Investigating Ancient Human Occupation at Zoboku: A Koma Site in Northern Ghana

Joyce Ampofoa Dartey

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Dedication

I dedicate this thesis to Nana Akwasi, Papa Kwabena, Maame Yaa Affoah and Adom Ofori, for the many challenges and rewards.

Abstract

It was the highly elaborate terracotta figurines that drew research attention to the Koma archaeological sites in northern Ghana in the mid-1980s. Since then, several mounds in the area have suffered the ravages of illicit looting and sale of the figurines, resulting in a loss of essential contextual and archaeological information. Nevertheless, scientific research has also made considerable advances in examining and revealing some aspects of the social, ritual and technological organisation of the past Koma societies. For example, research has revealed that the Koma sites were probably inhabited as early as the sixth century AD. It has also been revealed that some of the mounds are the remains of ritual actions possibly focused on healing and ancestor veneration practices, in which figurines and other objects were specially curated, used and ultimately deposited in special spatial arrangements. So far there has been considerable attention on the Koma terracotta figurines and how they were appropriated in such symbolic and ritual processes and how they embody the aesthetic constructions of the past Koma people. This primary research focus on terracotta figurines has however, resulted in a marginalization of the importance of other associated artefact categories such as pottery.

This thesis attempts to address this imbalance by focusing on the pottery artefacts from Zoboku, near Tantala in northeast Ghana. Based on the premise that the materialities of pottery and terracotta figurines were entangled in several ways, the thesis explores ways in which the social contexts of pottery can be elucidated in the Koma archaeological record. The thesis focuses on the technology of the pottery and examines how the techniques of potmaking were situated in social contexts of interaction and transmission of knowledge. Surveys and excavations have been used to examine how these evidences are structured in the archaeological record of the site.

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Chapter 1. Background to the Study

1.0 Introduction

This thesis is a study of the archaeological material culture and past settlement pattern of Zoboku, one of more than a hundred mound sites located in the valleys of the Sisili and Kulpawn Rivers in the middle of northern Ghana (Anquandah 1987; 1998; Kankpeyeng & Nkumbaan 2009; Insoll et al 2012). The study has used surveys and excavations to examine how archaeological features and artefacts are organised on the landscape, and the material data obtained have been analysed using paradigms based on the concepts of agency, materiality and technology. Similar investigations at the nearby sites of Yikpabongo, Tando-Fagusa and Dabozeasi have revealed complex social and technological organizations in the form of diverse culture spaces including domestic contexts, shrines and burial spaces as well as multiple patterns of artefact deposition.

Large quantities of stone and metal objects, potsherds, intact pots and terracotta figurines from these sites suggest the existence, in the past, of cultures with rich and well-developed material culture structures, and these have provided avenues to examine in greater detail, the past technological and socio-economic patterns of the region. Organic samples and figurines from sealed contexts in Yikpabongo (located about 18km from Zoboku), have been dated by thermoluminescence and radiocarbon methods to between the sixth and twelfth centuries AD (Kankpeyeng et al 2011; Insoll et al 2012:28;

Kankpeyeng et al 2013:480). Material culture such as cowry shells and figurine imagery of horses and camels from the mound sites suggest that the area was possibly part of a wider landscape of social and economic interactions, possibly featuring long distance trade or exchanges of ideas and objects.

Historical information for this period is virtually non-existent for this region, as is the case for many other parts of Africa. Thus, the results of this present research project, which adds to what is already known from the nearby sites represent essential cultural information, filling a gaping void in our knowledge of prehistoric human occupation in northern Ghana and the West African sub-region. For our knowledge of most of the past human activity in Africa, material culture constitutes a primary source.

Artefacts and archaeological features have generally enhanced understandings of prehistoric subsistence and living patterns, early food production, stone tool and metal technologies, socio-economic complexities, settlement patterns, trade and exchanges, movements and interactions of persons, symbolic behaviours and cognitive conceptions globally and in Africa. Building on this background, the thesis focuses on the material culture from Zoboku, especially the pottery artefacts to examine aspects of the behaviour and culture processes of the past people.

Due to its location and material culture, Zoboku is one of many related sites in what I describe as the 'Koma geoarchaeological area' in northern Ghana. This area has also been called 'Komaland' by other researchers (Anquandah 1998; Kankpeyeng & Nkumbaan 2008; 2009; Kankpeyeng et al 2011). It spans an area of approximately $100x100km^2$ within which are located hundreds of mound sites which have produced highly stylised and elaborate terracotta figurines. Some of the figurines have been exhibited in the Musée Dapper in Paris, the Musée Barbier-Mueller in Geneva (Anquandah 2003), and the Galerie Amrad in Canada (Dagan 1989) and more recently at the University of Manchester Museum in the United Kingdom (Insoll et al 2014).

The major argument of this thesis is that so far, archaeological research of the Koma sites have focused on the terracotta figurines to the neglect of the significance of other artefact categories, especially pottery. The terracotta figurines have been used to interrogate the art and aesthetic structures of the past culture, and how they were employed in family, clan or communal burial practices to materialise beliefs about death, the after-life and encode aspects of the social and political organisation of the past people (Anquandah & Van Ham 1985; Anquandah 1998; Anquandah 2003).

Other lines of inquiry have focused on how the figurines were engaged with in ritual processes incorporating ancestor veneration practices, healing and witchcraft exorcism (Kankpeyeng & Nkumbaan 2009; Kankpeyeng et al 2011; Insoll et al 2012; Kankpeyeng et al 2013).

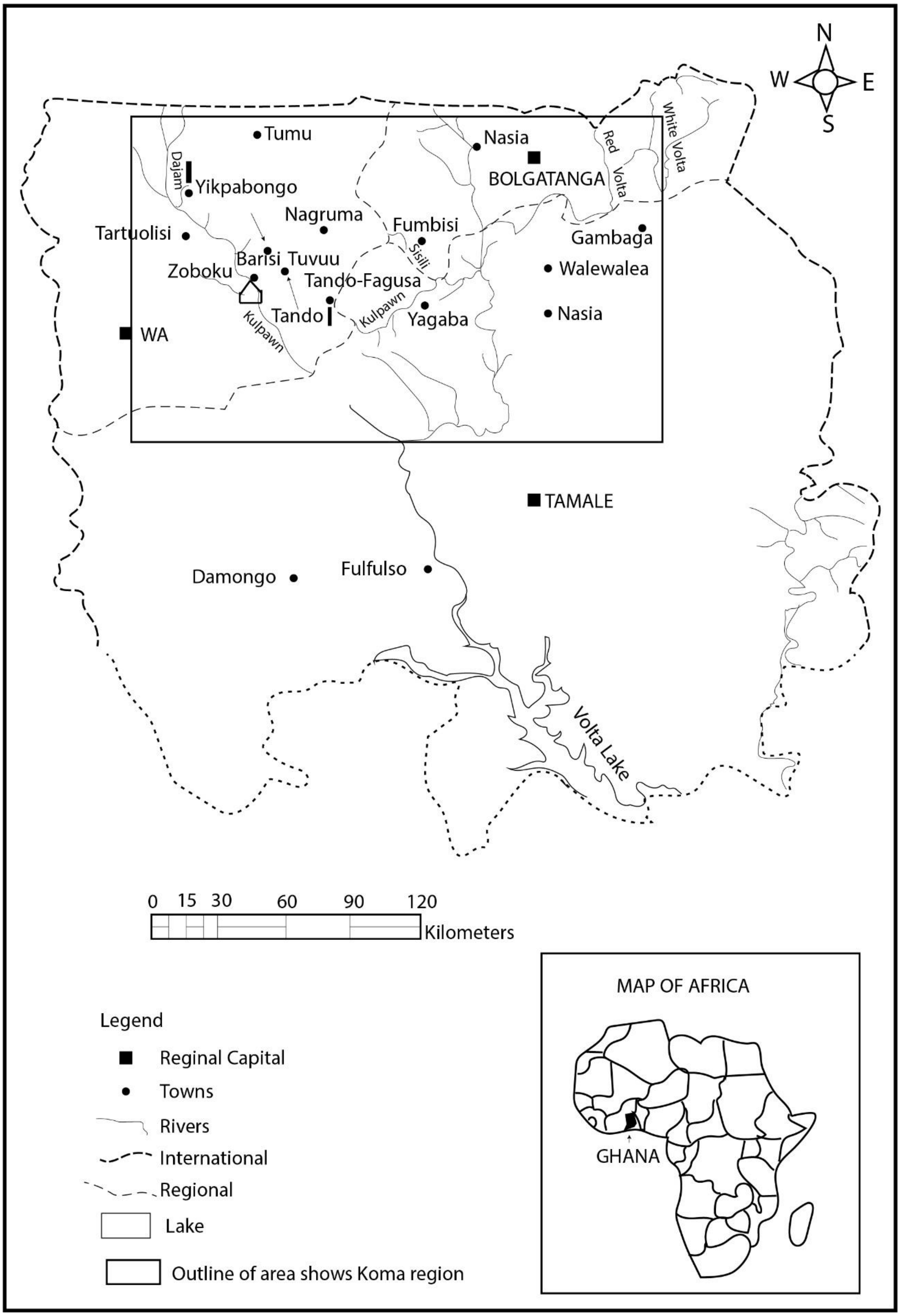
Although potsherds and intact pots have been recovered in the same contexts as the Koma figurines and in some cases in very close associations (Anquandah 2003:143-145; Kankpeyeng et al 2013: 482), as an artefact category, it has occupied an ancillary position in the existing interpretive frameworks. Yet, pots and terracotta figurines are known to share very close correlations and their materiality and functions are entangled in several contexts (Barley 1994). Besides sharing common basic raw materials, the technology involved in creating both object categories is very similar, and both are elaborate media through which people express their personal and social cognitive concepts, ideas and perceptions. Both pots and figurines can and have been used in, and engaged with, in different spheres of life. Pots however, have the additional advantage as fundamental artefacts in most prehistoric, recent historic, and contemporary societies (Dietler & Herbich 1989; Arnold 1985) although it is facing stiff competition from other materials such as enamel, porcelain, aluminium and plastics in modern times (Allsworth-Jones 1996:314).

Pots and other ceramic objects have been used in the very essential processes of food and drink preparation, consumption, storage and transport. Thus, besides playing an active role in the creation and negotiation of personal and social identities, the making and use of pots is also an important part of the practical domestic and economic organisations of most societies. In addition, pottery has been known to have many ceremonial and sacred uses. The relationships between terracotta figurines and pottery are explored further in Section 1.8, where I discuss the research problems of the thesis in detail.

As an outline of the background to this thesis, I contend that as our knowledge of the Koma figurine tradition and its significance to the social and ideological organisation of the past Koma culture is presently relatively advanced, it is time to focus analytical lenses on the pottery material culture and determine what these can tell us of the technological, and socio-economic aspects, and also explore ways in which the past people engaged with other artefacts besides the terracotta figurines.

Accordingly, it focuses on pottery artefacts from excavations carried out at Zoboku. Specifically, the thesis considers the character of the pottery technology, and how the techniques of the industry and the products can inform us of the social organisation of the past people. Although pottery is central to the issues interrogated in this thesis, other artefact categories recovered from the excavations, as well as the archaeological features and the settlement pattern of the site are also explored to provide us with a holistic understanding of the past culture.

Ultimately, the thesis is intended as a contribution to increased research of the Koma archaeological landscape and an expansion of our knowledge base of the past societies in the area.



Map 1: Northern Ghana, showing Zoboku and other Koma sites

1.1 Structure of the Thesis

The thesis is organized into seven chapters. Chapter One introduces the reader to the Koma geo-archaeological landscape and the spatial pattern of sites through a review of previous surveys of the area. The discussion also touches on the distribution of contemporary settlements and their relationships with the archaeological landscape. A review of the historical and archaeological context of Northern Ghana as well as previous excavations in the Koma area, findings and interpretations sets the background for the research problems of the thesis. This is followed by a discussion of the theoretical framework and a description of Tantala, the contemporary settlement adjoining the research site.

Chapter Two is an overview of the geographical background of the Koma area. The climatic and geomorphological characteristics of the area are discussed, and the relationships to the archaeological data are evaluated. Chapter Three presents the processes by which field data was collected, namely the surveys, excavations and interpretations of the datasets.

Chapter Four comprises classifications and other analyses of the ceramic artefacts recovered from the excavations: potsherds, intact vessels, daub, and terracotta fragments, while Chapter Five presents the non-ceramic artefacts from the excavations. Chapter Six constitutes a discussion of the research findings.

Chapter Seven concludes the thesis, drawing together the various chapters and outlining summaries and syntheses of the main findings and the contributions of this research to our understanding of the archaeology of the Koma area.

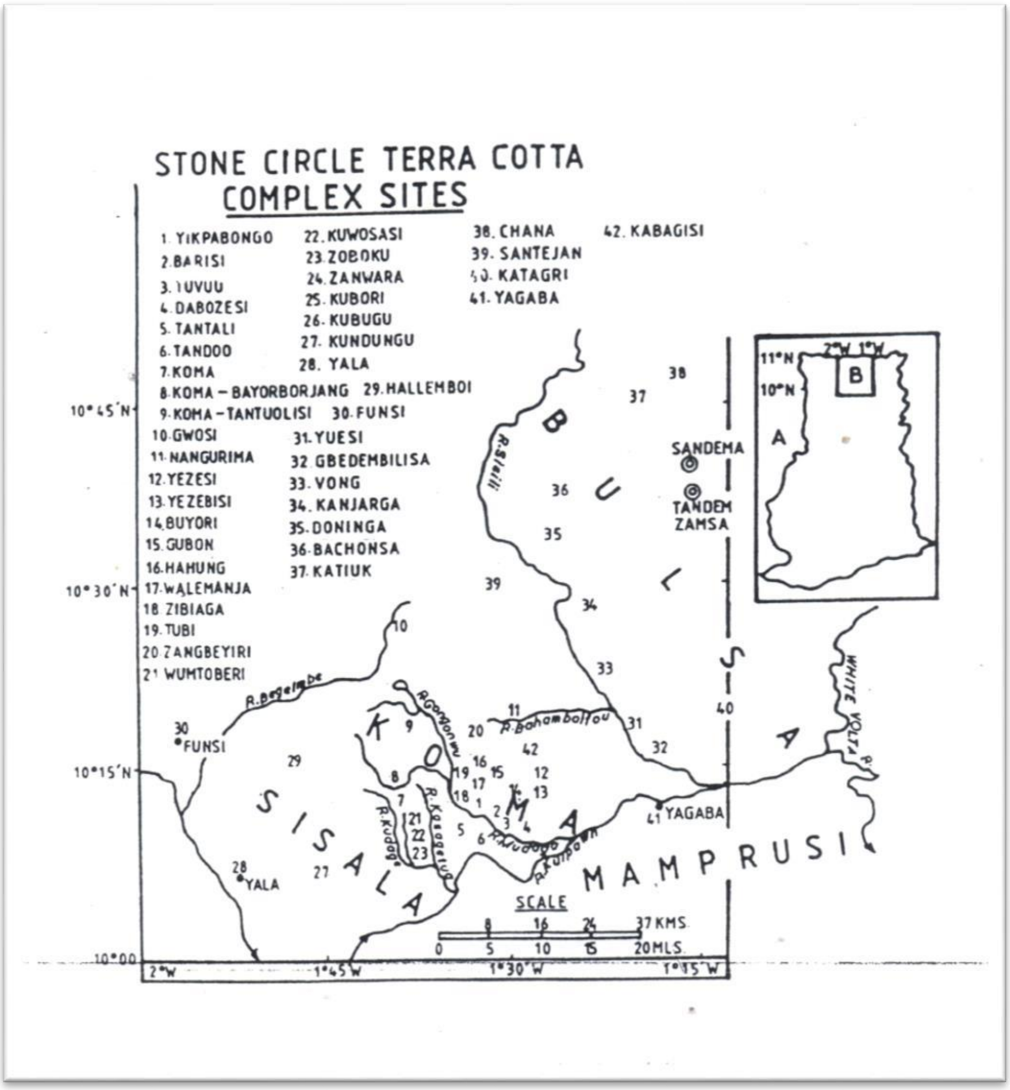
1.2. Previous Surveys and Delineation of Sites

The Koma archaeological region was unknown to the academic community until the 1970s when a local inhabitant of Yikpabongo, Ben Saibu Baluri, presented samples of terracotta figurines to the Ghana Museums and Monuments Board in Accra. Several years later in 1984, Franz Kroger, an anthropologist working in nearby Bulsa communities informed the staff of the Department of Archaeology at the University of Ghana of the presence of terracotta figurines in the possession of some of the inhabitants of Yikpabongo. Kroger had previously obtained a thermoluminescence date of 405 ± 135 BP (uncalibrated) for a sample of the terracotta figurines. His conviction that the figurines were of some historical significance played an important role in the commencement of research in the area (Anquandah & Van Ham 1985: 15-16).

Thus, in 1985, a research camp was set up at Yikpabongo and beginning with foot and vehicle reconnaissance surveys, efforts were made to identify and record the locations of other sites where similar figurines had been found by local inhabitants (Anquandah 1998: 68-69). The surveys documented thirty-three locations distributed over an area of approximately 100x100km containing several hundreds of mounds. The mounds were mainly earthen but also incorporated large quantities of stones, mainly quartzes, muscovitebiotites and schists (Kankpeyeng & Nkumbaan 2009: 99). Some of the stones appeared unused but others showed evidence of previous use possibly as grinders, pounders and rubbers. Across the survey area, the sites displayed typical site structure and surface scatters of fragmented and whole terracotta figurines as well as potsherds decorated with roulette motifs. This apparent homogeneity implied some form of cultural connections leading Anquandah (1998) to suggest that the sites constituted a 'Complex', or a 'Civilization', possibly with its capital at Yikpabongo, inferring the existence of a related group of settlements or some form of organised political structure.

It must be stressed that although the sites that have been excavated so far demonstrate some similarities in material culture, the nature of the affiliations, relationships and inter-site interactions are still unclear. As of now, we cannot say for certain whether all the sites existed at the same time, were related as a complex, with shared forms of knowledge, ideas, technologies and cultural objects, within an organised socio-political system, or whether groups of people moved from one site to another over time, replicating similar material cultures and technologies. Nevertheless, the structural appearance of the mounds as well as the material contents uncovered posed several questions centred on chronology, function, identity of the mound makers and users and generally, the place of this unknown culture in the historical and archaeological context of Ghana and West Africa.

The mounds were found to be located near contemporary communities, usually in areas being used presently as farmlands (see Table 1). For instance, the present-day village of Yikpabongo, has been built on the ruins of the



Map 2: Distribution of Koma sites (Source: Anquandah 1998:22)

ancient mounds and earth from the mounds have been to construct new houses. And at Zoboku, the land area where the excavations were conducted had been farmed in previous seasons and was surrounded by farms of cassava, yam, guinea corn and sorghum. Following the surveys and subsequent excavations of 1985, most of the sites were heavily looted for the terracotta figurines for sale to illicit art traders (Kankpeyeng & DeCorse 2004: 102-105). Despite efforts by the Ghana Museums and Monuments Board and government agencies, the illicit looting appeared to have continued as GPS surveys conducted about two decades later recorded more heavily looted sites in the area. These later surveys combined GPS with vehicle reconnaissance to record the exact locations of mounds sites in the areas initially identified by Anquandah, locate additional sites and generally ascertain the nature and condition of the archaeological features (Kankpeyeng & Nkumbaan 2009:195) (see Table 1).

The surveys also documented new oral information indicating that the mound sites possibly occurred over a wider geographical extent than previously suggested. Kröger and Saibu (2010) have also documented some of these sites as part of anthropological research in contemporary Koma villages. Interestingly, the inhabitants of the contemporary societies do not identify with the mound sites, as their oral histories of origin indicate that they migrated into the area in the very recent past, possibly in the nineteenth century.

For example, the name of the village of Yikpabongo is believed to be a corrupted version of '*dzikpiebongo*' which means 'ruins in the forest' (Anquandah 1987:172). The inhabitants indicate that their ancestors migrated from a location near Gambaga and that upon their arrival at the present settlement after several interim stopovers, they encountered ruins of previous human occupation (Anquandah 1998: 33). The people of Yikpabongo further recount that the reason for this migration was to escape from slave raiding activities. Kröger and Saibu (2010) have used remembrances, memories and ages of informants in Yikpabongo to calculate that this migration probably occurred in the second half of the nineteenth century. Similar movements and migrations of groups of people in escape of political violence feature in the oral histories of several ethnolinguistic groups in northern Ghana (Apentiik 2002: 23-25; Lentz 2000:482-486; Kuba & Lentz 2002: 395-404; Mendonsa 1976:58-59; Grindal 1972:412-413).

Historical records also confirm the activities of slave raids and freebooters, especially of Babatu and Samory in northern Ghana during the mid-nineteenth and early twentieth centuries. Most of these raids targeted small groups of non-centralized societies who in response moved from place to place seeking escape and refuge (Goody 1998; Holden 1965; Wilks 1971a; 1971b; Lentz 2000).

These events were part of wider political and economic events that affected northern Ghana and beyond from about the fourteenth century and which significantly influenced the socio-cultural organisation of communities in the region. The historical and archaeological context of northern Ghana is discussed in further details below.

Ethnolinguistic Identity	Sites recorded by Anquandah (1998:68-69)	Sites recorded by Kankpeyeng & Nkumbaan (2009: 195)	Sites recorded by Kroger & Saibu (2010)
Koma settlements	Yikpabongo*, Barisi, Dabozesi*, Bayorborjang, Gubon, Tantuolisi, Kuwosasi, Nangruma, Tubi, Walemanja, Wumtoberi, Zangbeyiri, Zibiaga, Zoboku*	Yikpabongo, Barisi, Nangruma, Tantuolisi, Dabozesi*, Zoboku*, Magongu, Janga, Tando Fagusa*, Biyori-Tampaga	Yikpabongo, Tantuosi, Wumtoberi, Nangruma Gubon#, Senta#, Bayeba-Tigin#
Mamprusi settlements	Kubor, Kubugu, Tando, Tantali, Tuvuu, Yagaba, Yezesi, Yezebisi, Zanwara	Tuvuu, Tantali, Yizesi, Yagaba	---
Bulsa settlements	Bachonsa, Chana, Doninga, Gedebembilisa, Kanjarga, Katuk, Santenjan, Vong, Yuesi	---	---
Sisala settlements	Gwosi, Hahung, Hallemboi, Kasagatuo, Kundungu, Yala	---	---

Table 1: Contemporary settlements in the Koma area (where mound sites have been located using oral information, reconnaissance and GPS surveys). Some mounds in the asterisked settlements have been excavated. #These settlements were reported to be old or abandoned (Kroger & Saibu 2010).

1.3. The Koma Area in the Historical Context of Northern Ghana

Radiocarbon and thermoluminescence dates suggest that the Koma area was occupied between the sixth and eighteenth centuries AD with a high point around the twelfth century AD (Kankpeyeng et al 2011:209-210). However, there are no direct historical references to any period of this occupation. Referring to the Dagaba area in the region of the Black Volta River (west of the Koma area), Kuba & Lentz (2002: 382) have observed that "there seem to be no Arabic manuscripts from the nearest Islamic centres, Kong, Sya,…or Wa…..no major trade routes… crossed it.". This observation bemoans the general lack of historical sources for events that occurred over long periods of time in many parts of Africa.

But formal documentation, albeit late and flawed in many respects, did arrive in the Dagaba area as well as some parts of northern Ghana from the latter part of nineteenth century following the introduction of French and British political administrative structures. Boahen (1966: 212, 215, 220) has observed that historical documentation especially by the British and other Europeans certainly flourished in Ghana from the nineteenth century AD, but other documents in the form of Arabic sources such as the Kano Chronicle also exist covering periods from as early as the fifteenth century AD. Hunwick (2003:38-39) also speaks of the existence in northern Ghana of a rich historical documentation tradition inspired by the Islamic learning traditions of Timbucktu dating from the sixteenth century, which produced documents such as the popular *Kităb al-Ghanjă* of the eighteenth century detailing the history of the Gonja Kingdom, the introduction and growth of Islam in the northern territories and the early expansionist activities of the Ashanti Empire northwards (see also Silverman & Owusu-Ansah 1989: 326-327). The Koma area does not feature prominently in such documents as the late nineteenth and twentieth century AD colonial administrative structures were centred on the large towns and traditional capitals (Bening 1975: 118-121), and also because the Koma area appears remote from the trade and commercial centres to which the Arabic scholars were attracted.

One of the few early mentions of communities in the Koma area comes from Cardinall's (1921:16-17, 92) publication on the customs, religion and folklore of the natives of the northern territories, in which he uses 'Builsa (*Bulsa*) country' to refer to a large and indeterminate geographical area and 'Builsa (*Bulsa*) people' to refer to one of the major ethnolinguistic groups of the region. In this narrative, the Builsa is subsumed with other groups such as the Nabdam, Kasena and Nankani under the general Grunshi group and are collectively differentiated from the larger and more politically organised groups such as the Mamprusi and Mossi. Koma-type archaeological sites have been located in some modern day Bulsa communities (Anquandah 1998: 68-69). Anquandah (1998:32) has also suggested that the 'Koama' group mentioned in Koelle's *Polyglottta Africana* (discussed by Curtin & Vansina 1964 and Hair 1965), which documents the identities, languages and origins of recaptured and liberated slaves in Sierra Leone refers to the present day Koma people.

Discussing the activities of the horse-mounted Zabarima trader/mercenaries in northern Ghana from the 1860s, Holden (1965:680) states that the battles with the Dagomba political leadership by which the former attempted to entrench their position in the area affected communities such as Nangruma and Yagaba. Nangruma is listed as a Koma site (Anquandah 1998:68-69) and Yagaba, which is presently the district political and administrative centre of the Koma area is about 30km from Zoboku (Ghana Statistical Service 2014).

The earliest direct oral historical and ethnographic information about the communities in the Koma area were documented as part of an archaeological inquiry in 1985 (Anquandah 1998). This inquiry revealed that the contemporary societies stress a lack of identity and affiliation with the past cultural occupations, rendering oral and direct historical approaches to archaeological data interpretation less useful.

The Koma archaeological evidence is therefore something of an enigma as there are no clear preceding cultures nor secure ethnohistorical contexts and appear to have ended abruptly without clear material culture continuities. The abrupt termination of the Koma culture, believed to have occurred by the nineteenth century AD, has been attributed to abandonment or depopulation resulting from the ravages of an endemic disease, warfare, slave-raiding or mass migration (Insoll et al. 2012:28).

The remoteness and obscurity of the Koma cultures, however, appear merely ostensible, because recent excavations have produced artefacts which hint that the area was part of a larger and more expansive material, social and/or ideological landscape possibly incorporating the whole of northern Ghana and other parts of West Africa and beyond. These artefacts include cowrie shells (*Cypraea annulus and moneta*), glass beads and terracotta figurines depicting images of horses and/or camels. Using anthropological, historical and archaeological references, this section explores the significance of these artefacts and the Koma area in the historical landscape of commercial and cultural interconnections within northern Ghana and beyond. The discussion also outlines other past cultural, social, political and economic events of northern Ghana and how these probably affected the Koma sites.

Firstly, cowrie shells (*Cypraea annulus and Cypraea moneta*) have been recovered from excavations at Yikpabongo. The same site has also yielded pots decorated with stamped cowrie designs and terracotta figurines of people with helmets and other body parts decorated with cowrie motifs (Anquandah 1987:177; 1998: 77, 160). The cowries of West Africa, almost exclusively *Cypraea annulus* and *Cypraea moneta* are both Indian Ocean species originating from the East African coast and the Maldives Islands respectively (Johnson 1970: 2). Cowrie shells were mainly used as charms against evil or as ornaments in the Western Sudan during the first Islamic century (Hiskett 1966:341-343).

By the fourteenth century, cowries were being used as currency in the ancient empires of Ghana and Mali, and then in the city of Timbucktu and the Inland Niger Delta area by the sixteenth century AD. The use of cowries as currency probably spread along established trade routes southwards into the Mossi towns and others such as Walewale, Yendi and Salaga in northern Ghana by the nineteenth century (Johnson 1970: 34).

Examples have been found in the commercial centre of Begho which thrived on the fringes of the tropical rain forest between the fourteenth and early eighteenth centuries AD. Established by Mande-Dyula traders who migrated from the Jenne area, Begho was a southern entrepot of the long distance trade in gold, kola, brassware and cloth along what has been described as an arterial trade highway running through Bondoukou and Bobo Dioulasso on the western frontier of northern Ghana (Wilks 1962). But because the quantity of cowries recovered at Begho was minimal, it has been suggested that they were not used as currency but probably as ornaments or in other contexts (Posnansky 1973:158).

In addition to cowrie shells, thirteen (13) beads have been found in recent excavations in Tando-Fagusa. They include two twisted brass beads, one blue glass bead and eight small white ones probably made of glass or ivory. These were all associated with a burial. Two other beads were found in the soil contained in a large pottery jar (Nkumbaan 2015). A single monochromatic blue glass bead was also recovered from Zoboku (illustrated and discussed in Section 5.3, page 231).

Glass beads constituted a major commodity of the trans-Saharan trade network. Large quantities have been recovered from Igbo-Ukwu in Nigeria and were believed to have derived from the trade in the late first millennium AD (Insoll & Shaw 1997:15-16). The ancient market centre of Essouk-Tadmakka has also yielded quantities of glass beads among those made of other materials from contexts dated between 750AD and 1300-1400AD (Nixon 2009: 236-242). Large quantities of glass beads have been recovered from graves in Mare de Kissi in Burkina Faso dated between the fourth century BC and the thirteenth Century AD. Chemical analysis of some of the beads have indicated that a majority were made from soda-lime silica glass fluxed with plant ash, probably at sites in Egypt, Mesopotamia and Western Asia probably in the first millennium AD (Magnavita 2003:133).

The iconography of several terracotta figurines depicting horse and camel imagery recovered from Yikpabongo also attests to the influence long-distance trade may have had on the Koma area. Anquandah (1998: 80-81, 123-124, 160) describes and illustrates elaborately attired anthropogenic terracotta figures mounted on horses fitted with reins, bridles and stirrups. Two terracotta figurines of camels with riders have also been recovered as surface finds in the Tantala-Tuvuu area, near the present research site (Anquandah 1987:177). Similar horse/camel-mounted figurines have been illustrated by Insoll et al (2014).

Horses were introduced into the Nile Valley from Asia in the first half of the second millennium BC. From here it spread into North Africa and later across the Sahara into West Africa (Law 1976: 115). From the fourteenth century AD, improved and larger stock of horses were imported into and bred in parts of West Africa. These improved breeds were better suited to cavalry and military activities. Southerly West African states such as the Gonja and Dagomba imported horses from the north for use in slave-raiding activities and warfare. The slaves acquired were then sold to finance further military and state-formation agendas.

The material culture categories outlined above are examples of commodities associated with the long-distance trade between sub-Saharan Africa and regions of the Sahel-Sahara and beyond. Beads and cowries were also important trade items of the Atlantic coastal trade from the fifteenth century AD. Casey (2010:85-86) has suggested that the emergence of the Mossi-Dagomba group of states was stimulated by trade and the preservation of the trade routes of the northern trade network. The known trade routes did not pass directly through the Koma area. The closest place in the Koma area through which one of the northern arteries of the network passed is Yagaba (see maps in Goody 1967: 180 and Davis 1996:143). However, Casey makes the point that societies that were not directly located on the major trade routes still played ancillary roles in the overall process. Local economies based on the provision of food resources, tools, water and repair services probably flourished in response to the movements of merchant caravans along the trade routes.

Goody (1967: 183- 184) has outlined the roles of the smaller communities of the Gonja kingdom in the trade during the eighteenth and nineteenth centuries AD. While the major towns of Gonja served as market centres to which merchants from the commercial centres of the Middle Niger, Dahomey, Yoruba and Hausaland arrived, small scale internal trading also took place between the settlements whereby local people traded in items such as cloth, kola and trinkets from village to village.

Speaking of local perceptions of exotic trade goods, Casey (2010: 87-88) has also suggested that those who acquired such commodities probably sold them on to obtain profit rather than hold onto them. Moreover, items such as beads and cowries were incorporated into the socio-cultural and ideological structures. Such items may have acquired different estimations of value or been used in rituals or other functions and were thus transmitted from place to place within such contexts. The horse, for example, is perceived in some communities as a metaphorical representation of power, affluence, an uncontrollable force and so on.

In the case of the Koma communities, it is possible that the past local economies did not participate directly in the trade network as the area is not traversed by trade routes, but they probably engaged in ancillary roles in the trade system or acquired items such as cowries and beads through other socio-economic avenues. Insoll (2011:1013) has pointed out that Anquandah's (1998: 92) report that faunal remains recovered from Yikpabongo were exclusively of domesticates whereas figurine representations were of horses, camels and other wild species such as rhinoceroses and hippopotamuses is an indication that the latter category of animals constituted a 'good to think' group which was incorporated into local complex beliefs, concepts and metaphors.

Besides the position of the Koma area in the commercial context of the Northern Ghana discussed above, the foundations of its archaeological structures are rooted in the archaeological development of the region. The following discussion draws out some of these connections.

The Koma archaeological data is by and large of the Iron Age as it has not yielded firm evidence of Stone Age technological traditions so far. However, other sites in northern Ghana have produced remains of occupations spanning the Middle Stone Age up to the Early Iron Age. Examples include Ntereso (Davies 1980; Flight 1980; Carter & Flight 1972) and Birimi on the Gambaga Escarpment (Casey et al 1997; D'Andrea & Casey 2002; Godfrey-Smith & Casey 2003; Casey 2005) respectively.

Archaeological evidence is also available from sites related to popular historical socio-political events dating from the fifteenth century AD. These include Daboya (Kense 1983a; 1983b; Shinnie & Kense 1989), Mamprugu (Kense 1992), sites in the Oti-Daka corridor (Casey & Okoro 2007), Kasana (Bredwa-Mensah 2004), Yalingbong (Swanepoel 2003), Central Gonja (Mathewson 1968) and Yendi Dabari (Shinnie & Ozanne 1962).

However, there is a hiatus about the nature of human occupation and cultural activities during the early centuries of the first millennium AD. Thus, there are sites in northern Ghana which evidence the beginnings of subsistence, exploitation of natural resources and the development of early material culture technologies such as stone making, pottery and iron working on one end of the spectrum, and those that indicate the beginnings of the Late Iron Age and beyond, for which we can complement archaeological data with historical sources on the other end. Very little is known about the period in between. As Posnansky (1979:32) has reiterated, the period between the food producing cultures of the Kintampo Tradition and the emergence of complex societies stimulated mainly by trade from around 1400AD is by and large a blank.

Based on chronology and aspects of material culture, I suggest that sites in the Koma area represent information for some of this period.

Late Stone Age sites in northern Ghana feature evidence of composite economies that took advantage of seasonal variations of their localities to exploit a variety of food sources, including rivers, wild animals and plants. There is also some evidence of domesticated animals and cereals. For example, Ntereso located 53km west of Tamale is one of about twenty sites distributed across the country featuring evidence of early food production and animal husbandry coupled with pottery making and/or usage. These sites collectively labelled Kintampo cultures are dated to the second millennium BC (Carter & Flight 1972; Flight 1980: 91-92).

Ntereso is significant as one of the northernmost sites of the Kintampo tradition. There is also evidence here of possible hybridization with foreign culture materials believed to have been introduced from areas along the southern fringes of the Sahara. Ntereso has yielded remains of burnt daub with imprints of wooden poles indicating long term or semi-permanent structures and settlements. Remains of architectural features recovered also point to square flat- roofed structures which mimic architectural styles in parts of the Sahara region.

Shells, fish bones, bone harpoons and fish hooks indicate the exploitation of riverine resources. Small-sized wild woodland animals were also exploited, and others such as the dwarf goat were possibly domesticated. Plant remains recovered include oil palm (*Elaeis guineensis*), incense tree (*Canarium schweinfurthii*) and hackberry (*Celtis sp*.) seeds and husks. These appear to be wild but there are indications of attempts at cultivating cowpeas (*vigna unguiculata*). Other artefacts recovered include scored sandstone rasps, also known as terracotta cigars which were probably used to beat bark cloth, stone grinders and rubbers used to process plant and food resources, stone and ceramic beads and grinding hollows probably used to polish the beads.

Most importantly, pottery from the site indicate an incipient transformative technology with opportunities for self-ascriptions of identities and aesthetics through decorative patterns such as various motifs of comb stamps, jabs and strikes. In addition, Ntereso provides significant early evidence of inter-societal interaction and material culture exchanges with other areas. Davies (1980) suggests that thin fine cups, bowls and jars decorated with bands of comb impressions interspersed with areas of red paint may have been introduced to the site from areas to the north.

He differentiates this type of pottery from the thick and coarse vessels with inverted rims and rounded bases which appear to have been local and have been found at other Kintampo sites around the country. Other artefacts believed to be of foreign origin are stone points and bifaces. Stone bracelets and ground stone axes may have also featured in these exchanges.

Another site of importance to the history of northern Ghana is Birimi on the Gambaga Escarpment 17km north-east of Ntereso. At this site, Late Stone Age levels overlying sealed Middle Stone Age contexts containing Levallois flakes and cores, retouched blades and bifaces have been recovered (Casey et al 1997:35). Signifiers of the Late Stone Age at Birimi include a seasonal plant and grain-based subsistence economy, with firm evidence of pearl millet cultivars occurring in sealed contexts (D'Andrea & Casey 2002: 55; Casey 2005: 236), the exploitation of riverine sources for fish and fish products, pottery, stone grinders and polished stone tools. The western section of Birimi has produced important evidence of metal working technology in the form of the remains of approximately five iron smelters and numerous slag heaps in a possible industrial setting, situated at distance from habitation sites. The earliest of the smelters has been dated to 1600±100 years ago and the smelting activity appeared to have continued until 1080±100 years ago (Godfrey-Smith & Casey 2003: 1045).

Very little is known of the period following the Early Iron Age up to the mid-fourteenth century in northern Ghana. For the latter period and beyond much of what is known comes from traders and explorer accounts, Arabic documents and historical chronicles which mainly focus on political centres and capitals or are written around the prevailing commercial activities of the time (Posnansky 1979).

According to these records, by the fourteenth century, northern Ghana was enmeshed in a trade network that incorporated the coastal and forest belt of West Africa as well as the Sahel and Sahara regions and beyond. The area was very much a transitory zone of trade routes linking the commercial centres on the fringes of the Sahara to entrepots on the edge of the forest (Wilks 1962). By about 1400AD, Begho had been established on the northern fringes of the gold-bearing forest belt by the Dyula; Mande-speaking traders and merchants from the region of the region of the Upper Niger (Lovejoy 1978:180; Wilks 1962:337). From Begho, a similar network of routes and trade posts extended southwards to market centres on the coast such as Elmina where Portuguese merchants were trading in firearms, beads and textiles (Wilks 1962). This section of the trade network is believed to have been active between the fifteenth and the nineteenth centuries but Lovejoy (1980: 111) has suggested that the Dyula were trading with people from the Akan forests probably as early as the eleventh century.

One of the major effects of this long-distance trade was the arrival of and interactions between people from other parts of the sub-region and the subsequent emergence of centralized polities in the region. The history of the Gonja kingdom, for instance, is traced to the arrival of a band of warriors who followed the trade routes from the Niger towns of the Segou-Timbuktu area (Goody 1967:184). Similarly, the Mossi-Dagomba group of states are believed to have been established by small but militarily superior bands of people who migrated from the area east of Lake Chad (Illiasu and Delobson 1971). The kingdom of Gonja and the Mossi-Dagomba group of states are believed to have been in existence by the sixteenth century AD. Their subsequent commercial and political engagements had profound effects on socio-cultural patterns within the region.

Some of the sites relating to these socio-political and economic events have been excavated, and some of the archaeological data generated have been supported by documentary sources. For example, there have been investigations at Daboya, Gambaga, Yendi-Dabari and Kitare believed to be the capitals of the Gonja, Mamprusi, Dagomba and Nanumba Kingdoms respectively.

The documented version of the origins of the Gonja kingdom based on oral sources is that it was formed by a group of horsemen sent south from the Kingdom of Mali in the sixteenth century sent on a punitive mission to investigate shortages in the flow of gold northwards from the mines around Begho in central Ghana. After the mission, the horsemen under the leadership of King Naba, or Naboga crossed the Black Volta and embarked on military invasions against the local inhabitants of the area, establishing the Gonja kingdom. By 1672, the Gonja kingdom under Jakpa Lanta had extended its frontiers to incorporate areas belonging to Dagomba in the east including Daboya and had set up outlying provinces overseen by his sons.

Findings from archaeological investigations at Daboya do not however support this abrupt invasion and development of the kingdom but suggest that Daboya is one of the oldest and most continuously occupied settlement sites in West Africa. Although settlements shifted from place to place at the site, there is evidence of a repeated pattern by which buildings deteriorated and were rebuilt and re-occupied continually for a period spanning four millennia (Shinnie & Kense 1989: 229-231). The site witnessed a riverine based Late Stone Age Kintampo settlement which was later supplanted by Early Iron Age occupations, and then more nucleated Later Iron Age cultures (Shinnie & Kense 1989: 231; 233).

There is however some evidence in the Phase B Early Iron Age levels of significant innovation, trade or other contact with neighbouring groups. The pottery of the preceding Phase A is characterised by comb-stamped or walking-comb impressions whereas Phase B pottery depict variations of roulette decorated pottery (Shinnie & Kense 1989:236).

Phase C witnessed major changes in pottery vessel forms and decorative patterns suggesting the presence of multiple ethnic groups or far reaching and established trade and exchange networks. For example, this period yielded the distinctive Silima Ware which is characteristically decorated with red painted geometric patterns and have been known in areas in the Middle Niger river valley and Jukun in north-western Nigeria. The presence of the Yagha local ware indicates that lateral inter-community exchanges within the region were also important.

Phase D at Daboya produced the first known terracotta figurines of the region. One hundred and fifty-three fragments were recovered depicting persons seated crossed legged, or in standing positions, with rounded or tapered heads and cylindrical bodies with some depicting extended navels. While some of the figurines showed comb stamp decorations, others were decorated with red paint (Shinnie & Kense 1989: 161-170).

This phase of occupation which has been dated to between the seventeenth and eighteenth centuries has also yielded horse bones, horse regalia and tobacco pipes. For this period, there is corresponding documentary evidence about the establishment of the Kingdom and an evolving socio-economic and political status (Goody 1967). However, the overall archaeological data suggests a gradual development of an indigenous culture enriched by innovations, trades and exchanges in material culture rather than an abrupt or disruptive change resulting from violent military invasions, subversion or displacement of populations.

Archaeological investigations have also been conducted at sites on the Gambaga escarpment and on the banks of the Oti and Daka rivers, believed to be the locations of capital cities or towns associated with the Mossi-Dagomba group of states which arose in the area in the fourteenth and fifteenth centuries. Oral traditions including drum histories recounted by courtiers of the present day Mamprusi and Dagomba traditional courts recount the origins of these states and others in the southern part of Burkina Faso.

Collectively called the Mossi-Dagomba states, they are made up of Mamprugu (also known as Mamprusi), Dagomba and Nanumba in northern Ghana and the Mossi states of Tengodogo, Ouagadougou, Yatenga and F'ada N'Gourma in present day southern Burkina Faso (Tonah 2012: 24; Fage 1964: 177-189; Illiasu & Delobson 1971: 108; Wilks 1962: 349). Historians debate the exact periods of origin (Illiasu & Delobson 1971: 103-108), but agree that the states had been established between the first half of the fourteenth and the end of the fifteenth centuries AD. All the states trace a common ancestry to Tohazie, the Red Hunter who led a group of mounted warriors from the Lake Chad area into the lands south of the Niger bend.

It is believed that his son Gbewa migrated southwards and through gradual conquests and assimilations, exerted authority over an extensive area which possibly stretched from the Black Volta in the West to the White Volta in the East and as far south as the lands of the Gonja Kingdom in the south. He introduced a system of secular political rule to communities with established religious leadership structures.

Upon Gbewa's death, disputes over succession among his sons led Tohogu to migrate eastwards to the area of Gambaga, eventually consolidating it as the Mamprugu kingdom. Sitobu followed Tohogu eastwards but eventually settled westward at Yendi-Dabari, founding the Dagomba kingdom. A breakaway faction of this kingdom later led to the establishment of the Nanumba kingdom further west. The Mamprugu Kingdom on its part gave birth to the Mossi group of states when a descendant of Tohogu, called Ouedrago with the help the Mamprugu Kingdom, founded the states of Yatenga, Ouagodougou and Fada N'Gourma. Details of these histories are discussed at length by (Illiasu & Delobson 1971; Fage 1962; Skinner 1964: 7-11; Kense 1992).

Archaeological investigations have identified Yendi-Dabari located about 30km north of Tamale as the possible capital of the Dagomba Kingdom (Shinnie & Ozanne 1962:88). Believed to have existed between 1500AD and 1650AD, the site consisted of several mounds with a dense surface scatter of potsherds and has yielded artefacts such as iron objects, stone querns and tobacco pipes. The settlement pattern of the site suggests that it was probably a large densely populated town surrounded by subordinate hamlets. The architecture of the town was made up of large rectangular enclosures with at least one two-storied building (Shinnie & Ozanne 1962:90-95).

Kitare on the western bank of the Oti River, believed to be the capital of the Nanumba Kingdom in the late seventeenth or early eighteenth centuries AD has also been excavated. The site which is about three quarters of a square mile is enclosed by three encircling embankments of laterite gravel ranging from 1.5m to 3.7m high. The embankments are suggested to be defensive structures enclosing several low mounds. Also found were the remains of large ponds which were probably used to supply water to beasts of burden and livestock travelling as part of trade caravans from the Hausa states in the north-east to commercial centres such as Begho on the fringes of the forest in the south.

The most profound effects of these kingdoms on the outlying areas and smaller communities such as the Koma area can probably be seen in the immense threat they posed to the peaceful existence of the latter. In their efforts to extend and consolidate their political power and influence, the inter-state struggles and warfare between the kingdoms affected the organisation and settlement patterns of the smaller and less centrally-organised groups in the region.

Soon after its establishment, the Gonja kingdom using its powerful military force that included cavalry, embarked on expansionist invasions of its surrounding settlements. It attacked areas to the north-west, towards Wa, the confluence of the two Voltas towards Daboya, and in the Salaga area to the east to gain control of trade routes (Goody 1967:198).

The Ashanti Kingdom also invaded the region from the south between 1774 and 1874 in economically motivated attacks and exerted control over both the Dagomba and Gonja kingdoms. The latter kingdoms became vassal states obligated to supply slaves, livestock, cotton and silk strips among others to the Ashanti Kingdom. The slaves for these tributes were in turn procured from the surrounding smaller communities, especially from the Gurunsi area. The Gurunsi is an all-encompassing term used to describe ethnolinguistic groups occupying areas to the north of the Gonja Kingdom and west of the Dagomba and Mamprusi kingdoms but excluding the Wala State. The Gurunsi were made up of smaller groups such as the Sisala, Frafra, Nunuma, Builsa and Kasena who were characteristically organised as segmented and non-centralised communities (Holden 1965:64). Arhin (1987:55-57) has observed that over the course of about a century and a quarter, significant numbers of slaves were supplied as tribute to the Asante Kingdom. This source of human capital was used to replace Ashanti's fighting men in farming and craft activities located around the capital of Kumasi.

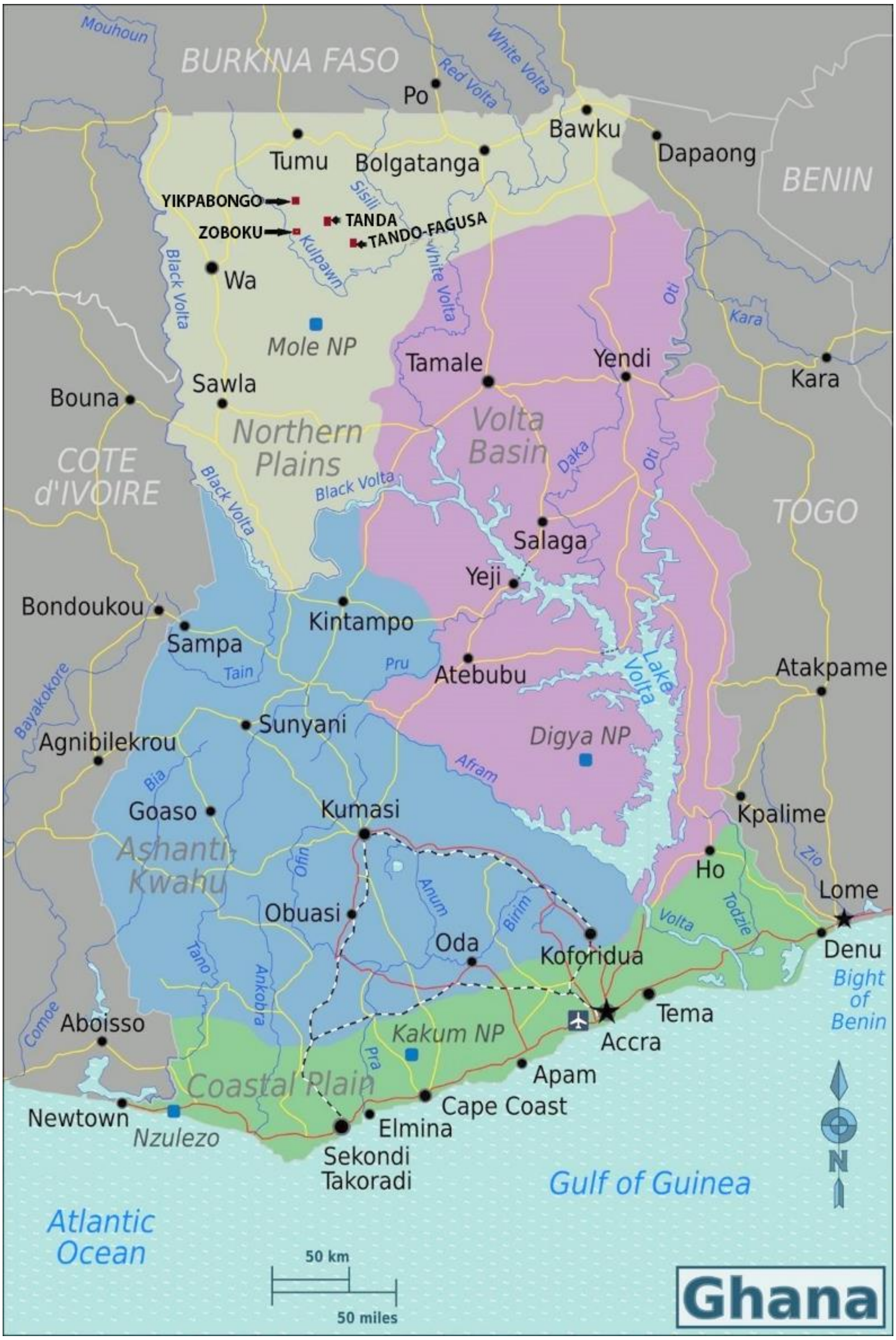
Between 1860 and 1880, the non-centralised communities of northern Ghana suffered further upheavals and military violence at the hands of the Zaberima horse-mounted soldier-mercenaries. Engaged initially by the political authority of the Dagomba state, these soldiers carried out slave-raiding activities on behalf of the Dagomba state. Later, the Zabarima settled in the Sisala area and were alternately employed by inter-warring communities to assist in battles (Holden 1965: 65-68).

As a growing military force, they were courted by some of the larger states such as the Wala and Gonja to assist in slave raiding activities and gradually attempted to lay the foundations for a state with its headquarters at Kasana. They attacked several resistant communities and entered into peaceful alliances with welcoming ones (Holden 1965:70-78). In the late nineteenth century, the attacking and slave raiding activities of freebooters such as Samory in the area caused further instability. Goody (1998) has discussed the state of affairs in the north-west during this time, during which the British authorities attempted to terminate the activities of Samory, control inter-community battles and prevent German and French attempts to gain control in the area. The ongoing instability disrupted socio-economic organisation, decimation of villages, caused settlements to shift from place to place and abandonment of communities as the people retreated or moved into inaccessible and remote areas to escape raiding and invasions (Grindal 1972:412). Such population movements were probably responsible for the settling of the Koma area by the modern-day communities. Kroger & Saibu (2010) put the arrival of the present day Koma people into the area to around the latter part of the nineteenth century.

A significant period of the Koma occupation predates the establishment of the Gonja and Mossi-Dagomba group of states, as well as the commercial and political events described above. But it is also clear from the material culture evidence that there was undeniable contact with cultures and people involved in trading activities within the region and beyond, and/or knowledge of and familiarity with trade items, some of which were appropriated into local craft, economic and ideological structures.

There have been questions concerning the authors of the Koma cultures especially in light of the apparent lack of ethnographic connections with any living community in the area, and the place of the cultures in the archaeological and historical framework of northern Ghana. However, the cultural developments of northern Ghana outlined above provide foundations upon which the Koma culture was probably built. Iron Age sites in the region display exploitation of natural plant and animal resources, water sources for the location of settlements, pottery technology, inter-community trade and exchanges in local items. Northern Ghana has evidence iron smelting, blacksmithing and the use of stones for grinding and processing food resources, smelting iron and blacksmithing. It is undeniable that some of the Koma material culture reflect foreign influences from the long-distance trade but it is also clear that the cultures were probably in existence and were considerably advanced by the time the region became involved in the trade. Exotic items, imagery and ideas from the trade were appropriated into already established social and economic structures.

In the following section, I review previous archaeological research in the Koma area based on the initial period of research up to 1985, the recent phase spanning 1985 to 2006, and finally the contributory efforts of very recent student-led graduate projects.



Map 3: Towns and communities mentioned in the text.

1.4 The Initial Period of Research -1985

Koma mounds were first excavated in the village of Yikpabongo. Reconnaissance surveys identified over six hundred mounds, out of which four mounds were excavated: Mound L.370 (4m wide; 0.7m high) was fully excavated; Mound H.310 (12m wide; 1.2m high) was nearly completely excavated and Mound I.220 (12m wide; 0.5m high) and Central Mound I (11m wide; 0.6m high) were partially excavated (Anquandah & Van Ham 1985:22; Anquandah 1998: 71-77).

Artefacts recovered from these excavations included grinding stones, pottery discs, copper, brass, and iron objects, pieces of daub, human and animal bones, cowries, a large quantity of terracotta figurines (whole and fragments), whole pots and large quantities of potsherds. (Anquandah & Van Ham 1985; Anquandah 1987; 1998: 110). The analyses of these focused primarily on the terracotta figurines while very general information was provided on the pottery data.

In view of the fact that more than forty thousand (40,000) potsherds in addition to intact pots were recovered from the excavations, the less detailed information generated from the pottery analysis indicates that the main focus of the analyses was on the aesthetics, symbolisms and meanings of the terracotta figurines. To emphasize, all the data on the pottery were presented as a sub-section comprising fifteen pages while the terracotta figurines were discussed over three chapters (Anquandah 1998: 101-115, 116-156).

Using mainly ethnographic analogies from nearby Bulsa communities, Anquandah has suggested that the techniques of manufacture of the Koma pots were similar to methods used by contemporary Bulsa potters (Anquandah 1998: 111). The bases of the vessels were first formed by pressing and moulding, and the rest of the body was added by the coiling method. Surface treatment and decorative methods exhibited in about sixty-five percent of the Koma pottery included red slipping, burnishing, roulette motifs (string, plaited grass and carved roulettes), combinations of painting and roulettes, incisions, channelling, comb stamping and carved stamping (Anquandah 1998: 101-113).

Anquandah (1998) also outlined the following pottery types based on morphological analysis of complete pots and potsherds: miniature or cuplike vessels; finely made jars and amphorae (vessels with height greater than diameters); finely made bowls and dishes (vessels whose diameters are greater than height); coarse culinary vessels, storage and conveyance vessels (large and thick-walled vessels with nearly equal diameter and height dimensions). Again, Anquandah (1998:112) suggested that both the decorative motifs and the pottery types bore very close resemblances to Bulsa ethnographic examples.

In addition to the pottery, Anquandah's research at Yikpabongo yielded about seven hundred pieces of terracotta figurines and these were analysed in greater detail based on technological, formal, stylistic and iconographic characteristics (Anquandah 1998: 120-173). Using visual examination, Anquandah identified that the clay raw material and techniques used in making the figurines were similar to those used to make the pottery, thus production was likely to be local to the Koma sites. The outlines of the figurines were first shaped by modelling and then pieces of thin strips of clay were added gradually to build up the rest of the body. The figurines measured between 10cm and 30cm and depicted various subject matter such as humans (male, female, adults and children), in various postures with dress items and ornaments, wild and domestic animals, combinations of humans and animals especially equestrian images, and other items such as stools, whistles and flutes (Anquandah 1998:119-124, 129).

Although Anquandah has noted that the Koma terracotta figurines were different in style from extant types in Bulsa communities, he suggested that there are analogies between the motifs and certain aspects of Bulsa social organisation and cosmology. Firstly, he proposed that dress styles and body ornamentations depicted on the anthropomorphic figurines were antecedents to contemporary Bulsa examples. In addition, the images of amulets, neck pendants, waist strings, necklaces, anklets and calabash or helmet-like head gear depicted on Koma figurines corresponded to real examples in modern Bulsa communities (Anquandah 1998: 162 – 165).

Furthermore, Anquandah related the zoomorphic icons of the Koma figurines to Bulsa domestic deities (*jadoska*) which are believed to manifest as animals. Most of these animals are venerated and occupy symbolic statuses as clan totems. This led Anquandah to suggest that the zoomorphic images depicted in the Koma figurines may have functioned in similar contexts (Anquandah 1998:158).

Apart from the interpretations outlined above which pointed to the possible identity of the authors of the Koma sites, Anquandah also used the iconography of the figurines to outline some socio-economic and political features of the past Koma society, such as family life, childbirth or childcare, solidarity and other domestic activities (Anquandah 1998: 123, 153). The facial expressions of some figurines especially the open-mouth expressions indicated wailing, shouting or chanting, mimicking actions performed during mourning or funerary processes (Anquandah 1998: 152-153, 164).

Also, economic activities such as travel and involvement in trade activities (possibly the trans-Saharan trade, were depicted by figurines showing horse and camel riders. The trans-Saharan trade is believed to have begun in the seventh century CE and by the tenth century BCE, incorporated several societies living to the south of the Sahara, and in the Sahel and Savanna geographic regions of West Africa (Wright 2007; Austen 2010).

Participation in the trade probably resulted in some degree of wealth and prestige which were displayed through elaborate attires and ornamentations on some figurines and also by cowriform symbols on the heads, hats or torsos of some figurines. High political status and authority were also portrayed by human figurines in ‘kingly or chiefly’ seated postures and manners (Anquandah 1998: 124, 138, 141, 162). The social and political complexity of the ancient Koma societies is also evidenced in the large sized mounds, the building of which were probably labour intensive. Such mounds served as burial spaces for high-ranking members of the society.

On the question of functional contexts of the sites, Anquandah suggested that the mounds were burial sites and tombs. He identified that a sub-structure was first dug about 30-60cm into the ground and burials and artefacts were deposited therein. The substructure was then closed with an earthen mound and the perimeter was circumscribed by a circular arrangement of stones.

Differences in sizes of the mounds and in the quantity of the grave goods also hinted that the ancient Koma community may have been characterised by political or socio-economic differentiation. Samples of terracotta figurines from surface collections at Yikpabongo were dated by thermoluminescence to 405 ± 135yrs BP and 480 ± 80yrs BP (Anquandah 1998: 79).

In summary, Anquandah’s interpretations of the data from Yikpabongo were that the mounds were the remains of burial sites of a previously unknown Iron Age group who possessed highly developed skills in ceramic technology and complex social and political structures. At the centre of their society’s social structure were funerary practices in which a variety of material culture were used to mediate relationships with the dead and materialize conceptions about the afterlife.

The artefacts used in these practices were probably produced in large quantities and rapidly, possibly in intensive or even specialised technical systems in view of the fact that the mounds did not appear to be very large nor have the deeply stratified deposits characteristic of long periods of occupation and gradual build-up, and yet contained large quantities of artefacts.

All four mounds ranged from 4m to 12m in diameter and 0.6m- 1.2m in height, and the substructures which formed the base horizons of the mounds were only 0.3m to 0.6m deep. However, Mound H310, for example, yielded 34, 453 potsherds, 1, 786 milling stones and 258 terracotta figurines among other artefacts (Anquandah 1998: 76, 83). To Anquandah, this indicates rapid or instantaneous depositions of large quantities of artefacts which could only have been mass produced by well - structured production systems.

The Koma people also used their highly artistic figurine technology to portray evidence by which we can allude to some aspects of their social, economic and political organizations. The figurines portrayed family or group relations, social activities, beliefs, socio-political status, and possible economic interactions and exchanges with other communities.

However, these excavations were only the beginnings of research in the Koma area and judging from the large geographical area and the dense distribution of the mounds, the excavations uncovered a mere fraction of the existing archaeological evidence. Despite the interpretations and conclusion arrived at by Anquandah, there were still several questions and aspects of the ancient Koma culture that remained to be unravelled. For instance, apart from the burial mounds or tombs, no other activity spaces were identified. Thus, other areas such as domestic or living areas, middens or production contexts of the ceramic or stone artefacts all remained to be identified and investigated.

Moreover, through reconnaissance surveys and verbal local information Anquandah (1998) had documented that there were about forty sites in the area and they all appeared to have similar material culture. However, the true character of the spatial distribution of the sites and the nature of the relationships between them and the degree of similarities or otherwise needed further investigation.

Other pertinent questions concerned the implications of the Koma archaeological evidences for the historical processes of the region. On the issue of the identity of the authors of the site for instance, Anquandah had suggested the ancestors of the present-day Bulsa people. However, Davis (1988:10-11) has pointed out that the authors of the mounds could be groups of Kantosi people, known for their highly developed skills in craft making and other technological activities, who migrated southwards from the Sahel area.

On the same issue, Insoll et al (2012) have also commented that attempts by Anquandah (1985; 1987; 1998; 2003) to trace direct analogies between the Koma archaeological evidences and Bulsa ethnographic material culture and social structures may be misleading as there is no proven direct historical continuity between the two groups. Kankpeyeng et al (2013: 477) have also observed that none of the ethnolinguistic groups presently inhabiting the area have a direct link in terms of material culture, to the mound sites.

The need to answer some of these questions and learn more about the archaeology of the Koma area motivated the next phase of research which is discussed below.

1.5. The Later Research Period- 2006 to Date

A later phase of archaeological research in the Koma area from 2006 was driven by the need to answer some of these lingering questions (Kankpeyeng and Nkumbaan 2008; 2009; Kankpeyeng et al 2011; Insoll et al 2012; Kankpeyeng et al 2013). It began with a GPS survey aimed at "locating and mapping all sites of archaeological interest and update the delineation of the archaeological region containing stone circle mounds with terracotta figurines" (Kankpeyeng and Nkumbaan 2009: 195).

Also, mounds in Yikpabongo were re-investigated, as well as others at two additional sites (Tando and Tando Fagusa located about 24km from Yikpabongo), with the objective of re-evaluating the contexts of the mounds and the functions of the artefacts, especially the terracotta figurines. New dating methods were applied to some of the artefacts to re-examine the chronology of the sites, as this had previously been determined mainly from surface finds.

In addition to confirming some of the sites recorded previously (Anquandah 1998: 67-69), the survey discovered thirteen additional sites, and obtained oral information of similar sites located in more distant places such as Gambaga in the east and Fulfuso and the Mole Game Reserve in the south. The results of the surveys thus expanded the known geographical scope of the Koma mounds to between 90.0'0" N and 00 0'0" longitude (Kankpeyeng and Nkumbaan 2009: 195-196).

At Yikpabongo three mounds were excavated: YK10-4; YK07-2-D2 and YK10-3 (YK103 also appears in some publications as YK-11 and YK10/YK11) (Kankpeyeng et al 2011: 209 - 210; Kankpeyeng et al 2013: 480; Insoll et al 2012). The artefacts recovered were very similar to those documented previously by Anquandah (1998). They included whole pots and potsherds, whole and fragments of terracotta figurines, grinding stones and rubbers, pottery discs, iron and brass items.

However, the interpretations put forward following these latter excavations differed markedly from Anquandah's views (1987; 1998). Anquandah had interpreted the Koma mounds as burial sites and tombs. However, in the latter period of research, the researchers suggested that the mounds are shrine spaces and are the vestiges of deposits of artefacts used in repeated ritual actions performed over time.

Anquandah had previously documented human remains in two mounds, noting that females were oriented westwards whereas males and children were oriented to the south-east. Pots found near the head of the deceased may have served as head props and containers of drink or food offerings. Associated closely with the burials were items such as cowries and iron implements and large quantities of potsherds and figurines in the soil matrix of the mounds (Anquandah 1998: 83). Anquandah thus interpreted the human remains mainly as primary burials, and the artefacts as grave goods.

The later excavations at Yikpabongo (Mounds YK07-D2 and YK103/YK11) also yielded human remains, but unlike the whole burials documented earlier by Anquandah (1998), these appeared to be secondary burials of certain parts of the human body. For instance, in Mound YK103/YK11, a skull was found on top of a group of long bones with the teeth and jaw removed and placed to the east and south respectively, with anthropomorphic and zoomorphic figurines, pottery, stone querns and grinders in close association (Kankpeyeng and Nkumbaan 2008: 97-99; see also Kankpeyeng et al 2013: 483).

The researchers noted that in several instances, especially in Mound YK10-3/YK11, certain arrangements of artefacts clearly showed evidence of "structured deposition" (Insoll et al 2011:37, see also Richards & Thomas 1984: 208-209), whereby artefacts such as complete pots, figurines, ceramic discs and upper grinding stones appeared to be arranged in recognizable patterns and collections. These collections of artefacts were recurrent in the mound and suggest some degree of intentional deposition and repetitiveness associated with prescribed ritual or symbolic activities.

Thus, in response to Anquandah's suggestion that the mounds were constructed and used as tombs (Anquandah 1987; 1998), it was countered that they were probably built up gradually over considerable periods of time, through regular deposits of material culture used in ritual and healing activities (Kankpeyeng and Nkumbaan 2009; Kankpeyeng et al 2011; Insoll et al 2012). The mounds were therefore interpreted as "the accumulation of material remains of single acts repeated over time" (Kankpeyeng et al 2013: 484). Certain groups of artefacts were consciously bundled together in clusters and as they were used together in ritual performances, the symbolic artefacts such as the figurines imbued non-symbolic ones with ritual essence, transforming their materiality in the process.

The interpretive frameworks that have been applied to Koma material culture in this later period of research have centred on the agency of especially, the terracotta figurines and how they were used to materialise conceptions about the spiritual world and engage with it through ritual and shrine-based activities, constructing and mediating forms of personhood such as ancestors.

The interpretations have highlighted the iconographies and morphologies of the figurines, and how certain properties and features were consciously created and curated to perform certain symbolic functions. For example, most of the anthropomorphic figurines were conical in shape with hollowed-out heads and pointed shaft-like bases. These were probably inserted into the ground to receive and/or hold liquid offerings, possibly as part of ancestor veneration rituals (Insoll et al 2012: 39; Kankpeyeng et al 2013: 485).

Other stylised examples such as fused bird and human figurines probably represented conceptions of metaphysical entities such as witchcraft and may have been employed in exorcising activities (Kankpeyeng and Nkumbaan 2008: 98). Similarly, a figurine of a crocodiles covered with knobs could have been used to materialise ailments and enhance healing processes (Kankpeyeng et al 2011: 212; Insoll et al 2014).

Some of the figurines were also treated in certain ways to enhance their materiality and probably make them more powerful. For example, Computed Tomography (CT) scanning of some figurines have revealed cavities leading from the top of the heads, nostrils, mouths or ears into the bodies.

Interestingly, these cavities have only been identified in anthropomorphic figurines and they do not appear to have technical functions, nor are they inadvertent mistakes of the processes of manufacture. It has therefore been suggested that such cavities may have been deliberately created as receptacles and channels of liquid offerings and libations (Insoll et al 2012: 32). In relation to this, a circular daub feature believed to be a libation structure or platform was uncovered in Mound YK10-3/YK11 (Insoll et al. 2102: 36; Kankpeyeng et al 2013: 483).

Other ways in which Koma figurines were probably 'treated' to materialise personhood, identity and relationships with ancestors include deliberate fragmentation. Most of the figurines recovered were fragments and this has led to suggestions that they were intentionally broken to represent partible personhood and enchain the living, the dead and material objects (Insoll et al. 2012: 39-42).

Another discovery from this renewed phase of research was a mound type whose structure appeared different to the types discussed above. The surface configuration of this newly discovered mound type showed relatively sparse scatters of potsherds and grinding stones. They also tended to be larger in size than the 'stone circle/ shrine-related' mounds. They were labelled as 'house or settlement mounds' (Kankpeyeng & Nkumbaan 2009: 196; Insoll et al 2012: 41). Examples of this type of mounds have been investigated at Yikpabongo (YK 10-4) and at Tando-Fagusa (TDF-HM12 and TDF-TP2) and have been found to contain complete human burials, potsherds, fragments of figurines, few grinding stones, iron and brass ornaments and glass beads

(Kankpeyeng & Nkumbaan 2009: 196; Kankpeyeng et al 2011:209). The house mounds were believed to be spaces of domestic habitation, but also served as burial spaces for members of the household accompanied by relatively small quantities of personal objects as grave goods. One such burial was recovered in a mound at Yikpabongo and eleven in Tando-Fagusa. Associated with the burials were iron bracelets, twisted brass ornaments, glass beads and potsherds (Kankpeyeng et al 2011: 210).

Another significant result of the renewed research at Koma sites is that new dates were obtained from sealed contexts which challenged the dates suggested earlier by Anquandah. Anquandah (1998) had used thermoluminescence to date terracotta figurines obtained as surface finds from Yikpabongo to 405 ± 135 BP (No. K414) and 480 ± 80 BP (No. 53855). Thermoluminescence dates from other sources suggested a chronological range of between 620 ± 200 BP and AD 1579 ± 135 (cited in Anquandah 1998: 79; see also Dagan 1989 and an exhibition advertisement in the Front Matter of *African Arts* 1989 Issue 23 (1), page 23).

Anquandah had also relied on comparisons of the data from the Koma sites with other known material culture and chronological contexts to arrive at a relative chronological frame. For example, he related the surface treatments and decorative motifs of Koma pottery to similar materials from dated Middle and Late Iron Age sites in other parts of sub-Saharan Africa. In addition, he envisaged resemblances between the structures of the Koma mounds and the stone circle megaliths and tumuli of Senegal, Gambia, Chad and Mali (Anquandah 1998:77). He also traced the cowrie motifs and horse/camel imagery depicted on some Koma terracotta figurines to the period when these materials were introduced into West Africa. Altogether, he arrived at the conclusion that the ancient Koma sites were occupied between AD 1200 and 1800 (Anquandah 1998: 82).

However, following recent research, this chronological estimation has been challenged by a suite of radiocarbon and thermoluminescence dates obtained from a range of excavated artefacts including human remains, pottery and figurines. These have produced radiocarbon dates ranging between cal AD 535 to 652 (1475 ± 35 BP) and cal AD 1010 to 1170 (970 ± 40 BP), and thermoluminescence dates of between AD 979 ± 39 and AD 1317 ± 24 (Kankpeyeng et al 2011: 209). Research in the Koma area is being boosted by individual student-led research projects addressing specific research questions. These are outlined below.

1.6. Student-Led Research Activities

An increasing number of sites and mounds are currently being investigated through student-led research and diverse research questions are now being asked of the archaeological evidence. For instance, ongoing research at Tando-Fagusa (24km away from Yikpabongo), as part of a doctoral project is focused mainly on house mounds, although some stone circle mounds have been tested. Preliminary findings appear to confirm the hypothesis that the two types of mounds differ with regards to quantities of material culture and in patterns of artefact deposition. The artefacts recovered from the house mounds include burials covered with large potsherds, fragments of terracotta figurines, beads and metal objects. The stone circle mounds, on the hand have yielded mainly, terracotta figurines and potsherds. The radiocarbon dates that have been obtained for this site fall within the sixth and tenth centuries AD (Nkumbaan 2015:50).

For his master's dissertation, Zakari (2010) has conducted investigations at Tando-Yikora, near Tando-Fagusa. The aims were to document the settlement histories of the present populations and investigate abandoned sites where the people initially settled upon arrival in the area. Ultimately, he intended to determine how the data from these sites relates to the ancient Koma sites.

As part of their economic activities which include subsistence farming, weaving and small-scale trading, Zakari (2010: 14-16) observed that the people of Tando-Yikora also carved wooden figurines to represent certain spiritual entities such as the spirits possessed by twins, which are believed to have the power to bring success or misfortune to families. These wooden figurines are adorned with metal ornaments and are offered sacrifices occasionally. In Zakari's opinion, this figurine tradition mimics the Koma terracotta figurine tradition, with which the local people are familiar through surface collections and looting of the archaeological mounds.

Zakari (2010: 30) also recorded twenty-five mounds ranging from 1m to 5m in height. Using surface finds, he identified fourteen of the mounds as stone circle mounds (figurines, potsherds and stones) and eleven as house mounds (a sparse scatter of potsherds and daub). These observations correspond to what has already been noted at Tando-Fagusa (Kankpeyeng & Nkumbaan 2009; Kankpeyeng et al 2011:201), discussed above, and what was observed by the current research at Zoboku. The material culture recovered from Zoboku are outlined below from Chapter Four.

Zakari's interpretations of the data from Tando-Yikora are however not very clear. Although the mound excavated was located at an abandoned settlement site of the contemporary population, he recovered Koma type artefacts such as zoomorphic and anthropomorphic terracotta figurines, iron ornaments and roulette-decorated potsherds. He also recovered some clay smoking pipes which he attributes by way of relative dating to the eighteenth century AD. The site therefore appears to be an ancient Koma site resettled in the recent past by the contemporary people.

However, Zakari (2010: 76-83) does not indicate the distinctions in these settlement periods by stratigraphic deposition or in material culture but relates the excavated pottery to types currently in use in the community, which are obtained from market centres located about 40km away. In contrast, he interprets the excavated terracotta figurines in the context of what is already known from other Koma sites.

Thus, he presents a somewhat conflicting picture of the site. Nevertheless, the documented settlement histories, which indicate that the people of Tando-Yikora are recent migrants into the area, is in consonance with what has been documented at Yikpabongo (Anquandah 1998; Kroger and Saibu 2010), and at Tantala, the site associated with this research.

Another student-led project has been conducted by Appiah-Adu (2013) at Hambuikong near Yikpabongo. His research adopted a landscape approach and focused on understanding the pattern of distribution of mounds on the site. Using differential structure and surface configuration of artefacts, he distinguished forty- six house mounds and thirty ‘stone circle’ mounds. He recorded the spatial distribution of all the mounds through GPS surveys and the geo-spatial dimensions of fifty-three of the mounds with a Total Station.

The surveys revealed that most of the stone circle mounds had a volume of less than $100m^3$ (Appiah-Adu 2013: 53-54). This corresponds with the prevailing observation that the ‘stone circle’ mounds are generally smaller in size than house mounds. The GPS surveys also revealed that most of the stone circle mounds were clustered in the south-western section of the site. The house mounds on the other hand were relatively evenly distributed.

Test excavations of some of the mounds at Hambuikong also yielded a range of artefacts similar to what has been recovered already from Yikpabongo and other sites, namely, pottery decorated with various forms of roulettes, terracotta figurines (one whole and eleven fragments), iron objects (three bracelets and one razor blade), sixty-four stone querns, eleven ceramic discs and some faunal remains.

Significantly, the terracotta figurines were recovered from the stone circle mounds and this is also similar to what has been documented already from other mounds at Yikpabongo and Tando Fagusa (Anquandah 1998; Kankpeyeng & Nkumbaan 2009; Kankpeyeng et al 2011). However, unlike the other sites, the stone circle mounds excavated at Hambuikong did not yield any faunal or human remains (Appiah-Adu 2013: 103).

There has been additional student-led research at Yikpabongo, this time focused solely on one house mound and analysing the pottery and figurine artefacts therein as products of technology and art (Asamoah-Mensah 2015: 121). The artefacts recovered included pottery, grinding stones, daub, a metal ring and a human burial. As the researcher was also interested in the ancient Koma pottery production system and the source of the clay raw material, she compared samples of pottery and clay deposits from the mound with samples from Fumbisi (about 43km away) by X-ray fluorescence.

The results revealed that Fumbisi is the most probable source of the clay used to produce the Koma pottery (Asamoah-Mensah 2015: 125-126). The clay raw material was probably obtained from the environs of Fumbisi and used to produce the pots at Yikpabongo or finished pots from the area were acquired and transported to the Koma area. Fumbisi is presently a large pre-urban settlement and the centre of a major weekly market, from where several communities in the Koma area acquire pots and a wide variety of other household items.

In the following sections, I build on the existing data from the Koma as discussed above to contextualise the current research project. In Section 1.7, I set out the research problem, aims and objectives, and in Section 1.8, I situate these within the wider social framework of the theories of materiality, agency and technology.

1.7. The Research Problem

This thesis problematizes the minimal research attention that has been given to pottery artefacts from the Koma sites so far and proposes that the characteristics and technology of the pottery artefacts can be used to delineate aspects of the social and economic organization of the past Koma people. Particularly, it emphasizes that the interpretive frameworks which have already been applied to the terracotta figurines, as outlined above, can be enriched by a corresponding research focus on the materiality of the pottery artefacts, and that our understanding of the past Koma culture can be enhanced considerably through analyses of the social contexts and technological patterns of the pottery production.

Traditionally, categorisation of material culture distinguishes art objects and artefacts; symbolic and mundane objects. Symbolic objects are assumed to be imbued with meaning and are used in ritual, religious or sacred contexts, while mundane objects are seen as utilitarian with functional properties which are used to carry out tasks such as procuring or preparing food, extracting or harvesting natural resources and making other objects. Figurines are commonly placed in the art category and pots in the artefact category.

This dichotomy is rooted in intellectual development in material culture studies over the years. Art has been described as an expressive, representational transformative concept which is aimed at and received by an audience. An audience in this case can be the individual, clan, family, community or the public including outsiders and strangers. It can also be an unseen but identifiable familiar or unfamiliar entity residing in the spiritual realm, such as spirits or ancestors.

Art objects are considered as markers of highly developed or complex cognitive structures which are made and/or acquired and used by a culture after achieving primary and fundamental cultural thresholds such as sufficient food supplies or shelter. They are the end products of actions that utilize labour, resources and time which are considered surplus and not required to be applied to meet functional needs.

Artefacts, on the hand, are perceived to exist in the realm of crafts, produced by artisans usually replicating existing technical templates and with definite aims of being used to achieve set objectives or meet needs, often tangible. Artefacts are assumed to lack the spontaneity, individuality of expression and skill that characterize art objects. When found in archaeological contexts, figurines are usually treated as symbolic, representative or aesthetic objects, while pots are considered as artefacts.

Figurines, described as miniature iconic representations or models (Hamilton 1996: 281; Prufer et al 2003), are commonly made of clay, stone, wood or metal. The subject matter of figurines may be anthropomorphic, zoomorphic, inanimate, naturalistic or stylistic. They have been found in varied contexts including tombs, graves, shrines, in house walls, near hearths, on refuse dumps and so on. Figurines embody symbolisms, ideas, and perceptions of the maker or the group and may be used in a variety of ways.

Figurative art has been considered an important threshold of human cultural development. The earliest figurines are believed to have come from Upper Palaeolithic sites, although some proto-figurines have been recovered from Middle Pleistocene sites (Bednarik 2003: 90) Since then, figurines have been recovered from sites of various culture periods and dates all over the world (Bailey 1994; 2005; Martin & Meskell 1998).

Figurines are particularly dynamic visual objects which tend to stimulate strong emotions and heightened interests in their viewers, be it archaeologists, analysts or museum audiences (Hamilton 1996: 281). Several questions are asked of a figurine when found in an archaeological context, the foremost and most fundamental being 'what does it mean' or 'what was it used for'?

Whereas the method of production can usually be determined using a plethora of techniques focused on its physical and formal attributes or through experimental studies, the meaning embodied by a figurine and what it may be intended to represent, encode and achieve is not easily ascertained. And yet such levels of information are what archaeologists and art historians most desire to uncover.

The importance of the meaning and functional contexts of figurines is reflected in the amount of debates and multiple views on the subject in the literature. For instance, the anthropomorphic female 'Mother goddess' or 'Venus' figurines from Neolithic sites in Europe and the Near East have been the subject of several interpretive frameworks embedded in political views, feminism, ancient beliefs, conceptions of the female body, and so on (Hamilton 1996; Haaland & Haaland 1995; Bailey 2005).

In Mesoamerica, anthropomorphic and zoomorphic figurines have been found from several sites and various culture and chronological periods. These have been interpreted variously using contexts, subject matter and stylistic variations. For instance, Lesure (1999; 2011; 2015) has highlighted how stylistic variations in figurines from sites in Mexico emphasizing bodily features, ornaments, dress and hair styles are suggestive of identity and ethnic markers, gender divisions and constructions of social persons (see also Begun 2008).

Joyce (1993:264) also suggests that figurines from the Ulua Valley in South Central America were probably used to create common bonds among members of a household while creating distinct identities from other households. They were also used to define the social roles of males and females. Some of the figurines depicting a variety of imagery were possibly used in ritual ceremonies centred on fertility and warfare or to assert the self-sufficiency and status of households as challenges to the political authority of ruling elites.

Terracotta figurines found in West Africa are commonly interpreted within ritual or ceremonial contexts. For instance, the Nok terracotta figurines from Nigeria are believed to be the earliest known in Africa south of the Sahara (Fagg 2014). They have been associated with potsherds and iron remains (Fagg 1969: 44-48; Connah 2004:120), but there are also indications that some of the figurines were smashed deliberately, possibly relating to ritual or religious activities (Breunig & Rupp 2010:50-51; Zimmerman 2014:61).

Another African figurative art tradition comes from sites in the Inland Niger Delta in Mali. Although hundreds of the figurines have been illegally looted, the examples recovered from settlement mounds in Jenne-Jenno appear to have been used as symbolic objects to negotiate ambiguities of belonging, identity, status and belief in the face of fluid and changing technological, social, economic and settlement structures. Some of the figurines were purposively buried in house walls near entrances or deposited in rainmaking shrines and funerary urns (McIntosh & McIntosh 1988: 156).

The interpretations of ways in which figurines from the Koma area were used have been outlined above and have clearly advanced our knowledge of how the past people manipulated the materiality of clay and other substances and perceived and negotiated concepts such as death, afterlife, witchcraft, rituals, and the creation and maintenance of relationships between persons.

Nevertheless, this thesis contends that pottery artefacts from the same sites have the potential to provide information on other aspects of the past culture. In effect, the question being asked here is: in relation to what is already known from Koma figurine analyses, what new and alternative information can be obtained from the technological structures of other artefacts, especially pottery? Although these interpretations have given us adequate information of what appears to be highly elaborate and developed cognitive and social structures of the past Koma culture, this thesis contends that there is the need to consider the potential of ceramic pottery artefacts to further elucidate other aspects of the past Koma culture.

Pottery are the end products of one of the most common and fundamental technologies developed and engaged in by humans. The main raw materials required for one to produce pottery namely, clay, water and heat or fire, are readily available in the natural environments of most societies. Furthermore, there is usually considerable returns from the material, labour and effort invested in the form of sizeable quantities of utensils, tools and equipment which can be utilised in several areas of human activities.

Even in modern societies, ceramic articles are used in several spheres of activities. In several prehistoric and recent historic societies, especially in Africa and Asia, the production of pottery is an enduring industry supplying most simple as well as complex domestic and symbolic vessels and containers. Pottery is a common artefact category recovered from most archaeological sites, and the situation is no different at the Koma sites. For example, Anquandah's (1998) excavation of four mounds in Yikpabongo yielded over 46, 000 potsherds in addition to a number of whole pots. In addition, other mounds in Yikpabongo have yielded considerable quantities of pottery artefacts (Kankpeyeng et al 2011).

Important as figurines undoubtedly are, this thesis takes as its starting argument, the need to consider pottery too. Barley (1994:9-17) has observed that pottery is often perceived within a sphere of passivity, conservativism and domesticity, whereas sculptural ceramics are considered dynamic, glamorous and powerful. Pots are seen as ordinary, essential and utilitarian craft items while figurines are presumed to embody artistic, aesthetic, ritual or spiritual concepts. Recent ethnographic and ethnoarchaeological studies are however, beginning to prove that although in many contexts, pots may not have outright artistic values, ritual and symbolic significances, the technology by which they are produced as well as the products themselves play several vital roles in social learning and identity creation, and may represent milestones throughout the cycle of life and maintain social cohesion. For example, a sustained ethnoarchaeological research covering large parts of West, East and Central Africa has documented how pottery play active roles in social organisation, identity creation and materialization as well as the maintenance of socialised bodies of knowledge and learning (MacEachern 1994; Gosselain & Livingstone-Smith 1995; Gosselain & Stark 1998; Gosselain 1999; 2000; Haour et al. 2010).

By and large, these studies have put pottery at the forefront of a revitalised theoretical discourse on practice-based and socially-situated technological activities. They have highlighted ways in which pottery making processes, pottery vessels and their usage contexts are used to conceptualise the world and place events and life processes such as purity, profanity, pregnancy, birth, death and so on in accessible frameworks with which people can engage, renegotiate and attempt to control (David et al. 1988).

The objective in this thesis is not to chronicle symbolic or ritual significances of pottery over terracotta figurines, but to highlight the equal and complementary potential of both artefact categories for a holistic understanding of, especially archaeological records which lack secure ethnographic contexts such as the Koma sites. At Yikpabongo, pots which have been found associated with figurines in probable ritual contexts have been labelled as ritual pots (Kankpeyeng & Nkumbaan 2008: 100, see Figures 7a -7d). However, there are no or very little sculptural or figural elements on these pots, and had they been recovered from different contexts, they would probably be considered domestic pots and therefore utilitarian artefacts.

This shows that in the prehistoric Koma settlement contexts, pots which are categorised ordinary, non – ritual or profane based on our present subjective interpretive structures, probably possessed a multiplicity of characters, shifted contexts and properties, and moved through different functional contexts within their life histories. It is also very likely that the two artefacts categories were probably not far apart in terms of technological structures, labour networks, or usage contexts.

I contend, therefore, that the holistic analysis of one category cannot be conducted in isolation from the other. Studies on Koma terracotta figurines are relatively advanced and the framework has been created for exploring the materiality and agency of the objects and the people who used them. It is thus time to focus similar analytical lenses on the pottery technology and determine what evidence are contained therein to contribute to our understanding of the entirety of the Koma cultures. Steps have already been taken in this direction by Asamoah-Mensah (2015), who has investigated pottery from Yikpabongo in the framework of art.

Another concern of the present research is to investigate the wider landscape context of Zoboku. Previous research has mainly focused on the contextual arrangements of artefacts within mounds spaces. As a result, very little is known of the spatial patterns of the Koma societies. Any understanding of the technological practice of a culture is likely to be severely limited without contextual information about the space within which, for example, raw materials were acquired, production sequences carried out, and objects used and reused. Therefore, some of the overall research questions of this research include; what is the nature of the spatial pattern of the site at Zoboku, which activity areas can be identified on the site, and how can landscape-based data contribute to our understanding of the pottery technology?

Based on the research problems outlined above, the aims and objectives driving this research are:

1. To determine the spatial pattern of Zoboku and ascertain the extent to which this dataset can inform us about the functional contexts of the site.
2. To examine, through excavations, the nature of the material culture of the site and obtain dateable samples to help build up the chronological framework of the Koma tradition.
3. To examine the technology of the pottery artefacts and delineate technical sequences, production processes and usage contexts.
4. To determine, using contextual analyses, the functions of the pottery, whether ritual or non-ritual or whether pottery artefacts moved between functional categories.

1.8. Theoretical Framework

This thesis has a primary material culture focus and is therefore situated in the theories of agency, materiality and technology developed (and still developing) as part of the paradigms of the Post Processual School over the last three decades. As a set of related paradigms, the theories consider the complex and interactive relationships between people, objects and the structures of their environments. Objects, landscapes and the processes of production have been longstanding concerns of archaeology but as part of recent theoretical and methodological discourses, the theories of agency, materiality and technology encourage critical reflections on the entangled and affective nature of these dimensions.

The beginnings of Archaeology are often traced to fascinations with unfamiliar and exotic objects and things. Scientific archaeology was born out of accidental discoveries of objects of the past, deliberate treasure hunting, collecting and antiquarianism. People with the interests and the means sought and collected antiquities, displayed and considered similarities and differences in style, form or make-up and classified them based on culture development stages (Renfrew & Bahn 2016:8-10; Bahn 2014: 11-15; Fagan 2016:9-17; Kohl 1993; Trigger 1968; Dietler & Herbich 1998; Hodder 2004; Boivin 2004).

The formal attributes of objects were used to trace evolutionary trends in artefact styles, map out the identities of culture groups, and the extent of spatial interactions such as diffusions and movements between societies.

Even after archaeology evolved from simple fascination-fuelled treasure hunting to a somewhat complex pseudo-scientific discipline by the early twentieth century, its primary concern remained the empirical nature of objects, albeit the cultural salience of artefacts rather than their eccentricity and exotic characteristics. Archaeological enquiry of this period incorporated some awareness of the social aspects of material culture. The characteristics, types, styles and forms of objects were considered as shared traits and behaviours which resided in the social domains of societal interaction and influenced the continued making and usage of objects resulting in similar distribution patterns of objects across space and through time.

With the continued development of archaeological studies, objects gained significance as markers of culture histories and patterns. An emphasis on the formal attributes of objects gave birth to various interpretive concepts such as the normative notion of culture which pervaded the discipline for most of the first half of the twentieth century. Objects were used to delineate technological areas, trace the movement of people between spaces and suggest relationships between culture areas. Spatial discontinuities or differences in artefact styles were attributed to natural barriers, rejections of social relations or foreign intrusions (Binford 1962; 1965).

Culture was considered as a pattern of norms acquired through historical tradition and an awareness of society-situated knowledge. This normative behaviour was perceived as the underlying factor in producing culture areas, namely geographic units displaying similar culture traits such as language, subsistence patterns and material culture assemblages which archaeologists sought to identify through the horizons of time and space (Earle & Preucel 1987:503).

In the 1960s, theoretical entanglements between archaeology and other humanistic disciplines such as anthropology, sociology, philosophy, and geography led to the formation of the Processual or New Archaeology School. This school advocated paradigms that recognise the dynamisms of people-object interactions and the social context of artefacts (Hodder 2004:23). The period represented an analytical leap from using artefacts to describe space-time systematics, culture history sequences and technological patterns to a concern with uncovering and explaining the underlying reasons for such patterns.

Some of the tenets used to interpret culture patterns included functionalism, cultural materialism and positivism, which stressed the functional properties of artefacts and how they are used to perform roles and meet demands, especially to procure and perform utilitarian activities. Artefacts were seen as the end products of people's actions as they interacted with the environment and endeavoured to solve problems.

The Processual School also favoured a systemic view of culture which considered artefacts as part of the sub-system of technology which was in turn one of the components of a culture's overall system. Artefacts were the products of technological systems representing the material record of the functional needs and requirements of society, the existing environmental and energy resources and the practical skills available within the culture. Material culture existed in an interdependent arena alongside politics, beliefs, customs, religion and so on. Altogether, these represented a static organizational template of a society which could be used to distinguish or align societies.

In the 1980s and 1990s, further theoretical developments especially in British archaeology and social anthropology led to the formation of the Post-Processual Archaeology School. This conceptual movement not only placed more emphasis on the sociality of artefacts, but more importantly adopted a corresponding expanded social perspective of technology and human behaviour. Influenced by disciplines concerned with the structures of the mind and thinking processes such as cognitive science, psychology and philosophy and humanistic disciplines such as sociology and anthropology, Post-Processual Archaeology considered technology as meaningful and socially situated.

In the preceding conceptual period, technology had been bound to the conditions of the environment and was largely determined and influenced by the nature and limitations of the environment and energy resources. Under the Post-Processual School however, technology was considered to reside within human consciousness and represent the meaningful and intentional choices people make with regards to material resources and activities. These choices are embedded in peoples' experiences, learned bodies of knowledge and social relations.

The strength and usefulness of the current conceptual period stem from its constitution as a collection of paradigms which altogether emphasize all aspects of people-material culture interactions. Based on the theoretical formulations of symbolism, structuralism, historical processualism, material science studies and phenomenology, among others, the paradigms of the Post-Processual School consider in totality, the power of the individual in material culture manipulations and engagements with technology. These paradigms also recognise the importance of material culture in creating, maintaining and re-negotiating social relations and behaviours of people, and the social dynamism of technology as the specific set of techniques and resources consciously chosen by individuals to make and use objects and how the processes of technological activities transform and reproduce existing social structures.

Some of the theoretical formulations of the Post-Processual School which are significantly influencing current archaeological discourse in the social arena of people's behaviours and the relationalities between behaviour and material culture are the theories of agency (Dornan 2002; Dobres 2000; Dobres and Robb 2000), materiality (Hodder 1986; Knappett 2012) and technology (Dobres 2010; Sillar & Tite 2000; Killick 2004; Pfaffenberger 1992; Lemonnier 1992).

These theoretical discussions provide an appropriate background for this research project as it is mainly aimed at ascertaining the organisation of the material culture of Zoboku. The following discussion outlines in detail how the problems of the current research resonate with ongoing dialogues and applications of the theories of agency, technology and materiality.

In contrast with earlier deterministic models of human behaviour, the tenets of the theory of Agency suggest that people intentionally act and alter the world around them. The theory considers ways in which human behaviour are constrained, enabled, constructed and maintained within a social system and how the social system is in turn affected by human behaviours. The theory of agency is founded on the propositions of Pierre Bourdieu's Practice Theory and Anthony Gidden's Theory of Structuration (Dorman 2002:305), which are in turn based on the thoughts of social and philosophical theorists such as Karl Marx, Emile Durkheim and Max Weber on the relationships between society and the individual. Both the Practice Theory and the Theory of Structuration delineate the dialectical relationships between the agent who possesses both bounded and wilful dispositions with the ability to alter social structures, and structure, which is the more expansive, constituted and enduring environment in which the agent acts and which is also a result of ongoing interactions of and between agents.

The most significant contribution of Bourdieu's Theory of Practice to archaeological considerations of agency has been identified as the concept of habitus; the notion that individuals unconsciously internalize certain dispositions as they interact in different social conditions which in turn influence practice. Habitus has been described as systems of durable, transposable dispositions or structures which generate practices which can be objectively regulated and are themselves regular without in any way being the product of obedience to social and cultural rules. Archaeologists however identify some shortcomings in this underlying definition as the concept proposes that the individual's actions unconsciously result from their social conditioning and leaves little room for active intentional and conscious behaviours (Dornan 2002:306).

Bourdieu goes on to propose the concept of Doxa as the naturalized perception of existing social structures which result from the habitual and regularized experiences of individuals. But scholars also identify that this notion severely restricts the subjectivities of the individuals in the creation and manipulations of social structures (see for example Smith 2001 for a critique).

To some extent, Anthony Gidden's Theory of Structuration overcomes some of the shortcomings of Bourdieu's notions of agency. The Theory of Structuration proposes that social structures are both constraining and enabling and provide opportunities for individual intentionality and innovations. Social structures are considered as the results of reproduced habitual action but are recognisable as such to the individual who can reflect and adapt their actions based on a resource of tacitly accumulated knowledge of social capital (Dornan 2002:308).

Despite these shortcomings, the theories of practice and structuration have served as foundations for several strands of modern approaches and enquiries into both individual and collective anti-deterministic rational behaviours as well as the dynamics of social and political structures within which these are played out (see Dornan 2002 for examples of such approaches).

Archaeology now considers agency as a central dimension of humanity, encompassing the relationships between a human organism and everyone and everything else that surrounds it. Agency has been applied to various questions and considerations on the historical constitution of human societies. For instance, research into agency have considered the nature of individual freedom and self-ascription and reactions to social constraints, the role of societies in the construction of persons and the place of accepted ways of doing things in the reproduction of cultures (Gardner 2004).

Dobres and Hoffmann (1994) have also identified that the concept of agency engenders the awareness of intentionality and situatedness of individuals in variations in material culture forms and styles as well as enhances understandings of identities, inequalities and social differentiation. The individual's conscious pursuit of status, prestige or power could be examined through actions that effect large scale changes in a culture or result in the production, acquisition and use of objects which may be visually appealing, exotic or symbolic, and which in turn helps reproduce the identity of the individual. The formulations of agency theory further provide points of dialogue and interrogation with variations of material culture and the attitudes and values underlying the processes of making and using artefacts.

The paradigms of the Post-Processual School also include the concept of materiality which emphasizes the importance of the social as well as the material components of material culture, how humans consciously engage with objects and how objects shape human experiences (Jones 2004). To the proponents and practitioners of the concept of materiality, material culture is not merely a static backdrop to active human lives and activities but possesses and embodies its own agency and has the power to construct and reproduce social relations. The intentions of people are translated into material forms and these in turn affect other people's intentions and actions (Hodder 1986; Jones 2004).

The concept of materiality adopts a biographical approach to material culture studies with the view that things both have and shape social lives. Stahl (2010) suggests that human actions and practices allow us to delineate material histories of past cultures on three analytical levels, namely biographical, deposition and genealogical.

An awareness of the biography of material practices enables us to identify contexts of object use, transformations, transference or alterations of contexts within and between societies. She suggests that instead of echoing the traditional notions of change and continuity through time and across space, materiality places the focus on how people create and recreate such contexts through experiences of familiarity, appropriation and recontextualization of the unfamiliar and exotic.

Deposition of artefacts is important in understanding the material histories of a culture. Objects may be bundled, drawn or gathered together in specific deposition contexts to reflect perceived experiences and relationships with humans. Stahl (2010) acknowledges that the interpretative contexts of meaning may initially be sought from formalized and prefigured deposits, but the social processes and identities formed and produced by such actions are also important. People's experiences with objects may determine which objects are incorporated into specific deposit structures and within what spaces. This is especially pertinent if the context under study is a ritual, symbolic or burial context.

This notion is reflected in some of the interpretative contexts applied to research at Yikpabongo. Insoll et al (2012) and Kankpeyeng et al (2013) have suggested that certain Koma objects such as figurines, small pots, potsherds and stones were repeatedly bundled together in structured deposition contexts constituting conscious and meaningful actions. Stahl's notion of materiality also legitimatizes the present research by providing an arena within which we can examine the biography of pots and how those found in non-ritual and mainly domestic contexts as pertains at Zoboku could have been transferred between contexts during the life histories of the objects.

Another important paradigm of the Post-Processual School is that it adopts a social analytical perspective towards the study of technology. Technology has been described as the raison d'etre of objects with which archaeology is fundamentally concerned (Dobres 2010). But artefacts, some of which may be fragmentary or enigmatic, can only be understood if they can be related to the totality of processes and techniques that brought them into being or the ways in which they were used.

Unlike anthropologists however, archaeologists do not always have the chance to confirm such processes and techniques in living contexts. Nonetheless, they also recognise that the systems that produced artefacts were likely well-defined and involved several and specific actions and manipulations of matter supported by or embedded in systems of technical knowledge owned by the collective human environment in which the artefacts were validated or accepted as suitable, appropriate or innovative.

The paradigms of the Post-Processual School emphasize technology as a form of social production and highlight the importance of the environment within which technological actions are performed. As Dobres and Hoffman (1994) have emphasized, technology is not only the material means of making artefacts, but a dynamic cultural phenomenon embedded in social action and reproduction. Dobres (2010) has traced the trajectory of research in ancient technologies based on positivist and materialist standpoints and practical reason and has identified the recent shift towards cultural reason interpretations as a multi-faceted endeavour focusing the study of technology around human agency, social relations and the materialities of objects.

Pfaffenberger (1988; 1992) has similarly observed that traditional conceptions have favoured a "standard view of technology" characterised by naive and disembodied considerations of technology as merely ways of making and using artefacts. The standard view of technology also favours technological determinism which assumes that technology is an independent objective variable that impacts on society and culture.

Implicit in this view are the suggestions that material culture or tools are primarily aimed at fulfilling specific needs, based on their inherent physical or technological properties, and a simplistic assumption of a rational relationship between an object and its intended function. This dissocialised view of technology ignores the significance of all other non-functional aspects of artefacts such as style, decoration and colour and limits the significance of artefacts to the arena of necessity, presumed function and unproblematic disembodied use in carrying out tasks.

Pfaffenberger (1992: 492-497) therefore advocates that human technological activities must be considered using the concept of the sociotechnical system, which he describes as the distinctive technological activity that stems from the linkage of techniques and material culture to the social coordination of labour. The sociotechnical system builds on existing social and cultural structures, but each new sequence of technical activity or process transforms the existing structures and is itself reproduced as it is being carried out.

Dobres & Hoffman (1994:212-214) have contributed to this view by outlining four paradigms by which the social dimensions of technology can be recognised and evaluated in prehistoric material culture. These are scale, context, materiality and social theory. The dimension of scale encourages an awareness of the microscale day to day activities carried out by people in making and using objects. This leads to explorations of variability in actions, processes and artefacts, differential participation in technical activities and how these microscale actions contribute to macroscale phenomena.

The dimension of context suggests that other contexts might be at play besides the social structure, which could also have effects on the technological system. These could include political or economic structures. Thirdly, there is the need to investigate the materiality of technology and attempt to identify the technical attributes, sequences and processes that constrain human behaviours.

Ultimately, Dobres & Hoffman (1994:214) envisage that the application of these dimensions will lead to the generation of a body of social theory that can illuminate the dynamics of technology in specific archaeological contexts. They also encourage that attempts must be made to demonstrate the evidence of operational sequences involved in technical processes. This is echoed by other scholars and ties in with the increasing use of the *chaîne opératoire* analytical or methodological approach to analyse detailed technical actions.

Martinón -Torres (2002) states that each technical step or sequence is important as it involves information on intention, choice, knowledge or ability of the subject and the social conditions at that point of action. This ensures that the whole enchained process involving intentions, gestures, knowledge, resources, tools and so on can be identified and given equal importance.

The *chaîne opératoire* methodology has been most successfully used in ethnographic research into potting activities (Gosselain 1999), but it has also inspired attempts to explore the social aspects of variables identified in archaeological pottery assemblages (see for example Manning 2011). It has also been suggested that operational sequence analyses of a pottery assemblage can be achieved through waste product, debris or use wear analyses, refitting and experimentation as well as analyses of differential function, discard, deposition and post deposition patterns.

1.9. The Study Area – Zoboku, near Tantala

The fieldwork component (surveys and excavations) of this research was conducted on a group of mounds at a site measuring 250 x250m at Zoboku. Zoboku is located about 18km from Yikpabongo and about 3km from the nearest settlement Tantala. Reconnaissance surveys by Anquandah (1998) and Kankpeyeng & Nkumbaan (2009: 195) identified mound sites in and around both Zoboku and Tantala (see also Table 1).

However, my survey and research revealed that Tantala is a contemporary settlement and there are no mound sites in its immediate environs. The mound sites were located in Zoboku, which is essentially the farmlands of the inhabitants of Tantala. No permanent households were found but most farms have small huts which serve as shelter and storage areas for farmers in the planting and harvesting seasons. The landscape of Zoboku is mainly high grasses, a fair distribution of wooded trees and farmlands of cultivated cereal and root crops such as sorghum, millet, guinea corn, yam and cassava.

The village of Tantala has about twenty-eight compounds. The compounds are arranged in a nucleated pattern and most of them are designed as open circular or square spaces enclosed by several adjoining rooms. Collective or family activities such as hosting visitors, cooking and other domestic activities take place in the open space.

The inhabitants are predominantly Muslim. The village boasts of a sizable mosque but no identifiable Christian church building. The community also has a school for primary and junior secondary pupils and a health centre, but the latter was not in use at the time of the research. The traditional political authority in Tantala rests with a royal family which owes allegiance to the royal lineage of the Mamprusi traditional authority at Gambaga. In terms of the national political structure, however, Tantala is overseen by the District Assembly based at Yagaba.

The people of Tantala are predominantly farmers and each family have portions of lands which are divided among the male members. They practise land rotation as a means of conserving the fertility of the soils. The portions of lands to be farmed in any year is prescribed by the chief. In December 2012 and January 2013, when I conducted the surveys and excavations, surrounding parts of the land area where the mounds are located had been cultivated with sorghum and millet. However, the piece of land which I excavated was lying fallow.

In addition to cereals such as millet, sorghum and guinea corn, the people also cultivate root crops such as yams and vegetables and legumes. Cultivation is by manual labour whereby the farmer and his immediate family, usually his wife/wives and children clear the land and cultivate the crops. For labour intensive aspects such as harvesting and transporting the produce to the village, extended family members may be called in to assist.

Tantala is the centre of a market held twice a week on a Monday morning and a Wednesday evening. People from neighbouring villages partake in these markets. On Fridays, large trucks from larger settlements such as Kundungu and Wa to the west pass through the village to transport mostly women and farm produce to the larger market at Fumbisi about 45km away. The sense of time for most people in the village revolves mainly around the market days.

I conducted semi-formal interviews with the chief and eight elders of the village to discuss the nature of the research and its significance and seek their permission. During these interviews the elders recounted their settlement history which begun with migrations from their ancestral home, Nalerigu near Gambaga. They first settled for a while at Zori and then crossed the Kulpawn River to Kuwosasi. After settling at there for a while, they again crossed the Kulpawn River to Santale, which means ‘the place near the stream’. With time, the name Santale became corrupted to Tantala. The mnemonic events to which the elders of Tantala associate these histories are the wars and slave raiding activities carried out by Babatu and Samori which caused several communities to move from place to place seeking refuge.

Similar to what has been documented in other settlements (Anquandah 1998), the people of Tantala do not profess any cultural identity with the mound sites. They are aware of the locations of the mounds in their farmlands and know of their contents recalling that some members of the community had dug up some of the mounds for the figurines, and that a few people still possessed some of the figurines. However, they emphasized that the mounds already existed upon their arrival in the area and that the figurines and potsherds are probably the remains of communities that once existed in the area. They have expressed opinions that the figurines are portraits of people who might have lived in the area previously. This is similar to what has been documented in Yikpabongo where the inhabitants refer to the figurines as ‘olden day children’ (Anquandah 1998). Some of the inhabitants of Yikpabongo incorporate the figurines into their ritual paraphernalia in the belief that they contain spiritual power, but no such appropriations were mentioned in at Tantala.

The ethnographic dissociation from the archaeological context realised during the interactions with the people of Tantala informed the analytical and interpretive frameworks applied to the archaeological data. Besides farming, dressmaking, and small-scale trading in foodstuffs or manufactured products and condiments, no other economic activities were observed at Tantala. There were no indications that pottery had been carried out in the community in the recent past. Anquandah (1987: 177; 1998) and Asamoah - Mensah (2015) have both recorded that there are no extant pottery making industries in Yikpabongo, and that like Tantala, the modern lifestyle is generally unrelated to the archaeological contexts. A detailed ethnographic document on Yikpabongo also failed to record any pottery industries (Kroger & Saibu 2010). Thus, the research was limited to archaeological investigations of Zoboku.

1.10. Concluding Remarks

The archaeological evidence of the Koma cultures are something of an enigma. The archaeological record is virtually devoid of any historical or ethnographic context. Particularly, the terracotta figurines have posed an engaging and exciting puzzle to art historians. The stylistic characteristics and iconographies of the figurines are different to the better-known figurine artworks from Akan societies such as Twifo-Hemang and Fomena, the Moreover, the regal statures, elaborate dress styles and profuse ornamentation of the anthropomorphic figurines, coupled with exuberant depiction of facial features, including some with mouths open in silent words or screams, songs (Anquandah 1998: 164) or libations (Insoll et al. 2012:31) defy explanation and at the same time invoke multiple imaginations and interpretations.

To archaeologists, there are questions about the temporal status of the mound sites; the chronological span, change or continuity in material culture over the period of its existence, when and why the sites were abandoned, and the technological and economic contexts of the material culture. There are also questions to be addressed concerning the settlement pattern of the sites and the relationships between the numerous clusters of mounds.

GPS and other surveys have documented about thirty-eight very similar Koma sites, but not much is known at this stage of the relationships between them. For example, were all the sites occupied at the same time, or did the past Koma populations move from one site to the other? Or are the sites the results of fissions and breakaway segmentations from core clan units or lineages? To a large extent, the answers to these questions lie with systematic landscape and material culture studies of all the dimensions of the Koma archaeological record, and this is where a detailed study of the technology of pottery such as proposed here holds much potential and significance.

In this chapter, I have introduced the Koma archaeological area and outlined some of the general questions that have driven research so far. But more importantly, as more nuanced questions are continually asked of the Koma sites, I have outlined the research question of this thesis, which is primarily to ascertain the nature of the technological processes of the pottery from Zoboku and attempt to answer the extent to which its technology can give us clues about the social organisation of the past society. Chapter Two presents the physical and human geography of the Koma area.

Chapter 2: Geographical Context

2.0. Introduction

Archaeological and geographical landscapes share entangled relationships as cultural activities take place within geographical and environmental contexts. Archaeology's fundamental concern with things, relationships, processes and meanings of past behaviour incorporates an awareness of the integral spatial and temporal contexts (Hardesty & Fowler 2002). From its very beginnings, archaeological inquiry has recognized the effects of culture and environment interactions in creating and shaping cultural landscapes.

Early theoretical considerations of these interactions have however been criticized as unidirectional in outlook, emphasizing singular factors rather than the processual integration between the environment and human activities on various layers (Frielich 1967). An example is environmental determinism which focused on the causative effects of nature on culture systems. A society's physical environment was seen as the determining factor of its culture patterns and the behaviour of its people and similar environmental settings were expected to produce similar cultures. At the other end of the spectrum, theories advocating culture deterministic approaches considered culture as the affective agent and nature as a mere backdrop.

A later recognition of the myriad and dynamic ways in which humans interact with their environments are reflected in several anthropological paradigms such as cultural ecology, ecological anthropology, environmental archaeology and historical ecology (see for example Butzer 1982; Balée 2013; Steward 1972; 2006; Moran 2008).

Cultural ecological approaches propose that technological and subsistence systems may be organized differently by societies depending on the peculiarities of the prevailing environment and how the societies adapt to it (Steward 2006: 6- 10). Other rigorous paradigms available over the last two decades adopt integrative outlooks recognizing that societal-environmental interactions can have multivariate characteristics and take place at multiple levels. For instance, modern settlement pattern studies are underlined by an awareness that archaeological sites are usually part of a network of geographic, ecological and behavioural contexts (Sabloff & Ashmore 2003; Ashmore 2002).

Such studies show that in the past as well as presently, human cultural activities are fused with geographic and environmental contexts in symbiotic relationships. The physicality of geographic landscapes provides spatial contexts and tangible resources for performing human activities and serve as a sensory resource on which humans construct social and symbolic relationships with the world.

Scholars of landscape archaeology emphasize that humans experience their surrounding landscapes bodily and construct meanings based on their experiences and material engagements with resources such as rocks, rivers clay source and so on over time (Tilley 2010; Layton & Ucko 2003; Ashmore & Knapp 1999; Ingold 1993; Jones 2004).

Apart from such microscale human and biophysical interactions, climate-related events including variations and abrupt changes in conditions have been known to have significant consequences on cultural development and trends. Movements of populations, patterns of resource exploitation, and the organization of social, religious and political structures have been linked to climatic and environmental conditions (see for example, Vernet & Maley 2015; McIntosh et al 2000; Manning & Timpson 2014; Mayor et al 2005; McIntosh & McIntosh 1981; 1983; Brooks 1986).

Such studies are more available for the Saharan and Sahel-Sudan regions of Africa; an area which has witnessed significant fluctuations in climatic conditions, especially precipitation, than for the Guinea Savanna and forest regions to the south. For instance, there has been ample research on the evidences and effects of the Africa Humid Period and other climatic oscillations especially on vegetation and fauna of the Sahara and ultimately on cultural constructions within and beyond that region.

This chapter discusses the geographic characteristics of the Guinea Savanna zone of West Africa, where the Koma sites are located. It must be emphasized that the discussion is mainly based on what has been documented of the climatic and geographic conditions of the Koma research area presently and/or in the recent past. Despite documented evidence that geographic conditions in this area, especially climate, have been relatively stable over a considerable period of time, the discussion does not necessarily imply that similar conditions pertained when the archaeological landscape was occupied and created. Instead, it is expected that the information discussed here will serve as appropriate relative contexts to aid the evaluation of some of the artefacts from the excavations. Similar approaches have been utilized by other researchers. For example, Shinnie & Kense (1989:5-13) have emphasized that an awareness of the types of soils enhanced an identification of the different sources of clays used to make pottery excavated from sites in the Gonja area. They have also suggested that soils together with other factors such as vegetation and the location of water bodies influenced past settlement patterns in the area. In addition, geological information on stone types in the Tong Hills have been used to significantly enhance the interpretation of lithic artefacts from surveys and excavations (Insoll 2013a: 149-162).

2.1. The Guinea Savanna Zone: Climate

The Koma area is located between $1^{0}15'$ - 1^{0} 45'W and 10^{0} 0' - 11^{0} 0'N (Anquandah 1998:21). It is located within the Guinea Savanna ecosystem of West Africa (Udo 1978: 22-25). The main defining characteristics of this zone are vegetation and climate, especially rainfall. Adams et al (1996: 196) has defined the Savanna zone as … 'a tropical and subtropical ecosystem characterized by a continuous herbaceous cover of grasses with a high degree of rainfall seasonality, in which woody species are significant but do not form a closed canopy or continuous cover.' Savanna woodland biomes have a well-defined stratum of tall perennial grasses supported by shallow sandy soils with low moisture holding capacity and gallery forests occurring along some river banks or on some plateaux (Boulière & Hadley 1970).

The Sudan-Guinea Savanna belt, like other climatic zones of West Africa, runs parallel to the Atlantic coast in a west-east direction. It is bordered in the north by the much drier Sahel belt and in the south by the moist humid rain forest. The region experiences consistently high temperature values usually ranging between 27^0C and 30^0C (Wiredu et al 2010:3). The rainfall pattern here exhibits a high degree of seasonality and fluctuations rendering many societies vulnerable to drastic changes in farm yields, food supplies and incomes.

The rainfall pattern is however, determined mainly by the manner of convergence of the Tropical Maritime and Tropical Continental air masses in the imaginary Inter-Tropical Convergence Zone (Ahn 1970: 87). This phenomenon largely dictates the climate pattern of the entire West African sub-region. The former, a moist and humid air mass, originates in the sub-tropical anticyclones of the South Atlantic Ocean and blows over much of West Africa in a north-east direction. The latter air mass, which is hot, dry and of low relative humidity, originates from the sub-tropical Azores anti-cyclones in the north and blows southwards across the Sahara Desert and over the sub-region.

The two air masses meet in the Inter-Tropical Convergence Zone and react with localized air masses and pressure conditions resulting in local rainfall conditions. The zone oscillates northwards or southwards in accordance with the zenithal position of the sun and its location at any point in time determines the pattern, amount and duration of rainfall, and thereby the alternative rainy and dry seasons that prevail over a geographic area.

The rainfall pattern of the Koma area and the rest of the Savannah woodland belt of Ghana exhibits a temporal contrast of rainy and dry seasons. There is a long rainy season from March to October, with a peak in August/September, followed by an equally lengthy dry spell during the remaining months. Mean annual rainfall figures range between 1000-1150mm and the pattern and quantity significantly affect the drainage system and flow patterns of several rivers and streams (Armah et al 2010: 126; Wardell et al 2003: 239).

The rainfall pattern described above directly affects the Koma sites which are situated in the drainage basins of the Sisili & Kulpawn Rivers. Fed by a dense network of small streams, distributaries and groundwater systems, these two large rivers are major tributaries of the extensive Volta river basin. During the rainy season, large areas are flooded and several access roads are washed away, inhibiting human movement, travel and interaction within the area and also with other parts of the country. The communities in the area are effectively cut-off for several months in the year, resulting in the informal labelling of the area as 'Overseas' (Kankpeyeng et al 2013: 477).

It is important to note that this situation is probably very modern and a direct result of a lack of infrastructure such as good roads and bridges. Most of the minor water systems in the immediate environs of the mound sites do not appear to be navigable. Nevertheless, they may have been important factors in attracting and sustaining human settlements. The relationship of communities with the river systems of northern Ghana has been researched and discussed by Hunter (2010).

2.2. Geology and Soils

The geological formation of an area influences the types of soil and vegetation. The basement rock that underlies the Guinea Savanna belt, like most areas of the country and the sub-region, is made up of early pre-Cambrian rocks (Schlüter 2008:19). These are mainly metamorphic rocks such as schist, phyllite, granite, quartzite, gneiss with volcanic intrusions in some areas (Ahn 1970:56). Precambrian rock formations belong to the oldest geological period but in some areas, it is overlain by later sediments.

In Ghana, the pre-Cambrian geological formation is divided into four rock types, namely the Dahomeyan, Birimian, Akwapim-Togo and the Tarkwaian (Furon 1963: 227). The Birimian rock formation is of primary concern here as it occurs in the Koma and the wider Savannah area. The geology is particularly relevant to understanding one of the major artefact categories of the Koma sites, namely, stone grinders, querns and rounded rubbers.

These stone artefacts have been consistently recovered from Koma mounds in significant quantities (Anquandah 1998; Kankpeyeng & Nkumbaan 2008; 2009; Insoll et al 2012) and have already been noted as characteristic artefacts of the mound sites. Archaeological evidence recovered so far appear to indicate that the past Koma people consciously acquired, modified and used stones in various specific and meaningful ways.

For instance, they have been used to delimit burials (Anquandah 1998:92) and have also been found in close association with other artefacts in ritual spaces (Kankpeyeng et al. 2013:479). Additionally, they were probably used to process food or medicinal substances (Insoll et al 2012: 27). There is also evidence from excavation contexts that they were used as supports for large stationary pots (Asamoah-Mensah 2013: 145; see also Figure 32 below).

Data on the geological character of the research area can be used to assess the degree of availability of such stones either in pre-made forms or as raw materials used to produce the required sizes, shapes or quantities as well as the ease with which the past inhabitants could have acquired them. This has further implications for delineating the existence of a stone tool technology, the economic patterns of procurement or acquisition of the stones as equipment (where they are used as grinders or rubbers) or their curation and appropriation (where they have been used in non-domestic contexts or in metaphysical or ritual processes).

The relative ease or difficulty with which these stones were acquired based on local availability could determine the value to the owners and users and the manner in which they may have been reused, transformed or discarded. In the Tong Hills for instance, such geological data has been used to conceptualize the significance of stones found in archaeological contexts to the cosmological structures of the Tallensi people (Insoll et al. 2005).

Furthermore, the types of rocks together with climatic conditions such as rainfall, determine the soil structure of an area and thereby, the types of naturally occurring and cultivable vegetation. Soil has been identified as Africa’s most important resource as it is the basis of her dominant agrarian economy (Areola 1996: 134). This is especially pertinent for northern Ghana, where agriculture remains the primary economic activity. The major soil type that occurs in northern Ghana is the Lactasolic soil (Brammer 1962: 90), but there are a range of diverse localized subsoils (Mikkelsen & Langohr 2004).

Geology and soils are also important as sources of clay and other mineral deposits for making ceramic artefacts. Like most archaeological contexts in West Africa, the Koma sites have yielded large quantities of pottery. In addition, terracotta figurines, the flagship artefact category of the sites, have also been recovered in large quantities. Knowledge of the geological and soil types that occur in the immediate areas could give us an idea of whether the clay and tempering materials used in producing the ceramic objects were obtained from local sources or whether such raw materials or finished ceramic objects were acquired from distant areas.

2.3. Vegetation

Northern Ghana is characterized by a high water deficit as a result high temperatures and low mean annual rainfall amounts. Its soils are therefore mainly neutral or highly alkaline. During the long annual dry season when temperatures and rates of evaporation are high, soil water reserves are used up rapidly and the vegetation dries up very quickly. The soils also harden impeding vegetation growth. Soluble soil minerals released through weathering of the underlying rock are concentrated near the surface forming hard iron pans which are unfavourable to vegetation growth. In addition, fires frequently break out during this time destroying the microflora and fauna of the soil and thereby, adversely affecting nutrient reserves and the capacity of the soil to support vegetation growth (Kowal & Kassam 1978: 93).

A contrasting situation occurs during the rainy season, whereby low rates of evapotranspiration and increased amounts of rainfall result in surplus water in the soil. In some areas, soil nutrients are leached by the torrential rains and the water table rises resulting in severe topsoil runoff. These conditions also affect the composition and nutrients of the top soil as well as the ability of plants to maximally absorb the rain water (Boateng 1966: 52).

The resultant vegetation type in this environment is the Savannah Woodland, which is dominated by perennial coarse high grasses and herbaceous plants, and a sparse cover of low trees with specialized functional and adaptive features to withstand drought, intense heat and fires. Trees in this area have thick leathery barks which can withstand the seasonal bush fires, and/or curled and twisted leaves to minimize exposure to sunlight. The leaves may also be covered in thorns to discourage grazing by animals, while some trees may develop preservative features such as subterranean bulbs to withstand drought conditions and ensure regeneration after fires (Adams et al 1996: 200- 201).

An example is the baobab (*Adansonia digitata*), a very common tree in this area which stores water in its trunk. This characteristic makes it one of the few trees in this area to exhibit longevity and the ability to grow to a considerable height and size. It is therefore an important feature in the cultural landscape of most settlements. For example, research in southwestern Mali indicates a positive spatial association between settlements and the distribution of baobab trees. They are usually cultivated after a settlement has been established but sometimes their existence also influences the location of new settlements (Duvall 2007). It is thus a useful indicator of the potential locations of archaeological sites. In rural northern Ghana, baobab trees commonly serve as communal spaces for public activities and meetings (Northcott 1899: 8). Other trees common to this area include, shea nut (*Vitellaria paradoxa*), African locust bean, (*Parkia biglobosa*), and silk cotton (*Bombax buonopozense*) (Boateng 1966:52). In areas of considerable population density, tree harvesting for charcoal and wood fuel, clearing, burning and farming activities as well as grazing have reduced the vegetation to open grasslands with sparse distributions of economically valuable trees.

2.4. Economic Geography

The population density of northern Ghana is relatively sparse. The three constitutive administrative regions; Upper West, Upper East, and the Northern Regions together cover about half of the land area of Ghana. However, according to the 2010 National Population Census, the three regions make up only 18.5% of the total population of the country. Some of the accountable reasons are high incidences of infant mortality and emigration. Economically active men and women frequently migrate southwards in search of employment in the farmlands or in the commercial centres in the larger cities of Kumasi and Accra.

This enduring pattern of out-migration can be traced to the colonial period when the British administration encouraged and actively recruited labour from the northern regions to supply burgeoning mines and booming plantations of cocoa and other commercial crops in the south (Sutton 1989: 641; Thomas 1973: 80-82). Van der Geest (2010: 596-609) has identified that presently the southward migration may be seasonal or long term.

Incomes generated are largely returned as remittances to invest in remaining families, provide food resources, improve household infrastructure such as architecture or to provide agricultural supplies such as seeds, fertilizer or farm equipment. However, the long-term effects of this trend include a loss of labour to invest in local agricultural systems and infrastructure and a general lack of development.

The deficiency in development in the northern regions is further compounded by poor soils, unpredictable climatic conditions which sometimes result in extreme adverse events such as flooding or droughts, and a general lack of infrastructural, industrial and commercial investment by both the national government and the private sector.

Agriculture in the region is mainly small scale and based on household settings. Most of the crops cultivated are domestic subsistence or food sources rather than cash crops of commercial value. Farming is weather-dependent, and the scale is usually determined by the available labour, comprising one's immediate family. Common land regenerative methods include land rotation, whereby some sections are left to fallow for some time and the use of manure from household animal stock to fertilize the land.

The planting and harvesting seasons generally depend on the alternating cycle of the rainy and dry seasons. Some crops that are commonly cultivated include millet, sorghum, maize, guinea corn and rice. Root crops, such as cassava and yam, are also cultivated as well as various types of beans and groundnuts. In addition, peppers, okra, tobacco and cotton are cultivated (Northcott 1899).

These crops are usually cultivated by a combined system of compound farming and land rotation. Most households have small plots of land adjoining or near their compounds where they cultivate vegetables and legumes. In addition, families may cultivate larger plots of land further afield. Alternative plots are cultivated during each planting season ensuring that some plots always lie fallow to allow for regeneration of the soil structure and nutrients.

The most common methods used for preparing the land for planting are clearing with cutlasses and hoes or burning. Old cereal plant stalks or cow dung may be used to fertilize compound farms while burning is used to reinvigorate the mineral structure of field farms. Planting and harvesting is manual and carried out by nuclear family units. The crops cultivated are mainly for subsistence purposes, surpluses may be sold in communal markets. However, recent national and international intervention programmes are encouraging irrigation-based medium and large-scale cultivation of commercial oriented crops such as rice, cowpeas and groundnuts.

2.5 Concluding Remarks

This chapter has discussed the geographic setting of northern Ghana where the Koma sites are located. West Africa has experienced major changes in climatic conditions, some of which have significantly affected culture processes resulting in movements of people to take advantage of flourishing natural resources and subsequent development of complex socio-political structures. These phenomena, however, mainly occurred in the Sahara-Sahel region. There is no evidence to suggest that northern Ghana has experienced any drastic changes over the last millennium, when the Koma sites were occupied. Nonetheless, it is certain that here have been minor changes in the micro-climatic structure of the region and that the geographical conditions that prevailed during this occupation is not the same as the present.

Bearing these premises in mind, the discussion has attempted to find general interpretive correlations between the current climatic and environmental conditions and the archaeological material culture. Current geological information can be used to enhance our understanding of the stone acquisition and use contexts of the past societies, pottery analyses could benefit from data on the soil mineral constitution and the current farming methods could also enable an awareness of the degree and manners in which archaeological contexts have been disturbed or transformed.

Chapter 3: Surveys and Excavations

3.0. Introduction

This chapter discusses the methods and results of surface and subsurface surveys, as well as test excavations conducted at Zoboku. Foot reconnaissance, global positioning, total station and geomagnetic surveys were employed as part of a multi-faceted approach to examine the spatial arrangements of archaeological materials on the site. The main objectives were to ascertain the settlement pattern and arrangement of archaeological features on the surface of the site and the nature of the subsurface cultural deposits. Geo-magnetic surveys were conducted on an area of 13800m^2 and four units measuring a total area of 20m^2 were excavated. The surveys were conducted first, and then the results were used to guide the excavations.

The first part of this chapter focuses on the survey techniques, results and significance to the overall objectives of the research. The second part of the chapter describes the test excavations, the data obtained and the interpretations.

3.1 Justification of the Field Methods

As already mentioned in Chapter 1, one of the major research aims of this project is to examine the spatial pattern and wider landscape of Zoboku. Space is a cardinal concept in archaeology. Human activities are played out within and over spaces and the resultant material remains and other evidence, which form the dataset of archaeological analyses necessarily have spatial properties such as location or scale. Lock (2009) for example, has outlined the fundamental nature of human spatiality and how individuals and groups move through, experience and manipulate space bodily, and form relationships with the materiality of space by creating objects, structures and features, which they use, relate to, depend on and which define their cultural landscape.

Spatial and landscape archaeology, together with settlement pattern studies are concerned with identifying and interpreting the evidence of human experiences in space and how humans are disposed over the landscape. Using position, arrangement, distribution, orientation, scale and so on, these fields examine the dwellings, activities, movements, technologies and interactions of societies with one another, and with the natural environment.

Recent theoretical developments have seen shifts from the basic objective of tracing the remains of human actions across space, to exploring fully, ways in which humans engage with and experience spaces around them. There has therefore been advocacy for more research in the phenomenology and materiality of space and landscape, as well as social perspectives of space.

I find that the underlying theoretical concepts of this thesis aligns with these paradigms, as they provide to a large extent, the conceptual structures within which to examine the spatial contexts of the archaeological evidences of the site. Previous research at Yikpabongo has also explored in some detail, how the prehistoric culture engaged meaningfully with space. Focusing on individual mounds, the research has revealed how the people through ritual actions engaged with the materiality of the earth and meaningfully arranged and deposited bundles of artefacts in spaces (Insoll et al 2012; Kankpeyeng et al 2013). The researchers have identified what are possibly intentional and meaningful clusters of artefacts deposited structurally throughout mound spaces (Kankpeyeng & Nkumbaan 2009:99, Kankpeyeng et al. 2013: 482-484). Moreover, the research has revealed evidence of how the past people engaged with the earth through the agency of terracotta figurines by, for example, inserting the figurines into the earth and materializing relationships with ancestors through actions such as libations.

The survey techniques employed at Zoboku were therefore designed to explore further how the prehistoric group here engaged with their surrounding spaces and structures, and generally organized themselves. But unlike the focus on individual mounds such as has been adopted at Yikpabongo, (but see Appiah-Adu 2013, who has applied landscape based methods to investigate sections of Yikpabongo), the agenda here is to investigate the wider landscape contexts of the mounds, find out if and which other types of features and activity areas exist besides the mounds, and the relationships between the various features.

The importance of landscape contexts of artistic archaeological traditions has been emphasized by on-going research at Nok sites in Nigeria. After several decades during which terracotta figurines occupied centre stage as the most popular artefacts from these sites, renewed research is now focusing on their contextual background by identifying site structures, environmental contexts, activity areas, patterns of deposition and composition of cultural materials in order to elucidate hitherto unknown aspects of human occupation at the sites and place the figurines in a holistic and social context. (Kahlheber et al. 2009; Breunig and Rupp 2010).

At Zoboku, foot surveys were initially used to locate all the archaeological features in the area and delimit a perimeter around them. Following this, geomagnetic surveys were used to scan a portion of the delimited area and examine the sub-surface constitution of archaeological deposits. Then Global Positioning (GPS) and Total Station surveys were used to record the locations of archaeological features and other areas of artefact concentration within and outside the perimeter. Some natural features outside the perimeter were also recorded. The results of the surveys were then used to guide test excavations of some of the mounds located within the perimeter.

This nested survey approach was employed to achieve the following objectives, namely, delineate the areal extent or boundaries of the site, determine and record the spatial pattern of the archaeological features on the site, ascertain how the features relate to each other and determine the character of the surrounding natural environment and its possible relationships with the site. It was also intended to find out if the site contained other cultural areas apart from the mounds such as artefact producing areas, raw material sources or refuse sites, and how these relate to the data from the mounds.

It is important to note at this point that although the research aims influenced the survey methods employed, suitability to the ecology of the area was also considered. Banning (2012:10) has stressed the importance of designing surveys not only to meet a set of goals, but also to take into account the cultural and geomorphological circumstances of the site. The vegetation cover at Zoboku was dense, coarse high grass with a considerable number of woodland trees (see Figure 1). This particularly limited the foot surveys to random and unsystematic walks across the land area to locate cultural areas. Moreover, the site was very near cultivated plots of sorghum and millet and this also restricted the total area cleared and surveyed with the magnetometer. Some of these conditions are discussed further in the following sections.

Figure 1: The vegetation of Zoboku.

3.2. Reconnaissance Surveys

The fieldwork at Zoboku was conducted over two seasons. There was an initial preliminary season of five days in January 2011 during which the site was located and the possibility of further investigation was assessed. Foot reconnaissance surveys were conducted in a general area located about 8km from the village of Tantala based on information from a published GPS inventory of Koma sites (Kankpeyeng and Nkumbaan 2009) and information from the local inhabitants. The field team was made up of myself, Professor Ben Kankpeyeng (an archaeologist at the Department Archaeology and Heritage Studies, University of Ghana, who is also currently researching the neighbouring site of Yikpabongo), Mr. Malik Saako, a representative of the Ghana Museums and Monuments Board and two farmers from the community.

The area surveyed was essentially the farmlands of the people of Tantala which were lying fallow at the time. As a result, the vegetation, comprising tall grasses and trees was very dense and impeded both movement and easy identification of archaeological features. The most visible feature identified was a large rock outcrop (N10.17241 W1.59734) with deep circular and oval grooves on its surface which appeared to suggest some human activities such as grinding or rubbing (see Figure 2). Similar features have been discovered in the Tong Hills (Insoll et al 2008).

In addition, the reconnaissance surveys also discovered concentrations of stones and scatters of potsherds at certain locations. However, the dense vegetation cover precluded a more detailed search. Photographs were taken, and the positions of the rock and artefact scatters were recorded with a GPS device.

Figure 2: Large rock outcrop on the site showing grooves

The survey conducted at this time was mainly a fact-finding exercise aimed at familiarising with the terrain and gathering information to plan a more detailed research exercise. It also afforded an opportunity to hold discussions with the chief and elders of Tantala to explain the planned research and seek their permission. The main field season followed some eleven months later, spanning thirty-two days between December 2012 and February 2013. This comprised detailed surface and sub-surface surveys as well as test excavations. The field team was made up of six people: myself as principal investigator, Dr. Carlos Magnavita, a specialist geophysicist, two postgraduate students from the University of Ghana and four men from the local community.

The rock outcrop identified earlier (N10.17241 W1.59734) was used as a benchmark for the rest of the surveys, and from this location, foot surveys were used to identify archaeological evidence in a radial direction and determine a rough perimeter which was then cleared of vegetation cover for more detailed investigation (see Figures 3a & 3b).

Figure 3a: Readying the site for magnetic surveying.

Figure 3b: Delimiting the boundaries of the site.

The resultant perimeter measured 800 x 800m lying to the southwest of the rock outcrop. Foot surveys, combined with careful visual examination were used to identify as many discrete loci of surface concentrations of artefacts as possible and roughly delimit the spatial extent and boundaries of the site. All locations showing evidence of past cultural activity in the form of mounds and artefact clusters identified were marked with wooden pegs, and later recorded using GPS and Total Station devices. Four of these locations were also selected for test excavations.

3.3. The Geomagnetic Survey

The magnetic survey was conducted by Dr. Carlos Magnavita, a specialist geophysicist assisted by Mr. Appiah - Adu (one of the postgraduate students) and the rest of the team. A grid of five blocks of 50 x 50. 5m and one block of 50 x 23.5m was laid out using ropes and wooden pegs. Each block was further divided by a grid of 0.10 x 0.50m to guide the trajectory of the magnetometer. The magnetic survey was conducted with a wheeled Fluxgate gradiometer with three vertical channels equipped with two sensors, each of which scanned the land surface at a vertical distance of 0.3 and 1m from the earth surface (see Figures 4a & 4b).

The readings were continually recorded for the entire land area as the magnetometer was walked along the grid. At the end of the surveys, the data was transferred to a computer and a magnetogram was produced by Dr. Magnavita (Figure 5). The magnetic data was then analysed alongside data from the GPS and Total Station surveys.

3.4 Results of the Geomagnetic Survey

A magnetic survey relies on the principle that certain human activities create small magnetic fields with signatures that contrast with the earth's magnetic field. These include burning, firing, digging, filling ditches, rubbish disposal and some natural biological processes such as decomposition. When burning occurs on a site, for example, domestic fires or kiln fires, it produces reducing conditions which converts iron oxides in the soil from haematite to magnetite. As the fire cools down, re-oxidation occurs, and this converts the magnetite to maghaemite, manifesting as strong magnetic signatures which are likely to be recorded in a magnetic survey (Tite and Mullins 1971: 209).

Figure 4a: Setting up the geomagnetic survey


Figure 4b: Conducting the geomagnetic survey

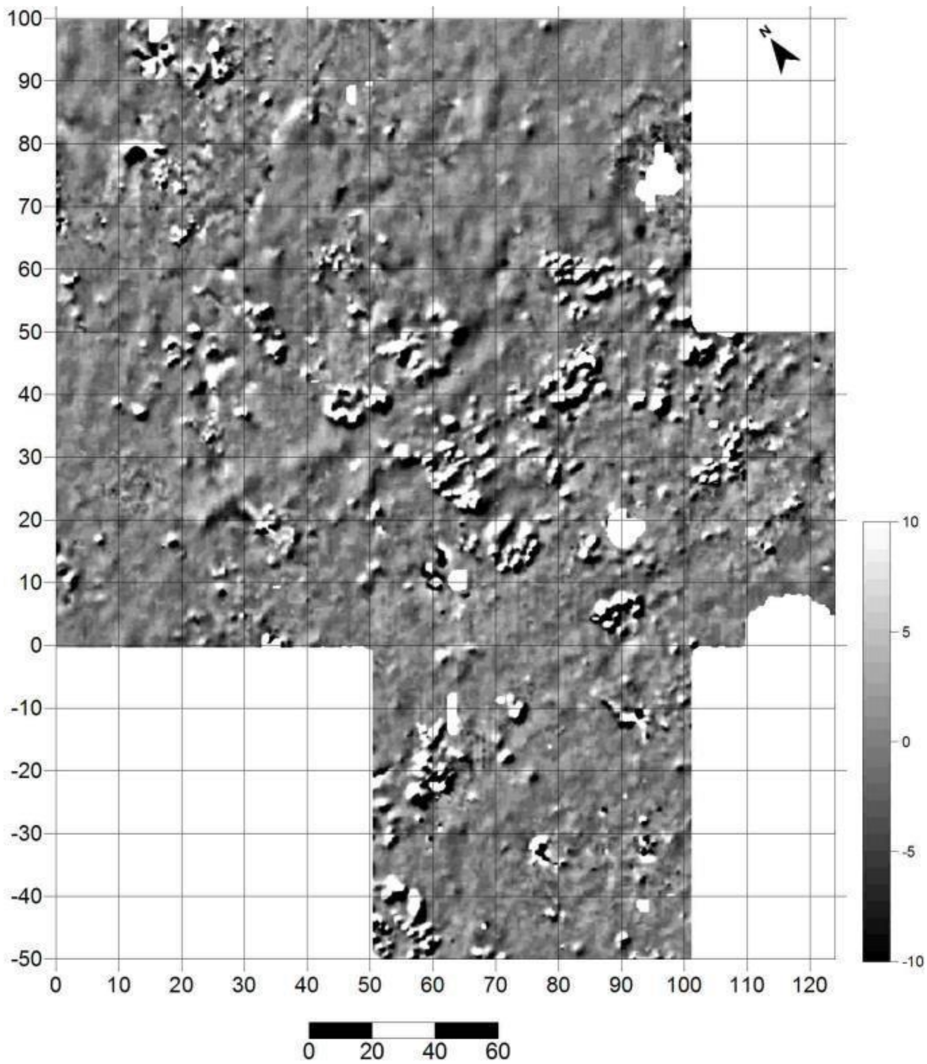


Figure 5: Magnetic map showing sub-surface features at Zoboku.

Other activities such as digging or creating ditches interfere directly with the underlying soil strata and create vacuums. When such vacuums are deliberately re-filled with topsoil, rubbish or inadvertently through silting, the infill displays different magnetic signatures to the surrounding soil matrix, creating anomalies in the earth’s field. Such anomalies can also be recorded by magnetic surveys. The main objective of the magnetic survey conducted at Zoboku was to determine the nature of subsurface deposits of the site, and thereby delineate the boundaries and spatial extent of the site. The magnetic survey was also intended to identify potential areas of interest to guide the test excavations. As shown in the magnetic maps (Figures 5 and 6), the survey determined that there were substantial evidences of past human activities concentrated at discrete locations in the site. The maps show differential distributions of concentrated areas of subsurface deposits and surrounding areas generally devoid of such deposits. This indicates that the areas showing concentrations of anomalies were the spatial foci of past human activity and the surrounding and intervening ‘empty’ areas were spaces of relatively insignificant or less cultural activity.

Magnetic anomalies in archaeological surveys usually reach values of +/- 10 nano Tesla (Magnavita & Schleifer 2004: 51). The range of magnetic flux density recorded at Zoboku was about -40 to 40 nanoTesla and this gives strong indications that the mounds probably contain remains of enclosures preserving anthropogenic features such as pits, refuse disposal areas, built-up areas and spaces associated with uses of fire.

Some of the anomalies also exhibit circular outlines which could be the remains of arrangements of stones, fired earth or burnt post-holes or combinations of these, probably indicating the remains of some structures. Some of the structures revealed on the magnetic map measured 7-8m in diameter (see Figure 6), and these could represent considerably large structures and cultural spaces, when uncovered through excavations.

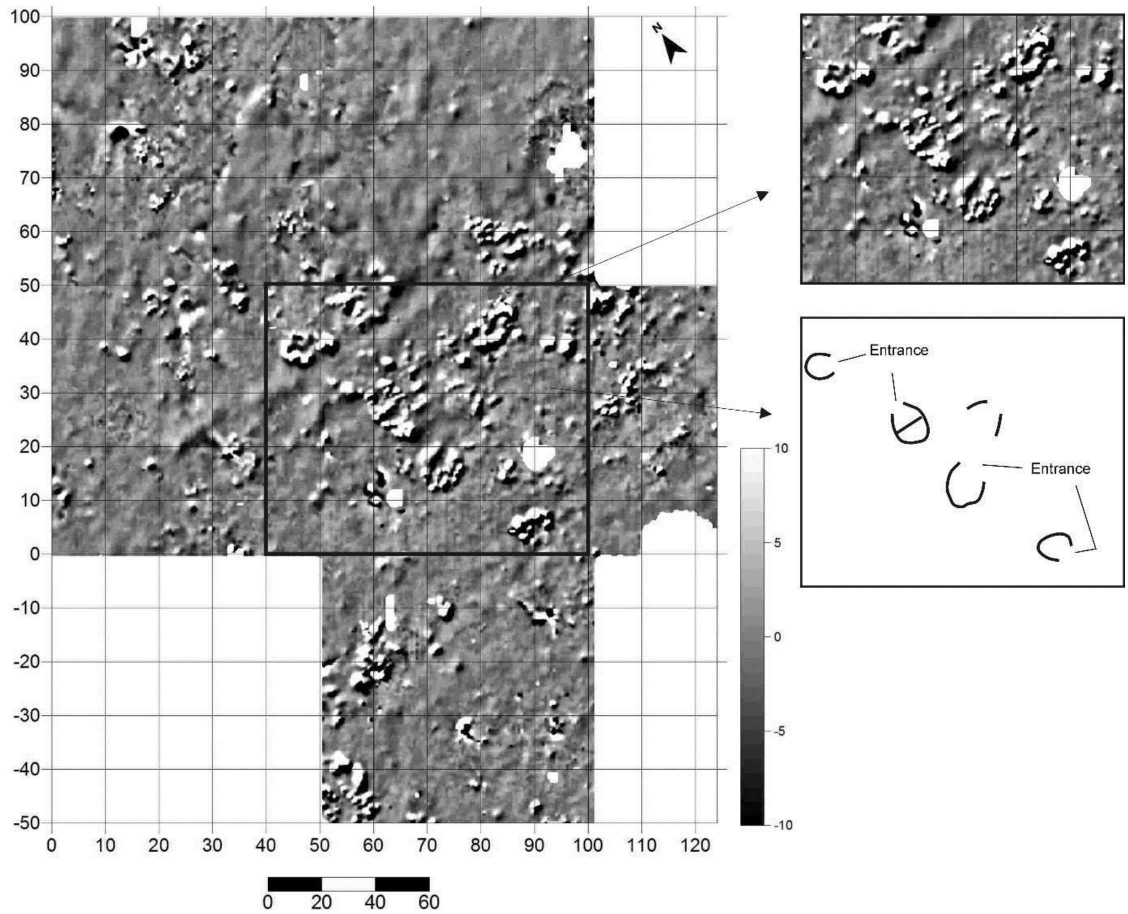


Figure 6: Close-up of magnetic map showing the outlines of activity areas, possibly compounds.

The magnetic survey also gives an idea of the possible temporal character of the site. It suggests that the site was probably occupied for only a short period of time. This suggestion is based on the discernible differential spatial patterns of discrete centres or places of activity and surrounding areas of no or less activity, which means that activities were probably focused at areas of initial settlement and that brevity of occupation did not allow gradual expansion into adjoining spaces, nor the incorporation of additional spaces.

A longer period of occupation and activity would have caused gradual shifts to utilize the areas lying in between the centres of activity, and probably resulted in a more homogenous character of the subsurface deposits. This is however, generally absent. This was confirmed by the excavations which showed shallow stratigraphic and cultural deposition.

3.5. Global Positioning System (GPS) and Total Station (TS) Surveys

The next phases of surveys conducted were Global Positioning (GPS) and Total Station (TS) surveys. These were aimed at accurately recording the positions of evidence of human activity on the site namely, artefact scatters or mounds. The strategy used was to walk across the 800 x 800m land area and record discrete concentrations of artefacts or features. This land area encompassed the smaller area of 300m x 255m where the magnetic survey was carried out. Two forms of indicators were used in identifying the sites, namely, concentrated clusters of potsherds and stones and a significant elevation of the land surface indicating a heap or a mound.

The Global Positioning System is a worldwide radio-navigation system formed of a constellation of twenty-four satellites and their ground stations. It uses the satellites as reference points to calculate the locations of features to within a few metres. A handheld GPS unit operates by picking up signals from at least four satellites and triangulates positions by using the interval between the transmission and reception of the satellite signal. The GPS was used to record the locations of archaeological remains as well as natural features such as rock outcrops and water bodies around the site.

A Total Station is an accurate electronic distance measuring device also capable of a diverse range of mapping and positioning tasks. It has great advantage over the traditional theodolite due to its effectiveness over a great range of scales and distances and its immense accuracy. A total station incorporates an electronic distance measuring device which utilizes the measurement of infra-red laser wavelengths reflected onto a glass prism to measure distance between locations.

This eliminates the risk of inaccuracies and errors associated manual determination of distances. Results from the two surveys were used to generate a map of the spatial pattern of features on the site (see Figures 7), and a contour map to reflect the physical dimensions of the mounds (see Figure 8). The information from the TS survey was also used to guide the test excavations (see Figure 9).

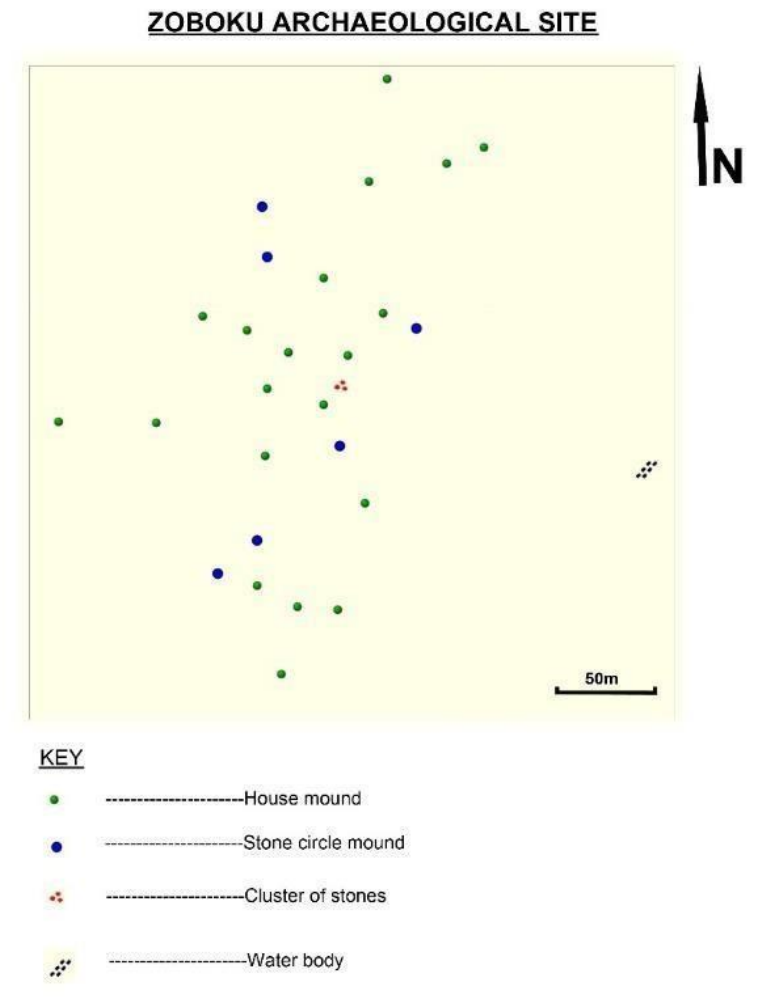


Figure 7: Spatial pattern of mounds at Zoboku, based on GPS surveys

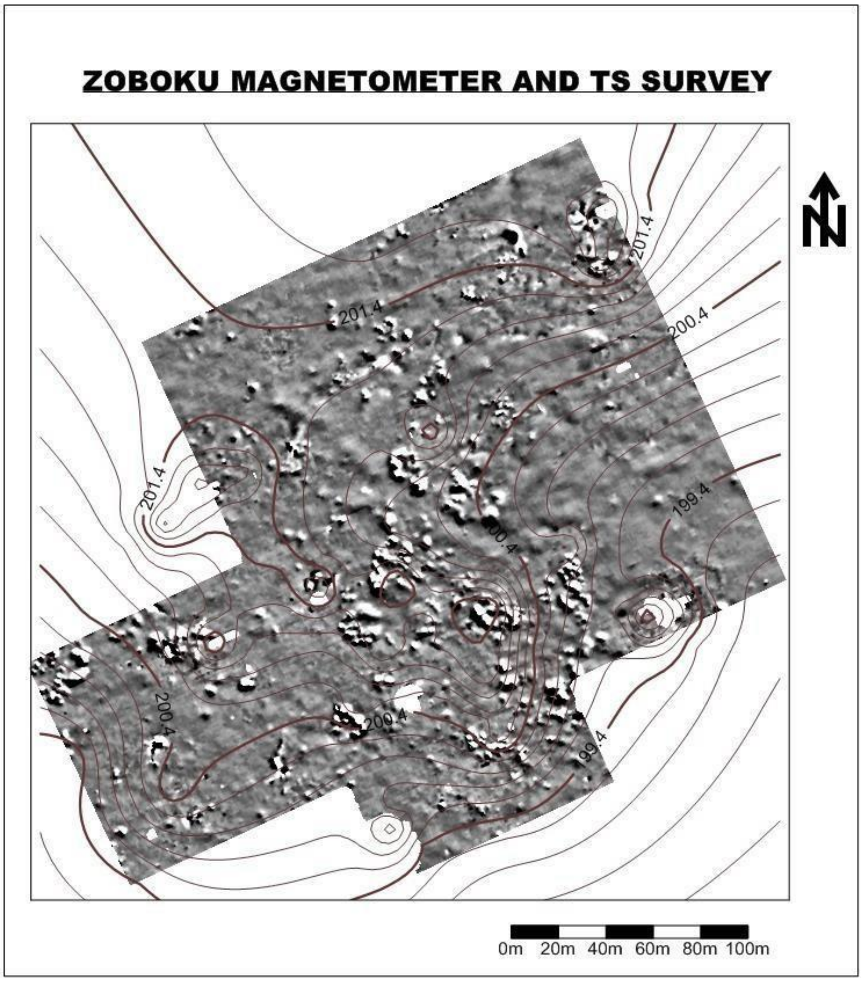


Figure 8: Contour map of the Zoboku site superimposed on the geomagnetic map.

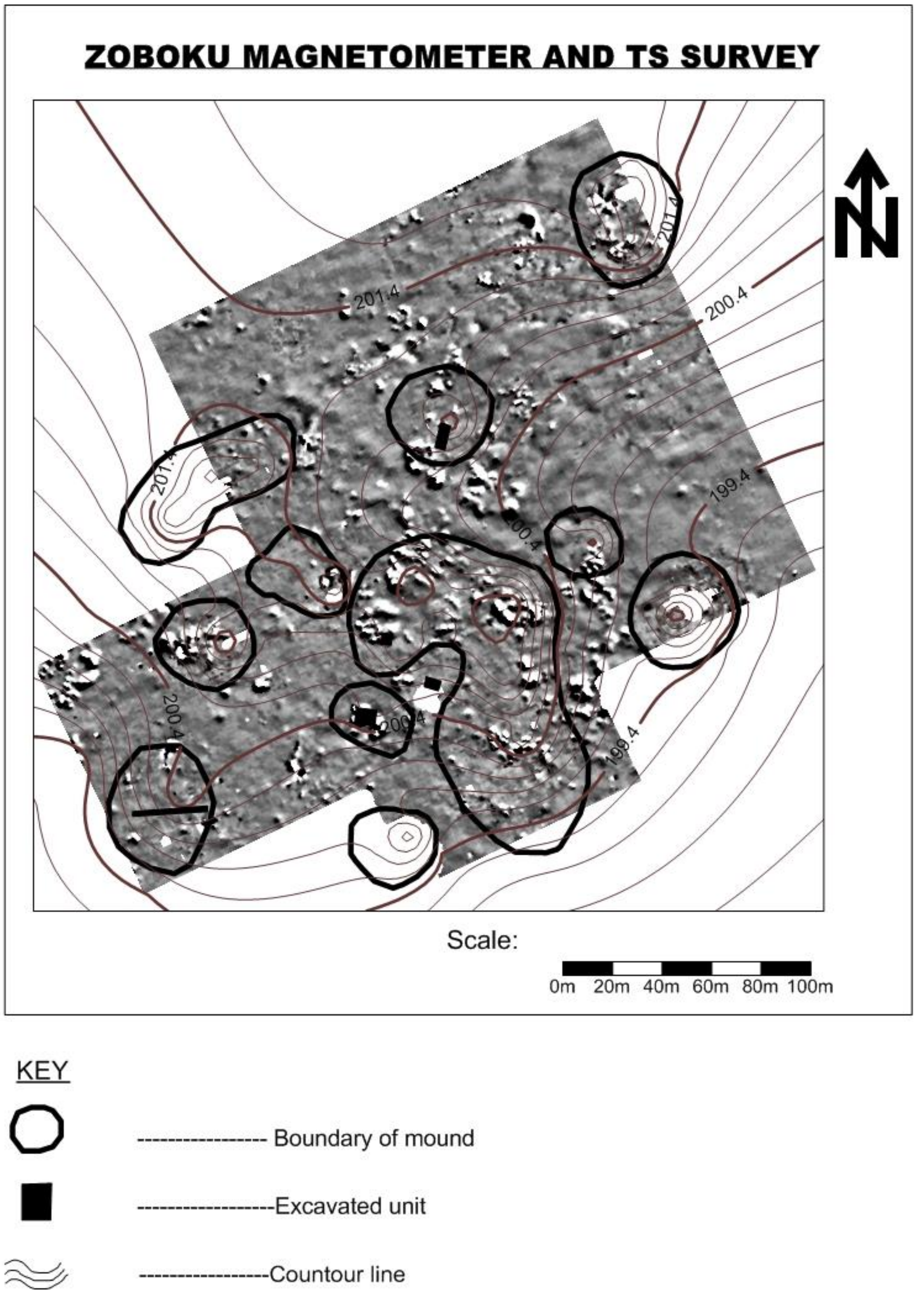


Figure 9: Total Station results superimposed on the geomagnetic map.

3.6. Results of the Surface Surveys

The landscape approach adopted at Zoboku was a different dimension of enquiry to methods that have been employed previously at other Koma sites. Research at other Koma sites have had a primarily temporal or contextual focus whereby stratigraphic layers of mounds and/or the contextual arrangements of artefacts in mounds have been used to explore the chronology and functions of objects and the mound structures (Anquandah 1998; Kankpeyeng & Nkumbaan 2009; Kankpeyeng et al. 2011; Insoll et al. 2012).

The surveys at Zoboku were used to examine how the distribution of features and artefacts over the land area can inform us about how the society was organised spatially. Another objective was to determine whether the natural or cultural features found on the site can be used to determine its boundaries and the nature of cultural-natural interactions on the site. The visual assessments and surface surveys revealed four (4) types of archaeological sites at Zoboku. These are described below.

Although the general area can be considered a site, the use of 'site' here is to delineate the differential occurrences of material culture on the land area. It connotes a specific or discrete area of concentration of material culture that can be assumed to mark the location of some past settlement or habitation and/or activity.

3.6.1 Site Type 1

This can be described as mounds with a compact soil cover and a surface scatter of numerous potsherds but a relatively less number of stones (rounded pebbles or rubbers and large stones). This type of site showed considerable inclination of the land surface. The mounds in this site category are similar to those that have been identified at other Koma sites as ‘settlement mounds or house mounds’ (Kankpeyeng & Nkumbaan 2009:196; Kankpeyeng et al. 2011: 209).

3.6.2 Site Type 2

These are mounds with a copious surface cover of large and medium- sized stones and rounded pebbles, fragments of figurines and an equal or lesser quantity of potsherds. Although this type of site also showed an inclination of the earth surface, compared with Site Type 1, it appears to be more of a circular heap of stones as the main matrix of the mound is made up more of stones than soil.

Site Type 2 mounds are like to those previously labelled as ‘stone circle mounds or tombs’ (Anquandah 1998; Kankpeyeng & Nkumbaan 2009: 196). At Zoboku, four mounds of this type were identified. Three were located outside the 300 x 255m area that was surveyed with the magnetometer. The mound which was located within this area was not scanned because its rough stony surface could not be traversed by the magnetometer. None of these mounds was excavated as they appeared heavily looted and any attempt to investigate its sealed contexts implied a scope of effort and time that was beyond the capacity of the current research. However, some fragments of figurines were randomly collected from the surface of the mound most proximate to the excavated units (see Figure 9).

3.6.3 Site Type 3

Site Type 3 is a flat area with a concentration of many potsherds and a few medium and large sized stones. This type of site does not show any degree of inclination but has a concentration of pottery similar to Site Type 1.

3.6.4 Site Type 4

Site Type 4 is a flat area with a concentration of many medium to large sized stones and a few potsherds. Though similar to Site Type 2 in the characteristics of its surface material, this site type does not show any particularly defined outline but clearly shows a dense concentration of stones with a few potsherds.

3.7. Methodological Overview of the Excavations

Following the surveys, test excavations of four locations were conducted. Three test units were located in the 300m x 255m inner perimeter and one was located outside this area. These four loci were selected judgmentally out of a total of thirty-one cultural activity areas based mainly on information from the geomagnetic survey and the visual assessments of the physical configurations of the activity areas and surface scatter of artefacts. Two of the units: ZBK13-M3 and ZBK13-M4, were used to test areas which showed significant degree of anomalies on the magnetic map to determine the nature of archaeological deposits below the surface.

Of the other two units, ZBK13-M1 was located on a large low mound with surface scatters which did not show much anomalies on the magnetic map, while ZBK13-M2 was situated in an area which was not covered by the magnetometer survey. This area fell outside the perimeter surveyed with the magnetometer because it was very near fields containing cultivated cereals and was thus not subjected to the necessary clearing and burning. However, as will be seen below, the surface of area of ZBK13-M2 showed concentrations of daub-like object which also resembled iron slags. It was tested to further explore the nature of past activity on the site.

A total area of $20m^2$ was excavated (Units ZBK13-M1 and ZBK13M2 measured 2m x2m each, and ZBK13-M3 and ZBK13-M4 measured 3m x 2m each). Although the dimensions of the test units were relatively small, it was expected that the units would yield adequate artefact data to ascertain the material culture repertoire of the site and the nature of deposition. In this regard, the test excavations were considered as a form of ground-truthing to test the cultural deposits on the site. Each unit was initially opened as a 2m x 2m test pit. However, ZBK13-M3 and ZBK13-M4 were extended during the excavations to 3m x 2m in response to the arrangements of artefacts within the pits.

This method sufficiently satisfied the main objective of the excavation aspect of the research methodology, which was to determine the nature of material culture at Zoboku, gain an idea of the vertical extent of depositions within the mounds and obtain dateable samples from sealed contexts to help determine the chronology of the site. It also ensured that the excavations were completed within the time frame available and that the material recovered could be adequately transported for detailed analysis. The pits were dug in arbitrary spits of 20cm in all the units. Each 20cm spit was labelled as a level of the unit. This arbitrary digging method was adopted because the colour and texture of the soil appeared homogenous. The stratigraphic profiles and soil characteristics of each unit are described in detail in sections below.

The excavations took place during the dry season when the soils were compact and hard. Thus, the tools used included pick-axes and hand picks which were used to break up the compact soil layers and trowels and large brushes were used to remove the loose soils. The soil was collected into head pans and wheel barrows with shovels. It was then sifted through a sieve of $2mm^2$ mesh size. All artefacts collected in the process of sieving were stored in plastic bags which were tied and labelled according to the excavated levels. The bags of artefacts were transported to the base camp at the end of each day for washing, drying and labelling.

The excavations were conducted over twenty-eight days in January and February 2013. A team of seven people made up of four local assistants, myself and two postgraduate students worked for about eight hours daily. When the excavations were completed, all the artefacts were transported to Accra for preliminary sorting. Decorated and undecorated potsherds that were 2.5cm in diameter or smaller were counted and recorded according to units and levels, and then stored in sacks in the Department of Archaeology and Heritage Studies, University of Ghana. All other potsherds were transported to the United Kingdom under permit number GMMB/0142/V7.9/9 for detailed analysis. The artefacts transported to the United Kingdom also included whole pots, metal objects, bone fragments and a single bead. Daub deposits recovered from ZBK13-M3 were counted, measured, photographed and discarded as part of the backfill of the unit as they were numerous and too heavy to transport. Also, as they were compacted clay, they could have disintegrated during transit. A note was included in the backfill deposit stating that the materials have already been excavated and analysed. The following sub-sections present details of the test units and the artefacts recovered.

3.7.1 Test Unit 1: Mound 1 (ZBK13-M1)

ZBK13-M1 was located on a mound measuring 18m x 18m in diameter. The surface scatter of artefacts on this mound was sparse as compared with the other mounds excavated. A 1m x 1m grid was laid over an area of 8m x 8m on the upper part of the mound. The reasoning behind this was that it was more likely that the artefacts on the lower part of the mound have been displaced from the upper part and that the upper sections of the mound was the true representation of the surface distribution of artefacts. Thus, placing a test unit on the upper part was more likely to reveal the whole vertical extent of cultural deposits. A 2m x 2m unit was randomly selected from the grid and excavated.

The soil of ZBK13-M1 was mainly brown and of a loose loamy texture mixed with small and medium sized gravels. Artefacts recovered include potsherds and a bead. In addition, the unit revealed a spatial arrangement of two clusters of pots that appeared to have been broken in situ associated with some stones (see Figures 10a-c). The sterile level of this unit was reached fairly quickly at a depth of 68cm. Figure 11 shows the soil profile of the north aspect of the mound.

Figure 10a: Clusters of pots in situ in Mound 1 (23cm deep)

Figure 10b: Close-up view of one of the clusters of pots in Mound 1.

Figure 10c: Close-up view of the cluster of pots in north-east corner of Mound 1

Level 1 (0-20cm)

Soil from this level was loose and reddish-brown. The level yielded a significant amount of small to medium sized potsherds.

Level 2 (20-40cm)

The loose reddish-brown soil from Level 1 continued into Level 2.

This level also yielded potsherds and one small bead.

Level 3 (40-60cm)

Level 3 was the most productive layer of Mound 1. A large number of potsherds were recovered from this level. In addition, the excavations recovered two clusters of broken pots and stones in the south-east and south-west sections of the unit. The clusters were found in a compact soil matrix and appeared to be at least two large pots broken in situ (see Figures 10a and 10b). The associated stones were visually examined, and they did not appear to have been worked or shaped in any way, nor subjected to rigorous or abrasive action. Therefore, they could have been used as supports for the pots. A similar arrangement of a large intact pot supported by large stones was recovered in situ in ZBK13-M3 (see description of ZBK13-M3).

Level 4 (60-80cm)

After the clusters of potsherds and stones were removed, Level 4 turned out to be unproductive and yielded no artefacts. The soil at this level was very compact and clayey in texture. The dig was thus ended at a depth of 68cm.

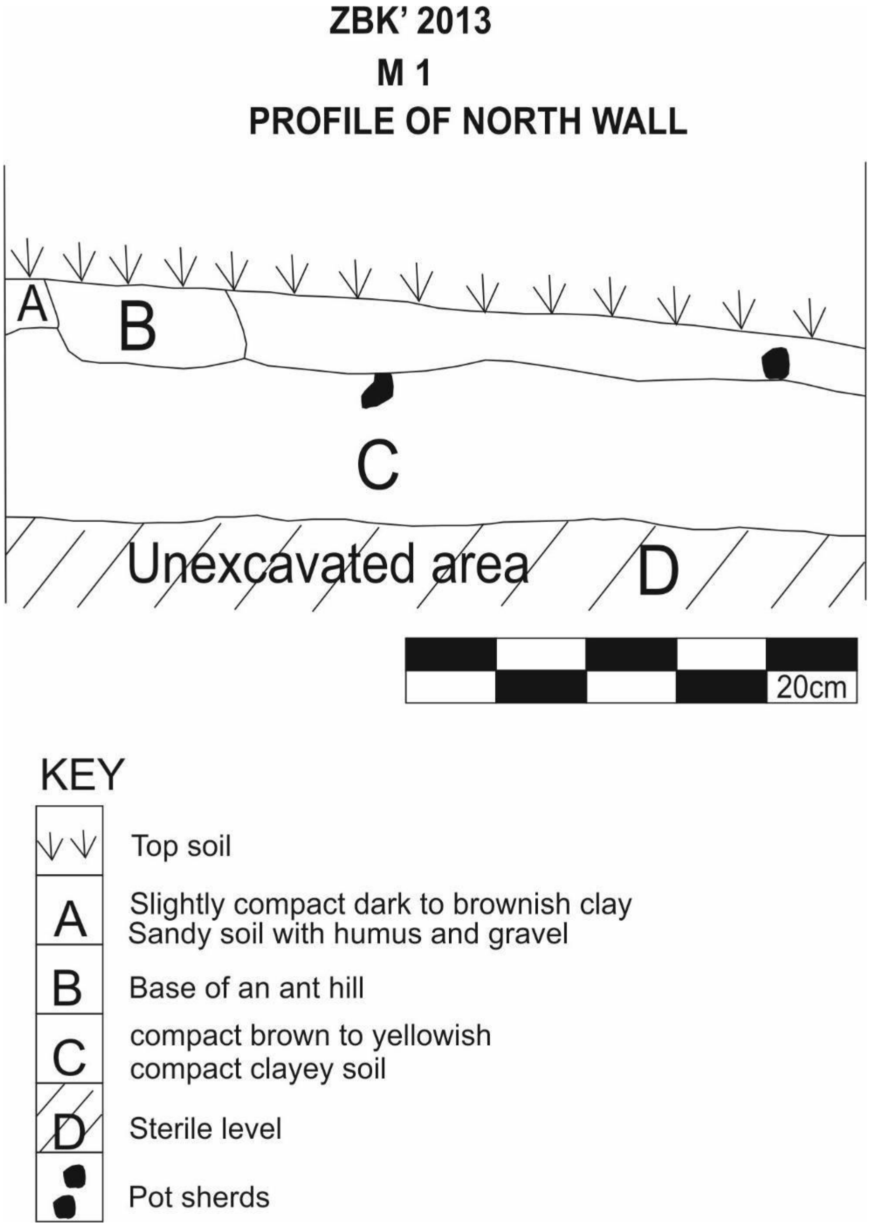


Figure 11: Stratigraphic profile of Mound 1 (North wall).

3.7.2. Interpretations of Mound 1 – ZBK13-M1

The artefact deposit record of ZBK13-M1 was shallow. Although the test unit was placed on the upper part of the mound to provide a 'key-hole' view of the vertical extent of the artefact record, the sterile layer was reached at an approximate depth of 60cm. This corresponds with the overall structure of the mound which has considerable breadth (a diameter of 18m) but generally low height and a gentle slope. The three arbitrary levels excavated yielded potsherds, stones and a bead. However, the most significant features in the mound were two separate clusters of large pots broken in situ and associated with medium-sized stones at a depth of 46cm in Level 3. Level 3 appeared to be the earliest occupation layer or floor of the mound. After the clusters of pots and stones were removed, the layer below was largely unproductive and the dig was ended at a depth of 65cm.

The compact soil matrix which surrounded the pots and the stones indicate that the stones were probably used to support the pots in upright stationary positions. Furthermore, the sherds making up the cluster of pots were large and held together by the soil matrix, suggesting that the pots probably entered the archaeological record intact and were broken up while in the soil. Majority of the constitutive sherds were reconstructed successfully.

It is also significant to note that no organic remains (bone, shell or charcoal) were recovered from the unit. This further supports the suggestion that the area of the unit most probably represents a domestic space or where large pots were kept in upright positions rather than an area of regular activity such as a food preparation or refuse area. See Table 2 for a summary of finds from the mound.

Provenance	Natural Stratigraphy	Features	Artefacts
Level 1 (0-20cm)	Loose reddish-brown soil	-	Potsherds
Level 2 (20-40cm)	Loose reddish-brown soil	-	Potsherds; one bead
Level 3 (40-60cm)	Compact brown/yellow soil	Two clusters of large pots broken in situ, associated with stones, probably used as pot stands	Potsherds; stones
Level 4 (60-80cm)	Compact brown clayey soil	-	-

Table 2: Summary of finds from Mound 1 (ZBK13-M1)

3.7.3 Test Unit 2: Mound 2 (ZBK13-M2)

Mound 2 (ZBK13-M2) was located on a flat land area which showed no inclination or slope. The significant surface features identified were clusters of rough stone-like objects, some large fired clay objects and potsherds. The stone-like objects were black or dark brown in colour and their outer appearance resembled iron slags (see Fig. 12a and b). However, upon breaking them up, the interior was dark reddish clay soil and resembled compact baked clay or daub. This appeared to be evidence of some burning or firing activity, but it was not clear if this had happened in recent times due to for example, burning as part of land preparation for farming activities, wild fires or in the past as the result of some prehistoric cultural activity.

This site was therefore tested to find out more about the past activity. A grid of 2m was laid over an area of $8m^2$ to cover the spatial distribution of the stone-like objects. A 2m x 2m unit within the grid was randomly selected and excavated by arbitrary spits of 20cm. The soil was sieved through a screen with a $2mm^2$ mesh. The soil profile was simple with only three layers (see Figures 13 and 14).

Figure 12a: Surface of Mound 2 (ZBK13-M2)

Figure 12b: Close view of the surface of Mound 2 (ZBK13-M2)

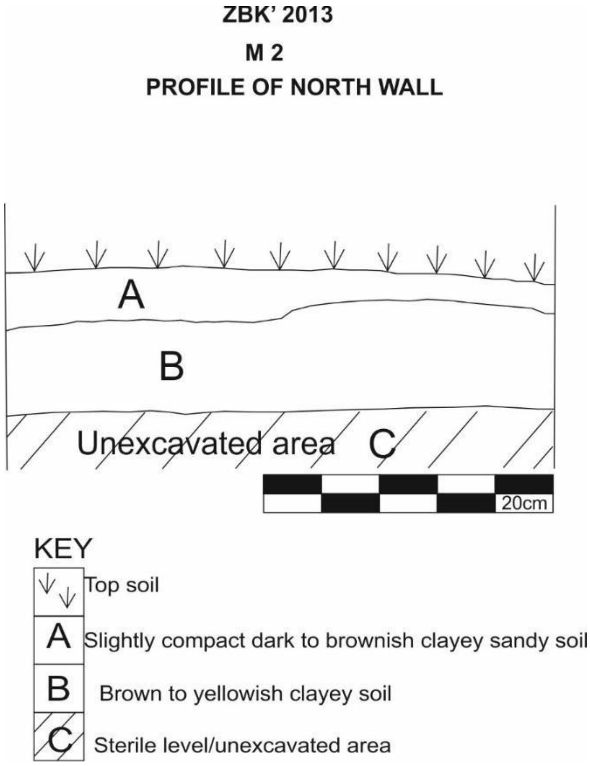


Figure 13: Stratigraphic profile of Mound 2 (ZBK13-M2)

Figure 14: Completed excavated unit - Mound 2 (ZBK13-M2)

Level 1 (0 – 20cm)

The soil of Level 1 of Mound 2 was dark brown and friable. It contained potsherds and medium to large daub-like stones. This level also yielded fourteen pieces of some unusual fired ceramic objects. The objects were heavy with a thickness range of 40-60mm. The edges were mostly bevelled or tapered on one side and flat or concave on the other side (see Figures 15a & 15b). The profiles were roughly circular and are probably the remains of some circular clay structures rather than pieces of pottery vessels.

Figure 15a: Enigmatic fired clay objects from Mound 2 (ZBK13-M2)

Figure 15b: Close view of the enigmatic fired clay objects showing concave depressions.

Level 2 (20-40cm)

The soil at Level 2 was different to that of Level 1 as it was brown to yellow in colour with a compact clayey structure. This level yielded less numbers of potsherds and daub artefacts than Level 1.

Level 3 (40-60cm)

Level 3 produced more compact clayey soil similar to Level 2 and lesser amounts of potsherds. At a depth of about 55cm, the soil appeared undisturbed. As the dig was no longer producing artefacts, it was ended just below this level at 62cm. Table 3 presents a summary of artefacts from Mound 2.

Provenance	Natural Stratigraphy	Artefacts
Surface	Rough textured stones with slag-like appearance and burnt surfaces	A sparse scatter of potsherds; enigmatic fired clay objects
Level 1 (0-20cm)	Dark brown loose soil	Potsherds; stones; enigmatic fired clay objects
Level 2 (20-40cm)	Brownish-yellow compact clay soil	-
Level 3 (40 -62cm)	Brownish-yellow compact clay soil	-

Table 3: Summary of artefacts and features from Mound 2 (ZBK13-M2)

3.7.4 Interpretation of ZBK13-M2

Like ZBK13-M1, the vertical artefact deposition context of ZBK13M2 was also shallow. Most of the cultural objects recovered were near the surface between the 0-20cm soil layer, and these were mostly the large enigmatic fired clay objects described above, the stone-like objects and some potsherds. The unit also produced the least number of potsherds. Based on the nature of the features of the sites and the types of artefacts, one can probably suggest that some firing activity was carried out here or some form of waste products comprising broken pieces of some fired-clay structure and potsherds may have been deposited on the site.

3.7.5 Test Unit 3: Mound 3 - ZBK13-M3

ZBK13-M3 was located on the southern part of a large irregularly shaped mound made up of about four hillocks. It had a dense surface scatter of potsherds, small to medium- sized stones and some daub deposits. Initially, a unit of 2m x 2m was excavated but during the excavation, this was extended on the east side to an overall dimension of 3m x 2m.

Level 1 (0-20cm)

The top soil layer of this unit was compact dark brown with a loamy texture mixed with small gravels and stones. The top layers revealed compacted deposits of daub overlaying some artefacts (see Figure 16a). As the excavations progressed, the daub pieces were removed with trowels and hand picks, counted, measured and photographed (see Figure 16b). Potsherds were also obtained from this level.

Figure 16a: A layer of daub deposits at Level 1 (0-20cm) of Mound 3

Figure 16b: Some of the daub deposits recovered from the layer of daub at Level of Mound 3 (shown by the blue arrow).

Level 2 (20-40cm)

The soil at this level was similar to Level 1. Some potsherds were embedded in the eastern wall of the unit and to recover these, the unit was extended by 1m to the east. This extension revealed a cluster of about five broken pots and five whole small and medium sized pots (Figure 18). This cluster of pots was in a north-south alignment and was about 0.5mm from the east wall and covered an area of 0.3m x 1.7m (Figures 17a and 17b).

One of the whole pots was overturned and contained a greyish fine sand deposit. The other two whole pots and bowl were upright. At least two of the broken pots were on their sides and one was upright. The pottery cluster was made up of a number of pots broken in situ as the cracks were large and most of the fragments of any one of the pots were recovered. A significant quantity of charcoal was recovered (see figure 18).

Figure 17a: Cluster of pottery unearthed at Level 2 (20-40cm) of Mound 3.

Figure 17b: Close-up view of the cluster of pots at (20-40cm) of Mound 2.

Figure 18: Charcoal deposits recovered in Mound 3 (Level 2)

A curvilinear outline of daub deposit was revealed at this level. It began near the northern wall and curved along the east wall for about 1.1m. The pottery cluster was located between this daub wall and the southern wall. After close examinations of the other walls, there was no evidence of similar daub outlines. It was therefore not possible to trace the complete outline of the daub deposits in the other walls.

Figure 19a: Curved daub outline (arrowed in the top right corner of the image).

Figure 19b: Curved daub feature and the cluster of pots 20-40cm of Mound 3.

As the excavation of Level 2 continued, it was realized that the daub outline did not have much depth and so the daub pieces were removed, cleaned, counted, measured and photographed. Some of the daub pieces showed pole impressions, some of which were blackened, possibly indicating that they may have supported wooden poles as part of some upright structure and that some of the poles may have burnt out while still embedded in the daub (see Figure 20).

Figure 20: One of the daub pieces recovered from Level 1 of Mound 3.

A small metal arrowhead was obtained. In addition, two large axe-like metal objects were found very close to each other near the south wall (see Figure 21). In addition to the interesting arrangements of artefacts described above, a significant number of potsherds were recovered from this level.

Figure 21: Metal objects recovered from Mound 3 (20-40cm).

Level 3 (40-60cm)

The soil at this level was mainly brownish to yellow compact clay mixed with loose gravel. In addition to potsherds, some charcoal deposits and three rounded stones were recovered from this level. A long metal pin was found, but it was not associated very closely with any artefacts. At about 50cm, the dig revealed the upper part of a large pot embedded in the north wall and about 1.7m from the east wall. The lower part of the pot was embedded in the soil and was fully revealed as the dig proceeded.

Level 4 (60-80cm)

At Level 4, the middle portion of the large pot was uncovered. Potsherds were recovered, a long metal pin and a flat arrowhead were recovered. The soil at this layer was brownish yellow, compact and clayey. Two samples of rounded stones which came up in the excavations were collected for analysis.

Level 5 (80-100cm)

This level revealed the base of the large pot described above and an arrangement of seven large stones around its base (see Figure 22). A similar arrangement of stones was seen in the corner of the north and west walls, but they were not associated with any potsherd. Some more potsherds were recovered from this level. The soil type, like that of Level 4 above was brownish-yellow, compact and clayey.

Figure 22: Large pot in Level 3 (40-60cm)
and supporting stones.

Level 6 (100-120cm)

The base of the large pot and the supporting stones were fully uncovered at this level (see Figure 22). The seven supporting stones measured between 15cm and 40cm in diameter. The pot was washed and the decorative patterns on it were photographed and drawn. Because it was badly cracked, it was likely that it could come apart when lifted out. It was therefore analysed in situ and its attributes such as rim diameter, height and so on were recorded.

Level 7 (120-140cm)

At this level the large pot was removed. It came apart upon removal, but its soil contents were sieved, and some shells were recovered. The digging produced fewer potsherds at this level.

Level 8 (140-160cm)

The soil at Level 8 was coarse and sandy in texture and mixed with small gravels. It was very compacted as it was the sterile level of the unit. No cultural materials were recovered, and the dig was ended at this level. Figure 23 shows the soil profile of this unit.

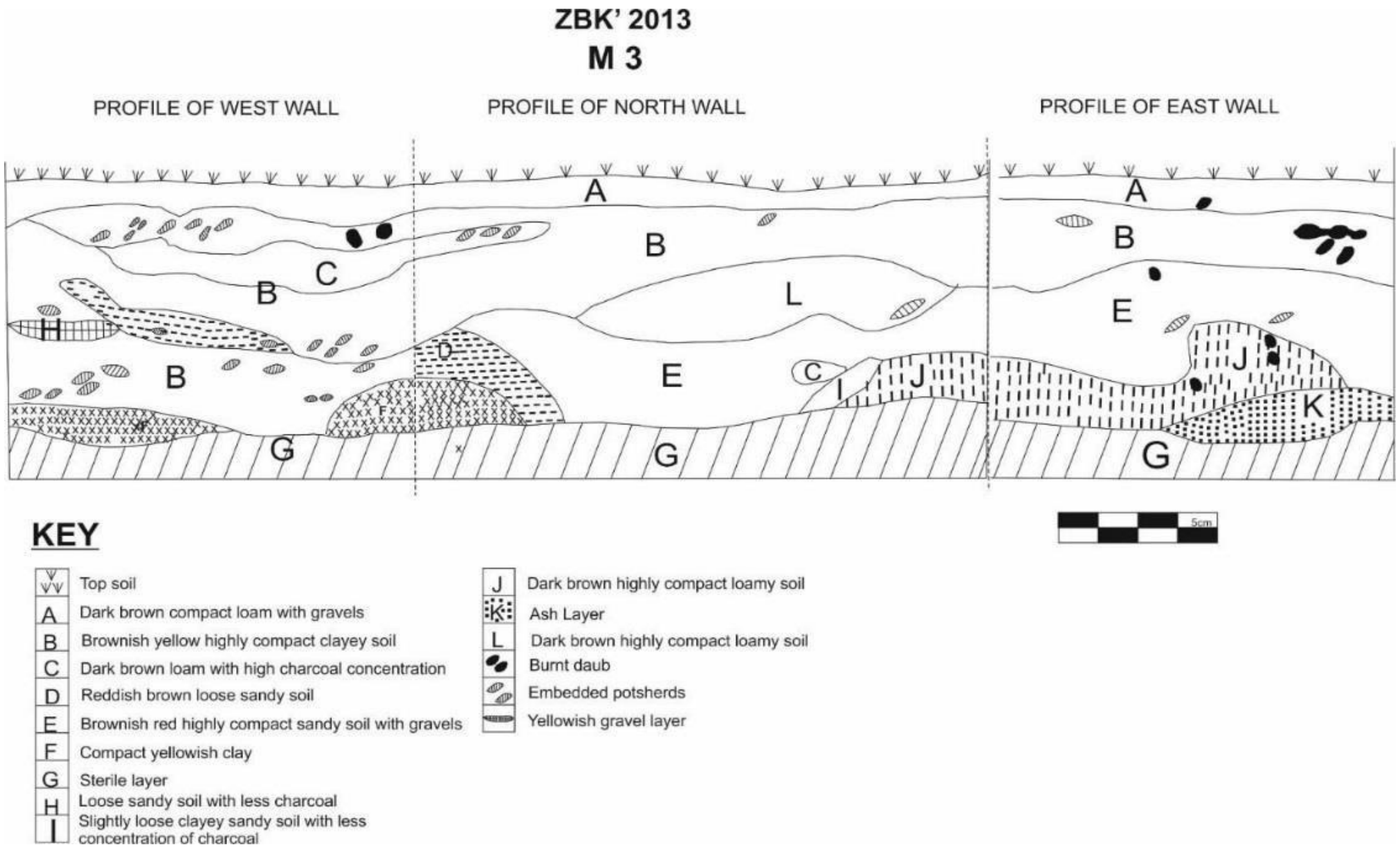


Figure 23: Stratigraphic profile of Mound 3.

3.7.6 Interpretations of Unit 3- ZBK13-M3

This unit was one of two that was located on the west part of the largest mound in the site. It yielded various datasets that suggest it was a domestic spatial context incorporating an area of food preparation or storage area for pottery vessels. The first dataset is the presence of pieces of daub which were encountered from the first level (0-20cm) through to the third level (a depth of about 62cm). Large pieces of daub, some with pole impressions were recovered between 0-20cm, and an outline of daub deposits was uncovered in-situ between 20cm and 40cm. Although the complete outline could not be traced, it had considerable length and depth to suggest that it was part of some architectural structure, probably the wall of a mud building. Together with the pieces of daub, one can suggest that this section of the unit constituted parts of a collapsed wall.

The second dataset is a cluster of about five pots, which were probably broken in situ. In addition, five whole pots were recovered from the cluster. The cluster of pots were embedded in a compact and reddish clay matrix, which is probably a floor context. Fairly large pieces of charcoal were recovered in association with the cluster of pots. This further supports the suggestion of a domestic context. Moreover, the top of a large upright pot was recovered at a depth of about 50cm but its base and supporting cluster of stones was fully uncovered between 100cm and 120cm. This also confirms that this section of the mound is the remains of a collapsed structure with evidence of some of its contents.

There were some pots still embedded in the walls of the unit, indicating that the unit ZBK13-M3 probably only uncovered a minute fraction of the structural and artefacts deposits of the mound. This also confirms the data from the geophysical survey which showed prominent anomalies within the whole mound. Other domestic contexts excavated in Yikpabongo (Asamoah-Mensah 2013) and Tando-Fagusa (Nkumbaan 2016 pers. comm.) have yielded burials covered with large pieces of potsherds. This was not the case with ZBK13-M3, but as I have pointed out already, the larger part of the mound remains to be investigated.

The charcoal samples from Levels 4/5 and Level 3 have been dated to 970 ± 30 BP [Beta 354925] and 720 ± 30 BP [BETA 354924] respectively. Similar radiocarbon dates have been obtained from Yikpabongo: Cal AD 1010 to 1170 (970+/-40BP) [YK10-3-N-1-L2 (Beta-274104)] (Kankpeyeng et al 2011: 209). In summary, this puts the occupation of Zoboku in the same temporal context as Yikpabongo. A summary of finds from this unit is presented in Table 4.

Provenance	Nature of Soil	Features	Artefacts
Surface	Friable reddish-brown soil with daub deposits	-	Potsherds, stones
Level 1 (0-20cm)	Compact dark brown soil with small stones	Daub deposits	Potsherds; daub pieces
Level 2 (20-40cm)	Compact dark brown soil	Cluster of about ten broken and intact pots; outline of a daub wall	Potsherds; intact pots; pieces of daub with pole impressions; charcoal deposits
Level 3 (40-60cm)	Brown- yellow compact clay	The upper section of a large pot in-situ	Potsherds; long metal pin; round stone grinders; one pair of adze-like metal objects
Level 4 (60-80cm)	Brown-yellow compact clay	Mid-section of the large pot described above	Potsherds; metal pin; flat metal arrowhead; round stone grinders
Level 5 (80-100cm)	Brown - yellow compact clay	Base of pot described above and seven supporting stones	Potsherds
Level 6 (100-120cm)	Brown – yellow compact clay	-ditto-	-
Level 7 (120-140cm)	Brown-yellow compact clay	-	-
Level 8 (140 – 160cm)	Coarse loose sand with small stones	-	-

Table 4: Summary of finds from Mound 3 (ZBK13-M3)

3.7.7 Test Unit 4: ZBK13-M4

ZBK13-4 was located about seven meters from ZBK13-M3. The surface of the unit was a dense concentration of stones and potsherds. A grid was laid over a 6m x 8m area to encompass the surface scatter of artefacts. A 2m x 2m unit was randomly selected from the grid and excavated using arbitrary spits of 20cm. During the excavation, the north and south walls were extended to 3m to fully uncover a cluster of stones and potsherds which was partially embedded in the east wall. Thus, when the sterile level was reached at a depth of 160cm, the overall dimensions of Mound 4 was 3mx 2m. The following are layer by layer descriptions of this unit.

Level 1 (0-20cm)

The top layer of ZBK13-M4 was made up of dark brown loamy soil mixed with small and medium stones, smooth rounded stones (possibly rubbers) and potsherds. The rounded stones were collected and counted, and the potsherds were bagged for analysis.

Level 2 (20-40cm)

The loose loamy soil layer of Level 1 became more compact in Level 2. It was still mixed with small gravels and other larger stones. A considerable quantity of potsherds was collected from this level as well. A charcoal sample from this level yielded a date of 1160 ± 30 bp [Beta 354926].

Level 3 (40cm -60cm)

At Level 3, the structure of the soil changed to a sandy texture. Parts of a compact cluster of stones and potsherds was discovered partially embedded into the east wall. The unit was therefore extended eastwards so that the complete cluster could be uncovered (see Figure 24). Level 3 also yielded some charcoal deposits, although these were not in direct association with the cluster of artefacts. The cluster of potsherds and stones continued into the next level.

Figure 24: Cluster of potsherds and stones uncovered at 40cm in Mound 4

Level 4 (60 – 80cm)

The soil structure at Level 4 was still sandy but mixed with charcoal deposits in some places. At a depth of 62cm, the major part of the cluster of potsherds and stones was revealed (see Figure 25). Due to the compact nature of the artefacts and the surrounding soil matrix, it is likely to have been a part of a pit into which objects were deposited. The cluster was about 8cm from the east wall, 64cm from the north wall and 46cm from the south wall. It measured 76cm in diameter. It extended to a depth of about 90cm and so was still encountered in Level 5. In addition, Level 4 yielded a metal ring, a small conical clay object, two pieces of teeth and some bone fragments.

Figure 25: Closer view of the structure of potsherds and stones in Mound 4

Level 5 (80-100cm)

The base of the platform and cluster of artefacts described above was fully revealed at this level. The feature was photographed and measured, and the potsherds and stones were removed and bagged. The soil structure at this level was sandy and reddish-brown. Potsherds were collected as well as several pieces of bone. Charcoal samples from levels 3, 4 and 5 yielded a date of 720 ± 30 bp (Beta 354927).

Level 6 (100-120cm)

At Level 6, the sandy soil structure continued. Here the texture of the soil changed to a moist one mixed with powdered charcoal. Pieces of bones were recovered but most of these were fragmented. The excavations also yielded potsherds, two thin metal pieces, possibly iron and some fragile flat greenish stone pieces, some of which were collected for analysis.

Level 7 (120 -140cm)

As the excavations went deeper, the number of potsherds decreased. The reddish-brown sandy soil continued at this level, but it was more compact.

Level 8 (140-160cm)

The excavation was ended at 160cm as the digging produced large chunks of compact soil and no potsherds. The stratigraphic profile of the mound is depicted in Figures 26 and Table 5 presents a summary of finds from the excavations.

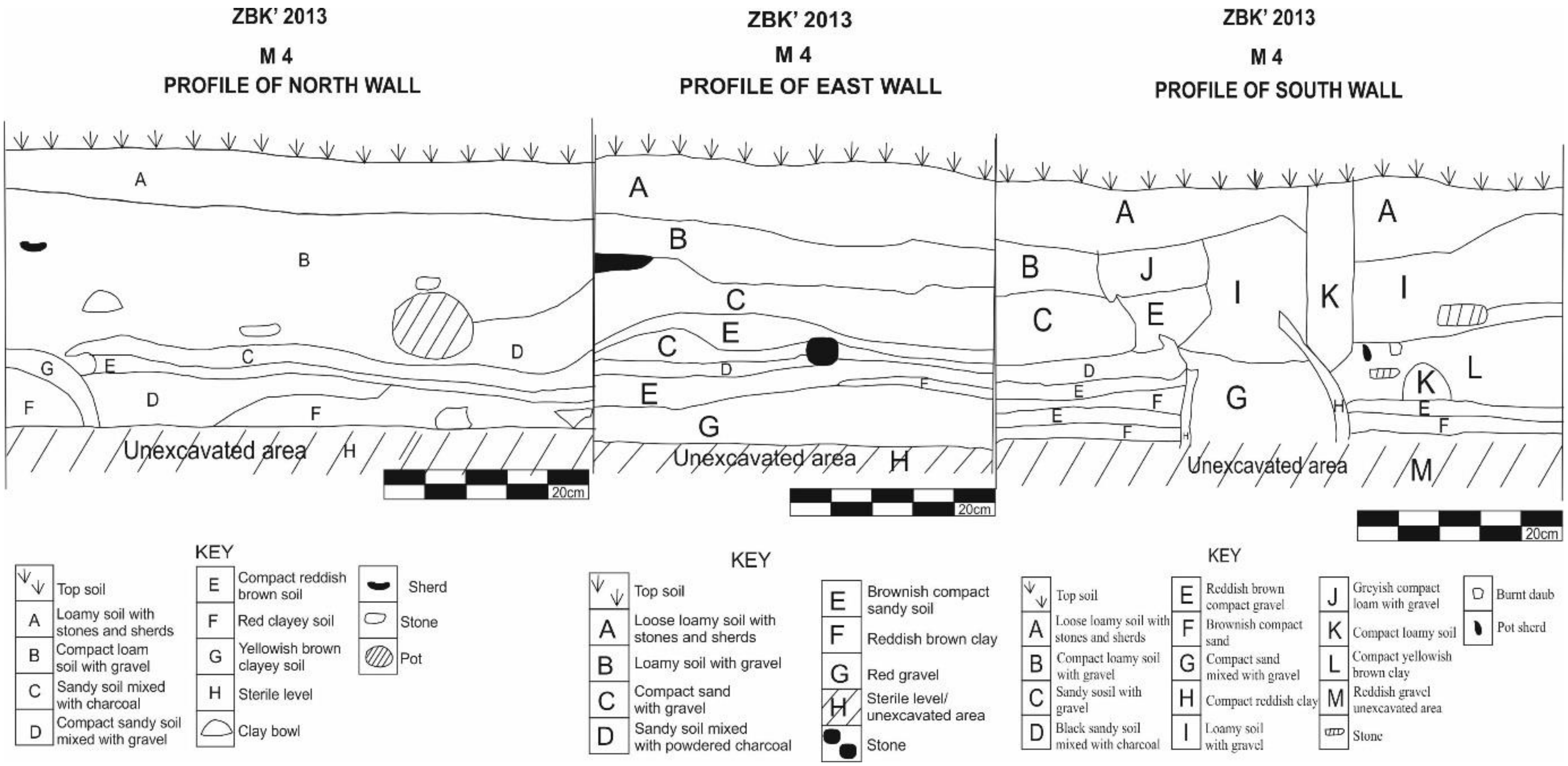


Figure 26: Stratigraphic Profile of Mound 4 (ZBK-13 M4)

Provenance	Nature of Soil	Features	Artefacts
Surface	Loose dark brown soil mixed with small stones	-	Potsherds
Level 1 (0-20cm)	Loose dark brown soil mixed with small stones	-	Stones; potsherds
Level 2 (20-40cm)	Compact dark brown loamy soil mixed with stones	-	Potsherds
Level 3 (40 – 60cm)	Red sandy soil	Compact cluster of stones and potsherds	Potsherds; stones; metal ring; charcoal samples
Level 4 (60-80cm)	Reddish-brown soil mixed with charcoal	-ditto-	Potsherds; pieces of bone
Level 5 (80-100cm)	Compact reddish-brown soil	-	Potsherds
Level 6 (100-120cm)	Sandy soil mixed with charcoal	-	Potsherds; metal objects; pieces of bone
Level 7 (120-140cm)	Compact reddish-brown soil	-	Potsherds
Level 8 (140-160cm)	Sterile layer	-	-

Table 5: Summary of artefacts and features from Mound 4

3.7.8 Interpretation of Mound 4 (ZBK13-M4)

The most significant feature of ZBK13-M4 was the compact cluster of potsherds and small rounded stones which was found from 40cm through 100cm deep. Similar structures have been described from Squares 11 and H14/I14 of Mound YK10-3/YK11 excavated at Yikpabongo (Kankpeyeng et al 2013:482-485). However, in the Yikpabongo context, the constitutive artefacts were potsherds, spherical stones, quartz fragments as well as figurines. Due to the association with figurines, the structures have been interpreted as possible libation structures and the artefact deposits as a bundling together of both quotidian and powerful materials over short time periods in ritual contexts (Kankpeyeng et al 2013: 484).

The artefacts that constituted the compact feature in ZBK13-M4 did not include any figurines but appeared to have been a deliberate deposit. Other evidential characteristics further suggest that ZBK13-M4 incorporated discard or disposal contexts. For instance, the distribution of potsherds on the surface of the unit was very dense and very fragmented.

The high density of fragmented pottery could indicate that the mound was possibly a dump site or midden. However, it also possible that the potsherds could have been inadvertently broken up during farming using hoes and shallow digging to create mounds to plant root crops.

3.7.9. Concluding Remarks

The survey and excavation methods used at Zoboku considered the nature of the landscape, natural hindrances such as the presence of large trees and proximity of the site to farms, limited time and resources. Most importantly, as a set of related techniques, foot surveys, GPS and TS recordings, the geomagnetic scanning and focused text excavations worked together to achieve the aims of the fieldwork component of the research project.

Chapter 4: Ceramic Data

4.0 Introduction

Most of the artefacts recovered from the excavations at Zoboku were ceramic, with small numbers of stones, daub, metal objects and a single bead (see Table 4.1). Ceramics have been described as fired eathernware products (Rice 1987:3). The ceramic artefacts from Zoboku comprised potsherds, pot bases, perforated sherds, intact pottery vessels, fragments of terracotta figurines and some unusual fired clay objects. This chapter focuses especially on the technological and formal characteristics of the ceramic artefacts. It begins with a discussion of the analytical framework and methods used and statistical representations of the attributes of the potsherds, followed by descriptions of the other ceramic artefacts.

Artefact	Quantity	Percentage
Potsherds	4645	98%
Intact pots	6	0.1%
Vessel bases	5	0.1%
Perforated sherds	8	0.2%
Stone rubbers/grinders	6	0.1%
Pottery disc	1	0.02%
Daub pieces	14	0.3%
Enigmatic fired clay objects	14	0.3%
Metal objects	8	0.2%
Bead	1	0.02%
Bone fragments	25	0.5%
Total	4733	99.84%

Table 6: Types, quantities and percentages of artefacts from Zoboku

4.1 Pottery Analyses: Methodology

The basic method used to analyse the artefacts from Zoboku was classification. Classification has been defined as the grouping of similar entities with the objective to create types (Rice 1987: 274-275). It is considered fundamental to all scientific enquiry and to how humans perceive and conceptualize matter and the general physical world around them. Classification primarily depends on identifying and outlining similarities and differences in the form or other physical features of objects with the aim of creating groups whose members share similarities but at the same time differ from other groups.

Underlying the process of classification is the notion that the perceived similarities and differences are caused by circumstances or factors which can be delineated, interpreted and engaged with further. A good classification scheme, therefore achieves more than simply ordering a variety of artefacts, but ultimately elucidates the meanings inherent in the observed characteristics.

Classification schemes are concerned not only with the physical character of the artefacts, but also with the culturally framed conceptual systems that underlie and shape the production and use of the artefacts. Thus, the process uses the physical attributes of the artefacts to infer the ideational and structural concepts that resulted in the perceived attributes. For example, in pottery classification processes, the primary underlying notion is that variations in constitution, form or style are embedded in sociocultural frameworks (Miller 1985; Chilton 1999; Stark et al. 2008).

One of the strengths of archaeology is to reveal artefact patterning based mainly on variations, across space and through time. This has been the foundation for studying and understanding the development of technical processes, the creation of culture histories, transmission of objects, skills and bodies of knowledge across space and between groups, and the creation and reinforcement of identities (Lyman & O'Brien 2003; Lycett 2015). Classification has been an essential tool in this process. As a major tool in archaeological analyses, it has been used extensively to unravel and understand the broader cultural processes that surround the manufacture, use and discard of artefacts, and the organization and dynamics of past culture systems and processes (Neff 1993; Wylie 2002; Read 2009).

Several classificatory and typological schemes have been outlined by archaeologists, especially for the analysis of pottery artefacts (Adams & Adams 2007; Read 2009). Rouse (1960), for example has stated that artefacts are an extension of the behaviour patterns of artisans conditioned by their cultural setting and that classification processes should be aimed at elucidating the organization of such behaviours in time and across space. (Rice 1987: 274-282) also identifies devised or formal classification based on artefact classes determined by the archaeologist, and folk classification based on attributes and features that are significant to the artisans and users.

Although these conceptual frameworks differ in content, fundamentally they all contrast how the archaeologist/analyst views an assemblage of artefacts with the views of artisans and/or users of the artefacts. It is important that in the process of classification, the definition of attributes ultimately result in the identification and construction of types which have cultural salience for the people to whom the artefacts belonged. The overall aim of classification and typological analysis should therefore be to elucidate the social and material organization of the past culture.

The *chaíne opératoire* analytical concept which was discussed earlier as part of the theoretical framework of this thesis shares some of the fundamental principles of traditional classificatory and typological frameworks. Like most traditional classificatory schemes, the *chaîne opératoire* concept focuses on variations that occur in an artefact assemblage (Gosselain and Livingstone-Smith 1995; Gosselain 1999; Martinón-Torres 2002; Manning 2011; Santacreu 2014). However, it goes beyond this fundamental analytic function to consider how actions and gestures involved in each step or sequence of a production process can be identified using the material and physical characteristics of the artefacts.

Some of its tenets also examine how the bodies of knowledge of a technology are transmitted and learned between persons and shared by the community. Against a backdrop of a summary review of traditional classificatory concepts, I explore how the application of the *chaîne opératoire* concept to the pottery assemblage from Zoboku supports the overall theoretical framework of the thesis.

Traditionally, classification schemes have been aimed at highlighting variations in objects of the same or different constitutions. One of the most common artefact categories that is subjected to classificatory and analytical processes, especially following excavations, is pottery. Pottery has been defined as low fired unvitrified materials usually formed as vessels, containers and objects of art (Rice 1987:4). It is part of the broader class of ceramics which comprise objects and materials produced by the technology of combining clay, non-plastic substances, water and heat (Sinopoli 2013:9). As an essential component of the material culture of most human societies, pottery plays several vital roles in all spheres of life, from the mundane to the sacred (Skibo 2012:3).

Most importantly, it is commonly used in procuring, processing, preparing, storing, transporting and consuming food, drink and other substances. As these are primary activities performed in almost every household, pottery is an essential component of the material culture repertoire of most societies. This is especially the case in prehistoric and early historic societies where the use of other materials such as metal and glass in domestic contexts was relatively minimal (Rice 1987:226).

The many ways in which pottery items were produced acquired, used, reused, valued, devalued and discarded provide clues to how such societies were organized. Pottery technology is also accumulative and comprises several sequences and actions most of which leave evidences in the physical configuration of the end product. Moreover, it is a flexible and adaptive process by which a variety of techniques are employed depending on the individual producer's, knowledge, ability, socio-cultural and historical experiences. Pottery analysis therefore provides a window into the individual and collective ideational concepts of persons or groups who make and use the products. A large body of literature exists on these concepts (see for example Arnold 1985; Skibo & Feinman 1999; Gosselain & Livingstone Smith 2005; Gosselain 1992; MacEachern 1994), and I have drawn on some of these in framing my analyses.

Most classification schemes, especially of the twentieth century, prioritize the relationship between the properties of artefacts and the concepts and ideas held by their makers and users. To this, the *chaîne opératoire* concept adds a focus on the materiality of the objects; a perspective which considers the attributes of the artefacts not only as evidence of shared patterns but also as analytical domains in themselves.

Focusing on the ontology and phenomenology of the physical characteristics as evidence of the technological process, the *chaîne opératoire* concept represents the awareness that artefact characteristics, form and style are influenced or are the results of choices made by artisans out of a range of substitutable options.

4.2 Bodysherd Analyses

In this section, I present the formal characteristics of the bodysherds. The analytical methods used include visual examinations and measurements highlighting differential occurrence and frequencies of attributes such as colour, size, thickness, fabric constitution, surface treatment and decorations. The results are presented in the form of tables, charts and other diagrams.

The potsherds were initially sorted by size on-site. Bodysherds and rims measuring 2.5cm or more in size or diameter were washed, labelled and bagged by provenance and transported to the Sainsbury Research Unit, University of East Anglia, United Kingdom, for detailed analysis and photography. This numbered four thousand and ninety-seven (4097), constituting 88.2% of all potsherds recovered. The remaining five hundred and eighty-four or 11.2% which measured less than 2.5cm were discarded as part of backfill material. Table 7 shows the quantities of diagnostic and non-diagnostic potsherds from each unit.

Context	Mound 1 (ZBK13-M1)	Mound 2 (ZBK13-M2)	Mound 3 (ZBK13-M3)	Mound 4 (ZBK13-M4)	Total No. of potsherds
Diagnostic bodysherds	287	152	1319	1855	**3613**
Diagnostic rims	46	21	186	231	**484**
Non-diagnostic bodysherds (<2.5cm)	17	12	148	276	**453**
Non-diagnostic rims <2.5cm)	11	6	19	59	**95**
Total	**361**	**191**	**1672**	**2421**	**4645**

Table 7: Total numbers of diagnostic and non-diagnostic pottery from Zoboku

The first section of the chapter focuses on description, classification and analyses of the bodysherds and rims, while the second part constitutes discussions of the other ceramic artefacts namely pot bases, perforated sherds and fragments of terracotta figurines. The analyses focus mainly on comparative classifications using the dimensions and other physical attributes of the sherds as well as other interpretative contexts which have enhanced their understanding and significance.

4.2.1 Colour

The colour of a pottery assemblage can be evaluated both visually and with standard colour determination tools such as the Munsell Colour Charts (Shepard 1965: 107-113; Rice 1987: 339-343; McIntosh 1995:135). The colour of a pottery vessel may reflect not only the aesthetic choices of the potter, but also the type and composition of the clay raw material, the firing process and in some instances, the use context of the vessels (Sinopoli 2013:12).

The type, amount and distribution of impurities such as iron compounds and organic material in the clay and the temperature or length of firing can determine the primary colour of the pottery vessels. When iron compounds are present in the clay raw material and it is fired in an oxidised atmosphere, the vessels may exhibit red, yellow or orange-brown colours (Rice 1987:333). When fired in a reducing atmosphere, however, similar clay raw materials may result in dark brown, black or grey coloured vessels (Sinopoli 2013:12). Moreover, the presence of organic matter in the clay paste may result in grey, black or dark brown pottery vessels. Potsherds may also acquire secondary colours by absorbing stains when used to store substances, cook over the fire or as a result of deposition in the soil upon discard (Shepard 1965: 103).

These premises were considered in determining the colour range of the bodysherd assemblage from Zoboku. The interior, exterior and clean cross section surfaces of all the sherds were visually examined. Generally, the surface and paste colour of a most of the sherds fell in the range of light/dark brown and dark red/orange colours. These colours are most likely to correspond to the yellow-red spectrums of the Munsell Soil Colour Charts (Rice 1987:340; Shepard 1965:107-112: McIntosh 1995:140-142). However, twenty-eight bodysherds showed black clay paste or blackened interior and/or exterior surfaces.

4.2.2 Sherd Sizes

Pottery recovered from archaeological contexts are usually broken or fragmentary. Due to the fragile nature of their constitutive matter, pottery vessels are highly susceptible to breakage through use or by accident. Some breakages may also be deliberate symbolic gestures linked to ritual or metaphysical practices such as funerary or ancestor veneration rites (Barley 1994; Arnoldi & Hardin 1996; Gosselain 1999). Alternatively, pots that enter the archaeological record in wholesome states may also be broken by tree or plant roots and animal or human activities.

Sherd size coupled with evidence of erosion could indicate the type of activity that occurred on a site or how the pottery materials entered the archaeological record. The sizes of the potsherd assemblage from Zoboku were measured by placing individual sherds into templates of squares measuring between $3cm^2$ and $50cm^2$. The sherd size measurements from each unit are detailed below.

4.2.2a. Sherd Sizes- ZBK13-M1

48.7% of the bodysherds from this unit measured between 3cm and 14cm. A further 34.5% were in the range of 15cm and 25cm. Sherds belonging to the larger size bracket of 26cm to 35cm made up 14% and those measuring between 36cm and 50cm made up 2.4%. All the sherds making up the largest size category came from the 40-60cm depth (Level 3) of Mound 3, where approximately three large pots had been broken in situ. This has already been described in Section 3.9.1. Figure 27 shows the distribution of the sherds sizes by excavated levels.

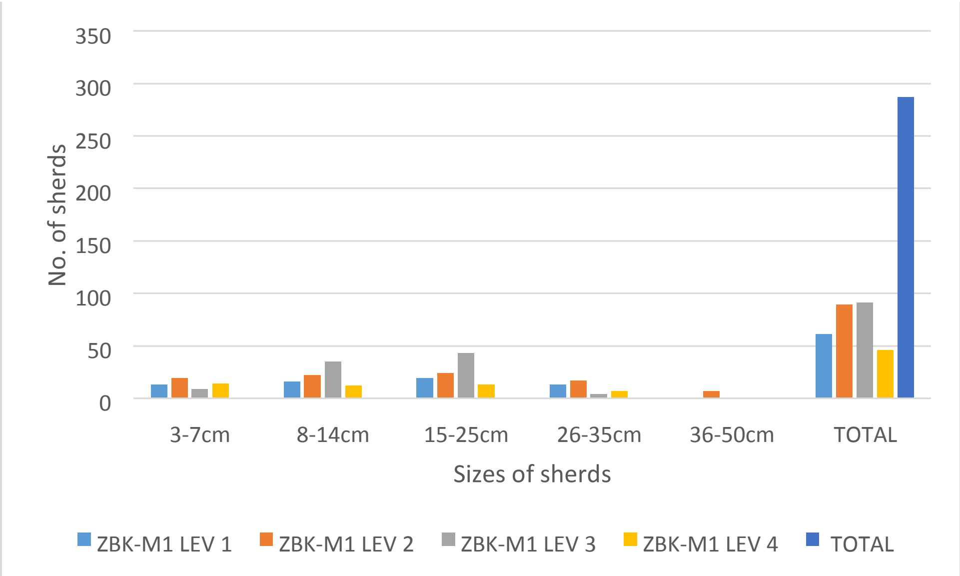


Figure 27: Sizes of bodysherds from Mound 1

4.2.2b Sherd Sizes – ZBK13-M2

In this unit, sherds measuring between 8cm and 14cm dominated, making up 38%. Small sherds measuring between 3cm and 7cm constituted 30%. Medium-sized and large sherds measuring 15cm to 25cm and 26cm to 50cm constituted 21% and 9.2% respectively. This distribution is depicted in Figure 28.

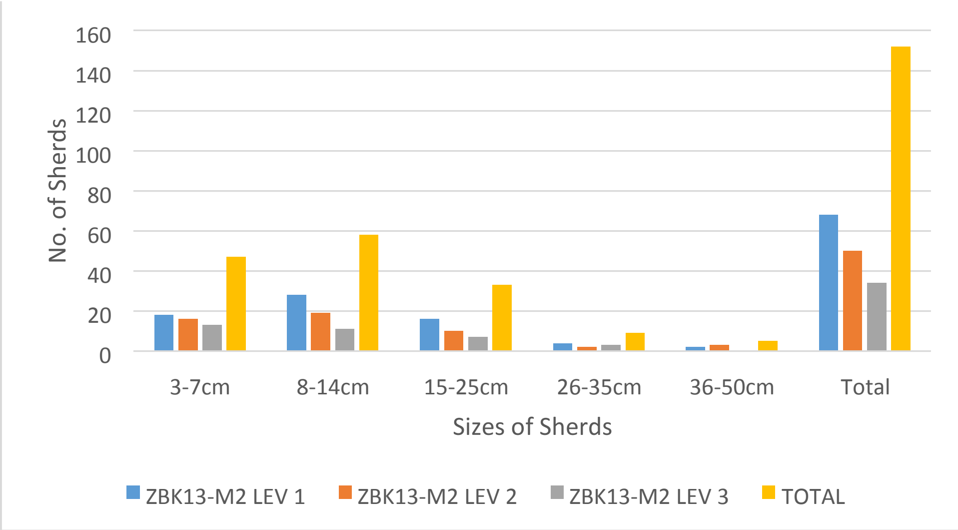


Figure 28: Sizes of bodysherds from Mound 2

4.2.2c. Sherd Sizes ZBK13-M3

Mound 3 showed a generally even distribution of sherds among the size categories. 47% of the sherds fell in the 3cm – 14cm and 15cm -35cm brackets each. Larger sherds between 36cm and 50cm made up 5.4%. Figure 29 shows this sherd size distribution by excavated spits.

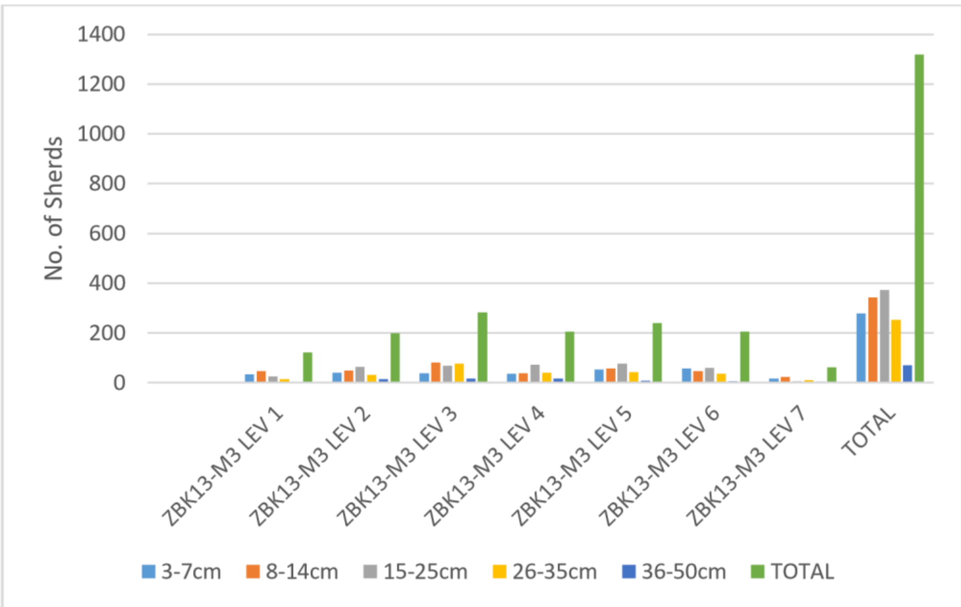


Figure 29: Sizes of bodysherds from Mound 3

4.2.2d. Sherd Sizes – ZBK13-M4

Mound 4 was predominated by sherds measuring 8cm to 14cm. This constituted 85.5%. Smaller sherds measuring 3-7cm made up 10%. Sherds measuring between 15cm and 35cm made up 4.5%. There were no sherds measuring 36cm to 50cm. The sherd sizes from each level are shown in Figure 30.

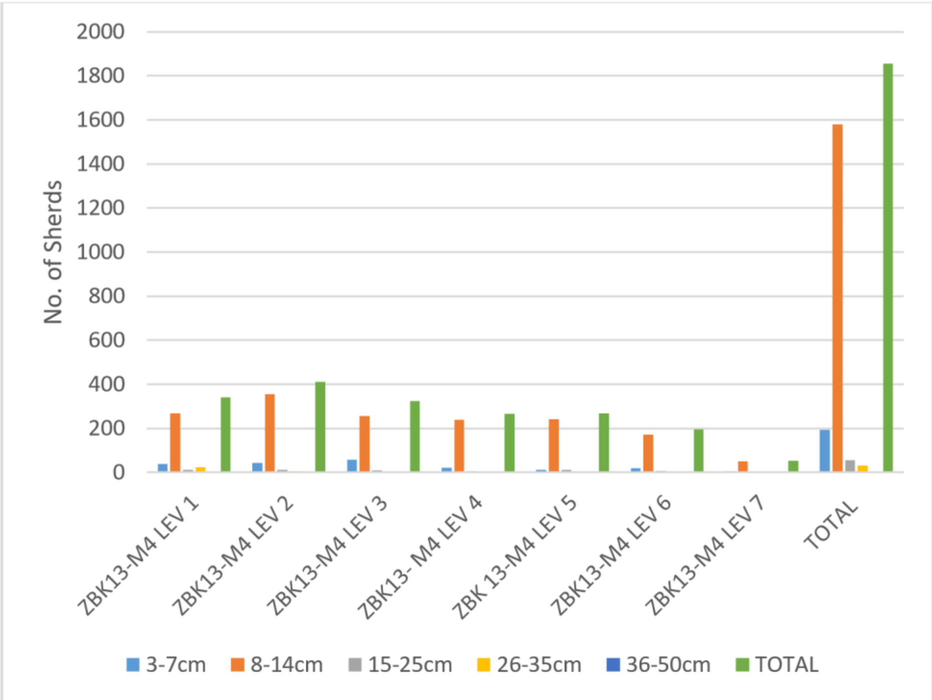


Figure 30: Sizes of bodysherds from Mound 4

4.2.3 Thickness

The thickness of the walls of a pottery vessel may be influenced by its intended function. Large vessels intended for storing substances such as water usually have thick walls to prevent conduction of heat to its contents, thereby keeping the water cool. Pots that are regularly carried around such as those used to fetch and convey water or used in food processing such as grinding and pounding may also have thick walls. Alternatively, vessels intended to be used for cooking are made with thin walls to allow for quick conduction of heat to the food.

Parts of a pottery vessel may also be made thicker to withstand stress of usage such as the collar or rim area which may be frequently handled when the vessel is picked up or carried, or where appendages such as handles are attached. The thickness of the pottery assemblage from Zoboku were measured with the help of a pair of digital callipers. The variables were recorded in ranges of 0-4mm, 5-8mm, 9-12mm and 12mm+ (see Figures 31-34).

4.2.3a. Sherd Thickness- ZBK13-M1

A majority, namely, 31% of sherds from Mound 1 measured 5mm to 8mm. Those measuring up to 4mm made up 24%. Sherds measuring 9-12mm and more than 12mm together made up 44%. Figure 31 shows these size distributions and the quantities recovered from each level.

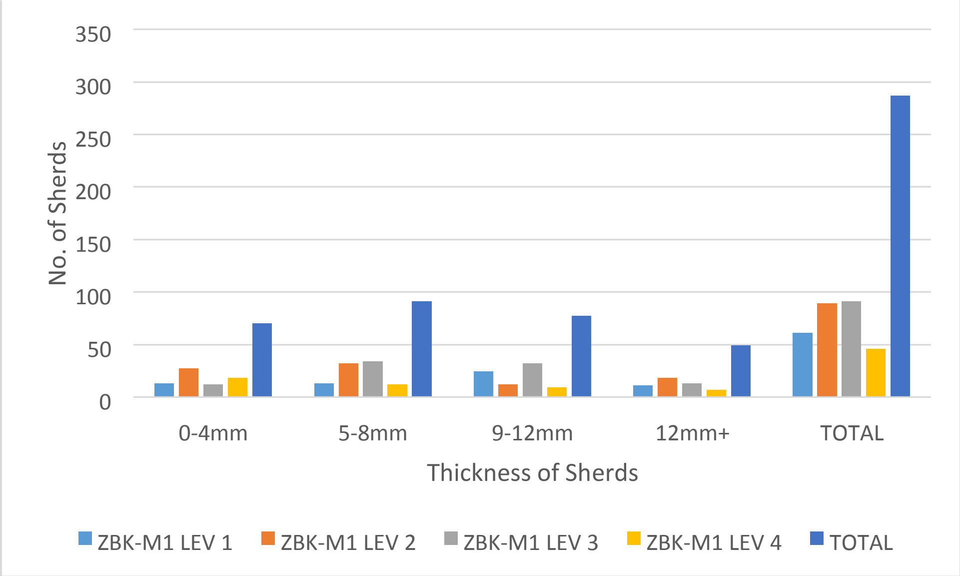


Figure 31: Thickness of bodysherds from Mound 1

4.2.3b. Sherd Thickness –ZBK13-M2

21% of the sheds from Mound 2 had a thickness of 9mm to 12mm and another 21% measured 12mm or more. Many of the sherds, namely 33.5% were between 5mm and 8mm. Sherds with a thickness of 4mm or less constituted 24%. These quantities are shown in Figure 32.

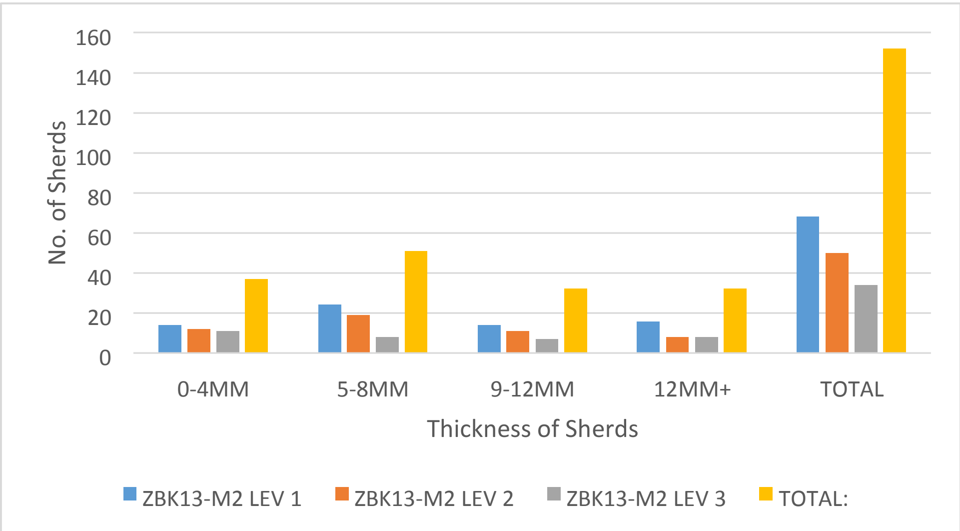


Figure 32: Thickness of bodysherds from Mound 2

4.2.3c. Bodysherd Thickness – ZBK13-M3

Like the two units described above, most sherds in this unit fell in the category of 5mm- 8mm. This made up 32% and was slightly higher than sherds in the 9mm-12mm category which made up 31%. Larger sherds measuring 12mm or more made up 16.1% while sherds of up to 4mm made up 21%. Figure 33 shows the quantity distribution of the sherd sizes from the individual levels.

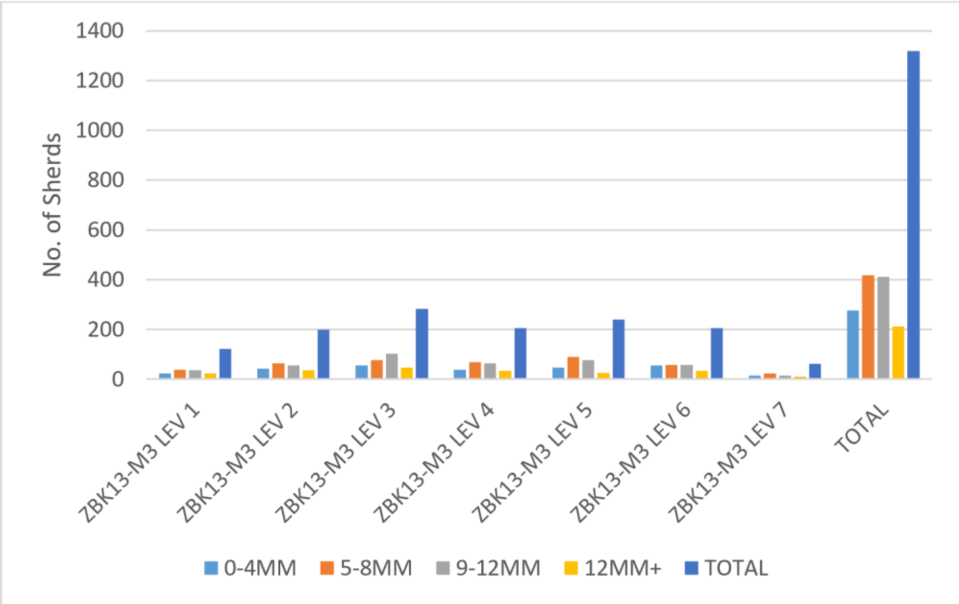


Figure 33: Thickness of bodysherds from Mound 3

4.2.3d Bodysherd Thickness –ZBK13-M4

Mound 4 was also dominated by sherds measuring between 5mm and 8mm. This made up 37.7%. Sherds measuring 9mm to 12mm constituted 32.2%, and those measuring up to 4mm made up 25%. The least number of sherds had a thickness of 12mm or more, namely 4.2%. Figure 34 shows the distribution of these quantities by excavated spits.

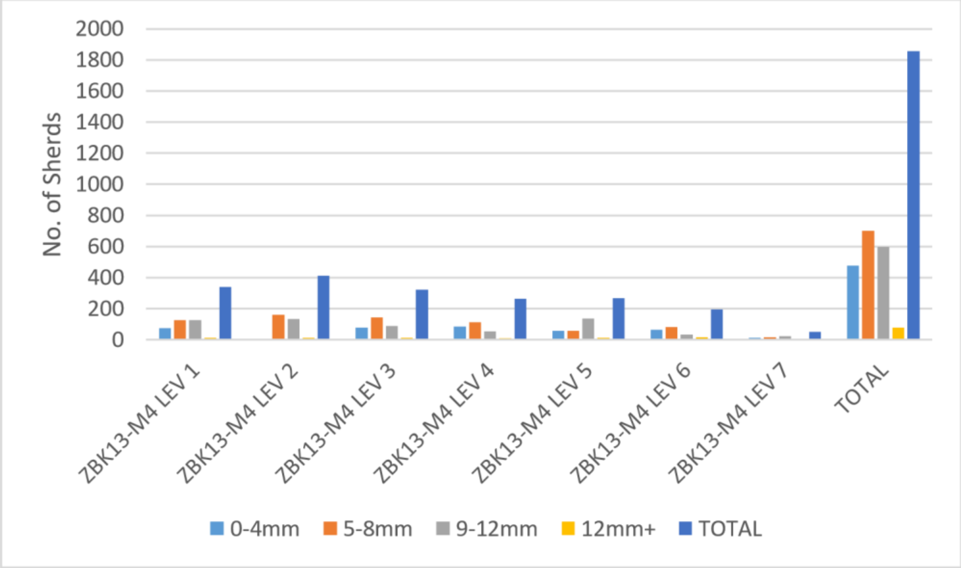


Figure 34: Thickness of bodysherds from Mound 4

4.2.4 Clay Paste Texture

The texture of the clay paste of a pottery vessel is determined mainly by the type and nature of non-plastic or organic materials that may be added to the clay mixture as temper. Non-plastic inclusions are fine or coarse materials that occur alongside the actual mineral matrix of a clay raw material (Rice 1987: 72; Rye 1981: 31). They may occur naturally in the clay material, for instance, through formation processes such as weathering and sedimentation or may be added as temper to the clay paste.

The addition of temper improves the plasticity and workability of the clay and prevents excessive shrinkage during drying and firing (Shepard 1965:116; Rye 1981:1). Examples include sand, rock fragments, crushed flint, shell, limestone, and organic material such as chaff, dried grass or animal dung (Tite 2008:217). In West Africa, the variety of temper materials that have been identified in ethnographic contexts include crushed pottery (grog), animal dung and grit from termite mounds (Bredwa-Mensah 1996:52).

The natural composition of the temper and how it is prepared and added to the clay paste also affects the texture of the finished vessel, and influences its durability, rate of performance and usefulness as a cooking or storage receptacle. Other important determinants of paste composition are the nature of the clay raw material, the methods by which the potter prepares and mixes the clay paste and firing conditions (Orton & Hughes 1993). Detailed analysis of the pottery fabric can provide information on the technology of the manufacturing process, firing conditions and sources of the clay and temper raw materials. Texture is an unevaluated variable and a range of paste textures may be identified differently by individual analysts depending on the pottery assemblage (Shepard 1965).

The texture of the pottery from Zoboku was assessed based on the nature and density of inclusions that could be visually identified in the matrix of the pottery. The broken edges of the potsherds were examined visually, and the apparent density of inclusions was used to classify the potsherds as having no inclusions, few inclusions or many inclusions. Shepard (1965) has however cautioned that such as an assessment is subjective and may be hindered by the colour contrast between the pottery paste and the particles of the temper. The variables that were observed in the Zoboku pottery assemblage are therefore an approximation of the character of the clay paste and inclusions as observed with the naked eye and under optimal lighting conditions. The paste characteristics of all four units are detailed below.

4.2.4a. Clay Paste Constitution – ZBK13-M1

No inclusions or non-plastic particles were observed in the clay pastes of 27.1% of the sherds from Mound 1. 29.2% showed many inclusions, while a majority of the sherds, namely 43.5% showed few inclusions.

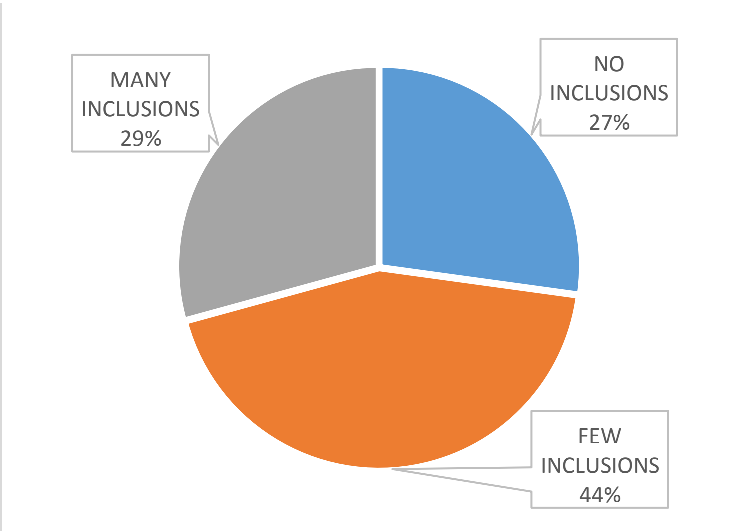


Figure 35: Percentage distribution of clay paste texture in Mound 1

4.2.4b. Clay Paste Constitution - ZBK13-M2

Like Mound 1, most of the sherds in Mound 2 had few inclusions. This category made up 47% of the sherds. 27% showed no inclusions and 26% showed many inclusions. These are shown Figure 36.

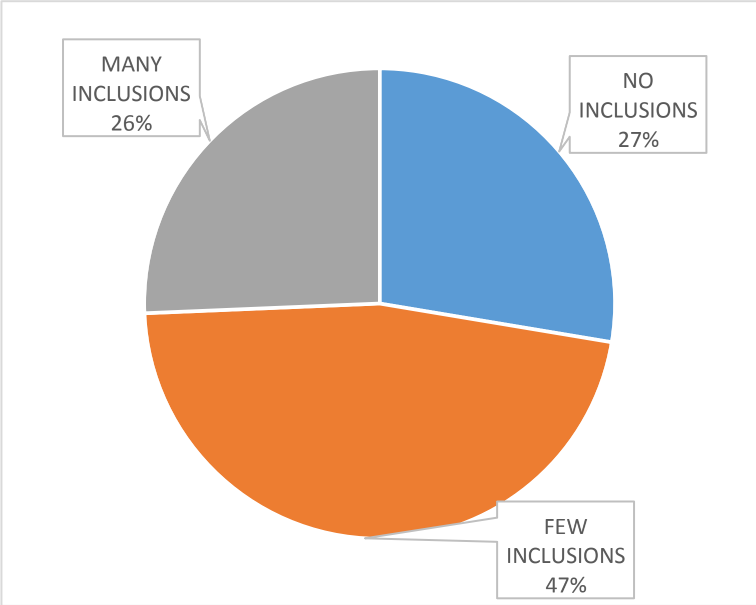


Figure 36: Percentage distribution of clay paste textures from Mound 2

4.2.4c. Clay Paste Constitution- ZBK13-M3

Sherds showing few inclusions in the clay pastes were dominant in this unit, making up 55%. This is similar to what was observed in Mounds 1 and 2. Sherds with no inclusions and those with many inclusions constituted 35% and 10% respectively. These are shown in Figure 37.

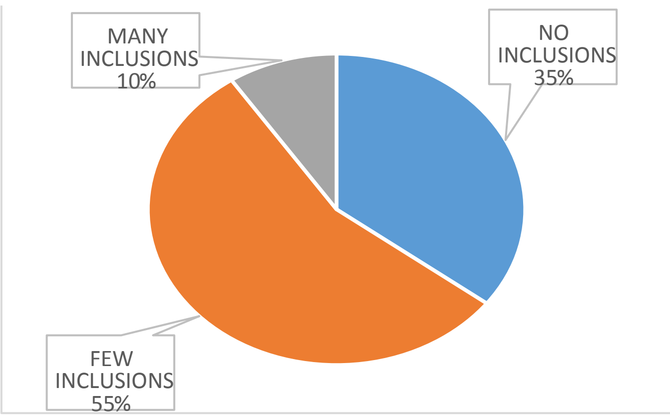


Figure 37: Percentage distribution of clay paste textures from Mound 3.

4.2.4d. Clay Paste Constitution – ZBK13-M4

In Mound 4, sherds with no visible inclusions were dominant making up 67%. Sherds showing few inclusions and those with many inclusions made up 24% and 9% respectively. These are shown in Figure 38.

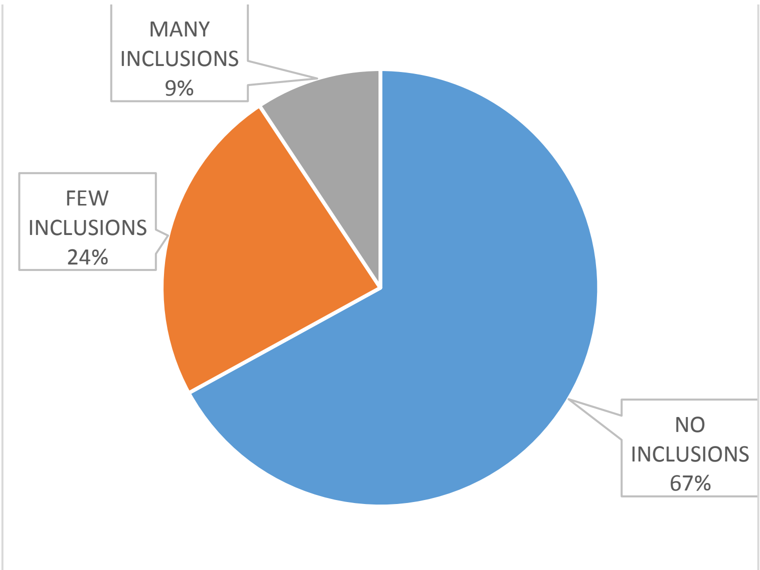


Figure 38: Percentage distribution of clay paste textures from Mound 4

4.2.5 Surface Treatment-Slipping

Most surface finishing actions, such as burnishing and other plastic decorative patterns are carried out after the intended ceramic vessel shape has been achieved and the clay is still in a plastic state or when the vessel walls are leather hard. However, others such as slipping may be applied when the vessel is completely dry or immediately after firing (Rye 1981:24). Surface finishing techniques do not necessarily affect the dimensions, shape or form of the vessel as they are mainly aimed at creating distinctive outward appearances in terms of colour and/or texture. They may be used to improve the appearance of the finished vessel by evening out irregularities resulting from the shaping or forming process or to give the vessel a uniform surface texture. In this regard, such actions may be described as decorative.

Rye (1981:40) has however, observed that in some instances, the colour or texture of a vessel's exterior surface may not be a result of the application of a surface treatment substance, but of firing conditions or the presence of certain materials in the clay paste. Sometimes surface treatment techniques may also be aimed at achieving functional objectives such as reducing the permeability of the vessel walls. Slipping may be considered as a purely decorative variable (example McIntosh 1995: 135), or as part of the forming techniques meant to improve colour, texture, surface density, and reduce permeability, especially if the vessel is intended for cooking or boiling (Shepard 1965:187).

Common surface finishing methods include smoothing, burnishing, polishing, slipping, painting and glazing (Shepard 1965:187; Rice 1987:138). While burnishing, smoothing and polishing involve the use of tools or hard objects, slipping, painting and glazing involve the application of liquid substances to the surfaces of the vessel (Rye 1981:40; Rice 1987:147-152).

The predominant surface treatment method identified on the Zoboku pottery assemblage was slipping. Ethnographic contexts however indicate that smoothing, burnishing and polishing are common procedures in pottery production in most West African contexts. In the case of the Zoboku pottery assemblage, tell-tale marks such as fine shallow striations, associated for example, with some smoothing and burnishing methods were not easily identifiable.

The bodysherds were classified into slipped and unslipped categories. The surface where the slip has been applied, whether on the interior or the exterior was also used to create categories. Rice (1987:149) has defined a slip as a fluid suspension of clay and/or other materials in water that is applied to a pottery vessel to form a thin coating. Slips are usually different in colour and lustre to the clay paste of the vessel and this aids identification with the naked eye, or with hand-held magnifying lenses or microscopes.

To apply the slip, a pottery vessel may be dipped or immersed in the solution. This method results in a more uniform coverage of the surfaces of the vessel than is achieved by other methods such as pouring or wiping. One of the tell-tale signs of this method is that other surface treatments such as decorative motifs may be covered by the slip suspension. Also, depending on how the vessel was held for dipping, the surface area where the potter gripped the vessel may remain uncoated (Rye 1981:41).

Other methods by which slips can be applied include pouring and wiping. Pouring is used especially when the slip solution is being applied to the interior surfaces of large sized vessels. The vessel is revolved rapidly as the suspension is poured and this may result in uneven coverage, evidences of which include lines or arcs where the flow of the slip is disrupted as the vessel is revolved and thicker coating on the lower sections of the vessel (Rye 1981:41).

A slip solution may also be applied by soaking a soft material such as a piece of cloth, sponge or a handful of grass in the solution and wiping it onto the surfaces of the pottery vessel. This method may result in uneven coverage of the surfaces of the vessel and fine grooves corresponding to the direction of the wiping action (Rice 1987: 150).

To aid the identification of the presence of slipping on the Zoboku pottery assemblage, attention was paid to the differences in colour between the clay paste of the core section of the potsherd and its exterior and interior surfaces. This method was possible as a red-coloured slip had been used on most of the potsherds and this was easily distinguished from the predominantly dark brown and dark red/orange clay pastes of the sherds. The slip coating had also peeled off from the surfaces of some sherds further aiding identification. Sections 4.2.5a-d outline the surface treatment characteristics observed in each unit.

4.2.5a. Slipping –ZBK13-M1

77% of the sherds from Mound 1 were not slipped. 16% showed slipping on the exterior surfaces, and 7% were slipped on the interior surfaces. Figure 39 shows the distribution of surface treatment characteristics across the unit.

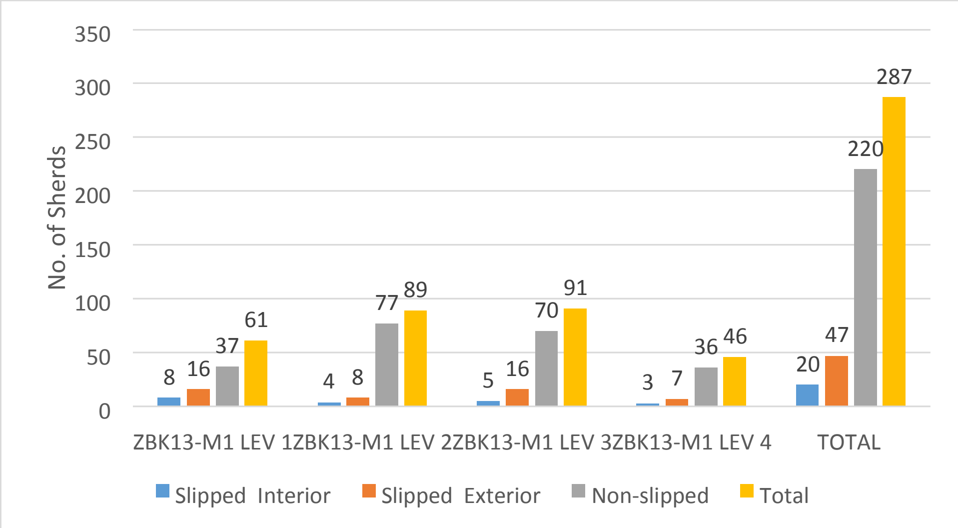


Figure 39: Surface treatment of bodysherds from Mound 1 (ZBK13-M1)

4.2.5b. Slipping – ZBK13-M2

In Mound 2, unslipped sherds constituted 63% of the total number of sherds. Sherds showing slipping on the exterior made up 24% and those slipped on the interior, 13%. The quantities as recovered from the unit are illustrated in Figure 40.

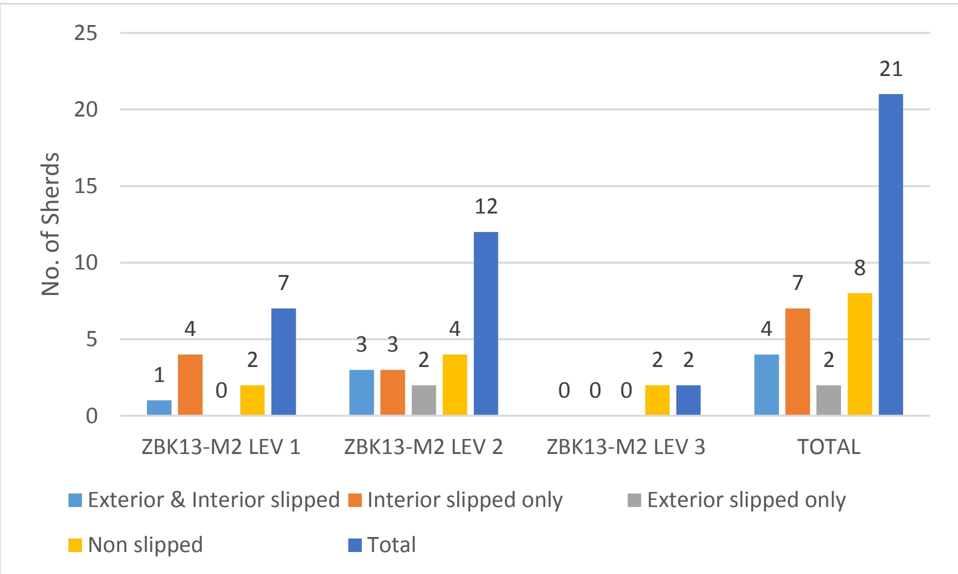


Figure 40: Surface treatment on bodysherds from Mound 2 (ZBK13-M2)

4.2.5c. Slipping – ZBK13-M3

A majority of the sherds from Mound 3, namely 63%, were unslipped. This was reflected in all the spits of the unit. Sherds with exterior slipped surfaces were more than those slipped on the interior in each excavated level. Altogether these constituted 24%, and sherds slipped on the interior surfaces made up 13%. There were no sherds with interior slipped surfaces from Level 7, which was the deepest level of the unit. Figure 41 shows these characteristics.

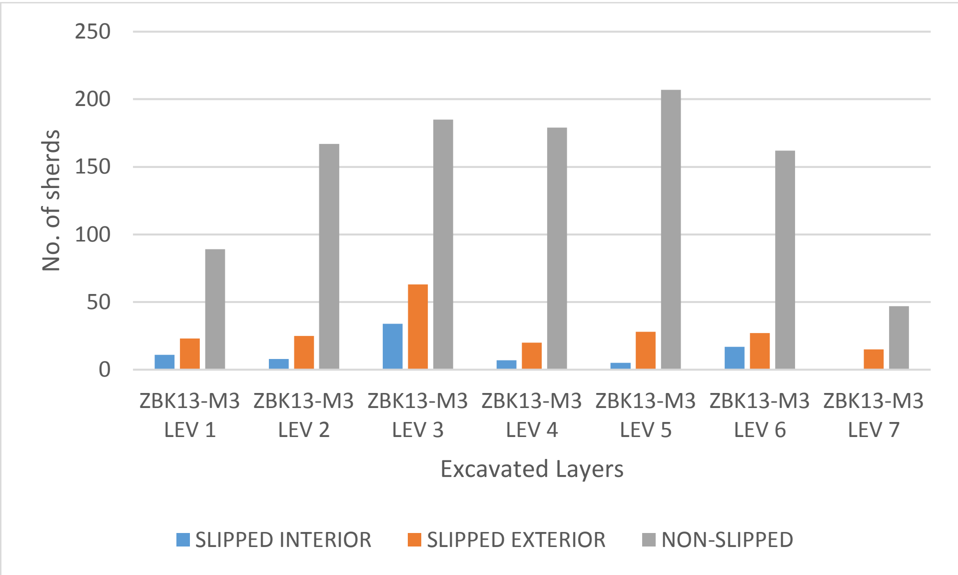


Figure 41: Surface treatment on bodysherds from Mound 3 (ZBK13-M3)

4.2.5d. Slipping – ZBK13-M4

Like all the units described above, sherds showing unslipped surfaces dominated in Mound 4, making up 87%. Again, this was reflected in all the excavated spits. Sherds with exterior slipping made up 7.4% while those with interior slipping constituted 5.2%. Figure 42 depicts this distribution.

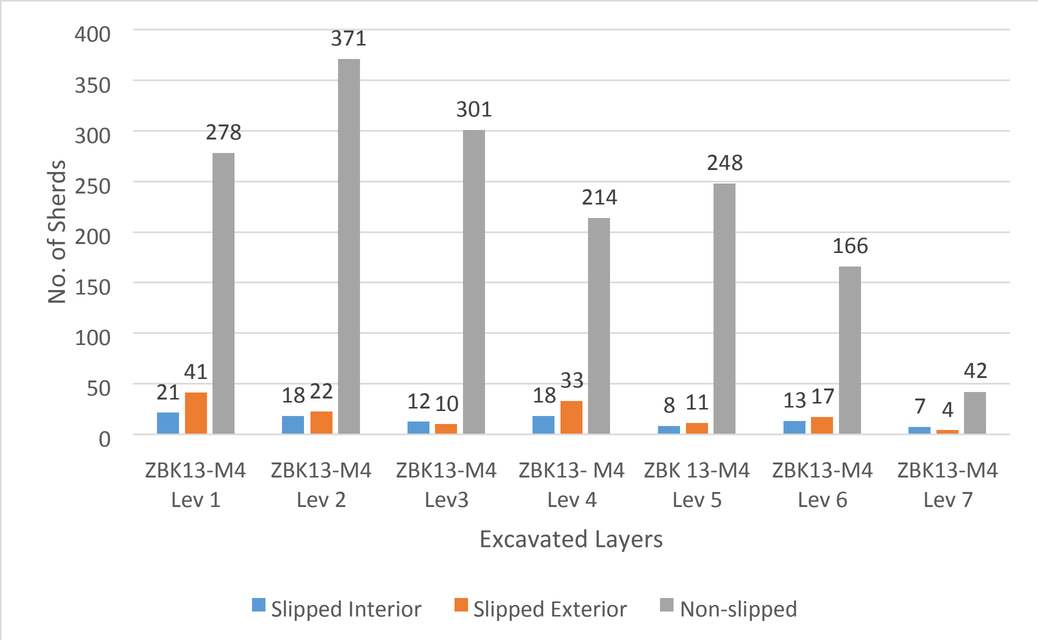


Figure 42: Surface treatment on bodysherds from Mound 4 (ZBK13-M4)

4.2.6. Bodysherd Decorations

Rice (1987:144) describes decoration of pottery as actions that embellish the vessel beyond the process of forming the clay paste into a complete vessel and finishing its surfaces. Ceramic analysts identify certain distinctions in pottery decorative techniques, namely, techniques that penetrate the surface of the vessel leading to displacement or removal of clay matter, and those that add matter to the surface of the vessel. Examples of penetrative decorative methods include incisions, stamping and rouletting. Additive decorative methods include painting, glazing and appliquė or embossments. Rice (1987: 144) further distinguishes between decorative motifs that cover the whole or part of the vessel surfaces, and motifs applied to the vessel before or after firing. A total of 978 potsherds from the Zoboku assemblage were decorated. This represents 29%. 68% of the potsherds were undecorated and 2.6%

showed some decorations but were heavily eroded, making it difficult to ascertain the types of decoration. Most of the motifs identified were executed using surface penetration and/or displacement (Rice 1987: 144-146). The dominant decorative motif was roulettes, with 632 potsherds showing some type of roulette. This represents 98.1%.

Apart from the addition of red slip to some of the vessels as discussed previously (see Section 4.2.5), the only example of an additive technique observed was a series of applique knobs applied on the exterior surface of a bowl (see Fig 4.78). Out of the total number of decorated potsherds, 734 showed a single motif. This represents 75%. The rest depicted combinations of two or more motifs. The various forms of motifs identified are outlined below.

4.2.6a Incisions/Grooves

Incisions are made by cutting lines into the surface of a vessel with a sharp pointed implement (Rye 1981:90; Rice 1987: 146). The appearance and quality of the incised motif is influenced by the size and shape of the tool, the stage of application, the amount of pressure applied and the angle as well as direction of the motion. Two main types of incisions were identified in the pottery assemblage, namely broad shallow grooves (Figure 43a and fine deep lines (Figure 43b).

Figure 43a: An example of broad shallow incisions.

Figure 43b: Examples of fine incisions.

4.2.6b. Stabs or Punctates

Stabs or punctates are created by using the edge of a pointed blunt tool to remove pieces of clay paste from the surface of the vessel when it is at the plastic or leather hard stage (see Figure 44). The examples of stabs found at Zoboku rarely occurred alone. They were mostly combined with other patterns especially incisions and grooves (see Figures 45 and in Figure 46, stabs have been combined with roulettes).

Figure 44: An example of triangular punctates

Figure 45: Triangular stabs combined with incisions

Figure 46: Triangular stabs combined with roulette motif

4.2.6c. Roulettes

Roulettes refer to continuous plastic impressions made onto the surface of pottery vessels before firing (Rice 1987: 145). Referencing the tool, Soper (1985:30) describes a roulette as a roughly cylindrical object, usually small in size, which is rolled over the surface of wet clay to leave a continuous band of impressions that are repeated at every revolution.

A variety of flexible or rigid objects can be manipulated in a variety of ways (twisted, knotted, braided, folded, wrapped and so on) and used to impress plastic patterns on a vessel’s surface (Hurley 1979: 3-4). Ceramic analysts identify that a great and complex variety of roulettes exist because potters employ several materials in different formats, based on their peculiar ethnographic environments to create a wide range of roulette impressions. The analysis of the roulette decorations on the pottery assemblage from Zoboku followed very closely, the scientific classification system outlined by Livingstone Smith et al (2010: 52). This system identifies the constitution of the materials that serve as the roulette tools and how they have been modified.

It therefore distinguishes patterns made by tools of assembled materials such as manipulated round fibres and strips, fibres combined with wood, tools made from modified materials such as wood, bone, inflorescences and fruits, and those made of unmodified materials such as shells and recycled manufactured items.

Tools made from assembled materials are further divided into simple tools and tools on a core. Simple tools are made by twisting, folding, knotting or braiding a core or a strip. Tools on a core are divided into two forms based on whether the core material and the wrap constitute a single element or whether the two are independent. Tools of the former sub-category are generally made by continuously building on a flexible or semi-rigid core such as a cord or straw, while those of the latter sub-category are made of a rigid material such as wood, bone or metal to which flexible materials such as fibres or wires has been attached.

Based on the descriptions by Livingstone Smith et al (2010: 36-114), five main types of roulette motifs were identified in the Zoboku pottery assemblage: twisted cord, cord wrapped, folded strip, braided strip and carved roulettes. The folded and braided strip as well as twisted cord roulettes belong to the category of designs made by simple tools of assembled materials, while the cord wrapped motif were made by tools built on a semi-rigid or rigid independent core. The carved roulette designs were probably made by modified or unmodified rigid materials. The following sections look at each motif in more detail.

4.2.6c.1. Folded Strip Roulette

Strip roulettes are made of flat rigid fibres. This is in contrast with cord roulettes which are made of flexible rounded fibres. The seminal volume by Haour et al (2010; see entries on pages 60-68, 70-74 and 169-191) outlines three main forms of strip roulettes, namely folded, braided and knotted strip roulettes. Based on the descriptions of the characteristics of the tools and patterns of the motifs therein, two principal forms, namely, folded strip and braided strip roulettes were identified in the Zoboku pottery assemblage. These were identified using sherds that clearly displayed the diagnostic features of the motifs. A discussion of the folded strip roulettes follows in this section, while braided strip roulette is described in the next.

Folded Strip roulette patterns are made using a rigid material with a flat section folded over itself (Haour 2011:40). The diagnostic characteristics of this motif are parallel rows of angular convex impresses. The rows are diagonal in orientation and are linked by faint perpendicular lines, giving the appearance of a ladder (Haour & Keita 2010: 169; Haour 2008: 11). There are variations of this motif depending on how tightly the strip is folded or the skill with which the patterns are executed (see Figure 47).

Figure 47: An example of folded strip roulette pattern

4.2.6c.2 Braided Strip Roulette

Unlike the folded strip motif described above, the braided strip roulette pattern is made using strips on a continuous core. The motifs appear as parallel rows of concave impressions resembling the steps of a staircase. The tool may comprise five or more strips of flat sectioned fibres, folded in the middle and braided (Mayor 2010: 181). One of the fibres serve as a primary core around which the rest are braided. The resultant tool is spiral in profile with a polygonal braid structure. See Figure 48 for an example of this pattern.

Figure 48: Sherd showing Braided Strip roulette pattern

4.2.6c.3. Twisted Cord Roulette

This motif is made with a tool comprising two or more strands of flexible fibrous material twisted together (Hurley 1976: 15). The fibrous cords used are round-sectioned in profile, and the actions used to make the roulette tool may include rolling the fibres in the palm of one's hand, on the thigh or the ground or twisting a pair or multiple strands together and then knotting the ends (Livingstone Smith et al 2010: 54; Arazi & Manning 2010: 134; Soper 1985:35).

A simple twisted cord roulette is made by twisting two strands of the same composition, size or length in the same direction, but more complex and intricate variants can be achieved by varying the properties of the constituent strands; for instance, by increasing the number of strands, using strands of unequal nature, length, thickness or size and by varying the directions and tightness of the twists or incorporating knots at intervals. Hurley (1976:16 - 81), for example, describes over two hundred variations of cord wrapped roulettes identified in Japanese and American pottery assemblages.

Livingstone Smith et al (2010:54, 88) have outlined two broad forms of twisted cord roulette motifs using archaeological and ethnographic pottery data from various parts of Africa: namely the simple twisted and the double twisted cord roulettes. The same motif is termed twisted string roulettes by other analysts (Haour 2008:9; Magnavita et al 2009: 32, 36, 40; and Soper 1985: 35-36).

My focus here is on the double twisted sub-category as this was observed on bodysherd in the assemblage. The motif is made by the impressions of a piece of cord which has been doubled over itself. The pattern appears as discontinuous delimited series of beads oriented diagonally (Livingstone Smith et al 2010: 54). On most of the bodysherds, the impressions were not very well preserved and on others it was difficult to determine the direction of execution. In the example shown in Figure 49 below, the impressions appear to have been made in several directions. However, the diagnostic concave rounded impressions of the beads are quite clear.

Figure 49: An example of double twisted cord roulette

4.2.6c.4 Cord Wrapped Roulette (on an Independent Core)

Cord wrapped roulette tools may be built on a flexible continuous core or a rigid independent core (Livingstone Smith et al 2010:68, 74). The examples of this motif found at Zoboku appeared to have been made with the latter tool. The predominant pattern observed is what has been described by MacDonald & Manning (2010:145) as the most basic, comprising an untwisted cord wrapped around a rigid object such as a stick, bone, metal rod or nail. Variations can be created based on how tightly or closely together the cord is wrapped around the core. A tightly wrapped tool results in dense overlapping lines while a widely spaced wrapping produces clearly separated linear segments. The dominant cord wrapped motif from the Zoboku assemblage (shown in Figure 50) is similar to the experimental impression illustrated in Figure 3.10 of McDonald & Manning (2010:152).

Figure 50: An example of cord wrapped roulette pattern

4.2.6c.5. Carved Roulette

Carved roulette motif is an example of a pattern made by a rigid modified or unmodified material (Livingstone-Smith et al 2010: 78, 104-105; Soper 1985: 33). The commonest examples of this roulette tool are small cylindrical bone or wood pieces into which various patterns have been carved. However, other natural objects such as inflorescences and the cobs of plants may also be used. The diagnostic characteristic of this motif are continuous geometric impressions occurring in clearly defined rectilinear bands. Four examples of carved roulette motifs were found at Zoboku. These are depicted in Figures 51a-d. They exhibit the characteristic evenly spaced geometric impressions occurring in clear bands over a considerable area of the surface of the sherd. In Figure 92, a band of carved roulettes encircles the pot. Most of the carved roulette motifs from Zoboku were combined with other roulette patterns (see for example Figures 51a & b).

Figure 51a: Carved roulettes combined with folded strip roulettes

Figure 51b: An example of carved roulettes combined with folded strip roulettes.

Figure 51c: Square patterned carved roulettes

Figure 51d: Carved roulette of a herringbone pattern.

4.2.7 Distribution of Decorative Patterns in the Units

The following sections detail the decorative patterns observed in each excavated unit.

4.2.7a. Mound 1 (ZBK13-M1)

A total of two hundred and eighty-seven (287) bodysherds were recovered from Mound 1. Of these, 72% were decorated. 18% were undecorated and on the remaining 10%, the decorative motifs were either indistinct or eroded and could not be identified (see Figure 52). Roulette patterns dominated the decorations, making up approximately 62.3%. Folded strip was the most dominant pattern constituting 55.6%. Two potsherds showed carved roulettes combined with incisions/grooves and this constituted 0.9%. Incisions/grooves occurred as singular motifs on 22.2% of the bodysherds and were combined with stabs on 14.5%.

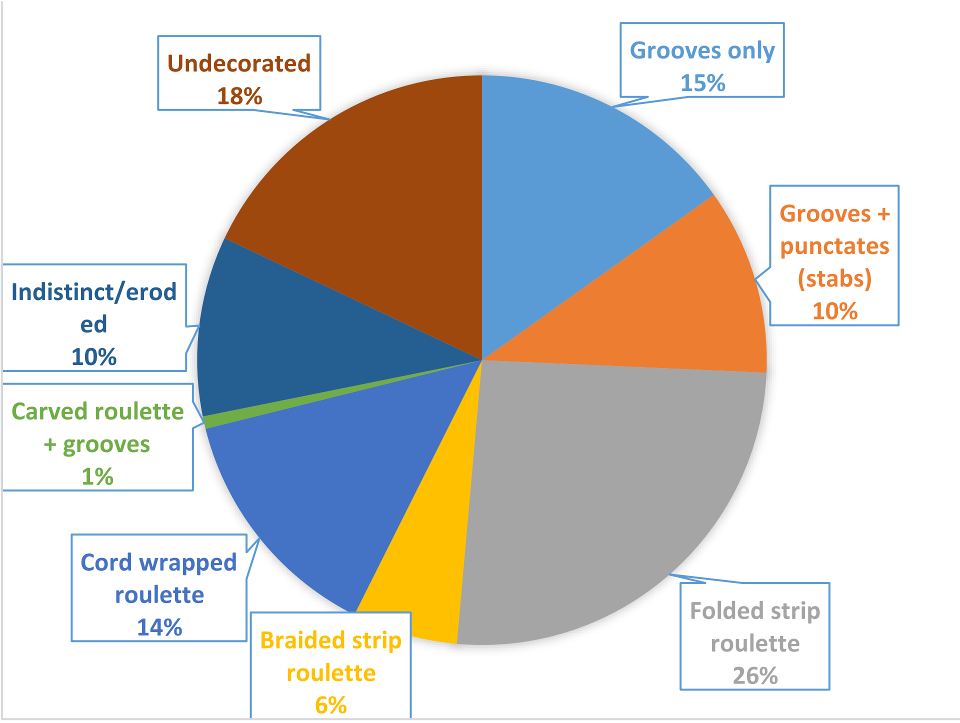


Figure 52: Decorative patterns observed in Mound 1

4.2.7b. Mound 2 (ZBK13-M2)

In Mound 2 (ZBK13-M2), undecorated bodysherds constituted 54% of the one hundred and fifty-two (152) bodysherds recovered. Sherds with eroded or indistinct motifs constituted 9.2%. The analyses of decorative patterns were therefore carried out on fifty-seven (57) sherds making up 37.5%. Like Mound 1 above, the motifs identified were incisions/grooves, combinations of grooves and stabs, folded strip, braided strip and cord wrapped roulettes. However, no carved roulettes motifs were identified. Grooves/incisions were the most common motif as it occurred on 56% of the decorated sherds. Of this quantity, 53% featured grooves/incisions combined with stabs. The roulette motifs were again dominated by the folded strip variety. It was found on 48% of the sherds.

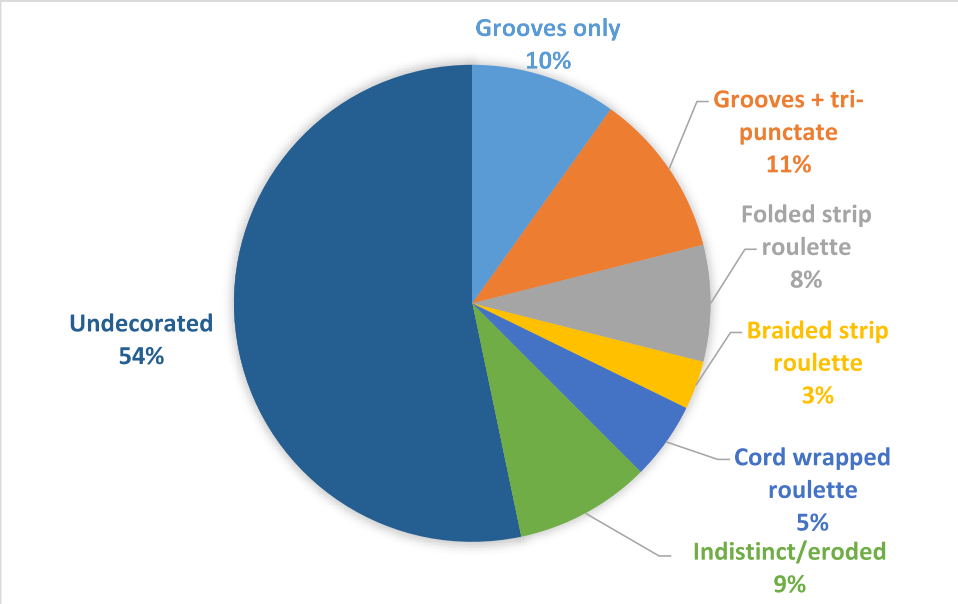


Figure 53: Decorative patterns observed in Mound 2

4.2.7c Mound 3 (ZBK13-M3)

80% of sherds from Mound 3 (ZBK13-M3) were undecorated. Of the decorated sherds, 63% bore roulette patterns but on 16% of this quantity, the roulette motif had been combined with incisions. Nine (9) sherds showed a combined motif of carved and folded strip roulettes. Similar to what was observed in Mound 1 and 2, folded strip roulette was the dominant motif here (see Figure 54). However, no braided strip patterns were observed.

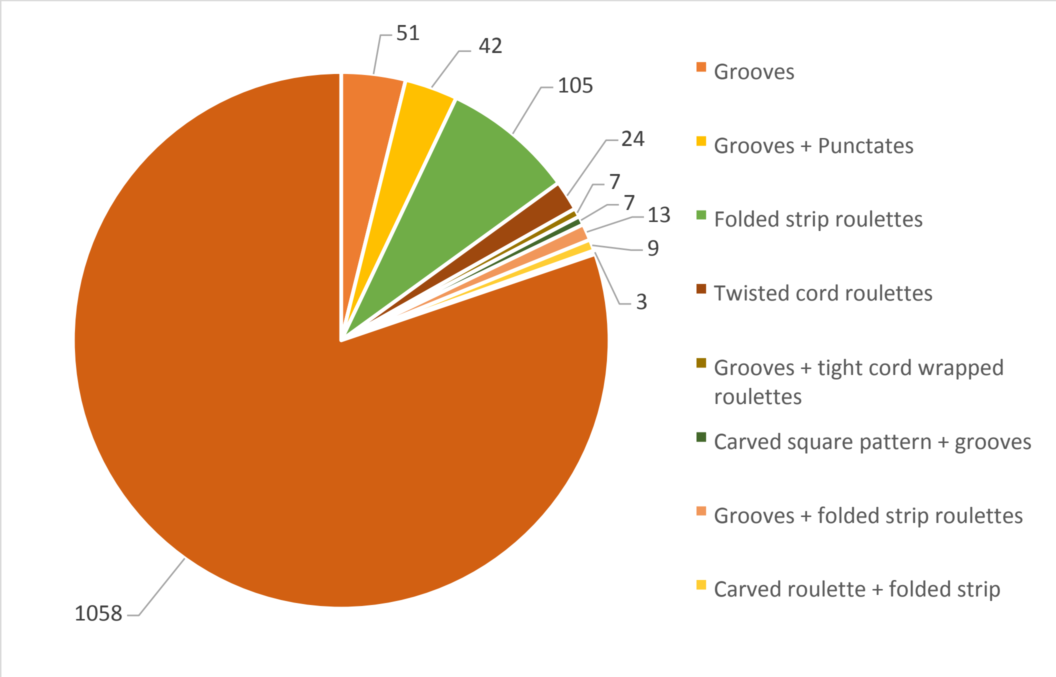


Figure 54: Decorative patterns observed in Mound 3

4.2.7d. Mound 4 (ZBK13-M4)

Undecorated sherds constituted 72% of the total amount of potsherds from Mound 4. The decorative motifs were eroded or indistinct on 2.75% and decorated sherds which were analysed made up 24.4%. The three major decorative patterns already discussed above, namely grooves/incision, stabs and roulettes were observed here but they occurred either as single motifs or in various combinations (see Figure 55). Roulettes dominate the decorative patterns, making up 67%.

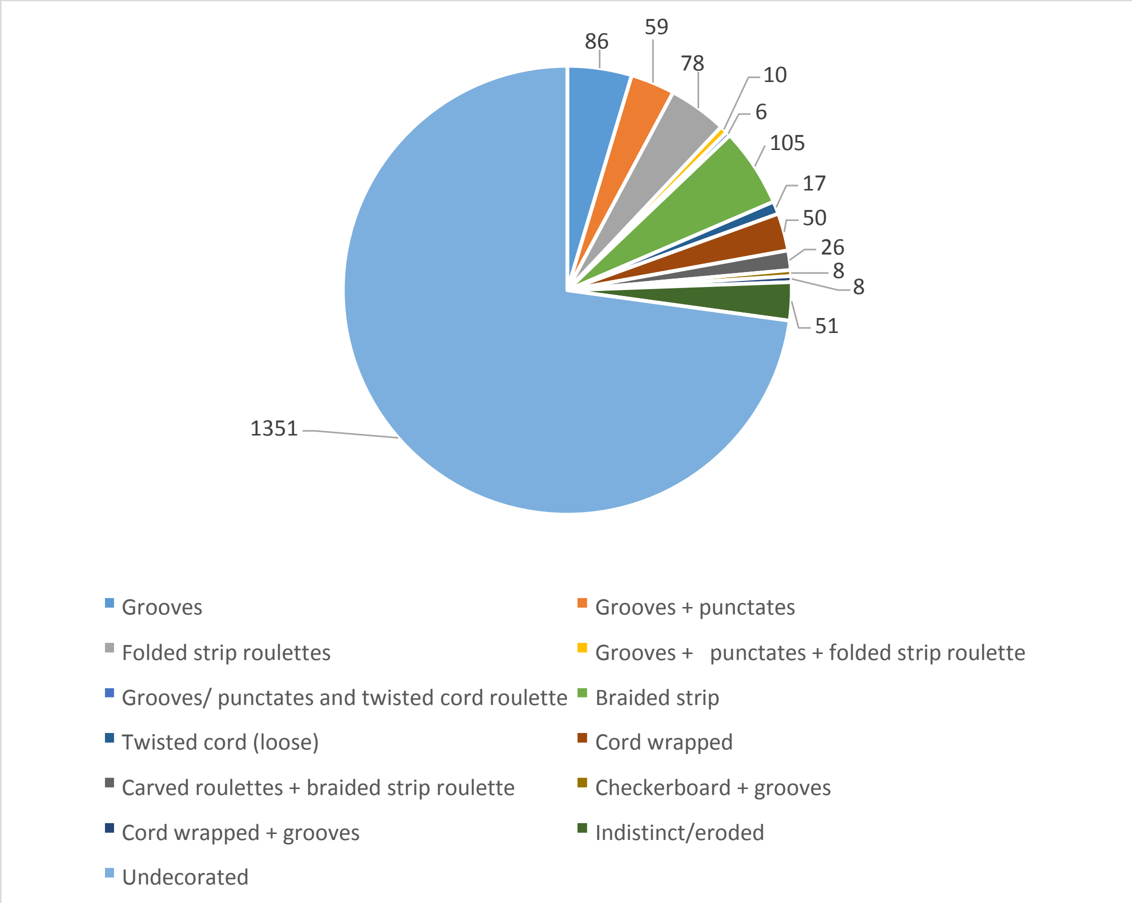


Figure 55: Decorative patterns observed in Mound 4

4.3 Rim Sherds Analyses

A rim sherd usually refers to the upper portion of a pottery vessel or the area which incorporates a pot's orifice or mouth. In addition to the pot's opening, other specific zones such as collar, neck and throat may be identified in the rim area. These zones are defined in relation to the form, angles and curvature of the vessel (see Rice, 1987: 212). Where a change in orientation in the form of the vessel allows an identification of these specific zones, a rim refers to the lip or upper edge of the pot. Rim sherds, which have also been called feature sherds (McIntosh 1995:139), usually evince physical characteristics by which we can outline the shape, form, and other stylistic attributes of a pot. Rice (1987: 240) also stresses that the orifice is the area which is usually modified to a vessel's function.

A total of five hundred and seventy-nine (579) rim sherds were recovered from Zoboku. Of these ninety-five (95) were too small to be analysed and were discarded. Therefore, four hundred and eighty-four (484) or 83.5% were analysed. Mounds 1, 3 and 4 yielded forty-six (46), one hundred and eighty-six (186) and two hundred and thirty-one (231) rim sherds respectively. The least number of rims, namely twenty-one (21) came from Mound 2. The analyses of these rims which are set out below, are intended to elucidate the techniques by which the pots were formed as well as the various pottery types that were recovered. To achieve these, the analyses highlighted the following attributes: orifice diameter, angle, texture, surface treatment and morphology.

4.3.1 Rim Diameter

Rim diameter was determined from the profile of the rim sherd. The lips of individual sherds were matched with arcs of circles drawn on a piece of paper with a compass. The diameter of the circle into which the inner lip of the sherd best fits was recorded as the diameter value of the rim sherd. For the Zoboku pottery assemblage, the diameter values of the rim sherds were collated into three ranges of 8-20cm, 22-30cm and 30cm or more. The diameter values 3.5% of the rim sherds could not be measured as they were too small or did not have enough lip area to fit into the diameter templates. The results of the diameter analyses from each unit have been outlined below.

4.3.1a Rim Diameter Values- ZBK13-M1

The diameter values of three rim sherds from Mound 1 could not be ascertained as they were too small. 60% of the remaining sherds had diameter values ranging between 22cm and 30cm. 20% measured between 8cm and 20cm and 18.6 % had diameters of 30cm or more. This suggests that majority of the rim sherds from Mound 1 came from medium sized vessels. These values are depicted in Figure 56.

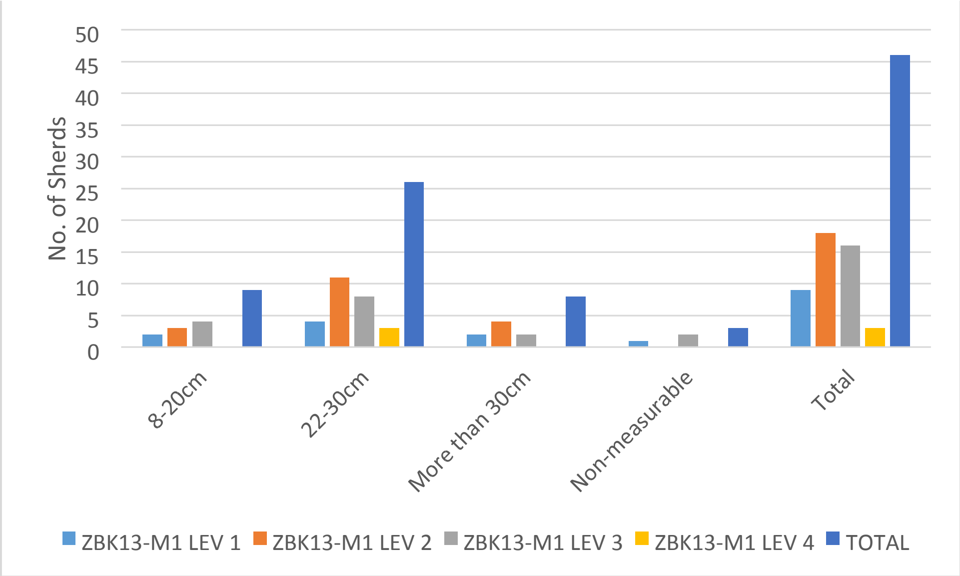


Figure 56: Diameter values of rim sherds from Mound 1

4.3.1b. Rim Diameter Values - ZBK13-M2

57.1 % of the sherds from this mound had diameters of between 22cm and 30cm. 23.8% had diameters in the range of 8cm and 20cm. Sherds with diameters of 30cm or more constituted 19.0%. Like Mound 1, most of the sherds appear to have come from medium sized vessels. Figure 58 shows the diameter values from Mound 2.

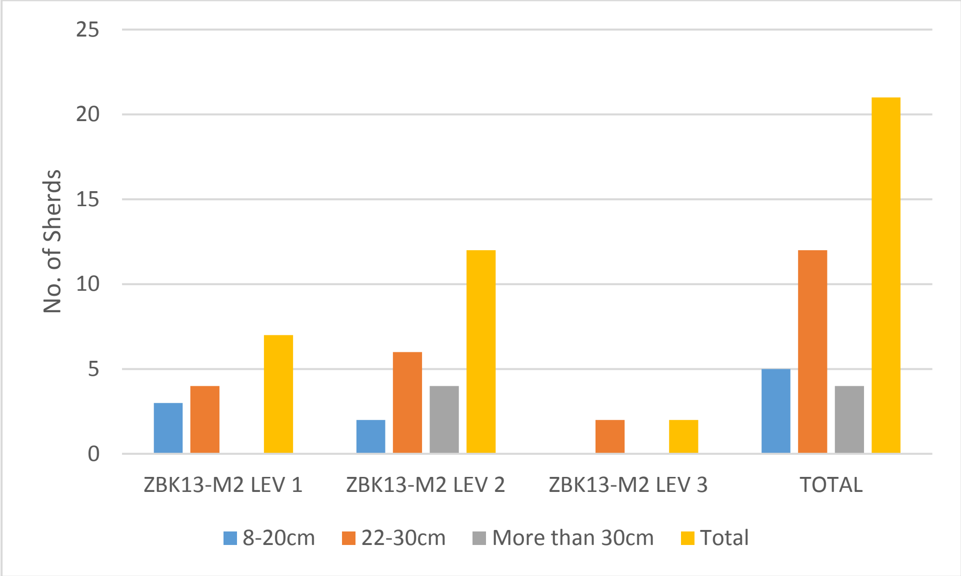


Figure 57: Diameter values of rim sherds from Mound 2

4.3.1c. Rim Diameter Values- ZBK13-M3

In Mound 3, more rim sherds (48.8%) had diameter values ranging between 8cm and 20cm, probably from smaller sized vessels. This is unlike what was observed in Mounds 1 and 2. A further 44.3% of the sherds had diameter values between 22cm and 30cm and 6.7% recorded diameters of 30cm and above. Eight (8) rim sherds could not be measured due to being too small or not having enough lip area. These values are shown in Figure 58.

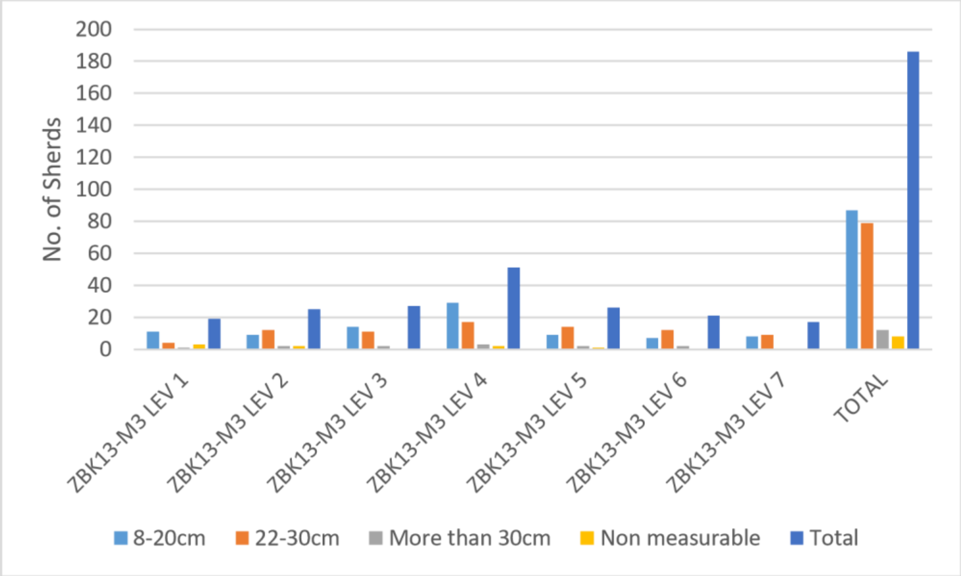


Figure 58: Diameter values of rim sherds from Mound 3

4.3.1d. Rim Diameter Values- ZBK13-M4

Seventeen (17) rim sherds from Mound 4 were non-measurable. This represents 7.9%. Of the measured sherds, 54.2% had diameter values between 22cm and 30cm. 41% had values between 8cm and 20cm and 4.7% fell in the larger bracket of 30cm or more. These are shown in Figure 59.

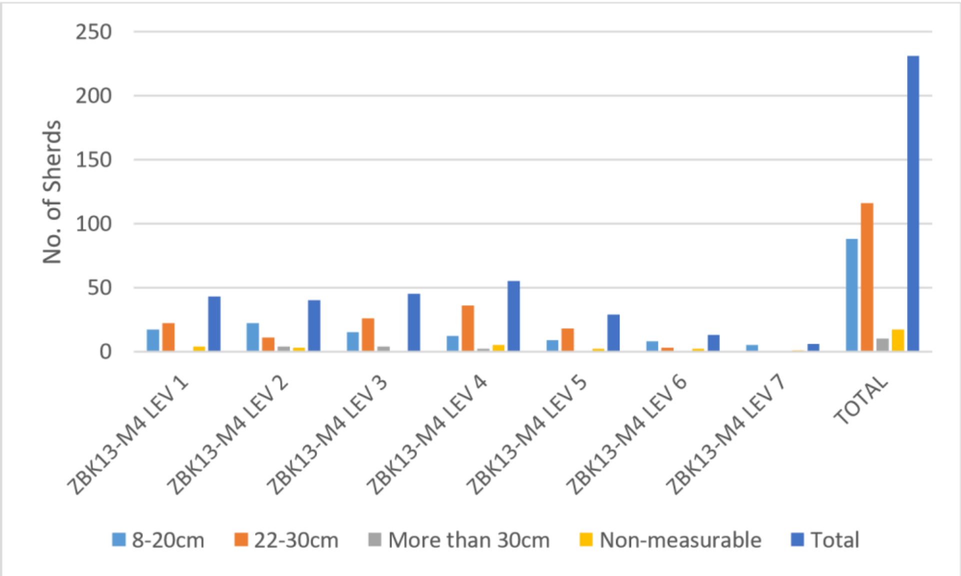


Figure 59: Diameter values of rim sherds from - Mound 4

4.3.2. Rim Angles

The angle of a rim sherd helps to determine the type of orifice of the vessel. The degree of restriction of the vessel is determined as the diameter of the mouth relative to the diameter of the widest part of the vessel. Rim angles have been a useful variable in functional analysis of pottery (Wilson & Rodning 2002: 31). The template used to measure the rim angles was adopted from one created by (McIntosh 1995: 141, 170) for analysing potsherds from Jenne-Jenno (see Figure 60).

To measure the rim angle, the template was laid on a flat surface, and a rigid plane, (in this instance, the back of a hardcover book), was aligned with the double horizontal line, and perpendicular to the plane of the drawing. The lip of each rim sherd was then placed against the rigid plane, with its outer surface facing the left section of the template. As the rim was shifted gradually from the inner lip to the outer lip, the position on the template where it had closest contact with the rigid plane was assumed to be the position of the rim on the pottery vessel. On the template, the value of the line on the outer side of the rim was taken as the rim angle.

The angle values are directly proportionate to the degree of restriction of the vessel orifice. For example, rim sherds which fall in Section 2 on the template measuring 45^0- 85^0 belong to vessels with more restricted orifices. Following the rim angle coding system also devised by McIntosh (1995: 141) the pottery assemblage was classified into four divisions, numbered from 2 to 6, corresponding to 45^0-85^0, 85^0 - 95^0, 95^0 -130^0, 130^0-170^0 and 170+. The values of the rim angle measurements for each excavated unit are outlined below.

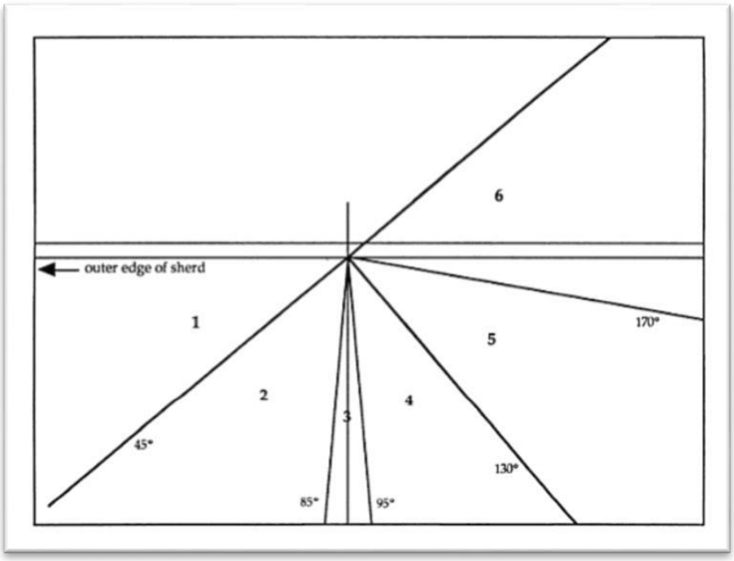


Figure 60: Rim angle measurement template
(Source: McIntosh 1995: 170)

4.3.2a Rim Angle Values –ZBK13-M1

Rim sherd angles of between 85^0 and 130^0 dominated in Mound 1. Altogether, 70% of the sherds fell within this range. 26% had angles of between 45^0 and 85^0. Sherds between 130^0 and 170^0 constituted 4%. No sherds measured above 170^0 (see Figure 61).

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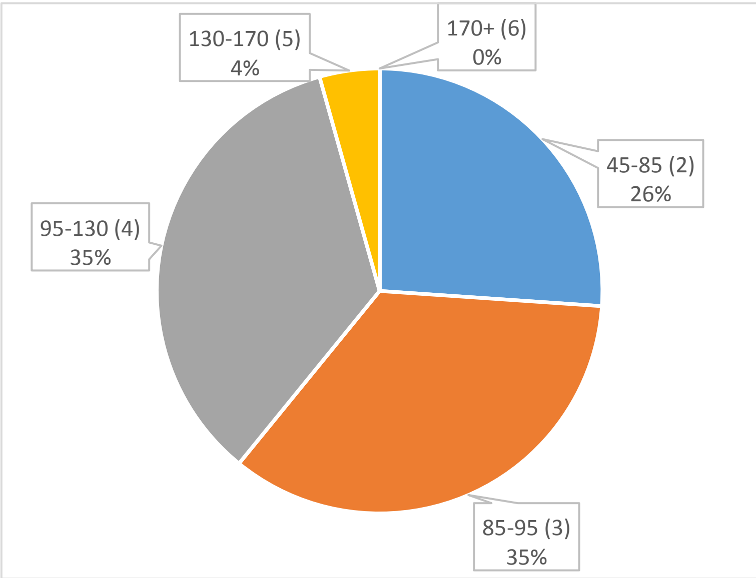


Figure 61: Percentage distribution of rim angles from Mound 1

4.3.2b. Rim Angle Values - ZBK13-M2

Again, rim sherds with values of between 85^0 and 130^0 dominated in this unit, constituting 76%. Sherds from more restricted vessels with angles between 45^0 and 85^0 numbered 14%. 5% of the sherds had angles between 130^0 and 170^0, and another 5% measured above 170^0. See Figure 62.

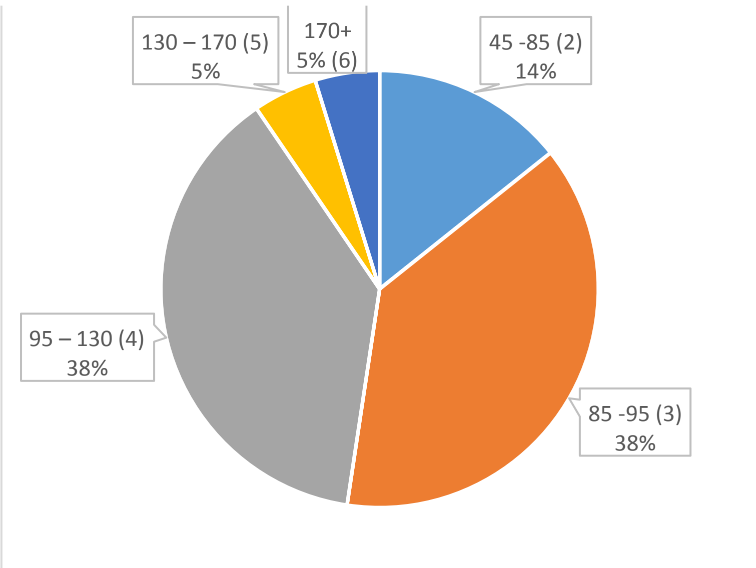


Figure 62: Percentage distribution of rim angles from Mound 2

4.3.2c. Rim Angle Values - ZBK13-M3

In Mound 3, sherds with angle values of between 130^0 again dominated, making up 73% of the total number of sherds. Sherds with angle values between 45^0 and 85^0 constituted 18%. 9% of the sherds fell between 130^0 and 170^0 but no sherds measured above 170^0. See Figure 63.

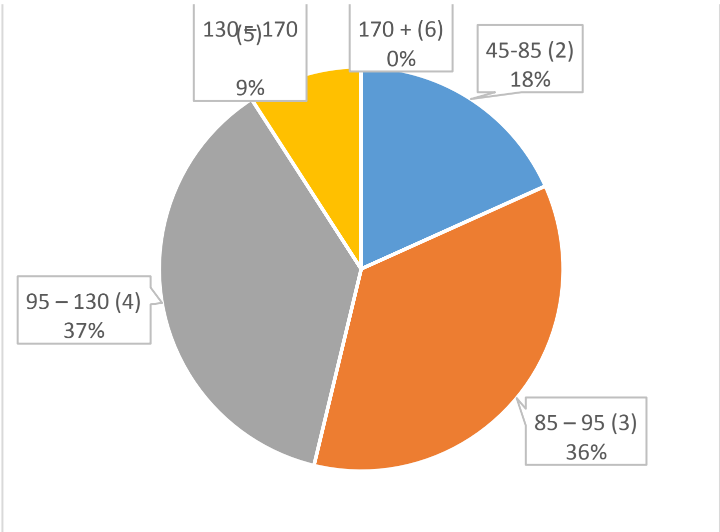


Figure 63: Percentages distribution of rim angles from Mound 3

4.3.2d. Rim Angle Values –ZBK13-M4

In Mound 4, 40% of the rim sherds had angle values between 95^0 and 130^0. This is slightly higher than sherds with angles between 85^0 and 95^0, which constituted 35%. 15% had angles of between 45^0 and 85^0 and 9% had angles of between 130^0 and 170^0. Sherds measuring 170^0 or more constituted 1%. These are shown in Figure 64.

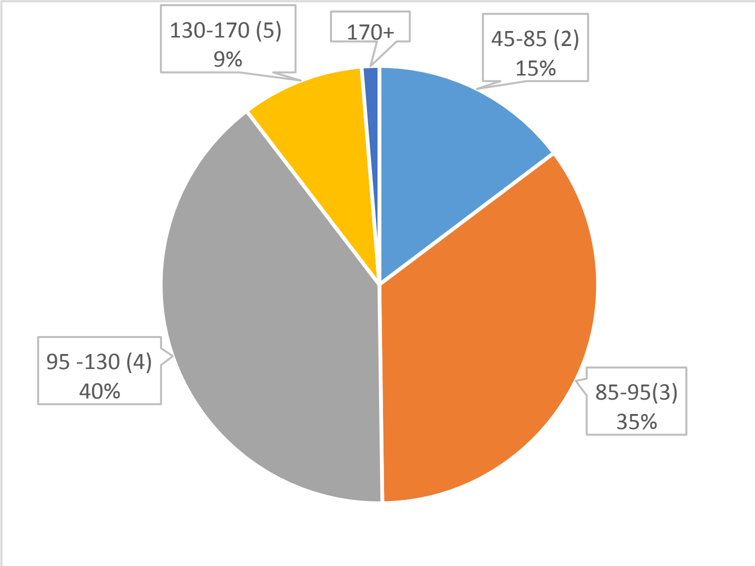


Figure 64: Percentage distribution of rim angles from Mound 4

4.3.3 Rim Types

A rim type can be described as the shape of the rim in radial section. Rim type analysis determines the type of the orifice of the vessel; whether restricted or open. This is in turn related to the overall form, style and intended function of the vessel. Classification of the rim types of the pottery from Zoboku was based on adaptations of rim sherd classifications developed in the context of archaeological work in the Crossroads of Empires Project, Niger River Valley by Dr. Anne Haour and her team.

This scheme is based on variations of simple, everted and thickened rims, which emphasize the shape of the vessel lip, alignment of its orifice, the degree of inflection of the rim area off the neck, and the differential degrees of thickness of parts of the upper rim area and the lip. Although this scheme informed the classification of the Zoboku pottery assemblage, some variations were observed, which have formed the basis for defining rim types that are specific to this site. These are outlined below.

4.3.3a. Zoboku Simple Rim 1

This refers to rim types that do not show significant inflection off the body of the vessel. The rim may be oriented toward the vessel's interior or project outward but with no obvious point of inflection. The rim area has an even thickness and the lip may be rounded, square, slightly tapered or rounded. In the samples illustrated here, the rim profiles are largely vertical (see Figures 65 and 66).

Figure 65: Zoboku Simple Rim 1

Figure 66: Zoboku Simple Rim 1 with a more thickened lip

4.3.3b. Zoboku Everted Rim 1

With Everted Type 1 rims, the profile is oriented outward. It shows an even rim area thickness but a small degree of inflection. The lip is squared (see Figure 67).

Figure 67: Zoboku Everted Rim 1

4.3.3c Zoboku Everted Rim 2

The variation that is highlighted by this rim type is its overhanging rim lip. Like other Everted types, its profile is oriented outward, and it shows a good degree of inflection, but the lip is pronounced and falls away from the rim edge (see Figure 68a and b).

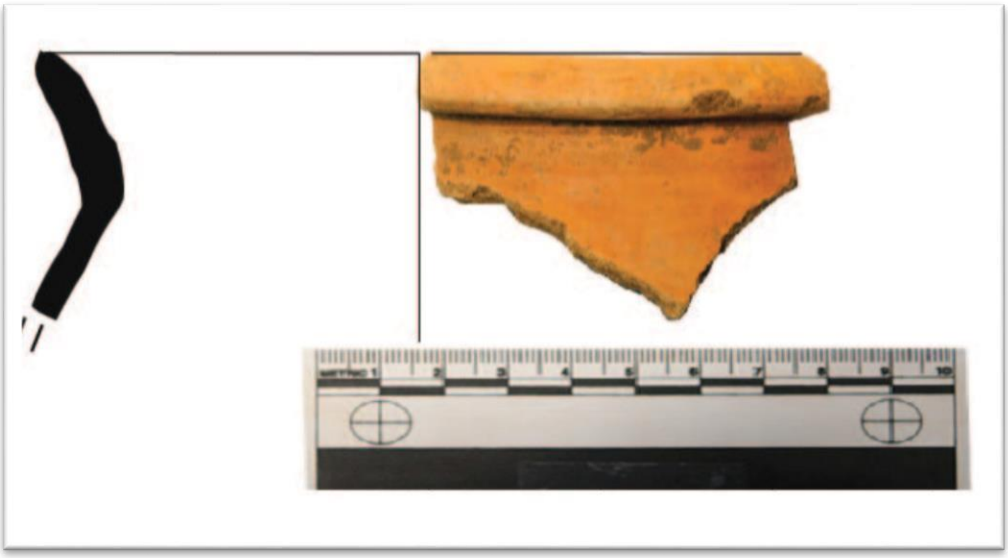


Figure 68a: Zoboku Everted Rim 2 showing an overhanging lip

Figure 68b: Zoboku Everted Rim 2 with a thickened lip

4.3.3d. Zoboku Everted Rim 3

This rim type emphasizes a well-defined and sharp angle of inflection between the collar and the body and has a rounded lip (see Figure 69).

Figure 69: Zoboku Everted Rim 3 showing a sharp angle of inflection at the collar.

4.3.3e. Zoboku Everted Rim 4

This rim type shows a well-defined point of inflection. The area of its maximum thickness is at the area where it is oriented outward. The lip is thin and tapered (see Figure 70).

Figure 70: Zoboku Everted Rim 4 with maximum thickness at the neck

4.3.3f. Zoboku Everted Rim 5

This rim type shows no definite point of inflection, as it curves gently outwards in orientation. The lip is rounded (see Figure 71).

Figure 71: Zoboku Everted Rim 5 showing a gentle angle of inflection

4.3.3g. Zoboku Thickened Rim 1

The profile of this rim type is oriented inward. The lip is thickened on the outside creating a rounded bulb and a flat upper portion (see Figure 72).

Figure 72: Thickened Rim 1

4.3.3h. Zoboku Thickened Rim 2

This rim profile is also oriented inward. The lip is significantly tapered and thickened on the exterior (see Figure 73).

Figure 73: Zoboku Thickened Rim

4.3.3i. Zoboku Thickened Rim 3

This rim type shows a smooth orientation inward. It shows no degree of inflection and the lip is rounded (see Figure 74).

Figure 74: Zoboku Thickened Rim 3

4.3.3j. Zoboku Thickened Rim 4

The area of maximum thickness is on the inside of the rim. The orientation of the rim is largely vertical and the lip slopes gently toward the interior of the vessel (see Figure 75).

Figure 75: Zoboku Thickened Rim 4

4.3.3k. Zoboku Thickened Rim 5

The angle of orientation of this rim type is at its exterior shoulder. It shows a well- defined inflection inward and has a rounded lip (see Figure 76).

Figure 76: Zoboku Thickened Rim 5

4.3.4 Rim Types by Excavated Units

This section outlines the quantities and types of rims excavated from the various units.

4.3.4a. Rim Types –Mound 1 (ZBK13-M1)

Nine rim types were identified in Mound 1. These were dominated by everted sub-types which altogether made up 58.6%. Sherds with simple rims with no orientation constituted 36.9%. Sherds with thickened rim types constituted only 4.3%. These are shown in Figure 77.

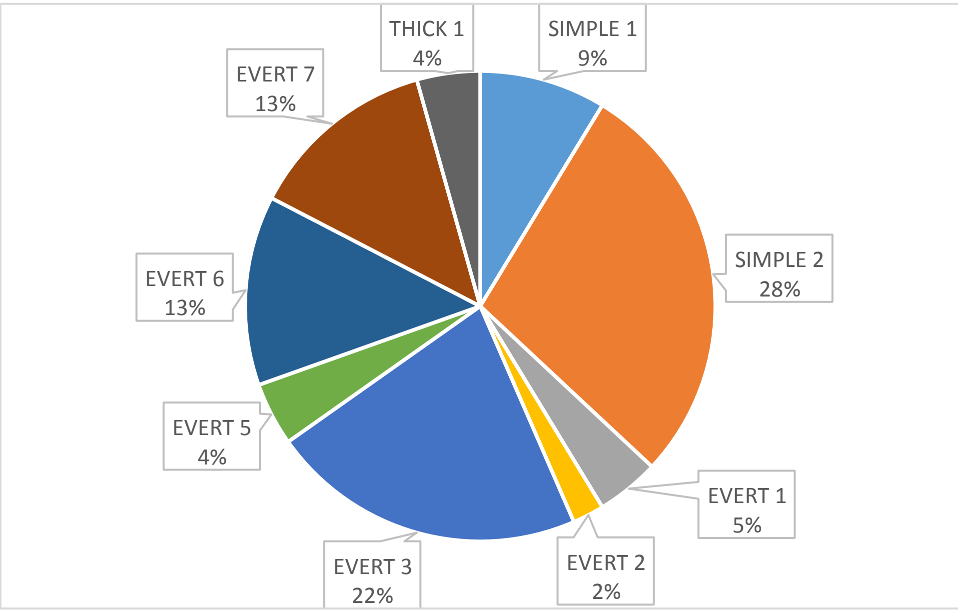


Figure 77: Percentage distribution of rim types from Mound 1

4.3.4b. Rim Types- Mound 2 (ZBK13-M2)

Like Mound 1, Mound 2 was also dominated by Everted rim types. Four sub-types were observed taking up a total of 57% of the sherds. 28.5% had thickened rims observed as two sub-types, and two simple rim types featured constituting 14.2% (see Figure 78).

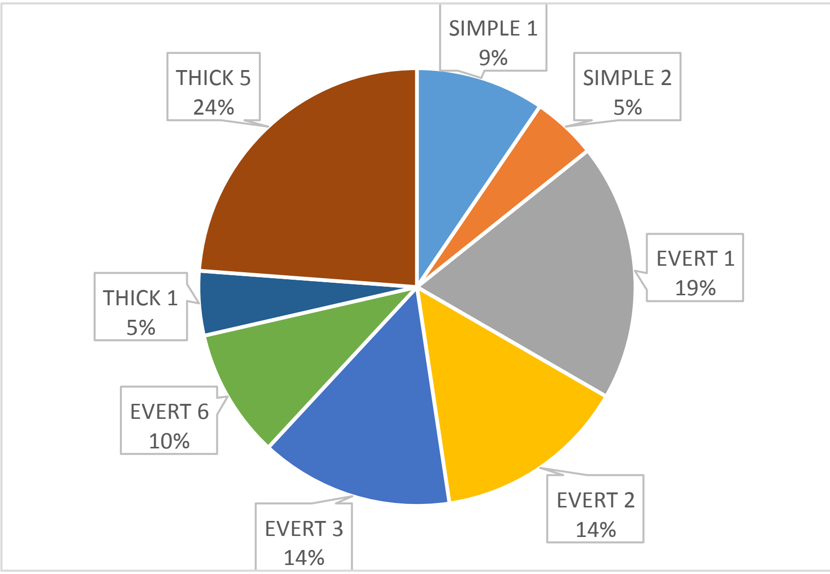


Figure 78: Percentages of rim types - Mound 2 (ZBK13-M2)

4.3.4c. Rim Types –Mound 3 (ZBK13-M3)

In Mound 3, 22.5% of the sherds had simple rims, 42.4% had everted rims and 35% had thickened rims. However, six everted rim subtypes were identified, compared with two and four of the simple and thick categories respectively. These are illustrated in the Table 8 and Figure 79.

	M3 Lev 1	M3 Lev 2	M3 Lev 3	M3 Lev 4	M3 Lev 5	M3 Lev 6	M3 Lev 7	Total
Simp 1	2	3	4	6	5	2	3	25
Simp 2	0	0	2	7	2	4	2	17
Evert 2	2	4	3	4	0	1	1	15
Evert 3	3	5	2	0	4	3	2	19
Evert 4	3	3	4	2	3	2	0	17
Evert 5	2	1	2	0	0	0	0	5
Evert 6	3	3	0	9	0	3	0	18
Evert 7	2	1	1	0	1	0	0	5
Thick 1	0	0	3	8	4	2	4	21
Thick 2	1	2	2	4	3	1	3	16
Thick 3	1	3	4	5	2	3	2	20
Thick 5	0	0	0	6	2	0	0	8
Total	**19**	**25**	**27**	**51**	**26**	**21**	**17**	**186**

Table 8: Frequency distribution of rim types from Mound 3

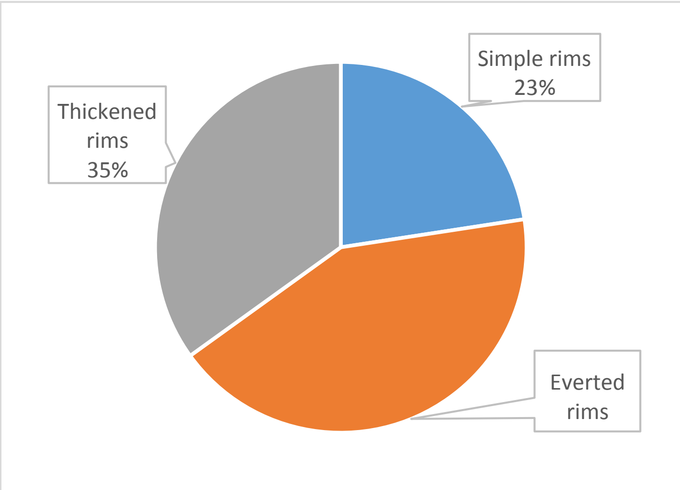


Figure 79: Percentage distribution of rim types from Mound 3

4.3.4d. Rim Types –Mound 4 (ZBK13-M4)

The three main rim types, namely, simple, everted and thickened constituted 33% each of the sherds from Mound 4. However, the sub-types of each category observed were three, six and five respectively. The distribution of these rim types by excavated levels is depicted in Table 9 and simplified in Figure 80.

	Lev 1	Lev 2	Lev 3	Lev 4	Lev 5	Lev 6	Lev 7	Total
Simp 1	8	4	5	8	4	3	2	34
Simp 2	6	5	6	7	5	2	0	31
Simp 3	3	2	2	3	1	0	0	11
Evert 1	5	2	4	4	5	1	0	21
Evert 2	0	6	3	6	3	1	2	21
Evert 3	4	0	6	0	0	0	0	10
Evert 4	0	0	0	5	0	0	0	5
Evert 5	0	0	3	8	2	0	0	13
Evert 6	1	0	0	5	0	0	0	6
Thick 1	7	6	6	4	3	2	0	28
Thick 2	4	2	3	2	4	2	0	17
Thick 3	2	5	1	0	2	0	0	10
Thick 4	2	4	3	0	0	0	0	9
Thick 5	1	4	3	3	0	2	2	15
Total	**43**	**40**	**45**	**55**	**29**	**13**	**6**	**231**

Table 9: Frequency distribution of rim types from Mound 4 (ZBK13-M4)

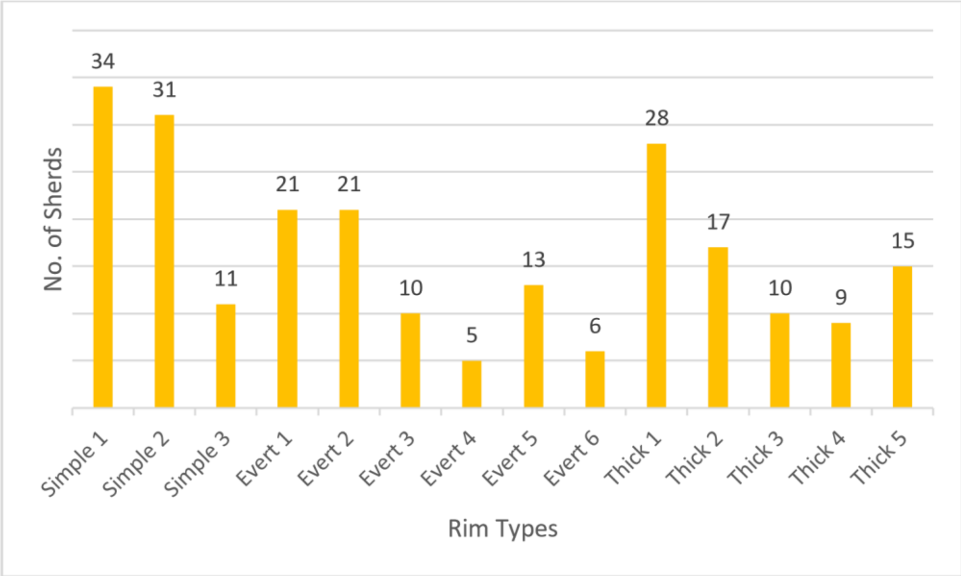


Figure 80: Distribution pattern of rim types from Mound 4

4.3.5. Surface Treatments of Rim Sherds - Slipping

Both the outer and inner surfaces of the rim sherds were visually examined for the types of surface finishing treatments applied. The techniques of slipping and the benefits to a pottery vessel have already been outlined above. The rim sherds were classified according to the presence of slipping on the interior or exterior surfaces or on both surfaces as well as the absence of slipping. The results from each unit are presented below.

4.3.5a. Slipping –Mound 1(ZBK13-M1)

39% of sherds from this unit were un-slipped. 50% showed slipping on both their interior and exterior surfaces. Two sherds were slipped on the interior surface only and three sherds, on the exterior surface only. These are shown in Figure 81.

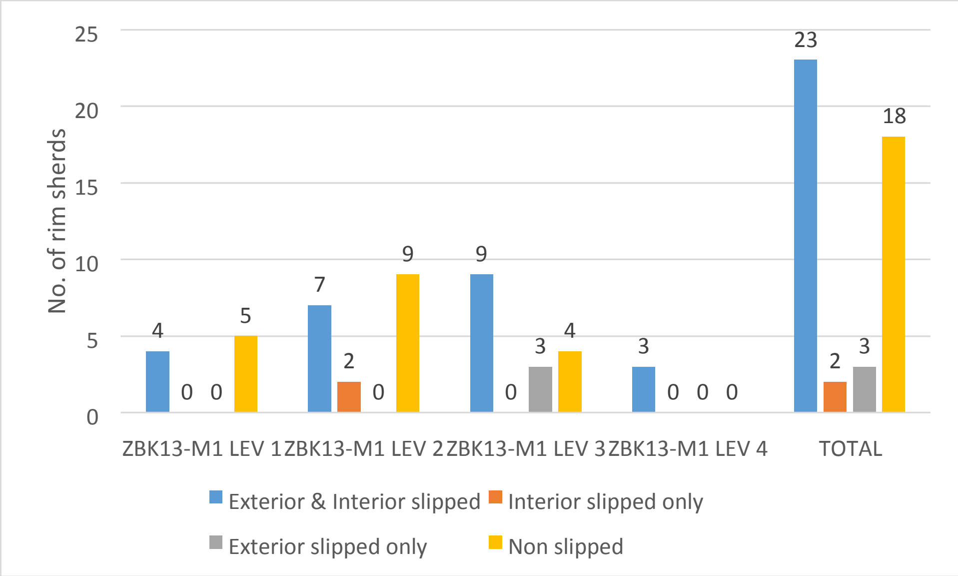


Figure 81: Surface treatments of rim sherds from M1

4.3.5b. Slipping-Mound 2 (ZBK13-M2)

In Mound 2, un-slipped sherds were predominant, making up 38%. 19% were slipped on both interior and exterior surfaces, while 33% and 9.5% were slipped on the interior and exterior surfaces respectively. The results as seen in the various levels are presented in Figure 82.

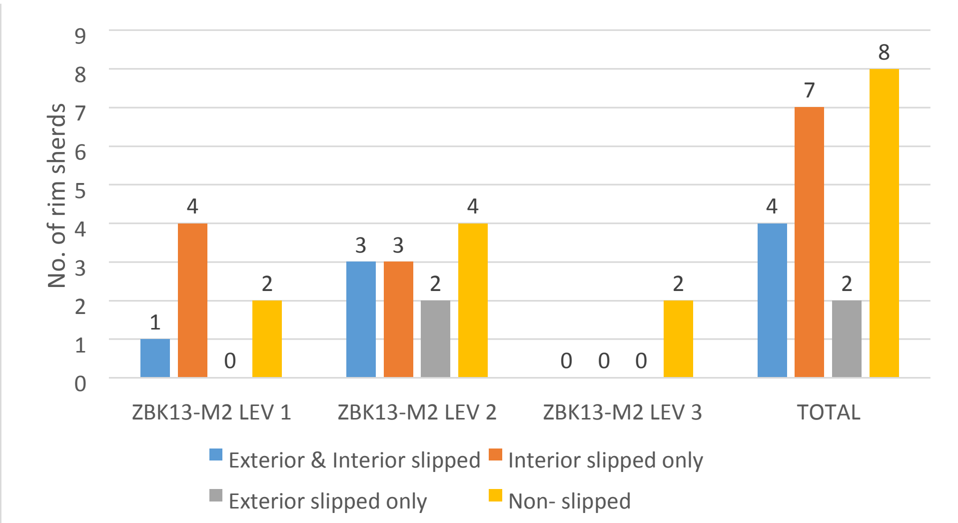


Figure 82: Surface treatments of rim sherds from M2.

4.3.5c. Slipping - Mound 3 (ZBK13-M3)

66% of the rim sherds in Mound 3 was unslipped. 27.4% was slipped on both interior and exterior surfaces. 1.6% showed slipping on the interior surface only and 4.3% on the exterior surface only. Table 10 shows the distribution of the surface treatments observed on the sherds from each level.

Context	Exterior & Interior slipped	Interior slipped only	Exterior slipped only	Non slipped	Total
ZBK13-M3 Lev 1	5	0	1	13	**19**
ZBK13-M3 Lev 2	7	0	0	18	**25**
ZBK13-M3 Lev 3	9	0	3	15	**27**
ZBK13-M3 Lev 4	16	3	2	30	**51**
ZBK13-M3 Lev 5	3	0	0	23	**26**
ZBK13-M3 Lev 6	7	0	0	14	**21**
ZBK13-M3 Lev 7	4	0	2	11	**17**
Total	**51**	**3**	**8**	**124**	**186**

Table 10: Surface treatments of rim sherds-Mound 3

4.3.5d. Slipping-Mound 4 (ZBK13-M4)

As was observed in all the other units, unslipped rim sherds were predominant in Mound Four, making up 75%. 19% showed slipping on both surfaces, 0.9% showed slipping on the interior surface only and 5.1% were slipped on the exterior surface. Table 11 shows the distributions of these quantities.

Context	Exterior & Interior slipped	Interior slipped only	Exterior slipped only	Non slipped	Total
ZBK13-M4 Lev 1	5	0	3	35	43
ZBK13-M4 Lev 2	8	2	6	24	40
ZBK13-M4 Lev 3	7	0	0	38	45
ZBK13-M4 Lev 4	6	0	2	47	55
ZBK13-M4 Lev 5	11	0	1	17	29
ZBK13-M4 Lev 6	6	0	0	7	13
ZBK13-M4 Lev 7	0	0	0	6	6
Total	**43**	**2**	**12**	**174**	**231**

Table 11: Surface treatment of rim sherds –Mound 4 (ZBK13-M4)

As shown in Figure 83, in all the units the majority of the rim sherds were unslipped. Most of the slipped sherds exhibited the treatment on both the exterior and interior surfaces. Sherds that showed exterior slipping only were more than those with interior slipping only in all the units except in Mound 2.

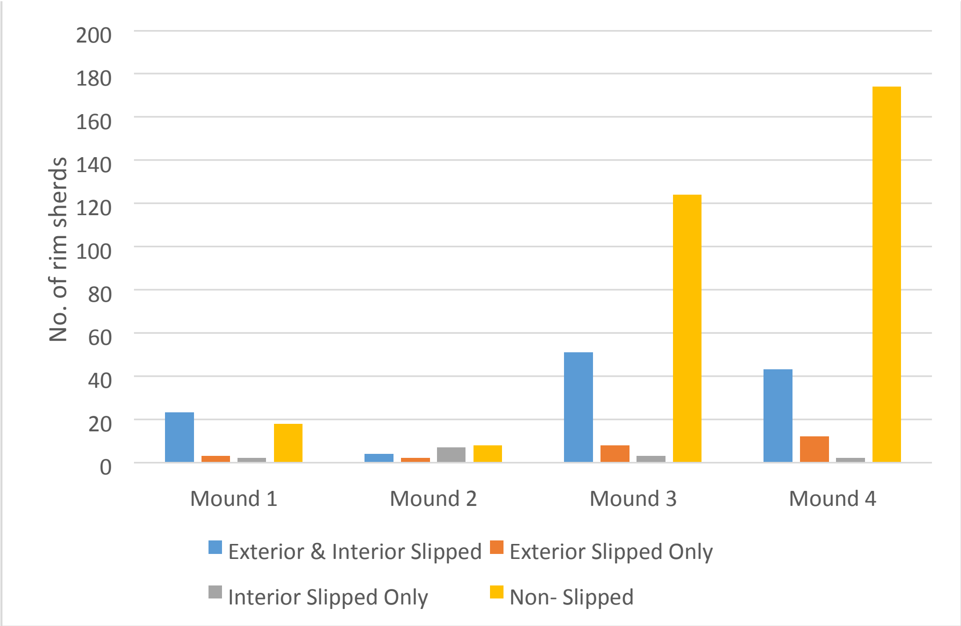


Figure 83: Distribution of surface treatments of rim sherds from all units

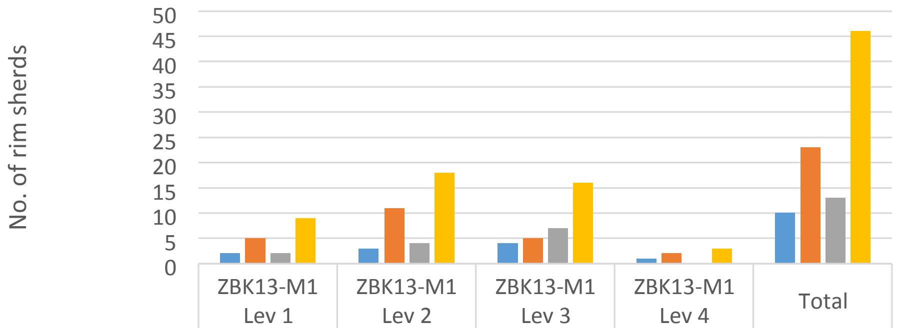
4.3.6. Rim Sherd Clay Paste Characteristics

The nature of the clay paste of rim sherds from each unit was also determined. This was based on the density of non-plastic sediments observed in the cross section of the rims. This distribution is outlined below.

4.3.6a. Rim Sherd Paste Texture –Mound 1 (ZBK13-M1)

Across all the levels of this unit, most of the sherds were made of fine to medium textured clay paste showing no or few non-plastic particles. Thirty-six out of the total amount of forty-six sherds showed such characteristics.

Ten sherds contained relatively many inclusions (see Figure 84).

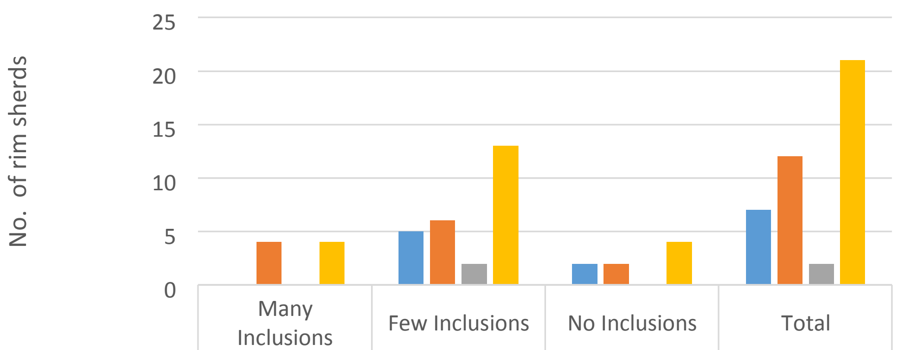


	ZBK13-M1 Lev 1	ZBK13-M1 Lev 2	ZBK13-M1 Lev 3	ZBK13-M1 Lev 4	Total
Many Inclusions	2	3	4	1	10
Few Inclusions	5	11	5	2	23
No Inclusions	2	4	7	0	13
Total	9	18	16	3	46

Figure 84: Clay paste characteristics of rim sherds from Mound 1

4.3.6b. Rim Sherd Paste Texture- ZBK13-M2

Three levels were excavated in Mound 2 and a total of twenty-one rim sherds were recovered. Thirteen sherds out of this quantity had clay pastes with few inclusions. An equal number of four sherds had many or no inclusions (See Figure 85).

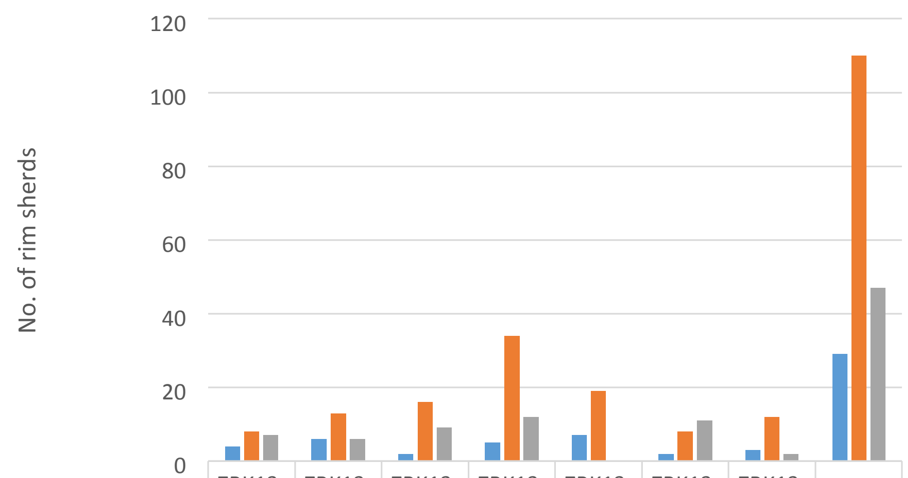


	Many Inclusions	Few Inclusions	No Inclusions	Total
ZBK13-M2 Lev 1	0	5	2	7
ZBK13-M2 Lev 2	4	6	2	12
ZBK13-M2 Lev 3	0	2	0	2
Total	4	13	4	21

Figure 85: Clay paste characteristics of rim sherds from Mound 2

4.3.6c. Rim Sherd Paste Texture – Mound 3 (ZBK13-M3)

59% of the rim sherds from Mound 3 had few clay paste inclusions. This was followed by sherds with no inclusions which made up 25%. 15.5 % of the sherds showed many inclusions. These characteristics are shown in Figure 86.

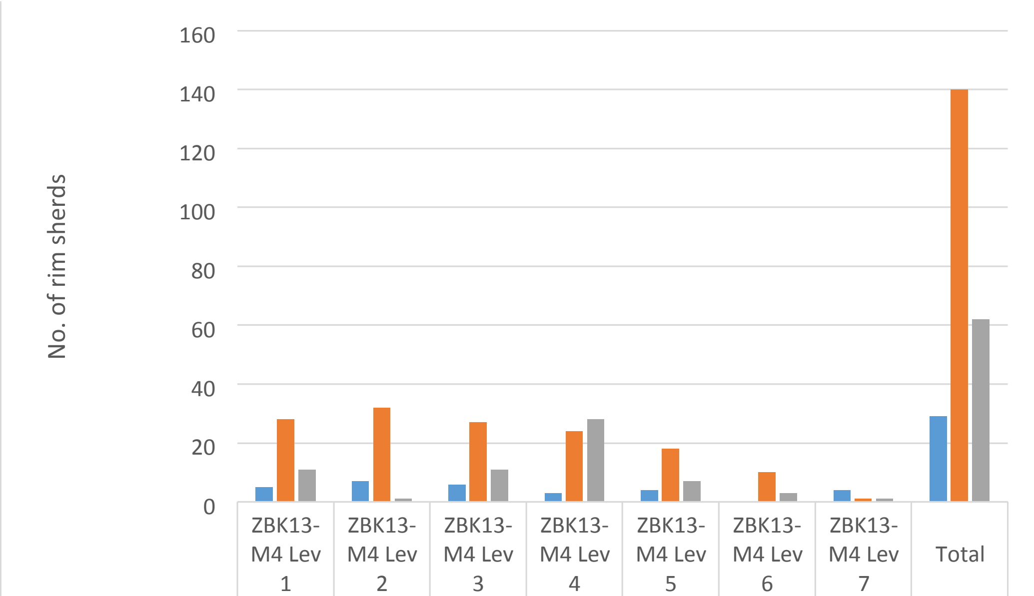


	ZBK13-M3 Lev 1	ZBK13-M3 Lev 2	ZBK13-M3 Lev 3	ZBK13-M3 Lev 4	ZBK13-M3 Lev 5	ZBK13-M3 Lev 6	ZBK13-M3 Lev 7	Total
Many Inclusions	4	6	2	5	7	2	3	29
Few Inclusions	8	13	16	34	19	8	12	110
No Inclusions	7	6	9	12	0	11	2	47

Figure 86: Clay paste characteristics of rim sherds from Mound 3

4.3.6d. Rim Sherd Paste Texture – Mound 4 (ZBK13-M4)

In Mound 4, as was the case in all the other units, a majority of the rim sherds, namely, 60% were of clay pastes having few inclusions. 27% had no inclusions while 13% showed many inclusions. The quantities of the sherds and these characteristics are shown in Figure 87.



	ZBK13-M4 Lev 1	ZBK13-M4 Lev 2	ZBK13-M4 Lev 3	ZBK13-M4 Lev 4	ZBK13-M4 Lev 5	ZBK13-M4 Lev 6	ZBK13-M4 Lev 7	Total
Many Inclusions	5	7	6	3	4	0	4	29
Few Inclusions	28	32	27	24	18	10	1	140
No Inclusions	11	1	11	28	7	3	1	62

Figure 87: Clay paste characteristics from Mound 4

4.3.7 Rim Sherds Decorative Patterns

Four rim sherds showed decorative patterns. All the sherds came from Mound 4. These are outlined below.

4.3.7a. Rim Sherd M4-5-R13

This sherd is from an inverted bowl of reddish paste containing medium sized particles. The sherd also features a red-slipped interior and a slightly overhanging lip. The decorative pattern is placed along the shoulder, comprising a band of a composite motif of two diagonal parallel incisions and a number of short vertical strikes. Roughly made triangular stabs are placed at the ends of the diagonal incisions. The pattern is bounded above and below by thin incisions. This sherd has already been shown above in Figure 74.

4.3.7b. Rim Sherd M4-6-R8

This is an inverted square-lipped rim with a profile suggestive of a bowl. The paste is fine with few inclusions, and both the interior and exterior surfaces show red slipping. The slip is eroded in some places and black smudges also occur on parts of the exterior surface. The decorative pattern consists of four broad shallow grooves on the shoulder, with one slanted upwards and almost touching the lip of the sherd (already shown in Figure 44a).

4.3.7c. Rim Sherd M4- 4-R44

This rim features a slightly inverted square lip and a bowl profile. The clay paste is reddish brown and appears fine in texture with very few inclusions. The rim shows folded strip roulettes occurring below the shoulder (this sherd has already been illustrated in Figure 75).

4.3.7d. Rim Sherd M4-6-R2

This rim has an everted jar profile with a rounded lip and a well-defined neck which clearly sets the upper rim area apart from the rest of the body. The decorative pattern consists of roulettes which start just below the neck. It covers the whole of the lower rim area. The roulette pattern is bounded below by an incision and a band of carved roulettes, but a large portion of the rim is broken off. It is only visible in the lower left corner (see Figure 88).

Figure 88: Rim sherd showing folded strip and carved roulettes

4.4 Other Ceramic Artefacts

In addition to the potsherds discussed above, other ceramic artefacts recovered from the excavations included six intact pots, eight perforated potsherds, five pot bases, and one pottery disc. Also, six fragments of figurines and one small pot with four pedestals were collected from the surface of one of the looted mounds on the site to aid comparison with the excavated ceramic artefacts. Descriptions of these objects are presented in the following sections.

4.4.1 Intact Pottery Vessels

All the intact pots came from the 40 to 60cm layer of Mound 3 (ZBK13-M3). They were found in a cluster in the east section of the unit near a daub outline which looked like the remains of a wall (see previous discussions in Chapter 3 Section 3.9.5). The cluster also included potsherds, some of which appeared to be the remains of pots broken in situ. There was no identifiable pattern of arrangement of the pots and potsherds in the cluster. During the excavations, some of the pots suffered minor damage, mainly from the tools used. This however, inadvertently aided analyses of the clay paste constitution of the pots. The formal attributes of the pots are outlined below.

4.4.1a. Intact Pot 1 - ZBK13-M3 P1

Pot 1 (depicted in Figure 89), measured 12cm in height and 12cm across the orifice. The area of its widest diameter of 20cm was across the body. The thickness of the rim measured 22mm and that of the body area measured 18mm. The interior of the pot appeared burnished and showed striations running in a roughly circular pattern, possibly caused by the tool used. Although the exterior surface of the pot appeared considerably eroded there were still some traces of a red slip, especially around the upper section, indicating that a red slip suspension was probably applied to the exterior surface of the pot.

Evidence of wear on the lower exterior surface of the pot indicates that the pot was in regular contact with the ground or other abrasive surface through usage or other functional context such as transport. However, stationary usage as a function is more likely as due to its small size, it is less likely to be efficient as a container for transporting substances. The base of the pot is also relatively flat, further strengthening this assertion.

When experimented, the pot appeared to rest securely on its base or on the lower sides. The interior of the pot was blackened possibly as a result of the firing process, and traces of some roulette motif could be observed on the shoulder, but it was not possible to identify the specific type as it was very eroded. The pot has an everted rim profile showing a sharp inflection of the rim from the body by means of a well-defined collar. However, the collar does not significantly restrict the opening of the vessel. Based on the ratio of the vessel's height to its maximum diameter, it can be described as an everted or unrestricted bowl (Rice 1987: 216; Shepard 1965:228-230). It is also similar to the flared mouth bowl form identified by Insoll et al (2013a:127).

Figure 89: Intact Pot with an everted rim (ZBK13-M3-P1)

4.4.1b. Intact Pot 2 – ZBK13-M3 P2

Pot 2 (see Figure 90) is a plain, everted pot with a prominent flared flange. There is no clear shoulder or collar as the flange projects directly and sharply off the vessel body. It has a rounded lip with a thickness of 91.3mm. Other structural dimensions of the vessel are: a height of 12cm, rim diameter of 14cm and body area diameter of 9cm. The interior of the vessel appears burnished as well as the area directly underneath the flared flange, but the rest of the body is rough to the touch and shows evidence of significant wear.

It is possible that the whole vessel may have been burnished but was worn off due to regular use or post deposition conditions. The colour of the vessel is reddish-brown, and this is also the colour of the clay paste which contained many rough inclusions. Unlike ZBK13-M3 P1 described above, this vessel has a relatively flat bottom and does not rest securely on its sides. Because the height of ZBK1-M3 P2 is greater than its maximum diameter, it can be described as an everted or unrestricted jar (Rice 1987: 216-217: Shepard 1965: 228). Insoll et al (2013: 127) also illustrates a similar example labelled as an everted neck jar.

Figure 90: ZBK13-M3-P2 Plain Exerted Pot

4.4.1c) Intact Pot 3 - ZBK13-M3 P3

ZBK13-M3 P3 (see Figure 91) can be said to be an example of the category of ceramic vessels described by Shepard (1965: 230- 234) as having composite silhouettes or shapes. This is because of its well-defined shoulder which is at a significant angle of inflection from both the lower and upper parts and accentuated further by a ring of applique knobs. On the upper part of the pot, the shoulder ends with a thickened overhanging rim area with a collar and rounded lip. It has a height of 14cm and a body area diameter of 22cm. A third of its exterior surface area, namely, the shoulder area is plain, burnished and shows traces of red-slipping. The rest of the exterior surface below the ring of applique knobs is covered with braided strip roulette decoration. The roulette motifs are not neatly executed as there is an unequal distribution of deep and shallow channels some of which overlap. There is however evidence of a clockwise pattern of execution, radiating from the base of the vessel and ending along the border marked by applique knobs.

One of the knobs had come off affording the opportunity to suggest how they might have been created. A thick ridge of clay similar to the rounded belt forming the rim was created, probably by pinching. Then, portions of clay were removed at regular intervals to create the knobs. Evidence in support of this conjecture include regular spaces of 2cm between the knobs, which may not have been achieved if the knobs were attached individually.

In addition, the upward facing parts of the knobs appear burnished just like the upper section or shoulder of the vessel, while the lower facing areas show roulette motifs like the lower part of the vessel. It is therefore likely that the ridge of clay paste was created first, and after the surface treatment methods had been applied, portions were removed to create the knobs.

Another interesting feature observed on Intact Pot ZBK13 M3 P3 was that the base did not show any evidence that it has been rested on the floor or on a hard surface for use or storage. There were no smudges or evidences of wear or abrasions as will be the case if the vessel had been in contact with a hard surface. This coupled with the fact that the base of the vessel is very rounded and not morphologically suitable to rest on, could suggest that pot was probably not intended for resting, storing or using on a floor or on a hard surface.

Figure 91: Thick-lipped everted pot decorated with a circle of embossments and folded strip roulettes.

4.4.1d) Intact Pot 4 - ZBK13-M3 P4

This is the largest of the intact pots. It measures 22cm in height and has a rim diameter of 14cm. Its thickness ranges from 12mm at the lip to 20mm at its middle portion. It has an inverted rim profile with a rounded lip. An area of up to 4cm below the rim shows red-slipping and burnishing. Except for a band of carved roulettes bordered with incisions running around its shoulder, and an incised pattern just below, the rest of the vessel is decorated with folded strip roulettes. Its interior surface is not slipped but shows clear evidence of burnishing in the form of circular striations. The vessel shows no evidence of use over fire but most of its base area is abraded suggesting previous use on the ground or other hard surface. See Figure 92.

Figure 92: Large inverted pot with carved and folded strip roulettes.

4.4.1e) Intact Pot 5 – ZBK13-M3-P5

ZBK13-M3 P5 is a miniature jar measuring 9cm in height, 5.5cm in diameter and 5mm in body wall thickness. The vessel fits easily in one palm. It is everted with a well-defined inflection of the rim off the body. It shows evidence of slipping and burnishing but also bears signs of fire-clouding possibly from the firing process. It is decorated from below the neck with a mosaic of twisted cord roulettes, circular punctates and incisions. The punctates have been used to mark focal points where a number of incisions converge. These appear to have been superimposed on the twisted cord roulette patterns.

This miniature vessel was probably used to store a dry substance such as spice, salt or herbs, or a valuable liquid substance possibly for culinary or medicinal purposes. This conjecture is based on certain factors. Firstly, the decorative motifs cover the base of the vessel suggesting that some effort was made to produce an aesthetically pleasing object of personal use. Its small size and ease with which it fits into one's palm could also indicate that it was meant to keep a portable substance or one that is of limited availability. In spite of these tentative interpretations, it is also important to note that miniature objects, are commonly considered as ritual or votive objects (Tournavitou 2009; Kaner 2011:460; de Maret 2016), or as children's play things and toys (Okoro 2008; Crawford 2009: 60-61). The clay paste of the miniature pot also showed shiny mica particles and this was not observed in the rest of the pottery assemblage (see Figure 93).

Figure 93: Miniature pot

4.4.1f) Vessel 6 ZBK13 M3-P6

This is the only bowl included in the cluster of pottery under discussion. It measured 28cm in diameter and 7cm in height. The interior surface shows evidence of slipping but this is somewhat eroded. The clay paste shows a few large sized inclusions. Apart from the shades of red-slipping on parts of the interior surface, the vessel is generally brown in colour. The most interesting feature observed was that the outer surface is covered with circular patterns of knobs. The knobs appear to be individual portions of plastic or wet clay which were attached by applique method. This is clearly seen from where some of the knobs have come off the vessel wall. The base of the vessel is eroded, probably a result of use on a hard surface (see Figure 94).

Figure 94: Bowl with embossments

4.4.2 Perforated Sherds

Eight perforated sherds were recovered from the excavations (see Figure 95). Four were recovered from Levels 4 (60-80cm) and Level 7 (120-140cm) of Mound 4, and two were recovered from Level 4 (60-80cm) of Mound 3. The remaining two came from the 40-60cm depths of Mound 2 and Mound 1. The range of thickness of the sherds measured from 5cm to 12cm.

The largest of the sherds is part of a rim sherd and was possibly part of a vessel which is completely covered with such perforations. The perforations were irregular in shape and ranged from 5cm to 16cm diameter. Some of the sherds have slipped surfaces while others have blackened surfaces possibly from use over fires. Five of the sherds are decorated with roulette motifs, the most identifiable being folded strip patterns.

Displaced clay around some of the perforations indicates that they may have been made when the clay paste was leather hard. The roulette patterns on the surfaces also suggest that the holes were probably created after the vessel surfaces had been decorated. Some of the holes do not go through the sherds completely, and in one example, (Sherd 2-2-23 in the lower left corner of Figure 95), the blackened interior of the incomplete holes could indicate that the cavities were possibly used to cook or fire some non-liquid substances. Alternatively, this could be the result of unsuccessful perforation.

Figure 95: Perforated Sherds

4.4.3 Pottery Disc-ZBK13- M3-1-15

One pottery disc was recovered from Level 1 (0-20cm) of Mound 3 (ZBK13-M3). Both its interior and exterior surfaces are red-slipped. Its circular shape is not very regular, and it appears to have been obtained from a larger sherd and ground into a circular shape, thus some sides appear more eroded or reduced. The disc is 12mm thick and 5cm in diameter (see Figure 96). It shows fine incisions on its exterior surface.

Pottery discs are characteristic artefacts of the Koma sites. Anquandah (1998) recovered several examples from mounds in Yikpabongo and has suggested that they were probably game pieces. Insoll et al. (2012:36) have also recovered thirty-six (36) pottery discs from Yikpabongo and have documented ethnographic evidence that they were used as stoppers for horns and/or narrow-necked gourd receptacles used to store medicines.

I also suggest that the pottery discs could have also been used in pottery producing processes to burnish or smoothen the surfaces of pottery. Potters may have had one or two of these in their tool kit, as well as novices or young children who were learning how to smoothen or burnish pots surfaces. This functional context will explain why several pottery discs have been recovered from excavations and why the sides of some discs appear eroded and irregular in shape. However, this is only a conjecture and not supported by ethnographic data. It is more likely that the discs were used as stoppers as suggested by ethnographic information (Insoll et al. 2012:36). We must however, be mindful of the fact that the contemporary Koma people, including the village of Yikpabongo are not directly descendent from the people who inhabited the archaeological landscape being discussed here, so the function of the discs in ethnographic contexts may not be same as in the archaeological contexts.

Also, there is currently no evidence of pottery making in Yikpabongo or its surrounding settlements, therefore the function of the discs as a burnishing tool is not likely to be known ethnographically. Furthermore, research data demonstrates that it is quite common for most cultural items to have multiple functions. For example, several household items are appropriated as pottery decorating or shaping tools.

Figure 96: Pottery disc

4.4.4 Bases

Five fragments of pot bases were recovered. Three were recovered from Level 4 (60-80cm) of Mound 3, and two came from Level 3 (40-60cm) and Level 5 (80-100cm) of Mound 4 (ZBK13-M4). The sherds attached to the pedestals ranged from 8mm to 25mm in thickness, and 7cm to 13cm in size. The height of the pedestals from the end points to where they are attached to the vessel ranged from 4cm to 11cm. Most of the bases were decorated with roulettes on their exterior surfaces but showed signs of erosion where they have been in contact with the floor.

Figure 97: Pot Bases

4.4.5 Surface Finds

Six fragments of figurines and a miniature four-footed pot were randomly collected from the surface of one of the looted mounds on the site. The mound showed signs of heavy looting in the form of several depressions and ridges where tools such as picks, and spades had been used to unearth the soil in search of terracotta figurines.

The looting appeared to be have happened in the recent past as some of the locals assisting with this research project, aged approximately forty years on average remembered their fathers and uncles partaking in such activities. The figurines were collected for comparisons between their technology and the technology of the pottery from the excavations. Because the looting activities have already resulted in the loss of the contextual information of all material culture from this mound, the main information generated relates to stylistic and technological characteristics.

4.4.5a) Figurine Fragment 1 - ZBK13- F1

Figurine ZBK13-F1 is a seated or kneeling human figure without a head. The anatomical features depicted on it include two breasts, a navel and a penis. The figurine is missing its right arm, but the remaining left arm is shown with long fingers clutching its knee, and a wrist band or bracelet around the wrist. The exterior surface is reddish showing some form of slipping, while the colour of the clay paste as seen from the broken edges is black. The figure rests on a flattened base, giving some idea of the position in which it may have been intended to be kept or used. The figurine measures 8cm in height and 6cm in breadth.

Figure 98: Fragment of figurine depicting a kneeling or seated human with one hand on knee.

4.4.5b) Figurine Fragment 2- ZBK13-F2

This figurine is a fragment of an elongated human head and neck. It has an open mouth, and two ears which were made by pinching the clay paste rather than attachments. It has a high profiled nose. Its nostrils are aligned with the eyes which are protruded. The nose appears to be placed on its forehead, and there is a depression on the top of the head. There is a collar or cape below the head to mark its neck and where it was probably attached to the rest of the body. It measures 10.5cm in height and 4cm in breadth. See Figure 99.

Figure 99: Figurine fragment of an elongated human head with an open mouth

4.4.5c) Figurine Fragment 3- ZBK13-F3

This figurine fragment is the upper torso of a human figure. It is missing its head and neck as well as its right arm. Its left arm is placed across its body at the stomach level. The figurine shows four fingers and an armband or bracelet around its elbow. Stripes are depicted across its shoulder resembling the folds of a garment. There are no clear depictions of breasts on its upper body. It is brownish red in colour.

4.4.5d) Figurine Fragment 4 - ZBK13-F4

This figurine is half of a hollow human head from the nose upwards. It shows a pair of naturalistic eyes set on either side of the nose. There is one complete ear on its left side, represented by pinched clay and a perforation. A large portion of its ear on the right side is broken off. There are about forty-seven small dimples in a circular pattern on top of the head which probably indicates hair, pores, a hairstyle or a textured headgear. The dimples appear to have been made by stabbing. The figurine showed reddish patina on parts of its otherwise brown exterior surface (see Figure 100).

Figure 100: Fragment of a human head with dimpled features, possibly a headgear or hairstyle.

4.4.5e) Figurine Fragment 5 - ZBK13-F5

Like ZBK13- F4 above, this figurine fragment is the upper section of a human head showing highly stylized protruding bulbous eyes and eyelids. The depiction of the eyes is very prominent relative to the ears and nose. There is a depression in the top of the head which also shows a perforation. The base of the figurine is also hollow but not connected with the cavity on the top of the head. The figurine measures 4cm in height and 3.5cm in breadth.

4.4.5f) Figurine Fragment 6 - ZBK13-F6

This is a fragment of a stylised anthropomorphic figure consisting of a head and a body. The head is made up of two upward looking faces. The two faces share a common forehead, and this is what has resulted in the upward looking profile. Other features shown on the faces are a knob on the foreheads, sets of nostrils, open mouths and beards. The beards are indicated with vertical incisions. The body of the figure is represented by a narrow stem with three curved limbs which resemble handles. A fourth limb has broken off. Each limb is attached to the body (stem) in two places namely, just below the head and in the middle.

From the middle part of the body, the limbs extend downwards as separate appendages each with a base. As a result, the figure can be said to have four bases: three bases of the limbs, and the base of the body (stem). The figure measures 22cm in height (Figure 101).

Figure 101: Figurine depicting two heads and multiple limbs (surface find)

4.4.6. Surface Find- Small Pedestaled Pot ZBK13-V6

ZBK13-V6 is a very small vessel with three pedestals. I have included this object here because even though it is not a figurine, it was collected as a surface find from the same context as the figurines. The vessel has an inverted rim and two handles on either side, just below the lip. The handles appear to have been made by pinching. A portion of its upper section is broken off and rest of body below the handles is decorated with roulette motifs (see Figure 102).

Figure 102: Pedestaled miniature pottery vessel (surface find)

Chapter 5: Other Artefacts

5.0 Introduction

This chapter discusses the non-ceramic artefacts from the excavations. Altogether these artefacts constituted less than two percent of the artefacts recovered. They comprised stones, metal objects, pieces of daub, a single bead and some enigmatic fired clay objects. Each category is described below.

5.1 Daub Pieces

Twenty-eight pieces of daub were recovered from depths of between 30 and 60 cm in Mound 3 (ZBK13-M3). They occurred as a layer and as a circular outline. This has been described as part of the discussion of Unit 3 and illustrated in Figures 16a and 16b. These could be easily identified in the surrounding soil matrix as hardened and compacted pieces of soil with shades of a deep orange colour.

Some pieces had hollowed out faces where they had been attached to wooden poles, possibly as part of the walls of structures (see Figures 103a). Others showed evidence of soot or smoke, possibly indicating that the wooden poles to which they may have been attached were burnt out (see Figure 103b).

Figure 103a: Piece of daub which was possibly attached
to a wooden pole recovered from a depth of 30-60cm of Mound 3

Figure 103b: Piece of daub showing blackened hollows
from 30-60cm of Mound 3

This observation is consistent with the data from the geomagnetic survey which showed possible incidences of major fires or frequent firing activities, as already discussed in Chapter 3.

It was not possible, however, to determine the actual type of architecture the daub pieces were part of, as no evidence of such structures were found (McIntosh 1974). However, the pole impressions on the surfaces of some of the daub pieces, and the context of their deposition indicate that they were probably part of the wall or upright section of a structure, incorporating the use of wooden poles.

The daub deposits were concentrated mostly in an area of the unit where a cluster of broken and intact pots were found in situ. This area may have served as a storage area for pots and the daub pieces were probably part of an enclosing wall which collapsed, integrating with the soil matrix in which the pots were deposited (see previous discussions in Chapter 3).

The daub pieces have together with the intact pots, potsherds and charcoal pieces suggest that Mound 3 (ZBK13-M3) was probably a domestic setting. This is especially pertinent as it contrasts with previous interpretations by other researchers that the Koma mounds are primarily burial or ritual spaces (Anquandah 1998; Kankpeyeng & Nkumbaan 2008; 2009; Kankpeyeng et al. 2011).

While these interpretations are based on human remains, figurines and special arrangements of artefacts, finds from Zoboku such as the daub pieces and the cluster of intact pots certainly indicate that domestic or living spaces are present on Koma sites alongside burial and/or shrine spaces.

5.2. Enigmatic Fired Clay Objects

Mound 2 (ZBK13-M2) yielded fourteen enigmatic clay objects which have so far been problematic to contextualize and interpret. The surface configuration of the unit and the artefact scatter initially appeared to suggest the site of some fire activity. However, it was not very clear if this had occurred recently as intentional or wild fire, or some controlled firing activity that occurred in the past (see Figures 12 a & 12b above). Intentional burning of grass and plant debris is carried out regularly as part of agricultural activities in almost all the communities in this area. Burning by wild fires are also quite frequent. As outlined in Chapter 3, this mound was selected to investigate the nature of the cultural deposits.

Besides potsherds, the only other artefacts recovered from the unit were the clay objects discussed here. Although similar to the daub pieces described above in Section 5.1 in general appearance, bulk and weight, these objects are more compact and appear to have been made of finer clay pastes. The wall surfaces are smooth like pottery vessel walls. Most of the objects are bevelled or tapered on one end and concave on the other end (see Figure 104a and 104b). They measure between 40cm to 60cm in thickness, and are deep red to orange in colour, very much like the colour observed on the pottery assemblage from the site.

Figure 104a: Enigmatic fired clay objects recovered from Mound 2.

Figure 104b: Concave depression in the enigmatic clay objects

The tapered edges, smooth surfaces and acute concave impressions give these objects much refined outer appearances than the daub deposits recovered from Mound 3 (compare Figures 104a and b with the images of daub pieces in Figures 103a and b). This suggests that they may have been intentionally modelled or formed as part of some structure, possibly some sort of furnace. It is important to mention, however, that the research found no evidence of waste material such as iron slags on the site, therefore this is merely a conjecture.

In light of this, the other remaining conjecture could be that they are remains of the architecture of the site. Most mud houses incorporate wooden poles. The wet earthen paste is usually smeared on a framework of poles and sticks, which are largely unshaped (McIntosh 1974: 161-162; Agorsah et al. 1985: 105). The resultant impressions made by the wooden poles are usually not as sharp and acute as those of the clay objects under discussion. However, Davies (1967: 115-118), has documented some clay objects showing fine imprints of wooden mouldings from the Late Stone Age site of Ntereso, also in northern Ghana.

Prehistoric sites have been known to yield enigmatic objects, the interpretations of which become problematic, especially if there is a lack of ethnographic or direct historical linkage with living communities. A case in point is the enigma of 'terracotta cigars' or 'rasps' recovered from Late Stone Age Kintampo sites, which have been variously suggested to be pot decorating tools, graters, bark cloth beaters, gaming or recreational objects (Agorsah 1986). With increasing research on the nature of the wider landscape of Koma sites, more light is likely to be shed on these fired clay objects.

5.3. Glass Bead: ZBK13-M1 GB1

A single glass bead was recovered from a depth of 35cm (Level 2) in Mound 1 (ZBK13-M1). It will be referred to for the purposes of this discussion as ZBK13-M1-GB1. It is discoid and transparent blue in colour and measures 4mm in length and 7mm in diameter (see Figure 105). Microscopic examination showed some white threads running parallel to its vertical axis. It also showed chipping in two places on one of the faces and some brownish specks in the matrix. The latter are barely visible to the naked eye but considerably clear from the microscopic examination (Figures 106a and 106b).

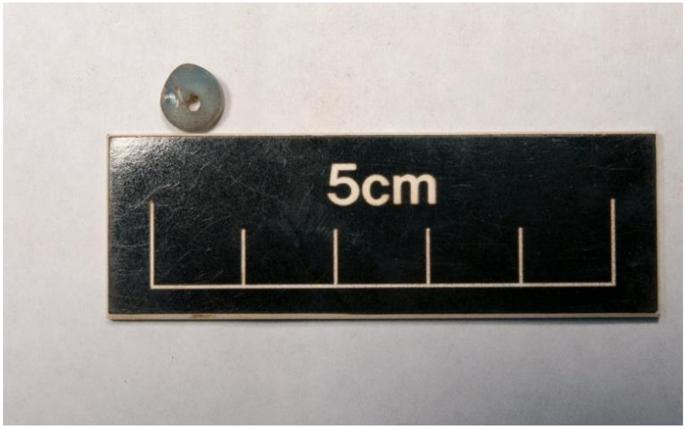


Figure 105: Glass bead recovered from Mound 1

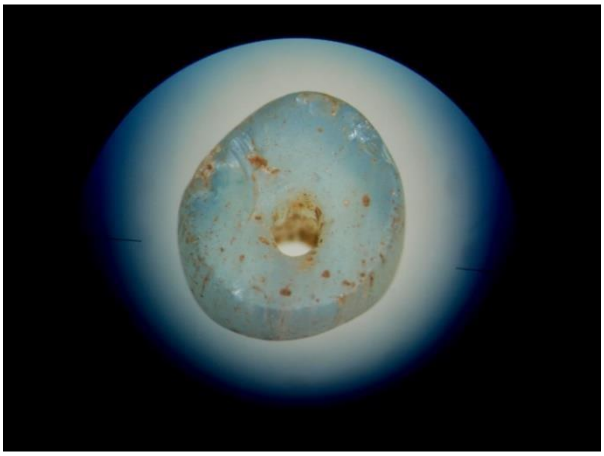


Figure 106a: Microscopic image of the glass bead

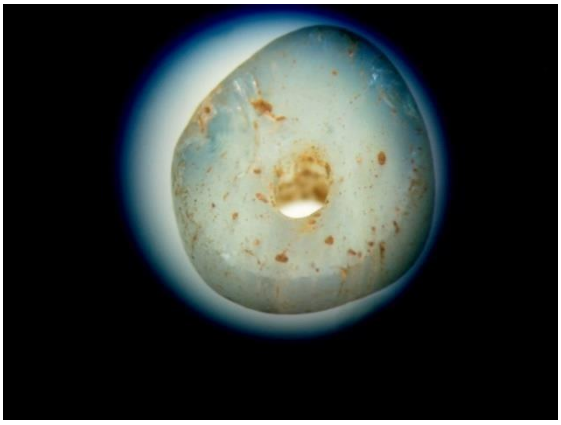


Figure 106b: Microscope image of ZBK-M1-B1 showing brown specks and white strands. *(The microscopic images were taken by Stefka Bargazova of the SCVA-UEA)*

Beads of various materials including bone, shell, stone, metal and glass have been found in archaeological contexts, ranging from the Stone Age through the Iron Age and into historical times in West Africa. In Ghana, most of the sites which have yielded glass beads belong to the historical period and the period of contact and commercial interactions between European traders and local inhabitants primarily along the coast, during which time, glass beads constituted an important trade commodity.

Upon their arrival, Europeans merchants met a high local demand for glass beads which they fulfilled by bringing in imports from the Benin region (Fage 1962: 344). This pre-existing demand had been created by the trade activities that linked the Saharan and Sahel regions and parts of the country, and the coastal trade of the fifteenth century onwards merely took advantage of this. (Wilks 1962; DeCorse 1989).

Although Mound 1, the unit from which ZBK13-M1-B1 was recovered was not dated, other units on the site have been dated by radiocarbon to between AD 1020 and 1290, indicating that the bead is probably a trade object predating the Atlantic-oriented global trade. These dates however, also appear to be earlier than the period before the northern region of Ghana became involved directly and in the trans-Saharan trade. Determining the exact provenance of this little blue bead is therefore not very straightforward.

Beads have not been recovered from the nearby site of Yikpabongo, but recent research at Tando-Fagusa, also close by, has yielded two twisted brass beads, a cylindrical blue glass bead and eight white beads, probably ivory (Kankpeyeng and Nkumbaan 2009: 196, Nkumbaan 2015:143). The most likely route by which these beads, like the one from Zoboku reached the Koma sites is through trade networks or contact with foreign social and technological systems. Although the Koma sites are not located on the known major trade routes, as detailed in Chapters 1 and 3, other material culture evidences recovered from other Koma sites, such as horse, camel, cowrie imagery depicted in terracotta figurines and cowrie shells, suggest some form of participation in some long-distance trade networks.

Casey (2010: 87) has observed that most of the societies located in the intervening areas between the northern and southern termini of the trans-Saharan trade may have played various secondary but important roles in the trade network, some of which were rewarded with exotic trade goods. However, for such societies it was more profitable to sell on the goods than to keep them. This could explain the low incidence of trade goods that have been recovered from such areas. Beads made of unknown or unfamiliar material such as glass, may have been attractive to collect or acquire, easy to keep and valuable to pass on as heirloom. These are the probable contexts in which the example from Zoboku may be understood.

5.4. Stone Rubbers

A total of thirty-six stones were recovered from all excavated units at Zoboku, except for Mound 2 (ZBK13 –M2). These were made up twenty-four medium and large granite bases (grinders and pot supports) and twelve spheroid quartz and schist grinding balls/rubbers/pounders. Six of the spheroid stones were collected but have not been subjected to mineral or other analysis at this time (see Figure 107). The rest were measured and incorporated in the backfill for the excavated pits.

Figure 107: Stone rubbers recovered from the excavations

Stones are characteristic artefacts of the Koma sites. The large quantities of stones in and around the matrix of the mounds led to the longstanding reference of the sites as ‘stone circle mounds’ (Anquandah 1987). Although such presumed circular stone arrangements are not so evident now, collections of stones particular areas are still important indicators of mound sites in the Koma area. This has been discussed in detail in Chapter 3, see also (Kankpeyeng & Nkumbaan 2009; Appiah-Adu 2013). Besides occurring on the surface, stone grinders, pounders and rubbers have been recovered from sealed contexts.

Anquandah (1998:88) has documented large quantities of such stones from excavations at Yikpabongo and has suggested that although they may have been used primarily as milling equipment in domestic contexts, they assume symbolic materiality once they are deposited in graves as burial goods. Spheroid quartz stones which have been found in recurrent associations with potsherds and figurines are also believed to have played agentic roles in materializing personhood and relationships with ancestors through ritual veneration activities (Kankpeyeng & Nkumbaan 2009:99; Insoll et al. 2012:36-37).

Insoll (2015a: 158) has emphasized that in many societies in sub-Saharan Africa, the materiality of stone is harnessed and used in several symbolic concepts and multi-dimensional ways to mark territories, legitimize authority, serve as references to life processes and so on. For example, societies in the Tong Hills, in northeast Ghana have demonstrated complex patterns of use of stones since prehistoric times Excavations and surveys have revealed dense clusters of standing stones associated with deposits of iron ornaments and points, potsherds, ritual pots and small stone grinders/rubbers (see also Insoll 2013a; Insoll 2009; Insoll et al. 2008). These are believed to have functioned as personal gods, ritual bundles and sites for sacrifices and libations. Various types of stones were collected by the inhabitants and arranged in certain patterns making use of their natural red, pink, black or grey colours.

At Zoboku, the uses of stones for utilitarian purposes were clearly evident. In Mound 4 (ZBK13-M4), unworked stones and used spheroid ones were recovered from a compact clay structure which also contained potsherds (see Figure 25). This was probably a pit into which unused stones, small grinders and rubbers as well as other artefacts were disposed of. In addition, in Mound 3 (ZBK13-M3), a total of seven large and medium unworked stones ranging from 15 – 40cm in diameter had been used as supports for a large pot (see Figure 22). The excavations did not uncover any clear ritual use of stones.

5.5. Metal Artefacts

The excavations at Zoboku yielded eight metal artefacts. They include an arrowhead and a flat blade-like object with a tapered end (see Figure 108). These were recovered from depths of 20cm to 40cm and 40cm to 60cm of Mound 3 respectively. Also, a long point and a medium length point with a small blade-like extension were recovered from a depth of 100cm to 120cm of Mound 4. These are the two topmost objects shown in Figure 109. A small finger ring was also recovered from 40cm to 60cm of the same mound (Figure 110). The longer metal point shown on the lower part of Figure 109 was recovered from a depth of 40 to 60cm of Mound 3. In addition, a pair of large axe-like objects were recovered from a depth of 20cm to 40cm of Mound 3. These are shown in Figure 111.

Figure 108: Metal objects possibly an arrowhead and an axe-head.

Figure 109: Metal points from excavated contexts.
(Note that the topmost one has a blade-like extension).

Figure 110: Small finger ring (from 40-60cm of Mound 3).

Figure 111: Two composite axe-like metal artefacts

The metal objects were not analysed to determine the specific types of metal from which they are made but based on their dark brown/orange colours and corroded appearances, one can say they are probably iron. The identical pair of adzes-like objects shown in Figure 111 were however scanned using Computer Tomography to examine the internal structures. This is described later in this section.

Previous excavations in the Koma sites of Yikpabongo have yielded iron objects similar to some of the examples shown above. For instance, Anquandah (1998: 97-98, 102) lists and illustrates iron arrowheads, knife blades and hoe blades as well as finger rings among other ornaments. Furthermore, iron bracelets have been found associated with a human burial in Yikpabongo and in Tando-Fagusa, where the burial also contained twisted brass and glass beads (Kankpeyeng et al. 2011: 209).

Twisted or knotted iron objects have also been recovered as part of what is believed to be a ritual arrangement of intact and broken pots, upper grinding stones, ceramic discs, figurines and ceramic gourd objects in a mound in Yikpabongo. An iron razor, ring, point and part of a bracelet were found associated with a possible libation structure in the same mound (Kankpeyeng et al. 2013:482).

The origins and spread of iron metallurgy and iron objects in Africa and especially sub-Saharan Africa have been the subjects of several debates (Alpern 2005: Holl 2000; 2009; Childs & Herbert 2005; Okafor 1993; Childs 1991: 337; Childs & Killick 1993; McIntosh & McIntosh 1993: 102-107). There is a consensus however, that the knowledge of iron working existed in sub-Saharan Africa by 500BC (McIntosh & McIntosh 1988; Childs & Killick 1993). This debate is important, but not directly relevant to the present discussion. Of relevance however, is the chronological and cultural significance of iron technology and how the presence of the metal objects in the material culture repertoire from Zoboku enhance our understanding of the socio-economic and symbolic organization of the past society, and the following discussion focuses on these issues.

Iron is the major cultural signifier of the Iron Age which generally dates from 500BC in Africa. From this time and through the first millennium Ad, iron technology and products have been linked with intensified and increased exploitation of natural resources and the subsequent development of agriculture. Iron tools made it easier to clear forest resources and expand the spatial extent of settlements. As the scale of clearing and tilling arable land

and cultivation of crops increased, the foundations of the myriad dimensions of sociocultural complexity were laid in several parts of Africa. Iron smelting and forging nurtured the construction of social identities and roles, as well as ritual and symbolic structures in societies. Weapons forged by blacksmiths helped to shape political authority and structures (McIntosh & McIntosh 1988:109).

Both ethnographic and archaeological research provide evidence of iron smelting and working activities in northern Ghana. Pole (1975:11-14, 35; 1974) has documented oral historical and ethnographic experimental data on iron working in about ten localities in the upper regions of northern Ghana and outlined that generally iron was smelted using cylindrical furnaces of about 120cm high inclined at an angle. Indigenous iron smelting had been carried out in these areas for many generations and some of these activities have been documented in travellers' and geologists' reports of the twentieth century.

The archaeological record confirms some of this information. For example, Kense (1992:146-147) documents the remains of over one hundred furnace sites in the Gambaga area (see also Okoro 1989). These include about five smelters found in what appeared to be an industrial setting in the western part of Birimi (Godfrey-Smith & Casey 2003:1045). About one hundred and sixty-three iron objects were also found in excavations at Daboya but there was no clear evidence of smelting (Shinnie & Kense 1989: 201-210). Both Daboya and Gambaga have been dated from the Late Stone Age through the Late Iron Age.

Furthermore, excavations in the Tong Hills have yielded iron objects as evidence of blacksmithing activities. But evidence of large scale iron smelting in the form of slags and tuyeres has been found nearby at Zandoya (Insoll 2013b:134-148). The Tong Hills sites and Zandoya have been dated by OSL to the Early Iron Age (AD 364-794) and the Later Iron Age (post AD 1000) respectively (Insoll 2013c: 94-111).

So far, there has been no evidence of iron smelting or working in the Koma area. Iron ore has been mentioned in excavation reports from Yikpabongo, where it had been used to make the eyeballs of an anthropomorphic terracotta figurine (Kankpeyeng & Nkumbaan 2008:99; Insoll et al. 2012: 33). This has been suggested as a decorative feature or a symbolic attempt to harness and manipulate the ritual power of iron, but there are as yet, no reports of firm evidence of the technology in the form of slags, tuyeres of remains of furnaces.

Nevertheless, iron objects appear to have been an important component of the Koma archaeological material culture as demonstrated by examples from Yikpabongo (Anquandah 1998; Kankpeyeng & Nkumbaan 2009; Appiah-Adu 2013; Nkumbaan 2015:144) and from Zoboku as outlined above. Finished or semi-finished iron objects were probably acquired from other culture settings and used in various contexts, possibly including symbolic or ritual (as will be shown by the discussion of the two identical adze-like objects below).

5.6 Computer Tomography Analysis of Metal Objects

The two identical adze-like objects illustrated in Figure 111 were scanned with Computer Tomography Technology at the Norwich and Norfolk University Hospital in Norwich, UK. From the initial general visual examination, it had appeared that the objects were axe-heads similar to types that are usually hafted into wooden poles to make agricultural tools used for digging tubers and other root crops in some societies in Ghana. But the objects appeared to contain some internal components that would have made hafting difficult or impossible. Thus, their exact nature and function became issues for contemplation and this necessitated the scanning procedure.

It was anticipated that the scans would clarify the characteristics of manufacture, material constitution and density of the objects and reveal the internal structures, to help ascertain the probable functions of the objects and their economic value as locally produced or trade items and also their social or symbolic significance.

One of the objects was scanned as a single component as it was still held intact by its soil matrix (see Figure 112). However, the other had inadvertently come apart during transit and these were scanned as a group (see Figure 113).

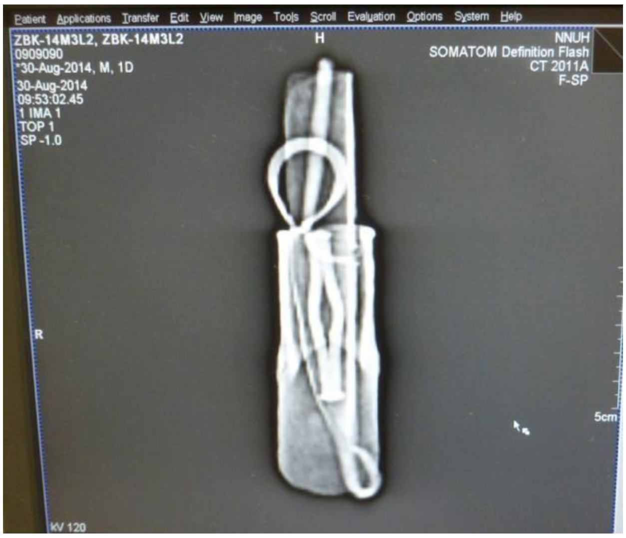


Figure 112: Computed Tomography image of the enigmatic composite metal object.

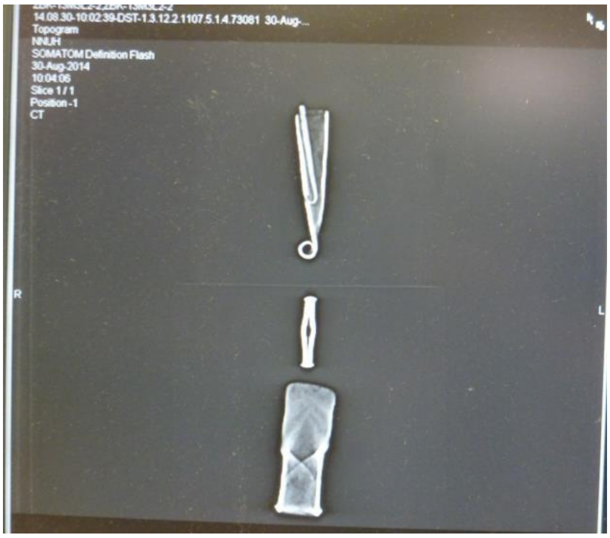


Figure 113: CT image of the components of one of the metal objects.

The scan of the intact object revealed that it was made up of a heavier hollow sleeve into which a long conical bell-like article had been inserted. The bell-like object in turn contained a 'clapper' and a smaller piece with a perforated mid-section and flared ends. There were other components as well, some of which appeared to be threadlike and curved but these were absent in the second object (compare Figures 112 and 113). The scan also showed that the 'clapper' was less dense than the bell-like object, and that the flared extremities of the small pierced object were denser than the middle portions. The scans did not, however, reveal any evidence of use-wear on the objects, but gave an idea of the technique of their manufacture. It appears that the conical bell-like object was made by folding over a sheet of metal, and the clapper was inserted as a single piece into a cavity in the wall. The external part of the object also appeared to consist of a sheet of metal wrapped around the internal components

From both visual examination and the scans, it was clear the objects did not have much functionality as tools hafted onto poles or held by hand and used in vigorous activities such as digging, cutting, piercing or striking. The internal components would have made it impossible to haft or join onto other tools or objects and too fragile for vigorous usage. Note that one of the objects came apart when its surrounding soil matrix disintegrated (Figure 113).

It is therefore probable that the objects had some symbolic, ritual, ornamental or cosmological significance or function. It appears the objects were probably made as a bundle of meaningful components to be used by holding in the hand, inserting into the ground in a non-vigorous manner or depositing in some space. The method of manufacture and the appearance of some of the internal components resonate with the forms of other objects from other cultural settings nearby in northern Ghana and further away in East Africa and the ancient Americas, some of which have been interpreted in symbolic and phenomenological contexts. For instance, wrapped objects are placed in the base of iron smelting furnaces in many African societies to protect the smelt against witchcraft or ill-fortune and ensure productive results. In other African societies, the creation of ancestors involves wrapping items of different textures, including certain parts of the body of deceased elders into a single object (Insoll 2015b). Insoll et al. (2013:72) have also documented that bundles of sacrifices wrapped in nets are sometimes stored on some Tallensi shrines.

The scans revealed that the metal objects under discussion here were likely made by folding, wrapping and insertion techniques and these are known symbolic actions in archaeological discourse. Wrapping one or several objects with other materials or creating bundles by wrapping one or several objects together are commonly observed in archaeological and ethnographic contexts. The objectives of such actions are various, including to join or fuse an object with others, reinforce, protect, conceal or contain the inner material with the outer wrapping, or simply make an object more compact and portable.

Items of different materialities are brought together through wrapping and bundling to create objects of different characters usually, liminal ones. Wrapping or bundling may sometimes constitute mechanical techniques of making objects, for instance as used as forms of preservation in mummification in ancient Egypt. In other cultural settings, however, they may also be considered as symbolic actions and the resultant objects may be intended to function within cognitive and ideological parameters. Douny and Harris (2014:16) have noted that wrapping can be an intentional action intended to cover, enclose, contain or transform an object into another or create interfaces between objects and between the object, a subject and the world. They further emphasize that while the significance of the wrapped object depends on the context of use, it can be a mechanical action necessitated by the need to reinforce a material with another or it can be symbolic or metaphysical act of grouping or gathering several objects into a single entity or bundle. In such cases, the bundle becomes a powerful object with the ability to transform the materiality of its contents and that of other entities it interacts with.

Pauketat (2012:27) has also described a bundle as a set of otherwise distinct things which form nodes in a larger web of relationships where material and metaphorical relations articulate with one another. The internal components of the iron objects under discussion here are certainly distinct and appear to have been intentionally bundled together. Some of the components, namely the bell-shaped component containing a clapper and the small piece with the perforated middle section and flared ends resonate with recognised shapes and forms of symbolic material culture in other African settings.

Bells constitute one of the categories of objects produced by blacksmiths in several African societies in the past (de Barros 1986:153). Vansina (1969:189-190) outlines that several types of clapper-less bells played a variety of roles in African sociocultural contexts, including during hunting, to signal to armies during war, as military standards, to recite praise songs, to relay messages by town criers or for divination purposes. Clapper-less iron bells have also been linked with the development of political organisation in parts of Central Africa and as insignia of political leadership and legitimation of power. For example, Childs & Killick (1993:332) have noted that metal bells are often used to activate the spirts of leaders. Similar examples of bells have also been found as grave goods and have been suggested as symbols of social stratification at Sanga in the Shaba region of Zaire (de Maret 1977:334), and as ceremonial items at Ingombe Ilede in the Zambezi Valley (Fagan 1969:4). It is evident that like the clapper-less bells, a miniature bell with a clapper as found in the adze-like object under discussion most probably had a symbolic or ritual significance.

The small piece of object with a perforated mid-section and flared ends also bears some resemblance to an anvil which also constitutes a symbolic object in African material culture. De Maret (1985: 79-87) has documented that in several communities in Central Africa, the blacksmith's anvil is an embodiment of ritual power. Commonly shaped as a large nail, it also plays a role in rituals relating to the enthronement of kings.

5.7 Concluding Remarks

The non-ceramic artefacts from the Zoboku excavations, which consisted of stones, metal objects, pieces of daub and a blue bead, as well as some enigmatic fired clay objects, have been discussed in this chapter. Although forming a much smaller quantity than the ceramic artefacts, they provide indications of the economic and possibly ritual functions by which we can further explore other aspects of the past community. This chapter has attempted to do this by considering how this small group of artefacts give an insight into the trade and other contacts of the society with other cultures, how natural objects such as stones were incorporated into their cultural structures and how metal objects were probably valued as symbolic objects and appropriated into ritual contexts.

Chapter 6 Interpretation of Research Data

6.0 Introduction

As shown in the preceding chapters, a variety of artefacts were recovered from Zoboku, namely, metal objects, stone grinders, daub pieces, a bead, intact pots and potsherds. In addition, fragments of terracotta figurines were collected as surface finds from looted mounds on the site. This chapter employs an evaluative approach and examines what the artefacts can tell us of past human occupation at Zoboku. The first part of the chapter builds on the morphological and stylistic attributes outlined earlier in Chapter 4 to delineate the technological characteristics of the pottery from the site. This information is compared with similar data from other archaeological contexts in the Koma area, northern Ghana and West Africa.

The second part of the chapter focuses on the chronology, spatial pattern, artefact depositional structure and functional contexts of the site and again these are put into context with what is known from comparable archaeological settings in the region.

6.1 Technological Characteristics of Zoboku Pottery

The invention and development of pottery technology is no doubt an important landmark of human culture history. The beginnings of pottery technology have been traced to sites in Japan, Siberia and China between

15000 and 10000 cal BC (Huysecom et al 2009:905). Pottery has been an important indicator of human habitation in West Africa since the first millennium AD. MacEachern (1994) has observed that increased quantities and improved pottery characteristics underlie evolutions in settlement patterns and resource exploitation. Over the years, the formal attributes and technology of pottery have been adapted to meet the requirements of changing cuisines that require varying forms of preparation such as stewing, roasting, grilling and so on. Apart from its importance in culinary and dietary structures, pots have also been important in structuring communal activities such as feasting, sharing drinks, etc.

Within a household, pottery may perform several functions including cooking, storing and transporting substances, bathing or cleansing, brewing drinks and so on. Pottery may also be acquired and used to negotiate social and economic power and identities. For example, pottery may serve as bride wealth for women who acquire certain quantities and types prior to or during marriage to signify and negotiate their economic autonomy, status and power.

Pottery dominated the Zoboku assemblage, making up more than ninety percent (90%) of the total number of artefacts. The potsherds were analysed in two broad categories, namely bodysherds and rims. To highlight the variabilities in formal attributes, the body sherds were classified based on size, thickness, the nature of non-plastic inclusions in the clay paste, the types of surface treatments and patterns of decorations.

The rim sherds were classified based on variations in diameter, angle and profile. In addition, the types of surface treatments including plastic decorations and slipping as well as the density of non-plastic inclusions in the clay pastes were considered. These characteristics make up the foundations of the pottery technology and these are considered across the site in the following sections.

6.1.1 Colour and Surface Treatment Methods

The general colour of the pottery assemblage from Zoboku is reddish-brown to orange. This was determined by visually contrasting the colour of the clay paste in the sections of the broken edges of the potsherds with the colour of the internal and external surfaces. About 80.2% of the total number of potsherds were of this colour. This quantity also generally corresponded to the number of unslipped potsherds. Slipped potsherds which made up 19.6% showed a brighter shade of reddish-orange due to the layer of slip suspension on the surfaces. Eleven potsherds representing 0.3% showed blackened surfaces resulting from reduced firing conditions or fire-clouding.

Appiah- Adu (2013) does not specify the colour of the pottery from his excavations at Yikpabongo but documents the presence of red-slipped surfaces on some of potsherds. However, Asamoah-Mensah (2015:89) analysing pottery from the same site, identified a range of black, red and brown colours on most of the potsherds, in addition to minor quantities of grey, yellowish-brown and red-black colours.

The surface colour of a pottery vessel is usually a result of the types, quantities and distribution of impurities in the clay paste, the most common of which are iron and organic material. Under optimal oxidized firing conditions, the presence of iron impurities in the clay paste will result in a reddish-orange colour while the presence of organic impurities may result in grey, black or dark brown coloured pots.

However, some firing conditions such as duration and temperature can also influence the colour of a pot. The abundance or scarcity of oxygen can lead to oxidized or reduced conditions and red or black coloured pots respectively (Rice 1987: 333-335). In several West African contexts, pots are fired in bonfire-style open air spaces (usually in shallow pits) with abundance of oxygen, resulting in generally reddish-orange pots (Calvo et al. 2016: 306). The pots are arranged on a fuel bed of firewood and covered with soft combustible matter such as dry grass and small twigs.

To ensure successful firing, pots of generally similar sizes are fired together to enhance heat distribution around the pile. Generally, pottery making in West Africa is a seasonal activity which takes place in the dry season, but where the activity is carried out throughout the year, potters will endeavour to make use of dry weather conditions both to aid the natural drying out of the vessels and to ensure successive firing (Gosselain 1992:575). During firing, more fuel is added as needed to regulate or maintain high temperatures. However, when desired, carbonised or reducing conditions can be created by placing red-hot vessels onto a bed of fresh vegetal material such as green leaves or animal dung. This results in blackened vessel surfaces.

The application of liquid surface treatments especially after firing can also achieve similar effects. For example, in the potting villages in the Bondakile (*also rendered Bonakire*) area in central Ghana, vessels are immersed in a dye solution of vegetal material to produce shiny dark red surface colours (Crossland & Posnansky 1978: 84) or dark mottled kola-like appearances (Berns 2007:89). The desired black surfaces of grinding bowls in this area are also achieved by smoking the pots with green leaves, cow dung and groundnut husks (Crossland & Posnansky 1978: 84). Among the Bafa of Cameroon, black glossy caramel-like colours are achieved when red-hot pots are immersed in a solution of *bridelia ferruginea* (Gosselain 1992:576).

Red-slipping is the other variable which was used to significantly influence the colour of some of the potsherds from Zoboku. 12% of the bodysherds were slipped on their exterior surfaces and 7% on the interior surfaces. 5% of the rim sherds showed red-slipping on the exterior surface only and 3% on the interior surface only. Rims slipped on both the exterior and interior surfaces constituted 25%.

Although slipping affects the colour of a pot, it is also a surface finishing technique aimed at improving the outer texture and appearance of the vessel. When a vessel is immersed in slip suspensions or dyes, the open pores of the walls are sealed making it less permeable. This is a desired characteristic of vessels intended for cooking purposes. In most societies in Ghana red slip suspensions are made from water and haematite rich soils and are applied to the pottery vessels at the leather hard stage.

6.1.2 Sherd Thickness

A majority of the bodysherds from Zoboku, namely 66.7% were of medium thickness of 5mm to 12mm. Thin sherds of up to 4mm constituted 23% while very thick sherds of more than 12mm constituted 10.3%. Vessel wall thickness is sometimes the result of the modelling technique used by the potter.

Ethnographic research among the Kusasi and Komba potters in the Upper East region of Ghana shows that different coiling and pressing techniques result in vessels of different wall thickness and this together with other variables, affect the distribution and consumption patterns of the pots in the area (Calvo et al 2016:306-307). Potters may therefore decide to produce thick or thin-walled pots to meet demand patterns or to satisfy the functional requirements of the vessel.

6.1.3 Sherd Sizes

57% of the bodysherds from Zoboku measured between 8cm and 14cm in size. Compared with large sized sherds of more than 26cm which constituted 11.6%, it appears the pottery assemblage of Zoboku was relatively fragmentary. This variable was evaluated to aid inferences about the types of activity areas on the site. Pottery may accidentally break in the process of use and the fragmented sherds are likely to be moved out of households and disposed of as refuse. Alternatively, potsherds may be recycled within or outside a household in a variety of secondary functions such as pot supports or wedges, receptacles for temporarily storing water for activities such as grinding, polishing, metal working or as animal feeders. In some West African contexts, broken pots are used to pave floors within a compound, and this results in further fragmentation. Pots may also be broken deliberately on refuse dumps or at certain meaningful spaces within the community as part of symbolic or ritual activities. Following disposal, potsherds may be broken further by erosion, trampling by animals and humans or by farming tools.

At Zoboku, a positive correlation between sherd size and probable mound site function was evident only in Mound 4. In Mound 1, which has been tentatively interpreted as a living area, smaller sherds of 3cm to 14cm constituted 48% while large sherds of 26cm to 50cm made up 16.7%. In Mound 2, smaller sherds amounted to 69% while large sized sherds constituted 9.2%. The possible function of Mound 2 is not very clear, but because of the enigmatic fired clay objects recovered from the mound, it is tentatively suggested to be the site of some technological activity.

Mound 3 exhibited clear structural evidence as a living or domestic area in the form of daub outlines and deposits. However, there was a fairly uniform distribution of sherd sizes. Sherds measuring 3-7cm made up 21%, those measuring 8-14cm constituted 26% while those measuring 15-25cm constituted 28%. There was a similar proportion of larger sherds of 26cm or more which made up 24%. In Mound 4 however, small sherds of 3-14cm constituted 95% while large sherds of 26cm- 35cm made up 1.62%. There were no sherds larger than 35cm. The sherd size pattern in Mound 4 supports its suggested interpretation as a refuse disposal site. The functional contexts of the sites are discussed in more detail below.

6.1.4 Fabric Constitution

Visual observation was the main method used to analyse the fabric constitution of most of the pottery from Zoboku. Only a few samples were subjected to elementary characterization, the results of which are outlined below. The visual observations recorded the appearance of the density of inclusions as seen on the broken edges of the potsherds. However, it was not possible to use this method to identify the types of temper in the clay paste. Rice (1987: 409-411) has outlined the difficulties in distinguishing added temper from naturally occurring materials in a clay paste. Apart from organic tempering materials which leave tell-tale signs of pore spaces in the vessel after firing, most other tempering materials can only be firmly identified through radiographic or granulometric temper analyses.

The analyses of the clay pastes of the pottery from Zoboku revealed that most of the potsherds from three of the mounds showed few inclusions. In Mound 1, potsherds with few inclusions made up 43.5%. In Mound 2 and Mound 3 the percentage quantities of the same category were 47% and 55% respectively. However, in Mound 4, only 24% showed few inclusions in the clay paste. Most of the pottery in this mound, namely 67%, showed a greater density of inclusions. The percentage figures for this category were relatively low in the other mounds; namely 27% for both Mound 1 and 2 and 35% for Mound 3.

6.1.5 Clay Constituent Analyses

Clay paste characterization analyses were conducted on a total of twenty-five samples, comprising five potsherds each from Mounds 1 and 4, three samples from Mound 2, six samples from Mound 3, a sample of soil from an overturned pot recovered from the 20- 40cm layer of Mound 3, and two terracotta figurines recovered as surface finds. Also analysed were a piece of flat micaceous piece of stone from Mound 4, a sample of the fired enigmatic artefacts from Mound 2 and a sample of a chalky deposit from the 120cm layer of Mound 4.

The analyses were aimed at identifying the nature of constituent materials in the samples as well as the quantitative structures. It was also aimed at identifying inclusions which may have been added to the clay pastes of the potsherds as temper. A similar method was used by Asamoah-Mensah (2015) to determine the provenience of the clay raw materials used to make pottery from Yikpabongo.

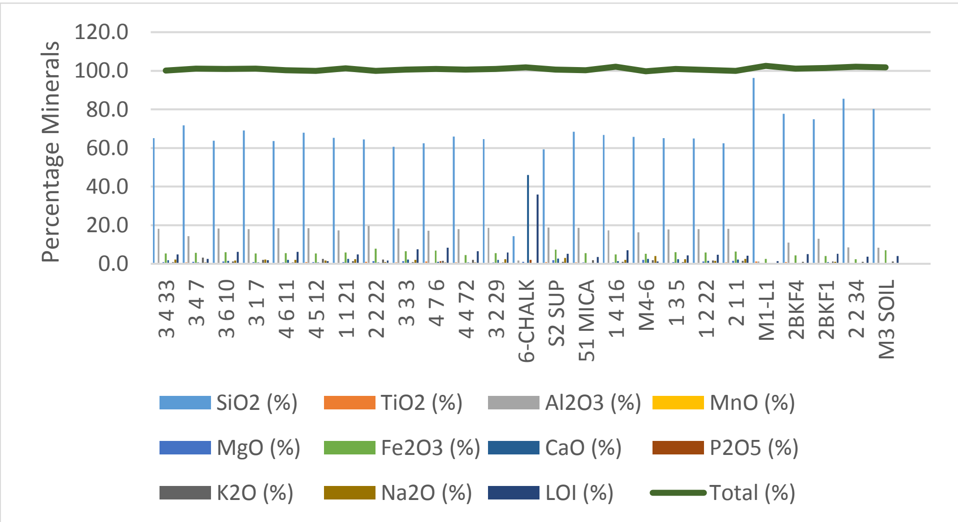


Figure 114: Major elements in the sample materials

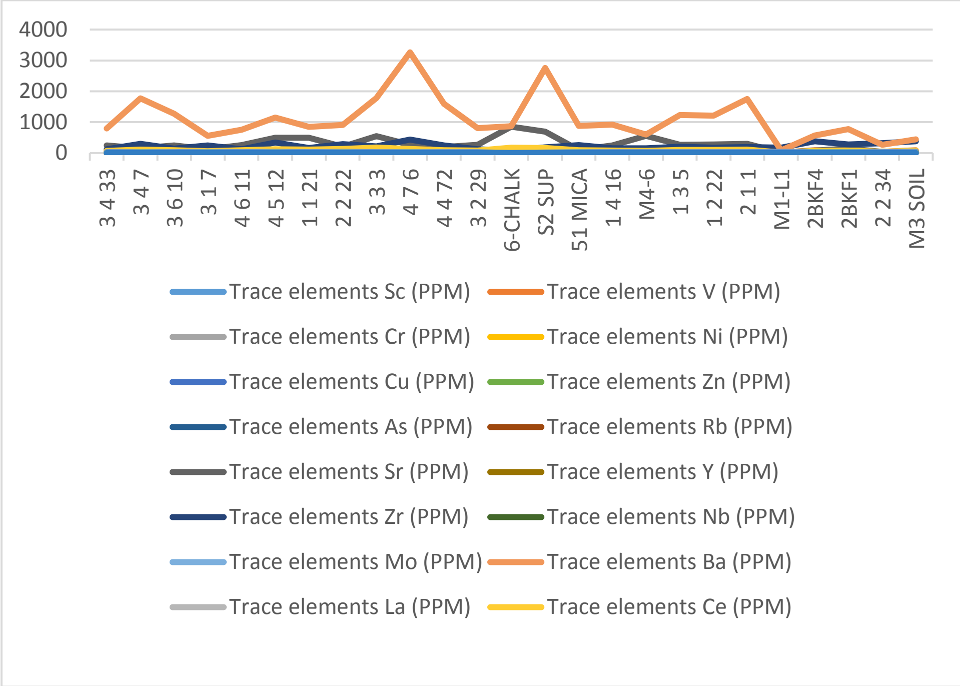


Figure 115: Trace elements in the sample materials

The chemical composition of pottery is related to the source of its clay paste. Certain major elements may be common to different clay sources. The presence of trace elements however, highlights differential sources of clay or the presence of temper. The major elements found in the samples include silicon dioxide, manganese oxide and ferric oxide, and the most common trace element detected was Barium.

6.1.6 Rim Diameter

The rim of a pottery vessel usually highlights its functional properties. The rim type determines the orifice of the vessel, its profile and usually its function. The rim diameter together with the assumed maximum diameter of the body can be used to calculate the vessel profile, height and thereby the type of vessel. When the rim diameter of a vessel is greater than or equal to the maximum body diameter, the vessel has an unrestricted orifice. The height of such a vessel is likely to be less or equal to the maximum body diameter and therefore such a vessel is a bowl. When the rim diameter of a vessel is lesser than the maximum body diameter, the vessel has a restricted or closed orifice and the height of the vessel is most probably greater than or equal to the maximum body diameter. These are the properties of a jar form.

Most of the rim sherds from Zoboku were in the diameter value ranges of 22cm and 30cm. This was recorded for 60%, 57% and 54% of rims from Mounds 1, 2 and 4 respectively. In Mound 3, most of the rim sherds fell in the lesser diameter range of 8cm to 20cm. Very marginal quantities from all four mounds fell in the larger diameter range of 30cm or more, the highest being 19% from Mound 2. This seems to suggest that most of the rim sherds from the excavations probably derived from medium sized vessels.

6.1.7 Rim Types

Three main rim types were identified in the pottery assemblage, namely simple rims, everted rims and thickened rims. However, fourteen sub-types were identified altogether. The main types were identified using the orientation or profile of the rim either towards the interior of the vessel or away from the vessel.

6.1.7a Simple Rims

Simple rims are defined as rims that do not show any significant orientation. The rim area proceeds directly from the body of the vessel and there is no defined shoulder or neck of the vessel. Simple rims may have thickened lips which provide a good grip for handling the vessel. This rim type is likely to belong to medium or small sized vessels such as bowls as the vertical rim profile denotes a wide rim diameter. Two sub-types of simple rims were identified, with sixty-five (65) potsherds belonging to Simple Rim sub-type 1 and sixty-two (62) to Simple Rim sub-type 2.

6.1.7b Everted Rims

Seven (7) everted rim sub-types were identified in the assemblage. The degrees of orientation of the rim profiles were used to distinguish the sub-types. The classification outlined a range of gentle and sharp angular deviations from the main vessel profiles. Also, the areas of the rims which were most thickened and which accentuated the deviations were considered. 40% of the total number of rims in the assemblage had everted rims.

6.1.7c. Thickened Rims

The classification also identified thickened rims whose profiles were oriented vertically or inward. The rim area which shows maximum thickening and its degree of inward inflection were used to differentiate five sub-types. Only one sub-type was recovered from Mound 1, but the other mounds, namely 2, 3 and 4, yielded examples of all five sub-types. 31% of the total number of rims were thickened.

6.2. Interpretation of Site Structure

Like the other Koma sites already investigated, the site structure of Zoboku consist mainly of a cluster of mounds bearing surface scatters of potsherds and stones. A few flat areas were identified having similar surface distribution of potsherds and stones. The following sub-sections present details of the site structure.

6.2.1. Mound Deposition Context

The surveys at Zoboku identified approximately twenty-six mounds. Some of these appeared intact showing surface scatters of potsherds but others had been looted and showed disturbed surface configurations of haphazard fragmented figurines and potsherds. Test excavations were conducted on three of the intact mounds (Mounds 1, 3 & 4) and another at a flat area with a surface scatter of burnt slag-like materials (Mound 2).

The excavations revealed that the vertical deposition context of the site is generally shallow. Mound 1 was ended at a depth of 68cm, and Mound 2 was ended at 62cm. The sterile layers of both Mounds 3 and 4 were reached at 160cm. These relatively shallow artefact deposition contexts suggest that the site was probably occupied for a short period of time. A similar indication was given by results of the geomagnetic survey which showed discrete areas of cultural evidence interspersed with large areas devoid of any cultural signatures.

Based on the above-mentioned observations, it can be suggested the overall period of human cultural activity and occupation on the land area was relatively short and activities were restricted to some discrete areas and not long enough to result in use of the whole land area. Similar shallow deposit contexts have been documented at Yikpabongo where most artefacts have been recovered from contexts up to 40cm below mound surfaces (Kankpeyeng et al. 2013:482).

6.2.2 Functions of the Mounds

One of the objectives of this research was to determine the presence of other activity contexts on the site besides the known 'stone circle' mounds. The surveys and excavations at Zoboku revealed areas of different functional contexts. Previous research at Yikpabongo had established that the Koma mounds are primarily burials or shrines, but evidence from Zoboku revealed domestic and other activity spaces. All four test pits were completely devoid of figurines. Some figurines fragments were however found in the looted mounds. I suggest that Mounds 1 and 3 most probably functioned as domestic or living spaces as evidenced by the clusters of pots and potsherds found at Levels 3 and 2 respectively. The large pot found in situ from Levels 4 through 6 of Mound 3 further supports this interpretation. Similar domestic mounds completely devoid of figurines have been documented recently at Tando-Fagusa (Nkumbaan 2015).

At Zoboku, however, there was also evidence that such domestic spaces may have been used to store or keep non-domestic or ritualized objects. For example, the cluster of pots found in Level 2 of Mound 3 included a pot whose external surface were covered in circular embossments. Examples of such pots from Yikpabongo have been interpreted as ritual objects (Kankpeyeng &

Nkumbaan 2008:100; see also Lanning 1972:138-139). A total of eight perforated sherds were also recovered from the excavations. Perforated pots are common in domestic contexts in West Africa and may be used as strainers, frying or roasting receptacles or to carry hot coals, but research indicates that they are also used to perform various roles in ritual contexts (Norman 2009: 194; Stahl 2013:58-60).

Furthermore, the two identical metal adze-like objects made of composite parts including bell-like components found in Level 2 of Mound 3 suggest that spaces within the apparent domestic or living areas were probably transformed into temporary ritual spaces through storing and/or use of ritualised objects. At both Yikpabongo and Tando-Fagusa, primary burials of complete skeletons have been recovered from house mounds. Other activity areas which were revealed at Zoboku were a refuse dump area and an area of some firing activity. The dense concentration of highly fragmented potsherds mixed with stones and gravels and the lack of identifiable living areas (as was observed in Mound 1 and 3), suggest that Mound 4 was probably a refuse disposal area.

Mound 2 also appeared to be an area which where some activity involving the use of a large circular fired structure probably took place. Overall, the mound was very shallow and besides potsherds, the only other artefacts recovered were the remains of this structure (discussed in Sections 3.7.3 and 5.2 above). As stated earlier, it has not been, possible as of now, to determine the exact interpretation or function of these objects. A large rock outcrop with grooves on its surface was also found at Zoboku. This area was probably a communal area used to grind or process food and plant resources. This goes to strengthen the assertion that the site was not merely a burial or shrine site but an integrated space of living areas and areas of other activities.

6.2.3. Chronology of the Site

Charcoal samples collected from Mound 3 and Mound 4 were dated by radiocarbon methods. In Mound 3, samples collected from a charcoal deposit associated with a cluster of intact pots and potsherds at a depth of 40cm have been dated to Cal AD 1246-1302 (720 ± 30) (Beta-354924). The other charcoal sample from Mound 3 was collected from soil associated with a large upright pot supported by a group of stones at 80cm to 100cm. This sample was dated to Cal AD 1016-1115 (970 ± 30BP) (Beta 354925). In Mound 4, charcoal samples were recovered from a cluster of broken pots and small round stone grinders and large stones at a depth of 62cm. These yielded dates of Cal AD 773-906; Cal AD 916-968 (1160 ± 30BP). Additional charcoal samples retrieved from a rich moist midden-like soil layer occurring at a lower depth of 110cm of the same mound were dated to Cal AD 1246 -1302; Cal AD 1367-1383 (720 ± 30 BP). These are outlined in Table 11.

Lab. Number	Ref. No.	Excavation Context	Date bp	Date Calibrated
Beta-354924	Zoboku-M3-2/3	Mound 3 (20-40cm)	720 ± 30 bp	1246-1302 Ad, 1367-1383 Ad
Beta-354925	Zoboku-M3-4/5	Mound 3 (80-100cm)	970 ± 30 bp	1016-1155 Ad
Beta-354926	Zoboku-M4-2	Mound 4 (20-40cm)	1160 ± 30 bp	773-906 Ad, 916-968 Ad
Beta-354927	Zoboku-M4-5	Mound 4 (80-100cm)	720 ± 30 bp	1246-1302 Ad, 1367-1383 Ad

Table 12: Radiocarbon dates from Zoboku.

Anquandah (1998: 79, 82) obtained thermoluminescence dates of between AD 1200 - 1800 from figurines collected from the surface of mounds in Yikpabongo. Excavated organic data from mounds in Yikpabongo have also been dated by radiocarbon and thermoluminescence to between AD 500 and 1100 (Kankpeyeng et al 2013:480; Kankpeyeng et al 2011: 209-210). Tando-Fagusa has also been dated by radiocarbon to between AD535 and 900 (Nkumbaan 2015). The dates obtained from Zoboku appear contemporaneous with dates from the other sites. Overall, they point to a relatively early period of occupation and material culture tradition in northern Ghana, which fills a gaping void in what is known from existing archaeological and historical research data.

6.3. Zoboku in the Context of the Koma Area

As already mentioned, Zoboku shares similarities with the other Koma sites that have been excavated so far, namely, Yikpabongo and Tando-Fagusa, and several others which have been surveyed. The structures of the sites are made up clusters of low broad mounds covered with surface scatters of potsherds and stones. The pottery from the excavated sites are also similar consisting mainly of low-fired relatively coarse brownish-red potsherds, majority of which are decorated with roulette patterns. The sites have also produced identical pottery forms namely small cup-like vessels, bowls with wide rim diameter ranges and various jar forms with a range of narrow, medium and wide rim diameters.

Other artefacts from Zoboku such as metal (possibly iron) objects such as arrowheads, pins and razors, pottery discs, large and small stone grinders and rubbers and perforated potsherds have been recovered from all the sites as well. Most importantly, Zoboku's chronological range of AD 773 -1386 tie in well with dates from the Yikpabongo and Tando-Fagusa and suggests roughly concurrent occupation of the area.

Some of the mounds are the remains of collapsed house structures probably built with sun-baked or low fired mud bricks. At Zoboku for instance, an in-situ remains of a daub wall indicates that Mound 3 was a house structure. However, unlike house mounds identified in Yikpabongo and Tando-Fagusa, this house mound did not contain any human burials. Kankpeyeng et al (2011:209) report the presence of elaborate burials of complete skeletons covered with potsherds and associated with grave good such as iron, twisted brass and glass bead ornaments in house mounds in Yikpabongo and Tando-Fagusa. The house mounds are differentiated from stone circle mounds which contain secondary burials of parts of human skeletons, animal or human figurines and rounded stone grinders. These stone circle mounds are suggested to be spaces of multiple ritual activities (Kankpeyeng et al. 2011: 209-210: Kankpeyeng et al. 2013: 483-485).

The investigations at Zoboku did not uncover any shrine spaces nor figurine artefacts during the excavations, but there was evidence that house mounds were probably used for some ritual activities or as storage spaces for ritualised items. For example, two enigmatic adze-like metal objects and a knob-covered pot were recovered from Mound 3. Furthermore, surveys uncovered at least four large mounds containing numerous stones, potsherds and figurine fragments, but these mounds had been looted.

A significantly unique discovery at Zoboku was Mound 2, which yielded the unusual fired clay pieces discussed in Section 5.2. The configuration of the site and the presence of these artefacts suggest the occurrence of some activity possibly involving the use of a furnace or kiln. So far, no industrial or craft producing areas or remains have been recovered from the other Koma sites.

Chapter 7 Summaries and Conclusions

Zoboku had been documented as a heavily looted site by previous reconnaissance surveys (Kankpeyeng & Nkumbaan 2008). Indeed, when research for this doctoral thesis commenced, it was observed that the soil layers and contents of about four large stone circle mounds possibly containing figurines had been turned over by looters, leaving several small ditches and haphazard configurations of pottery, figurine fragments and stones.

However, this did not inhibit the proposed research as the major objectives were to investigate other non-figurine contexts and document the cultural features of the whole landscape. Another objective was to find out if artefacts such as pots possessed fluid materialities and were transferred from one use context to another or performed in a variety of contexts. The research also aimed at outlining the nature of the pottery technology of the past community and how archaeological evidence can be used to delineate the operational processes of the pottery technology and possibly, the transmission of such knowledge through time. Other mounds which had been left intact on the site served these purposes adequately.

These research objectives coupled with the desire to address a relative dearth in information on the wider occupation contexts of the Koma sites, provided the impetus for the application of a multi-faceted research and analytical approach in this research. Walking surveys, visual examinations, locational surveys using GPS, a total station and ground penetrating radar equipment were employed. Test excavations were also used to determine the nature of artefact deposits below the surface of the site. The material culture recovered were analysed visually, with measurements, counting, and photography. Two of the metal objects recovered were analysed using Computer Tomography Scanning and a few samples of potsherds and figurine fragments were analysed using XRF methods. Samples of charcoal deposits from sealed contexts were also dated by radiocarbon methods.

The survey methods attempted to identify the boundaries and spatial extent of the site and the nature of the archaeological landscape. It was not possible to delineate, especially, magnetically the entire boundaries of the site and scan all the mounds therein, but it was clear that the mounds occurred as a cluster, and possibly collectively represent the vestiges of a community.

A variety of artefacts were recovered including metal objects, a glass bead, stone rubbers, daub remains, perforated sherds, intact pots and potsherds. Whereas the repertoire and distribution of artefacts generally point to a domestic communal setting with no definite artefact manufacturing workshops, burial or ritual spaces, fluid and possibly liminal objects which appear to connote ritual characteristics or functions were incorporated into apparent domestic spaces.

Furthermore, it appeared the site was made up of other activity areas such as a refuse disposal area and a possible fire-related activity area. The rock outcrop which showed grooves on its surface possibly served as a communal place where food or other substances were processed.

Both the excavations and the magnetic survey revealed that the deposition profile of the site was not very deep. Two of the mounds excavated showed occupation layers of just 60-80cm deep. The magnetic survey also indicated that occupation on the site had not existed long enough to materially and culturally spread over the expanse of the site. Thus, the site was probably occupied for a relatively short time period. Similar relatively shallow deposition contexts have been demonstrated in some mounds at Yikpabongo.

This further compounds the question of the exact nature of the spatial pattern of the Koma sites as a whole. The sites investigated so far indicate similarities in structure and artefacts, and some contemporaneity in chronology. But at the moment, it is not clear if the sites represent groups of related people occupying adjacent areas at the same time or groups moving from place to place after short periods of occupation in response to changes in natural environmental conditions, adverse cultural factors such as violence, or if factions of particular groups broke away from parent ones to found adjoining settlements. Kopytoff (1987:5-6) has observed that this is a common means by which African societies reproduce themselves. Once in the local frontier zone, the newly formed community could grow by attracting other people sometimes even from the parent group. Future research with a regional or landscape scope could help clarify these relationships.

The Koma archaeological evidence present a baffling and intriguing subject. Particularly, the style of the terracotta figurines differs markedly from known traditions from the Akan communities in the southern part of Ghana as well as from the popular examples from the Inland Niger Delta area. However, the roulette decorated pottery which dominate artefact assemblages from the sites bear similarities with pottery from areas in the Inland Niger Delta, the Sahel and Sahara (MacDonald & Manning 2010:146-150; McIntosh & Guéye 2010:157-161; Manning 2011:78-79; Haour 2011.) Cameroon (Gosselain 1992:572-574) and so on. Twisted and plaited roulette decorated pottery have been recovered from Daboya in the middle belt of Ghana (Shinnie & Kense 1989:50-72) and potters in the Begho-Hani area decorate pottery with corn-cob roulette patterns (Crossland & Posnansky 1978:82).

This shows that the pottery tradition shares affinities with other cultures within a wide geographical area. Suggestions of the importance of trade have been put forward by Anquandah, particularly stressing that artefacts such as cowries and equestrian imagery portrayed in figurines attest that the people participated in the trans-Saharan trade. However, the chronological frame of the sites indicates that, although the area was somewhat involved in the long-distance trade network, indigenous technological, social, and possibly ritual organisations already existed and were probably rooted in the early cultural foundations of the region.

Moreover, the material indicators of the trans-Saharan trade recovered have been minimal as compared to the evidence that the people manipulated local and available resources such as clay sources to produce large quantities of pots and figurines to materialize their metaphysical and ideological conceptions, and stones to process food and other substances and construct shrines as well as materialise rituals and symbolic relationships.

Concerning the identity of the authors of the Koma cultures, Anquandah (1998:177) has suggested linkages with the Sene-Gambian, Saharan and Malian monument cultures, and also with present day Bulsa communities. Davis (1988:10) has also suggested that the Kantonsi people who settled in the Kulpawn river basin prior to the seventeenth century were responsible for the Koma cultures. The Kantonsi people are believed be Mande-speaking people who migrated into the north-western part of Ghana from the Niger Bend area. Around the seventeenth century, they moved south-eastwards into the area of the Mamprugu Kingdom to serve as mercenaries (Davis 1996:138-139). As they were highly skilled people especially in weaving and dyeing, it has been suggested that they were probably responsible for the Koma cultures as well. However, none of these suggestions is supported by firm ethnographic or archaeological evidence. More light can only be shed on such questions with increasing regional and landscape-based research which will put the existing and on-going material culture studies into meaningful perspectives.

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