparison to wings and legs. Carpals and tarsals of small to medium-size bovids and smaller mammals, and the crania, vertebrae, and torsos of birds were not found.

Fauna at Mound 11 varied more between deposits and over time than in other units. Available evidence suggests that the cattle remains found with metallurgical deposits in E-YII-a and E-RII-a were from older individuals (particularly in the latter case). This also matches with the advanced age of the horse from E-RII-a. Horses were still very rare in West Africa in the twelfth century; this was the only horse identified at the site. The age of the sheep and goats varied between deposits. In E-YII-a and E-YII-b, the metallurgical deposit and the pottery firing area contained the remains of older individuals. The individual from E-RII-a was of prime age; E-RIII-a and E-RIII-b each included an older and a prime-age individual. Probable chicken eggshell was recovered in E-YII-a and E-RII-a, while possible domestic guinea fowl eggshell was present in the Red III deposits. The dog remains in E-YII-a varied from elsewhere at Kirikongo. While there were multiple dog postcranial elements, the deposit lacked the cranial and mandibular fragments most commonly recovered in other units.

Wild animals were comparatively rare in Unit E, and there was no evidence for the large-scale hunting common in Red III in other units. A potent part of an oribi, the horn core, was included in the E-YII-a accumulation associated with metallurgy, as was the complete mandible and possibly the cranium of a domestic or wild cat, an animal that is unlikely to have been consumed. The Gambian rat, on the other hand, appeared in most of the deposits at Mound 11, with the exception of E-YII-b, and it is notable that the tail (a potent part rarely found at Kirikongo) was present in both Red III deposits.

Fauna was not recovered in isolation, and all contexts with concentrations of faunal remains also contained material culture. While material culture assemblages were reduced in comparison to other units (particularly in the Yellow II deposits), the patterning in diversity and condition (treatment) substantiates an argument for intentionality in assemblage construction. Particular materials appeared to have been assembled throughout the sequence, including the assemblage of materials and tools associated with pottery production in E-RIII-a. Contexts contained limited numbers of fragments of diverse ceramic vessels that never constituted much of a vessel, and in several deposits there was a very high frequency of small consumption and possibly ritual-related highly decorated vessels that may constitute representative parts of ceramic vessels in the same way that faunal taxa were represented by certain, often identifiable, parts. Only in Red III were complete vessels identified, and these were purposefully overturned vessels in sequential abandoned kilns, likely as part of mortuary-related rituals (see chapter 7).

Associations between fauna, ceramics, and other material culture varied by level, with the lower pyrotechnic levels lacking ground stone and producing only a single iron fragment, in addition to lower ceramic densities. The Red II and III deposits more closely resemble those elsewhere at Kirikongo, with diverse ceramics including consumption vessels, ground-stone fragments, metal objects, occasional slag, and, in E-RII-a, a complete microlithic stone tool. Overall, the intentionality of accumulations is indicated by the taphonomy and internal patterning in the nature and condition of contents. However, at Unit E there is a wider range of processes and structure types related to industrial production. These created differences both within the unit and in comparison to other units in the nature of the accumulations.

Emplacement and Architectural Sacrifice

Contexts were spatially and stratigraphically discrete accumulations of offerings, most often associated with the remains of architectural constructions, deconstructed activity areas, or other features. Several different context types were identified within the built environment.

The first were discrete pits with fauna and material culture dug into existing deposits and, in the case of the earliest examples, extending into the lateritic basement. These frequently occurred in association with burials (distinct from the inhumation pits themselves) but were also dug into previously abandoned spaces and then used for foundational deposits placed immediately prior to new construction in areas that had been abandoned. Pits were most common in the early phases of occupation and occurred in Unit A in Yellow II and Red III; Unit B in Yellow II, Red III, and Red IV; Unit C in Yellow II; and Unit E in Yellow II and Red II.

The second were constructions where faunal remains and material culture were found in discrete concentrations (lenses and clusters) mixed with clay (and in a couple cases slag and iron ore) and capped by round structures with walls of coursed earth or earthen brick and thin (single-layer) floors of pounded clay or laterite pavement. These structures ranged in size from 50 cm to more than 2 m in diameter. (The C-RI-c structure truncated by C-RII-a burials may have reached 4 to 5 m in diameter.) Five to 15 cm of wall were generally preserved, and new structures were frequently layered over previous ones. It is unknown how tall the structures were, but in general walls for these contexts were not thick and sturdy. An example that burned down in Red III at Unit C (C-RIII-a) likely had low walls, as the 30 cm–tall standing walls were burned to the pavement. Many of these contained burials within the slightly mounded area under the monument. While excavations in early periods were sometimes in small spaces, multiple contexts resembled parts of the superimposed monuments found in later periods with broader exposures. These contexts appeared in Unit A in Yellow I and II; Unit B in Yellow I, Yellow II, and Red I; and Unit C in Yellow II, Red II, and Red III.

The third context type is deposits associated with much more substantial abandoned structures and courtyards that had thick pavements and replastered walls. These structures had standing wall foundations between 10 and 20 cm tall and had been leveled to this height prior to subsequent construction, with most of the remains from the upper structures removed (that is, the foundations were not filled with the amount of wall collapse or melt that would be expected from gradual decay or in place leveling) (Figure 5.36). While excavations often sampled only part of a given structure, most contained concentrations of fauna and material culture (either within or adjacent) and in some cases burial pits as well. Burials also occurred in courtyard locations with adjacent accumulations of materials and faunal remains. After deposition of materials and burials, a new structure was built above, sealing the deposits with minimal disturbance. These occurred in Unit A from Red I to Red IV and in Unit B from Red III to Red IV.

Industrial use areas also included ritual depositions associated with the leveling of previous architecture and new construction events. In Unit E, the lowest layers (E-YII-a) were related to metallurgical activities (a fragmented forge) that were sealed with a shea-parching oven; a foundational deposit also underlaid the early E-YII-b kiln in the same unit. In Red III, multiple kiln levels saw ritual practices similar to residential areas; walls of structures, in this case workshops and kilns, were leveled. Then the prepared space was filled with a concentration of fauna and material culture prior to paving and construction of another level. Given the likely duration of use of the first and second kiln complexes, abandonments of these spaces, like those of houses, may be related to the death of the potter, although no burials were identified in the excavated space in Red III.

The burned ritual complexes at Mound 4 (B-RI-b, B-RII-a, B-RIII-a, B-RIII-c) provide evidence of more daily ritual practices that produced faunal concentrations. The space in Room 3 next to an opening in the pavement contained stratified sacrificial offerings and broken material culture that strongly resembled accumulations elsewhere, although likely formed over a broader period of time. The higher concentrations of chickens may have been indicative of routine ritual practice. Truly abandoned spaces did not preserve much fauna at Kirikongo (for example, after E-YII-b, A-YII-d, and A-RII-a); nor, based on stratigraphic assessment in road cuts, were bones common in the midden deposits that formed the talus slopes of mounds.

As described in chapter 1, place and emplacement of shrines is a fundamental component of ritualized practice in the ethnohistoric region. Shrines, including ancestor shrines (often related to tombs) and other shrines associated with diverse divinities, tend to have accumulations of attached materials, often bones, blood, and feathers. Many places where fauna was preserved were associated with mortuary deposits, architecture, and/or ritual deposits (often in pits) prior to new construction. This

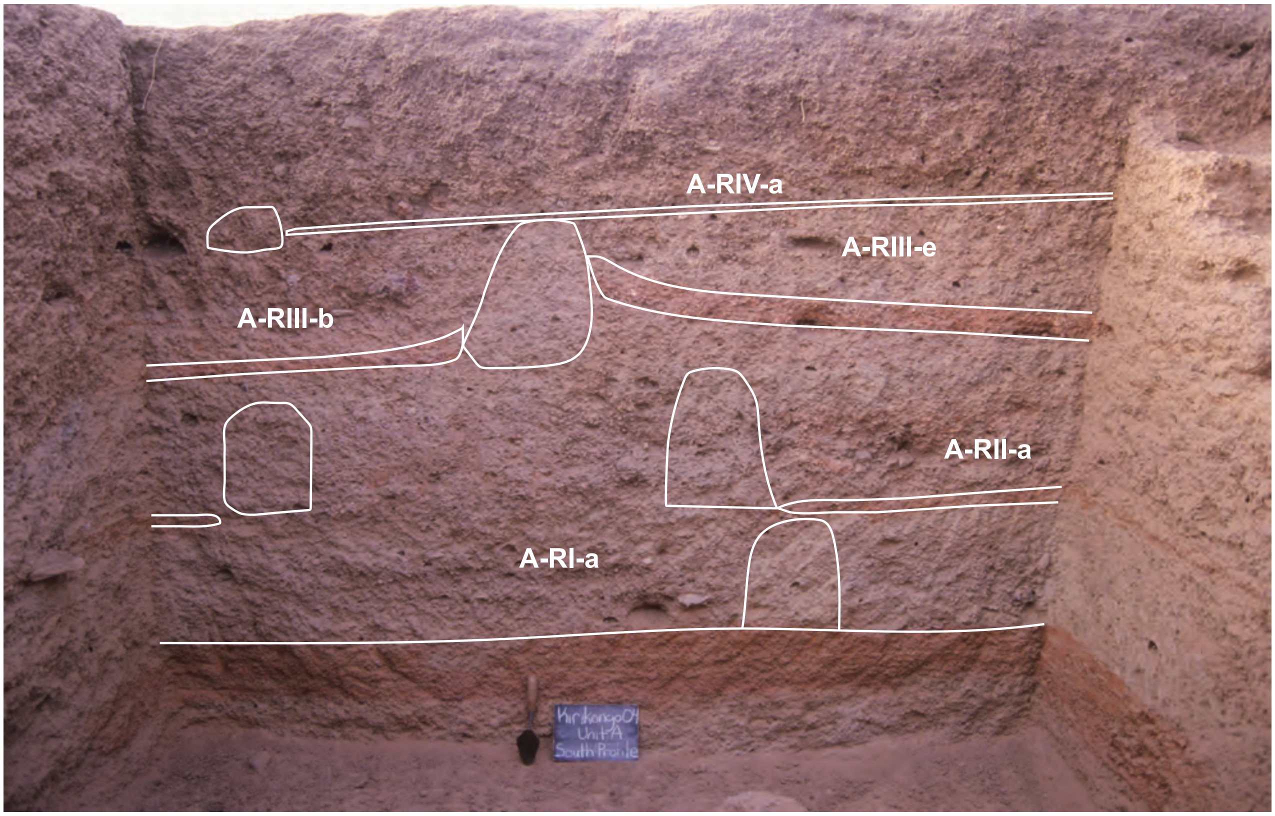

Figure 5.36. Unit A south profile showing architectural layering

patterned behavior involves connecting current building levels to previous ones by modifying and sealing ritualized deposits in architecture likely associated (through residential or industrial use) with an individual or social group. Abandoned spaces seemingly required depositions within the earth to sanctify the space for new construction. Most excavated deposits formed by construction of sequences of designated mortuary monuments or transfer of domestic spaces into mortuary architecture to then enable new construction above them. The former appear to have been constructed as low-walled houses atop mounded tombs that sealed ritualized accumulations. Active domestic spaces were converted to mortuary spaces upon abandonment by leveling, and ritualized accumulations were placed within prior to construction of new structures. Pits were found in association with or in likely association with mortuary monuments and as foundation deposits. They do not appear to have been dug into abandoned residential architecture except when a space was being reoccupied after long abandonment. The use of pits, houses, and sequences of tombs provided ancestral anchoring for construction and resulted in the buildup of large, spatially segregated mounds over time.

The complex well-stratified architecture (mortuary, industrial, and domestic turned mortuary) provided an anchor or emplacement for ritual practice and sanctified later structures. Following the logics of the ethnohistoric record, architecture, as described for material culture in chapter 7, can be conceptualized as sacrificed. It could be attached (to ancestors) through retention of a wall foundation, with associated materials and fauna that enable a foundation for one dimension of the soul, and detached through incomplete nature (mortuary monuments) or destruction (domestic spaces and industrial activity structures). Funerals and funerary rituals are fundamentally about simultaneously providing an anchor for the creation of ancestors who play an active role in causality and freeing other parts of the soul so the individual can enter into a new existence elsewhere. The need to keep systematic wall stubs as markers of a former house may have deeper roots in the region, perhaps going back several millennia to the Kintampo era, as discussed in chapter 8. The spatially segregated mounds at Kirikongo formed as a result of agentive destruction of architecture and activity areas at death leaving a remnant attached to the place. In addition, the construction of partial structures as funerary monuments invoking the same partial status likewise may have served as a base for an ancestor. These themselves may have been systematically leveled to smaller foundations over time (perhaps several generations later) as actively venerated monuments were devoted to people who were remembered. For example, eight successive monuments were constructed at Unit C during a roughly 450- to 500-year period, which averages to about three generations per monument, or ca. 60 years. Goody (1962) suggested that this was a common length for active veneration of a generation of ancestors in central West Africa ethnohistorically.

Deposition Types and Faunal Context

At Kirikongo, faunal remains were preserved in part due to the intentionality of deposition events that placed animal bones in discrete sealed contexts with other materials and ash (a process that may have affected the soil chemistry, further aiding preservation). Contexts that were exposed to different deposition types (soil acidity) or to the elements (leaching, carnivores, rodents) due to abandonment typically did not yield many faunal remains due to either preservation or cleaning of the space. For example, the short (likely several decades) abandonment of A-YII-d likely affected the preservation of bird bone in this deposit; very little bone was found in A-RII-a and E-YII-a.

The consistency of the cultural choices that resulted in excellent preservation parallels internal patterning in the assemblages themselves. Faunal assemblages in each context have a baseline diversity of animals (domestic livestock, fowl, aquatic taxa) and material culture represented, regardless of the assemblage size. Variations beyond the baseline also tended to pattern by deposition type and excavation unit (that is, social group) and are a key line of evidence for understanding the ancient community. As explored in chapters 6 and 7, these contexts were likely ritualized deposits similar to the accumulations of bones and material culture created by ethnohistoric practices (shrines, bundles, divination bags; see chapter 1). The ritual nature of the process explains the standardized use of particular taxa, the body parts consistently present and missing, the particular pieces of fragmented and complete material culture, and the locations in which these accumulations were placed. While diverse deposit types are represented in the excavated sample, many of these accumulations appear to be related to mortuary rituals of attachment and detachment in the making of ancestors, and they served a dual purpose as foundational ritualized deposits for new constructions. Consequently, they materialize the anchoring of social groups and help explain the spatially segregated tell formation at the site.

CHAPTER 6

DIVINE CONSUMPTION: FEASTS, SACRIFICE, AND SOCIETAL TRANSFORMATION

Using a relational analysis of fauna, material culture, and architecture, chapter 5 established that fauna was part of intentional ritualized accumulations primarily associated with mortuary rituals and with the construction and deconstruction of architectural units. Aside from the accumulation from long-lived daily practice in the ritual complex at Mound 4 (B-RIII-a), which preserved due to the burning of the complex, most accumulations likely reflected events or short-term processes in which materials and bones were quickly buried through insertion into the earth and/or being sealed under a new structure. The contexts in which these ritual accumulations occurred included the conversion of domestic spaces to mortuary spaces, specifically constructed mortuary monuments; deconstructed structures related to industrial activities; and foundation deposits prior to reoccupation of abandoned spaces (Table 6.1). Understanding these ritual processes provides insight into diverse aspects of society, including how and why the mounds at Kirikongo built up over time.

In this and subsequent chapters, I argue that mounds were vital spaces related to the making and maintenance of relations with house ancestors and that patterned ritual accumulations were connected to these histories. It was the beliefs in emplaced ancestors that likely influenced the long-term social anchoring of houses and the development of spatially segregated mounds over time. In this chapter, I use comparative analysis of fauna from different contexts to provide insights into the continuities, transformations, and variability in ritual processes of both particular houses and the community as a whole.

I begin with an exploration of the practices that led to a baseline level of diversity regardless of context, and from there I identify multiple patterns of practice beyond this standard correlated with particular social units and places at the site. In these analyses, it was possible to identify domestic animal taxa that were consistently sacrificed, domestic and wild animal taxa consumed in feasting events, animal taxa that were not consumed but whose parts were incorporated into deposits, animals for whom only

Table 6.1. Summary of Kirikongo contexts

Unit	Context	Description
Unit A	sterile	Laterite basement
Unit A	A-YI-a	Layer of mixed ash, fragmented material culture, and animal bones
Unit A	A-YII-a	Construction of a coursed earthen structure with associated ash, fragmented material culture, and animal bones
Unit A	A-YII-b	Pit excavated through earlier deposits into laterite basement. Contained diverse material culture, animal bone, and ash.
Unit A	A-YII-c	Thin, small pit to the north of A-YII-b. Contained ash and animal bone.
Unit A	A-YII-d	Several adult and one infant burial capped by a 2 m structure. Associated deposits include ash, animal bone, and fragmented material culture. Evidence for pyrotechnic activity in north of unit. After use as a mortuary area, briefly abandoned.
Unit A	A-RI-a	Thick laterite pavement over the entire unit. This context is the central courtyard area with shea oven. At abandonment, a burial pit for an adult was excavated through the courtyard, and an accumulation of fragmented material culture, ash, and animal bones deposited around the pit.
Unit A	A-RI-b	Thick laterite pavement over the entire unit. This context is the northwest structure that contained a grinding platform. An adult burial pit was placed in the center of the structure and surrounded by fragmented material culture (including two grinding implements), ash, and animal bones.
Unit A	A-RI-c	Thick laterite pavement over the entire unit. This context is the northeastern structure. After abandonment, deposit of fragmented material culture, ash, and animal bones.
Unit A	A-RII-a	Laterite pavement over the majority of the unit, with multiple structures, including one in center-north with bowl inset in floor, a larger structure with grinding platform and storage jars in the southwest, and a structure and connecting wall in the southeast. Deposit of fragmented material culture, animal bones, and ash, possibly associated with abandonment of a structure in southeast unit. After this deposit, excavation unit area abandoned. Terrace roofs and walls collapsed on interiors of northern and southwestern structures.
Unit A	A-RIII-a	After period of abandonment, space leveled. Foundation deposit dug into A-RII-a deposits that contained fragmented material culture, ash, and animal bones.
Unit A	A-RIII-b	Laterite pavement over east and south of unit with several structures. This context is the southern paved interior courtyard, with a post-abandonment burial pit and adjacent deposition of fragmented material culture, ash, and animal bones.
Unit A	A-RIII-c	Laterite pavement over east and south of unit with several structures. This context is the exterior unpaved courtyard, with a grinding installation and a post-abandonment deposition of fragmented material culture, animal bones, and extensive ash.
Unit A	A-RIII-d	Laterite pavement over east and south of unit with several structures. This context is the northeastern structure, with a post-abandonment deposition of animal bones and ash in the small excavated space.
Unit A	A-RIII-e	Southern structure. Contained no animal bone.
Unit A	A-RIII-f	Area behind west boundary wall. Contained no animal bone.
Unit A	A-RIV-a	Construction of two round structures with thin pavement. Horseshoe-shaped hearth containing burned seedpods in unpaved exterior courtyard. Abandoned after short occupation. Fragmented material culture, animal bones, and ash deposited in courtyard atop the hearth.
Unit A	A-RIV-b	Thin pavements possibly from several structures. No walls preserved. Upon abandonment after short occupation, a deposit of material culture, animal bones, and ash was placed near a courtyard infant burial.
Unit A	A-RIV-top	Excavation area abandoned in Red IV
Unit B	sterile	Laterite basement
Unit B	B-YI-a	Postholes into bedrock, atop which was a layer of ash, fragmented material culture, and animal bones
Unit B	B-YI-b	Pounded clay floor with ash and animal bones
Unit B	B-YI-c	Pounded clay floor with smashed jar, material culture, ash, and animal bones
Unit B	B-YI-d	Discrete ash pit through previous floors reaching the laterite base. Pit contained dense fragmented material culture and animal bones. Cap deposit contained additional animal bones, fragmented material culture, and ash.

Unit	Context	Description
Unit B	B-YII-a	Pounded clay floor over an infant burial. Ash with animal bone and material culture underneath the floor. Floor burned in places on top, likely from B-YII-a materials.
Unit B	B-YII-b	Likely burial pit surrounded by a ring of slag and iron ore with ash, material culture, and animal bones. Materials may have been deposited still hot. Capped by a coursed earthen structure with a pounded clay floor.
Unit B	B-RI-a	Burial pit surrounded by a ring of slag and iron ore with ash, material culture, and animal bones. Capped by an earthen brick structure with a pounded clay floor.
Unit B	B-RI-b	Construction of a fired brick architectural complex composed of at least three rooms and likely partially subterranean. This context is in the unpaved sacrificial area in Room 3 and contained ash, fragmented material culture, and animal bone.
Unit B	B-RII-a	Layer in the unpaved sacrificial area of Room 3. This context contained ash, fragmented material culture, and animal bones.
Unit B	B-RII-b	Large (potentially 40 m diameter) coursed earth compound wall with a laterite pavement interior located to the east of the ritual complex with a floor surface 1 m above the ritual complex floor. A small structure extended off the compound wall to the southwest, and the deposit within contained ash, fragmented material culture, and animal bones.
Unit B	B-RIII-a	Burning and destruction of the ritual complex. At the time of destruction, the southeastern Room 3 had an unpaved sacrificial area, the central multi-entrance (vestibule) Room 4 contained storage vessels and had a spring of sorghum hanging from the roof, and the southwestern Room 5 contained a clay granary. A second story above Room 5 collapsed into the structure during its destruction. Walls were still standing 70 to 80 cm in places.
Unit B	B-RIII-b	Deposit of fragmented material culture, animal bones, and ash, laid in the remains of the destroyed ritual complex. Likely took place shortly after the destruction of B-RIII-a. The deposit was particularly rich and contained the only glass and copper at the site.
Unit B	B-RIII-c	A new ritual structure with similar dimensions to Room 4 was constructed slightly offset to the east. It was destroyed by fire in the early fourteenth century AD, at which time it contained at least two jars and animal bone fragments.
Unit B	B-RIII-d	Deposit of fragmented material culture, ash, and animals bones laid in a small depression directly atop the remains of B-RIII-c.
Unit B	B-RIII-e	Several new structures constructed in Red III. This context was a concentration of ash, animal bones, and material culture deposited in a structure in the northeast after abandonment.
Unit B	B-RIII-f	Several new structures constructed in Red III. This context was a concentration of ash, animal bones, and material culture deposited in a southern structure and extending over the wall stubs to the adjacent grinding platform.
Unit B	B-RIV-a	After their abandonment, a burial pit was excavated through two structures at the eastern edge of the unit. A dense deposit of ash, fragmented material culture, and animal bones was deposited adjacent to the burial.
Unit B	B-RIV-b	After the abandonment of a structure at the western edge of the unit, a dense deposit of fragmented material culture, animals bones, and ash was deposited on top of the structure and adjacent courtyard.
Unit B	B-RIV-c	A large 2 m diameter, 80 cm deep pit excavated through the center of the unit. It was filled with a very large and rich deposit of ash, fragmented material culture, and animal bones. It was sealed quickly by a laterite pavement.
Unit B	Red V	A Red V architectural layer was the final deposit in the unit. It will be discussed in future publications.
Unit C	sterile	Laterite basement
Unit C	C-YII-a	An adult burial pit interred into laterite bedrock, with an adjacent pit to the east filled with a dense concentration of ash, animal bones, and material culture. To the north, half of a broken jar was interred in a separate pit.
Unit C	C-RI-a	A small, 50 cm–diameter structure with earthen-brick walls and laterite floor. The area surrounding the feature contained a deposit of ash, fragmented material culture, and animal bones.
Unit C	C-RI-b	A 2 m coursed earthen structure with a pounded clay floor was constructed atop an adult burial, with a pit bottom/hearth base located directly to the south. The deposit associated with the burial contained fragmented animal bone, ash, and material culture.
Unit C	C-RI-c	Series of ephemeral wall stubs and floors from structures of different sizes truncated by multiple adult-size burial pits, some extending through the C-RI-b monument. These were surrounded by fragmented material culture, animal bones, and ash.

Table 6.1. Summary of Kirikongo contexts *(continued)*

Unit	Context	Description
Unit C	C-RII-a	A series of four monuments with coursed earth walls and laterite pavements. The first three structures were associated with infant and small child burials, and a burial pit for an older child was dug into the westernmost structure. The last is associated with an adult-size burial pit. Underneath the monuments around burials were deposits of ash, animal bones, and fragmented material culture.
Unit C	C-RIII-a	The unit area was paved over multiple times with laterite pavements. There were no new interments. Several deposition events were identified on these floors, with fragmented material culture, animal bones, and ash. The edge of a small burned structure was found in the southeast.
Unit C	C-RIII-b	The area atop the final floors of the multiple repavings had depositions of fragmented animal bones, material culture, and ash.
Unit C	C-RIV-a	The excavation area was used as a leather-tanning facility, with at least 17 in situ pottery basins and occasional animal bones and metal objects. The pots were just below the unit surface.
Unit E	sterile	Pure yellow clay
Unit E	E-YII-a	Fragments of a forge, possibly in a pit with fragmented material culture, animal bones, and ash. Shea parching oven built over forge (contained no fauna).
Unit E	E-YII-b	Foundation deposit prior to construction of early pottery firing kiln contained material culture, ash, and animal bones. Kiln, transitional to Red I, had wall stubs left intact on later abandonment.
Unit E	E-RII-a	Foundation deposit for reoccupation of mound. Burial pit and pit with material culture, animal bones, and ash.
Unit E	E-RIII-a	Kiln with at least 15 repavings with associated pottery production workshop. Upon abandonment, workshop wall stubs and kiln walls partially destroyed. Deposit of material culture (including two overturned jars), animal bones, grog, and ash.
Unit E	E-RIII-b	Kiln with several repavings. Upon abandonment, wall stubs left in place along with a complete overturned jar in the kiln itself. Deposit of fragmented material culture, ash, and animal bones in a shallow pit directly to the south.
Unit E	E-RIII-top	Excavation area abandoned in Red III. Occupation continues on western part of Mound 11.

potent parts were present even though there is evidence that they were consumed, consistently missing parts that may have been used in talismans, animal taxa associated with particular social groups, and seasonal variability in depositions. These faunal patterns are correlated with the abandonment of particular structures and activity areas or with new constructions (mortuary monuments or new domestic or ritual spaces) that involved interment of fauna and particular accumulations of material culture. Fauna is therefore part of a historical dialogue between generations and reveals insights into the identities of and relations between houses at Kirikongo.

Fundamentals of Faunal Assemblages and Diversity in Practice

Assessment of the relative taxonomic diversity of varying contexts was a critical first step for understanding differences and similarities in the Kirikongo faunal assemblages. Like Linseele (2007), I controlled for variability in sample size by applying Cruz-Uribe's (1988) logarithmic diversity index measure to Kirikongo's 48 contexts in which fauna was found (Figure 6.1). Given the widely discussed complexity of quantifying richness between zooarchaeological assemblages (see overview in Gifford-Gonzalez 2018:487–97), I chose this approach due to the relatively low number of statistical assumptions involved. Results largely mirrored those produced by comparing number of taxa in a context, suggesting that greater diversity was not simply a result of increased sample size (Figure 6.2).

Almost all deposits had fairly similar diversity indices that represent approximately seven different taxa in a 20-fragment assemblage or, scaled logarithmically, 10 taxa in a context with 100 fragments. The consistency is related to the repeated presence in almost all assemblages of domestic goat or sheep, chicken, fish, and bivalve taxa, a pattern that speaks to the intentional nature of the decisions and practices involved in the creation of accumulations. Above the baseline diversity, some contexts contain additional

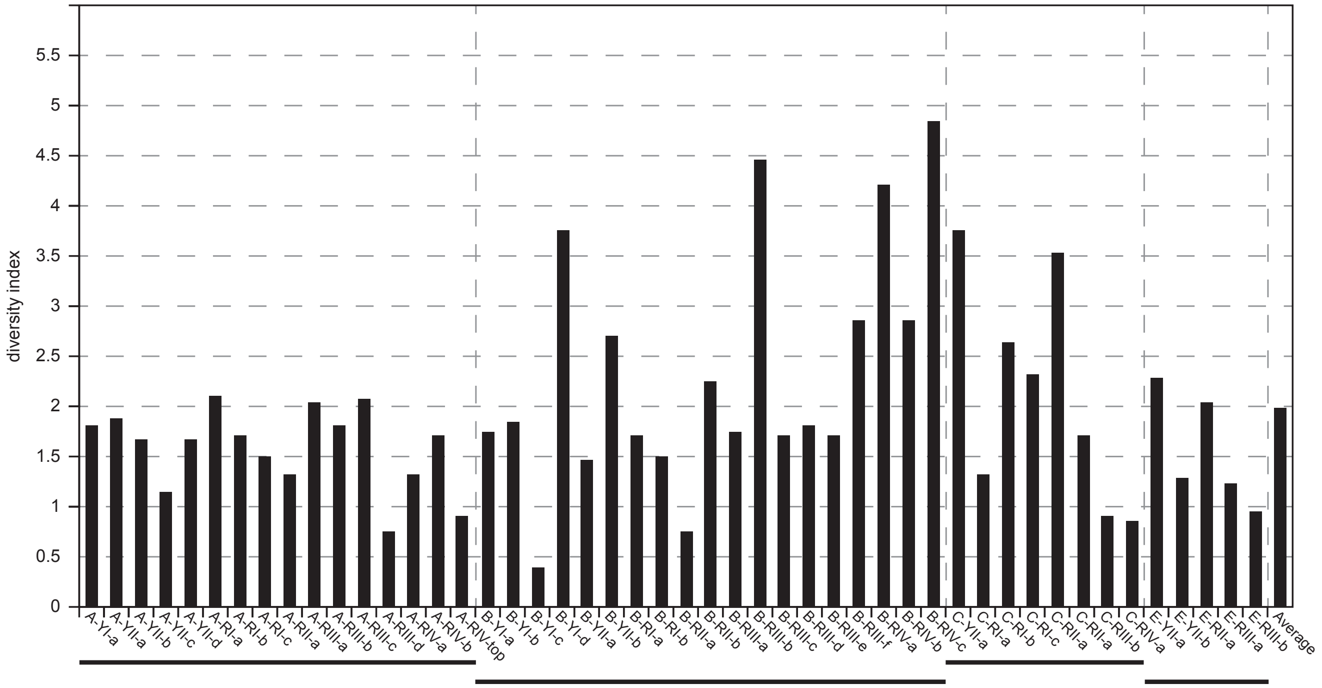

Figure 6.1. Diversity index by context

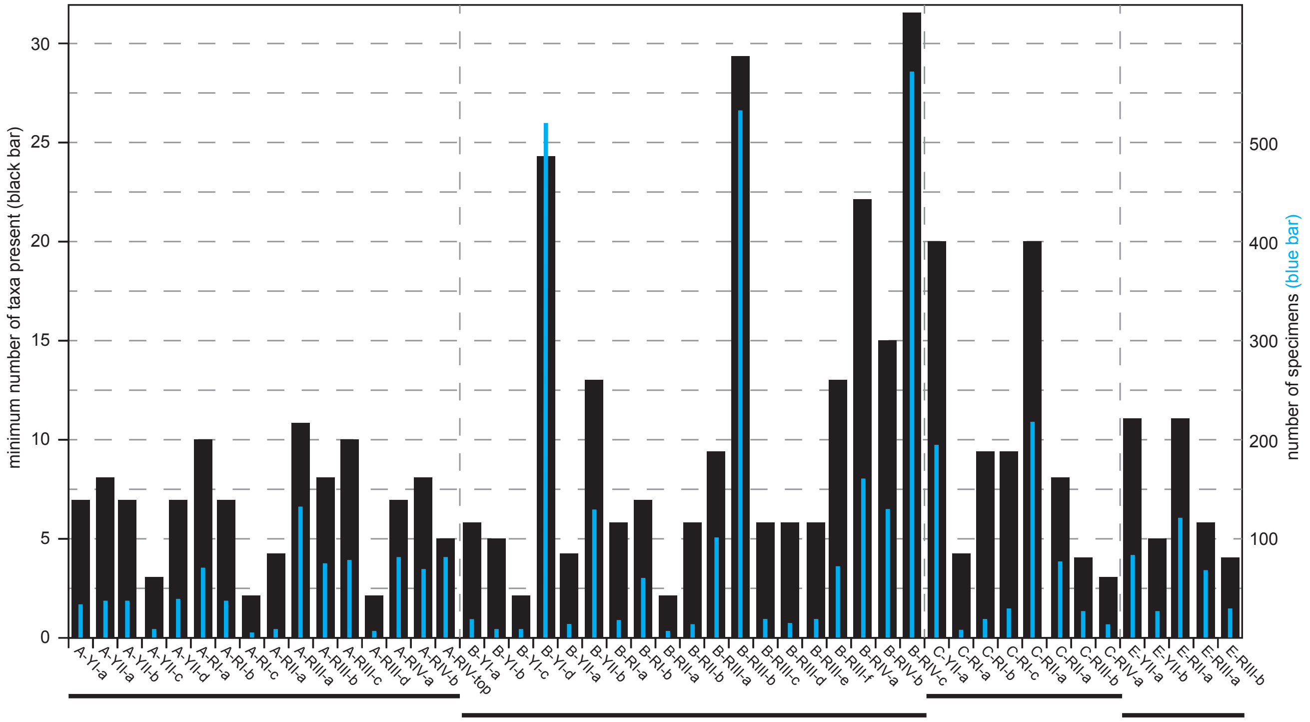

Figure 6.2. Number of taxa and number of fauna fragments by context

animals used in different ways than domesticates (number of parts, which parts, and so on). The most diverse context was B-RIV-c, a pit deposit that contained at least 32 different taxa (the log equivalent of 23 taxa per 100 fragments, more than twice the average diversity).

In general, Unit B had more diverse assemblages than Units A or E. Unit C had diversity indices similar to Unit B during its use as a mortuary locus for Mound 4 prior to Red III and lower diversity in later contexts. Deposit type influenced diversity measures as well. In Unit B contexts such as the B-RIII-a ritual complex, fauna derived from gradual accumulation of daily ritual practices was less diverse than in some deposits related to mortuary events. Similarly, the leather-working installation at Unit C (C-RIV-a) had low diversity, as did the deposit associated with a potting kiln at Unit E (E-YII-b). On the other hand, the incorporation of potent parts of wild animals among iron-working debris from the earliest layer of Unit E (E-YII-a) resulted in high taxonomic diversity in this context.

Units A and B both saw an increase in diversity after mid-Red II, although the increase was greater at Unit B. These patterns reflect fundamental changes in the nature of ritualized use of wild animals, with increased feasting debris from previously rare or nonexistent taxa commonly found in assemblages correlating with several other lines of evidence for increased communal activity at the site. Meanwhile, linked changes led to a lowering of diversity at Mound 3, with a shift from active creation of new funerary monuments to veneration of previous tombs. At Mound 11, a foundation deposit associated with reoccupation of the space in Red II (E-RII-a) was quite diverse due to the inclusion of parts of elderly prestigious animals that subsequently disappeared from the unit. However, following this deposit, the use of a very specific and reduced set of wild resources (E-RIII-a, E-RIII-b) by the pyrotechnic specialists at this mound led to a decrease in diversity.

Comparison of diversity indices calculated for individual deposits with those for excavation units as a whole provided insight into historical changes in diversity. Unit A had more consistency in practice through time and used a more limited set of taxa (at least 20) throughout its occupation. In Unit B, the higher level of diversity in individual assemblages was compounded by changes in practice over time; more than twice as many taxa (at least 48) were identified here as were identified in Unit A. The use of the logarithmic diversity index confirms that, even though the assemblage in Unit B was much larger, these differences are not based in sample size. The greater size and diversity of Unit B accumulations suggests larger amounts of labor involved in their creation.

As described in chapter 5, during analysis it was observed that the array of body parts occurring in contexts was consistently higher for some taxa than for others, providing clues into how and why different animals were present, including some that may not have been eaten. Comparing the number of identified elements to the number of contexts within which the taxon is present identifies multiple groups (Figure 6.3 and Figure 6.4). Given the systematic under-identification of domestic sheep and goats, wild small bovids, domestic chickens, wild/domestic guinea fowl, dogs, and jackals in the assemblage, diverse quantification methods are needed to provide a representative approximation of the relative ubiquities of the taxa (see discussions in chapter 4).

In Figures 6.3 and 6.4, the sheep and goat category includes contexts with both confirmed and probable sheep and goat remains. Specimen counts were quantified by dividing the overall small bovid size class elements proportionally by the ratio of confirmed domestic/wild small bovid identifications. Despite this, domestic sheep and goats are likely slightly underrepresented on the chart compared to wild small bovids, since prior to Red III individual contexts tended to contain relatively larger numbers of elements of domestic stock than of wild small bovids. For domestic chickens, contexts with and specimens from probable chicken bones in the *Gallus/Numida* size class prior to the first positive identification of guinea fowl in Red III were included in the chicken category. For Red III and IV contexts, specimen counts were quantified by dividing the *Gallus/Numida* size class elements proportionally by the ratio of confirmed identifications of the two taxa. Guinea fowl context numbers are likely underrepresented, as only two confirmed and one probable identification are known, despite the possibility that domestic individuals were being raised starting in Red III. Chickens are almost certainly underrepresented on the chart, since at least some of the *Gallus/Francolinus* size class bones are likely to be chickens. Dogs and Jackals were quantified following the

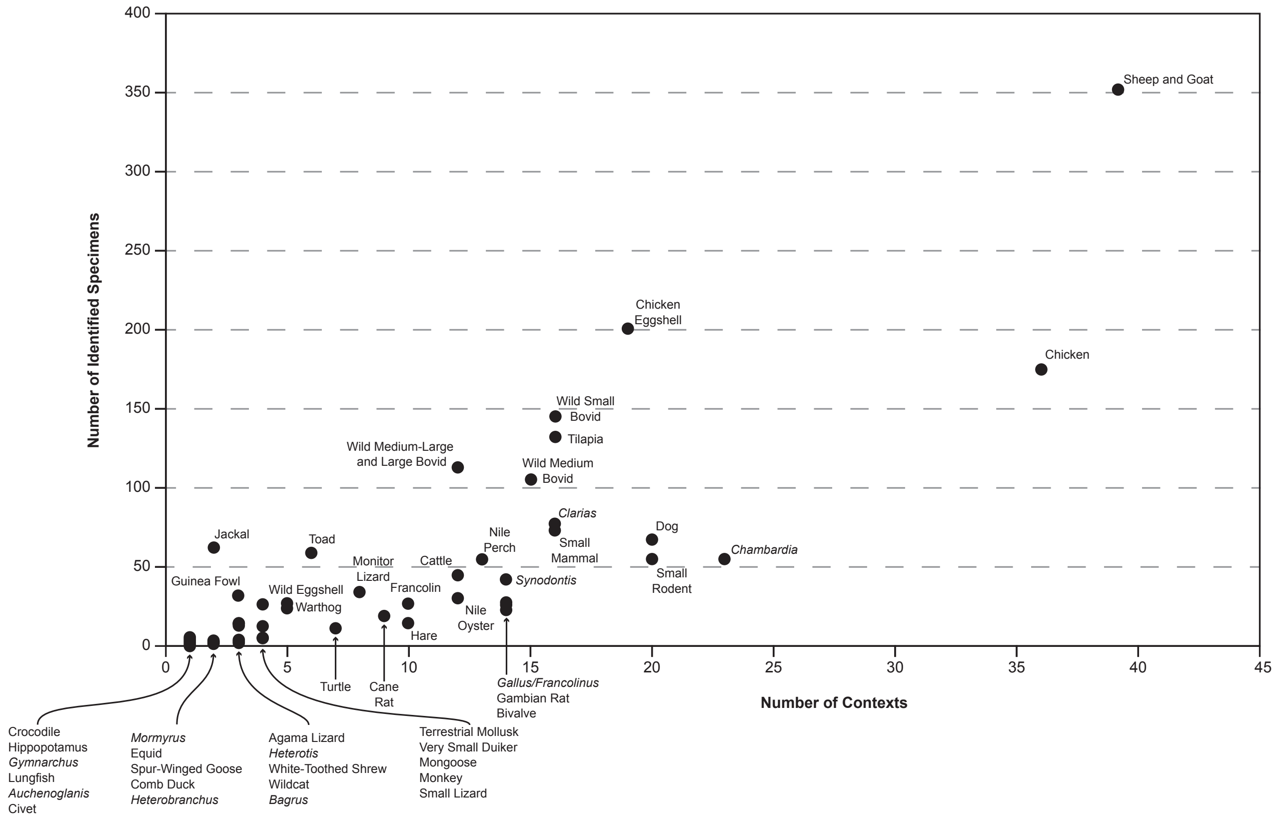

Figure 6.3. Ubiquity and total number of fragments by taxon

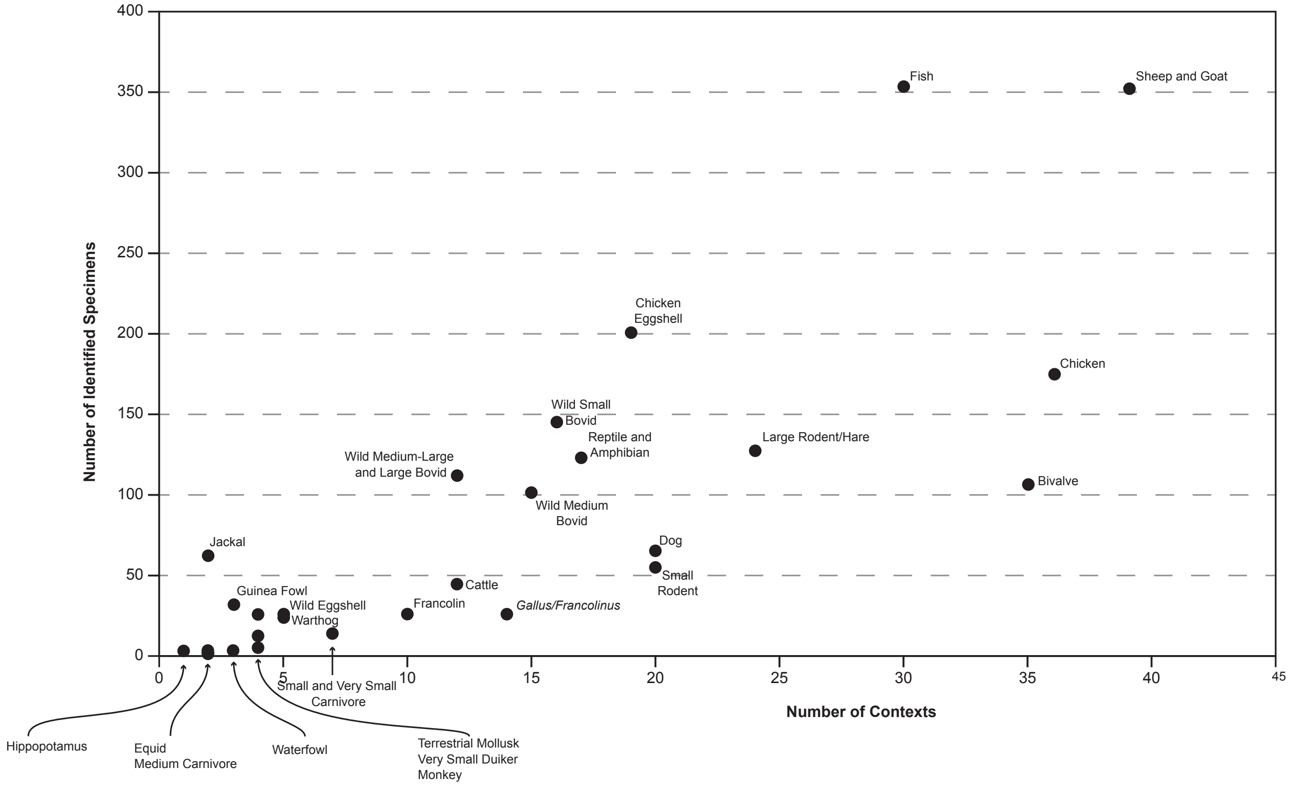

Figure 6.4. Ubiquity and total number of fragments with categorized taxa

methods described in chapter 4. Only the two contexts with the strongest evidence for jackals were attributed to jackal in the charts, although a few elements in contexts B-RIV-a and B-RIV-b could also be jackal. While the use of these quantification methods results in a more accurate representation of the scale of the differences in ubiquity and quantity, the same patterns discussed are present if only confirmed identifications are employed.

Among the taxa that are common in both number and distribution, goat, sheep, and chicken (skeletal) were the most ubiquitous. These were followed by wild small, medium, and large bovids; tilapia; and probable chicken eggshell. Many of the wild bovids are found in contexts where deposits contained clear feasting debris. Tilapia, where present, tended to have their heads, which contain large numbers of identifiable elements, included in the deposits, resulting in slightly higher numbers of identified bones. Some taxa were very uncommon, but when they occurred they were represented by large numbers of bones (Figure 6.5). For example, jackals only occurred in a few contexts, but in each of these a family group was recovered, with multiple elements from each individual.

Other taxa were common but typically represented by only a few elements or fragments within a context. For example, the two freshwater bivalves (*Chambardia* sp. and Nile oyster) were usually represented by one or a few fragments of shell. Many fish taxa were commonly represented in contexts by one easily identified element (for example, pectoral spine of clariid catfish, preopercular of *Heterotis niloticus*). This pattern is clear when compared to B-YI-d, a context that accounted for more than half of the fish remains from Kirikongo and contained a comparatively high number of unidentifiable ribs and small fragments. These unidentifiable bones tended to be missing entirely from other contexts, although larger fish taxa such as Nile perch and clariid catfish did tend to have a few more parts present per context. Fish as a category occurred in almost all contexts and, if clustered together, group with goat, sheep, and chickens (Figure 6.4). However, unlike those groups, the higher number of elements typically represented multiple individuals. Some of the large rodents and lagomorphs, wild fowl (francolins), and turtles were similarly widely present but often represented by at most a few, usually distinctive parts.

An interesting set including dogs, cattle, monitor lizards, warthogs, and non-chicken bird eggshell fell between these two extremes. In each case, there were some contexts where larger numbers of their bones were present and others where a single element was found. For monitor lizards, wild bird eggshell, and warthogs, this pattern

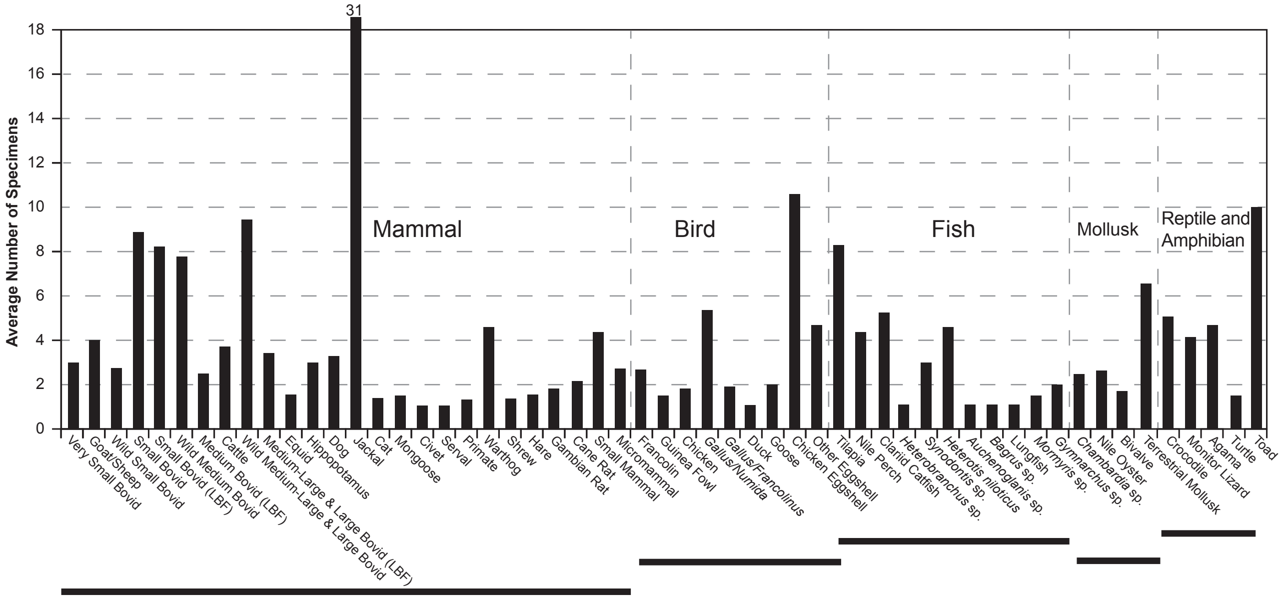

Figure 6.5. Average number of elements found in each context in which the taxon occurs

reflects changing uses over time, as early deposits contained at most a couple representative parts while later deposits had larger assemblages more representative of the body. For cattle, several deposits had simply a representative part (for example, the elderly cow at E-RII-a) while most had more substantive representation similar to the likely sacrificed chickens, sheep, and goats. In contrast, for dogs, most contexts included only part of a paw or the mandible (see below), while a few had a more representative body part distribution. Lastly, there were a large number of animals that were both uncommon and represented by a single or very few parts in an assemblage, such as cats, hippopotami, diverse fish (*Auchenoglanis* sp., *Bagrus* sp., *Heterobranchus* sp., *Gymnarchus* sp., *Mormyrus* sp., *Protopterus annectens*), and mongooses. Some of these animals may not have been consumed (small carnivores), and most patterned according to ecological preference, cultural associations, or context.

Cattle, Goats, and Sheep

Domestic sheep and goats were some of the most commonly identified taxa at Kirikongo, as they were consistently found in contexts in which multiple elements from throughout the body were recovered. Teeth were particularly common (especially during Red III and IV), along with mandibular fragments. Burning was frequent in most contexts on the upper limbs and non-cranial axial skeleton, and it sometimes extended to cranial elements and parts of the lower appendages. In these cases, animals may have been roasted whole prior to the consumption of some parts and distribution of others. Ribs, vertebrae (including the tail), tarsals, and carpals were nonexistent or extremely rare, as were phalanges and horns, indicating the removal of both meat-bearing parts and dense or highly culturally significant parts prior to deposition. Evidence of dismemberment was found on some elements, with the highest frequencies on the lower appendages. In general, hind limb elements were slightly overrepresented. However, this may in part reflect dismemberment strategies that resulted in identifiable parts of the tibia and/or that hind limbs are longer than forelimbs. Only forelimbs were present in both the burned ritual complex (B-RIII-a) and the infant/child mortuary features (C-RII-a), a pattern also consistently observed in cattle remains more generally at Unit C.

Since sheep and/or goats occur in almost all the contexts at Kirikongo, they co-occur with virtually all taxa from the site, including each other. Goats were present in multiple units from the start of the occupation, while sheep are confirmed for the first time in the late first millennium AD at Mound 1 (A-RI-a) and do not appear at Mounds 4 and 11 until Red III (B-RIII-b, E-RIII-a). While this may be due to the known difficulties of distinguishing sheep from goat remains, it is more likely, given the fairly uniform size and characteristics of sheep/goat bones from early Kirikongo, that this reflects an actual absence of sheep. Interestingly, this may be correlated with patterns in cattle keeping. Sheep and cattle are both grazers and compete for grasses, while goats are complementary with both, as their diets contain significant browse. Particularly in the wooded savanna environment indicated by the general faunal spectrum and the likely low levels of anthropogenic deforestation in the early sequence, it may be that grassland settings were less common, further incentivizing keeping livestock with diverse dietary habits. The first sheep occur at Mound 1 during a period in which this house did not have access to cattle, and sheep occur at Mound 4 only after the loss of cattle from the village more generally.

Based on their consistent presence and treatment, goats and later sheep and goats were likely important sacrificial animals at Kirikongo and can be viewed as a fundamental component of ritual and economic practice. One major temporal and contextual difference was in the age of animals at death, as most mortuary-related deposits from Yellow I to Red II contained either prime-age or younger individuals (in the case of the cemetery C-RII-a), with notable exceptions of the earliest layer with confirmed small stock at Unit B (B-YI-a) and the pyrotechnic complex at Unit E (E-YII-a), perhaps indicating that funerary contexts called for codified use of younger animals. Later contexts in Red III and IV tended to have a mix of young, prime-age, and older individuals. Ritual programs at this time may have been less codified, perhaps due to the presence of large amounts of hunted meat in these later assemblages. If these deposits associated with ritual activity (for example, funerary) represent the primary moments of meat consumption, it is possible that a significant proportion of annual sheep or goat slaughter occurred in these settings.

Cattle were commonly identified in the early levels at all mounds and are the only medium-large bovids identified at Kirikongo until Red III. However, they became restricted to contexts associated with the founding house (Mound 4) after Yellow II and disappeared entirely from the site in the mid-twelfth century AD. In many contexts, like sheep and goats, parts from several different regions of the body were identified, including frequent cranial elements. There is a strong and distinctive tendency for forelimb elements in many contexts, with hind limbs most commonly represented by the lower, non-meat-yielding parts of the appendages. In those cases, perhaps forelimbs were preferentially consumed by those who created the context (that is, the sacrificer), paralleling local ethnohistoric ethno-anatomy valuation systems that rank the forelimb highly (see Cremer 1924, 1927; Insoll 2010). Cattle were associated with funerary contexts, although the particular characteristics of those practices may have varied in the community. Mound 1 had cattle in almost all burial contexts in Yellow I and II, although the cattle tended to be older at death. An older cattle individual was also associated with the pyrotechnic iron metallurgical deposit at Mound 11 (E-YII-a). In contrast, at Mound 3, and possibly also at Mound 4 in B-YI-d, the cattle were prime age and even younger at the time of death. Typically, only one cattle individual was present in any given deposit, with the notable exception of C-YII-a, where two individual cattle were sacrificed. Starting in Red I and continuing into Red II, cattle were found only in deposits associated with the founding house (Mound 4), including widely distributed cattle parts throughout even the infant and child burial monuments at Mound 3 (C-RII-a) and a cattle-size rib in the ritual complex in early Red II layers (B-RII-a). In contrast, cattle were no longer present in the mortuary monuments for adults at Mound 1, despite having been previously a standard component of funerary ritual practices. The last cattle elements recovered at Kirikongo were from an older individual associated with the foundational burial deposit for the reoccupation of Mound 11 in mid-Red II (E-RII-a). Based upon multiple lines of evidence (ceramic production tradition, evidence for prior metallurgists, evidence of prior cattle), it is probable that the reoccupants of Mound 11 derived from the founding house. After this deposit, cattle disappeared completely from Kirikongo.

While it is uncertain which animal is represented, it is notable that a quadruped figurine with its head and legs broken off was deposited in the B-YI-d pit. Since most quadrupeds identified at the site at that point were cattle and goats, this figurine, the only one identified at Kirikongo, may have been a materialization of a sacrificed animal.

Domestic Chicken and Guinea Fowl

Like goats, chickens were frequent and ubiquitous at Kirikongo. Despite the overlap in size with local West African fowl taxa, given the positive identification of chicken bones from the sixth century AD, the lack of positive identification of guinea fowl until Red III, and the consistent patterns of usage in contexts throughout the sequence, it is probable that chickens were available, common, and culturally important from the start of Kirikongo's occupation. The presence of chickens is further supported by the eggshell data. The bulk of eggshell at Kirikongo was likely derived from a single population of birds. It had a thickness peak at around 0.3 mm, consistent with domestic chickens (see chapter 4, Figure 4.45). Possible chicken evidence is found in the very earliest levels (for which it has not yet been possible to get a date) and could in fact be present as early as the last centuries BC or first century AD.

Like sheep and goats, chickens tend to be represented by elements from multiple regions of the body (wing, legs, and pectoral girdle), with these parts often grilled, consumed, and then deposited in the context. In contrast, the pelvis, rib cage, vertebral column, and cranium were systematically removed and very rarely found. The dominant pattern with chickens is their ubiquity. They were clearly not restricted to a particular setting or house over time. Unlike chickens themselves, there was some patterning identified in the eggshell data. Some eggshells may have been broken prior to hatching, suggestive of egg sacrifice. There is evidence for likely egg sacrifice in Unit B deposits from B-YI-b to B-RIV-c. In contrast, at Mound 1 no potential egg sacrifice occurs until Red III, when it is found in only three successive contexts. It disappears in Red IV.

The contexts that contained confirmed guinea fowl dated to Red III (B-RIII-b) and Red IV (B-RIV-c) and included large numbers of galliform body parts, consistent with patterns in other sacrificed animals. However, even if the birds themselves were sacrificed, their eggs may not have been sacrificed, consistent with ethnohistoric practices that focus sacrifice on chicken eggs. For example, an eggshell thickness grouping between 0.54 and 0.59, consistent with contemporary guinea fowl eggs, appeared in the faunal record in Red IV (see discussion in chapter 4). One of the fragments from B-RIV-c had been hatched, which suggests that perhaps guinea fowl were being reared at Kirikongo by the second quarter of the second millennium AD.

Dogs

Dog mandibular, cranial, and metapodial fragments were consistently present in Kirikongo deposits. For example, at Unit A, dog heads and metapodia were identified in most layers. They included a dog head in pit A-YII-b, but no other body parts were found. The B-YI-d pit contained a mandible and lower dentition of two different individual dogs, which were the only confirmed non-fish cranial or mandibular remains on the interior of the pit. The crania and mandibles of other taxa occurred only in the cap deposit, suggesting that dogs had a different status. Dog parts other than the head and paw were found only in Unit B (B-YI-d, B-RI-a, B-RI-b, B-RIII-a) and Unit E (E-RII-a, E-YII-a). E-YII-a, the only potential iron-smelting/smithing location, was unique in that it contained a diverse set of postcranial dog elements but no head. At Mound 4, starting in Red III, there is evidence for hunting families of jackals (B-RIII-b, B-RIV-c). However, not all canid remains from Red III and IV are likely jackal, as the B-RIV-b deposit also included a confirmed dog mandible. It is possible that the incorporation of dog crania and postcrania into Mound 4 contexts continued into Red IV. Interestingly, the cemetery deposit entirely lacked domestic dog remains, as did the post–Red II layers at Mound 11. Dogs are therefore as common as but treated differently than other domestic animals. In the ethnohistoric record, dogs have a highly variable status in sacrifices due to a potency derived from being a "witness" to human lives (see chapter 1), and the Kirikongo archaeological record likewise supports a unique status.

Equids

The one identified donkey element dated to the late thirteenth century AD at Mound 1 (A-RIII-a), in a context associated with the construction of new architecture in a space that had been abandoned for more than a century. The metacarpal had been cracked for marrow and was part of a larger feast with diverse wild taxa. A horse tooth of an elderly individual was recovered in the mortuary deposit at Mound 11 in Red II (E-RII-a), which also marked the reoccupation of a temporarily abandoned space. The horse was in the same deposit as the last cattle elements recovered at the site, and the sacrifice of these two prestigious animals may have been linked to vestiges of the former status of iron-workers upon their removal to the north mound.

Game Hunting and Fowling

Wild small bovids (oribi, common duiker) were consistently present throughout the sequence, with very small bovids (forest duikers) present in late Yellow II/Red I (late first millennium AD) and late Red III/Red IV (late fourteenth to mid-fifteenth centuries AD) contexts. Forest duikers tend to be found in areas that today receive around 1,200 mm or more annual rainfall, and their occurrence may mark periods with higher rainfall levels. Prior to Red III, a limited array of elements tended to be recovered. They included horn cores and other cranial elements and lower appendage elements such as phalanges that would later occur infrequently. Common duikers and forest duikers were much more common in deposits at and associated with Mound 4 (Units B, C, E); no forest duikers and only one common duiker (A-YII-d) were identified in Unit A. Oribi were found at deposits at both Mounds 1 and 4, but after A-YII-d they were comparatively more popular at Mound 1, as they were the only wild small bovid identified there.

As part of a broader shift toward feasts centered on wild animals in Red III, the wild small bovid assemblages transformed as a broader array of elements from different parts of the body were recovered. While most elements became more common, horn cores and crania were absent aside from highly fragmented cranial remains, as were carpals and tarsals and, to a lesser extent, phalanges (third phalanges were nonexistent). Burning data suggest that at least some animals were roasted whole prior to dismemberment. In Red IV, the assemblage shifted again, with increased inclusion of lower appendages and evidence of skinning marks along with a continuation of evidence for feasting on wild taxa initiated in Red III. This shift was likely associated with use of the animals for leather production as well as consumption.

Wild medium-size bovids (reedbuck, kob, bushbuck, sitatunga) were very rare prior to Red III, with only a few instances of single forelimb elements at Unit C (C-YII-a, C-RII-a) and the tooth and ribs of a kob in Unit A (A-RI-b). In Red III, wild medium-size bovids became much more common and were represented by a wider array of body parts, with evidence for roasting animals whole, particularly at Mound 4. As with other wild bovids in Red III, no horns, few teeth and cranial fragments, and very few tarsals, carpals, and phalanges were recovered, although the back of a kob skull with the horns removed was found in A-RIII-a. Reedbucks and kobs consistently co-occurred in contexts from Mounds 4 and 1 from Red III to Red IV. The other two wild medium-size bovids in the assemblage, bushbuck and sitatunga, were found together in one context, B-RIII-f at Mound 4, along with at least one unidentified larger wild bovid. Bushbuck and sitatunga tend to inhabit forest and swamp as opposed to grassland, and since reedbuck and kob were absent from this assemblage, hunting may have taken place in a different location than usual. As with small bovids, evidence for skinning appeared in Red IV; a kob was one of the few animals identified in the leather-tanning installation at Mound 3 (C-RIV-a).

The only identified medium-large and large bovid taxon prior to Red III was domestic cattle. Starting in Red III, two wild taxa, the hartebeest (medium-large) and roan antelope (large) became common. Like small and medium-size wild bovids, the contexts in which these taxa appeared were large feasting deposits with evidence for roasting of large sections or complete animals, and a wide range of body parts was represented, suggesting that consumption likely took place nearby. In comparison to medium-size and small bovids, carpals, tarsals, and phalanges were more common, perhaps due to their generally large size precluding their use as talismans. While crania (horns, mandible, and skull) were usually systematically removed, in B-RIV-c an entire roan antelope upper tooth row and some mandibular dentition were deposited in the pit. Mound 1 contexts included only hartebeest/probable hartebeest remains throughout Red III and Red IV (including A-RIV-a, in which two individuals were identified), while in Unit B contexts, both hartebeest/probable hartebeest and roan antelope/probable roan antelope repeatedly co-occurred. A hartebeest was identified in the tanning installation at Mound 3 (C-RIV-a).

The side-striped jackal was identified both positively and through contextual analysis due to the presence of multiple ages of canid in the same deposit (that is, family groups) (see discussions in chapters 4, 5). Jackal was present in Unit B only in Red III and IV deposits with evidence for feasting on diverse wild game. As with the bovids, diverse parts of the skeleton were typically represented and crania were rare or absent, suggesting that they were systematically removed. A notable exception was a well preserved, positively identified jackal mandible from B-RIV-c that had the teeth pulled, leaving marks from removal. Warthogs were often found in contexts with jackals and were also hunted in family groupings with evidence for younger and older individuals in the same context. With the exception of a warthog tooth in C-RII-a, all warthog remains were from Red III and IV deposits in Unit B. A broad range of elements was present; many of them were roasted, suggesting feasting activities. However, there were some unique patterns, notably the relatively high frequency of cranial elements and an absence of hind limb elements in many of these contexts. Like the jackal from the same context, a warthog cranium from B-RIV-c had evidence for the purposeful removal of teeth, in this case ivory from a particularly large individual that may have been targeted for the size of its tusks. Forelimb elements of a hippopotamus were recovered from the same B-RIV-c deposit where the jackal and warthog had their teeth removed. It was perhaps also hunted for its ivory.

The Gambian rat was a particularly common animal at Kirikongo in Units B, C, and E; however, it was not found in Unit A. The larger cane rat was similarly frequent in Units B and C and absent in Units A and E. The scrub hare was identified in Units A, B, and C but not E. The taxa co-occur in a variety of contexts in Units B and C. Similar to other wild taxa, prior to Red II large rodents and lagomorphs were represented by fewer body parts and a larger frequency of cranial elements than in Red III and IV assemblages. However, likely due to their small size, which made division less important or feasible, this pattern was weaker than in bovids, and larger portions of these animals were found in deposits. Evidence for roasting was identified in both early and later deposits, although some contexts starting in Red III had particularly extensive burning. With the exception of calcanei, tarsals and carpals were absent, and while metapodials were present in some contexts, toes and claws were entirely missing. The Gambian rat may have had special status with iron-working associations, as it was common in all contexts where metallurgy or metallurgists were found, including the almost unique presence of rat tails in the Red III deposits at Mound 11 (E-RIII-a, E-RIII-b).

Fowling was focused on a targeted group of taxa comprising two waterfowl and two to three species of terrestrial fowl (depending on whether the identified guinea fowl were domesticated varieties). Francolins were commonly identified at Units B and C throughout the occupation, with possibly two taxa of francolins in both C-YII-a and B-RIV-c. Unit B yielded the only positive identifications of guinea fowl, whether wild or domestic. In contrast, francolins appeared for the first time at Unit A in Red III as part of a general diversification of hunted taxa. Waterfowl were found at both Units A and B in only a few contexts (A-RI-b, B-RIII-b, B-RIV-a). Eggshell yielded roughly similar results to skeletal elements, as two different thickness groupings correlated with contexts believed to have two francolin populations; a slightly thinner group correlated with guinea fowl, which may have been wild in early levels and perhaps domestic by Red III. Francolins were represented by more limited parts in the early sequence, with increasing body part representation in the Red III and IV deposits. In B-RIV-c, the high frequency of wings, some of which had damage, possibly from plucking, could suggest collection of francolin feathers, particularly given the association with evidence for skinning, ivory extraction, and tooth extraction.

Carnivores and Primates

A few isolated elements of small and medium-size carnivores, including shrews, small and large mongooses, wildcats, servals, and civets, were found in a variety of contexts in Units B and C and in association with the metallurgical context at Unit E (E-YII-a). In sharp contrast to other animal taxa, cranial elements constituted more than half of the recovered remains, with several complete mandibles identified. In one of the largest early assemblages, small carnivores (shrew, mongoose, cat) as well as primate remains were left atop the lip of the B-YI-d funerary pit in association with the crania of other wild and domestic animals. With the exception of the burned ritual complex (B-RIII-a), no small or medium-size carnivores were identified between early Red III and mid-Red IV levels, after which they became more numerous again beginning in B-RIV-b. Only in one of these latter contexts, B-RIV-c, is there evidence for the roasting (and possible consumption) of small carnivores, in the form of a burned humerus of a large mongoose. Body part representations and species represented were more diverse in Red IV, as civet and serval cats appeared for the first time. In contrast to earlier contexts, all remains of small and medium-size carnivores in B-RIV-c were postcranial, perhaps reflecting different uses (for example, for skins). Primates were distributed in low frequencies throughout the sequence at Unit B and were mainly represented by cranial elements. Once again, the exception was in B-RIV-c, where the only non-cranial element was recovered; the same context yielded a patas monkey mandible with teeth systematically removed after death. The only burned monkey element was the canine of a vervet-size monkey from B-RIII-b.

Fish, Bivalves, and Aquatic Taxa

Fish were clearly an important component of the ritual process at Kirikongo, with fish remains as ubiquitous as those of domestic animals. In most contexts, a small number of elements of particular taxa were recovered, including primarily spines and cranial elements, while vertebrae and ribs were extremely rare, suggesting that bodies were distributed away from these contexts. An exception to this general practice can be identified in a few early funerary contexts at Mound 4 (B-YI-d, B-YII-b), where an extremely large number of fish bones, including numerous ribs, was recovered, in addition to the usual identifiable elements, although even here vertebrae were underrepresented, indicating removal of portions of the body. Particular taxa were systematically prepared by smoking or grilling, with only very rare exceptions.

Fish diversity varied by excavation unit and over time, with some transformations in Red III and Red IV. Generally, Units B and C contained much more diverse fish faunal assemblages representing more diverse water conditions in comparison to Units A and E, a pattern that could reflect either different seasonality of riverine visits or use of a different location along the river. Until Red III, Unit A's fish faunal complex included only clariid catfish, Nile perch, *Synodontis s*p., and large *Heterotis niloticus*, all taxa that can be caught in the main river channel in the dry season, matching the systematic presence of Nile oyster, which can be collected when water levels recede in the Mouhoun River beginning in December or January. Unit A lacked the shallow-water fish and bivalve taxa more commonly caught/collected during flood recession. In contrast, the fish and bivalve assemblage at Units B and C included a wide variety of shallow, marsh, and main river taxa—*Heterobranchus* sp., lungfish, tilapia, smaller *H. niloticus, Bagrus* sp., *Auchenoglanis* sp., and *Mormyrus* sp.—as well as the more size-diverse assemblage of clariid catfish, Nile perch, and *Synodontis* sp. Moreover, the primary bivalve collected was *Chambardia* sp., a shallow-water taxon most easily collected as floods recede in October and November. Overall, the assemblage suggests expeditions to the Mouhoun River or a major tributary during recession at the end of the rainy season or very beginning of the dry season.

Starting in Red III, the shallow-water taxa tilapia and *Chambardia* sp. occurred in Unit A for the first time, suggesting a weakening of the seasonality profile of visits to the river. However, the fish assemblage from Unit B continued to have evidence for a more diverse array of individual taxa. Fishing became less important in Red IV at all units, although some fish remains continued to be identified in most contexts. Unit E contained very few fish remains. In the early context associated with metallurgy (E-YII-a), only shallow-water taxa were present, including tilapia, clariid catfish, and *Chambardia* sp. Later deposits contained mixed-condition deepwater taxa like other units, but in very low frequency.

Reptiles and amphibians were commonly and systematically found in contexts at Units B, C, and E. However, not a single element from these taxa was identified at Unit A. In the units where they did occur, there were patterns in their use over time. Mud turtles, African bullfrogs, monitor lizards, and agama lizards were found commonly in contexts throughout the early sequence and continued to be hunted in the later sequence, with the addition of softshell turtle. The addition of the crocodile in B-RIV-c is notable and likely related to the production of animal commodities, particularly since, like the warthog and jackal from this context, its teeth had been removed. Many of these taxa prefer marsh and shallow-water habitats, further supporting late rainy season or very early dry season river expeditions by the residents of Mound 4.

General Spatiotemporal Patterns

Three general patterns of animal use can be identified at Kirikongo. The first applies to activities at the site prior to mid-Red II. During these early phases of occupation, domestic livestock, chickens, and fish represented the main components of ritual deposits, and other wild animals (some non-consumed) were employed sparingly although increasingly over time. Domestic animals were often grilled, and ritual deposits typically took the form of discrete pits that contained particular components from the remains of feasts. This period also saw the increasing co-option of cattle by the founding house, with concomitant increasing inequality in the scale and nature of contexts, including the diversification of wild taxa.

The second pattern of animal use started in mid-Red II and continued to early Red IV, during which time no cattle were identified at Kirikongo. While domestic livestock continued to be a central symbolic core of ritual deposits, diverse, sometimes large, and sometimes numerous wild animals indicate the increasing importance of hunting (and feasting) for ritual practices. In these contexts, the body part diversity of wild taxa increased, as they were often grilled and consumed in situ with particular parts left in the ritualized deposit. Hunted taxonomic diversity increased throughout the community, with taxa from the founding house comparatively more diverse. At the same time, the non-consumed carnivores became much less frequent.

The last major faunal shift occurred in mid-Red IV after the plague era at Kirikongo, when despite conforming to long-established patterns for ritualized deposition, new values are reflected in choice and treatment of hunted animals. In particular, there was a new concern for commodities that materialized through both the presence of new taxa (for example, serval, hippopotamus, crocodile) and evidence for an increased emphasis on skins, ivory, and feathers from continuing taxa. Particularly when contextualized with other material classes, each of these major shifts can be understood as the result of the creation of different concepts of house and community.

Diversity of the Sacrifice, Diversity of the Hunt

The most striking pattern at Kirikongo is the consistently greater diversity of animals identified throughout the occupation in Units B and C as compared to Unit A. These differential distributions of taxa varied within the broader shifts described above. While all contexts included some hunted taxa from late Yellow I to Red II (Table 6.2; see also Tables 5.1–5.4), the hunted taxa in Unit A were drawn from a very narrow list that lacked small carnivores, wild terrestrial fowl, large rodents, primates, reptiles and amphibians, and fish and bivalves from mixed water environments, all of which were found at Units B and C. Even the small assemblage in the metallurgical context at Unit E (E-YII-a) contained large rodents, shallow-water fish and bivalves, and small carnivores. This lower variance at Unit A during this time was coupled with the absence of cattle after Yellow II and a complete lack of avian eggshell (domestic and wild).

Contexts at both Units A and B became more diverse after mid-Red II, and all lacked cattle. However, Unit B contexts were differently and continually more diverse than those at Unit A. Some previously restricted faunal categories became open to Mound 1, with shallow-water fish and bivalves, bird eggshell, and terrestrial wild fowl identified. However, Mound 4 continued to have privileged access to large rodents, reptiles and amphibians, more diverse wild game (suids, jackals, monkeys) and fish taxa, and one taxon of wild small carnivore. In addition, while both houses hunted wild bovids, Unit B contexts included a more diverse set of taxa. The pattern continued into Red IV. However, at this point Mound 4 elaborated upon these differences with taxa likely hunted for commodities, adding small and medium-size carnivores, new reptiles and amphibians, and even hippopotamus, while fish became less diverse. Unit C had a more reduced set of fauna in Red III, with fewer hunted animals, although large rodents were present. A similar distribution was found at Mound 11, associated with pottery production features. Unit C in Red IV (C-RIV-a), like Unit B, attests to animal use for commodity production.

Seasonality

As described above, there is compelling evidence for differences in the seasonality of ritual accumulations at various mounds for most of the sequence. Contexts in Unit B (the founding house) contained taxa likely obtained near the end of the rainy season/early dry season (October or early November), while those from Unit A were likely obtained during the dry season—December or January if not later. However, there is evidence for some variability in practice at each mound. As discussed in chapter 4, aquatic resources are particularly informative regarding seasonality. In the Mouhoun Bend, the river is in a deep channel with occasional shallower shoulders with aquatic vegetation. It recedes during the dry season, concentrating deepwater taxa and ultimately exposing Nile oyster. During the rainy season, shallow-water taxa are readily available, but the impacts of the floods and high river level make fishing for deepwater taxa more challenging.

The Unit B fish assemblages had consistently mixed profiles that included both main river taxa preferring deep water (due to taxon preference and/or size of individuals) and those that prefer shallow water or areas with aquatic vegetation. This, combined with shallow-water bivalves that prefer muddy bottoms and the regular presence of mud turtles and lizards that prefer shallow water as well, offers strong evidence for fishing in habitats more easily accessible during the rainy season with simultaneous access to deeper-water taxa. At the end of the rainy season one can find adjacent (both accessible) convergence of deep water and shallow water contexts that would allow convenient collection of the resources found in Unit B. This assessment is further supported by other lines of evidence. October or November is when wild fowl eggs would simultaneously be available with the aquatic resources, as all the wild avian taxa identified tend to have a peak laying season in the rainy season or directly afterward. While domestic chickens tend to have more complex laying patterns than wild taxa, in the Mouhoun Bend today, laying typically peaks in the rainy season with more limited egg production at other times of year. Eruption patterns on small mammal dentition, including mongooses, also indicate a likely end of rainy season or early dry season pattern.

Despite the overall trend, there was one significant context in Unit B that had evidence for having taken place in the later dry season. The large-scale hunt, feast, and ritual deposit B-RIII-b followed the destruction of the 300- to 400-year-old ritual complex. A later dry season expedition is suggested by multiple lines of evidence, including the

Table 6.2. Presence/absence of major taxa by context at Kirikongo

Context	Cattle	Sheep/ Goat	Dog	Chicken	Eggshell (chicken)	Equid	Wild Bovid	Primate	Warthog	Small Carnivore
A-YI-a	X	x	x	x						
A-YII-a	*	X		x						
A-YII-b	*	x	x	x						
A-YII-c	x		x							
A-YII-d	X	X	X				X			
A-RI-a		X	x	x			X			
A-RI-b		x	x	x						
A-RI-c										
A-RII-a				x						
A-RIII-a		x	x	x	X	X	X			
A-RIII-b		*		x	X		X			
A-RIII-c		X	x	x	X		X			
A-RIII-d										
A-RIV-a		*		x			X			
A-RIV-b		X	x	x			X			
A-RIV-top		X	x				X			
B-YI-a		x	x	x						
B-YI-b	x	x		x	X					
B-YI-c		X								
B-YI-d	X	X	X	x	X		X	X		X
B-YII-a		X								
B-YII-b		X		X	X		X			
B-RI-a		x	x	X						
B-RI-b		X	x	x	X					
B-RII-a	x			x						
B-RII-b		x		x	X					X
B-RIII-a		X	x	X	X					X
B-RIII-b		X	x	X	X		X	X	X	
B-RIII-c		x		x	X					
B-RIII-d		x		x			X			
B-RIII-e				x			X			
B-RIII-f		X	x	X	X		X			
B-RIV-a		X	*	x	X		X		X	
B-RIV-b		X	X	x			X	X	X	X
B-RIV-c		X		X	X		X	X	X	X
C-YII-a	X	X		x	X		X			
C-RI-a		x		x						
C-RI-b	x	X								
C-RI-c	x	X		x			X			
C-RII-a	X	X		X	X		X		X	X
C-RIII-a		x		x	X					
C-RIII-b		x		x						
C-RIV-a							X			
E-YII-a	X	X	X	X			X			X
E-YII-b		X		x	X					
E-RII-a	X	X	X	x	X	X				
E-RIII-a		X		x						
E-RIII-b		X		x						

Note: X indicates positive identification, x indicates probable identification, * indicates possible presence.
(No fauna was recovered from A-RIII-e or A-RIII-f.)

Jackal	Lagomorph	Large Rodent	Wild Fowl	Wild Waterfowl	Eggshell (non-chicken)	Reptile and Amphibian	Fish	Bivalve
							X	X
							X	X
							X	X
							X	X
	X						X	X
				X			X	X
	X							X
							X	
	X		X				X	
			X		X		X	
							X	X
							X	
			X				X	X
							X	X
							X	
	X	X	X		X	X	X	X
							X	X
	X	X	X			X	X	X
		x					X	X
	X	X					X	X
						X		X
		X			X		X	X
X	X	X	X	X		X	X	X
		x					X	X
						X		X
		x						X
						X	X	X
*		X	X	X		X	X	X
*		X	*			X	X	X
X		X	X		X	X	X	X
	X	X	X		X	X	X	X
						X		X
	X					X	X	X
	X	X	X					X
		X			X	X	X	X
		X				X		X
		X				X		
		X					X	X
								X
		X				X	X	X
		X			X		X	X
		X				X		

presence of Nile oyster shells; the more limited marsh or shallow-water fish fauna diversity; the limited shallow-water reptile assemblage, with the only individual being a very large Nile monitor lizard that could inhabit the main river; the lack of wild avian shell; and the fusion sequence of the likely jackal family elements that suggest a later dry season date. In addition, the presence of waterfowl and inclusion of an extremely diverse set of wild bovids may reflect the clustering around water sources that tends to occur later in the dry season.

In general, contexts from Unit C prior to the Red IV leather-tanning installation matched the end of rainy season or early dry season pattern at Unit B, with wild bird eggshell and bones, and shallow-water taxa. These were found even after active interments ceased in Red II and the mound was used for veneration rituals. Unit E, in comparison, systematically contained shallow-water and main river–related taxa, most similar to those at Units B and C.

In contrast to Units B, C, and E, the assemblages from Unit A consistently reflected middle or late dry season activities, with a notable exception in Red III that I argue is related to changes of the plague era. For most of the sequence, the residents of Mound 1 likely visited the river after the water level had fallen. Nile oyster was present in almost every context, and the recovered fish fauna was largely composed of deepwater taxa, with even *Heterotis niloticus* individuals quite large in size. Tilapia, ubiquitous in shallow-river environments, was completely absent prior to Red III. Hunted animals tended to be either drier savanna taxa (oribi, hartebeest) that cluster around the river at this time of year or those that live near the river year-round (kob, reedbuck). Two contexts in Red III suggest a possibility of different seasonality. Tilapia and clariid catfish occur in A-RIII-a, but a much stronger case for rainy season hunting is found in the mid-fourteenth century AD context A-RIII-b. This deposit contained wild (or domestic) probable guinea fowl eggshell, the only *Chambardia* sp. bivalve shell at Unit A, shallow-water fish, and a pregnant oribi (oribi tend to have a breeding peak in the rainy season). A-RIII-b is the only confirmed late rainy season or early dry season funerary ritual context in Unit A that contains multiple elements supporting a non–dry season seasonality, and it is likely no coincidence that it occurred during a time of rapid change in the community during the plague.

Scale and Nature of Treatment

Excavations revealed variability in the scale and elaboration of ritual deposits. While the sample size of any given deposit varied, there were many contexts in which a large proportion, if not all, of the ritual features (typically in defined pits, concavities, or abandoned structures) was recovered, allowing for comparison.

In the early sequence, cattle constituted a regular component of the ritual contexts and likely played a central role. During this time, contexts in or associated with Mound 4 stand out as particularly elaborate; the B-YI-d pit contained a relatively large amount of food and a diversity of animals, as did the pit in C-YII-a, which was also extremely diverse and included at least two cattle (one quite young). Similar patterns hold in the cemetery where ritualized depositions associated with infants and small children included cattle sacrifices (C-RII-a); multiple cattle may be represented in the remains, as they were distributed across multiple monuments. The rituals associated with metallurgical activities in Unit E (E-YII-a) were also quite elaborate, including cattle and diverse wild taxa. Cattle were also present in deposits in the early levels of Unit A, but over the course of Yellow II faunal densities became lower and the associated fauna was not as rich. By Red I, funerary rituals reduced in scale further with the loss of cattle, even with the occasional addition of a wild animal such as kob.

In Red III the scale of ritual depositions increased throughout the community, perhaps reflecting increasing numbers of people invested in procurement or attending events that involved large-scale feasting at Mounds 1 and 4. For example, in A-RIII-a, among other taxa, a hartebeest, kob, oribi, donkey, and likely domestic small stock were all identified, indicating a huge increase in scale over the Red I and II deposits at the same mound. Similarly, at Mound 4, B-RIII-b, while lacking cattle, included the roasting of a roan antelope, hartebeest, kob, reedbuck, common duiker, oribi, and families of warthogs and jackals. Both the procurement of these animals and the consumption event must have involved a very large group of people, larger than those inferred from earlier events.

The nature of rituals and the parts chosen for inclusion in deposits also varied. For example, remains from fish consumption were interred in the B-YI-d pit. However, with the exception of B-YII-b at the same mound, fish remains typically reflected preparation waste (spines, cranial parts) rather than consumption (ribs, vertebrae). Sheep/goats, cattle, and chickens throughout the sequence always had fairly representative distributions of body parts found in deposits, such that the addition of hunted taxa, sometimes representing large quantities of meat, likely reflects an increase in the scale of the event. Wild bovids were represented by only a few elements prior to Red II, but beginning in Red III, larger sections of the animals ended up in the deposits, perhaps reflecting feasting activities in which more meat was consumed collectively rather than being distributed elsewhere. Similar patterns are found in animals ranging from large rodents and lagomorphs to fowl, reptiles, and warthogs.

B-RIV-c marks a shift in the general treatment of animals in a very large-scale event that clearly involved immense amounts of labor and included the hunting of hippopotami and the roasting of a very large warthog, roan antelopes, and numerous other animals. This assemblage included some elements that had been consistently absent from earlier deposits (tarsals, carpals, and third phalanges), metapodials and other elements with cutmarks from skinning, systematic removal of teeth, and new species with products known to have been valuable in trading systems.

Given the repeated patterns, there is strong evidence that diversity was a highly valued component of accumulations generally, particularly at Mound 4 prior to Red II and more broadly at the site starting in Red III. That diversity of taxa was an important and even desired characteristic of faunal accumulations is further supported by a pattern in most contexts where only one individual from each taxon was present, even when the animals typically live in a herd or group. Notable exceptions may have been animals that defended a den or particular place (jackals, warthogs), such that taking one individual was difficult. For fish, diversity of taxa is found even when there are a small number of bones, and bivalves are often represented by a single or couple of shell fragments. Given that this intra-context diversity seems to have been an active and desired choice, and patterned in repeated ways, logic holds that differences in diversity between and within contexts over time likely reflect meaningful associations at the level of social groups and the community.

Exploring Diverse Animal Associations: Ecological and Cultural Patterns

Choice was integral to the composition of the ritual contexts. Wild animals were chosen out of hundreds (or thousands) of potential taxa, and taxonomic decisions provide an opportunity for insights into a variety of historical questions at Kirikongo. As explored in chapter 1, wild animals in ethnohistoric practice are connected to emplaced divinities with which they are associated and spiritually anchored. Faunal data from Kirikongo indicate that the patterned differences between units were similarly based upon where and how animals live, invoking classification systems rooted in emplacement.

Domestic Animals: Sacrificial Fundamentals and Inequities of the Feast

Cattle, goats, chickens, and dogs played a significant and central role in early ritual deposits. In early contexts, cattle were found in all excavation units. However, starting in late Yellow II, cattle remains became restricted to the founding house (Mound 4), and there is some evidence that cattle were slaughtered at a younger age, as is found in the associated cemetery at Mound 3 (for example, C-YII-a, where at least two cattle were slaughtered as part of the event). In subsequent Red I and Red II, cattle and probable cattle were found in association with adult and infant burials in the cemetery (C-RII-a) and in the early layers of the ritual complex at Mound 4 (B-RII-a). While goats were present from the start of the sequence, sheep first appear in Red I at Mound 1 (A-RI-a) after cattle became a restricted animal. They were incorporated into ritualized deposits from that point on, along with goats, with the first sheep at both Mounds 4 and 11 occurring in B-RIII-b and E-RIII-a after the loss of cattle. Older sheep and goat individuals became more common after Red III, when hunting became a more central focus of ritualized practice.

Domestic chickens were a fundamental component of rituals, appearing in the earliest levels. Given their ubiquity, they were likely as central to sacrificial systems at Kirikongo as they are in the ethnohistory of the region (see chapter 1). Chickens were never restricted to a particular unit, but their eggshell was recovered only in contexts associated with the founding house (Mound 4) until Red III. Analyses of eggshell indicate that eggs were unhatched at the time of deposition. Given the contexts in which they were recovered, it is possible that they were sacrificed (see discussion in Chapter 4). Domestic guinea fowl may have also been sacrificed if they were indeed present in Red III, and their hatched eggshell was present in Red IV. Finally, dogs played a more complex role, as they were systematically incorporated into ritual practices throughout the site, but in different and distinctive ways (for example, crania inserted in pits), and were entirely missing from Unit C. Both prior to and after the shift toward increasing hunting, sacrificed domestic animals had diverse body parts left in the ritual deposits, likely symbolically marking that the entire animal was offered.

Animals of the Earth

During Kirikongo's occupation, an array of medium-size and small mammals, including small carnivores, large rodents, primates, and suids, were found exclusively in Unit B (the founding house) and its associated deposits in Units C and E. After their initial appearance in B-YI-d, they were identified in most contexts at Units B, C, and E. These taxa never appeared in Unit A. There is no evidence that the carnivores were eaten, with the exception of one example in B-RIV-c. Binding these taxa is an association with subterranean contexts such as burrows, dens, and termite nests. Many of these taxa consume termites, widely considered potent sacred animals in ethnohistoric practice due to their subterranean homes and association with the divinities of the deep earth (see chapter 1 and Guébhard 1911).

Wildcats often live in the former dens of other animals (such as aardvarks and hyenas), and insects form a significant part of their diets. The slender mongoose lives in termite mounds or crevices and eats small vertebrates and invertebrates. For the banded mongoose, which also lives in termite mounds, termites are an even more important dietary resource. The white-toothed shrew is a micro-insectivore that consumes termites and builds lairs. The Gambian rat likewise lives in rock outcrops or the former dens of other animals, or it constructs extensive burrows and eats a wide array of foods, including insects. The Gambian rat was the most frequently found of all the animals of the earth at Kirikongo and was the main burrowing animal found at Units E and C in Red III. Cremer (1927) mentions them as ritualized animals in the Mouhoun Bend. The cane rat also is known to burrow.

Even the larger mammals in this group follow this general pattern, as warthogs tend to live in holes in the ground, including former aardvark dens. The patas monkey frequently lives near termite nests, where it surveys the surroundings and consumes termites. Beyond mammals, a large part of the diet of francolins, also restricted in the early sequence to the founding house, is insects, including termites. To this group could also be added some lizards, such as the monitor lizard, which lives underground, often in former termite nests, and the agama lizard, which has similar residential choices and diet. The B-YI-d pit had a concentration of elements (many cranial) of these animals laid together atop the cap deposit. Animals of the earth were also found in the mortuary features of Mound 3 from Yellow II to Red III. At Mound 11, these animals were in association with early metallurgy (E-YII-a), the burial in E-RII-a, and later deposits (E-RIII-a, E-RIII-b) associated with specialized blacksmith/potters who may have moved from Mound 4. Notably, iron smelting ceased at Mound 1 around the same time or only slightly after these associations began at Mound 4 in late Yellow I.

Nonrestricted wild taxa found at Mound 1 as well as Mounds 3, 4, and 11 during the first millennium AD included the savanna hare (absent from Unit E), which nests on the surface in slight concavities, geese that tend to consume aquatic foods and vegetation (absent from Units C and E), and bovids that inhabit the land surface.

While the presence of non-consumed small carnivores and some other taxa ceased in mid-Red II during a time of significant cultural change, many of the other routinely consumed taxa (large rodents, warthogs) continued to be restricted to the Mound 4 house and to the new specialist blacksmith/potters at Mound 11 after this point. In Red IV some small carnivores (mongoose, wildcat) reappeared, along with a broader array of other new taxa (including medium-size carnivores) that did not have the same earth associations. Their use in the Red IV context suggested their targeting for commodities production (and occasional consumption) in addition to or in place of their divine associations.

Forest and Grassland Animals

Starting in Red II another ecological division appears in the fauna, with unrestricted taxa associated with open grasslands found at Mounds 1 and 4 and restricted taxa found only at Mound 4 and the associated deposits in Mound 3 commonly associated with the forest or thickets. From Red III to mid-Red IV, while generally more diverse than previous phases, wild mammals in Unit A contexts are limited to grassland grazers that tend to inhabit more open spaces, including the oribi, reedbuck, kob, and hartebeest. Various combinations of these animals appear together in five successive ritualized contexts. In comparison, Unit B assemblages from the same time (six to seven contexts) almost all include these open grassland taxa but also forest or thicket taxa such as the common duiker (lives in the brush, avoids open plains, browses), forest duiker (inhabits riverine forest, eats fruit, browses), roan antelope (inhabits forest edge; mixed browser/grazer), bushbuck (lives in brush or forest; mixed browser/grazer), and sitatunga (inhabits marshes in forested locations, browses and occasionally grazes). To these can be added other new animals that appear in Unit B in Red III, including the green monkey, which is more tied to trees in savanna settings, and the side-striped jackal, which tends to prefer areas in or near the forest.

Unlike the small carnivores that previously distinguished units, all the above animals were feasted upon extensively. As mentioned above, the nature of ritual deposits (and presumably the hunts that produced the animals for them) seems to be purposefully related to diversity, as contexts in all units tended to have only one individual of a taxon, with the exception of animals living in family units such as the jackal and warthog. Interestingly, in Red III, Unit E does not contain hunted mammalian taxa except for the previously discussed Gambian rat appearing in two successive levels (E-RIII-a, E-RIII-b). Large rodents are likewise the only hunted mammal found in the veneration deposits at Mound 3 in C-RIII-a and C-RIII-b.

Animals of the River, Animals of the Marsh, and Seasonal Variations of the Mouhoun

Fish and bivalves played a central, fundamental role in the creation of ritualized deposits. As has already been extensively explored, throughout the sequence, Mound 1 had a different fish faunal complex than Mound 4 and the associated deposits in Mounds 3 and 11. These likely reflect both seasonality and restrictions on taxonomic diversity similar to those seen in mammals. Units B, C, and E contain fish and bivalve taxa that indicate expeditions to a mixed water environment that most likely occurred at the end of the rainy season/early dry season, while Unit A prior to Red III systematically contained fish and bivalves (Nile oyster) collected later in the dry season, at the earliest December or January. In Red III, the seasonality profile was briefly weakened in A-RIII-b, possibly due to plague, with the collection of *Chambardia* sp. bivalve for the only time at the unit and the presence of a pregnant oribi. There was also a brief period in Red III (A-RIII-a, A-RIII-c) where shallow-water tilapia appeared, but they disappeared once more in Red IV.

Significantly for this discussion, at no point in the sequence did Mound 1 have access to marsh or shallow-water taxa that live around aquatic vegetation. These include lungfish, *Auchenoglanis* sp., *Gymnarchus* sp., small *Heterotis niloticus*, and *Heterobranchus* sp., some of which were present consistently in low frequency throughout the Unit B sequence from at least Yellow I to Red III (similar taxa also appeared in C-RII-a). After Red III, the fish fauna complex in Unit B consistently included an even wider variety of fish caught by different techniques, suggesting larger-scale visits to the Mouhoun River, similar to the larger increased diversity of hunted animals at Mound 4.

Reptiles of the Marsh, Reptiles of the Earth

Like the earth animals, reptiles and amphibians were highly restricted at Kirikongo. They do not occur in Unit A but were consistently present in Units B, C, and to a lesser extent E, where they occur late in the sequence and were some of the only wild taxa present after the reoccupation of the mound by pyrotechnic specialists in Red II. The represented herpetological taxa include those that live or hunt in pools with aquatic vegetation and/or those that live in burrows in the earth. A common taxon was the Nile monitor lizard, which prefers shallow aquatic pools with rich vegetation for hunting but tends to live in burrows, including very commonly dens inside former termite nests. Mud turtles, which tend to live in shallow pools with rich vegetation, were the only turtle taxon in the early sequence. They were joined in the later sequence by African softshell turtles that inhabit a wider range of aquatic contexts (including occasionally deep water) but prefer the abundant food resources in shallow pools with rich vegetation. The African bullfrogs were regularly identified in contexts with other shallow-water taxa. African bullfrogs move to shallow pools at the start of heavy rain to live and reproduce, and they are closely tied seasonally to the floods. While there is a possibility that some may be intrusive, there is a strong case that they were intentional inclusions given not only their associations but also their systematic presence in Unit B, C, and E contexts and complete absence from similar contexts in Unit A. Also common were smaller lizards, some of which were identifiable as agama. These lizards inhabit crevices in the earth or other dens and burrows, and they consume insects, including termites. Only in B-RIV-c does the crocodile appear in the faunal remains at Kirikongo. However, in this case it occurred during a time in which hunting for commodities was a focus, as is the case for the hippopotamus.

The restricted distribution of reptiles therefore reinforces the symbolic animal associations already linked to Mound 4. The represented taxa have connections with the deep earth, linking to a pattern found in mammals, as well as with the marsh and rainy season aquatic contexts represented in the fish and bivalve assemblage. Interestingly, no grassland or dryland reptile or amphibian taxa were recovered from Kirikongo, and snakes were completely absent, which is fairly unusual for archaeological sites in West Africa, perhaps reflecting another cultural choice by Kirikongo's inhabitants.

Animal Parts in Rituals, Animal Parts as Commodities

Throughout the occupation at all mounds, certain animal parts (horn cores, mandibles, maxillaries) tended to either be the sole representative of a particular taxon, suggesting intentional placement of these elements, or be systematically missing, suggesting that they were intentionally removed for placement elsewhere. Prior to Red II, only cat mandible and dentition fragments were identified, mongoose mandibles were most common, and several horn cores of common duiker and oribi were identified. In all cases, postcrania were the primary elements of the animals found after Red II. To these could be added the shrew, which was found at Unit B in Yellow I, in early Red II, and in the long-lived ritual complex (where bones may have been accumulated); three of four elements were cranial or mandibular.

Some parts of animals were systematically missing or exceedingly rare from all contexts regardless of unit or phase. These included tarsals, carpals, sesamoids, caudal vertebrae, avian vertebrae, fish vertebrae, and some phalanges. These small, dense bones, along with horn cores and cranial elements, are today commonly incorporated as potent objects in diviner bags, shrines, bundles (often with accumulations of fauna and material culture), or protective portable talismans (see chapter 1). Kirikongo's data suggest that related beliefs may have deep histories in the region.

When present, these parts may then have been actively incorporated in contexts to construct shrines at places connecting with divine power. For example, in B-YI-d, very select wild animal parts were incorporated into the cap deposit; within the pit, fish ribs, spines, and pterygiophores were common but vertebrae were systematically removed. Similarly, a complete cat mandible was incorporated in the deconstructed forge at Mound 11 E-YII-a. Also notable were the Gambian rat tails in both E-RIII-a and E-RIII-b at the pyrotechnic complex at Mound 11, as caudal vertebrae were largely absent for all taxa at Kirikongo.

In Red IV (notably contexts B-IV-b and B-IV-c), many patterns changed regarding animal use and deposition, perhaps reflecting larger cultural transformations in society, with valuation of animal parts for commodities and less systematic approaches to removal of previously potent parts. For example, the usually missing cranial elements of small bovids, and smaller elements such as tarsals and third phalanges, were present, as were rare caudal vertebrae from a canid-size carnivore. Different patterns involving tooth extraction may indicate that previous patterns of either including or removing entirely mandibles and crania with teeth intact had changed, and loose teeth had different value. For example, the teeth of animals such as a jackal, crocodile, and patas monkey were systematically extracted and removed from the context, with mandibles left intact in the deposit (Figure 6.6). Similarly, an enormous warthog had its tusk and smaller teeth removed, likely related to ivory extraction, while a significant portion of the cranium and a mandible section containing an intact third molar were left

Figure 6.6. Jackal mandible with extracted teeth, B-RIV-c

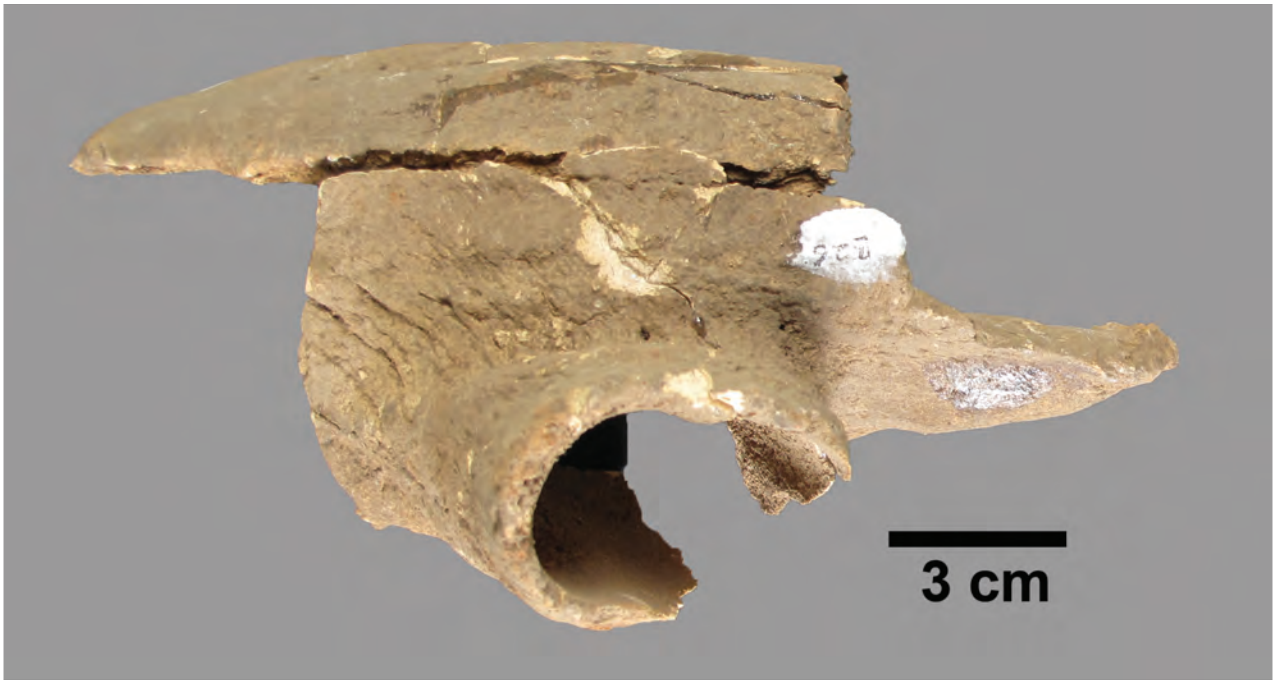

Figure 6.7. Warthog cranium with extracted tusk, B-RIV-c

interred (Figure 6.7). The inverse pattern was found for roan antelope, for whom loose teeth that had been extracted were found in the deposit with only a few small splinters of the cranium and mandible. Meanwhile, mandibles containing teeth from both a Gambian rat and cane rat were found, perhaps suggesting that rodent and roan antelope teeth remained ritually important in the deposit and/or that there was not a market for these teeth.

Meanwhile, small carnivores that had previously been limited at Kirikongo to cranial fragments with teeth, with no evidence for consumption, were identified in the deposit from postcranial bones, perhaps reflecting use for skins, and one mongoose may have been cooked. Even wild birds materialized in the deposit differently, as wings from multiple francolin individuals (perhaps four to five) were found, with marks from feathers being pulled out. To these patterns can be added the inclusion of animals such as the hippopotamus, often hunted for ivory.

The combination of unusual parts and treatment (differential processing) suggests an additional dimension to this deposit, one rooted in different but not mutually exclusive goals within a deeply held ritualized hunting tradition, one shifting toward targeting and processing of animals for known traded products with less systematic removal of previously important parts for talismans. While this likely reflects a change in values, I argue that it is unlikely that the animals were desacralized, as in areas of West Africa where hunting for commodities has been an ethnohistoric focus, the hunting process remains ritually potent (see chapter 1), but that ritual process likely changed to enable extraction and protect hunters in their interactions with wild animals.

Environmental Setting and Reconstruction

Recent overviews of paleoenvironmental sequences in West Africa have largely ignored the potential of archaeological faunal analyses for reconstructing landscapes (see, e.g., Maley and Vernet 2015; McIntosh et al. 2015). The exclusion of this valuable data set has limited the precision of knowledge on the effects of broader climate trends in localized settings. The main challenge in using archaeological fauna for environmental reconstruction is that, as with macrobotanical remains and other materials, the majority of remains occur in archaeological sites as the result of complex cultural choices and cannot be assumed to be an unfiltered reflection of the landscape around the site. For example, at Kirikongo, hartebeest and roan antelope likely lived in the region prior to their appearance in archaeological deposits in Red III, but livestock were the focus, at least for the ritualized practices that preserved archaeologically.

The analysis of deposits at Kirikongo has provided significant context for making inferences about environmental conditions, since the high resolution of the faunal record enables consideration of the impacts of factors such as choice and seasonality on the subset of animals recovered from the site. If Unit A were considered alone, the landscape would appear to have been an open grassland throughout the occupation, with floods fairly limited in scale. Similarly, Unit E as a pyrotechnic activity area (E-YII-a, E-YII-b) has a more limited diversity of animals, presenting a similarly disjointed reconstruction of the landscape. A more comprehensive picture emerges with the faunal spectrum from Units B and C, which combined the unrestricted animals also found in Unit A with those connected to the subterranean earth, forests, and floodwaters.

Another challenge with savanna reconstruction is the wide-ranging nature and ecological flexibility of many fauna taxa spanning many rainfall isohyets. Locally, the Mouhoun River is surrounded by gallery forest and even today can harbor taxa that are more commonly found in southern Burkina Faso. In general, Kirikongo's fauna indicates the presence of a humid savanna landscape in the Mouhoun Bend. It included both adequate forest cover for many taxa along with more open grassland environments throughout the sequence (Figure 6.8 and Figure 6.9). For some periods precipitation may have been much higher than today (as much 1250 mm annually), and there is no evidence that the region ever averaged less than 1,000 mm. This picture matches that from macrobotanical analyses to date, where millet, fonio, sorghum, shea, and baobab were important resources (Gallagher and Dueppen 2019). Similarly, the livestock breeds kept throughout the occupation suggest a wet savanna environment, as very small dwarf breeds of cattle, goats, and sheep were kept, although some larger (still dwarf) individuals appear to have been present for a short time in early and mid-Red III.

Despite the fact that all taxa identified inhabit the 1,000 to 1,250 mm rainfall zone, some variance along the upper rainfall limits may indicate that particular subphases were slightly wetter, while evidence in late Red II and early and mid-Red III suggests precipitation at this time may have averaged closer to 1,000 mm annually. For example, in Yellow I the Mouhoun Bend was likely a wet savanna environment with very small livestock, abundant floods, and diverse wild taxa, including the banded mongoose, which today tends to live in areas with more than 1,200 mm precipitation. Precipitation averages may have increased in the subsequent Yellow II and Red I phases, as indicated by the presence of a broader diversity of taxa that tend to be found above 1,200 mm, including cane rats, Maxwell's duiker, red-flanked duiker, and likely white-throated francolin. Faunal samples from the late first millennium AD in southeastern Burkina Faso along the Gobnangou escarpment similarly support a very humid environment at this

Figure 6.8. Average annual precipitation in West Africa, 1981–2019. Note location of 1200 mm isohyet. Precipitation data from Funk et al. 2015; made with Natural Earth. *Cartography by InfoGraphics Lab, Department of Geography, University of Oregon.*

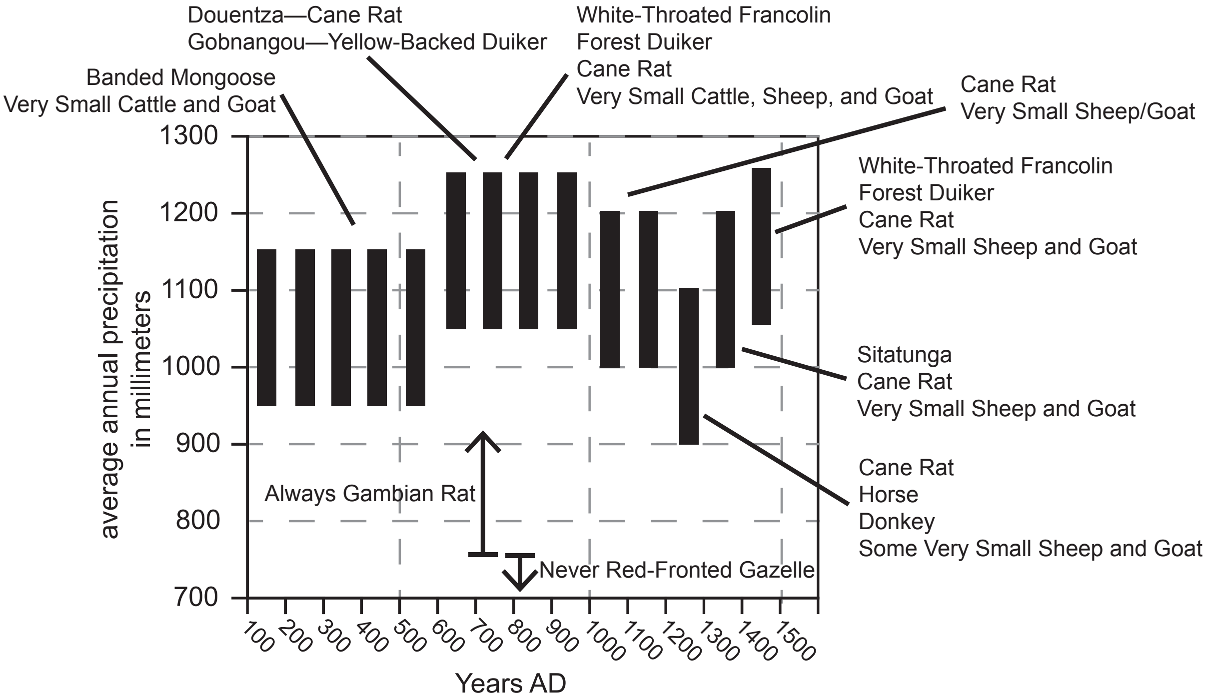

Figure 6.9. Reconstruction of possible rainfall levels at Kirikongo based on faunal assemblage. Douentza data from Gestrich and MacDonald 2018; Gobnangou data from Dueppen and Gallagher 2013.

time, with yellow-backed duiker and other forest duikers identified (Dueppen and Gallagher 2013).

In the second half of Red II and early to mid-Red III, the region may have become drier, probably closer to a 1,000 mm average, as the presence of horses, donkeys, and slightly larger sheep and goats, and a lack of forest francolins and forest duikers, attests. However, even in these strata, cane rats were present, so as with Yellow I, there is no evidence for arid climatic conditions at this time, although it is possible that interannual variability could have increased. The increase in large game hunting in Red III was not necessarily tied to an expansion in the distribution of these wild taxa, many of which were from grassland environments, would have been present beforehand, and were also present later in Red III and IV after a shift toward increased precipitation. However, an increase in the local populations of wild bovids could have occurred through the removal of cattle from the ecosystem after Red II, as animals such as hartebeest and other grazers are known to avoid areas with cattle competition. Moreover, rejection of cattle keeping at Kirikongo occurred during a time in which the landscape would have been better for cattle husbandry, supporting an agentive rather than climatic explanation for this important cultural choice.

The latter part of Red III and Red IV may have been slightly wetter, with a late fourteenth century AD context (B-RIII-f) containing very small livestock and a sitatunga, a marsh animal that has not historically existed in western Burkina Faso and may reflect the occurrence of more substantial flooded zones in the Mouhoun Bend at that time. The fauna from Red IV from the early to the late fifteenth century AD further suggests a return to very humid conditions, with extensive evidence for very small livestock (including an epiphenomenally small goat third phalanx), forest duikers, water mongoose, cane rats, and white-throated francolins, in addition to large aquatic animals, such as the hippopotamus and crocodile, that indicate deepwater conditions in the Mouhoun River.

Moreover, there is no evidence for an extreme or rapid increase in aridity in the first half of the second millennium AD or environmental conditions that could account for population losses during the mid-fourteenth century that are likely derived from plague epidemics. The pre-plague period of Red II and Red III was also a period in which populations in the Mouhoun Bend were at their highest level. Kirikongo likely had between 1,000 and 2,000 people. Large neighboring communities such as Tora-Sira-Tomo and Kerebé-Sira-Tomo (Holl 2014; Holl and Koté 2000; Koté 2007) also had considerable populations. Preliminary results from my unpublished 2011 regional survey indicate that the region was home to a dense network of agricultural communities during this era. As a result, the landscape was likely extensively opened by cultivation, perhaps reducing the forests where some of our indicator taxa would live. However, the keeping of larger goats and sheep as well further supports a reconstruction of a slightly drier setting. The post-plague era would appear to be the opposite, as there is clear evidence for increased precipitation and the return of southern savanna taxa to the region. However, their expansion may have been facilitated in part by a reforestation of the Mouhoun Bend due to the lower populations and reduction in the size of field systems. This setting may have allowed for the growth of wild animal populations and facilitated the shift toward the production of animal products.

These data largely concur with the second millennium AD lake levels at Bosumtwi in southern Ghana (Shanahan et al. 2009), which saw an increase in rainfall in the fourteenth and early fifteenth centuries AD after a drier period in the early second millennium AD. However, it is also clear that landscapes are more resilient to change than lakes and that local variability during general climatic changes can be extensive, as the steep drops in lake levels seen in the early fifteenth century AD at Bosumtwi were not reflected in the mid- to late fifteenth century B-RIV-c deposit at Kirikongo. In addition, as suggested previously, the post-plague landscape may have been more forested due to lower populations, such that water retention was higher, slightly delaying the effects of increasing aridity.

Sacrifice, Feasts, and Animal Associations: Human–Animal Relations at Kirikongo

Animal remains were found in discrete contexts at Kirikongo. Analysis of diverse patterns in these contexts suggests that each consistently incorporated domestic animals and aquatic resources, with wild animal use tending to be more variable over time. Units B and C had the highest levels of diversity in comparison to Units A and E, although the nature of this diversity changed significantly throughout the sequence. Within contexts, diversity seems to have been desired, as contexts typically contained one each of several taxa rather than multiple individuals of a particular taxon, a pattern that held true for both domestic and wild taxa.

Explorations of wild animal associations suggest that combinations of animals associated with particular landscape forms, lifeways, and/or ecological contexts tended to be found together or were restricted to particular units. As divinities are emplaced in landscapes, these patterns likely indicate alliances with the divinities associated with particular habitats. Treatment of animal parts in contexts indicate that representative parts of sacrificed and consumed domestic animals were regularly interred while certain parts were systematically removed, possibly for other ritual purposes. Wild animal treatment changed over time, with early deposits containing many potent body parts for wild animals more generally, whether consumed or not consumed. Starting in Red III, after the rejection of cattle keeping and significant changes in society, contexts indicate a change in uses of wild animals, with extensive hunting and feasting on sometimes extremely diverse animals (reflecting large amounts of labor), the inclusion of a more representative set of body parts, and the removal of potent parts from contexts. Lastly, a shift in this pattern toward an additional dimension of commodities production is indicated at the end of the sequence in Red IV, during a time when new commercial interactions are reflected more broadly in the community.

Based upon architecture, material culture, and formation processes, the next chapter advances the idea that fauna was a central component of ritual processes likely related to ancestors of the various houses at Kirikongo.

CHAPTER 7

EMPLACING ANCESTORS: ENABLING CO-PRESENCE THROUGH MATERIAL SACRIFICE

As established in Chapter 5, the fauna, botanicals, and material culture were components of concentrated accumulations within remnants of architectural features and activity areas at Kirikongo. The practices of deposition, which were systematically repeated throughout the site's occupation, resulted in excellent preservation. Likely derived from short-term events, the contents and nature of these deposits reflect the intentionality of the choices involved in their creation. Chapter 6 explored the animal remains recovered from these accumulations and demonstrated the systematic patterning of the animal species and parts incorporated into these accumulations. The analysis established that accumulations had standard components, with domestic animals (goats, chickens, and later sheep) and some aquatic resources present in almost all contexts regardless of sample size. In contrast, cattle, some aquatic taxa, and wild animal resources had a patterned spatiotemporal distribution and occurred only in certain contexts. In this chapter, I build on these analyses by exploring the accumulated materials within the emplacements to argue that the strong faunal patterns are echoed in the material culture of the site. Material culture analyses in this chapter draw from previously published detailed descriptions and analyses, as early stages of research focused on reconstructing Kirikongo's history based upon patterns in material culture and architectural histories (Dueppen 2012a, 2012b, 2015; Dueppen and Gallagher 2016).

Throughout Kirikongo's occupation, domestic animals were systematically treated in ways commensurate with sacrifice (as evidenced by species composition, age at death, body part representation, interment of specific elements, systematic removal of ritually potent elements, and so on). There was more variability in the use of wild animals, and animal uses and associations differed between units. Accumulations at particular mounds were mainly created in different seasons of the year, and wild animals at different houses were often from specific ecological settings. At different points, the founding house was connected to animals of the deep earth, shallow water, and forest, while at Mound 1, wild animals living on the surface of more open environments and animals from deepwater contexts in the river were the main faunas recovered. Potent wild animal parts were incorporated into accumulations in early subphases, to which were added the remains of large-scale feasting in Red III and of commodities production in Red IV. The remarkable repetition of fundamental features shared by contexts regardless of sample size and the patterned variance in wild animal use strongly suggest persistent ontological divisions between domestic animals (associated with people and sacrificable) and the wild animals (connected to points in the landscape and the divinities therein) with whom particular people or houses had relationships.

The excavated contexts at Kirikongo similarly contained evidence of repeated systematic material culture treatment with clear spatiotemporal patterns that mirror those identified in the fauna and reflect intentionality of process. The material culture reinforced the interpretation of these accumulations as discrete deposits from an event or short process; ceramics tended to have shared characteristics from a specific time within a subphase (for example, early Red I). As with the faunal analyses, understanding the ways and conditions under which material culture entered into accumulations reveals insights into cultural choices surrounding human relations with ancestors, places, substances, and divinities. Building on the strong evidence for the incorporation of parts of sacrificed animals present in the fauna assemblage, I argue that our understanding of the material culture of the site is enhanced by considering the rationales of sacrifice related to mortuary rituals of both attachment (ancestral emplacement) and detachment (release of dimensions of the soul to the afterlife).

Accumulations primarily included partial remnants of fragmented objects. Unlike the midden deposits on the talus slope of mounds, where multiple, refittable pieces of smashed vessels were visible, very few accumulations included multiple sherds from the same vessel, even though the lack of wear on the breaks indicated primary deposition. These fragments were drawn from very diverse sets of pottery vessels, perhaps indicating that each accumulation incorporated fragments from representative vessels from a synchronic living assemblage, albeit with a relatively high proportion of smaller, ornately decorated vessels (see Dueppen 2012a, 2015). Similar diversity characterized other material classes as well. The intentionality of practices leading to the creation of ritual emplacements with accumulations of fauna, material culture, and botanical remains strongly resembles that of ethnohistoric shrines. Their distinctiveness is also clear through comparison with abandonment layers where structures had fragments of their terraced roofs and wall collapse on the interior, and in situ activity areas or complete pots crushed from collapse.

Similar to faunal remains, material culture varied by excavation unit and subphase. While certain classes of materials (pottery, tripod vessels, sandstone and iron objects) were ubiquitous, the occurrence of other classes of materials, such as unmodified natural objects, ancient stone tools, stone beads, objects made from stones from the Birimian formation to the east (granite, dolerite, basalt, greenstone), and long-distance trade items, was more variable and most often associated with the founding house. Not all objects interred in contexts were broken, as unmodified natural objects, ancient stone tools, long-distance trade items, and tools made of wild animal parts were found complete. Drawing on the discussions of sacrifice in previous chapters, I explore the implications of these patterns and argue that created and used material culture is sacrificable, while objects created by or associated with divinities in the landscape, or from unknown sources, cannot be owned and sacrificed but rather represent associations with divinities in the landscape. I end this section with a brief discussion of the botanical results available from excavation at Mound 1. These indicate that plant-based food offerings were also fundamental to the creation of contexts, and they substantiate arguments for the diversity of ritual practices involved in their creation.

Finally, I combine insights from patterning and variability in emplaced accumulations to revisit and revise understandings of the economic, social, and political history of Kirikongo prior to exploring the implications of the Kirikongo sequence more broadly in the conclusion. Since social identities and political statuses were connected to ancestors and custodial relations with divine entities, this chapter sets the stage for a richer understanding of local and regional histories.

Material Culture and Sacrifice at Kirikongo

Ceramics

Pottery was the most common material class recovered in the accumulations with fauna. The ritual deposits tended to be composed of a diverse array of vessels spanning the likely range of forms produced, with jars, basins, bowls, brewers, and more, and they contained a proportionally high number of small, finely decorated consumption vessels (small bowls, beakers) and small pots (see discussions in Dueppen 2012a, 2015; Dueppen and Gallagher 2016). Many of these had pedestaled or footed bases, many were burnished or covered in slip, and some were intentionally blackened (Figure 7.1). These small vessels, likely used for solid and liquid foods, often constituted between a third and a half of the vessels present in a context (see Dueppen 2012a, 2015; Dueppen and Gallagher 2016).

Ceramics within the accumulations did not resemble the ceramics identified in abandoned spaces such as A-RII-a, where entire or near complete vessels (primarily jars) were present; nor those found along the talus slopes of mounds, where trash deposits contained high frequencies of jars likely broken during use (such as cooking vessels). Almost all ceramics were fragmented, even very small vessels, with only a portion of the vessel interred in the deposit. Particularly in the confined deposits in which accumulations were localized, such as pits or abandoned structures, one would expect some refitting of broken vessels or at least multiple sherds drawn from the same vessel. Ceramics were also very temporally discrete. For example, if multiple jars were found within the same deposit, they would tend to have the same rim angle, suggesting a finite temporality even within the particular ceramic subphase.

Figure 7.1. Small blackened vessels from Kirikongo

(For a discussion of rim angle variability in ceramic phases, see Dueppen 2012a.)

Despite the proportionally large number of fancy smaller vessels, many contexts seemed to purposefully include small fragments of other vessel forms, including beer brewing vessels, cooking pots (different sizes for porridge and sauces), and occasional strainers and fish smoking vessels. It is possible that some were involved in feasting processes indicated in the fauna, with the beakers and brewers perhaps also suggesting alcohol consumption. Many of the bowl forms strongly resemble calabashes used for beer consumption in the region today. These patterns span the technological shift from house-based potting traditions to specialized production beginning in Red III (see Dueppen 2012a, 2012b, 2015; Dueppen and Gallagher 2016).

Purposeful breakage of pots was clearly identified with a smashed half of a jar in Yellow I and the interment of a large fragment of a broken pot in its own burial pit in Yellow II at Unit C (C-YII-a). Pottery was also used in burials, as broken potsherds were routinely employed to prop up the head of individuals in graves (see Dueppen 2012a). Notably, a burial at the neighboring site of Diekono was completely covered with a broken jar (see Holl 2014). Two sequential contexts at Kirikongo in the pottery production workshop at Mound 11 included whole pots incorporated as parts of ritual depositions. First, the lower-level E-RIII-a contained two overturned pots—one complete and unbroken, the other with base missing but in a similar position—placed atop the remains of a kiln and associated work space within a deposition of animal bones and broken material culture related to potting (Figure 5.35). The second context was the deposition of an intact overturned vessel on the final floor of an abandoned kiln in E-RIII-b that was adjacent to a ritual deposition as well. The rare use of whole pots in a context likely connected to attachment/detachment rituals for potters is notable, perhaps indicating that the attachments to pottery for specialists were fundamental to identities, even after death.

While general patterns occur in the diversity and nature of vessels incorporated in deposits, certain types of ritualized vessels also correlated with deposits during particular periods. For example, fragments of locally produced (kiln-fired with local decorations) tripod vessels, a distinctive form of vessel found in sites in western Burkina Faso and eastern Mali (see Bedaux 1980; Bedaux et al. 1978; Dueppen 2015; Mayor 2011; McIntosh 1995), occurred systematically in deposits from Red I through Red III (ninth through early fifteenth centuries AD). The last example is from A-RIV-a (Figure 7.2). Regionally produced and used between the sixth and sixteenth/seventeenth centuries, these double-bowled cups have two to four legs and are widely considered to be dedicated ritual vessels (see discussions in Bedaux 1980; Mayor 2011). At Kirikongo, these were always broken and partial, with many deposits containing parts of legs, bowls, and bases; no complete or near complete examples have been recovered. I suggest that the distinctive double bowl form of this vessel class may invoke the idea of a commensal meal of co-presence with ancestors upon the vital earth, with one bowl facing down to the ancestors while the other points toward the living individual. Different breakage patterns are known from ritual deposits in rockshelters, such as at the seventh to twelfth century site of Dangandouloun, as vessels were found broken but mostly complete, likely fragmented through post-depositional processes (see Mayor 2011).

Similar to the fauna, pottery fragments in the ritual deposition contexts were very well preserved, with vivid slip colors, uneroded decorations, and fresh breaks (uneroded), as they were sealed by later construction. The patterns in diversity, significant proportion of small consumption vessels, good condition of sherds, presence of known ritualized vessels, and dissimilarities between ceramics in abandonment layers and midden deposits together make a compelling case that vessels may have been broken as part of the ritual process, with particular pieces selected for inclusion in the ritual deposits. Ethnohistorically, breaking pots is part of funerary ceremonies in some areas of western Burkina Faso and neighboring Ghana (see Bicaba 1975; Goody 1962; Saako 2017).

Iron and Metallurgical Remains

Iron fragments, broken objects, bent iron implements, and small amounts of slag were widely distributed in ritual deposits; some included metallurgical production debris such as iron ore, broken tuyère fragments, and larger amounts of slag (see Dueppen 2012a; Dueppen and Gallagher 2016). The sealed nature of deposition resulted in a high level of preservation for iron, and many objects could be identified

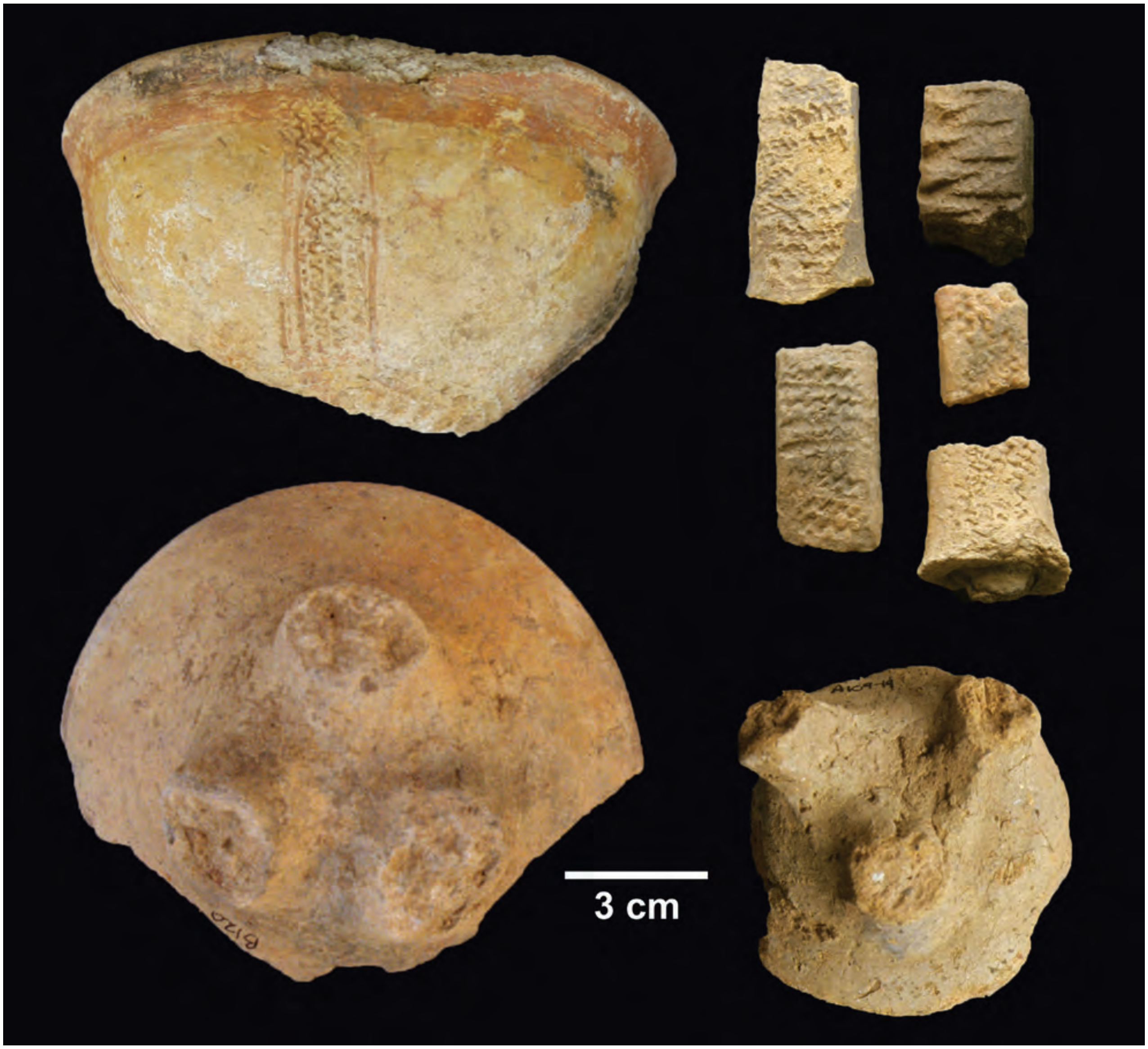

Figure 7.2. Tripod vessel fragments from Kirikongo. Top left: probable upper bowl. Top right: broken leg fragments. Bottom: vessel bases.

(Figure 7.3). Metals either didn't preserve well when exposed or were not commonly left in non-ritual contexts. For example, the abandoned structures in mid-Red II at Unit A (A-RII-a) did not contain a single fragment of iron. In general, early deposits, including pits and mortuary monuments, included some of the highest densities of iron, often with large broken fragments of recognizable iron implements. For example, the pit in B-YI-d contained a complete iron spear with a bent tip. Similarly, in A-YI-a there were fragments of a spear, a knife, and a point, as well as a rod fragment from the haft of one of these. From Yellow II through mid-Red II, almost all mortuary-associated contexts produced fragments of rods from the hafts of tools, iron wire fragments in a variety of shapes, and the occasional larger fragment of a recognizable object—for example, a point (C-RI-a), a hoe blade fragment (A-RI-a), and in one case an iron bracelet fragment that was cleanly broken in half, with no evidence of the other half (A-RI-a). While regularly present, large and identifiable fragments became less common in late Red I and early Red II deposits, a period in which the founding house likely had centralized control of now specialized iron production.

Figure 7.3. Metal objects from Kirikongo. Top: iron spear point, B-YI-d. Bottom, left to right: iron bracelet fragment, A-RI-a; copper earring, B-RIII-b; iron barbed point, A-RIII-e; iron rod, A-RI-b.

Higher densities of iron returned again in Red II with the shift in metallurgical production to Mound 11. Contexts from this point onward included larger numbers of hunting implements, such as barbed points, haft fragments, hoe/axe blades, fishhooks, rings, an earring, harpoons, arrowheads, and a knife hilt. While in Red III most pieces were fragmented and broken, or bent in the case of barbed points, in Red IV some iron objects were included fairly intact (although most were not), matching many lines of evidence for significant cultural change. E-RIII-a and E-RIII-b contained particularly high frequencies of iron tool fragments, including hoe or axe blade fragments, rods, wire, and a possible spoon-shaped item, unsurprising for an area associated with iron-working specialists.

Small fragments of vitreous slag were extremely common, incorporated into the majority of contexts at Kirikongo. Like iron, slag is a product of metallurgical production (see chapter 1), and slag is a potent material that is locally discussed today as having been historically used in ritual practices in western Burkina Faso. Vitreous slag has been discussed elsewhere as appearing in ritualized accumulations archaeologically (see Insoll et al. 2009).

Materials connected to metallurgical production processes (mining, smelting, smithing, and so on) were less common. A broken vitrified tuyère fragment was identified in the lowest level excavated at Kirikongo (B-YI-a), as well as in the last burial monument in C-RII-a, which was most likely associated with an adult person's burial pit. A non-vitrified tuyère fragment was identified in connection with the pyrotechnic area at Mound 1 in A-YII-d in an area with a pottery waster and extensive burned earth. Small ore and slag were found together at Mound 4 in the cap deposit of the Yellow I pit (B-YI-d) and in association with the second story of B-RIII-a, the mortuary feature C-YII-a, and the kiln complex E-RIII-b.

In several cases, contexts contained more elaborate constructions, with significant concentrations of metallurgical debris. For example, kilos of slag and iron ore were incorporated into ritual deposits to construct parts of mortuary monuments in late Yellow II (B-YII-b) and early Red I (B-RI-a). Iron ore and slag were also incorporated in the deposit that marked the reoccupation of Mound 11 in Red II (E-RII-a). Similarly, a deconstructed metallurgical production area at Mound 11 (E-YII-a) contained iron ore, slag, and a non-vitrified fragment of a tuyère. As discussed further below, a distinction can be made between the inclusion of the widely distributed products of iron working (iron and slag) and those with evidence for production itself, including mining.

Ground Stone

Fragments, partial objects, and occasionally complete ground stone tools in sandstone and granite were incorporated into many ritual contexts, and a greenstone fragment was identified in one context. This group can be divided into lower grinding stones and hand stones, in addition to a large number of fragments, many of which likely derive from lower grinding stones due to their shape (see Dueppen 2012a). Lower grinding stones were broken fragments, and those with preserved grinding surfaces were not close to worn through and were in good condition when broken. Most hand stones were also broken, whether in half or with a tip removed prior to disposal. For example, in A-RI-b, which was in a structure with a grinding platform, fragments of broken lower grinders and two beautifully preserved hand stones with their tips removed were interred in a small pit next to a burial pit (Figure 7.4). A few hand stones were still complete upon interment, particularly small, well-crafted examples from B-YII-b and B-RI-a. As was the case with iron objects, from late Red III through Red IV, lower grinding stones continued to be systematically broken. However, occasional small and dense hand stones were deposited whole.

Sandstone is locally available in the Mouhoun Bend, with exposed outcrops on the surface within a few kilometers of Kirikongo to the south and west. It is the primary material used historically for grinding grains and condiments. Sandstone was common throughout the site and was the only stone type present in Unit E. Pyrotechnic levels at Mound 11 in Yellow II (E-YII-a, E-YII-b) yielded no ground stone, even near the shea parching oven. However, E-RII-a contained a large piece of broken sandstone identified as a possible anvil fragment. Several sandstone fragments were found in subsequent levels in Unit E.

Due to its higher density and more regular and smoother surface (and lack of sandy residue), granite is more commonly used for crushing hard objects; it is often used today to process shea nuts in the Mouhoun Bend. Granite is found 15 km to the east in the Birimian formation, which is part of the Precambian basement under the majority of central and northern Burkina Faso. Consequently, granite represents either local trade and/or expeditions to other parts of the region, and one can imagine that it was of higher value than the locally abundant sandstone, particularly since it is also more difficult to work. Interestingly, in many contexts, granite was fairly common in relation to sandstone, perhaps reflecting that, as with iron tools, fragments of highly valued objects were incorporated in deposits. The inclusion of granite may also be related to the widespread evidence for shea butter production at the site. While granite was found in Units A and B in Yellow II and Red I, beginning in Red II granite was found only in Units B and C. Granite was fairly common in Unit B and also present in the Red I cemetery at Mound 3. Granite had breakage patterns similar to sandstone, the implications of which are explored in greater detail below.

Part of an unknown broken implement made of metamorphic greenstone, which derives from greenbelts within the Birimian formation (ca. 15–20 km distant), was identified in the sacrificial spot in the ritual complex B-RIII-a.

The ground stone assemblage substantiates rituals involving purposeful breakage of objects. However, patterns in access to nonlocal materials indicate that while initially multiple houses could obtain granites, these became solely available to the founding house starting in Red II. In addition, nonlocal greenstone was also associated with the founding house.

Stone Beads

Four out of five stone beads recovered were made of materials that would have been locally available near the site, including two white quartz beads (B-YI-a, C-RI-b), a large bead in polished sandstone (C-RI-c), and a beautiful red jasper bead (B-YII-b) (Figure 7.5). All were broken cleanly in half, with only one half found in the associated context. In addition, a broken greenstone bead was recovered from B-RIV-c. Under magnification, this bead contains traces of gold, which is consistent with the Birimian formation in western Burkina, including Birimian greenstone sources within 15–20 km to the east of Kirikongo. As discussed later in this chapter, the fact that the bead was broken like those made of more immediately available stones could suggest that the bead was in fact locally produced and that people from Kirikongo may have collected the greenstone themselves. The broken section indicates that the bead was drilled from one side and then from the other, and the drill holes from either side were only slightly offset (see Kenoyer 2005 for information on stone bead production). All stone beads were found in contexts associated with the founding house.

Possible Found Lithic Objects (Microliths, Spheres, and an Axe)

Two microlithic stone tools were recovered from Kirikongo. Given the complete lack of debitage and the stylistic similarities of the tools to those from LSA sites in the Sourou (Fontana et al. 2010) and Mouhoun Bend (Holl 2014; Koté 2007), these were likely produced in the deeper past and picked up and brought back to the site. However, the possibility that these were produced by foragers contemporary with Kirikongo cannot be ruled

Figure 7.4. Ground stone from Kirikongo. Top: two hand stones from A-RI-b. Bottom left: purple basalt ground stone axe from C-RI-c. Bottom right: knife sharpening stone from B-RIII-a.

Figure 7.5. Beads from Kirikongo. Top row: glass bead, B-RIII-b; quartz bead, B-YI-a; two bone beads, B-RIII-e; jasper bead (two views), B-YII-b. Bottom row: stone bead, C-RI-c; greenstone bead (two views), B-RIV-c.

out, since knowledge of the broader archaeology of western Burkina Faso is poor. The first tool was a complete, well-made microlithic crescent in brown chert that was stylistically similar to LSA tools in the region (Fontana et al. 2010:Figure 4). It was recovered from the ritual pit associated with the basal burial in Unit C (C-YII-a). The second tool was a small quartz point recovered from the funeral pit associated with the foundation deposit of the reoccupation of Mound 11 (E-RII-a). Both chert and quartz were commonly used for stone tools in LSA sites in western Burkina Faso (Fontana et al. 2010; Holl 2014; Koté 2007), and both types of stone were likely available from river cobbles, from the escarpments within the Mouhoun Bend near Kirikongo, or, in the case of chert, the more substantial escarpments 20 km to the west across the Mouhoun River. Late Stone Age sites in western Burkina Faso tend to be found along drainages and materialize as large scatters of debitage. Eroded ceramics are associated with LSA sites along the Sourou to the north (Fontana et al. 2010). However, the one identified LSA site in the Mouhoun Bend is aceramic, consisting of dense scatters of debitage in chert, quartz, and occasional jasper, and notable for the very low percentage of identifiable tools (Holl 2014; Koté 2007). However, if later occupants of the region collected tools from these sites, that may in part explain the low frequencies of finished tools.

Five dolerite spheres were recovered at Kirikongo: three from Unit A dating to A-YII-a, A-RI-c, and A-RII-a (Figure 7.6), and two in the B-RIV-c pit at Mound 4. Dolerite is found in the Birimian formation to the east of Kirikongo, along with granite, basalt, and greenstone (with gold), as well as in the sedimentary escarpments to the southwest near Bobo-Dioulasso. It is more likely that these derive from the Birimian formation, as they were tinted a dark greenish hue. While not the brighter green of the greenstone itself, this indicated a mafic formation with green

Figure 7.6. Dolerite spheres from Kirikongo: A-YII-a, A-RII-a

minerals potentially nearby. Given their size and round shape, they could have been used for pottery production (as the formation technique until Red II was pounding in a concave mold) or as hammerstones for ground stone tool production. However, they also strongly resemble in form, size, and weight second millennium BC stone spheres found at Rim (Andah 1978); in ritualized accumulations in Nok sites (Rupp 2014), such as the second millennium BC site of Pangwari, where they were thought to be hammerstones, grinders, or slingshots (see Franke et al. 2020); and in the ritual accumulations within Koma sites of the first and early second millennium AD in northern Ghana (Insoll et al. 2012). It is possible that Kirikongo's spheres could be, like microliths, older artifacts obtained during visits to the Birimian region to the east. Also like microliths, four of the five spheres were unbroken. Thus they were differently discarded than the consistently broken granite objects from the Birimian. The A-RI-c sphere was more irregular in form and may have been broken but also may be an unfinished or less modified object.

One small axe made from purple basalt was recovered intact from C-RI-c. Basalt, like granite, is available in the Birimian formations near Safané, at its closest approximately 15 to 20 km from Kirikongo. The axe had a depression similar to those from hafting. Given that this basalt is very light, it is unlikely that it was used for axe-like functions, and its shape may indicate a ritual or ceremonial usage.

Polished Stone Nodules (Pebbles)

Polished stone pebbles were identified in seven contexts, all of which were associated with the founding house and smith/potter specialists at Mound 11, and all were unbroken. These include polished quartz in C-RII-a, C-RIII-a, B-RIII-a, B-RIV-b, B-RIV-c, and E-RIII-a and a polished granite pebble with visible quartz inclusions from B-RI-a. As described in the introduction, distinctive stone pebbles are a common component of ethnohistoric shrines, as materials imbued with the power of localized divinities in the landscape, often found by hunters. The polished stone at Unit E was the largest and could have been used as a burnishing stone in ceramic production. However, this use is not mutually exclusive with its possible role as a powerful object.

Chert Blocks and Ocher

Two large blocks of brown/red chert (one more than 5 kg) were recovered from Kirikongo, indicating that large pieces of usable chert were available, as mentioned above, likely from escarpments within or to the west of the Mouhoun Bend region. Both pieces were of similar thickness (2.5–3 cm) and may represent parts of a natural vein. Both were found in contexts associated with pyrotechnic activities—one with pottery production (E-RIII-a), the other with metallurgical production debris (B-YII-b)—and can be considered as fire-starting tools. They were not clearly broken for interment but had been chipped on the edges, likely from fire-starting activities. Two unbroken ocher crayons were associated with each of these chert blocks. One had a pointed end that likely indicated use for drawing. The other had a larger blunted edge from dragging against a wider surface and strongly resembled ocher crayons personally observed in use for slip production by contemporary potters in the Mouhoun Bend.

Clay Objects

A fired terra-cotta figurine of a quadrupedal animal was recovered from the B-YI-d pit, which also may speak to the symbolic sacrifice of objects. The head and legs had been broken off and did not occur in the pit. A clay ball was identified in the ritual complex (B-RIII-a) near the sacrificial location. It likely preserved due to being slightly heated in the building collapse (Figure 7.7). A bowl full of many smaller clay balls was excavated at nearby Tora-Sira-Tomo, also from a contemporary burned structure that resulted in their preservation (Holl 2014). Two spindle whorls, similar in form and decoration, were recovered from late Red III and Red IV contexts (A-RIII-f, B-RIV-c), and both were deposited in the ritual contexts without being broken (Figure 7.8). While breakage patterns for material culture in Red IV are less systematic than earlier, as described further below, it is possible that spindle whorls, a new item at the site, were not made locally. The Kirikongo spindle whorls are most stylistically similar to those used in neighboring Mali at Jenne-jeno (McIntosh 1995). Lastly, a dense layer of grog was deposited at Mound 11 in Red III (E-RIII-a) at the kiln and associated potting workshop, along with potting tools including ocher, a polishing stone, smoothed rounded ceramic pieces for use as a slow wheel, and a chert block likely used as a fire starter.

Figure 7.7. Unfired clay ball, B-RIII-a

Bone Beads and Scraper

Three small unbroken bone beads were identified in the late Red III era (B-RIII-f). These were metapodial fragments from a medium-size carnivore larger than a dog or jackal (likely a felid) and had cut marks across the shaft from skinning (Figure 7.5). A possible scraper made from a scapula fragment of an animal the size of a medium-large bovid was found in A-RIV-a, with use wear (a polish) on one edge, likely from processing hides.

Cowries, Glass, and Copper

Kirikongo contains a large, extraordinarily well-preserved cowrie shell assemblage that is possibly the earliest in a West African archaeological site (Figure 7.9). The eleventh to mid-twelfth century AD complex of funerary monuments at Unit C (C-RII-a) contained eight cowrie shells; six are *Monetaria annulus* and two *Monetaria moneta*.

Figure 7.8. Spindle whorls. Left: B-RIV-c. Right: A-RIII-f.

These are of equal antiquity to, or possibly older than, the lost trans-Saharan caravan at Ma'den Ijafen (Christie and Haour 2018; Monod 1969), the cowrie excavated at Sadia in Mali (Huysecom et al. 2015), and those from Essouk (Nixon 2017). At Ma'den Ijafen, only 10 out of 3,000 shells were *M. annulus*, with the majority derived from *M. moneta*, which is also the species identified at Sadia and Essouk. This raises the possibility that the early cowries from Kirikongo, which are primarily *M. annulus*, the cowrie taxon more common along the East African coast, may have come to the region via different trading routes (east–west) and perhaps not through the trans-Saharan trade. Current data for pre–twelfth century cowries in West Africa is poor, but the possibility of multiple routes with different species compositions must be raised. Interestingly, three cowrie shells, all *M. moneta*, were also recovered from the successive burned ritual complexes at Unit B (B-RIII-a, B-RIII-c)—two from the first structure that burned, in the late thirteenth century AD, and one from the second that burned, in the late thirteenth or early fourteenth century AD. These may have come through the trans-Saharan trade, as presumably, once cowries entered West Africa, they spread widely regardless of source. The origin dates of the cowries in the first ritual complex (B-RIII-a) are presumed to be thirteenth century, as they were found in the last flooring layer in the complex, but it cannot be ruled out that they were obtained earlier, since the use of the ritual complex spans multiple centuries. The fifteenth century B-RIV-c pit contained a single cowrie shell of the taxon *M. annulus*, which is thought to have been increasingly common, particularly in southern sites along the forest belt (Haour and Christie 2019).

Kirikongo's cowries therefore may reflect shifts in the origin points for cowries in the region. In addition, 11 of the 12 cowries had their dorsal sides removed. Recent research on the Ma'den Ijafen cowrie assemblage indicates that cowries came complete (Christie and Haour 2018; Haour and Christie 2019), and indeed the one cowrie recovered intact was found in a ritual complex in neither a sacrificial location nor in association with a mortuary feature. While cowries could be modified for attachment to cloth or objects, at Kirikongo a strong argument can be advanced that cowries were sacrificed/ritual offerings given the contexts within which they were recovered.

Figure 7.9. Cowrie shells from Kirikongo.
Top row: B-RIII-c, B-RIII-a, B-RIII-a, B-RIV-c. Second and third rows: C-RII-a.

Two other items that indicate long-distance trade connections included a complete copper earring from B-RIII-b and a complete blueish glass bead from the same context (Figure 7.3, Figure 7.5). Both of these materials were unique at Kirikongo and may attest to the special nature of the rituals held after the destruction of the ritual complex at Mound 4.

Material Culture Patterns: Fundamental Elements and Spatiotemporal Variance

As detailed in chapter 6, contexts tended to contain a core assemblage of animal taxa that, regardless of assemblage size, resulted in a baseline diversity measure derived from sacrificed domestic animals (goat, sheep, cattle, and chicken) along with aquatic resources (fish and bivalves). Wild animal usage, including the particular taxa of aquatic resources, varied by excavation unit and by subphase. Similar patterns are present in the inclusion of material culture, indicating that objects in assemblages may have been intentionally selected (Table 7.1, Figure 7.10).

Most contexts contained diverse material culture produced from local materials, with diversified ceramic assemblages, iron implements, small pieces of slag, and sandstone grinding tools. Their frequency and ubiquity were similar to the baseline faunal assemblage, and like domestic animals and aquatic resources, these were fundamental features generally available for ritual purposes to all houses over time. To these could be added the tripod vessels found in most contexts during the era they were produced, from Red I to late Red III/early Red IV. The ubiquitous elements of the material culture assemblage (pottery, iron, sandstone ground stone) are made of materials locally available within the sedimentary formations of the Mouhoun Bend itself, were all modified or made by humans, and were all broken prior to their inclusion in ritual deposits.

Other material classes and object types occurred in patterns more analogous to those of wild animal remains and provide unique insights into changing practices, identities, and divine associations within the community and over time. These objects were made from both local materials (iron, clay, chert, quartz, jasper, sandstone, ocher, bone) and nonlocal materials (granite, greenstone, basalt, dolerite, copper, cowrie, glass), and, as discussed in detail in the next section, their breakage patterns depended on whether they were categorized as human-made. The majority of these objects were recovered from Units B or C and are associated with the founding house.

Aside from pottery, clay objects were quite rare. They include a terra-cotta figurine (B-YII-d), an *initially* unfired clay ball from the ritual complex (B-RIII-a), and two spindle whorls (A-RIV-b, B-RIV-c). Also made of clay was the deposit of grog included with potting tools in Unit E atop the partial remains of a kiln and an associated structure (E-RIII-a). Similarly, while ground stone was ubiquitous, other objects made of local stone were rare. These included stone beads of quartz, jasper, and sandstone (B-YI-a, B-YII-b, C-RI-b, C-RI-c); small polished quartz nodules (C-RII-a, C-RIII-a, B-RIII-a, B-RIV-b, B-RIV-c, E-RIII-a); locally available blocks of chert and lumps of ocher found in two contexts associated with other pyrotechnic evidence (B-YII-b, E-RIII-a); and microlithic tools made of quartz (C-YII-a) and chert (E-RII-a). Bone was rarely worked, and the few modified bone objects included a scraper (A-RIV-b) and three bone beads (B-RIII-f). Finally, products of iron production, both iron objects and small pieces of slag, were recovered from most assemblages, while metallurgical production debris linking to the broader *chaîne opératoire* (iron ore and slag) was limited to eight contexts (B-YI-d, C-YII-a, B-RIII-a, E-RIII-b, and in particularly high density in B-YII-b, E-YII-a, B-RI-a, and E-RII-a), vitrified tuyère fragments in two contexts (B-YI-a, C-RII-a), and non-vitrified tuyère fragments in two others (A-YII-d, E-YII-a).

Many differentially distributed objects were made of stone from the Birimian formation, at least 15 km distant from Kirikongo. Among these, granite ground stone was by far the most common and was found throughout the sequence in a spatially restricted distribution. Dolerite spheres (A-YII-a, A-RI-c, A-RII-a, B-RIV-c), greenstone (B-RIII-a), and basalt (C-RI-c) were even rarer. Although more commonly made of local materials, one stone bead was made from greenstone (B-RIV-c) and one small polished stone was of granite (B-RI-a). Materials likely derived from long-distance trade beyond western Burkina Faso were limited to contexts associated with the founding house, including cowrie shells (B-RIII-a, B-RIII-c, B-RIV-c, C-RII-a) and, in the same context, a copper earing and glass bead (B-RIII-b).

As with animal remains, the diversity of materials recovered from Unit A was less than that that from deposits associated with the founding house (Units B and C). As with all units, Unit A contexts systematically included pottery, iron, and sandstone implements. Granite ground stone and dolerite spheres were the only objects from beyond the local region and were recovered from only the first half of the sequence (Yellow II to early Red II). Rarely occurring objects made of local materials were almost entirely absent, with the exception of a spindle whorl and bone scraper from late Red III and Red IV, which occur during a time of general economic changes at Kirikongo. Overall, the residents of Mound 1 did not have access to many locally and externally derived object classes (polished stones, microliths, stone beads, long-distance trade items, and so on), and during Red II they seem to have lost access to materials from outside the Mouhoun Bend entirely.

The excavations at Mound 4 (Unit B) and the associated Mound 3 (Unit C) produced by far the most diverse assemblages of material culture at Kirikongo. Rare finds were found throughout the excavation sequence in both units, with two particularly rich and diverse contexts in Unit B (B-RIII-a, B-RIV-c). Some types of objects and materials were found only in these founding house deposits. These included a clay ball, a terra-cotta figurine, small basalt axe, a polished granite pebble, and stone beads made of local quartz, jasper, and sandstone as well as Birimian greenstone. Most notably, all excavated items that originated outside of western Burkina Faso (cowries, copper, glass) were recovered from these units. In addition, most rare objects that occurred elsewhere at Kirikongo were also represented in Units B and C, including granite ground stone, polished quartz pebbles, a microlithic stone tool, ocher, chert, a spindle whorl, and a dolerite sphere.

Temporally, as with all units, ceramics, iron, and sandstone implements were found throughout the sequence at Units B and C. Several contexts from Yellow II and Red I had high densities of metallurgical production debris, including iron ore, and many of the rare objects made of local materials (terra-cotta figurine, local stone beads, microlithic tool, ocher, chert) occurred in the first part of the sequence as well. After mid-Red II, the diversity of objects made of local materials decreased, with the primary continuing object class being the polished quartz pebbles (including those in Unit C in Red III after the cessation of active interments). At the same time, objects made of extralocal materials and/or imported items remained common and increased in diversity, with the spindle whorl, dolerite spheres, greenstone bead, and copper and glass appearing for the first time in Red III and Red IV. Cowries and granite objects spanned the transition.

At Mound 11, the earliest levels in Unit E were pyrotechnic features that had been deconstructed after use and contained only pottery and metallurgical debris (iron ore, slag, a tuyère). With the reoccupation of the mound in late Red II and through Red III, contexts contained a diverse array of objects and stones representing a range of materials available in the local Mouhoun Bend (pottery, grog, iron, sandstone, ocher, chert, a quartz microlith, a small polished quartz stone, slag, and iron ore). However, the unit did not contain any materials from the Birimian formations or beyond.

Overall, in addition to a baseline shared diversity of material culture throughout most contexts, those associated with the founding house contained a greater diversity of both local and externally derived (either Birimian or long-distance) objects over time. A significant shift occurred in Red II, when Unit A may have lost access to nonlocal materials, and while the founding house contained a more reduced set of locally derived objects, there appears to be an increased focus on exclusionary control of materials from the Birimian and beyond. In contrast, the new pyrotechnic specialists at Mound 11 maintained a wide diversity of locally derived objects but completely lacked materials from beyond the Mouhoun Bend. Finally, some of the clear Red IV changes in the faunal assemblage related to commodities production for trade are potentially hinted at in the material culture. The bone scraper could have been used for leather production and the spindle whorl for cloth production. The presence of a bead from a gold-bearing greenbelt could suggest links to or awareness of gold production in the Birimian formation.

Broken and Unbroken: Ontologies of Creation and Use

A defining feature of the architecture and material culture found in different contexts was that most objects were likely purposefully broken, as they were in very good condition

Table 7.1. Presence/absence of material culture at Kirikongo

Context	Pottery	Tripod	Iron Object	Sandstone	Isolated Slag	Polished Stone (quartz)	Microlith	Local Stone Bead	Clay Ball	Clay Figurine	Spindle Whorl	Bone Bead	Bone Scraper
A-YI-a	X		X		X								
A-YII-a	X		X	X	X								
A-YII-b	X		X		X								
A-YII-d	X		X	X	X								
A-RI-a	X	X	X	X	X								
A-RI-b	X	X	X	X									
A-RI-c				X	X								
A-RII-a	X	X	X	X	X								
A-RIII-a	X			X									
A-RIII-b	X	X	X	X	X								
A-RIII-c	X	X	X	X	X								
A-RIII-e	X		X										
A-RIII-f											X		
A-RIV-a	X	X	X	X									
A-RIV-b	X		X	X	X								X
A-RIV-top	X		X										
B-YI-a	X							X					
B-YI-c	X												
B-YI-d	X		X	X	X					X			
B-YII-a	X												
B-YII-b	X		X	X	X			X					
B-RI-a	X				X								
B-RI-b	X	X		X									
B-RII-a	X				X								
B-RII-b	X												
B-RIII-a	X	X	X	X		X			X				
B-RIII-b	X	X	X		X								
B-RIII-c	X												
B-RIII-d	X		X										
B-RIII-e	X		X	X	X								
B-RIII-f	X	X	X	X								X	
B-RIV-a	X		X	X	X								
B-RIV-b	X		X	X		X							
B-RIV-c	X		X	X	X	X					X		
C-YII-a	X		X		X		X						
C-RI-a	X												
C-RI-b	X							X					
C-RI-c	X	X	X	X				X					
C-RII-a	X			X	X	X							
C-RIII-a	X	X	X		X	X							
C-RIII-b	X		X	X									
C-RIV-a	X		X		X								
E-YII-a	X				X								
E-YII-b	X		X										
E-RII-a	X	X	X	X	X		X						
E-RIII-a	X	X	X	X	X	X							
E-RIII-b	X		X	X	X								

Note: A-YII-c, A-RIII-d, and B-YI-b contained no material culture.

Grog Deposit	Ocher	Chert	Slag with Iron Ore	Tuyère	Granite	Dolerite Sphere	Greenstone	Purple Basalt	Polished Stone (granite)	Greenstone Bead	Glass Bead	Copper	Cowrie Shell
						X							
				X	X								
					X								
					X								
						X							
						X							
				X									
			X										
	X	X	X		X								
			X						X				
					X								
			X		X		X						X
											X	X	
													X
					X								
					X								
					X	X				X			X
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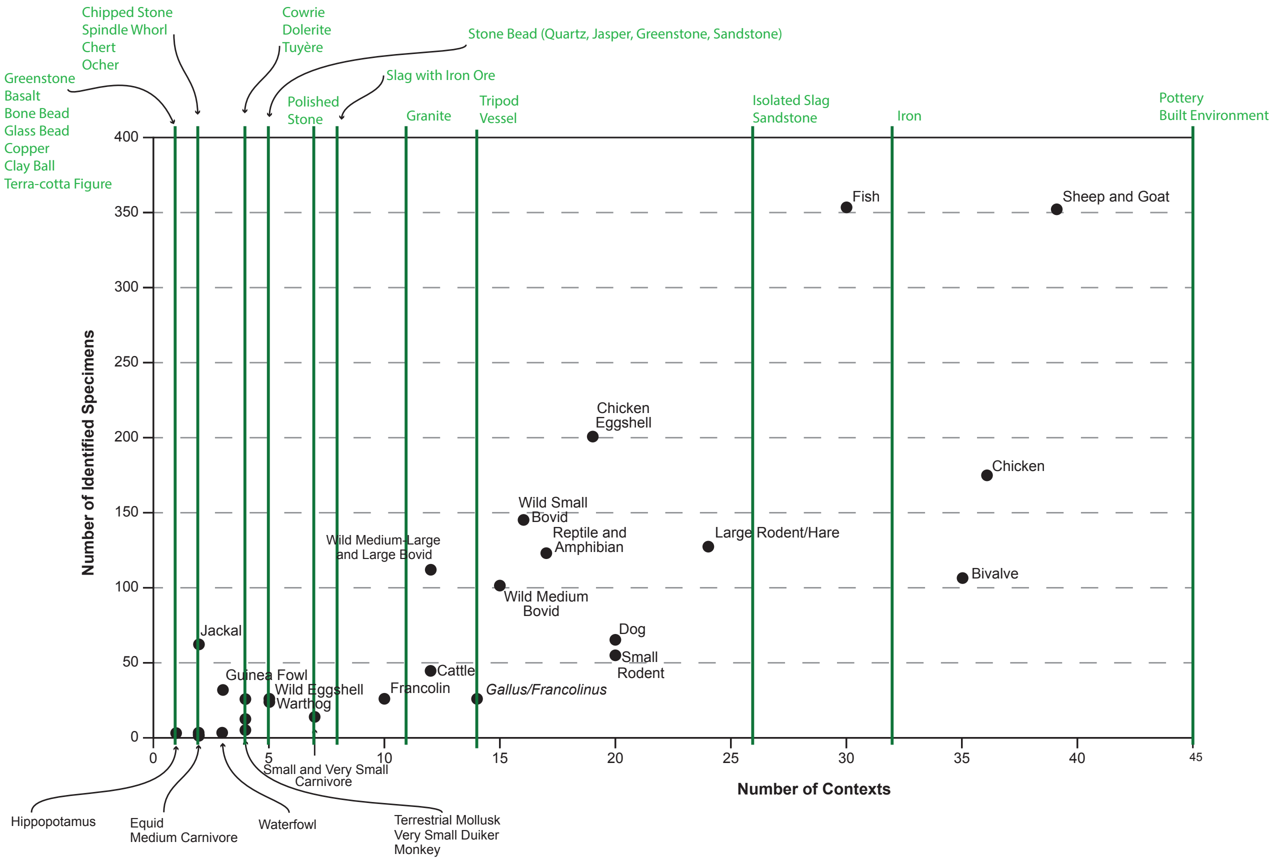

Figure 7.10. Ubiquity of material culture classes compared with categorized animal taxa

(rarely heavily worn) and contexts contain only representative portions of objects. Objects were clearly sealed into the contexts shortly after interment, and contexts tended to have at least a baseline diversity of types of material culture and animal remains. A strong argument for material sacrifice can be advanced based upon these patterns. Moreover, arguments for material sacrifice can be substantiated as well through exploring patterns in the materials that were not broken, which connect to the ontological distinctions between sacrificable entities and materials (domestic animals, locally manufactured objects), and those that cannot be sacrificed (wild animals, natural substances, objects manufactured by divine entities), as they can't belong to people, but are rather are materializations of relations with emplaced divinities in the landscape.

Systematically broken material culture included diverse pottery within contexts, ground stone implements, stone beads, iron tools, tuyères and possibly slag, a terra-cotta figurine, and even cowries. Binding this set of broken objects (with the exception of cowries) is that they were all likely locally created (manufactured or made) of materials that could have been obtained by the inhabitants of Kirikongo within 15 km. As discussed in chapter 1, material culture is connected to people through creation and/or use, and many of the transformative processes of natural substances involve extensive ritual practices.

Intact objects and materials included in contexts were either unmodified (untransformed) natural substances, objects often thought to have been made by divinities (nonhumans), or objects of unknown origin derived from long-distance trade. For example, polished stone nodules of quartz or granite were likely created by natural processes and all were unbroken, as were two chert blocks that both appeared to be unmodified sections of a chert stratum likely used in fire-starting and two ochre crayons that were unmodified. The unbroken microliths were likely collected from local LSA sites, and they may have been associated with local divinities, as special objects found in the landscape are in the ethnohistoric record (Cremer 1927; Dugast 2015, 2016). As described above, the unbroken dolerite spheres are also possibly of deeper historical origin and could have been collected as powerful objects not created by people. The small basalt axe, strongly resembling polished stone axes of the second millennium BC or earlier, was also unbroken. Some of the small (often elaborate), complete ground stone tools occasionally present at the founding house could also have been found objects from prior periods of time.

Long-distance imported objects that were unbroken included a glass bead, a copper earring, and potentially spindle whorls. As there is no evidence for the local production of glass and copper objects, and spindle whorls initially appear during a time of increased interaction with long-distance trading systems, these may have been classified as non-sacrificable due to their distant origins. Consistent with logics of sacrifice (divisions of wild and domestic), the bone beads and scraper likely made of wild animal bones were not broken during interment, as local wild animals cannot be owned due to their connections to divinities.

Cowries are a unique case as imported objects that were broken. Cowries differ from other imported objects in that they are the remains of an animal that served as a transferable exchange or currency item. As discussed throughout this book, the classification of domestic animals as sacrificable is rooted in their position as entities unconnected in origins to local divinities; thus they are solely associated with people of their own accord. Cowries, as derived from living entities (they are not made) unconnected to local divinities share a fundamental ontological feature with domestic animals, potentially allowing them to be sacrificed and more easily alienated.

I argue, consistent with the logics discussed in chapter 1, that sacrifice at Kirikongo enabled the necessary detachment that allowed a person to transfer to the afterlife but that the representative parts left emplaced provided a foundation for ancestors to play a role with their descendants and sanctify future activities. In some cases, these sacrifices were directly associated with nearby burials and/or recently closed architecture. Differences between houses in their divine associations are indicated by differential access to non-sacrificed objects, which when combined with patterns in wild animal remains substantiate arguments for histories of relations with divinities in the surrounding landscape.

Botanical Remains

Sealed within these emplacements, animal remains and material culture were not found alone. As suggested above, deposits systematically incorporated parts of a feast as well as associated objects and in some cases animal parts of non-consumed animals. Macrobotanical analyses for the site are still in progress, but the seed and fruit identifications are available for Unit A and occasional contexts elsewhere (Gallagher and Dueppen 2019; Gallagher et al. 2016). The results to date indicate that like the fauna, macrobotanical remains were primarily associated with discrete accumulations. These suggest primarily food consumption and preparation activities, and Unit A lacked the threshing waste often seen in archaeological deposits. Crops such as fonio (*Digitaria exilis*) and pearl millet (*Pennisetum glaucum*) were systematically recovered in these contexts, as were the parched shells of shea nuts (*Vitellaria paradoxa*), which are waste produced during the multiday shea butter production process. Sacrifice and ritual processes ethnohistorically often involve plant-based food offerings, and it would be unsurprising if the ritual events seen in the zooarchaeological and material culture data also involved plant-based fats and foods. The presence of brewers and small drinking vessels (bowls and beakers) in many deposits could indicate the use of alcohol as well.

Ritualized use of crops is supported by the presence of a sprig of sorghum (*Sorghum bicolor*) that had been hanging in the ritual complex when it burned (Room 4, B-RIII-a); in the ethnohistoric record, hanging the first or last harvested grain head is a common harvest-related practice (Capron 1973; personal observation). Sorghum, most often used for beer production, was not present in the Unit A macrobotanical assemblage, but its absence may reflect differential opportunities for carbonization if it was primarily used for brewing (Gallagher and Dueppen 2019:150). Given the seasonality of the fauna assemblages, ritualized practices were planned events; the consistency of botanical elements (such as shea shell) may also suggest that other parts of the feast were systematized along with ritual sacrifice, aquatic resource collection, and hunting.

The combined faunal, botanical, and material culture remains indicate that complex ritual processes were involved in the creation of deposits. These ritual processes took place in particular seasons at different mounds, and the deposits include the remains of likely multiple days of events and feasting preparations, including making shea butter, brewing, fishing, hunting, and sacrifice of livestock. To these are added rituals related to sacrificing material culture, possibly after feasting, as vessels for processing and consuming foods, brewing, and serving beer are common. Within the diversified assemblage of pottery, small finely decorated serving vessels (beakers, bowls), including small footed vessels and tripod ritual vessels, occurred in particularly high frequencies.

Mortuary Patterns and House Identity

As described in an earlier publication (Dueppen 2012a), only a small subset of the burials identified at Kirikongo were excavated. Human remains from Kirikongo are curated in the Local Museum of Douroula, 6 km from the site, by Lassina Koté of the University of Ouagadougou, as are material and archaeobiological finds excavated from the site. These await bioarchaeological analyses, which have been delayed due to interregional instability in rural and northern Burkina Faso and Mali over the past several years. During excavation some preliminary demographic assessments were made. While these must be used with caution pending full analyses, several observations can be made based upon these preliminary findings in combination with the contextual analysis. First, people of very different ages were interred in monuments, from infants to adults, with infants and smaller children receiving funerary rituals that involved baseline sacrifices similar in scale to adults. However, the material culture offerings associated with children were more streamlined (with the exception of some small, finely made vessels in Unit C), perhaps indicating that it was indeed objects that people owned in life (achieved) that were included in association with adult mortuary features. That children were commemorated with funerary rituals and monument construction may provide additional support for strong house identities seen in other lines of evidence at the site (see Dueppen 2015) that were rooted in membership from birth. That house membership was connected to forms of ascribed status is indicated by the fact that membership in the founding house meant that even infants and small children received cattle sacrifice and cowries at a time when adults elsewhere in the site did not.

Another observation is that men and women both likely received elaborate funerary rituals. For example, while confirmed sex determination requires additional analyses, one of the burials at A-YII-d was likely of an adult man in a monument with elaborate material culture and livestock sacrifice. Likewise, the burial of likely an adult women in C-YII-a was one of the most elaborate burials at the site, with multiple cattle sacrificed, in addition to a wide array of wild resources. Confirmation of these field determinations and further analyses will be of great interest. Bioarchaeological analyses of burials at sites elsewhere in the Mouhoun Bend (Maes and Walker 2014:191–94) also indicate that both men and women were buried with equally elaborate funerary rituals, in some cases within the same burial monument.

The last, and related, point here is that many if not all constructed mortuary monuments may have contained or commemorated multiple individuals, while burials in abandoned houses and courtyards, and foundation deposits, may have been for individuals. However, the difference may not be in actuality that great, as burials within individual structures that are part of a complex architectural compound are also in some regards group burials, as the house members are linked in death as they were in life.

Mounds as Emplacements of Made Ancestors

In the ethnohistoric record of West Africa, ancestors are active members of an anchored community who have agentive behavior with the descendant community. Ethnographic studies of funerary practices in western Burkina Faso and neighboring areas have documented the processes of making ancestors through proper ritual practices that allow transition to the afterlife, simultaneously anchoring souls to a place along with their associations (objects, divine alliances) (Bicaba 1975; Cremer 1927; Goody 1962; Saako 2017). At Kirikongo, the analysis of the manner of architectural destruction and construction, condition and location of material culture and faunal remains within these contexts, and repeated ritual practices indicates similar processes of attachment and detachment.

Detachment is materialized in the destruction of existing structures (whether a house, forge, kiln, or courtyard section), the fragmentation of material culture, and the sacrifice of domestic animals. While detachment would appear to be a systematic goal, attachment is equally important. Architectural foundations were left in place or, in the case of cemeteries, partially constructed; fragments of objects and animals that were sacrificed were interred; and materials and taxa that represent ongoing relationships with divinities were integrated as well. Sacrificed animals and plant-based foods likely also helped create new attachments with the deceased in their new status as ancestors in a first meal of co-presence between the living and dead. In the region today, the ground within which ancestors are buried is vital, and the mounds at Kirikongo reference a desire to emplace ancestors within the space connecting them to deeper histories of occupation. The placement of the ritual complex in a semi-subterranean setting atop a sequence of elaborate tomb structures invokes these connections. For areas that were abandoned, lacking continuity with tombs below, ritualized foundation deposits were dug into the spaces before new construction.

Animals clearly played an important role in rituals related to making and maintaining ancestors over time and also provide a basis for interpreting the associations of the social houses in the community, as they contain parts of wild animals that materialize connections to divinities in the landscape. Domestic animals likely invoked both detachment and attachment in the proper ritual process but also provided the communally consumed meat that enabled feasts, a role supplemented increasingly over time by wild taxa as these events grew in scale. Both the rituals themselves, involving feasts and destruction/construction events, and the material results in the form of ritualized deposits made ancestors and solidified the eternal co-presence of people and ancestors in a particular place. In so doing, the mounds themselves were loci of ritual action, where in daily life, current occupants could invoke and maintain their ancestors, some of whom had particular or institutionalized (between a house and particular divinity) alliances with divinities in the landscape. Named or remembered ancestors likely played a more direct role in intercession, as from AMS dates and discrete ceramic chronologies, it seems that layers within mortuary constructions were added, with truncation of previous monuments at multiple generation marks. For example, the Unit C monuments included eight events over 450 to 500 years, and similar timing is seen in Unit A from Yellow I to II and in Unit B from Yellow I to Red I.

Overall, mounds at Kirikongo were sanctified living spaces and/or veneration points for accessing attached ancestors in daily life. It is these cultural practices that resulted in the formation of deeply stratified and long-term spatially segregated mounds, some of which were in continual use for almost 1,500 years.

Revisiting Kirikongo's History

The reanalysis of contexts, inclusion of faunal remains, and reassessment of material culture patterns in relational frameworks have broadened understandings of Kirikongo. Here I revisit the synthetic narrative of the site's history presented in chapter 2. While basic elements of the narrative remain similar, I demonstrate how the knowledge that most of the fauna, material culture, and botanical remains derive from ancestor-related rituals augments our understanding of the archaeological sequence in fundamental ways (Table 7.2).

Yellow I, ca. AD 100–500/550

Kirikongo was established as a single homestead by at latest the early first millennium AD, likely as part of a regional settlement pattern of dispersed homesteads. The excavation unit at Mound 4 was likely to the west of the habitation area if spatial syntax from later periods extends to the early sequence. The Yellow I deposits at Mound 4 consist of multiple layers sealed by pounded clay floors and a capped pit, which are likely part of mortuary monuments. The earliest layer was atop the basal laterite, and there may have been a small raised platform due to the postholes. Near the end of Yellow I in the late fifth or early sixth century AD, a deep pit (B-YI-d) was dug through the earlier layers down to the laterite base, potentially suggesting ancestral anchoring to place. A large area with metallurgical production debris (including parts of smelting furnace walls, tuyères, and slag) was located to the west of Mound 4. Shortly before the B-YI-d pit at Mound 4 was dug (likely ca. AD 350–450), a single mortuary layer was deposited at Mound 1. A second metallurgical production area was located to the west.

Mortuary deposits at both mounds contained components of feasts, including sacrificed domestic goats, cattle, dogs, and chickens and the remains of fish and shellfish collected in and around the Mouhoun River. Although the evidence is less direct, other foods, including shea butter,

Table 7.2. Use of technologies and resources at Kirikongo

Technology/Resource		Early Years AD	Late Years AD	Notes
Architecture	coursed earth	100	1500	Likely present from beginning of sequence
Architecture	earthen brick	700–750	1500	
Architecture	fired brick	900	1280–1310	Used only in ritual complex
Architecture	pounded clay floor	100	700–800	
Architecture	laterite pavement	650–700	1500	
Architecture	two-story architecture	900	1280–1310	Likely after the development of laterite pavement techniques
Ceramics	pounding in concave mold	100	1150	Ceases as primary method around AD 1150; may be a minor technique throughout sequence
Ceramics	punch and draw	1150	1500	Primary method during this era
Ceramics	mat impressions	100	1350–1400	Become less common after AD 1150
Ceramics	cord roulettes	100	1500	
Ceramics	carved roulettes	600	1500	Become less common after AD 1350
Ceramics	comb impressions	600	1500	
Ceramics	burnishing	100	1500	
Ceramics	slip	100	1500	
Ceramics	open firing	100	700	Ceases as main firing technique in AD 700; may be a minor technique throughout sequence
Ceramics	kiln firing	700	1500	
Ceramics	intentional blackening	500	1500	
Iron-working	smelting furnaces	100	700–800	Likely bowl furnaces
Iron-working	semi-subterranean smelting furnaces	700–800	1350	
Nonlocal stone	dolerite	350–500	1500	
Nonlocal stone	granite	600	1500	
Nonlocal stone	basalt	900	900	
Nonlocal stone	greenstone	1280–1310	1500	
Imported items	cowrie shell	1000–1100	1500	Primarily *M. annulus* in eleventh and twelfth centuries AD; primarily *M. moneta* in thirteenth and fourteenth centuries AD; *M. annulus* in fifteenth century AD
Imported items	glass	1280–1310	1280–1310	Bluish color
Imported items	copper	1280–1310	1280–1310	
Industry	cloth	1350–1400	1500	
Animal products	skins	1425–1500	1425–1500	
Animal products	leather	1450–1500	1450–1500	
Animal products	ivory	1450–1500	1450–1500	
Domestic animals	cattle	100	1150	
Domestic animals	goats	100	1500	
Domestic animals	chicken	100	1500	Bones and eggshell
Domestic animals	dog	100	1500	
Domestic animals	sheep	800–900	1500	
Domestic animals	horse	1150–1200	1150–1200	
Domestic animals	donkey	1260–1320	1260–1320	
Domestic animals	guinea fowl	1280–1310	1500	Bones and eggshell

Note: "Early" is the earliest date of appearance at Kirikongo (categories at AD 100 are present from foundation). "Late" is the latest date of use at Kirikongo (categories at AD 1500 are still in active use at the end of Red IV).

millet, fonio, and beer, were likely incorporated as well. Sacrificed material culture included a quartz bead, a terracotta figurine, well-crafted iron objects, metallurgical debris (broken tuyère and slag), and sandstone, likely from a lower grinding stone. The elaborately constructed B-YI-d pit (ca. AD 450–500) from Mound 4 differs from the other deposits (including both the Yellow I context from Unit A and earlier contexts in Unit B) in scale and kind. The interior contained primarily domestic animal parts (including parts of two dog heads), wild bovid postcrania, and an extensive fish assemblage. In contrast, the cap deposit overlying the pit, which was potentially a surface shrine, included wild animal parts (largely crania of animals that live in dens in the earth or consume termites), domestic animal crania, and the first combined occurrence of slag and iron ore at the site. The accumulation of animal associations in the cap deposit may have occurred over several decades after the funeral pit was initially created, perhaps as relevant animals were encountered in the landscape. It is notable that nonaquatic wild animal taxa are identified at Kirikongo for the first time in B-YI-d and that their inclusion in the ritual deposit follows the founding of a second house.

The seasonality of ritual deposits is present from these earliest layers, with contexts in Unit B having evidence for occurring at the end of the rainy season or in the early dry season, when shallow-water contexts were still available, and with the context in Unit A suggesting a dry season deposition. Both houses smelted and smithed iron at this time, as each was located east of an iron furnace along the seasonal drainage. Both houses produced their own pottery, as indicated by minor variance in lip morphology, but with the same technique (pounding on a mat in a concave mold) and with the same decorations (red slip, braided strip roulette, mat impressions).

Overall, during Yellow I, dispersed houses valued livestock and access to the river, produced their own pottery, smelted and smithed iron, and buried their dead in monuments likely located to the west of their residences. Mortuary rituals invoking wild animal associations related to the deep earth and shallow water were initiated at Mound 4 upon the development of a multi-house community, but funeral feasts in both cases would have been elaborate events involving large groups of people.

Yellow II, ca. AD 500/550–700/750

In the mid-first millennium AD, Kirikongo continued to grow and diversify. In the early part of Yellow II, Unit A continued as a burial area within Mound 1, with multiple successive early layers and several discrete pits excavated for interment of ritual deposits. One early burial deposit, A-YII-a, included the construction of a coursed earthen structure with low walls and a pounded clay floor that a subsequent burial pit truncated. The A-YII-b pit also extended into the laterite basement. Like the B-YI-d pit, it suggests ancestral anchoring or emplacement. In the latter half of Yellow II, a larger burial monument (A-YII-d) or collective tomb with a coursed earthen structure and pounded clay floor was constructed; below this multiple burial pits of adults were identified. In the lower pits and within the collective tomb, the ritual deposits included primarily domestic livestock (cattle, goats, and dogs) and aquatic resources, once again from the dry season. The horn of a common duiker was found in A-YII-d, and matching previous practice, a dog cranium was included in the A-YII-b pit that extended into bedrock. The broken pottery contained a diversity of vessels, including numerous small beakers for drinking. Unit A had slag and high densities of well-crafted iron objects early in the phase, diminishing to low densities of nonidentifiable fragments by the end of Yellow II. An unbroken dolerite sphere occurred in A-YII-a. A pyrotechnic production area was set 2 m to the north of the A-YII-d mortuary structure, containing evidence for pottery firing and possibly metalsmithing, with highly fired earth. The iron-smelting installation to the west of Mound 1 was abandoned around the start of Yellow II.

Meanwhile, the eastern side of Mound 11, located on a thick pure clay deposit off the main laterite basement underlying other mounds, was founded during early Yellow II as a pyrotechnology activity area. The earliest occupation (E-YII-a) contained parts of a metallurgical production area and a very restricted ceramic assemblage resembling vessels from the founding house (Mound 4). Animal remains were the most numerous finds, with domestic livestock (including cattle), dog, and chicken (one of if not the earliest confirmed in sub-Saharan Africa outside of Ethiopia), in addition to shallow-water fish. The dog was treated differently from earlier mortuary contexts in Units A and B, as cranial remains were lacking. In addition, two potent parts of wild animals were present: an oribi horn core and the complete mandible of a wildcat, an animal that inhabits dens in the earth. The next layer was a shea-parching oven that contained no fauna, and at the very end of Yellow II there is evidence for an early pottery kiln (E-YII-b) associated with a smaller ritual deposit that incorporated an older goat, chicken, and shallow-water resources.

During Yellow II, excavations at Unit B identified two different tombs (B-YII-a, B-YII-b), the lower one of an infant that had broken pottery and a reduced set of animals in the accompanying ritual deposit, and the later one an individual with an elaborate tomb constructed of a ring of iron ore and slag (with red laterite pavement) and a chert block fire starter. In addition, a complete ocher crayon and a broken red jasper bead were recovered, as were broken elaborate pots and a rich faunal assemblage that was extensively burned. The associated feast was elaborate, most similar to B-YI-d, with an extensive fish faunal assemblage, as well as domestic livestock, fowl, and hunted animals, including those that inhabit dens and/or shallow water. At the very end of Yellow II, Mound 3 was established as a burial area for individuals, with pottery associated with the founding house (Mound 4). Here, the lowest layer (C-YII-a) comprised an adult burial into bedrock, with a discrete accompanying pit that contained the remains of an elaborate feast, including multiple cattle individuals and diverse wild resources, including burrowing animals and shallow-water taxa. The pit also contained objects such as a complete microlithic crescent, pottery sherds, slag, and iron ore. An associated nearby pit contained a large fragment of a purposefully broken pot neatly set within. The end of Yellow II also saw new mounds (houses) established to the east and southeast of Mound 4 (Mounds 6 and 7), beginning a process of clustering, or spatially centering, the founding house. In addition to innovations in pottery firing technologies, ceramics at Kirikongo also innovated during Yellow II, with highly individualized vessels, intentional blackening, and the use of new decorations such as carved roulettes. Granite was added to sandstone as a grinding implement and was available to multiple houses.

In general, the end of Yellow II appears to be a time of extensive change and transformation at Kirikongo. By early Yellow II, Mound 1 had ceased to smelt iron. Contexts never included iron ore, and late Yellow II provides the last evidence for smithing at the mound. Moreover, the mortuary monument was not used after late Yellow II. Meanwhile, the founding house experimented with kiln firing technology and, following construction of a tomb in Unit B containing extensive metallurgical symbolism, established a new cemetery monument to the west, near the mound's original iron furnace location. It continued to be associated with animals of the earth and shallow water and to perform mortuary ceremonies during the harvest season.

Red I, ca. AD 700/750–1025

At the start of Red I, Mound 11 was abandoned, not to be reoccupied until late Red II several hundred years later. Shortly thereafter, in early Red I, smelting activities shifted to the south of Mound 4, and it would appear from the nature of the remains that a shift in smelting technology occurred at that time, from surface furnaces to possible construction of subterranean furnaces (see Dueppen 2012a). New mounds continued to cluster around Mound 4, with Mound 2 established, creating a denser core, and it is possible that Mounds 5, 8, and 12 may have Red I basal deposits as well. In early Red I at Mound 4, a mortuary monument with a burial pit (B-RI-a) was constructed. Similar to B-YII-b, B-RI-a was built from metallurgical debris, including slag and ore, and included fine pottery as well as feasted remains of domestic livestock, chickens, and shallow-water aquatic taxa. Atop this monument were the basal layers of the ritual complex that was built in the tenth century AD (based on a date from a charred roof beam) and would last until mid-Red III (B-RIII-a), likely 300 to 400 years later. The early remains from the ritual complex were found in the sacrificial opening in the floor and consist of the established codified set of sacrificed domestic animals and hunted animals, some burrowing and some shallow-water aquatic taxa. Material culture included a broken knife-sharpening sandstone block and the first broken tripod vessel from Mound 4. Most notably, the ritual complex was constructed of fired brick, a very early example of this technology in West Africa, and it was likely semi-subterranean, like the furnace.

The cemetery at Mound 3 in Red I comprised three layers. The bottom layer (C-RI-a) contained a very small structure of earthen brick with a laterite pavement floor.

The second layer (C-RI-b) contained a larger coursed earthen structure with a pounded clay floor built over an adult burial and adjacent pit for feast remains. The final layer (C-RI-c) was a series of adult burials that were excavated through C-RI-b and surrounded by wall fragments whose dimensions and placement were unable to be discerned due to disturbance by Red II burials. These layers had roughly comparable faunal assemblages, with cattle and small stock, chickens, and diverse hunted taxa, including burrowing animals and shallow-water taxa, as well as diverse material culture, including small beakers and, in the final layer, tripod vessel fragments. An unbroken basalt axe and two broken stone beads in different layers, one in quartz and the other polished sandstone, were also present.

During Red I, Unit A became part of a habitation area, as a thick (up to 20 cm) laterite pavement flooring sequence was paved over the unit. The section indicates multiple refloorings, particularly in the areas where soft burial deposits underlie the unit, perhaps indicating that the floors were cut at certain points for burials. The architectural foundations on the final flooring layer indicate that the area excavated was likely part of a closed compound with multiple internal cells that may not have opened onto one another. Burials occurred in different parts at different times, closing off highly designated areas, while elsewhere structures continued to be used. The earliest burial (A-RI-a) occurred in the courtyard near a shea-parching oven, likely in the early tenth century, with a discrete burial pit. A second burial occurred later in the center of the northwestern structure (A-RI-b). Unlike the ritual deposits associated with burials in Yellow II and contemporary ones in Mound 3, these deposits did not contain cattle remains. While they did include hunted animals, the amount of meat decreased and they constitute smaller feasts than previously. Objects indicate systematic breaking of material culture, with diverse pots (including finely decorated beakers) and serving vessels, tripod vessels for both identified burials, an iron bracelet broken cleanly in half in the courtyard, and a diverse array of purposefully broken grinding equipment (including a large ceramic lid from a storage jar) in the ritual deposit near the burial pit in the northwest structure, which also contained the remains of a grinding platform. Another structure in the northeast (A-RI-c) contained a dolerite hammerstone similar to that from Yellow II and hunted fauna, perhaps relating to another burial in this space. Upon abandonment of both the courtyard and structures, a new building sequence was constructed in Red II.

Red I was a time of significant technological change at Kirikongo, as all pottery from at least two potting traditions was fired in kilns, resulting in a dramatic transformation in density, color, and firing conditions in vessels, despite continuity in technique, form, and style (see Dueppen 2015). Carved roulettes, also with roots in Yellow II, became increasingly common, and new decorations appeared, including folded-strip roulettes, twisted twine that quickly replaced braided strip roulette, and a new diagonal style of mat impressions, despite continuity in forming technique. Tripod vessels were likely locally produced, having been fired in kilns and decorated with locally popular techniques, including carved roulettes. Ceramic styles between the Mound 1 and Mound 4 traditions diverged even more during Red I, with generally more extensive investment in pottery production and decoration at Mound 1, which at this time no longer smelted or smithed iron or consumed cattle.

In Red I, regional connections continued with the east and south (indicated by granite and basalt), as well as to the north and west (indicated by decoration techniques and the tripod form). Other innovations include the development of new architectural forms, as earthen brick appeared in multiple structures and fired brick in another, in addition to continued coursed earthen techniques and the significant development of laterite pavement floors that defined the phase. (Earlier experiments are found in Yellow II.) Moreover, it is likely that terrace roof techniques (confirmed in Red II collapse) were used during this period, as the close proximity of the shea-parching oven to architecture (common today in the region) is unlikely to have occurred with thatched roofs, and laterite pavement is the technology that allows second-story architecture.

Red II, ca. AD 1025–1200

Red II can be divided into an early and a late component due to a series of fundamental transformations that took place midway through the phase. In early Red II, the community was likely a 400 to 450 m–diameter circular cluster of nine mounds, with varying space between mounds and hundreds if not more than 1,000 inhabitants occupying the 20 ha site. The Red II deposits at Mound 4 are the richest, as the last levels excavated prior to a significant reduction in the size of Unit B dated to this phase. The ritual complex's Red II levels contained diverse broken pottery, chicken, and a rib of a cattle-size animal. By this time, and possibly from its foundation, the ritual complex was likely semi-subterranean (like the furnaces), as Red II residential structures only a few meters to the east had floors 1 m above the Red II floor in Room 3 of the ritual complex. These structures included the entrance to what appears to be a large internally paved compound, at least 40 m in diameter if the angle of the courtyard wall continued beyond our excavation unit. Between this and the ritual complex was at least one smaller structure (B-RII-b) that may have been part of the ritual complex. Excavation in this structure recovered broken pottery and animal bones similar to those in the ritual complex, including shrew and shallow-water reptiles.

Mound 3 was used for a series of at least four successive cemetery monuments, with at least the first three for infants and child burials (C-RII-a). These contained a variety of diverse broken ceramics, including a special class of very finely made thin beakers, but lacked the tripod fragments, iron, stone beads, and ground stone common in adult burials, with stones from the bottom of the level likely derived from the tombs below. While the ritual deposits had different contents than those associated with adult burials, these tombs were very finely made and contained some of the only cattle remains from Kirikongo in early Red II (other than the ritual complex). In addition, very young sacrificed sheep/goats and many chickens were deposited, along with burrowing wild animals and aquatic taxa from shallow-water contexts. Of particular significance were eight cowrie shells from two different taxa scattered throughout the context. With a date no later than the early twelfth century AD, this is one of if not the largest and earliest set of cowries excavated in West Africa, with some cowries likely dating to the eleventh century AD. The species composition favoring East African taxa may indicate involvement in east–west trading networks. Consequently, infants and small children here received not only cattle but also cowries, neither of which were found associated with adult burials elsewhere in the community at this time (or ever in the case of cowries).

In early Red II at Mound 1, the northwestern structure (A-RI-b) had been converted into a burial monument just prior to the start of the phase and a new architectural layer was constructed on top. As with Red I, it appears to have been an interior section of a large internally segmented compound with multiple rooms. The northern structure had a pot inset in the floor, outside of which was a paved courtyard, while the larger southwestern structure had a grinding installation and storage pots, closely resembling the northwestern structure from Red I. A third structure was found in the southeastern unit. At some point in this flooring sequence, a burial pit was excavated in the space between the southern buildings, and a ritual deposit was placed to the north of it. This contained animal bone (domestic animals, aquatic taxa) similar to that of the Red I deposits below, as well as broken tripod vessels, small footed vessels, and other diverse pots and material culture, including a complete dolerite sphere similar to those from Red I and Yellow II, the last recovered from Mound 1. Subsequently, a wall was constructed over this area to connect the two southern structures. This is how the unit would remain, as this part of the mound was abandoned in mid-Red II. All three formerly active structures had their terrace roofs and walls collapse upon them, with the quantities of wall-fall and roof collapse distinguishing this architectural transition from, for example, the one from Red I to Red II. These abandoned levels were not converted into mortuary monuments, and the excavated area remained open until mid-Red III, possibly 100 to 150 years later.

Late Red II marks a distinct break from the early period at Kirikongo. The excavated area of Mound 1 was abandoned, while the cemetery at Mound 3 ceased to have new interments and was later paved over several times (C-RIII-a, C-RIII-b), with a low monument constructed along the southwestern wall of the unit. Mound 11 was reoccupied in late Red II when a burial was interred (E-RII-a), with an adjacent funerary pit excavated into the remains of the kiln from late Yellow II (E-YII-b). Directly over the burial pit was constructed a kiln (E-RIII-a) that would be used until mid-Red III. A structure that may have served as a pottery workshop was built above the adjacent E-RII-a offering pit. The E-RII-a funeral pit contained vessels resembling those from the early Red II founding house, including sherds from diverse well-made pots and tripod vessel fragments, as well as iron pieces, slag, iron ore, a possible fragment of an anvil and, notably, a complete quartz microlithic point. The funeral pit also included a cattle individual, the last one found at the site, and a horse, the only one found at the site; both were extremely old at death, unusual for domestic animals at Kirikongo to this point in mortuary contexts. Cattle keeping appears to have been rejected around this time at Kirikongo, and this may represent a residual animal brought to Mound 11 by the new inhabitants, who were industrial specialists likely derived from the founding house. The other remains included deep-earth and shallow-water animals.

In mid-Red II, pottery production became specialized at Kirikongo, with a unified set of ceramics replacing the individual house potting traditions. While some pots continued to be made by pounding on a concave mold, a new forming method, punch and draw, was increasingly used. Consequently, mat impressions became rare. Pots with these technical characteristics were found in direct association with the kilns at Mound 11, and it is likely that they were produced there. Iron-working was also reorganized at this time, and E-RII-a included some of the only late Red II metallurgical debris at Kirikongo. A new set of at least three smelting furnaces dating to Red II/Red III were identified several hundred meters to the west of Mound 11 on the north side of the community, as was a possibly associated mine. The western furnaces had the same technological character (with the same archaeological signature) as the Red I furnace in the south. It is notable that from this point on, potting tools and iron metallurgical debris were almost solely recovered from Mound 11, and deceased individuals were likely interred there as well, suggesting that this was likely a habitation/workshop for specialist smith/potters. In short, many of the material indicators of inequality and centralization, including the co-option of metallurgy, the co-option of cattle, the construction of a special cemetery, and the use of household potting traditions that expressed difference between houses, disappeared or were reorganized at this time. Instead, metals and pottery became shared throughout the community in a communal tradition. The ritual complex at Mound 4 (B-RIII-a) remained in place, but even this household lost access to cattle for use in sacrifices.

Red III, ca. AD 1200–1400

During Red III, 10 mounds, including the northern exterior Mound 11, were occupied or have evidence for use. Based on data from surface collections and road cuts, the site was at its peak size, both in terms of number of occupied mounds and extent of occupied space on mounds, during early Red III. However, in late Red III significant population loss and cultural change occurred, with most of the occupied mounds abandoned, leaving at most three to four habitation mounds and several activity areas occupied at the start of the fifteenth century AD.

In Red III, Unit E was primarily a pottery production area with successive kilns. The first, in the southeastern corner of the unit, was likely in use for some time, as evidenced by up to 20 reflooring episodes. The walls were extremely hard from the heat and were preserved to 60 cm tall. Upon the abandonment of the potters' workshop just to the north of the kiln in the late thirteenth/early fourteenth century AD, a pit was excavated into the remains of the workshop and kiln; the associated ritual deposit contained potting tools, grog, animal bones, and other materials. The deposit was capped by two pots turned upside down. The ritual deposit included mostly domestic sheep and goats, burrowing animals, and shallow-water taxa, and objects were mostly related to potting and metallurgy (fragmented tools and slag). The next layer included a kiln that was also likely abandoned in relation to a death after only a few refloorings in the second half of the fourteenth century, leaving a late Red III jar upside down on its surface. A ritual deposit containing an animal bone assemblage almost identical to the one from earlier in Red III was recovered. While surface collections suggested that the western half of the mound was occupied in Red IV, a retraction in occupation seems to have occurred around the time of the plague.

Mound 1 likely increased in population in early Red III, as the excavated space was reoccupied and the road cut exhibited extensive spatial activity. The first Red III deposit (from the late thirteenth century AD) was the remains of a feast that acted as a foundation deposit for a new architectural level. The deposit was quite different than those before the hiatus in this area, with evidence for large and small game hunting of grazers and the only donkey identified at Kirikongo, in addition to domestic fowl and aquatic resources, including some new fish taxa. There was an increase in iron implements in comparison to the more constrained ritual deposits from Red I. In the early fourteenth century AD, a new, well-made architectural complex extended into the eastern edge of the unit, with a long, extended wall connecting a structure in the center-south to one in the northeast. The area to the east was a paved interior courtyard, and that to the west was an unpaved exterior courtyard that itself had another wall to the west. The exterior space had grinding platforms, and in general the architectural syntax was more open. Two ritual depositions from the second half of the fourteenth century AD were interred, one with a burial to the east in the interior courtyard and one to the west in the exterior courtyard, and there is a distinct possibility that an additional burial occurred in the southern structure around this time as well. The interior and exterior courtyards had similar feasting remains in their associated ritual deposits (domestic animals, wild grazing animals, and aquatic resources), although material culture became much more reduced and more poorly made (particularly pottery). For the first time at Unit A, one of the burial feasts likely occurred closer to the harvest rather than on the usual dry season schedule. These and subsequent transformations may be related to the effects of plague (see also Dueppen and Gallagher 2016; Gallagher and Dueppen 2018). Mound 1 had lost access to materials from the Birimian formation to the east in Red III.

During Red III, Mound 4 experienced a complex series of events that resulted in the buildup of significant deposits. Early in Red III, several structures were constructed atop the compound wall from Red II in the eastern unit: one in the southeast (abandoned in B-RIV-a) and one in the northeast (abandoned in B-RIII-e). The ritual complex (B-RIII-a) burned down in the late thirteenth century AD, preserving the contents of the interior spaces of three rooms and an upper story. Remains of sacrificed livestock, dog, and chicken; burrowing animals; and shallow-water fish were recovered from the sacrificial spot and the second-story collapse. The rooms contained ritual objects (including cowries) and granaries/storage pots under the roof beams that collapsed inward. A ritual deposit (B-RIII-b) incorporating the remains of a very large feast was emplaced in the remains of the destroyed ritual complex, possibly as a direct response to the destruction event, since radiocarbon dates on animal bone are identical to a sorghum seed head from the burned roof of Room 4. This deposit had evidence for hunting a diverse array of wild animals, big and small, many of which were roasted complete, along with livestock, domestic fowl, and possibly domestic guinea fowl, and it had fish and aquatic resources that indicate a slightly later dry season event. A new component distinguishing ritual deposits at Mound 4, in addition to the burrowing animals and shallow-water taxa, was that of animals of the forest. The deposit also contained the only glass and copper items at Kirikongo, both unbroken, in addition to broken iron implements and diverse fragments of ceramic vessels. A flooring sequence was constructed atop the deposit shortly thereafter.

After the destruction of B-RIII-a, a new ritual complex (B-RIII-c), centered on a room similar in size to Room 4, was built roughly above the earlier one. The roof beams of this structure suggest construction in the late thirteenth century AD, and this building also burned down, likely in the early fourteenth century AD. Some of the contents included sacrificed fowl and an intact cowrie shell, as well as complete pots. As with the earlier destroyed complex, a ritual deposit was emplaced into the destruction level (B-RIII-d). Subsequently, by the mid-fourteenth century, a new structure was constructed slightly to the south. To the east of this rapidly evolving buildup of deposits were several house structures in a more open layout than in Red II, evoking a more fluid connection between ritual and habitation space. With the construction of a southern structure, the open space between buildings was filled with a storage vessel and a grinding platform, similar to the more open layout at Mound 1. In the latter half of the fourteenth century, structures were abandoned, and ritual deposits included domesticated animals but focused on hunts, including the new association of forest animals seen in B-RIII-b. The last Red III deposit (B-RIII-f) was tied to the abandonment of the southern structure, where diverse animals, including a sitatunga, were hunted. Routine in the Red III funerary monuments were remains from tripod vessels, as well as materials made of stone from both the local Mouhoun Bend and the Birimian formation to the east. Mound 3 during Red III was used for veneration of the prior tombs, with no new interments but continual ritual deposits and repavings over the surface to keep the mound sealed around a single standing monument with low walls. This structure burned down to its foundations at the same time as the destruction of the ritual complex at Mound 4, and both can be considered important ancestral anchors for the founding house, if not the greater community.

Late Red II and Red III mark a turning point in the community. Earlier, Mound 4 had been the primary node of power, combining anteriority with metal production and privileged access to certain wild resources (burrowing taxa, shallow-water taxa). With the emergence of specialists residing at a distance from the main cluster, the transformation of the cemetery into a place of veneration and remembrance rather than active interment, the opening of closed compounds to a new community that shared stylistic and commensal practice, and likely at a regional level the active destruction of long-used ritual monuments, Mound 4 was decentered within the community. In the late thirteenth and fourteenth centuries AD, in addition to domestic animal sacrifice, new dimensions related to a separation between the divinities of open spaces and the forest were added by the founding house, perhaps related to diversifying the restricted power of their custodianship of the earth shrine in a less centralized period. In the fourteenth century AD, a quick buildup of deposits occurred at all habitation mounds (seen in excavations and road cuts) from relatively rapid abandonment of structures, in addition to deviations from the usual seasonal scheduling and a less precise following of ritual traditions. By the end of Red III, Kirikongo was much reduced, with only Mounds 1, 4, 7, and 11 still containing evidence of habitation. It is possible that a demographically reduced community combined together at some of the oldest houses during this complex era.

Red IV, ca. AD 1400–1500

At the start of Red IV, Kirikongo was a rapidly changing community. Excavations at Mound 1 saw a continuation of quick deposition with the construction of more poorly built and more rapidly abandoned architecture over at most the first quarter of the fifteenth century AD. Reflecting cultural change and continued labor problems, mortuary rituals were reduced in scale, no tripod vessel fragments were recovered, ceramic assemblages were much reduced and poorly decorated, iron tools were interred largely intact, and even abandoned architectural spaces were less clean than in previous subphases. The burial monuments at Mound 3 ceased to be venerated, with no new floors or structures. Differences in seasonality and wild animal associations between Mounds 1 and 4 continued, but spindle whorls (from late Red III in Mound 1 and Red IV in Mound 4) and changes in hunting and butchering practices attest to new activities. Mound 1 was abandoned partway through Red IV, and it is not clear how much longer occupation continued at Mound 11.

Early Red IV at Mound 4 likewise saw the building and abandonment of several layers of poorly constructed architecture and the excavation of large pits for ritual deposits. These correlated with the abandonment of a structure in the north-central unit (B-RIV-a), a later abandoned structure in the west (B-RIV-b), and, lastly, a large ritual pit (B-RIV-c) covering a large part of the center of the unit, after which a floor was constructed immediately above, sealing the pit, following general site formation conventions. As at Mound 1, extensive cultural transformations are apparent starting in early Red IV. These include poorly made architecture and ceramic assemblages reduced in quality, quantity, and style. B-RIV-a was the last ritual deposit to contain a beer brewer and tripod vessel fragments, and the faunal assemblage combined domestic and wild animals in a way that closely resembled assemblages from Red III, although metal objects were less fragmented.

B-RIV-b and B-RIV-c had a very different character than previous contexts. While still following much of the previous template for ritualized depositions, a significant new focus on commodities production is apparent in species distributions and manner of usage. For example, a new set of taxa that produce known commodities (furs, ivory, teeth, feathers) was targeted, and the fauna reflected new butchering and processing practices focused on skinning and extraction. At this point Kirikongo was a reduced community where occupation extended in an east–west line from Mound 4 to Mound 7, possibly continuous, and with a leather-tanning installation to the west at Mound 3 (C-RIV-a). The tanning installation marked a significant transformation in values, as after 700 years, the cemetery ceased to be a place of ancestral veneration and became an industrial zone.

Similar economic shifts are attested in cloth production, as in addition to a spindle whorl in the R-IV-c pit, the saddle and top of Mound 7 were covered with a dense pure ash deposit (unlike previous pits with ash, fauna, and pottery or talus slope midden deposits with ash and dense pottery). This is similar to historic and ethnohistoric sites in Burkina Faso and elsewhere where large amounts of ash are derived from potash production for indigo dying of cotton cloth (Folorunso 2002; Gallagher 2021). An indigo dying installation was identified elsewhere in the Mouhoun Bend during Red IV at Tora-Sira-Tomo (Holl 2014). The R-IV-c deposit also contained a cowrie, extensive broken pots, and material culture but also a larger subset of unbroken objects (including metals and stones). Lastly, of historical interest is a broken greenstone bead with gold content that may have been produced at Kirikongo. If so, people from Kirikongo may have visited the Birimian greenstone strata to the east to obtain bead-making material. The combination of ivory, skins, fur, feathers, leather production, cloth weaving and dying, and perhaps bead production with new materials indicates a new dimension to the economy of Kirikongo. Overall, B-RIV-b and B-RIV-c indicate fundamental differences that may have led to the abandonment of Mound 4 in Red V. The subsequent move to a much smaller community at the eastern edge of the site, was likely associated with conversion to Islam.

Houses of History, History in Houses

The decisions leading to tell formation are poorly understood in West Africa, and elsewhere in the world, as even within Burkina Faso, some areas developed extensive tell sites while others produced extended surface deposits (e.g., Coulibaly 2006; Gallagher 2021; Holl 2014; Holl and Koté 2000; Koté 2007, 2013; Lingané 1995; Magnavita 2015; Marchal 1983; Millogo and Koté 2001, 2006; Petit et al. 2011; Simporé 2009). Kirikongo's mounds are composed of accumulations of ritualized practices related to ancestors and the need to attach ancestors to the living social group while partly detaching them from the "inclusive unity" of their bodies and the materials with which they are associated. Both residences and courtyards transformed into tombs and purposefully constructed half-structure tombs led to stratified deposits over time, as emplacement was of importance for creation and maintenance of ancestral relations with causal effect in the community. As has been recently discussed for mounded sites elsewhere in the world, for example, Çatalhöyük (Hodder 2018; Hodder and Pels 2010), Kirikongo's mounds are history houses, combining vital substances and materials with ancestors. In so doing, they yield insights into broader social, political, religious, and economic processes in the Mouhoun Bend and greater West Africa.

CHAPTER 8

SACRIFICING ANIMALS, OBJECTS, AND HOUSES: TOWARD AN ARCHAEOLOGY OF ATTACHMENT AND DETACHMENT

The mounds at Kirikongo are the result of structured practices and depositions rooted in historically situated choices regarding people, ancestors, and relationships with divine entities in the surrounding landscape. Remains of sacrificial practices and feasting were commonly found in contexts related to the making of ancestors at death, with evidence for a combination of attachment (fragmented remains, including objects, animals, and architecture) and detachment rituals (sacrifice) that simultaneously released and anchored the deceased. Those objects and materials not made by local people were unbroken, representing attachments (associations) between people and divinities. Divinities and ancestors in religious systems of the region played active roles in living communities but likely required people to access them at places or with objects from places that enable their co-presence with humans.

The mounds at Kirikongo, through ritual procedures that patterned consistently over time, can be viewed as loci of ancestral anchoring founded upon the sequential creation of ancestor shrines. Constructions on this vital earth maintained these relations, and in cases where new construction (domestic or industrial) was built in previously abandoned areas, foundation deposits (with burials or simply the remains of a feast and sacrificed objects) were interred in the earth. The accumulations of broken and unbroken materials, parts of wild animals, and sacrificed domestic animals therefore represent both the associations and maintenance of the ancestors. While most formation processes are the result of events, the ritual complex at Mound 4 attests to 300 to 400 years of routine sacrificial maintenance in a semi-subterranean location where ancestral co-presence was materialized in architecture. Overall, while following a fundamental template for ritual action, diversity in choices over time and between resident houses reflected and enabled changing political economies, family relations, identities, lifestyles, and interregional relations (Table 8.1). For example, alliances with divinities made or maintained by ancestors in life continued after death and were maintained with associated materials (both

Table 8.1. Activities and landscape use at Kirikongo, organized by excavation unit and by occupation phase

Unit	Phase	Cultural Activities in the Community							
		Domestic Animals	Cattle	Pottery Production	Metallurgical Production	Textile Production	Leather Production	Wild Animal Commodities	Ancestor Rituals
B & C	Yellow I and II	X	X	X	X				X
B & C	Red I and early Red II	X	X	X	X				X
B & C	late Red II and Red III	X							X
B & C	Red IV	X				X	X	X	X
A	Yellow I and II	X	X	X	X				X
A	Red I and early Red II	X		X					X
A	late Red II and Red III	X				X*			X
A	Red IV	X					X		X
E	Yellow I and II	X	X	X	X				X
E	late Red II and Red III	X	X	X	X				X
B & C	Yellow I and II	X	X	X	X				X
A	Yellow I and II	X	X	X	X				X
E	Yellow I and II	X	X	X	X				X
B & C	Red I and early Red II	X	X	X	X				X
A	Red I and early Red II	X		X					X
B & C	late Red II and Red III	X							X
A	late Red II and Red III	X				X*			X
E	late Red II and Red III	X	X	X	X				X
B & C	Red IV	X				X	X	X	X
A	Red IV	X					X		X

*Spindle whorl from Unit A is from very late Red III.

Objects and Materials from Mouhoun Bend							Ecological Divisions				
Sandstone	Iron Ore	Chert	Ocher	Chipped Stone	Polished Stone (quartz)	Local Stone Beads	Burrowing Animals	Surface Animals	Shallow Water	Deep Water	Forest Animals
X	X	X	X	X	X	X	X	X	X	X	X
X	X				X	X	X	X	X	X	X
X					X		X	X	X	X	X
X					X		X	X	X	X	X
X								X		X	X
X								X		X	
X								X	X	X	
X								X		X	
	X						X	X	X		
X	X	X	X	X	X		X	X	X	X	
X	X	X	X	X	X	X	X	X	X	X	X
X								X		X	X
	X						X	X	X		
X	X				X	X	X	X	X	X	X
X								X		X	
X					X		X	X	X	X	X
X								X	X	X	
X	X	X	X	X	X		X	X	X	X	
X					X		X	X	X	X	X
X								X		X	

Table 8.1. Activities and landscape use at Kirikongo, organized by excavation unit and by occupation phase *(continued)*

Unit	Phase	Birimian Materials						Long-Distance Origin		
		Granite	Dolerite Sphere	Greenstone	Greenstone Bead	Basalt	Polished Stone (granite)	Glass Bead	Copper	Cowrie Shells
B & C	Yellow I and II	X								
B & C	Red I and early Red II	X				X	X			X
B & C	late Red II and Red III	X		X				X	X	X
B & C	Red IV	X	X		X					X
A	Yellow I and II	X	X							
A	Red I and early Red II	X	X							
A	late Red II and Red III									
A	Red IV									
E	Yellow I and II									
E	late Red II and Red III									
B & C	Yellow I and II	X								
A	Yellow I and II	X	X							
E	Yellow I and II									
B & C	Red I and early Red II	X				X	X			X
A	Red I and early Red II	X	X							
B & C	late Red II and Red III	X		X				X	X	X
A	late Red II and Red III									
E	late Red II and Red III									
B & C	Red IV	X	X		X					X
A	Red IV									

*Spindle whorl from Unit A is from very late Red III.

unmodified substances and material culture) and wild animal parts that materialized the co-presence of ancestors and associated divinities of the landscape.

One of the remarkable aspects of Kirikongo (and several other tell sites in central West Africa) was the maintenance of particular, distinct house locations over a period of more than 1,000 years, resulting in a complex of multiple mounds. I argue that the spatial segregation of mounds at Kirikongo was likely rooted in the belief that vital ancestral earth provided an essential anchor and potential blessing to the living community. In this chapter, I return to the discussions in chapter 1 by examining the ontological foundations of these ritualized practices.

To be clear, I do not assume that cosmology, religious beliefs, ritual practice, or symbolic systems from the twentieth century ethnohistoric record can be directly applied to the archaeological record. Rather I argue that these create material patterns and, as is the case in other world regions, descendant practices are the most relevant point of contemporary and historical reference. Using a locally grounded framework of emplaced ancestors and divinities, associated animals, the inclusive unity of people and materials, and belief in complex partible souls, I explore the political and social history of Kirikongo through the lens of divine alliances controlled by various houses, materialized and asserted in ritualized practices connected to ancestors. Materialized ritual practice yields insights into custodial relations related to entities connected to the earth shrine, deep earth, forest, and intersecting beliefs related to rain.

The complex beliefs in causality and the ancestors described in the ethnohistoric record are materialized in formation processes of ritualized attachment and detachment and may have deep roots in the savanna of West Africa. As will be discussed below, Kintampo sites attest to formation processes whereby houses were destroyed (burned wattle and daub) and fragmented objects and diverse animal bones are found in pits. These practices led to stratification of deposits and/or the creation of large sites over time, and even the occasional preservation of animal bones in open-air sites. Kirikongo and Kintampo sites share both strong material culture affinities and site formation strategies, and I will argue for continuity over the first millennium BC, spanning the start of iron-working. Similar formation processes are also typical of Nok sites, where architectural destruction, pits with fragmented remains, and clusters of pots and broken figurines similarly invoke ancestral beliefs. These historical connections and shared ancestry connecting sites in a savanna interaction zone continued throughout the Kirikongo occupation. Shared histories with areas to the north and west also materialized in the archaeological record and cultural practices at Kirikongo, and I contextualize growing evidence for interactions and similar events and processes starting in the late first and early second millennium AD, as the creation of specialized economies and similarities of religious associations may have developed in the spaces between the Mouhoun and Bani Rivers. Subsequent cultural changes after a population loss due to plague, and possible arrival of Mande trading diasporas, indicate modifications to value systems and economic practices that were materialized in ritualized practices that remained rooted in deep history.

Sacrificing Animals, Objects, and Houses at Kirikongo

In chapter 1, I examined ethnohistoric regional beliefs regarding the most widely sacrificed entities: domestic animals. In exploring why domestic animals were sacrificable and wild animals less so, it was established that domestic animals are sacrificable because they have become objectified despite a divine origin through enculturation leading to association with people. Their sacrificial status is rooted in the fact that they are ownable, alienable, and transferable by people, such that their souls can be offered to divinities and ancestors. In contrast, wild animals cannot be owned; nor can they be conceived of as objects or objectified, as they are associated with the emplaced divinities in the landscape and are not alienable by people. To which entity a wild animal belongs depends on its ecological preferences and habits that bring it into association with landscape features (for example, porcupines in dens in the ground with subterranean entities). To kill wild animals, it is required to make alliances or have divine protection from the specific entities to whom the animals belong. Talismans, bundles, and shrines materialize this protective connection to these divinities.

Domestic animals were treated differently than wild animals throughout the Kirikongo sequence. From the beginning of the occupation, houses at Kirikongo had domestic cattle, goats, dogs, and chickens. Based on domestic animal body part distribution, burning patterns, and butchering, deposits included parts associated with slaughter, cooking, and consumption. Representative elements from different zones of the body were systematically present, but never the entire remains of the animal, indicating distribution of parts of the carcass elsewhere. Remains related to the consumption of appendicular meat were most often recovered, while the cranium, rib cage, and vertebral column were mostly (though not completely) removed from the context, and with the exception of a few contexts, the tail and small dense bones (tarsals, carpals, phalanges) were systematically removed. These smaller parts tend to be used in shrine construction, divination, and protective talismans in ethnohistoric practices. For the appendages consumed, a wider assortment of fragments are generally represented for sheep or goats, but in cattle and in a few contexts for sheep and goats, there was a clear preference in sacrificial locations for forelimb elements, perhaps reflecting ethno-anatomical divisions according to the relationship of the sacrificer to the deceased individual. Despite the fragility of bird bones, similar patterns are seen in domestic fowl, where multiple parts of the wings, legs, and representative small fragments of sternum are systematically found, often roasted, while the head, pelvis, and bulk of the breast meat were distributed elsewhere, and no avian vertebrae were identified.

Dogs were treated differently than other sacrificial animals, with an inverted body part distribution, perhaps reflecting a differential status for dogs, despite them clearly being routinely sacrificed. For example, dog cranial and mandibular elements were common in pits where other domestic animal cranial and mandibular fragments were missing. In fact, at Unit A, no canid elements other than cranial, mandibular, and metapodial (and one phalanx) fragments were recovered, indicating a different distribution system for their meat, while in Units B and E, more comprehensive body parts were identified. Interestingly, Mound 3 contained no canid elements. No claws, tails, or carpals and tarsals were recovered at Kirikongo, and it is likely that, as with bovids, these potent parts were systematically removed. The differential status of dogs appears to have been complex, aligning with ethnohistoric models in which they are either considered non-sacrificable or extremely powerful sacrifices, frequently due to their commensal relationship as "witnesses" of daily human actions (Cartry 1976; Cremer 1927). Ritualized uses of dogs have also been found in first millennium AD deposits at Tongo Maaré Diabal to the north in Mali (Gestrich and MacDonald 2018) and at Kuulo Kataa in central Ghana in the mid-second millennium AD (Stahl 1999, 2008).

Kirikongo's occupants also likely sacrificed chicken eggs as part of the ritual process. Preliminary investigations of eggshell indicated that for the studied samples, probable domestic chicken eggshell was routinely broken before hatching. As discussed in detail in Chapter 4, it is unlikely that this is debris from consumption of eggs. Ethnohistorically, egg sacrifice is a particularly potent process, as it is sacrificing potential procreative life and is powerful enough to clean (purify) a shrine or to be used as part of sacrifices related to lineages (see Cartry 1976; Goody 1962). At Kirikongo, this power was restricted as part of the ritual process to the founding house, and the few instances of egg sacrifice at Mound 1 in later periods may mark a fundamental shift from a community where the founding lineage was primary to one in which other houses held more significant roles (see below).

Prior to Red III, many wild animals were represented in deposits by only a single or a few body parts (for example, horn cores, toes, mandibles). Wild animal presence during this period has a different character, with the often easily identifiable parts likely providing visible associations in contexts. This stands in clear contrast to the more comprehensive interment of domestic animals. Some wild animals, notably small carnivores, were likely not consumed. In Red III, practices shifted. The remains of wild animals included in ritual deposits became more comprehensive and were often highly burned, indicating that the contexts contained the remains of larger portions of large and small animals that were consumed in one place, potentially as part of more public feasting events, given the scale. These contexts contained larger frequencies of parts (for example, ribs and vertebrae) that for domestic animals tended to be distributed. However, as with domestic animals, substantial portions of each carcass were missing from the deposit, suggesting distribution, and tarsals, carpals, phalanges, and tails were systematically removed. Unlike the pre–Red III levels, the horns and cranial fragments of wild animals were rare, as is indicated by a kob cranial fragment with evidence for horn removal at Mound 1 (A-RIII-a).

While sacrificed domestic animals are present throughout the sequence, there is variance in domestic animal practice in the community that may relate to the status of the sacrificer or reflect the political economy of ritual practice. This is not surprising in a region where political power tends to be connected to individuals as custodians (sacrificers) of divine relationships, often rooted through their ancestors. For example, cattle were clearly an important resource for houses in the early first millennium AD social landscape of the Mouhoun Bend. If the settlement landscape was indeed one of dispersed homesteads, cattle and goats may have played an important role in mediating social relations (that is, enabling marriages and supporting funerary rituals and feasts) and functioned as tangible transferable resources that helped create a sense of community despite the spatial distance of houses. A similar situation is known for the late first millennium AD Gobnangou region of southeastern Burkina Faso, where collective expeditions of early farmers that would have brought members of dispersed houses together were abandoned in favor of livestock within 100 years of agricultural adoption (Dueppen and Gallagher 2013).

Within a context where cattle husbandry had deep economic and social significance, the co-option of cattle by the founding house starting in late Yellow II was a symbolic act that would affect not only status in the community but potentially alliance building beyond Kirikongo. That cattle were connected to status at the level of the house and not to personal achievement is made clear in the infant and small child monuments at the Mound 3 cemetery, where abundant cattle remains from multiple sacrifices were found in a context in which material culture objects (iron, ground stone) potentially connected to achievement in life are lacking. That cattle in this cemetery context were found with cowrie shells may substantiate their role as familial wealth and their connections to alliance building beyond the community (see discussions below). The early Red II level at the Mound 4 ritual complex also indicates cattle sacrifice as part of ancestral veneration in a semi-subterranean context. The last cattle remains at Kirikongo were a tooth and forelimb elements of a very elderly cattle individual from Mound 11, which were interred in association with a mortuary context upon reoccupation of the mound by specialists likely derived from the founding house. It is notable that this deposit also contained an elderly horse. Ethnohistorically, equids, like dogs, are powerful sacrifices and can be classified as non-sacrificable due to their close commensal relations to people. However, unlike dogs, horses are strong symbols of wealth and power.

The rejection of cattle keeping in the community was a powerful symbolic act, connecting to the physical and social opening of houses after Red II. Changes in ritual deposits indicate a shift to larger-scale hunting expeditions involving larger amounts of meat and likely a broader range of invitees and participants in the feasts. A potential implied shift from a bride wealth system to bride service reflects a change from house alliance building to community-level practices, symmetrically found in the labor involved in collective hunts. The broader evidence for consumption of wild animals (particularly but not limited to bovids) appeared in ritual deposits following the rejection of cattle.

Unrestricted throughout the community over time was the sacrifice of domestic chickens, goats, sheep (starting in Red I), and possibly guinea fowl (starting in Red III). These are found, often together, as a fundamental part of mortuary ritual and co-occur in 70 percent of excavated contexts, with possible co-occurrence in 90 percent. Despite changes in community size, structure, and political organization, these enabled the ritual process and maintenance of relationships, likely in the living community and with the ancestors. Some differences prior to Red III suggest possible sacrifice of younger individuals at the founding house, and from Red II onward, ages of death were less codified across all houses, with routine sacrifice of older individuals and occasional sacrifice of very young individuals during the plague era. The only examples of sacrifice of older goats prior to Red II were in the basal deposits at Mound 4 prior to the foundation of Mound 1 and in foundation deposits under the Yellow II/Red I kiln at Mound 11, a non-mortuary setting. Fowl were likely the most sacrificed animals at the site, present from the establishment of the community. While contexts are skewed toward large-scale scheduled ritual practices associated with architectural destruction and construction, the B-RIII-b complex provides data that chickens may have, as today, been the motor of sacrificial systems, as the sacrificial spot had the remains of at least four different recently sacrificed individual chickens.

Material Culture, the Soul, and Sacrifice: Inclusive Unity and Attachment/Detachment

Sacrifice is not limited to animals but is rather deeply interconnected with beliefs of the soul and the effect of souls on transformations and action in the world. Ethnohistorically in western Burkina Faso and adjacent areas, materials and substances are at a basal level considered divine in origin, as they are related to the emplaced divinities inhabiting that location. They are imbued with the power of these entities and conversely cannot be objects, or ownable by people, unless through a potent process of transformation (or, more accurately, transubstantiation or creation) in which the substance is turned into an object. Similarly, wild animals are not sacrificable as they are not ownable due to their connection to divine entities. For example, the earth shrine establishes a "custodial" relationship to the emplaced local divinities that is widely referred to in the ethnohistorical literature as a "right" (see Capron 1973; Cremer 1927; Dacher 1997a; Duperray 1984; Lentz 2009) but does not imply ownership over the land. This relationship, even if culturally designated to the descendants of the founder, must be maintained, and lack of maintenance or unethical actions could breach this relationship, with consequences to health and well-being (for example, sickness, infertility, lack of rain). Similar beliefs exist in relationship to a cultural right with the ancestors, who may be related to particular descendant houses and the greater community by association (for founding houses) but who also need to be properly maintained lest bad things occur.

The power of transubstantiation of natural substances falls within this system of logic. In the region ethnohistorically, the transformation of clay into houses and pottery, wood into objects, ore into metals and slag, and so on is a potent process that frequently requires sacrifice both to ensure success and to maintain relations with the divinities with whom these resources are associated (Coulibaly 2006; Cremer 1927; Goody 1962; Kiénon-Kaboré 2017; Kiéthéga 1993a, 1993b; Pecquet 2004). The "right" to transform them derives from the proper ritual maintenance with the appropriate entities. After obtaining the right, a widely held belief is that the made object is attached to the soul of the maker, described by Goody (1962:200) as an "inclusive unity" that invokes the multiple dimensions of souls—some embodied, others potentially disembodied—that are invoked in scholarship throughout the region. To alienate the object, it must be detached ritually, as artisans and others do. Objects, either things made by people or those simply owned by a person, also become attached through use and interaction. Sacrifice, as a process that de-objectifies and releases attachments, is consistent with this philosophical view of material culture.

At Kirikongo, a similar logic is materialized throughout the deposits at the site, where, with the exception of abandonment layers and the talus slope of mounds, most material culture in contexts may have been purposefully broken in rituals related to ancestors. For example, almost every context included a diverse array of broken pottery, including disproportionate numbers of very small, finely made consumption vessels, votives, and tripod vessels but also everyday vessels and beer brewers. A strong argument can be made that these were purposefully broken, as sherds were in excellent condition, consistent with primary deposition, whole vessels or reconstructable vessels were not present, and the assemblages included many small ornate vessels that break less frequently as they are not used in everyday tasks such as cooking. In a couple of contexts, pottery was smashed in situ and fragments were left as such (B-YI-c); in C-YII-a, half of a broken pot was placed in its own prepared burial pit. As mentioned above, in some contexts, such as A-RI-b, it seems very likely that the ceramic assemblage interred was fragments of the range of vessels currently owned and used by the deceased or their family. It could be that the large percentage of small ornate vessels reflected their role as valued personal possessions of the deceased and that they do in fact represent the living assemblage used by the individual. While an individual over their lifetime would own many more cooking and storage pots, at a given point in time they would have simply had a comprehensive set for these tasks, but they might have accumulated a potentially more numerous set of special-purpose vessels that more infrequently broke. Notable is that the only contexts where complete pots were present within a ritualized deposit were at Mound 11 in relation to the kilns of specialized potters, where overturned vessels seemed to anchor the ancestral emplacements.

Iron objects were almost all broken or bent, with continuing but less systematic breakage postdating the plague in Red IV. While iron objects were consistently present, their size and nature may have changed with the availability of iron, as fragment size and identifiability of objects declined when iron-working was co-opted (and specialized) by the founding house but increased once more after the shift to specialized potters/smiths in late Red II at Mound 11. As with pots and sacrificed animals, only a part of an iron object was generally recovered in the deposit—for example, the half of an iron bracelet from A-RI-a. Another product of iron production, slag, was also common in deposits at Kirikongo, mainly in small fragments that could have been broken. The pattern of sacrificed objects is very strong in stone beads, as five stone beads (jasper, quartz, sandstone, greenstone) were all broken cleanly in different mortuary monuments, starting in the lowest levels of Yellow I. Ground stone fragments in sandstone and granite were routinely broken despite not being worn out. Lastly, another class of object that was likely sacrificed was cowrie shells. These may have arrived with the status of "objects" as an owned animal resource (not connected to a local divinity but still a form of potent entity) and may have been inherently transferrable (invoking the later known historic usage as currency (Hogendorn and Johnson 1986; Johnson 1970)).

However, not all things recovered from ritual deposits were broken. Seemingly untransformed, even if used, materials and objects were not broken at deposition. These included ocher crayons, chert blocks, iron ore nodules, polished quartz and granite nodules, dolerite spheres (hammerstones), a basalt axe, and microlithic stone tools. Items that were not made locally, including a glass bead and a copper earing, were also not broken. These were not made or "created" by the local community, and some of these items were likely found objects picked up during activities in the local and regional landscape. In the case of the two intact microlithic tools, local stories recorded by Cremer (1924, 1927) attribute special distinctive objects found in the landscape to having specifically been produced by nonhumans (see also Dugast 2015, 2016). There are abundant stories of hunters finding polished stones in the stomachs of hunted animals that connect to the divinities to which the animals are related. These then become materializations of a relationship between the person and the divinity, providing permission for the hunt if proper ritual maintenance occurs. Consequently, one cannot alienate or sacrifice untransformed materials. The dolerite spheres (and perhaps the basalt axe) may have also been found objects collected during expeditions to the Birimian formations to the east. As described in Chapter 1, durable powerful objects are important components of ethnohistoric shrines and ritual bundles, are carried as portable talismans, and are used in divination practices.

In a context where things made by people are imbued with the soul or essence of the person and are classified as sacrificable, do the same principles extend to architecture? Houses fit the criteria for sacrifice as a natural substance (clay) with divine properties transformed into an object that is used and owned by an individual, families, or multifamily socioeconomic units. The divinity of houses as part of the inclusive unity of individuals and groups is a common theme of ethnohistoric practice in the region (see Blier 1987; Bourdier and Minh-Ha 1985; Capron 1973; Cremer 1924, 1927; Prussin 1969; and particularly Pecquet 2004). For example, Pecquet (2004) discusses at length the characteristics of coursed earthen structures that need to be ritually detached from the masons who construct them in Lyela communities (directly east of the Mouhoun Bend) in order to allow other individuals to inhabit them.

Two types of architecture must be discussed for Kirikongo: mortuary monuments and residential spaces in mounds, both of which received burials. In Yellow I and II and continuing in the cemetery through Red II, structures were constructed over tombs and in association with pits that contained offerings related to the mortuary ritual or where offerings were included as part of monument construction. The walls of these structures appear to have been only 20 to 40/50 cm tall, and there was very little buildup of material related to the melting of these structures over time. The Red III monument at the top of Mound 3, used for veneration of ancestors in a space that was no longer receiving active interments, burned down, leaving walls at most 30 cm tall. This structure provides evidence that these features were roofed, as otherwise it would not have been able to burn. I argue that mortuary monuments were not complete houses, simply parts of a house, like a part of a sacrificed object, necessary for the emplacement (attachment) of an ancestor. (For comparable ethnohistorical examples, see Cartry's [1987] description of Gulmance chiefly burials and Tauxier's

[1912] description of funerary structures in western Burkina Faso.) Recent reconstructions of the megalithic circles of the late first and early second millennium AD in Senegal and Gambia suggest that laterite blocks may have been posts for the walls of houses (see Laporte et al. 2012, 2018) and that some material culture there may have also been sacrificed (an example is the practice of punching holes in the bases of pots) (Holl and Bocoum 2017; Holl et al. 2007; Thilmans et al. 1980).

The formation process of the residential spaces of mounds is known from Red I onward and creates a compelling argument for the sacrifice of houses as a form of object connected to a person. For example, in Unit A, a series of truncated (detached) architectural units were created sequentially in the same location. The foundations of the house or courtyard walls (approximately 20 to 25 cm tall) were systematically left in place (attachment), often with a tomb and funerary deposits associated with broken objects. Above each truncated structure, a new pavement was laid and a new structure built. The leaving of intact sections of the wall (that is, a fragment of the made object) upon death was practiced continually. It is these choices that have created the systematic layered deposits at Kirikongo. Ritual contexts were distinctively different than the few abandonment layers at Kirikongo, as these contained collapsed sections of walls and terrace roofs, little material culture except occasional crushed whole pots, and very few if any faunal remains. I argue that Kirikongo's contexts are the result of different intentional choices that contrast with those that result in the secondary buildup of deposits in abandoned houses over time (see Walicka Zeh 2000 for discussions of the latter process).

Following these logics, the mortuary monuments at Kirikongo likely reflect the detachment of elements of the soul through the sacrificial process, but the creation of the ritual deposit, with systematic inclusion of representative parts of sacrificed animals and broken objects, including potentially personal belongings and objects from family and friends, and maintenance of wall stubs simultaneously materialized the attachments of the individual. Parts of wild animals and non-sacrificed objects and materials may represent divine associations of the person and their family. Consequently, in discussions throughout the book I suggest that many of the materials in contexts at Kirikongo were accumulated there in rituals that made ancestors and that material sacrifice was about simultaneous attachment (emplacing ancestors) and detachment (freeing souls) for the afterlife. While in some contexts (for example, A-RI-b) it seems likely that the contents are the personal belongings of an individual, in others (A-YII-d) it is possible, given the large number of beakers, that the deceased person's social relations may have each broken a vessel.

The partial architecture, accumulated material culture and animal remains, botanical remains, and tombs of deceased individuals together created a vital earth that was a conduit to communication (that is, co-presence) with the ancestors and their alliances with other divinities. An illustrative example of the vital earth is the sacrificial spot in the ritual complex (B-RIII-a) that was a bare patch in the ground, similar to those found in ethnohistoric ancestor houses (see Capron 1973). In addition, the ritual complex itself may have been semi-subterranean to create a structure constantly imbued with co-presence of ancestors and the living community. The accessing and transference of vitality in mortuary rituals involved anchoring with burial pits, offering pits, and subsequent sealing by new architecture, whether residential or commemorative. It is possible that co-presence with the divinities in the deep earth was facilitated off mounds with semi-subterranean iron furnaces (which may have developed in Red I) as well as the co-presence of smiths and deep earth divinities in iron mines and/or laterite quarries.

Earth Shrines, Furnaces, Ancestors, and Animal Associations: Divinities of the Forest, the Deep Earth (Furnaces), the River, the Marsh, and the Fields

The materialized ritual processes at Kirikongo reflect the associations of people with past and present social groups and individuals, places and things, allied divinities, and the animals that serve as mobile agents related to emplaced divinities (Figures 8.1–8.4). Strong archaeological patterns are found in the animals associated with particular houses over time, and these likely reflect the alliances or pacts between that social group and particular divinities, with moments of transformation occurring at the start of village life, with the revolution in Red II, and with a changing ethnic landscape in Red IV.

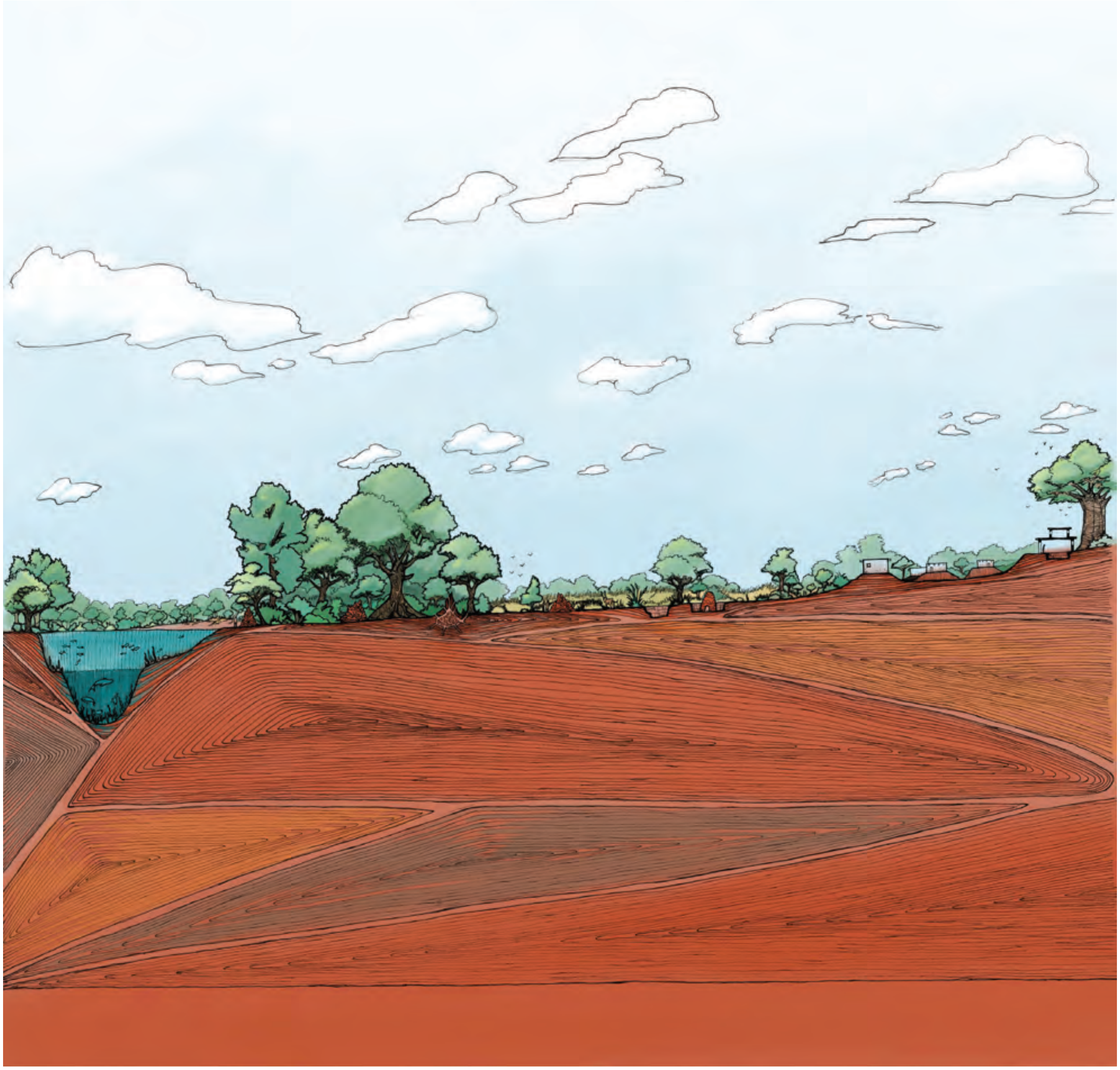

Figure 8.1. Schematic representation of the Mouhoun Bend landscape. *Illustration by Neo Lehoko.*

It is first important to consider that there are associations throughout the Kirikongo sequence that are fundamental to the ritual practices of all, including domestic animal sacrifice and aquatic resources from the Mouhoun River system. Regardless of house and time, river expeditions appear to have been a standard component of the ritual process for funerals. The Mouhoun River plays a role in many ethnohistoric funerary systems of the region, with the land of the dead often to the west across the Mouhoun. This association with the river may have been important for all deceased persons regardless of house and necessary for proper ritual detachment. Moreover, in some Bwa histories, humanity initially came from aquatic origins (Cremer 1927; see also Saako et al. 2014 for river shrines in northern Ghana). There is evidence that river products were particularly significant in early mortuary rituals at Kirikongo, which may speak to the importance of fish for early sedentary life in central West Africa. For example, the fish preservation techniques (smoking) attested to at Kirikongo from Yellow I onward may suggest

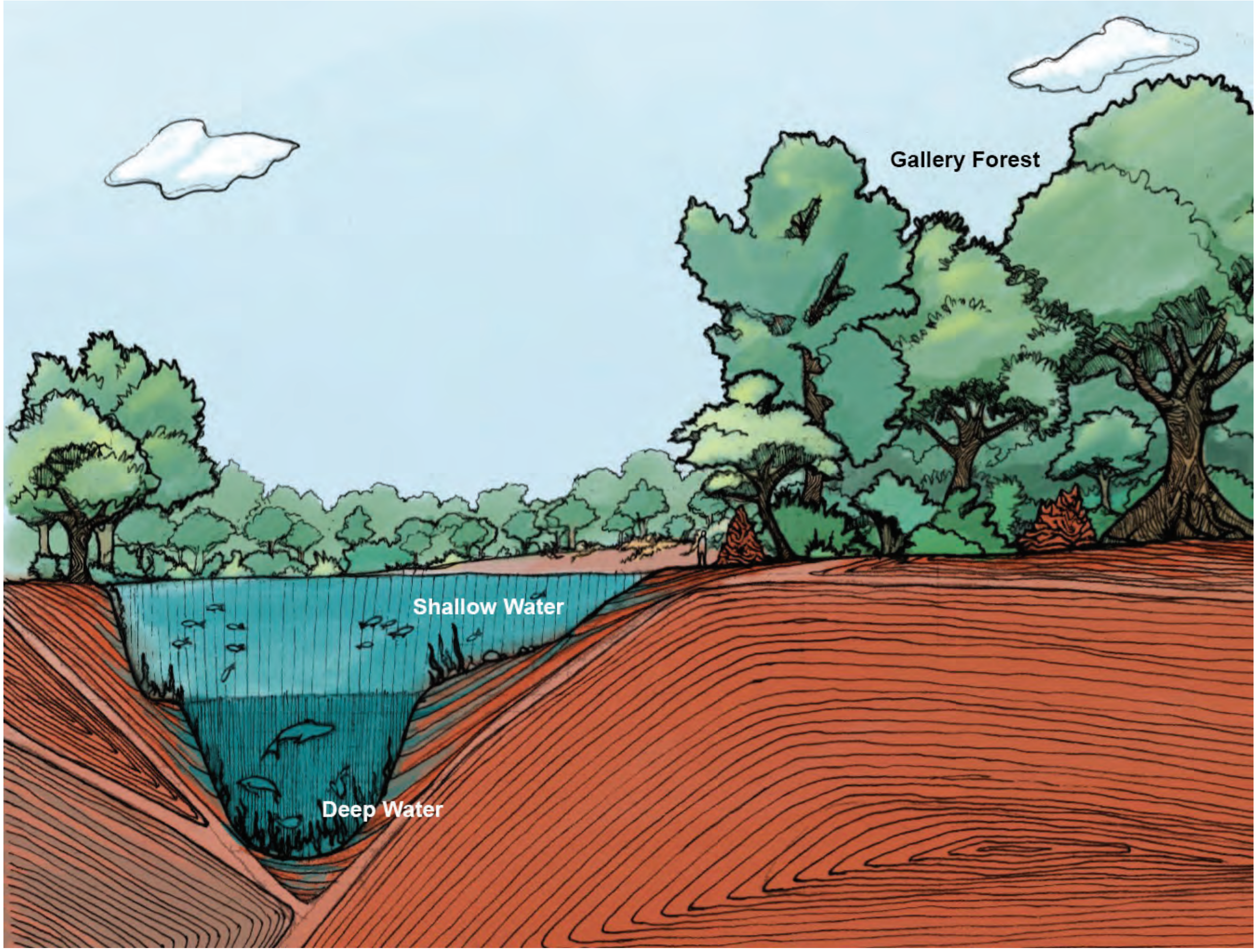

Figure 8.2. Deep and shallow water in the Mouhoun River with adjacent gallery forest. *Illustration by Neo Lehoko.*

that preserved and fresh fish were of great socioeconomic importance for communities in the region. Overall, the universal inclusion of riverine products, even if simply a single Nile oyster shell fragment, is a defining characteristic of ritual deposits at Kirikongo.

Village Founding and the Earth Shrine

One of the most obvious differences between the assemblages of different units is the strong evidence of seasonality in the ritual deposits associated with Mound 1 and those associated with Mound 4 and its linked activities in Mounds 3 and 11. Multiple lines of evidence (fish, bivalves, avian fauna, mammalian epiphyseal fusion) indicate that mortuary rituals associated with the founding house occurred systematically during the harvest season at the end of the rains, with only a single clear deviation (B-RIII-b), which may have been a ritualized response to the destruction of the ritual complex (B-RIII-a), an event that likely occurred deeper in the dry season. In contrast, the same lines of evidence indicate that Mound 1's rituals systematically occurred at lower water, deeper in the dry season, with the notable exception during the mid-fourteenth century AD plague era, when a burial occurred in the rainy season. The association of the founding house with the harvest likely indicates that some of the ritual dimensions related to fertility and farming (ethnohistorically rooted in custodianship of the earth shrine) may have been restricted to the founding house. Symbolically related could have been the restricted control over egg sacrifice, a potent symbol of potential fertility, at least prior to Red III, when for a short time eggshell was identified at Mound 1 in the fourteenth century. The connection between the village founder and the earth shrine is almost universal in ethnohistoric communities in western Burkina Faso, and it would be unsurprising if

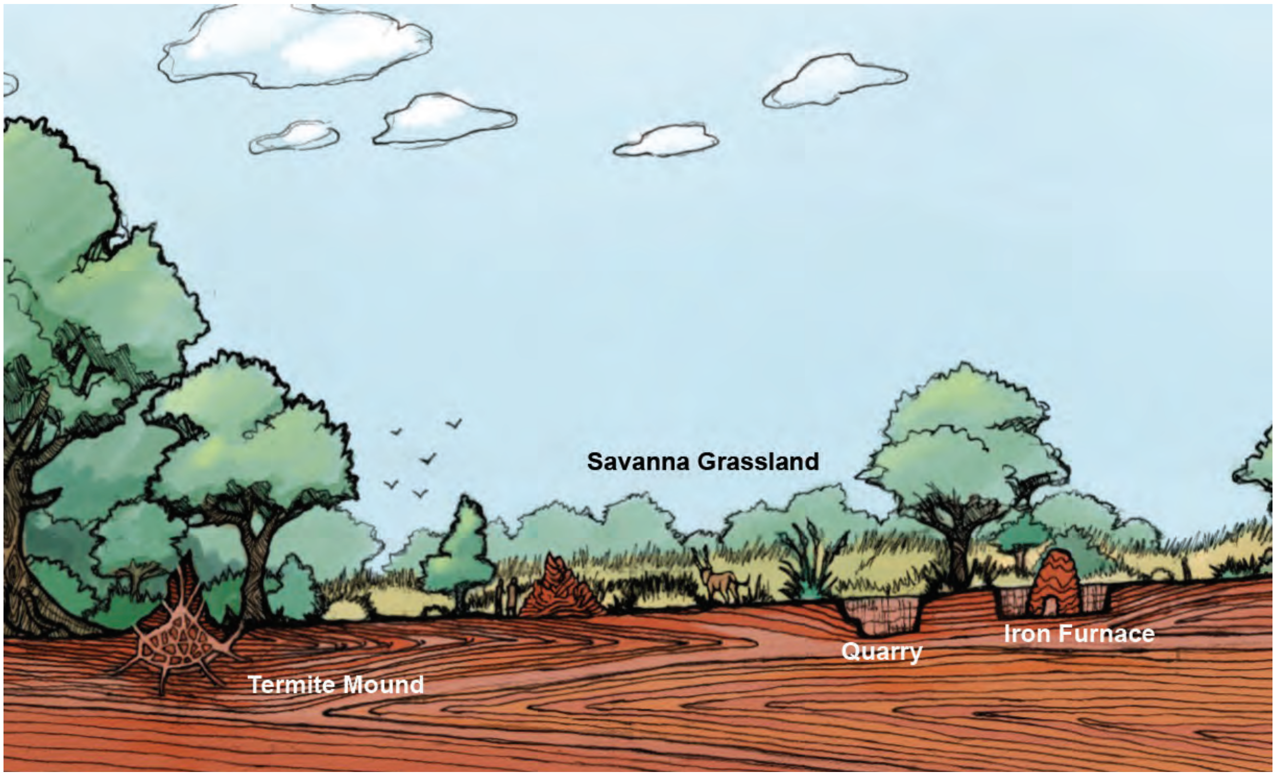

Figure 8.3. Deep earth and savanna grasslands.
Illustration by Neo Lehoko.

Figure 8.4. Community with houses emplaced on anthropogenic mounds.
Illustration by Neo Lehoko.

villages were sanctioned with a similar or related belief much earlier in time. Substantiating the harvest/fertility associations with the founding house's ritual role as village founder is its exclusive control over powerful objects that likely would have been collected from the area around the village (see below).

Pyrotechnic Activities and the Deep Earth

Slightly after the establishment of the second house (Mound 1) at Kirikongo, a new association appeared in deposits associated with the founding house, with the addition to ritual deposits of subterranean animals—that is, those that burrow, live in dens, and/or consume animals that live in the deep earth, such as termites. Ethnohistoric beliefs divide the earth into a superficial surface connected to fertility, farming, and the earth shrine, and deeper earth, which is more dangerous, unpredictable, and potent (Capron 1973; Cremer 1927; Coulibaly 2006; Guébhard 1911; Kiéthéga 2009). A large proportion of the early twentieth century hunting stories recorded by Cremer (Cremer 1924, 1927) concerns the dangers of hunting in holes, termite dens, and other crevices, which often leads to misfortune or the need to create strong alliances with the divinities of these places through extensive ritual offerings. Even mythical creatures live in these locations. Consequently, termites are considered one of the most sacred of animals (Guébhard 1911). The deeper parts of the earth are also connected to divine alliances fundamental to the power of blacksmiths, who maintain relations with these entities and who in many communities are responsible for deep excavation more generally (burials, mining, wells) (Capron 1973; Coulibaly 2006; Kiéthéga 2009). Moreover, ethnohistoric furnaces were shrines connecting into the earth and were intercession points for relations with divinities (Capron 1973; Cremer 1927; Coulibaly 2006; Guébhard 1911; Kiéthéga 2009). The use of subterranean furnaces in this region, the construction of furnaces from termite mound earth, and the restricted knowledge of these practices are consequently at the core of basic social divisions. At Kirikongo, elements of some of these divisions are apparent starting in late Yellow I during the initial transformations leading to specialized metallurgical production. It is unknown whether custodianship of a right similar to the earth shrine in the early first millennium AD would have been linked to associations with custodianship of other divine relationships.

The B-YI-d ritual pit is indicative of this association with subterranean animals, with a combination of small carnivores, including two different mongoose taxa associated with termite dens, wildcats that den underground, large rodents that extensively burrow, a shrew that eats termites, and possibly even a francolin that consumes termites. These were laid over the pit in a cap deposit that also included iron ore and slag and were possibly visible. This strong subterranean pattern is found repeatedly in early contexts associated with the founding house and is found even in the infant and small child cemetery monuments at Mound 3 that also include large rodents, the slender mongoose, and a warthog, all of which live in dens. In comparison, Mound 1 contained only the hare and other surface creatures (for example, geese that graze). The implications of this association, and its connection to iron metallurgy, may have been a component of the early co-option of metallurgical practices by the founding house. Starting in late Yellow I/early Yellow II, metallurgy became increasingly specialized and restricted to the founding house, first with smelting processes upon the abandonment of the smelting installation connected to Mound 1 and likely with specialized metallurgical production more broadly (smelting and smithing) in late Yellow II/early Red I.

The pyrotechnic activity area at Mound 11 in Yellow II was established during this period. Based on ceramic data, it was likely connected with the founding house. The bottom deposit contained the jumbled fragments of a former early Yellow II iron forge mixed with iron ore and animal remains, including two burrowing animals, the Gambian rat and a likely wildcat, the latter marked by a complete mandible. Also found were shallow-water aquatic taxa, similar to seasonal associations at the founding house, plus unique early dog remains lacking cranial elements and an elderly cattle individual. Associations with metallurgy and subterranean animals are also found in late Yellow II and Red I with two sequential mortuary monuments at Mound 4. There, deposits surrounding the burial pit were composed of a mix of metallurgical production debris (ore and slag), a large block of chert likely used as a fire starter, and even ocher for possible slip production in pottery (or other uses of red pigment) along with burrowing large rodents.

The centralization of metallurgical production may have reduced the availability of iron for use in ritual accumulations, as in Red I and early Red II only small fragments of iron were included in deposits through the community.

Experiments in several other technological processes in Red I may be related to the restriction of subterranean relationships and pyrotechnology to the founding house. These include a shift from bowl furnaces to subterranean iron-smelting furnaces and the development of and shift to crushed red laterite pavements, first seen with the B-YII-b burial monument in association with ore and slag. This strong pavement technology utilizes materials from the deep earth; in the Mouhoun Bend today, it is smiths who mine laterite for the increasingly popular laterite brick construction (personal observation). The B-RI-b, B-RII-a, and B-RIII-a ritual complex, constructed in the tenth century AD, connects the associations of the founding house and its ancestors with subterranean contexts and pyrotechnologies. It was constructed of highly fired (kiln-fired) square earthen bricks that were blue-gray in color, resulting from a very high temperature. These highly durable bricks enabled the complex to be simply refloored and replastered over the subsequent 300 to 400 years of its use. Burrowing animals like Gambian rats and shrews were excavated in ritual accumulations within the complex.

Pottery production remained unspecialized at Kirikongo until Red II, with distinctive house potting traditions. While early experiments in kiln firing may have been carried out by the founding house in late Yellow II, Mound 1 also produced kiln-fired pottery starting in Red I. Clay tends to be found in surface deposits in the Mouhoun Bend today and does not require excavation into the deep earth. The foundation deposit for the Yellow II kiln at Mound 11 does not include burrowing animals as were found in the previous metallurgical deposit, reflecting this difference. However, like other contexts associated with the founding house, it does include a shallow-water taxon. With the reoccupation of Mound 11 by specialized blacksmiths/potters, all three contexts included burrowing animals, including ritually potent parts of the animals. The complex ritual associations of the earth shrine and furnace are discussed further below. While different in fundamental ways, due to a long shared history they each are different facets of custodial relations with local divinities on behalf of the greater community. Notably, iron ore was incorporated exclusively within contexts associated with the founding house roughly contemporaneously with the appearance of burrowing animals and was likewise incorporated into the foundational deposit (E-RII-a) upon reoccupation of Mound 11 by smiths/potters in Red II.

Shallow-Water Associations and Rain

An association between the founding house and shallow-water taxa is interconnected with the seasonality argument for scheduled ritual processes in the late rainy or early dry season, when some flooded areas were still present around the Mouhoun River. Diverse taxa (fish, bivalves, reptiles, amphibians, and in one case a bovid) inhabiting marshes, swamps, and seasonal floodwaters were restricted to rituals connected to the founding house.

The Mouhoun River has very different seasonal faces—one connected to the rainy season, when the river fills tributaries and shallow pools and expands its marshy borders, and the other the dry season river set in a deep bed with only narrow shoulders with aquatic vegetation. In ethnohistoric practice, lizards, turtles, and frogs are associated with rainfall and seasonal floods, and lizard depictions on architecture or pots are connected to ritualized associations of rain (Capron 1973). Found in almost all contexts associated with the founding house, whether mortuary or industrial activities, are shallow-water taxa, including the shallow-water fish tilapia and *Clarias* sp. and the marsh taxa *Heterobranchus* sp., *Auchenoglanis* sp., *Gymnarchus niloticus*, *Protopterus annectens,* African bullfrogs, mud and softshell turtles, and monitor lizards. While more easily obtained during floods, all these taxa would also have been available when Mound 1 visited the Mouhoun River in the later dry season, and it appears that these visits specifically targeted only the main channel taxa and/or larger individuals that inhabit the main channel. With the exception of the plague era, this pattern repeats over Kirikongo's occupation, and it is remarkable that Unit A did not yield a single herpetological element.

Ensuring rainfall is a main concern of multiple ritual avenues in ethnohistoric practice, with maintenance of rain connected to initiation activities of Do, the earth shrine, furnaces, and emplaced divinities in the landscape (Capron 1973; Cremer 1924, 1927). However, when rain doesn't fall the earth shrine is consulted first through divination to diagnose the cause, as rain is fundamentally connected to the earth's fertility. Sacrifices can be made at the earth shrine to maintain divine relations and encourage rainfall, or leaders will be sent to sacrifice to divinities elsewhere. Smiths also have a special relationship regarding the encouragement of rainfall, and furnaces (connected to lightning) are often consulted through sacrifice as an alternative avenue, particularly if the earth shrine isn't successful in enabling rain. The likely connection of the founding house to the earth shrine, from the earliest layers, may be interconnected with shallow-water associations enabling rainfall. That Mound 11's faunal assemblages in Red II and III continued to have an association with shallow-water taxa may suggest that ritual custodianship related to rain split (as it is in the ethnohistoric record) when iron production was split from the earth priest role during the political transformations of Red II.

The Forest and the History of Do

In mid-Red II, over at most a generation, a series of fundamental transformations occurred at Kirikongo. Metallurgy, previously deeply tied to Mound 4, was transferred to the now long-abandoned pyrotechnic Mound 11. There, a foundational deposit, including a burial and adjacent offering pit, was interred; a new set of spatially segregated furnaces was constructed; and a likely associated iron mine was quarried directly to the north. Pottery production became specialized, and a new kiln complex with multiple strata was constructed at Mound 11 as well; this is likely the local origin of the potter/smith hereditary occupation group ubiquitous in central West Africa in the ethnohistoric record. In addition, the cemetery was closed to new interments and became a point of veneration, and cattle keeping was abolished. In addition to a communal pottery style, architectural units and spatial syntax became more open. Both foundation and likely mortuary rituals became larger and more elaborate, with a stronger emphasis on wild animals, and likely would have required labor crosscutting the village to enact. Iron levels increased in the size and number of implements interred in ritualized deposits, perhaps reflecting a shift to full-time specialization. However, even in this context, there emerged new animal associations that differentiated the founding house from others.

Based on faunal data, earth shrine associations of the founding house were inalienable, and the related ritual scheduling in the harvest season persisted, as did shallow-water associations likely related to rain. Some game animals of the deep earth were still accessible, although a weakening of this association is indicated by a lack of non-consumed carnivores. However, a new association with animals from the forest was added to faunal profiles to distinguish the founding house from Mound 1 and from the new specialist group at Mound 11. For example, in mortuary deposits of Red III and Red IV, Mound 4 systematically included a wide array of animals that browse in addition to grazing and/or that inhabit forested locales (common duikers, forest duikers, roan antelope, bushbucks, sitatunga, green monkeys, large rodents), while those from Mound 1, which practiced a similar type of hunting, were limited to oribi, hartebeest, reedbuck, kob, and hare. These patterns repeated across multiple contexts in each unit. It is notable that this distinction may not have been relevant prior to Red II, as Unit A did contain a common duiker in Yellow II. However, throughout the sequence, Unit B deposits included a wider array of hunted animals, including some from forest and brush.

One religious dimension of life in the contemporary and historic Mouhoun Bend is ritual related to Do, which is rooted in a mask tradition involving forest associations, with leaf masks as part of collective initiation practices (Capron 1962, 1965, 1973; Coulibaly 2006; Cremer 1924, 1927). If the new thirteenth to fourteenth century AD forest associations were related to connecting to the powers and mysteries of the forest and therefore, potentially, the history of today's Do, it could be that the emergence of Do was similar to that of many ethnohistorically documented religious practices involving talismans and/or shrines, with restricted custodianship related to emplaced entities that provide a foundation for inequalities and competition between houses and communities. Examples include the rise of the *kwara* shrine in Nouna communities of central Burkina Faso in the late nineteenth century. Through association, their custodians exercised exclusionary power, including extraction of cattle (Duperray 1984; Duval 1985). In Bobo communities to the south of Kirikongo in the twentieth century, houses competed to create kɔnɔ bundled talismans (Şaul

1991). The associations between the founding house and forest seen in Red III and IV are today distributed in Bwa communities within the Do system that structures collective hunts. If Do started as an unequal association, that history may help explain why the Do priest (keeper of masks) can be the village headman's brother in some Bwa communities (Capron 1973). Notable at Kirikongo is that upon their move to Mound 11, the smiths/potters did not have access to the animals of the forest, although they did continue to exercise associations with animals that burrow and with those of shallow water (lizards, turtles).

The forest association with the founding house was active when the plague occurred, and it is possible that with the likely undermining of ritual power due to the inability to end sickness and death, Do became more communal in orientation by the fifteenth century AD. From current data, plague resulted in a less densely populated landscape and could have undermined existing authority structures. A broader part of the residual population could have at that point become founders of new communities. Do as we know it today in western Burkina Faso may then have roots in a decentralization of ritual powers of village founders during the plague. This would explain why divinities of the forest are associated with both Do and the earth shrine (as rain and shallow water are between the earth shrine, forge, and later Do) as a part of accumulated divine relationships over time. Notably, cattle and sheep (both grazers) are not classifiable as sacrificial to Do.

Fundamentally, animal associations likely indicate alliances, pacts, or custodial relations with divine entities (including ancestors) that influenced causality. They were constantly activated (attached), maintained, transferred, or transformed over time, underpinning political economy and ritual practices. While all families had access to domestic animals, the superficial earth for farming, and riverine resources, other dimensions of nature were restricted during different eras. Contexts materialize fragments of a philosophy whereby well-being is tied to successful maintenance of divine relations, and these basic principles appear to have been in place from the establishment of Kirikongo, where a potent landscape of emplaced entities surrounded a human community anchored by ancestors and the divine attachments of the living and dead.

Place Associations and Divine Relations: Materiality and Contextual Identities

Animal remains indicate that domestic animals and aquatic taxa were consistent fundamental components incorporated into ritual contexts at Kirikongo, although the use of cattle differed due to political transformations at the site. Wild animals differed more in spatial and temporal distribution over time. Their patterning reflected the seasonality and habitat of the species, which in ethnohistorical practices are associated with particular divinities for which access to custodial relationships may be more or less restricted—for example, tied to social identities such as village founders or pyrotechnic specialists, or open to the general community, as is the case for Do.

Patterns in material culture provide a complementary alternative line of evidence for the associations of the deceased (and their respective houses) over time, rooted not in distinctions between ecological zones as with animals but rather in spatial distance from the community, although as will be seen below, these are related concepts. When placed in spatiotemporal dialogue within contexts, patterns in animal usage and material culture associations substantiate changes in identity and their divine associations over time at Kirikongo.

Like animals, material culture at Kirikongo can be separated into sacrificable and non-sacrificable types. I argue that domestic animals and objects made by people as part of a cultural creative process were sacrificable, while unmodified natural materials and objects made by nonhumans (including in different time periods or of unknown origin) were, like wild animals, likely indicative of associations with divinities in the landscape and therefore non-sacrificable. Such non-sacrificable materials may have been attached to people due to their custodial relationships, but since they never "belonged" to people, they were not broken upon interment.

As with the habitat of animals, the origins of raw materials and made objects are patterned in the archaeological deposits. All contexts include locally available materials on or near the surface or, in the case of iron, materials essential to farming life. While the organization of production changed several times, access to finished products was never restricted. In comparison, rare objects and raw materials from within the Mouhoun Bend, as well as those from mid-distance locations such as the Birimian formations to the east and those obtained through trade due to their long-distance origins, had patterned distributions that in some ways reflected those of wild animals.

The Mouhoun Bend

All houses at Kirikongo had access to pottery made from clay common in surface deposits throughout the region, grinding stones made from laminate sandstone available as close as 1 km to the west, and iron smelted from laterite quarried adjacent to the site. In addition to these object classes, the founding house had access to a variety of rare objects made from local materials as well as materials that were uncommon. In contrast, the residents of Mound 1 had no access to this broader range of local objects until late Red III and Red IV, where two objects possibly used in commodity production (a spindle whorl and a bone scraper) were recovered. At Mound 11, additional local objects are absent in the early levels, but a range of local materials and objects was used by the pyrotechnic specialists who reoccupied the space in Red II.

At the founding house, unique local objects are represented from the earliest level, which contained a quartz bead. From there, a variety of rare objects and materials from the Mouhoun Bend region were regularly recovered. They included made items such as a clay ball, a terra-cotta figurine, and several stone beads, as well as found objects such as polished stone nodules and microlithic tools. The production of stone beads and other objects from local materials would be consistent with sanctioning of the creative process through a relationship rooted in the earth shrine, as would exclusionary control over power objects found in the local landscape. Beginning in late Yellow I, there is evidence that residents of the founding house began to co-opt metallurgy. This period is marked in the faunal assemblage by the incorporation of subterranean animals and in material culture associations with an intensification of localized controls manifested as a more diverse assemblage of locally made and obtained objects. These occur in some cases along with mortuary features that contain subterranean materials (iron ore) and in B-YII-b with a block of chert likely used as a fire starter and an ocher crayon. Notably, the early deconstructed forge at Unit E (E-YII-a) also contained iron ore blocks in the accumulation, along with subterranean animals and sacrificed domesticates. As mentioned in various discussions throughout this book, the earth shrine and furnace can be considered two different, alternative emplacements at the interface between the cultural community and local divinities (surface and subterranean) that sanction a settlement and its activities. The control of these different divine associations resulted in an increase in centralization that was rooted in local sources of power (earth shrine, furnace) and further evidenced by the restriction of status symbols such as stone beads and status/wealth symbols such as cattle.

None of these materials were employed or included in contexts at Mound 1. During the early part of the sequence, the identity of the Mound 1 house does not seem to be related to localized divinities except through the founding house; nor did it have access to material or animal status symbols. Later in the sequence, many of the rare local materials associated with iron that were identified in mortuary contexts at Mound 3 and 4 were distinctive features of the mortuary practices of the pyrotechnic specialists at Mound 11 in late Red II and Red III.

The Birimian Formations

Beyond the local catchment of the Mouhoun River, the most common raw materials are stones from the Birimian formation. As discussed in chapter 2, western Burkina Faso has multiple Birimian geologic formations, most of which run in north–south bands. These comparatively mineral-rich locales include a diversity of metamorphic stones, such as granite and greenstone, and contain gold deposits. While Birimian stones at Kirikongo are most likely from a nearby formation (the closest is only 15–20 km to the east), the geology of these formations is such that Birimian materials could in theory originate throughout what is today western Burkina Faso.

In distinct contrast to the restriction of rare local objects to the founding house, Birimian materials were accessible to both the founding house and Mound 1 prior to mid-Red II. Granite objects were recovered from Mounds 4, 3, and 1, and multiple contexts at Mound 1 contained dolerite spheres. While the distribution of rare local objects suggests that the founding house maintained privileged access to materials in the site catchment (likely due to a custodial relationship with an earth shrine), the more equitable access to Birimian stone indicates that the same rights did not extend beyond the Mouhoun Bend region. Similar assertions of house identity by Mound 1 during this era have been documented in characteristics of the ceramic assemblage (Dueppen 2015).

Beginning in late Red II, the founding house lost exclusive access to cattle, iron metallurgical production, and rare local objects and materials as part of a general process of decentralization. However, the house maintained its unique status using other strategies. The residents of Mound 1 lost access to all Birimian materials; the new pyrotechnic specialists at Mound 11 did not use them either. In contrast, the founding house expanded its use with the addition of greenstone and dolerite spheres to a continued granite assemblage. Forest animals became exclusive to the founding house at the same time. When viewed together, the association with forest and medium-distance resources may be related to an effort by the founding house to cultivate new exclusive relationships with divinities based beyond the community to replace the now more broadly accessible local status symbols.

In Red IV, the founding house became more engaged in targeting particular (and new) taxa for the production of animal commodities. When viewed in this context of a broader investment in trade, the occurrence of a greenstone bead made from the stone of a gold-bearing Birimian deposit could suggest engagement in the exchange of other, less visible commodities, such as gold.

Long-Distance Exchange

Cowrie shells are the first traded objects originating from beyond western Burkina Faso to appear at Kirikongo. They initially occurred in the cemetery associated with the founding house in early Red II, where they were in association with a series of burial monuments, several of which were exclusively for infants. These cowries indicate that in addition to controlling localized sources of power, by the very early second millennium AD, the founding house was at minimum networked into down-the-line long-distance exchange systems.

The founding house maintained exclusive access to long-distance trade items through the social changes of mid-Red II that transformed the distribution of local and Birimian material at the site. Cowries were recovered from the founding house itself in Red III and Red IV. The only other long-distance trade objects from the site were a copper earring and a glass bead from a deposit (B-RIII-b) overlying the 300- to 400-year-old destroyed ritual complex at Mound 4. As suggested above, new expanded forms of valuation from interregional connections occurred in Red IV after plague events, when, in addition to importing items like cowries, Kirikongo may have produced ritually charged commodities, including a greenstone bead from gold-bearing deposits (perhaps suggesting early gold exploitation), diverse animal products (ivory, cat skins, leather products), and likely dyed cotton textiles. However, these were not accompanied by an increase in the occurrence of preserved objects from beyond what is today western Burkina Faso.

The Status and Divine Associations of Hereditary Pyrotechnic Specialists (Blacksmiths and Potters)

Many societies in western Burkina Faso have historically been divided into endogamous hereditary occupation groups (farmers, blacksmiths/potters, griots), with different divine associations that sanctify their socioeconomic status. As described in chapter 1, in the central West African ethnohistoric record, earth shrines and furnaces are common localized sources of power; they have played important roles in sanctioning settlement communities with local divinities. Although generally complementary and distinct, with different divine associations, they also can have significant ritual overlap, to the extent that the earth shrine may be materialized by a piece of iron implanted in the earth. In many societies in the region, earth shrines are not only sites of rituals related to the annual agricultural cycle but are also a first point of consultation when problematic circumstances, such as sickness or inadequate rain, arise. If problems continue or are more severe, sacrifices are also (and sometimes exclusively) made to the furnace. In the case of Kirikongo, shared associations between the earth shrine and the furnace could have their origins in the early co-option of iron smelting by the founding house, which likely already held a custodial relationship with the earth shrine (or its equivalent). Their connection during the early periods of occupation at Kirikongo is materialized in late Yellow I and Yellow II features, including a deconstructed forge at Mound 11, the cap deposit of a Mound 4 pit, and a mortuary monument at Mound 4, all of which incorporated iron ore as well as parts of subterranean burrowing animals and shallow-water taxa.

The duality of these two powerful loci was still apparent in mid-Red II, when Mound 11 was reoccupied by new specialized blacksmiths/potters after several hundred years of abandonment. A wide variety of rare local objects and materials was included in both the foundational burial (E-RII-a) and the detached kiln complexes (E-RIII-a, E-RIII-b). These included potentially functional objects for the production of iron and pottery, such as iron ore (mining and smelting), chert (fire-starting), ocher (slip), and a polished quartz nodule (burnishing), and also a quartz microlithic point. In addition to these items, which had been recovered exclusively from earlier contexts associated with the founding house, the fauna included the previously founding house–specific burrowing animals and shallow-water aquatic resources. Vestiges of the high-status surrounding localized power sources are seen in the remains of the last cattle and only horse ever identified at Kirikongo. The small lizard pelvis recovered could possibly be that of a chameleon. Ethnohistorically, chameleons are associated with smiths due to the fact that both have transformative creative power (see Dugast 2009).

The archaeological evidence suggests that at Kirikongo, the divine associations with iron-working are rooted in a complex history. At the initial occupation of the site, iron-working was not specialized, and given the limited data set from this period, its articulation into ritual at the site is unknown. During late Yellow I and Yellow II, iron smelting came under the exclusive control of the founding house and potentially intertwined with other local divine associations, notably earth connections signified by burrowing animals and subterranean materials like iron ore, and rare local objects. The close, interrelated local associations remained with iron-working after it was removed from the founding house in Red II. The inability to untangle these may be one reason for the founding house seeking out new, nonlocal divine associations after mid-Red II. While the founding house likely maintained a special relationship with the earth shrine, the earth shrine could no longer function as an exclusionary source of localized power.

Material and Animal Associations

While the focus of this book is on animal remains from Kirikongo, the parallel analyses of material culture provide an enriched reconstruction of the cultural landscape. From the beginning of the site's occupation, the founding house had divine associations with the local area around the community commensurate with what ethnohistorically would be an earth shrine, establishing a cultural "right" rooted in the initial alliance between the community and local divinities. The fauna and materials evidencing these localized associations increase in quantity and diversity at the founding house in conjunction with its co-option of metallurgy in the early sequence prior to mid-Red II. In contrast, there is very little evidence for local divine connections at Mound 1 during this time, although the house did have access to materials from the Birimian formations to the east. Their access to Birimian resources suggests that the increasing political centralization seen at Kirikongo from Yellow I through early Red II was likely rooted in exclusive control of local power sources tied to the settlement catchment.

Although the founding house's connection to the earth shrine continued, the political transformations in Red II resulted in a decentralization of localized associations that would have changed the nature of power. The new specialized smiths/potters at Mound 11 shared many faunal and material culture associations with the founding house, and residents of Mound 1 increased their access to larger-scale hunting of animals. Likely in reaction to or as a way of facilitating this shift, new associations with the forest were added at the founding house by Red III, along with a newly exclusive association with objects and materials from farther away. From Red III onward, no materials from the Birimian were recovered from Mounds 1 and 11, and only open grassland animals were identified at Mound 1. In Red IV, these patterns were altered by a general trend toward new forms of commerce at Kirikongo. These endeavors appear to have been centered at the founding house, although residents at Mound 1 may have produced textiles and possibly leather starting a few decades before its abandonment.

Voltaic Connections: Shedding Light on Southern and Eastern Interactions over Four Millennia

Many of Kirikongo's cultural practices, including site formation processes, may have much deeper roots in the region. When contextualized with the accumulation of a substantial body of research on the Kintampo (Agorsah 1986; Anquandah 1993, Casey 2000; Davies 1964, 1973, 1980; Gavua 1985; Logan and d'Andrea 2012; Shinnie and Kense 1989; Stahl 1985, 1986; Watson 2005, 2010), recent scholarship on Nok sites in Nigeria (Breunig 2014; Breunig and Rupp 2016; Franke et al. 2020), and data from Rim II in northwestern Burkina Faso (Andah 1978), Kirikongo's data shed light on a second and first millennium BC social landscape with strong continuities of practice regionally and historically with descendants. Many arguments for a northern origin of Kintampo are rooted in its economic and material culture distinctiveness and historical isolation, with similarities to lifeways in the far north but a lack of mechanisms for diffusion of these traits due to a spatial gap in related sites in Burkina Faso (Watson 2005, 2010). Based on new data, I argue that Kintampo seems less like an isolated phenomenon and more like a regional variant of broader farming societies likely spread across large parts of West Africa, at least from the savannas of Nigeria to Ghana and Burkina Faso.

I have argued since 2008 that Kirikongo's early ceramics strongly resemble those from Kintampo sites of second millennium BC Ghana and also that these ceramic affinities and a shared interaction zone are found between northern Ghana and western Burkina Faso continuing through the first millennium AD and later (Dueppen 2008, 2012a, 2012b, 2012c, 2015, 2019b; Dueppen and Gallagher 2016). In this book, I have examined continuities of practice at Kirikongo that have included the purposeful sacrifice of animals (in many contexts), the treatment of material culture and architecture at death rooted in beliefs of a partible soul that must simultaneously be attached and detached, and the significance of divine landscapes with emplaced entities that must be maintained. Burial contexts often involved the excavation of a tomb and a pit and/or accumulation of broken objects correlating with the construction of a partial architectural unit or the destruction of an architectural unit. In addition to the striking similarities in ceramic style between Kintampo ceramics and Yellow I pottery at Kirikongo (thickened and rounded everted rims, bulbs on rims for handles, chevron designs, red slip, and frequent burnishing), a reexamination of Kintampo practices suggests that similar rituals leading to site formation may be taking place. For example, two of the primary components of Kintampo distinctiveness in site formation are the ubiquity of burned daub (with flat roofs at Ntereso) and pits that seem to be filled with a mix of architectural debris and broken material culture, including broken rasps, figurines, and pottery. Many scholars (e.g., Davies [1973] at Ntereso; Casey [2000] and Sawatzky [1998] at Birimi) have suggested that structures may have been purposefully destroyed and that consistent stratification of levels at large sites such as Ntereso, along with pits that sometimes reach bedrock, may reflect a depositional process similar to that at Kirikongo. Moreover, Casey (2000) has evidence for extensive use of pits as well in a large site. So Kintampo sites may reflect related views of ancestors and emplacement, with souls requiring attachment and detachment rituals.

If the Kintampo pits and house remains are derived from similar cultural processes, then a broader set of implications may be suggested. For example, at Ntereso (Davies 1973), animal bones were preserved and yielded diversities of terrestrial and aquatic taxa similar to those at Kirikongo, along with occasional dwarf goats and possible cattle. As at Kirikongo, the high instance of wild resources (and common presence of Nile oyster at Ntereso) may be related to ritual practices scheduled for particular times of year, with livestock sacrifice and material culture detachment. This interpretive framework also calls into question some of the basic economic reconstructions of Kintampo sites. For example, based upon Kirikongo's faunal assemblages alone, it could be suggested that the settlement was not deeply invested in livestock and agriculture due to the extensive use of wild resources (particularly in Red III and IV), while all other lines of evidence indicate a heavily agricultural sedentary community. If a same logic is applied to Kintampo sites, the simple presence of domestic resources may suggest that Kintampo communities were more agricultural than previously believed, with wild resources taking on particular significance in ritual deposits. Sites like Ntereso could then suggest the likelihood of year-round sedentism, from dry season collection of aquatic resources and hunting (possibly as part of mortuary rites) combined with rainy season farming. The substantial and stratified architectural remains at the site resemble those related to the making of ancestors as social anchors. Moreover, Daboya contains more than 1 m of deposit in places, representing a low tell site with internal dynamics that allowed preservation of organics, similar to Kirikongo, and Birimi may reflect a more horizontal distribution of sequential anchors.

Temporal connections and continuity of practice between Kintampo and iron-using farmers in the greater region should be revisited with these new data. First, few Kintampo sites have been dated, and while there is a strong cluster of dates in the second millennium BC, the end dates for the Kintampo are much less convincing, including some dates that are correlated with architectural destruction events later in time (Casey 2000; Quickert et al. 2003; Shinnie and Kense 1989). For example, Daboya appears to have continuous occupation from the second millennium BC to the modern day (Shinnie and Kense 1989). Assessments of stratigraphic relations and material culture are complicated due to the highly diffuse and interdigitated deposits at Daboya. But it is notable that a series of Kintampo dates do in fact cluster in the first millennium BC, and it is also suggested that twine decoration may be found on some Kintampo sherds. At Birimi, in addition to dates from specific pits, thermoluminescence dates on both pottery and burned daub that span the first millennium BC have been obtained, and the Kintampo occupation seems to have formed a substantial site over time (Quickert et al. 2003). In the B-sites there are also later dates, including one on cattle from the early first millennium BC, and rouletted decoration is found on pottery (Watson 2005, 2010). Since evidence for iron metallurgy around the first millennium BC has been documented at sites in Burkina Faso (see Holl 2014; Koté 2007) that I have argued have similar pottery, these later dates for Kintampo sites are plausible.

Recent research at Nok has pushed back its origin to the second millennium BC (Breunig 2014; Breunig and Rupp 2016; Franke et al. 2020), suggesting cultural continuity spanning the stone to iron transformation in this region of Nigeria. This work has also provided expanded material culture and site formation data with which to contextualize Kintampo. In many ways, Nok closely resembles Kintampo despite the more poorly preserved sites and elaborate terra-cotta figurine tradition. Early Nok pottery has strong similarities to Kintampo (and early Kirikongo) in vessel form (identical thickened rims) and decorative style (zonation and possible slip patterns), much more so than middle and late Nok pottery, which seems to diverge. Moreover, most Nok finds are from pits that seem to have architectural debris and broken material culture, including possibly purposefully broken terra-cotta figurines (Franke et al. 2020; see also Breunig 2014 for suggestions of purposeful breaking of figurines). While bones do not preserve, similar plant remains are known from Nok and Kintampo sites (Breunig 2014, D'Andrea and Casey 2002; D'Andrea et al. 2007; Höhn and Neumann 2016; Logan and D'Andrea 2012). I argue that these similar ways of doing and initial material culture similarities suggest a lack of isolation in early agricultural communities in second millennium BC West Africa.

Kintampo sites, if defined narrowly as second millennium BC (temporally), non-metallurgical (technologically), and with distinctive rasps (index artifact), have not been identified yet in Burkina Faso. However, Burkina Faso is very poorly surveyed archaeologically, and sites like Rim II (Andah 1978) suggest that local variants of farming cultures with some similarities in style and practice to Kintampo and Nok may have occurred in western Burkina Faso. Rim II contained architectural remains of likely coursed earthen techniques, and pottery with thickened rims strongly resembles Kirikongo's Yellow I and consequently both Nok and Kintampo. While organics did not preserve, Andah (1978) argued based upon the extensive ceramics, ground stone tools, and lack of hunting implements that this was an agricultural community. While it is unknown if the architectural units were purposefully destroyed, preserved floors may attest to similar site formation processes. In general, Kirikongo's early pottery has affinities to widely distributed early farming economies throughout the region, and the range of vessel forms and rims at Ntereso (Davies 1973) could easily be mistaken for those from early Kirikongo, aside from the use of mat impressions and braided strip roulettes at Kirikongo.

From the combined data, it is possible that Kintampo and variants of Kintampo spanned the start of iron-working as they did in the Nok region, after which increasing diversification occurred. If indeed material culture and architectural sacrifice is occurring at Kintampo sites as at later Kirikongo, speculation on the nature and use of the Kintampo rasps is warranted. As the house and architecture are a recurring important theme in Kintampo sites, and strong ancestral beliefs seem to be indicated by ritual practices within sites, it is possible that rasps are in fact representations of ancestors, or objects shaped like simplified people within wattle and daub houses (the grid pattern carved in them), and that these, like later tripods or other pots at Kirikongo, were destroyed as part of rituals of attachment/detachment.

With the expanded regional data, Kintampo appears a less isolated phenomenon than was previously understood, and migration is a less plausible interpretation of Kintampo origins than a broader landscape of interacting early farmers with local cultural variations in different areas. Within this kind of landscape, resources and ideas can move quickly. Moreover, shared beliefs and practices suggest that continuities spanned the addition of metallurgy in the first millennium BC. Kirikongo arose out of this cultural setting by AD 100 and in many ways initially resembled some of the earlier sites before beginning a process of transformation when a multi-house village emerged ca. AD 350. It is also notable that economic resources like the domestic chicken may have moved through first millennium BC networks, as they were likely present at Kirikongo's founding in at latest the early first millennium AD and linguistic data suggest east–west connections in chicken terminology (Williamson 2000; see Dueppen 2011).

Continual maintenance of strong relations throughout the broader region is indicated by material culture similarities in addition to aspects of ritual practice in the first and second millennia AD. While specific decorations are more variable over time, jar forms and decoration syntax changed in tandem throughout Burkina Faso and northern Ghana after the inclusion of iron into economies (see Dueppen 2012a regarding Daboya [Shinnie and Kense 1989] and New Buipe [York 1973]). In particular, similarities in cultural practices, and potentially in material culture affinities, are found in the sites of Komaland in northern Ghana. Research in this region has identified hundreds of small mounds in clusters throughout the landscape dating to the second half of the first millennium and early second millennium AD (Anquandah 1987; Asamoah-Mensah 2013; Atkinson 2017; Dartey 2018; Insoll et al. 2012a, 2012b; Kankpeyeng and Nkumbaan 2008, 2009; Kankpeyeng et al. 2013). Excavations at multiple sites have identified house mounds with burials under floors, including one with a burial covered in broken potsherds (Asamoah-Mensah 2013; see also discussions in Kankpeyeng et al. 2013). More extensively studied at Komaland sites are the distinct shrine mounds such as Yikpabongo YK10-3/YK11 (Kankpeyeng et al. 2013). Based on published photographs and illustrations in the references above, jar rims from Komaland sites share many features, including decoration syntax and rim form, with Kirikongo pottery from the late first millennium and early second millennium AD. It is notable that Saako's recent work in northwestern Ghana also contains ceramics with features similar to those from Kirikongo as well from the late first and early second millennium AD (Saako 2017).

The Koma shrine mound YK10-3/YK11 is characterized by accumulations of complete and fragmented pottery, complete and broken stones, complete and fragmentary terra-cottas, metals, a burial, and evidence for rituals of libations (Kankpeyeng et al. 2013). The analysis and interpretation of this site has been focused on ritual practice. Kankpeyeng et al. (2013) suggest that the accumulations are the result of repeated construction of shrines in the same general location; each was likely venerated and/or used for rituals and contained objects potentially connected to ancestors and/or divinities. The terra-cotta figurines from these sites have been a major focus of research, and analyses of their forms, residues, and contexts have been used to reconstruct ritual practices (e.g., Anquandah 1987; Insoll et al. 2012a, 2012b, 2016; Kankpeyeng and Nkumbaan 2009; Kankpeyeng et al. 2013; Robinson et al. 2017). Ritualized depositions have also been explored farther south in central Ghana at Banda, where at Kuulo Kataa, Stahl (2008), drawing from Kopytoff's object biography approach (1986), employed an analytical framework focusing on the biographies of canid and python bones to reveal variance in body part distribution by context. She identified differential patterns in treatment to make a compelling case for ritualized deposition practices.

While under-researched in comparison to interregional connections to the north (particularly regarding trans-Saharan trade), east–west interaction zones within the savanna likely influenced cultural practices at Kirikongo and adjacent sites, as the early use of carved roulettes (see Dueppen 2012a, 2015) and the presence of a pottery pavement in a tomb at Tora-Sira-Tomo (Holl 2014; Koté 2007) and elsewhere in Burkina Faso (Aguigah 2018) may indicate connections to the eastern Niger zone (Agbaje-Williams 2005; Aguigah 2018; Haour 2019; Ogundiran 2000).

On the Roads to the Middle Niger: Kirikongo in Relation to the North and West

The Mouhoun Bend is on the border between the Mande and Voltaic worlds today, as part of a strong multicultural interaction zone between the Mouhoun and the Bani River in Mali. Shared cultural practices in this area include hereditary occupation groups, diverse societies that practice variants of the Do religious system (both Mande and Voltaic, both former states and autonomous communities), the use of Mande origin names in Gur-speaking Bwa families, and shared histories of collective action, including most notably cooperative dynamics in the nineteenth century and during the Volta-Bani anticolonial war (Capron 1973; Coulibaly 2006; Diarra 2007; Hubbell 1997; Philiponeau 2009; Şaul 1991; Şaul and Royer 2001; Tamari 1991; Traoré 2007). Based on current data, socioeconomic specializations, religious practices, and potentially many other societal features developed over the past few millennia within this broader interaction zone, and it is notable that Bwa, Bobo, and Senoufo populations extend from the Mouhoun system in western Burkina Faso deep into Mali, with, for example, Bwa communities part of the ethnic mosaic of the Djenné region (Capron 1973; Gagliardi 2014; McIntosh 1995). Data from Kirikongo indicate that deeper understandings of regional historical processes can be advanced if scholarship bridges the interconnections stretching from the Niger River system to western Burkina Faso and recognizes similarities in practice that transcend linguistic and political structures, as well as local variations resulting from different experiences of similar phenomena.

As described throughout this book, it is likely that iron-using farmers were already in the Mouhoun Bend prior to the establishment of Jenne-jeno on the southern borders of the Inland Niger Delta in the last centuries BC (R. McIntosh 1998, 2005; S.K. McIntosh 1995). If so, it is possible, given the dispersed settlement pattern, that similar communities may have been part of an initial interaction zone between the Inland Niger Delta and areas outside that could have provided goods such as iron and stone to floodplain settlements. The very low but consistent occurrence of braided twine roulette decorations in Yellow Phase pottery at Kirikongo may reflect these connections, and it is possible that chickens, small cattle, and earthen-brick construction were adopted into communities like Jenne-jeno as a result of interactions with societies located outside the delta (see also Dueppen 2012c). In addition to resources and techniques, it is likely that commercial relations brought iron ore, stone, and possibly even shea butter to the Inland Niger Delta, where they could be exchanged at settlements like Jenne-jeno for commodities such as salt. The level and intensity of regional interactions may have grown in the late first millennium AD, with the Inland Niger Delta as well as the Seno Plain and Bandiagara Escarpment (Mayor 2011), as reflected in Kirikongo's potters producing tripod vessels, starting in the ninth century AD with local decoration techniques, and in the increasing incorporation of twisted twine and folded strip roulettes in Red I ceramics.

Events at Kirikongo in the early second millennium AD may also have occurred within the context of this broader interaction zone, although with localized particulars. For example, in the mid-twelfth century AD, the fundamental transformation of Kirikongo into a horizontally interdependent specialized community could have been part of larger phenomenon calling into question previous centralized power relationships. Subsequent evidence indicates that after separation into interdependent rather than dependent specialized economies, the founding house formed a ritual connection with animals linked to the forest that today are in part intertwined with the Do religious system as a nonhierarchical divine relationship. However, it is possible that Do, like many other religious movements in the ethnohistoric region, became "attached" to the founding house in the twelfth to thirteenth centuries AD after the removal of iron-working power from the house. Do as a central feature of religious life has a wide distribution today as a communal practice in Mande and Voltaic communities extending from the Niger and Bani Rivers to the Mouhoun River catchment. Memories and traditions related to a more hierarchical Do are known from parts of neighboring Mali (see MacDonald et al. 2018), where they may connect to periods prior to the Sunjata epic, where a land of Do is the setting for important events connected to Malian origins (see Bulman and Vydrine 2017; Conrad and Condé 2004; MacDonald et al. 2018). It is possible that at Kirikongo, despite the potential emergence of Do at a time of increasing communalism, the founding house may have initially co-opted a privileged role in maintaining these new divine alliances. The current, communalistic iterations of Do in Burkina Faso and neighboring parts of Mali may have their origins in the fourteenth and fifteenth centuries AD as plague undermined centralization, opened the landscape to new village founders, and broadened access to Do.

After the plague, Kirikongo's interactions with societies from the north and west became more intensive, as multiple lines of evidence support the arrival of diasporic Mande populations in the Mouhoun Bend. The ethnohistoric record describes deep connections between western Burkina Faso and the Inland Niger Delta region, despite the general maintenance of autonomies in Burkina Faso, as multiple attempts at state formation transcended the region in the eighteenth and nineteenth centuries AD (see Capron 1973; Şaul and Royer 2001). Similarly, this zone was the setting for cooperative dynamics in the Volta-Bani anticolonial war in the early twentieth century, likely facilitated by strong cultural connections throughout the region.

Plague, Culture Change, and the Arrival of the Mande Trading Diasporas

In the thirteenth and early fourteenth centuries AD, both Kirikongo and the surrounding region were densely occupied, with specialized interdependent economies and possibly founding houses shifting associations of power to early versions of Do. Village autonomies were asserted in conflicts that led to the targeting of symbolically charged architecture, and communities had strong communal identities through shared uses of well-decorated ceramic traditions, elaborate funerary and marriage practices, interdependent ritual and economic practices, open architectural syntax, and the abolishment of cattle husbandry. As suggested above, the subsequent plague era may have permanently undermined founding houses from the power they had retained, causing new political and economic choices and distributing power to more houses.

In the mid-fourteenth century AD, the community at Kirikongo was reduced to half or a third of what it had been earlier in a very short time. I have argued in detail that this depopulation was likely caused by the plague (see Dueppen and Gallagher 2016; Gallagher and Dueppen 2018; discussions in chapter 2), building on and in line with work by other scholars exploring the possible impacts of plague in West Africa (Chouin 2013, 2018; Chouin and DeCorse 2010; Dueppen and Gallagher 2016; Gallagher and Dueppen 2018; Green 2014, 2018; Huysecom et al. 2015; McIntosh 1998; Posnansky 1987). Regardless of the cause, this rapid population change at the site had significant effects.

While many mounds were abandoned, the oldest mounds and the specialist mound were still occupied. It could be that these houses combined with smaller, demographically weakened houses at this time. In general, architecture became more poorly made, contrasting with the durable architecture previously constructed. Buildings were not as clean prior to the deposition of funerary or other ritual remains—for example, in Unit A, where an uncleaned hearth was left in place with ritual deposits laid atop it. More than 1 m of deposits formed in at most 50 years. Similarly poor architecture characterized Mound 4, where multiple structures were abandoned in short succession. In addition, ceramic densities decreased and deposits tended to have fewer pots than they had prior to the plague, and labor problems are evident in the poorly decorated pottery of the era (see Dueppen and Gallagher 2016), despite the continued use of the same forming and firing techniques.

The nature of rituals changed during this period as well. For the only time ever at Mound 1, a burial was associated with a ritual deposit from the rainy season. Typical practices of breaking objects occurred in the late fourteenth and early fifteenth centuries AD, but this was done more haphazardly, with only the tips of metals bent or small chips from hand stones, and occasionally a complete object was interred. Sacrificed animals tended to be more variable in age than the prime-age individuals typical elsewhere at the site, perhaps indicating unpredictability of scheduling. Cultural values may have also transformed, as tripod vessels ceased to be produced during this era, with the last one found in early Red IV deposits at Mound 4.

By the second decade of the fifteenth century AD, the founding house may have been alone at the site with specialists, and both Mounds 3 and 7 may have been activity areas. The nature of mid-Red IV ritual deposits indicates significant cultural changes by this point. As established elsewhere (see Dueppen and Gallagher 2016), evidence for the arrival of ethnohistorically described Mande trading diasporas is indicated by new pottery decoration techniques and forms typical of neighboring areas of Mali, and there is evidence of new economic practices relating to commodities chains likely established by these new occupants. The cemetery monuments at Mound 3 ceased to be venerated, with the area shifting to use as a leather-tanning facility. Mound 7 was likely used as a cloth-dyeing area due to the immense depositions of pure ash along with the presence of spindle whorls at Kirikongo. A dyeing installation also dating to Red IV was found at neighboring Tora-Sira-Tomo (Holl 2014; Koté 2007).

The B-RIV-c pit, while in many regards following traditional practices and serving as a foundation for the subsequent Red V architectural level, exhibited some fundamental differences in systems of valuation related to hunting, with a new focus on commodities production showing potentially additional aims and goals beyond deeply held traditions. B-RIV-c lacked tripod vessels and beer brewing jars but was filled with an extensive ceramic assemblage produced by local technological traditions but with new stylistic and formal features invoking prior and contemporary pottery found in neighboring parts of Mali (MacDonald et al. 2011; Mayor 2011; McIntosh 1995). While the pit contained sacrificed domestic animals, the wild animals of the pit seem to have been targeted and processed for known traded commodities. These included previously untargeted animals such as hippopotami, crocodiles, large mongooses not associated with termites, larger carnivores, and very large warthogs. In addition, there is evidence for the systematic removal of teeth and skins but less systematic removal of parts that were potent earlier in the sequence (for example, small bones for possible use in divination). The faunal assemblage from B-RIV-c strongly resembles the assemblages from Diouboye (see Dueppen and Gokee 2014; Gokee 2016), an earlier site connected to the Malian Empire along the Falemé River in Senegal, where industrial hunting and processing for animal products was a main focus. Animal products were likely a significant commodity in regional and interregional trade at this time (e.g., Guérin 2017, 2019). The B-RIV-c pit also contained an unbroken spindle whorl, indicating production of another traded commodity, cloth (possibly made with a nonlocally produced spindle whorl).

Another likely commodity from the region in Red IV is gold, as Kirikongo is located only 15 to 20 km from the Houndé Greenstone Belt of the Birimian sequence, and historically exploited gold deposits are known from the area to the east near Tienzan. The greenstone bead likely produced at Kirikongo showed trace amounts of gold under high magnification, which implies visits to areas where gold was available. It is notable that the evidence for new forms of commodities production at Kirikongo occurred during a period when sites in the Loropeni area near gold-bearing strata (both the Houndé and Boromo Greenstone Belts) were also active (see Kiéthéga 1983; Koté 2013; Somé and Simporé 2014). Western Burkina Faso may have been a central commercial zone in West Africa at the time.

As mentioned above, the plague may have called into question power arrangements and long-held belief systems. This may have democratized Do in some areas and led to Islamic conversion in others. Both processes may have been active in the Mouhoun Bend with the arrival of Malian diasporas. As will be discussed in future works, it is likely that changes in values seen in Kirikongo's later Red IV deposits are early shifts toward Islamic conversion.

Local Choices in Relation to Regional Interaction Zones through History

Cultural practices involving the interstices of the fauna and other material classes indicate that Kirikongo was a dynamic settlement, ultimately connected to cultural processes with deep roots throughout large areas of West Africa. Residents of the site were part of interlinked social networks that extended to the south and east and increasingly interacted with the Middle Niger and adjacent zones through the first into the second millennium AD. Despite these connections, the Mouhoun Bend maintained localized autonomies and values and made dynamic technological and political choices, with distinctive developments of kiln-fired pottery, earthen-brick and fired-brick construction, crushed laterite pavements, subterranean furnaces, multistory ritual structures, ceramic decoration techniques, and ritual processes. Localized sources of power rooted in custodial relations were ultimately more important than control of external trade, and these were symbolized by a rich system of sacrifice and wild animal associations reflecting relations with divinities. While distinctive in many features, events and processes at Kirikongo can shed light on practices in neighboring areas. Kirikongo provides evidence that upon the establishment of urban centers in the Inland Niger Delta, large parts of West Africa were already deeply interconnected with resources moving through east–west networks. The frameworks for the nature of subsequent complexity likely draw from all these sources, as they did at Kirikongo, but with localized distinctive choices.

Sequential Ancestor Shrines, Sacrifice, and Rituals of Attachment and Detachment, or Why Mounds Formed at Kirikongo

Analyses throughout this book have employed local religious logics to situate the relations between animals, material culture, substances, divinities, ancestors, and people to examine archaeological contexts at the site of Kirikongo. The data suggest that elements of these logics have deep roots in the region and have influenced the nature of agency and action, relations with local landscapes, and the ritual justifications of political and social identities, providing insights into myriad historical topics. The emplaced ritualized accumulations at Kirikongo have many features in common with ethnohistoric ancestor shrines. More specifically, archaeological patterns indicate that:

- Sacrifice of domestic animals was fundamental to ritual practices over time, and the use of sacrifice to create and maintain relations with divinities and ancestors likely has great antiquity.
- Wild animal use was more variable, likely reflecting that wild animals were a point of interaction and association with divinities distributed in the landscape. At different times, different individuals and houses had particular relationships with these divinities.
- Wild animals were found co-associated with other animals that share particular ecological settings and/or seasonal associations, suggesting divisions of the landscape into loci of emplaced divinities. These landscape features were restricted to particular houses in the community and likely reflect divine attachments, some with great antiquity (for example, harvest and fertility associations of the founding house) but others that connected to technological activities in society (for example, deep earth animals and iron-working).
- Locally produced material culture was likely sacrificed, indicating that ethnohistorically documented beliefs in the inclusive unity of humans and objects and the existence of partible souls may have significant antiquity.
- Natural objects (and ancient stone tools) were incorporated in archaeological contexts unbroken, suggesting that as in ethnohistory, these held a differential status, possibly related to their connections to divinities.
- Potent parts of both wild and domestic animals were either systematically included or systematically removed from deposits, possibly for use as talismans, in shrines and bundles, and potentially for divination (particularly the almost nonexistent smaller elements).
- Bodies of domestic animals were divided up into different sections, and while representative elements from throughout the body were often present, meat was likely distributed as part of feasts connecting large groups of people. It is likely that, as in ethnohistoric practice, distribution followed complex patterns related to the social and political relations of the sacrificer. Wild animals frequently received similar treatment, although the specific practices were more variable.
- At Kirikongo, animal parts and material culture fragments were deposited in discrete loci. These were likely a component of attachment and detachment rituals to emplace ancestors and maintain alliances and associations with divinities (both familial and likely personal). These rituals typically took place in association with funerals or commemoration, new construction, and other major events. Based on the animal remains, they may have involved feasts. The nature and size of these feasts varied over time, among households, and among events. Natural substances and potent animal parts were often accumulated in these deposits as well, perhaps reflecting familial and individual relations to divinities, which may have persisted after death.
- Mounds at Kirikongo formed from repeated choices involved in rituals of attachment and detachment, including the preservation of architectural foundations, construction of partial structures, and the maintenance of direct connections with ancestors enabled by living on and emplacing offerings within their spaces. The result was the neatly stratified, temporally discrete deposits seen in the archaeological record rooted in the sequential construction of ancestor shrines.

Through use of this basic ontological framework, the analysis of Kirikongo's archaeological record attests to a dynamic history involving political transformations, technological innovations, changing interregional relations, and the development of localized traditions out of shared origins. The archaeologically visible dynamism and accumulative nature of new social and economic roles over time may be rooted in a complex cultural setting with extremely diverse divinities and ancestral relations. While consistent in their core elements, ritual practices at Kirikongo enabled improvisation in cultural choices and ritualized relations, and were flexible enough to anchor the community for 1,500 years.

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Divine
CONSUMPTION

Schematic representation of the Mouhoun Bend landscape.
Illustration by Neo Lehoko.

Kirikongo is an archaeological site composed of thirteen remarkably well-preserved discrete mounds occupied continually from the early first to the mid second millennium AD. It spans a dynamic era that saw the growth of large settlement communities and regional socio-political formations, development of economic specializations, intensification in interregional commercial networks, and the effects of the Black Death pandemic. The extraordinary preservation of architectural units, activity areas and industrial zones provides a unique opportunity to discern the cultural practices that created stratified mounds (tells) in this part of West Africa. Building from a new detailed zooarchaeological analysis and refinements in stratigraphic precision, this book argues that repeated ritual activity was a significant factor in the accumulation of stratified archaeological deposits. The book details consistencies in form and content of discrete loci containing animal bones, food remains, and broken and unbroken objects and suggests that these are the remnants of sequential ancestor shrines created when domestic spaces were converted to tombs or dedicated mortuary monuments were constructed. Continuities and transformations in ancestral rituals at Kirikongo inform on earlier West African ritual practices from the second millennium BC as well as political and social transformations at the site. More broadly, this case study provides new insights on anthropogenic mound (tell) formation processes, social zooarchaeology, material culture theory, historical ontology, and the analysis of ritual and religion in the archaeological record.

Front: Animals counterclockwise from upper left: dwarf goat, bushbuck, sitatunga, Nile monitor lizard, serval cat, and double-spurred francolin. *Illustrations by Ethan Schmunk.*

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