A PRELIMINARY ARCHAEOLOGICAL STUDY OF IRON SLAG AND ORE SHRINES AT KORMANTSE, CENTRAL REGION OF GHANA.

BY

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THIS THESIS IS SUBMITTED TO THE UNIVERSITY OF GHANA, LEGON IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF A MASTER OF PHILOSOPHY (MPHIL) ARCHAEOLOGY DEGREE.

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DECLARATION

I hereby declare that this thesis is a result of an independent research I carried out with the support and supervision of Dr. Gertrude Aba Mansah Eyifa-Dzidzienyo and Dr. David Akwasi Mensah Abrampah and that no part of this work has been submitted to any other institution for the award of a degree.

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DEDICATION

With love to Mr. Desmond Apedu, my brother-in-law, Mrs. Anita Apedu, my sister and Mrs. Ernestina Arkoh, my mother, for their immense support throughout my MPhil academic period. God bless you all.

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ABSTRACT

Memories are preserved for future generations and most often oral history and traditions are its conduit. In this study, it has been observed that African Traditional Religion shrines apart from serving as dwelling places of the spirits and deities, serve as a memory bank for past iron working activity in Kormantse, a coastal settlement in the Central Region of Ghana. The persistent use of slags and iron ore in the religious context in Kormantse is analogous to some religious practices in some past iron working societies in Africa. This suggests that not only was the iron working activity enmeshed in rituals but the by-product from the iron working activity. Furthermore, the discovery of Kormantse as a past iron working society has added to the number of known iron working sites in the Central Region of Ghana and makes this work a precursor to further studies of the extent of the industry in Kormantse and the Central Region as a whole. The study employed ethnography, archaeology and earth science approaches to derive the data presented in this thesis.

CHAPTER ONE
BACKGROUND OF THE STUDY AREA

1.0 Introduction

This research seeks to investigate the significance of iron slag and ore shrines to the people of Kormantse as well as to substantiate or refute the claim of a past iron-working industry in the settlement as suggested by Agorsah and Butler (2008). The name Kormantse which comes in various spellings such as Cromanti, Kromantin, Cormantine,Coromantee (Agorsah, 2014) became a household name during the trans-Atlantic trade. The general history of the settlement is documented in the light of its trans-Atlantic encounter with the various European nations beginning from the 17th Century. Kormantse appears to have existed prior to the European arrival in the area (Agorsah & Butler, 2008), yet little is documented about the pre-European period of Kormantse. Archaeological work conducted at the site by Agorsah & Butler (2008) offered some clues to pre-Atlantic Kormantse. The work revealed the prevalence of piles of iron slag and ore all over the site some of which have been used by the inhabitants as shrines.

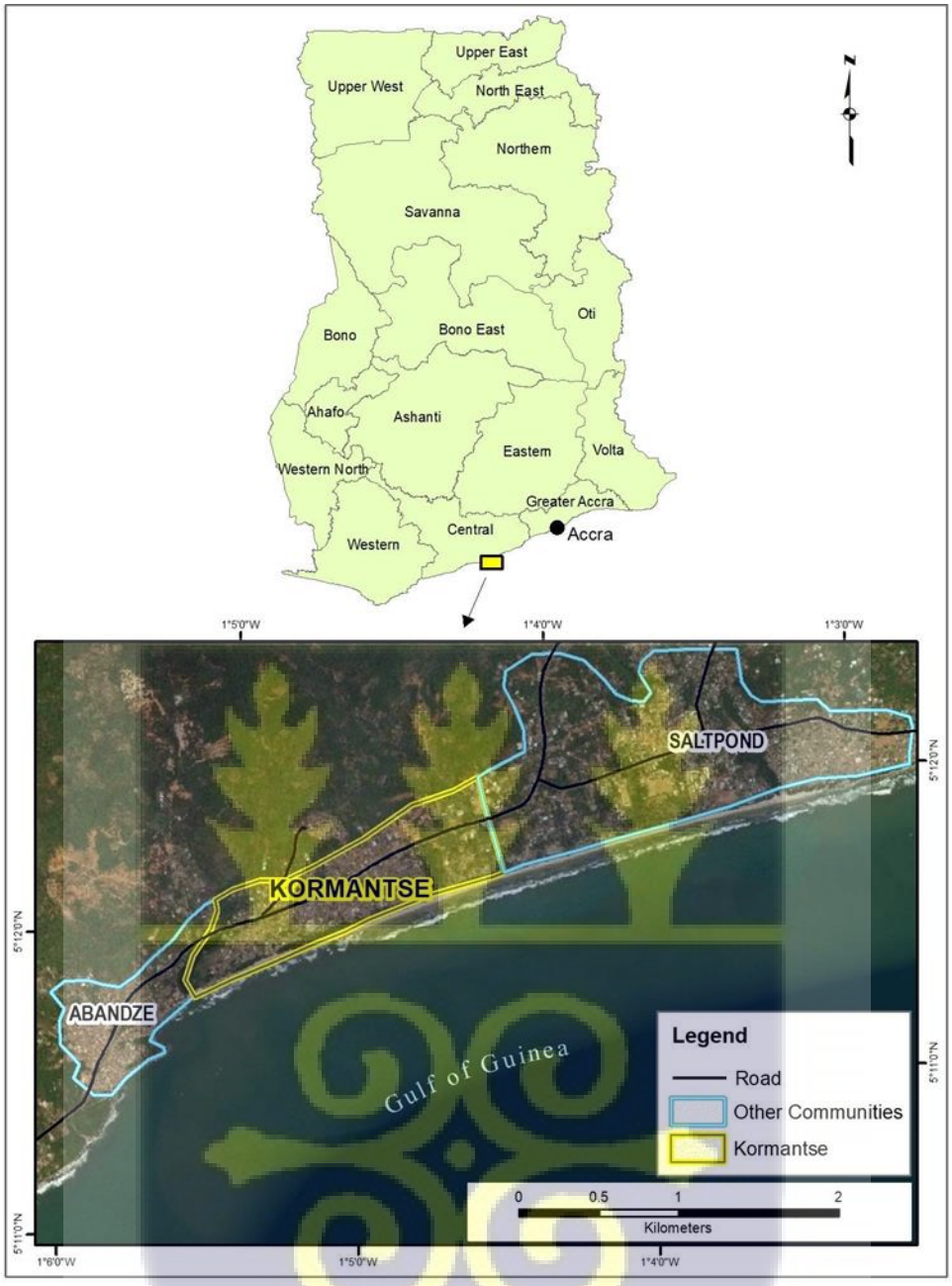
Shrines are indicators of African Traditional Religion across African societies, however the particular shape or form it takes is site specific. Shrines in Africa are cultural sign post, place of worship and symbolic vessels of the spirits of ancestors and deities who must be regularly placated, and petitioned for blessings (Allman & Parker, 2005; Apoh & Gavua, 2010; Field, 1939). Aside from their spiritual significance, shrines may be considered as a physical mnemonic that aid in recounting the past (Mather, 1999). The material make-up of shrines are varied and these materials hold both physical and spiritual connotations. At Kormantse, iron slag and iron ore are common materials used in majority of the shrines. Ores are the raw material employed in iron working from which the end product is a bloom and the by-product derived from it is a slag. Slags are regarded as waste while the bloom is further worked on to be furnished into tools and

implements. These materials are observed in shrines belonging to the entire community and individual households. The dominance of these materials in majority of shrines in Kormantse is peculiar and worth studying. This observation is the first of its kind in Ghana. An archaeological enquiry bolstered by ethnographic studies and scientific analysis was therefore undertaken to comprehend the phenomenon observed in Kormantse.

Considering the variant spellings of the site name in historical literature, this study uses the name Kormantse in accordance with the way it is spelt by the Mfantseman Municipal Assembly when providing primary information except where referenced sources are cited.

1.1 The Study Area

Kormantse is a hill top settlement found in the Central Region of Ghana. It lies on longitude 05°12'256''W and latitude 01°04'85''N and is one kilometer long and half kilometer wide. It is located at an elevation of 80 meters above sea level (web site 1) (**Map 1**). This settlement together with other communities such as Mankessim, Essarkyir, Dominase, Anomabu, Abandze, Otuam, Narkwa and Yamoransa are part of the communities that make up the Mfantseman Municipal Assembly (web site 2). Saltpond is the administrative seat of the Municipal Assembly and is bounded on the west by the district of Abura-Asebu-Kwamankese, in the northeast by the district of Ajumako-Enyan-Essiam, in the east by the district of Ekumfi and in the south by the Gulf of Guinea (the Atlantic). The district extends from Eguase to Mankessim, which is the Municipal Assembly's most western and eastern area respectively.



Map 1: Map of Ghana indicating the location of Kormantse. Source: Centre for Remote Sensing and Geographic Information Services (CERSGIS) University of Ghana, Legon, 2020

Kormantse is segmented into Upper (Old Kormantse) and Lower Kormantse (New Kormantse). Old Kormantse which is on a hill is gradually being abandoned for the New Kormantse site located along the coastline waterfront. The two main groups in the community are the Bentsir and Nkum, each of which claims ownership and control of one

of the two areas of the settlement (Agorsah & Butler, 2008). The groups in the settlement reside in a clearly demarcated area of the settlement of both Upper and Lower Kormantse. Thus, the Bentsir are found in Upper and Lower Kormantse No.1, and Nkum in Upper and Lower Kormantse No. 2. The people of Kormantse are Fante speakers although they claim the original inhabitants or first settlers were the Etsi people. Shumway (2011) intimated that the Etsi were one of the first settlers on the Fante Coast. Fante is the principal Akan language spoken in Central Region of Ghana which is bordered on the west by Ahanta speakers and in the East by the Ga and Guan (DeCorse, 2001) and North by Kasem, Gonja and Dagbani speakers. The Fante are part of the Akan or Twi speaking group which belongs to the Kwa sub family of the Niger Congo family of language as classified by Joseph Greenberg (1949).

The settlement has a population of about 8,501 people according to the 2010 Ghana Statistical Service census. In recent years, the Kormantse landscape has been disturbed by activities of local gold miners who pillage the site for antique materials and gold, which disturbs the archaeological record.

Upper Kormantse is surrounded on all sides by a deep depression except to the north-west. The depressions surrounding the hill area are characterized by compact clay soil some of which contain mica inclusions. The hill area has soil which is loamy whereas the settlement at the Atlantic waterfront has loose quaternary sandy soil (Ewusi & Kuma, 2011). The land is rich in iron ores. Soils in this region are classified under the Savanna ochrosol soil group which is greyish brown, sandy loam (*ibid*). The Central Region within which Kormantse is situated is underlain by the Cape Coast Granitoid Complex (CCGC) which is post-Tarkwaian. The granitoids consist of well-foliated, sometimes magmatic,

potash-rich rocks and come in medium-grained varieties of muscovite–biotite granite, granodi-orites, porphyroblastic biotite gneiss, aplites, and pegmatites (Kesse, 1985).

The Municipal Area has an average temperature of 24^{o} C with relative humidity of about 70 percent. Kormantse is located in the Coastal Savanna ecozone which has double annual rainfall; May-June with peaks in July and September to October with dry seasons usually from December to February and from July to September (web site 2). The vegetative cover of the region within which the study area is found is moist semi-deciduous forest (Ewusi & Kuma 2011). The study area consists of dense scrub tangle and grass and pockets of forest which are remnants of the past forested area. The area especially in the depression has tall trees and some grasses. Drainage features in the study area include Otsi lagoon and the coastal water front (web site 2).

The settlement history of Kormantse was narrated differently by the two groups in the settlement, namely the Nkum and the Bentsir. Nonetheless a line of similarity exists in both accounts. Each group claims to have emigrated from or passed through Techiman (the ancestral home of the Fante people). Both groups also claim to have been led by a male leader(s) with similar name(s). According to both the Nkum and Bentsir people, the name Kormantse is derived from two words *Kormir* or *Korme* and *Antsi*. *Kormir* or *Korme* was the name of the hunter who led both groups from Techiman to discover the hilltop settlement.

The Bentsir group claim they began their journey from Sudan and passed through Ngedum before reaching Techiman and later proceeded to their present location. Oral account has it that Kormir or Korme in his search for a place of abode for his people chose an area that could provide a panoramic view of low-lying areas so as to spot

possible intruders from beneath. This compelled him to choose the present settlement which is on a hill. On arrival, Korme found that the area was heavily forested and was habitat for various kinds of wild animals. He then killed an elephant and set it afire at a spot which is presently a dried pond referred to as *Komnsu*. It was also revealed in other narrations that he discovered the settlement with another group of people, but the latter deserted the place due to the dense and impenetrable nature of the vegetation. The news of the discovery of the hilltop settlement was announced to the rest of the population who were then camped at different locations within that enclave. However, the other group that discovered the settlement with *Korme* or *Kormir* were not elated with *Kormir's* decision to settle there. The group therefore retorted Kormir *antsi*….which translates as 'Kormir didn't heed our advice that the place is inhabited by wild animals'. The settlement subsequently assumed the name *Kormir-antsi* which later become Kormantse.

The Nkum group asserts that their ancestors were led by two leaders named *Kormir Panyin* and *Kormir Kakraba*. During their search for a place of abode on the hill, *Kormir Panyin* lost sight of his partner (*Kormir Kakraba*) and shouted his name several times without response until he discovered him under a tree and exclaimed to him *Kormir* didn't you hear me calling you? ('*kormir antsi*?'). Other accounts recount that both *Kormir Panyin* and *Kormir Kakraba* settled on the landscape for a while, after which *Kormir Panyin* decided to leave the settlement with his brother. However, *Kormir Kakraba* refused to accompany him. Soon the Asante invaded the settlement and *Kormir Kakraba* was arrested. So *Kormir Panyin* was aggrieved when he heard of that incident and exclaimed "if *Kormir Kakraba* had listened" (*kormir antsi*), he would not have been captured and it was abridged as Kormantse. Some sources also claim that the name was

derived from the Asante warriors who invaded the settlement. They exclaimed '*Me kɔe manti'* when they returned from the war and were asked what ensued during the war literally meaning, I partook in the war but I did not hear or I do not know the outcome of the war. This was said to conceal their defeat (Asante's defeat) from their people.

Both groups, the Nkum and Bentsir claim to be the first settlers and were present prior to the arrival of the Borbor Fante who were led by *Oburumankuma, Odapagyan* and *Osɔn* (the three ancestors that led the Borbor Fante). However, Shumway (2011) intimated that the Borbor or Boribori Fante migrated southward from the Akan heartland (Techiman) around the 14th Century CE and are the ancestors of the modern-day Fante speakers. They spoke a language that was the progenitor of the modern Fante language. The Fanteland prior to 1700 was home to people speaking Guan, Etsi and Akan languages (Shumway, 2011, p.13). Both Nkum and Bentsir are Fante speakers, but both claim to be Etsis as well. Etsi were presumably one of the early languages on the Fante Coast hence the 'fight' among the two groups in Kormantse for prominence as the early settlers. However, the Fantes are an amalgamation of cultural traditions of the Akan, Etsi, Asebu, Fetu, Eguafo and Agona (Shumway, 2011, p.15). The Etsi language is now defunct because the Etsi were subdued as a result of series of war with the Asebu, Afutu and Assin in the1660s (Ajayi, Espie & Dike, 1965, p.162) or most probably assimilated into other Akan speaking groups.

1.2 Kormantse in the Context of Fante History

The Fante people are known to inhabit both the forest and coastlands of the Central Region of Ghana. Prior to European contact, there were settlements scattered along the coast and throughout the adjacent hinterland. This pattern of settlement probably

extended at least 1000 years or much earlier as gleaned from archaeological data (DeCorse, 2001, p.18). Pre-Atlantic Fante coast comprised hilltop and lowland sites some of which had entrenchments surrounding the settlements for defense purposes (Chouin & Decorse, 2010, p. 125).

The Fantes are identified as Akans inhabiting greater part of the southern half of Ghana (Christensen,1958; Ellis,1887; Law, 2010; Priestly,1969). Prior to the arrival of Europeans, the general Akan ethnic group in the forest areas lived in widely scattered small chiefdoms or villages based on kinship (Daaku, 1964, p.4; DeCorse & Spiers, 2009, p.30) and were characterized by similar social organization. According to Hornsey (1979, p.98), the Fantes have never been organized under a single political entity but were composed of a number of independent chiefdoms. The family was the linchpin of the pre-Atlantic Fante society, each of which was headed by the family head who was subservient to the chief of the society (Daaku, 1964, p.4). Although there were state boundaries, movement of people were unrestricted on account that family clan membership transcended tribal and political boundaries (Daaku, 1964, p.5).

The Akans (Fantes) in the forest and the coast of Gold Coast were involved in long distance trade in gold and kola nuts to Western Sudan (Daaku, 1964, p.3-4) and intra trading activities long before the advent of the trans-Atlantic Trade. The Fante coast was also dotted with small fishing, palm wine tapping and salt producing villages such as Anomabo, Kormantse and Cape Coast, as well as agriculturalists who relied on shifting hoe cultivation and fallowing (Arhin, 1995; Daaku, 1970, p.2; DeCorse, 2001, p.18-19; Fynn, 1987, p.108).

According to Chouin and DeCorse (2010, p.123), data from the Central Region

Archaeological Project and a number of archaeological researches in southern Ghana point to the existence of substantial settlement of agricultural population before the European trade. Archaeological excavations carried out in the Central Region of Ghana have yielded fragments of slags and pieces of iron objects in areas such as Akrokrowa (Chouin & DeCorse, 2010), Elmina (Decorse,2001), Coconut Grove (DeCorse, 2005), Beifikrom near Mankessim (Nunoo, 1970), and the border between Apewosika and Amamoma (Penfold, 1971), which is indicative of iron working activities on the Fante coast. Radiocarbon date from Akrokrowa earthwork site for instance suggests that the site was occupied around the 2nd half of the 1st millennium CE. This is most likely during the 8th Century which is long before the first European landed on the Elmina Coast (Chouin & DeCorse, 2010, p.138). The other sites mentioned above have been speculated to be pre-Atlantic iron working sites based on their stratigraphy and the absence of European materials.

Additionally, in terms of religion, ancestor worship has been a prominent feature in the daily life (Welma, 1930, p.18) of the Akans in the southern coast of Ghana. The Fantes before the spread of Christianity believed and still believe in a Supreme Being, lesser deities and ancestral spirits (*Abosom*) who normally inhabit natural objects such as the sea, rocks, rivers and in trees (Welma, 193018). Shumway (2011, p.133), intimated that the abodes of the spirits or shrines specifically that of the *Nananom Mpow* (sacred grove) which predates European arrival played central roles in the ordinary lives, households and communities and in the development of the Fante culture. Kormantse existed before the coming of Europeans on account that it served as a rallying point and outlet of both the trans-Saharan and trans-Atlantic trades (Agorsah & Butler, 2008, p.1). However,

historical literature is silent on the socio-political organization of Kormantse prior to the arrival of Europeans on the Gold Coast now Ghana. The available information on the pre-Atlantic nature of the Fante coastland offers scanty details on the study area.

The Portuguese were the first Europeans to arrive in the Gold Coast in the 15th Century for trading purposes. Other European nations such as France, the Netherlands, Britain, Denmark, Sweden, and Brandenburg joined the trade at different times (Dickson, 1969; Fage, 1969). This trade which was material in nature at its inception was later replaced with the inhumane trade in enslaved people to feed the plantations in the New World. Two of these nations that had interactions with Kormantse are Britain and the Netherlands. Britain was one of the European nations that traded with the Gold Coast in the seventeenth century. The British built the first English trading post in Little Kormantin which served as the headquarters of the British trade in 1631 and occupied it till 1665. The fort was named Fort Kormantin after an existing settlement which was on a hill north-east of the edifice (Fage, 1969). The Dutch, in February 1665 (thus during the second Anglo-Dutch war), dispossessed the British of the fort owing to the lucrative nature of the trading activities there. The new occupants of the fort renamed it Fort Amsterdam. However, in 1867 when the slave trade had been abolished and profits were on decline, the English regained possession of the fort.

The area within which the fort was built according to Green (1745) was called Little Kormantin or Cormantyn (Bosman, 1721) to distinguish it from Great Kormantin; a settlement on a high hill which is a 'cannon shot below' Fort Amsterdam (Green, 1745). Bosman (1721) described little Cormantyn as so small and wretchedly poor that it did not deserve their attention, but Great Kormantin was so large and populous that it deserved its

name. This settlement (Great Kormantin) together with towns such as Axim, Shama, Komenda, Elmina, Cape Coast, Anomabu and Accra was described as larger and more prominent of the coastal settlements (Dickson, 1969). Great Kormantin was categorized as a major trading center during the trans-Atlantic slave trade (Dickson, 1969). Currently, Little Kormantin is known as Abandze or Kormantse number 3 whereas Great Kormantin still remains the same, but spelt as Kormantse, and is the focus of this research.

1.3 Research Problem

Kormantse is replete with different forms of shrine, especially in Upper Kormantse. The area has held strongly on to the African Traditional Religion for a long time. Shrines according to Parker (2011) are of varied array of materials. However, in Kormantse, iron slag and ore are the prevalent materials in majority of shrines in the old Kormantse hilltop settlement (Upper Kormantse). This observation was brought to light by Agorsah and Butler (2008) in the work "*Archaeological Investigation of Historic Kormantse: Cultural Identities.*" Surprisingly, this observation has not been documented in the literature even though Kormantse has received substantial attention in European literature. No researcher has also found interest in probing this phenomenon and its implication for unearthing the past of the settlement. This research therefore, used ethnographic and archaeological data to help understand the cultural transformation in the utilization of iron slag and ore in shrine context in Kormantse.

1.4 Aim and Objectives

The aim of this research is to study and understand the use of slag and iron ore in shrine context at Kormantse. The objectives of the research are to:

- Establish the presence of a past iron working industry and the uses of iron

working remains in Kormantse.

- Document the types, function and configuration of the slag and iron ore shrines at Kormantse.
- Examine the rationale for the use of iron slag or ore in creating shrines.

1.5 Research Questions

Key among the questions that guided the study are:

- What is or are the evidence of iron working and its remains in the past and at present?
- What types of shrines are found in Kormantse?
- What role(s) does ore and iron working remains play (s) in religion and shrine formations at Kormantse?

1.6 Material Culture Studies

This study benefits from material culture studies to interpret the findings of the research. Objects created (historical or pre-historical) are relics that continue to exist in the present and serve as a window to understanding and interpreting the past in many ways. The material forms or objects which represent the daily life of past people, in this case the people of Kormantse, find their way into the archaeological record as artefacts or material culture. These material forms have intimate relationships with the society within which they are created (Deetz, 1977; Oestigard 2004; Prown 1982). The relationship can be gleaned from the objects regardless of temporality (past or present), space and scale (local or global) through material culture studies (Miller and Tilley, 1996, p.5). Material culture studies evolved from the fields of anthropology, sociology and archaeology. It is defined as the investigation of material culture through which the beliefs, values, ideas, attitudes and assumptions of a particular community or society at a given time can be ascertained (Prown, 1982, p.1). According to Yonan, (2011, p.232), material culture studies are the

most reliable way of reconstruction of long lost or inaccessible ways of life or importantly, information written records have been silenced on. It is upon this premise that material culture studies is employed in this study to bring to light an aspect of the past of Kormantse that literature has not touched on.

Material culture as a facet of social morphology can be subjected to observation and description which reveals the form and understanding of people within the society from which they were recovered (Miller, 1994; Patnaik, 1995). Specific material culture mostly man-made recovered from a society indicates the existence of human intelligence operating at the time of fabrication (Prown, 1982, p.1). Material culture is thus, the tangible aspects of cultural interactions with the environment and other available resources (Patnaik 1995, pp. 59-64). Artefacts may embody different kinds of inherent and attached values, namely spiritual, economical, and technological, based on the context. The archaeological context gives direct sensory experiences of surviving pre-historical and historical events (Parrott, 2001) and in cases of persistence in use of the exact artefacts in the ethnographic context, may offer a clear picture of its value(s) especially those that are difficult to glean from the archaeological record for instance spiritual values. This offers a unique source of knowledge about the contemporary settlement of Kormantse and its ties to the past (Rathje, 1979, p.29).

Furthermore, material culture studies reflect the physical evidence of cultures that are made by people and which are attributed to the present or the past of that particular society. Renfrew (2004, p. 23) aptly posits that materials have histories and that the memory of that particular history is evoked when the material surfaces, through archaeological excavations. The concept of material culture underscores the importance

of archaeology in the reconstruction of history especially, long lost ones and may serve as a supplement to a known history. A common theme connecting interpretations of material records of the past is how people presently engage with the cultural expressions in their daily interactions (Beaudry, Cook & Mrozowski, 1991). The persistent use of the same material forms amongst the contemporary society advertently or inadvertently serves as a memory bank. These materials serve as window into the past and an avenue to recover more from the archaeological record. These artifacts in the contemporary society are more important in those societies that have no other means of transmitting information and preserving memory apart from oral communication (Kus and Raharijaona, 1990). These ethnographic observations can be explicated as perpetuation of meaningful ancestral ways of doing things.

Material culture studies has been employed by several archaeologists in Ghana. Apoh and Gavua (2010) applied material culture studies to interpret archaeological assemblages retrieved at the Katamansu site in Ghana. The interpretive framework helped to shed light on past events and occurrences which transpired at the site. In the mid-west area of the Volta Region, Ghana, Gavua (2015, p. 137) combined ethnographic research and material culture studies to better understand the traditional religious identity and practices of the people.

Material culture studies is the lens through which the physical evidence from the archaeological record in Kormantse is used to better understand the ethnographic observation in the contemporary society.

1.7 Significance of the Study

This research is significant because no research in Ghana has focused on the use of iron working remains in shrine context. It contributes to archaeological knowledge of past iron working history in the Central Region of Ghana, and specifically the important roles slags and iron ores played and continues to play in the religious context of Kormantse's past and present. It is also significant because it highlights the important role shrines play in preserving aspects of a society's past.

1.8 Challenges

The disturbance of the site by erosion and illegal gold mining (*galamsey*) by the local people made it difficult to settle on an area to excavate. The effect of *galamsey* operations far exceeds that of erosion as a vast stretch of land in Kormantse have been disturbed archaeologically. The activities of *galamsey* operators on the landscape is evident as a lot of potsherds and other materials are scattered on the surface of the land. Erosion has also exposed some of the buried cultural materials but this is attributable to the sloping nature of the land and as such cultural materials were seen to be out of context.

The ethnic rivalries between the two main groups required me to be circumspect in the questions I posed during the interviews since experience from the first phase of the interview showed that some questions were subjects of contention in the settlement. For instance, issues on the settlement history of the people. This limited the extent to which certain insights about the settlement were elicited.

Restricted access to some of the shrines and prohibitions on photography posed another challenge. Shrines are sacred places and for that matter having access to them required the performance of certain rites and sometimes were not open to even members of the community. This deprived me of the opportunity to document all the shrines in the

settlement.

1.9 Organization of Chapters

The thesis is segmented into six chapters. The First Chapter provides an introduction, background to the study area, a description of the study area as well as the aim and objectives of the research that was conducted. It also provides the interpretive framework that guided the interpretation of materials recovered from the excavation that was conducted.

The Second Chapter reviews literature on the Central Region of Ghana prior to and during the Atlantic trade as well as previous archaeological works conducted on the study area. Also, literature on the composition and significance of shrines is provided. Lastly, the chapter looks at iron slag in religious context and chemical analysis employed in the study of remains of iron working activity.

Chapter Three homes in on the methods that were employed in conducting this research. Chapter Four is a documentation of the contemporary life ways of the people of Kormantse by focusing on the various iron slag and ore shrines in the settlement. While Chapter Five provides the analyses of the materials recovered from the excavations as well as chemical analysis of the remains of iron working activity.

Chapter Six provides the interpretation of materials recovered, which is a synthesis of the analyses of materials excavated and the ethnography conducted. Finally, conclusion of the research is presented in this chapter.

CHAPTER TWO
THE CENTRAL REGION REVIEWED FROM HISTORY AND ARCHAEOLOGY

2.1 Introduction

This section reviews literature on the state of the Fante Coast prior to the Trans-Atlantic trade, changes the Trans-Atlantic trade wrought on the Fante Coast and then reviews archaeological works conducted at Kormantse. The issue of shrines and their composition is addressed as well as detailing archaeological evidence of reuse of slags in religious contexts. Additionally, review of literature pertaining to chemical composition analysis of iron remains and its products are presented in this chapter.

2.2 Central Region Prior to the Trans-Atlantic Trade

Scholarly literature have thrown light on the nature of 17th century Southern Ghana focusing on state formation of political entities. However, the nature of early or pre-15th century sociopolitical organizations of Southern Ghana remains scanty and elusive (Chouin & DeCorse, 2010, p.124). Archaeology has filled this gap by providing insights of societies prior to the introduction of Western form of writing. Archaeological data obtained points to the evidence of well settled agricultural communities in the Ghanaian forest prior to the advent of the Atlantic trade. In particular, Vivian's (1996) and Shinnie's (2005) data from Asante indicate the existence of stable village communities as early as 800 CE. Additionally, data emerging from Central Region suggest a pre-Atlantic settlement density that exceeds the post 1500 CE period. These settlements include hilltop and lowland sites of various sizes as well as entrenchments all with substantial evidence for iron production. Sites with entrenchments are the most visible of these pre-Atlantic settlements.

Chouin and DeCorse (2010), as part of the Central Region Archaeological Research Project,

conducted an archaeological work at the Akrokrowa earthwork site located near Abrem Berase, with the aim of evaluating the age of the earthwork. Earthworks are monumental trench systems; an enclosure often roughly elliptical composed of a deep ditch and raised earthen banks. Several of such have been found in the Birim valley and Kokobin (Chouin & DeCorse, 2010). Six samples of charred palm kernels, charred wood, and palm kernel recovered from the Akrokrowa earthwork site were subjected to radiocarbon dating to yield dates that were compared with dates from Kiyagaa Mulindwa's (1979) samples from the Monsa and Batabi sites in the Birim valley.

The samples dated place the construction of the Akrokrowa earthworks in the 8th / 9th Century which is consistent with the radiocarbon dates obtained for deposits found in the ditch. The Akrokrowa radiocarbon dates point to the construction of the entrenchment system in the 2nd half of the 1st millennium CE, most likely during the 8th century long before the arrival of the Europeans (Chouin & DeCorse, 2010). These results coincide nicely with samples (S1-2718) collected for dating by Kiyaga -Mulindwa in the ditch of Monsa (Chouin & DeCorse, 2010, p. 138). According to Chouin and DeCorse (2010) the fact that the sites belong to the same historical period radically changed the perception of socio-political and economic life in the forest of Southern Ghana before the commencement of the Atlantic trade.

Earthworks are believed to have been part of a settlement system. The amount of work involved in their construction suggests a social organization capable of mobilizing, controlling and coordinating labor, and relatively sedentary settlement over long periods of time (Chouin & DeCorse, 2010, p.138). The excavation at the Akrokrowa site yielded large quantities of fragments of palm-nut and fragments of oil lamps suggesting large scale

cultivation of palm trees. The inhabitants of the earthwork communities also made iron tools on account of the discovery of slag as well as pieces of iron objects. Other finds were quartz tools, polished axe and stone beads. Iron and iron technology were crucial factors in the process of digging earthworks, the latter being tangible evidence of the working power of this metal and at the same time a display of prestige for the elite who could demonstrate their ability to accumulate and control kin and followers (Chouin & DeCorse, 2010). The nature of the political systems of which the earthworks were part could not be ascertained from the excavations. However, their construction suggest a type of social organization capable of mobilizing material and human resources to build huge embankments (Chouin and DeCorse, 2010). Evidence of iron smelting and smithing were found in all excavated earthworks in the form of slag and fragments of iron. The slags suggest that iron was smelted locally. The excavations also produced early ceramics and no evidence of reoccupation after its abandonment.

The function of earthworks has become a subject of debate amongst scholars. Some scholars such as Davies (1961), Wilks (1957), Kiyaga-Malindwa (1979) have posited that earthworks functioned as fortifications, fosse, banks etc. According to Chouin and DeCorse (2010), earthworks were settlements and trenches that marked the limit of these settlements, evidenced by the absence of archaeological deposits outside the area delimited by the ditch at the Akrokrowa earthwork. Chouin and DeCorse (2010) asserted that the earthworks could have served as a social boundary. That is, to raise a community or elite groups to a higher status in a larger sociopolitical system. This social differentiation could explain the presence, during the same period, of small settlement without earthworks. The chronology of Akrokrowa is in agreement with an abandonment of the site by the mid-14th century. This is

in turn amplified by data coming from other earthwork sites in Southern Ghana suggesting a major change in settlement patterns before the commencement of the Atlantic trade characterized by the abandonment of earthworks (Chouin & DeCorse, 2010, p.143) possibly following a deadly plague. People abandoned their settlements and dispersed across the farmlands before reorganizing themselves according to new patterns. The advent of people from the Atlantic world may have coincided with the aftermath of this epidemic (Chouin & DeCorse, 2010).

Archaeological works by DeCorse (2005), Penfold (1971) and Nunoo (1970), touched on the technological aspect of the societies in Central Region before the coming of the European. In *"Coastal Ghana in the First and Second Millennia AD. Change in Settlement Patterns, Subsistence and Technology",* DeCorse (2005) brought to bear a possible past iron working site at the Elmina area. However, little insights could be gleaned from it since the research was not extensive. The site, Coconut Grove, which is located on a low elevation above the shoreline, four kilometres west of Elmina township revealed iron slags amongst other remains through excavation. A possible furnace base was identified, but it was ruled out as an iron furnace on grounds that iron slags and tuyeres were not found in association with the feature. Hence, it was considered to be a fish smoking oven. A chemical composition analysis of the remains would have revealed the microscopic characteristics of the furnace and could have been helpful in ascertaining its original function. Apart from this Coconut Grove site, slag deposits occur on several Central Region sites, including meter-deep slag mounds north of Komenda and Fomena.

Penfold (1971) conducted excavations on a hill three miles west of Cape Coast. The town, which is bordered by Apewosika and Amamoma, was inhabited by a group of people for a

short period after which the University of Cape Coast levelled it to make way for the construction of bungalows. Penfold (1971) identified prolific potsherds with varied decorations, numerous slags and three kilns on the settlement. Although the area has been disturbed, the kilns and slags recovered through excavation evinces a past iron working society. Penfold (1971) established that it appears that the hills around the coast were inhabited by Fantes who smelt iron and made pottery prior to the arrival of Europeans. However, the area was uninhabited at the time of the research and Penfold (1971) did not indicate its involvement or occupancy during the trans-Atlantic trade. Also, Nunoo's work in 1970 at Beifikrom near Mankessim yielded iron working remains such as furnace and tuyeres and large quantities of local pottery.

2.3 Central Region During the Trans-Atlantic Trade

DeCorse and Spiers' (2009) work details change and transformation in the political economy of the Akan coast specifically Elmina and Eguafo during the era of the trans-Atlantic trade. This work demonstrates that the situation on the Ghanaian coast before the 17th century can be dramatically contrasted with developments in the following centuries. The Central Ghanaian coast and hinterland can be characterized by its comparative lack of urbanization immediately prior to the advent of the Atlantic trade. Earthwork site at Abrem Berase may have been an exception, but data shows it was unoccupied in the late 15th century. Increasing urbanization is the most striking change in African societies on the coast during the post-European contact period.

Prior to the 15th century, villages in the Central Region were small in nature, engaged in localized trade and concentrated around small lagoons as evidenced by the presence of pre-15th century occupation around Benya Lagoon at Elmina, Brenu Akyinim and Aborobeano

lagoon (DeCorse & Spiers, 2009). However, with the coming of Europeans, large populations moved to larger settlements associated with European trade entrepots and the capital of the site in the immediate hinterland, also expanded in size and importance.

Eguafo already existed before the Atlantic trade era, but changed in form and organization during the Atlantic era, while Elmina sprang up after the advent of the trans-Atlantic trade. Eguafo incorporated at various times the areas between the Pra river and the Sweet River within its boundaries. The Eguafo Kingdom was one of several Akan polities that first traded with the Portuguese. It served as an intermediary position between the coast and the hinterland. According to Spiers and DeCorse (2009), the kingdom was instrumental in the coastal trade during the 17th and 18th centuries, and this was a period of dramatic expansion of the slave trade. During this period, the Kingdom experienced transformations in its size due to population growth, spatial arrangement and in its social control and the emergence of more centralized political hierarchies. Similar trends are observed in hinterland towns such as Asebu and Efutu (*ibid*). Archaeological data on the post 15th century period indicate a similar pattern at Eguafo where there was abandonment of a hilltop site and the expansion of a valley settlement during the 17th and 18th centuries. Archaeological data suggest that from the 17th century, the site of the Eguafo settlement increased and there were variety of artifacts as a result of the long distance trade. The settlement of Eguafo experienced a change in settlement from a small defensive settlement to a much larger town during the 17th century. This period of expansion was followed by a period of decline that extends to the present with the current settlement still occupying less area than it did at its apogee (DeCorse & Spiers, 2009).

According to archaeological evidence, Elmina; home to the first European trade post in West

Africa, prior to the trans-Atlantic trade was confined to two small loci on the Elmina peninsula (DeCorse & Spiers, 2009). Elmina was not an independent polity until after the advent of the trans-Atlantic trade since Eguafo and Efutu may have both claimed territorial rights to Elmina (*ibid).* After the founding of Castelo de Sao Jorge da Mina, Elmina with the assistance of the Portuguese became increasingly autonomous. Trading activities with the Europeans led to an influx of people into the settlement, leading to population increase in Elmina between the 15th and 19th centuries. Elmina was originally limited to the settlement area and adjacent farmlands. However, during the 18th and 19th centuries the town expanded west along the Elmina peninsula and into portions of the area north of the Benya Lagoon (DeCorse, 2001, 47-52). Presently, the Edina state with Elmina as the capital includes several towns and smaller settlements which is bounded by the stools of Dutch Komenda in the west, Oguaa (Cape Coast) in the east and Eguafo to the north (DeCorse & Spiers, 2009). Oral accounts suggest that the Edina state has incorporated some villages which were formally part of the Eguafo state until the 19th century. There is, however, no evidence for kingship at Elmina until much later and even then, it is an office lacking in hierarchical authority typified in traditional formulation of the state. The office of the Omanhene (Paramount Chief) did not emerge until the 18th century (DeCorse & Spiers, 2009). Currently the head of the Edina state who is the political, military and religious leader rule through monarchical succession. The polities of coastal Ghana do not follow the same pattern of development nor do they present an undirectional evolution from lesser to greater complexity. They thus afford insight into the varied processes that always characterized the evolution of political system (DeCorse & Spiers, 2009).

In DeCorse's (2001) book *"An Archaeology of Elmina: Africans and Europeans on the Gold*

Coast, 1400-1900", more emphasis is placed on Elmina's development over the past 500 years. The settlement encapsulates the years of European contact, trade and colonization than any other site in Ghana evidenced by trade list and archaeological data. One visible indicator of change in the Elmina settlement were the many dwellings of multi-storied flat roofed stone construction. These construction methods illustrate a unique aspect of Elmina, probably originating in the latter half of the 17th century with artisans trained by the Dutch. However, archaeology has showed that some of the buildings conformed to African ideals of the use of space. Despite some transformations noted above, variety of source material collectively suggest a great deal of perpetuity in some aspects of religious beliefs, behavior and material culture of Elmina. Although some individuals at Elmina may have imbibed European mannerism in certain contexts, food preparation and consumption practices probably remained unchanged. The social context in which food was consumed has also likely remained the same (DeCorse, 2001, p.178). There are also indications of continuity in ritual expression and the underlying epistemologies over the past 500 years. According to DeCorse (2001), changing values in Elmina appear more prominently in the 19th century after the advent of colonial rule. This period saw direct role in the political hierarchy of Elmina, increasing frequency of houses conforming to European floor plans and the neoclassical features of the surviving 19th century buildings. Although culture contact has been integral in human interactions, the 15th century interaction was between two dramatic different societies (DeCorse, 2001, p. 192). The Elmina data shows Elmina's adaptation of some European feature and additions to local material inventory rather than a drastic replacement and modification of African culture.

Considering the long history of culture contact between Europeans and societies along the

coast of Ghana, an archaeological study of shipwrecks and related sites holds great prospects. Maritime archaeology is a new field of endeavor in Ghana and employing it in the study of shipwrecks and other submerged sites will furnish a wide range of material culture involved in the Afro-European interactions, their temporal contexts and provenience. Elmina was one of the coastal towns that engaged and thrived during the maritime trade with Europeans. The siting of the first European trade post; Elmina Castle in Elmina close to an existing settlement, facilitated the trade for centuries. The Elmina maritime landscape is a wave dominated coast interspersed with rocks and sandy beaches (Cook, Horlings & Pietruszka, 2016). Under the Central Region Archaeology Research Project, the Fante Coast was the focus of underwater investigations based on methods such as side scan, sonar, magnetometer, echo-sounding, sediments coring and excavations. In 2009, a field work led to the discovery of a large anchor with one fluke visible and a chain in water 400m south-east of the Elmina castle. In 2007, two anchors with their shanks standing relatively vertical out of the sediments and their arms and fluke completely buried were also discovered. Also, Rachel Horlings led the team to Cape Coast castle and the seascape of Mouri, where three anchor sites were unearthed (Cook et al, 2016).

During the 2003 and 2005 field seasons at Elmina, the wreckage of a vessel believed to be the Groeningen, a Dutch West Indian company ship that sank after one of its guns exploded while saluting the castle on its arrival in 1647 and other objects were discovered. Initial assessment suggested mixed context with dates spanning the entire contact period and a prevalence of 19th Century material (Cook et al, 2016). Further investigations of the Elmina wreck site by Pietruszka and Horlings in 2007 led to the discovery of new features, an anchor, a sixth cannon at the northern end of the site and wood samples believed to be Dutch

in origin and dated between 1600 and 1730 (Cook et al, 2016).

Another field season in 2007 led to the discovery of a second historic vessel in the Benya River; a lagoon system that flows between Elmina Castle and the modern town. The discovery was made following a call to the Central Region Project team after a construction company chanced on remains of a wooden vessel and small cannon balls in the dredged debris. Inspection of the dredged debris by the team exposed 14 disarticulated timbers representing a wide range of structural components including, planking, floor, futtocks, deadwood and beams. The finds were identified as from an early 18th Century Dutch vessel (Cook et al, 2016).

2.4 Previous Archaeological Researches Conducted at Kormantse

The area known as Great Kormantse in most historical documents, has been archaeologically investigated by two Professors, E. K. Agorsah and James Boachie- Ansah. The investigations carried out in different years focused on revealing different aspects of the trans-Atlantic past of the society. The research by Prof. Agorsah which was the first archaeological work undertaken in Kormantse spanned 2007 to 2010. The research aimed at investigating the cultural formation and transformation of the settlement in response to changes occurring through colonial times. The excavations yielded cultural materials such as local and imported beads, local and imported ceramics, tuyeres, smoking pipes, human skeletal remains among others. The myriad of cultural materials recovered were not all analyzed and the report on the ones analyzed is yet to be published. However, a preliminary report on Kormantse excavation has revealed that the site abounds in iron slag some of which have been incorporated into shrines. Agorsah (2008) intimated that this points to a past iron working tradition in the society. Fairly little information can be gleaned from them

because no research has focused on them. It is on this account that this research becomes crucial in order to investigate how the slags have played significant roles in the religious and economic context of Kormantse's past and present.

The second archaeological enquiry was undertaken from 16th-27th June 2008 by Professor Boachie-Ansah. This excavation was carried out to compare the materials he recovered from Fort Amsterdam with those recovered in Kormantse to ascertain the extent to which the cultural materials from Kormantse bear resemblance to or differ from that of the nearby Fort Amsterdam, whose residents traded with the inhabitants of Kormantse. The excavation at Kormantse yielded materials such as European, Japanese and locally manufactured pottery, gun flint, glass bottles and beads. European smoking pipes, bricks and roofing tiles, metal objects, animal bones and mollusk shells. He noted similarities in the pottery from both sites which were regarded as indices of Asante influence and presence on the coast. Additionally, the dietary patterns were similar as inferred from the animal bones and mollusk shells obtained from both sites. The imported materials recovered from Kormantse attest to the trade relations that existed between the Kormantse and the Europeans. Boachie-Ansah (2015) added that indications of acculturation and reliance on European imported goods can be discerned in the archaeological record as numerous European goods were recovered from the excavations. This, just like Agorsah's work is revealing aspects of the trans-Atlantic past of the society and this has been the focus of most researches along the west coast of Ghana.

2.5 Shrines, their Composition and Significance

The Akan belief in the concept of a supreme being and sole creator of the world; Onyame/Nyame (God) who is assisted in the task of managing his creation (humanity) by

the *abosom* who are deities/ divinities (Blay,2009; DeCorse, 2001). The *abosom* either male or female are in essence, the intermediaries and immediate objects of reverence on earth. The *abosom* embody various manifestations of nature namely, wind, trees, animals, assemblages of rocks, natural features of the landscape such as mountains, ponds, shaped stones, lakes, rivers or other water features (Blay, 2009; Dawson, 2009). Shrines are built to function as a space and means through which humans can communicate with Nyame via an *obosom* in or near the locality where the *abosom* is said to reside (*ibid*). In literal sense, shrines act as 'containers' for the spirits of ancestors and deities who must be consistently placated and petitioned for blessings, requests for intercession and divine sanction (Dawson, 2009). Mather (2009) also posits that a shrine can be a physical object at which animal sacrifices and libations are offered in honor of supernatural and other worldly agents including ancestors, spirits of the land, divining spirits and nature spirits. Furthermore, shrines are foci of ritual practice (libation and sacrifice) because they hold the supernatural agents that the people pay homage to (*ibid).* According to Parker (2011), shrines within a particular religious tradition appear resistant to precise definition on account of their varying forms and configuration from one locality to the other. The material components of a shrine can be complex depending on the type of shrine in question (Kankpeyeng et al, 2013; Insoll 2011a and b).

A shrine may consist of multiple objects or a single object (Mather, 2009). African shrines can be mundane material objects such as ceramic pots, tools used to work the earth such as axes, hoes, iron, spears, bronze and iron bracelets, animal remains and materials ultimately derived from the earth such as worked stone pestles and grinders (Insoll, 2006). These were frequently found to form core elements of smaller shrines amongst the Tallensi (*ibid)*). For

instance, Kusaasi shrines are made from six different types of objects namely, trees, stone, pot, calabash, tail and root (Mather, 1999). These manmade or natural objects used in the shrine context could be explained as appropriate use of abundant materials in the locality. Nevertheless, they assume ideological, religious and spiritual functions besides their primary function through practice and context (Insoll, 2004, 2006). In, '*Material Culture and Indigenous Spiritism: the Katamanso Archaeological "Otutu" Shrine'*, Apoh and Gavua (2010), revealed that objects such as pottery, imported ceramics, bones, beads, metals, glassware, cowries, bottles of schnapps, gin amongst others excavated from the archaeological Otutu shrine, were bound up in spiritual expressions and practice owing to the context and practice.

Shrines are categorized on the basis of their attribute (Mather, 2009), function as well as the resident deities or spirits. Shrines therefore, can be classed into lineage shrine, personal destiny shrine, ancestor shrine, household shrine, external shrine, chiefly shrine, earth shrine and community shrine (Insoll, 2006). Dawson (2009) asserts that shrines like collectives are not static and their meanings within the society alters as morphology of the collective changes. They can be modified, rebuilt, renovated, relocated, forgotten, re-legitimised and forgotten once again (Dawson, 2009). According to Insoll, Kankpeyeng, & MacLean (2009), shrines especially in the West African contexts appear to serve as symbolic repositories of information as they are vital for recounting history, for remembering important people and events from the past. In Apoh and Gavua's (2010) work, the material assemblage in the Otutu archaeological shrine provided insights on the state of the society or nation, and indication of the people of Katamanso's involvement in local and international interactions or trade in the past.

2.6 Iron Slag in Religious Context

Slags are the by-product of iron working activity. Unlike the bloom, the end product which is fashioned into tools, the slag is left on the site after the process is completed. According to McCosh (1979), slag is considered waste and irrelevant and as such, is referred to as faeces by the Ngoni of Malawi. However, in other African countries, evidence of the use of slags in shrine, rituals and religion have been observed. In "*Ritual and Political Aspects of Iron Working; Iron in War and Conflict. Archaeology of Early Northeastern Africa",* Haaland (2006) reveals that a temple dedicated to the war god Apedemak is built on a slag mound at the south eastern part of the ancient city of Meroe. In Haaland's (2006, p.143) view, it is tempting to see the building of the temple on the slag mound in Meroe as a manifestation of rituals of iron smelting. Therefore, the ritual significance of the temple is manifested in it being localized on slag heaps (Haaland, 2006, p. 147).

Non-religious reuse of slag in Ghana and beyond has also been documented. At Adome, Gavua and Apoh (2011), in *"Alternative Site Conservation Strategies in Ghana: The Adome Ancient Ironworking Site"* undertook a research in a community where the inhabitants did not know the archaeological significance of the slag. The inhabitants used the slag as foundation stones for buildings and as bathroom flooring materials. In southern Finland and central Sweden, archaeologists have frequently observed iron slag in a number of iron age burials. According to Shepherd (1997), there are several strong reasons for believing that the slag may have a ritual overtone. In trying to establish a symbolic meaning of the slag with the burials, Shepherd (1997) asserts that both are by- products. Thus, the corpse is the by-product of a human life transformed by death into a freed and disembodied spirit and the slag is the by-product of the transformation of iron ore into powerful and dangerous iron.

The study of materials involved in the ancient iron working process (ore and slag) and

furnished iron tools (iron objects) possess the ability to provide information regarding composition, origin and technological inferences (Ashkenazi et al., 2012). Scanning Electron Microscopy, Energy-Dispersive X-Ray Spectroscopy (SEM-EDX) are touted as important analytical tools for such purposes.

Okoro (1989) presents the archaeological, ethnohistorical and ethnographical material on the iron technology at Gambaga in Ghana. In the study, iron ore samples from smelting sites, furnace and ore mining locations were subjected to an elemental or chemical composition analysis by the Geological Survey Department of Ghana. This made it possible to relate the iron ore and slag to different furnace forms found in the settlement. Unfortunately, the specific chemical analysis employed was not indicated in the study. Analysis of ore located 800m southwest of Gambaga and ore on which bowl shaft furnace was excavated indicated similarity in chemical composition, particularly an iron weight of 56%. This demonstrates that the ore used at the bowl shaft furnace was mined from the nodular hematite ore deposit from the same location. For the tall naturally induced furnace, ore samples analyzed had 48% iron content and was a lamellar ferruginous laterite. According to Okoro (1989), this implies that the tall furnace used lower iron content ores. Okoro (1989, p.123) gleaned from the analysis that smaller furnaces employed rich or concentrated ores while the large and tall ones seem designed to utilize poor quality ores. The stylistic variations in furnace built may be explained with reference to technological consideration of the ore used. The samples of slag collected from mounds and furnaces had high iron content of 40%. This hints at an inefficient iron working process since the slag that run off the furnace contained not mainly waste but a high amount of iron oxides, which forms a major component of the end product which is bloom.

In Gethlin's (2016) work, a study of archaeological slags was carried out to glean insights into the metallurgical activities and broaden the knowledge of such finds. The study analyzed archaeological slags from Tell Dhiban and Armenian region, all in Israel using Scanning Electron Microscopy, Energy Dispersion Spectroscopy (SEM-EDS) analysis. According to Gethlin (2016), SEM-EDS analysis is touted over other forms of chemical analysis because of its non-destructive nature and ability to provide large information. The analysis commenced with macroscopic assessment of the slags from both sites. This involved weighing, measuring and photographing of samples. The physical assessment of the slags identified the samples as smithing slags. Further chemical analysis showed high iron content in the samples with low silica and low alumina, and this according to Gethlin (2016), are characteristics of smithing slag. The chemical analysis showed that the slag specimens collected from both Tell Dhiban and the Armenian Garden all originated from smithing practices and were very similar in terms of chemical composition and microstructure. This indicates that the same or very similar general methodologies were being practiced at both sites. Furthermore, the chemical composition and microstructure produced by the SEM-EDS analysis of the samples from Tell Dhiban and Armenian Garden are distinct when compared to smithing slags from other regions and time period. This can be attributed to the use of calcareous rather than siliceous fluxing agents during the smithing operation (Gethlin, 2016).

2.7 Summary

Along the Fante coast of Ghana evidence of iron working activity has been in the form of slag, tuyeres and furnace fragments recovered from excavations in sites such as Akrokrowa earthwork site, Beifekrom and the area between Apewosika and Amamoma. Others are

surface evidence in the form of slag heap at Fomena and Komenda. However, none of these sites has slag and iron ore incorporated in their shrine and religion.

Kormantse's case of slag or ore shrines provide a unique evidence and probably the first of its kind, especially in a site associated with the trans-Atlantic trade. This offers an opportunity to understand this phenomenon and use archaeology to ascertain whether there was iron working activity in the past especially in the case where oral history and documentary sources does not mention Kormantse as a past iron working society.

CHAPTER THREE
RESEARCH METHODS

3.0 Introduction

This chapter details the approaches adopted in the collection of ethnographic and archaeological data for analyses and interpretations. The methods namely library research, interview, observations, photography and archaeological excavations yielded both primary and secondary data for the study.

3.1 Forms of Data (Secondary and Primary Data)

Secondary data which constitutes data collected earlier by previous researchers were obtained via library and internet research for the study. This phase of the research commenced months prior to the preliminary visit to the site and continued after fieldwork. Activities undertaken during this period were primarily reviewing of documents about the study area and the topic. The library at the Department of Archaeology and Heritage Studies was the source of literature on historical areas, iron working sites, indigenous African Religion, research methods and theories. The African Studies Library was also visited for historical books on Ghana and the study area. The Gunnerus library at the Norwegian University of Science and Technology provided numerous books such as European records on the study area, African settlements associated with trade post and the trading post (Fort Amsterdam). This helped to have a vivid background knowledge of the area as recorded by European writers. Additional books on theoretical frameworks and methods were also obtained from the Gunnerus library during my visit to Norway in 2019 as a participant of the NORPART (Norwegian Partnership Programme for Global Academic Cooperation**)** exchange programme.

The internet was also useful in obtaining most of the documents on current researches conducted in the study area. It served as the best resort for old European records which were not found in the library.

The primary data for this study constituted ethnographic data (including oral accounts) obtained through interviews, photography, observations and archaeological data. These were original data obtained by the researcher to meet the research goals. Primary data has the advantage of affording new knowledge and discovery to a discipline, but it involves much financial investment.

3.2 Ethnographic Field Work

Ethnography entails studying people in their natural settings by means of methods that capture their social meanings and ordinary behaviors, having the researcher directly involved in the environment, if not in the behaviors, so as to gather data in a systematic way, but without being externally placed on them (Brewer, 2000, p.313). This activity was carried out in the Kormantse settlement in two phases, the first phase spanned from 22nd to 27th July 2019 and the second phase from 30th January to 10th February, 2020. Oral accounts (oral history and traditions) were also collected during the ethnographic research. Ethnographic work was geared towards gaining insights on the contemporary and past economic activities, contemporary and past application of iron ore and slag in shrines, settlement history and the *Asafo Posuban* (monuments of the para-military group). The multiple methods employed in eliciting ethnographic data were interviews, direct and participant observation, photography, survey and mapping. These methods provided useful information that served as a check against distorted information and feedback. Adapting mixed research methods helped to use different method(s) in different situations (Schensul, Schensul & LeCompte, 2012) in the

data collection.

3.3 Population and Sampling

Upper and Lower Kormantse Number 1 and 2 have a total population of about 8,501 people (Ghana Statistical Service, 2010). For this reason, the target population for this study was obtained through three different sampling techniques. For the first ethnographic work conducted from 22nd to 27th July 2019, the target population were defined through convenience sampling, judgemental and snowballing. Due to the focus of the second ethnographic work, which spanned from 30th January 2020 to 10th February, 2020, the target population were shrine caretakers, elders, respondents who lived in proximity to shrines and respondents who had shrines in their homes.

Judgmental sampling was employed to obtain information from members of the community who are knowledgeable in issues pertinent to the study. People like the chiefs, elders, leaders of community groups like the Asafo Company (para-military group), fishermen association, clan heads and opinion leaders from both sections were selected based on their status in the community (**Fig. 3.1 and 3.2**). In soliciting insights about contemporary issues from the community members, convenience sampling was employed, thus, people who were willing, available and accessible at the time the research was conducted were interviewed. This was necessitated by the difficulty in finding respondents due to the time of the day the research was conducted and also the unwillingness of some people to participate in the research for reasons best known to them. In some cases, the researcher relied on referrals to other informants or informant's recommendations to other people they deemed knowledgeable. This method is referred to as snowballing. Chain referral sampling or snowballing was beneficial in Lower Kormantse Number 1, where a woman directed me to an 86 years old

man who had a wealth of information about Kormantse.

Fig. 3.1: An interview with the chief fisherman of Kormantse Number 2 (Field Photo, 2019).

Fig. 3.2: An interview with Asafo Supi (leader) cum Asafo flag maker in Kormantse (Field Photo,2019)

3.4 Interviews

Structured interview was employed in this study. Sets of pre-determined questionnaires (both open and close ended questions) that all interviewees answered, usually not in the same order were administered to respondents. This gave the researcher direct control over the direction of questions whilst eliciting rich array of information from the respondents.

Two different questionnaires were designed for the two different seasons of ethnographic work. The first questionnaire touched on almost every aspect of the contemporary society such as the economic, social activities, and issues about the European encounter (**see Appendix 1**). The second questionnaire homed in on the religious aspect of the people thus the various types of shrines in the settlement and evidence in the society which points to a past iron working activity (**see Appendix 2**). A total of 102 people were interviewed which included all Junior High School (JHS 3) pupils of Hasowodzi, a government school located at Lower Kormantse (**Fig.3.3**). The intent was to obtain from the school pupils certain insights of the society that the elderly may not divulge. The questionnaires were not self-administered for the purpose of clarifying certain issues to the respondents during the process when necessary and in some cases due to illiteracy. Though they were prepared in English, they were translated into Fante Twi (local dialect) by the researcher for the benefit of the respondents and answers were provided in the Fante language (**Fig. 3.4**). An interview session lasted approximately 10-15 minutes.

Fig. 3.3: Interview session with JHS three pupils of Hasowodzi Primary and JHS (Field Photo, 2019)

Fig. 3.4: Interview with three elderly women at Lower Kormantse Number 1 (Field Photo,2019)

3.5 Observation

Direct observations were made at both Upper and Lower Kormantse on the different typesof shrines, their location and composition of the shrines in the settlement. These observations influenced and guided the questions posed during the interviews (Dewalt & Dewalt, 2002). Furthermore, participant observation helped to review meanings of words used by participants in interviews and observe incidents that informants were unable or reluctant to disclose.

3.6 Photography, Survey and Mapping

Digital capturing of images and occasionally video recording were used to gather primary data. Gadgets such as digital camera and a smart phone were used in taking photographs after consent was sought from respondents. This enhanced the description and analysis of features and materials observed during the ethnographic work. Important events such as the performance of the Asafo Company at a festival which occurred during the second field research was also photographed and digitally preserved.

Survey and mapping of shrines in the settlement was conducted. During the survey, a Global Positioning System (GPS) was employed in taking the coordinates of shrines which access was granted. The GPS coordinates facilitated the creation of a shrine distribution map. Also, a measuring tape was used to take dimensions of the shrines.

3.7 Archaeological Field Work

Archaeology has a material element, aptly intimated by Renfrew and Bahn (2005). The material elements represent remains of past people, societies and cultures which are studied through theoretical basis for the interpretation of the diverse aspects of the past. Renfrew and Bahn (2005) noted that Archaeology includes both a physical activity (field reconnaissance survey, site mapping and excavation) carried out in the field, and an intellectual pursuit in

the study or laboratory work (laboratory analysis). The aforementioned were the methods adopted in the recovery and processing of archaeological data from Kormantse.

3.8 Field Reconnaissance Survey

A preliminary visit was embarked on the 8th of April 2019 for the purposes of undertaking a field reconnaissance survey. This survey was to first disclose my intentions to the chiefs, observe the necessary protocols and importantly to be familiar with the study area (**Fig. 3.5**). Accompanied by the Principal technician of the Department of Archaeology and Heritage Studies, Mr. Gideon Agyare, and an indigene of the community, Mr. Philip Attah Yawson, I made a courtesy call to the two chiefs of the settlement at their palaces at Lower Kormantse Number 1 and 2. This was followed by a visit to the old settlement known as Upper Kormantse where the archaeological work was undertaken. The team conducted surface inspection of the site, visited the areas previously excavated by Professor Agorsah, recorded resources on the settlement and observed the settlement layout. It was discovered that the site abounds in potsherds which were scattered in most parts of the settlement. There were also abandoned old structures which were still standing in the old settlement. Slags were found scattered in most parts of the settlement while others were used as shrines. Three Asafo *posuban* were identified in the settlement, two in the Nkum quarter and one in the Bentsir quarter of the settlement. These structures exhibited various anthropomorphic and zoomorphic art depictions which will be discussed in the next chapter. The reconnaissance survey was done with tapemeasures, ranging poles, GPS and a scale for photography.

Fig. 3.5: A bottle of schnapps and an undisclosed amount of money being presented to the chief through the linguist(*Okyeame*) of Kormantse Number 1(Field Photo, 2020).

3.9 Archaeological Excavations

In trying to understand the past, archaeological excavations were carried out at the old Kormantse hilltop settlement specifically, the Kormantse Number 2 quarter during a ten (10) day fieldwork which spanned January 29, 2020 to February 8, 2020. Although an excavation permit was obtained from the Ghana Museums and Monuments Board (GMMB), the permission and consent of the chiefs and owner(s) of the land were also sought before excavations commenced at the two different loci.

3.9.1 Locus 1 Trench 1

The first area excavated was selected based on the recommendation made by Professor Agorsah and the presence of the surface scatter of artefacts which were predominantly slags. A surface survey conducted on foot by the researcher and her team comprising Mr. Gideon Agyare, Kelvin Asare, Addison Odarkor and Gerald Ganyo indeed revealed numerous surface configurations. However, owing to the activities of illegal miners (*galamsey*) at

that area, the section of the land to the west which was relatively undisturbed was chosen for the excavations. Surface materials found on the site comprised bottles, potsherds and imported ceramics (**Fig. 3.6 and 3.7**). The site was cleared of its bushes in preparation for the excavations. The area was abbreviated as KTSE (Kormantse) 2020 for the purposes of labelling and recording of provenience information. The area (hereafter identified as Locus 1) lies on GPS coordinates of latitude N 5° 12' 228'' and longitude W 001° 04' 900'' (48 meters above sea level).

Fig. 3.6: Slags and potsherd seen during the surface survey (Field Photo, 2020)

Fig. 3.7: Surface finds of imported ceramic and bottle (Field Photo, 2020)

Equipment employed in the excavations were trowels, compass, pegs, ranging pole, string, shovels and head pans. The unit started off as a test pit (1x1) dug at a 20cm arbitrary vertical

intervals to ascertain the artefactual richness of the unit. This was preceded by establishing the north south baseline using a compass and two ranging poles (**Fig. 3.8**).The unit (1x1m) was then set up 50cm from the baseline using Pythagoras theorem (**Fig.3.9**) and with the use of the measuring tape and a peg. A string was tied around the ends of the unit to mark its boundaries. Both clearing or stripping and penetrating excavation techniques were employed to reveal the different cultural materials through space and time. The excavations uncovered four levels with the sterile level being reached at a depth of 80cm. Levels one and two had soils which were black in colour, but level three had a mixture of black soil underlaid by reddish brown soil mixed with mica. Materials were recovered from all the levels except level four. The materials recovered which comprised slag, bone, bottle, potsherd and metals were kept in separately labelled ziplock bags.

Fig. 3.8: Setting of the North-South baseline for gridding Locus 1 (Field Photo, 2020)

Fig. 3.9: Laid out test pit of Locus 1 (Field Photo, 2020)

The stratigraphic layers of the East wall were embedded with cultural materials necessitating its extension. The test pit was extended by 100 cm to the east making it a trench. Excavation of the extension commenced at Level 2 based on the surface measurement. This occurrence is attributed to the slopy nature of the land. Five layers of the soil were revealed with the sterile being Level 5 at 100cm deep although the previous unit ended at Level 4. Hence, a 20cm step down was excavated. Levels 1 to 3 had black soil, some part of Level 4 was black in colour and the rest were reddish brown in colour. The last level had soil which was reddish brown in colour. Some of the materials recovered were shells, slag, glass fragments and potsherds.

More materials were observed in the extended East wall which necessitated a further extension of the unit by 50cm eastward. This extended area reached the sterile level at a depth of 180cm. Soils in all the levels were black in colour except the last level which had a

mix of reddish brown and black soil.

Again, a similar observation was seen in the East wall of the current extension hence it was extended by another 50cm. Nine layers of soil with similar materials as the above were uncovered in this extension. Charcoal samples were recovered from Level 9 which was the sterile level. These four units amalgamated to form a 1 x 3m trench with sterile level at 180cm deep (**Fig. 3.10**) hence the name Locus 1 Trench 1. Materials were collected as excavations proceeded and soils from each layer were sieved in a ¼ inch mesh. The materials recovered included pieces of slags, tuyeres, beads, molluscs, palm kernels, glass fragments, foreign and local smoking pipes, foreign ceramics etc (**Table 3.1**). The stratigraphic profiles of the South and East walls were drawn and the trench was backfilled with the same soil that was dug.

Fig. 3.10: The sterile level of Locus 1 Trench 1 (Field Photo, 2020).

Table 3.1: Materials excavated from Locus 1 Trench 1

FINDS	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8	LEVEL 9	TOTAL
POTSHERDS	15	122	172	144	251	210	113	57	38	1122
LOCAL SMOKING PIPES	-	-	-	-	3	-	2	-	-	5
METALS	-	5	2	36	-	-	-	-	-	43
QUERNS	-	-	2	1	-	1	1	-	-	5
PALM KERNELS	-	3	15	2	1	-	-	-	-	21
BONES	-	2	2	7	5	-	8	-	-	24
MOLLUSCS	-	8	40	20	15	20	4	1	-	108
TUYERES	-	-	3	5	1	2	3	-	-	14
PIECES OF SLAG	17	24	40	38	27	43	13	33	8	243
BEADS	-	-	2	-	-	-	2	-	-	4
IMPORTED CERAMICS	-	-	2	4	-	-	1	-	-	7
IMPORTED SMOKING PIPES	-	2	2	1	1	3	6	2	1	18
GLASS FRAGMENTS	-	8	16	8	4	-	-	-	3	39
TOTAL	32	174	298	266	308	279	153	93	50	1653

The stratigraphic profile of the South and East walls were drawn in tandem with materials recovered to give indication of the cultural layers observed (**Fig. 3.11a&b**). The South wall of the trench comprised three layers. The first layer was black in colour with humus content represented by 5YR 2.5/1 in the Munsell colour chart. The second layer was recorded as 5YR 3/1 in the colour book. It had a dark grey colour with loose gravels and rootlets. The final layer was reddish brown in colour with soil colour number 5YR 4/3. Similar soil colour was observed in the East wall of Locus 1.

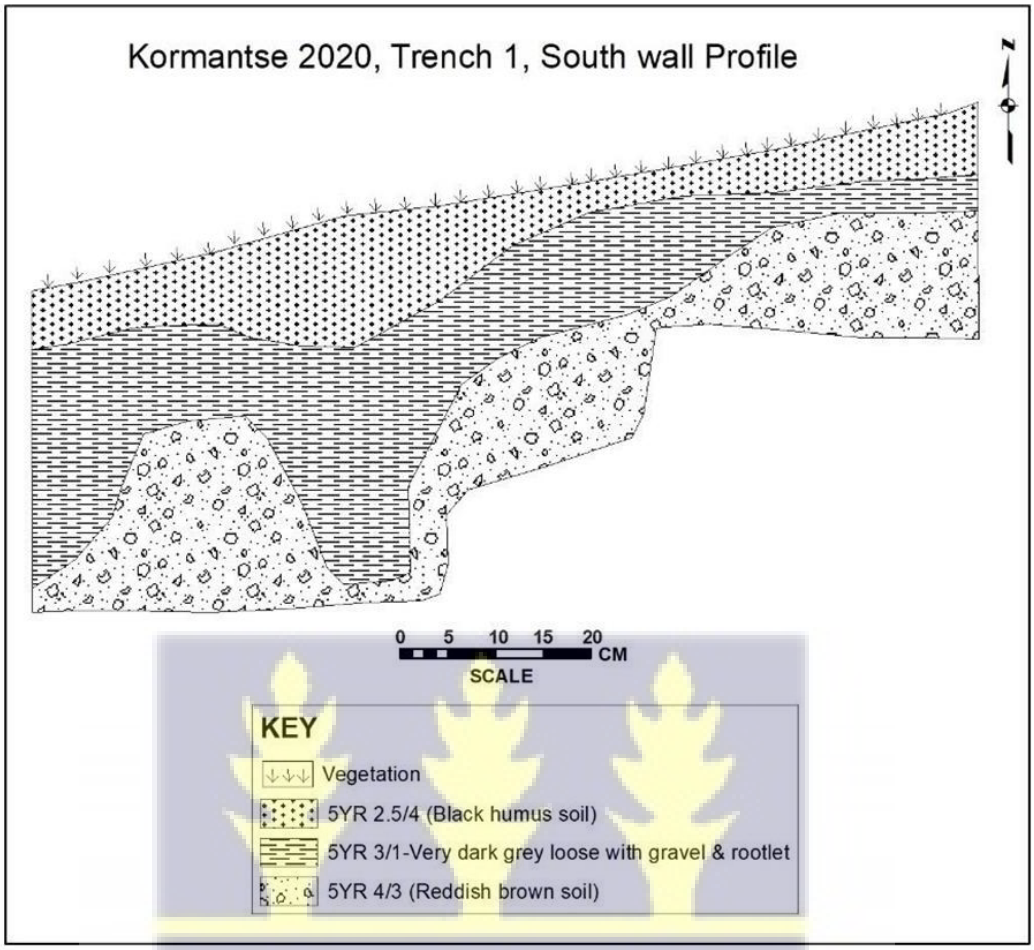


Fig. 3.11a: Stratigraphic profiles of the South wall of Locus 1 Trench 1

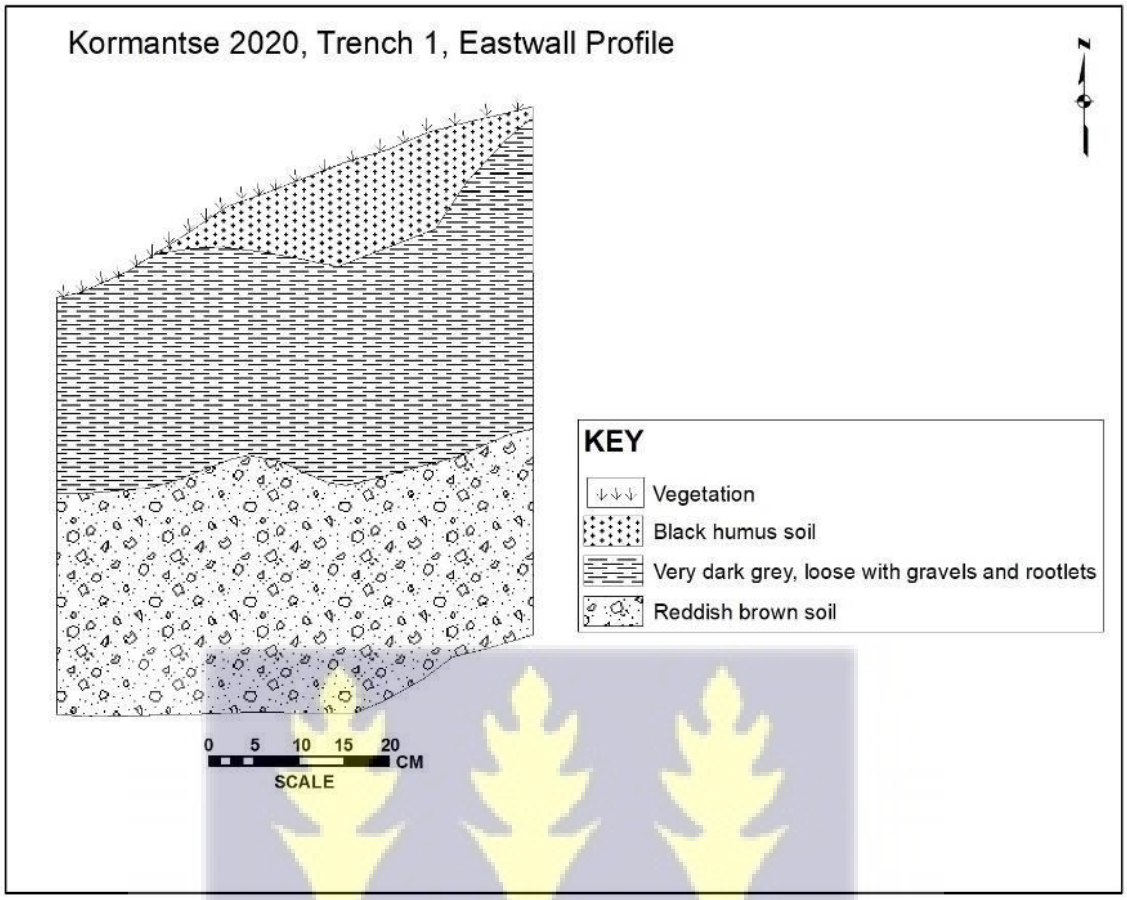
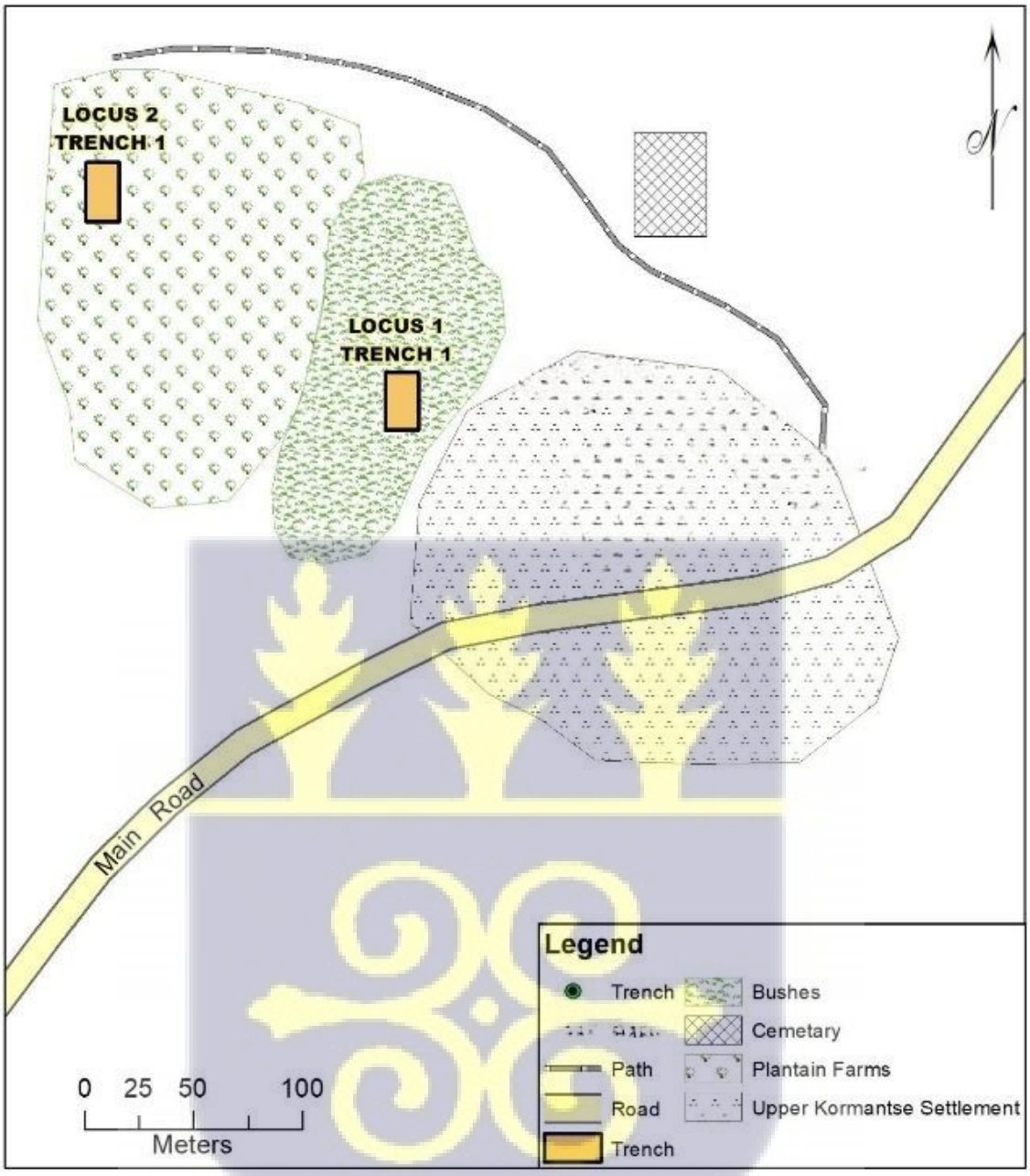


Fig. 3.11b: Stratigraphic profile of the East wall of Locus 1 Trench 1

3.9.2 Locus 2 Trench 1

The second area (Locus 2 Trench 1, hereafter Locus 2) was also chosen on the account of the surface configuration of slags, glass fragments, bones and potsherds on the land. It was 139 meters away from Locus 1, and at GPS coordinates of latitude N 05° 12' 297'' and longitude W 001° 04' 927'' (**Map 3**). The area was a plantain farm with surface soil slightly disturbed by galamsey and farming activities. A 1 x 2m trench was dug to a level of 60cm but was abandoned because of the disturbances in the form of over turned soil. The soil colour was light grey and mixed with pebbles. Another 1 x 2m trench was laid on the north of the previous trench and excavated at 20cm arbitrary vertical interval. Levels 1 to 4 yielded materials such as slags, shells, beads and potsherds from a black loamy soil. The levels

excavated had fewer slag as compared to Locus 1. It was also observed that the quantities of materials recovered were declining as lower levels were reached. At Levels 5 to 9 imported ceramics, imported and local smoking pipes and beads were recovered. However, from Levels 10 to 12 no imported material was recovered. The trench revealed 12 levels of soil with the sterile level at a depth of 240cm deep. Artefacts were collected as the soil was dug and soil from each stratum was screened to recover smaller materials and those that escaped our sight during excavations. Materials were bagged according to type in bags labelled with provenience information such as the site name, year, level, unit and find. Some of the materials excavated were imported smoking pipes and ceramics, beads, slags, tuyeres, metals and potsherds (**Table 3.2**). During the excavations a record form was filled by the researcher to note important observations during the excavation process and to serve as provenience control mechanism (**Fig. 3.12**).



Map 3: Sketch map of the site showing excavated areas in Kormantse.

Fig. 3.12: Excavation and recording of Locus 2 (Field Photo, 2020)

Table 3.2: Materials recovered from Locus 2 Trench 1

FINDS	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8	LEVEL 9	LEVEL 10	LEVEL 11	LEVEL 12	TOTAL
POTSHERDS	45	186	190	49	107	126	8	6	6	5	167	63	958
LOCAL SMOKING PIPES	-	-	-	-	1	-	1	-	-	-	-	-	2
METALS	3	1	5	2	8	7	5	1	-	-	-	-	32
QUERNS	-	1	-	-	-	-	-	-	-	-	-	-	1
PALM KERNELS	-	-	-	-	-	-	-	-	-	-	-	-	-
BONES	13	6	4	10	10	10	6	-	-	2	2	1	64
MOLLUSCS	20	197	140	10	176	76	130	-	-	3	2	3	757
TUYERES	-	-	1	-	-	-	-	-	-	-	1	-	2
PIECES OF SLAG	2	-	8	8	-	2	-	1	-	-	3	-	24
BEADS	-	-	8	1	3	-	-	-	-	-	-	-	12
IMPORTED CERAMICS	5	5	6	7	8	8	3	1	-	-	-	-	43
IMPORTED SMOKING PIPES	2	16	9	3	4	9	1	2	2	-	-	-	48
GLASS FRAGMENTS	7	5	6	64	70	32	21	-	-	-	-	-	205
TOTAL	97	417	377	154	387	270	175	11	8	10	175	67	2148

The South wall of Locus 2 comprised 11 different soil layers (**Fig. 3.13a&b**). Levels 1 to 3 consisted of a dark gray soil colour represented as 5YR 4/1 on a munsell colour chart. Level 4 was reddish brown (5YR 4/3 on the colour chart) and Level 5 was very dark gray in colour (5YR 3/1 on the colour chart). The succeeding Levels (6 to 11) were dark reddish brown in colour (5YR 3/4). Similarly, the East wall revealed 11 layers. Levels 1 and 2 were dark gray in colour (5YR 4/1) while Level 3 was reddish brown in colour (5YR 4/3). Levels 4, 5 and 6 were very dark gray (5YR 3/1), dark reddish brown (5YR 3/3) and very dark gray (5YR 3/1)

in colour respectively. Level 7 was reddish brown in colour represented as 5YR 4/3 in the colour book. At Level 8, a very dark gray colour was recorded (5YR 3/1). Levels 9 to 10 recorded the same soil colour thus, 5YR 3/3 dark reddish brown.

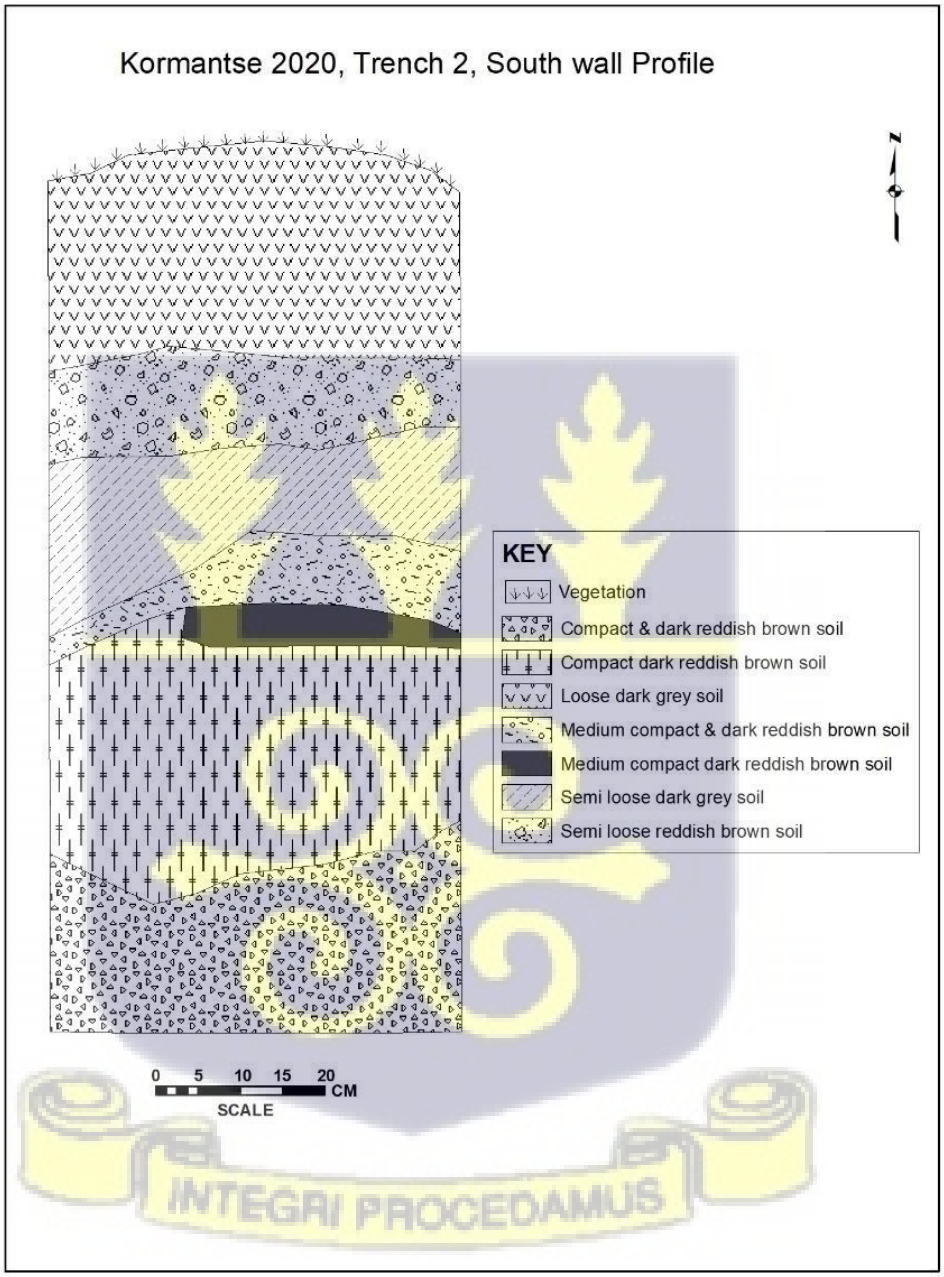


Fig. 3.13a: Stratigraphic profile of the South wall of Locus 2.

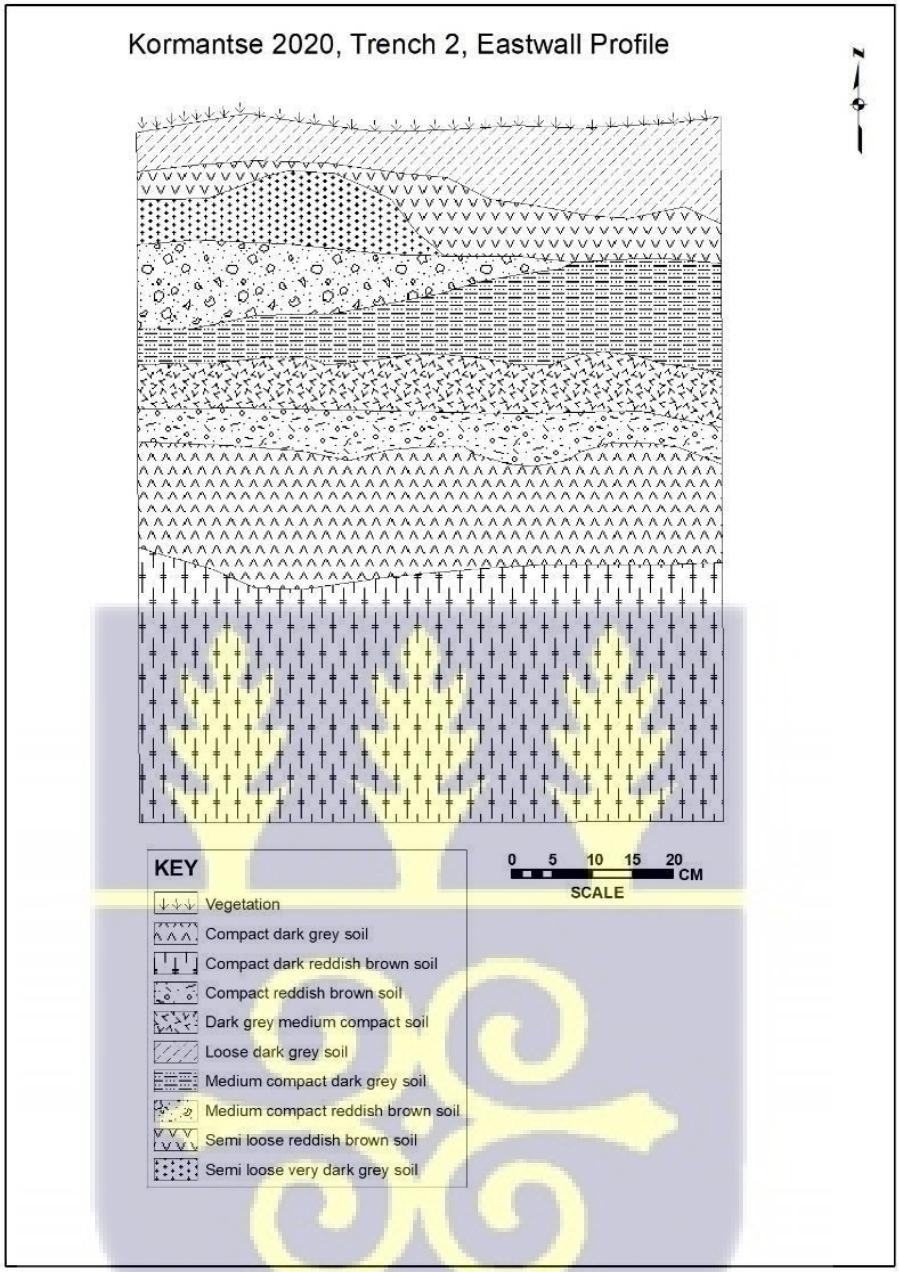


Fig. 3.13b: Stratigraphic profile of the East wall of Locus 2.

3.10 Artifacts Processing

This phase entailed the washing, labeling, classification and analysis of the cultural materials recovered. Archaeological materials such as glass bottles, beads, potsherds, imported, local smoking pipes and ceramics were washed in clean water with a soft brush. Organic remains like bones and shells were cleaned with a dry brush since washing with water could

disintegrate them or interfere with laboratory analysis. The faunal remains were taken to the Department of Animal Biology and Conservation Science and Department of Marine and Fisheries Sciences at the University of Ghana for specialist's identification. The washed materials were dried after which they were labelled. The artefacts and ecofacts were labelled with indian ink, cutex or nail polish, correction fluid and toothpick as improvised nib to directly write provenience information on the objects. Slags recovered were also washed and visual examination undertaken before nine (9) of them were selected and sent to the Department of Earth Science at the University of Ghana for chemical composition analysis. Miss Dora Fianyo, the Laboratory Technician at the Department of Earth Science carried out the analysis and produced the raw results. The results were then interpreted by the researcher. This was followed by classification and analysis of the archaeological materials according to characteristics such as decoration and shape.

CHAPTER FOUR
SHRINES AND *POSUBANS* IN KORMANTSE

4.0 Introduction

This chapter details the nature and the roles played by different types of shrines in Kormantse. It presents the types of shrines in the settlement, their function and material components which reflect some of the archaeological remains excavated. The *Asafo* (Para-military group) company *posuban* is also discussed. The insights gained from the ethnographic research (primary data) are presented in conjunction with insights obtained from secondary sources.

4.1 Shrines and Deities in Kormantse

In Kormantse, it is believed that the settlement is held together and supported by numerous deities (*abosom*) hence the people's claim of having 77 deities (*Abosom aduoson nson*) in the settlement. This is a testament of the important roles deities play in the community. Blay (2009) intimates that, to provide a space through which humans can communicate with *Nyame* via the *abosom*, in most cases a *bosomfie* (literally house of *abosom* or shrine house) is built. A shrine is a sacred room or space that essentially serves as a sanctuary for the spirits of the ancestors and deities to be periodically petitioned for blessings, intercession, requests and divine permission (Dawson, 2009). Shrines of varying importance, scale and material expressions are found in Upper Kormantse. The shrines in Upper Kormantse are categorized into three types according to the deity that dwells in it. These shrine types are the community shrines, clan shrines and household or private shrines. These shrines are commonly found in Upper Kormantse or the old settlement only (**Map 2**).

4.2 Community Shrines

In Kormantse, community shrines are shrines that are accessible to all in the settlement irrespective of their clan, because these shrines are inhabited by the community's deity or deities. About six community shrines were identified during the ethnographic field research, most of which are in enclosed areas and a few in the open. The main material expression in these community shrines are iron ore and pieces of slag. The details of these shrines are discussed below.

4.2.1 *Etuadze* or *Otuadze* Shrine

Etuadze or *Otuadze* is one of the shrines that serves the whole community. It is found at Upper Kormantse Number 2 at GPS coordinates of latitude N05°12'11.8" and longitude W001°04' 53.0". *Etuadze* shrine comprises a heap of iron slag and ore boulders located under a tree (**Fig. 4.1**). According to the respondents, the *Otuadze* shrine is very ancient as one respondent revealed that his 60-year-old mother always talked about seeing it during her childhood days. *Etuadze* is known to solve barrenness and performs other functions like protecting the community members from falling ill. It also has the ability to heal the sick. Schnapps and eggs are the main ritual items offered to it.

Fig. 4.1: *Etuadze* or *Otuadze* shrine at Upper Kormantse Number 2 (Field Photo, 2020)

4.2.2 *Etsi Baka*

Etsi baka shrine is one of the community shrines at Upper Kormantse Number 2 and lies on latitude N05° 12' 11.9" and longitude W001° 04' 50.7". This shrine is housed in a cement block structure with a width of 310 cm and a height of 2m (**Fig. 4.2**). *Etsi baka* is said to be the head of the *Etsi* lagoon, which is found at the periphery of Lower Kormanste. The structure has an ore at its frontage and iron slags and ores in the openings or small windows to prevent animals from entering. A collection of slags and other stones were found at the north wall of the building and this is said to be another shrine attached to the *Etsi Baka* shrine. The respondents recounted that the main material culture in the building are slags and iron

ores, a pot and some whitish substance. The caretaker of the shrine is the Great Mossi, a priest in the community who is said to be the only person that understands the language of the spirits that inhabit the shrine. The deity in this shrine is believed to wield powers that cure various ailments.

Fig.4.2: *Etsi baka* shrine at Upper Kormantse Number 2 (Field Photo, 2020)

4.2.3 *Egya Dadeɛ*

Egya Dadeɛ is also a community shrine at Upper Kormantse Number 2 which is found at GPS coordinates of latitude N05°12' 11.9″ and longitude W001° 04' 50.7″ **(Fig. 4.3).** *Egya Dadeɛ* literally means 'father of metals'. This shrine comprises a tree with a rectangular wall around it. Within the wall are slag, iron ore and other lithic materials which serve as the main material component of the shrine (**Fig. 4.4**). The wall has a height of 160cm and the small square opening at its base has a width of 30cm and height of 50cm. This shrine is used by the executioners in the community for ritual performance.

Fig. 4.3: *Egya dadeɛ* at Upper Kormantse Number 2 (Field Photo, 2020)

Fig. 4.4: Slags and other stones in the circular walled shrine (Field Photo, 2020)

4.2.4 *Bosom Akyin*

Bosom Akyin is the name of the deity that dwells in this community shrine located at latitude N05°12ʾ11.1″ and longitude W001° 04ʾ 49.3″. The shrine is a cement structure measuring

about 200cm in height and 280cm in width. Beside the shrine are two separate heaps of stones and iron ores and slags. The door has a height of 160cm and a width of 90cm and on the threshold or doorstep of the shrine, are slag and ore embedded in the cemented floor (**Fig. 4.5**). *Bosom* Akyin is believed to dwell in and around the lithic materials.

Fig. 4.5: *Bosom Akyin* at Upper Kormantse Number 2

At the *Asafo* meeting ground at Upper Kormantse Number 2, there was a shrine made of rocks, three slags, a pot and snail shells (**Fig. 4.6**). According to the elders of the community, this deity accepts sweet flavoured drinks, a reason for the presence of a fanta bottle at the shrine during the time of the interview. It is located at latitude N05° 12' 14.4" and longitude W001° 04' 47.6".

Fig. 4.6: Shrine at *Asafo* meeting ground (Field Photo, 2020)

4.2.5 *Nana Kyerekwabena*

Nana Kyerekwabena is the principal community deity of Upper Kormantse Number 2 and it is found close to the *Otuadze* shrine. *Nana Kyerekwabena* is built in a rectangular form and at its entrance is a pot known as *Da abo ano* (in front of the door) (**Fig. 4.7**). The pot is always filled with water to serve as a source of drinking water for other deities who visit the area. Nana *Kyerekwabena* shrine serves as the locus for all communal rituals in the settlement. It is also the storehouse of all the drums of the *Asafo* company. The elders of the community intimated that slags are part of the material inventory that makes the shrine complete.

Fig. 4.7: *Nana Kyerekwabena* with a pot embedded in the door step (*Da abo ano*) (Field Photo, 2020)

4.2.6 *Koko Takyiwaa*

Koko Takyiwaa is another shrine which is found in close proximity to the *Nana Kyerekwabena* shrine. *Koko Takyiwaa* shrine is a single rectangular boulder dug into the ground in a vertical position which is believed to have dropped from the skies (**Fig. 4.8**). It serves as a seat for some community members especially children. However, the respondents could not mention any specific function of this deity.

Fig. 4.8: *Koko Takyiwaa* shrine (Field Photo, 2020)

4.2.7 *Nana Amissah* Shrine

The only community shrine at Kormantse Number 1 is the *Nana Amissah* shrine. The respondents did not give any insights into the role of this deity apart from mentioning that it is very powerful, and caretakers must cover their eyes when entering the shrine. The research team was also prevented from taking pictures of it because taking of photographs is considered a sacrilegious act to the shrine. According to them photographs taken, will disappear from the camera.

4.3 Clan Shrines

Akans have seven clans or matrilineal clans and it is along these lines that inheritance of Akan stools or family assets is decided (web site 4). The clans do not have the same names across the Akan states but have equivalent names. Originally, there were seven clans in both Upper and Lower Kormantse but currently the core family groups have subgroups or

branches numbering about twenty-seven (27). Each of the core clan and the offshoot clans are headed by an *Abusuapanyin* (head of clan or family). In no particular order, the seven core clans in Kormantse are *Nsona* or *Asona*, *Twidan*, *Aboradze* or *Aberadi*, *Ekoɔna* or *Ekoona*, *Adwenedze*, *ɔdomna*, *Anona* or *Anana*. These clans have totems which are boldly designed on the family houses (**Table 4.1, Fig. 4.9**). *Nsona* clan has the crow, a woman, a snake and a pot believed to contain gold as its totem. *Twidan* has the leopard as its totem. The lion, plantain and fire are the totems of the *Aboradze* clan. *Ekona* has the deer and bird as its emblem. *Adwenedze* clan is represented by mudfish, an elderly woman and *Dwɔ* herbs (this herb mostly hangs around the neck of chiefs during festive occasions). The symbols of *ɔdomna* or *Domna* are a fish called *ɔdom* or *dom* while a parrot (locally known as *akoo*) and a palm tree represent the *Anona* or *Anana* clan. Some of the respondents added *Dikyina* (*Oyoko*) to the list of clans and it has the parrot with a red tail(*dua*) as its symbol. Information gathered indicate that the break away into sub clans were occasioned by divisions in the clans.

Table 4.1: A summary of clans at Kormantse and their totems

CLANS	TOTEMS
Nsona or Asona	A woman, a snake and a pot believed to contain gold
Twidan	Leopard
Aboradze or Aberadi	Lion, plantain and fire
Ekoɔna or Ekoona	Deer and bird
Adwenedze	Old woman, mudfish and dwɔ herbs
ɔdomna	Fish called *ɔdom* or *dom*
Anona or Anana	A parrot and a palm tree

Fig. 4.9: Depiction of *Nsona* clan totem on the wall of the family house (Field Photo, 2020).

Every clan in Kormantse has its own shrine which houses their respective deities and are used exclusively by clan members. Some of these shrines like the community shrines are composed of iron slags and ores. The succeeding paragraphs describe the various clan shrines in Kormantse.

4.3.1 *Akona* Shrine

The *Akona* clan shrine called *Nana Saman Kwadwo* is located at latitude N 05°12' 09.3″and longitude W001° 04'50.9″. This shrine is found very close to the old palace which was used prior to the division amongst the groups. *Nana Saman Kwadwo* is believed to solve fertility problems and it abhors ladies who are menstruating. This shrine has a tree with a rectangular wall around it (**Fig. 4.10**). It contains iron ore boulders and slags with other rocks in the enclosed area (**Fig. 4. 11**). The caretaker disclosed that the slags and iron ores already existed at the site before the wall was built around them. The caretaker of the shrine, Kwadwo Prah who is about 75 years old believes that the slag descended from the sky and so it is endowed with supernatural powers.

The *Akona* clan has another shrine which is found at latitude N05° 12'12.3″ and longitude W001° 04' 52.0″. It is a comparatively smaller structure with a width of 140cm and a length of 120cm (**Fig. 4.12**). The entrance has a height of 60cm and a width of 50cm. This shrine has a bottle of schnapps, a pot with some applique on it, similar to the one found in the *Nana Adaaban posuban*. Supplications are offered to it daily and the sick in the *Akona* clan are sent to the shrine for healing. It is exclusively owned and managed by the *Akona* clan members.

Fig. 4.10: Rectangular wall around *Akona* shrine (Field Photo, 2020)

Fig. 4.11: Iron slags and ores deposited in the *Akona* shrine (Field Photo, 2020)

Fig. 4.12: *Akona* shrine with schnapps and an embossed pot (Field Photo, 2020)

4.4 Household Shrine

Household shrines are found in individual homes and are accessible to only members of that household. Often the head of the house prays on behalf of the households (Mbiti, 1990, p.64). According to majority of the informants interviewed, every house has a shrine except the houses belonging to non-indigenes. The succeeding paragraphs describe some of the various household shrines in Kormantse.

4.4.1 *Isiw*

One common household shrine seen in Kormantse is the *Isiw*. Three types of *Isiw* were sighted in Upper Kormantse. The three *Isiws* were all in conical cement structures, the difference however, lies in the decorations impressed on them. The first type of *isiw* has three crossed incised lines only and the second type has an orifice in the middle in addition to the incised lines. The third type is a plain object having neither the orifice in the middle nor the three incised lines (**Fig. 4.13, 4.14 and 4.15**). *Isiws* are usually found in homes that have had

or has an *Asafohene* (the chief of the Para-military group). The deity that dwells in the *isiw* strengthened the men in the house for wars and it fulfils all needs of the supplicants in the house.

Fig. 4.13: *Isiw* with three crossed incisions (Field Photo, 2020)

Fig. 4.14: Two *isiw* with plain surface (Field Photo, 2020)

Fig. 4.15: *Isiw* with three crossed incisions and an orifice on the left (Field Photo, 2020)

4.4.2 *Da Abo Ano*

Da abo ano (literally means in front of the door) is the name assigned to shrines found close to the door of a room or the entrance of a home. This type of shrine has different composition which could be a collection of slags and in other homes just a pot at the entrance of the house. *Da abo ano* in the form of a collection of slag protects members of the household from evil spirits (**Fig. 4.16**). Some homes have special names for their *Da abo ano* shrine to reflect its power. In one home, the shrine was called *Abubufin* (breaker of rips) because it is believed to possess the powers to break the rips of evil spirits and people with evil intent. Both variants of the *Da abo ano* shrines are deemed ancient as for instance two women aged about 70 and 60 years claimed their grandmothers said they saw them while growing up. The informants in houses that had the *Da abo ano* also believe that the iron ore and slags occur naturally because slags are not ordinary and that their ancestors discovered the slags on their arrival at the place and began to worship them as their deity. Another house with a similar shrine revealed that slags are used because it is believed to be precious. It is believed that people saw fire coming from them while others believe they brought them from where they migrated. Some of the taboos associated with the *Da abo ano* shrine are that it must not be urinated on otherwise

one's genitals will swell. Also, widows are not supposed to come close to this type of shrine unless some rituals are performed for them. The community members also maintained that the deity in the *Da abo ano* shrine hates palm wine and left over food. Yam, plantain, eggs and *akpeteshi* (local gin) are usually the ritual food items that are offered to it for appeasement.

Fig. 4.16: Slag collection called *Da abo ano* (Field Photo, 2020)

4.4.3 *Akor*

Apart from clans which have the *Akor* shrines, some houses also have their own. The *Akor* in the household normally vary from those that belong to the clans. The household *Akor* is made of pots with iron ore and slags mixed with cement mortar (**Fig. 4.17**). The pots are always filled with water while bottle of schnapps is placed at the base. It is believed that the deity offers the water and the schnapps to other deities who come to visit. Just like the clan *Akor*, the household *Akor* are located at the entrance of the house so they can protect the family. Goat sacrifices are made outside the house while that of sheep is slaughtered in the housing

unit to appease the deity. The water in the *Akor* pot is believed to cure infertility and provides good health. Also, prayers are said at the *Akor* when a member of the family or household passes on**.** A hearth used for preparing traditional food for the deities (*bosom bukyia*) was sighted in one of the houses. It is made of two overturned pots with appliques on them (**Fig. 4.18**).

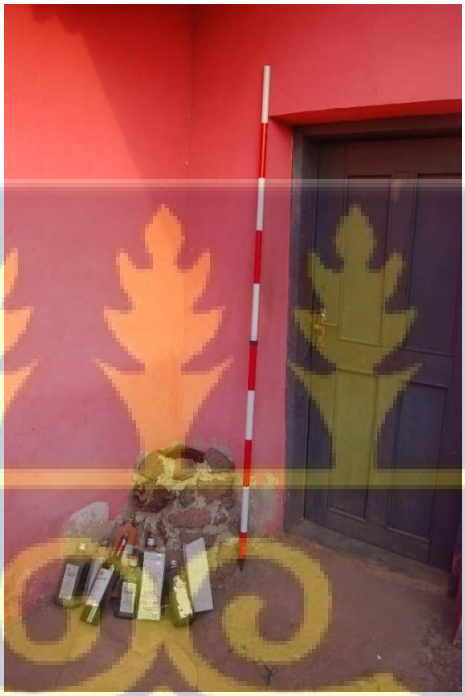
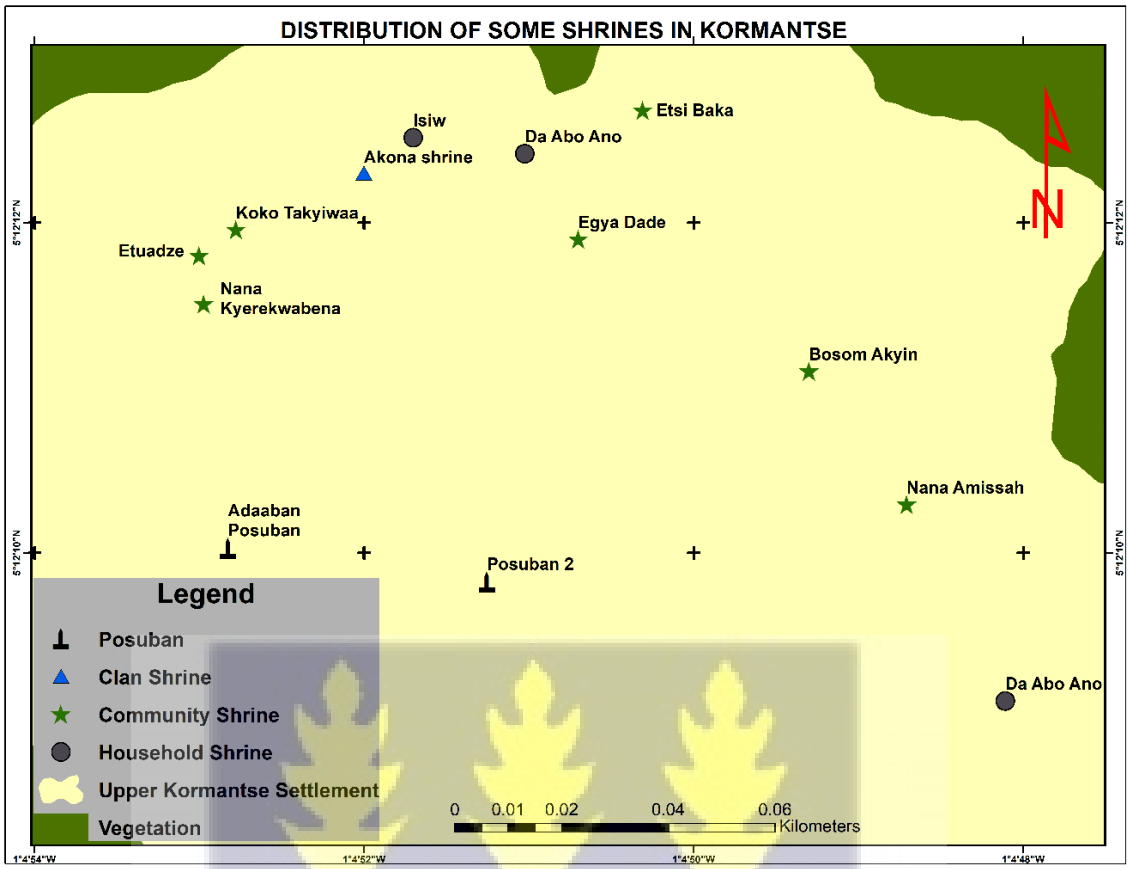


Fig. 4.17: Slag and cement-built shrine with pot embedded in the middle called *Akor*, around it are different drink bottles (Field Photo, 2020)

Fig. 4.18: *Bosom bukyia* (ritual hearth) (Field Photo, 2020)

Generally, the shrines of Kormantse contain spirits of the deities which protect the household and community (**Map 2**). Some of the taboos of the community shrines are that they abhor black cloths, menstruating women and men who have not bathed. Also, they cannot be consulted on taboo days. Food like mashed yam and plantain with egg and palm oil (*Eto*), and fowl are prepared for the deities with no salt added. According to the respondents the taste of the food changes after it is presented to the deities. The wall around the deities or shrines serve as covering while the trees around provide shades for shrines underneath. Those shrines located in the homes do not need any shade because the houses provide the covering or shade for them.

Members of the Kormantse community are divided on the issue of the source of the iron slag found in the settlement. Some of the community members believe that they were obtained from another settlement while others are of the view that the iron ores and slags already existed in the settlement from ancient times since they are unique to hilly areas. There is a common believe in Kormantse that their ancestors first used the iron slags and the ores as deity that is why the present inhabitants are perpetuating this tradition. They also believe that because iron slags and ores are impervious to any form of destruction they were preferred by their ancestors as place of abode for the spirits. Also, their overwhelming abundance in the settlement (as some people attest to seeing them when they dig up the soil in their farms) makes it easy to continue an old practice.



Map 2: Distribution of some shrines in Upper Kormantse

4.5 The *Asafo* Company

Asafo (*sa* meaning war and *fo* people) meaning war people or warriors (Ross, 2007) or fighting men (Shumway, 2011) were the armies of the traditional Akans states in the past. The *Asafo* is a patrilineal military company which played a major part in the life of maritime towns in Ghana (Priestly, 1969). In Kormantse the name *Asafo* alludes to the group and their performances. On the function of the *Asafo* company, the respondents revealed that they served as the community defense team in time past. They were also endowed with civil, religious and military functions (Shumway, 2011). Also, they acted as community warriors, rescue team and search party (Shumway, 2011). According to Ross (2007), the *Asafo* had to

redirect their energies when the British Gold Coast Colony beginning in the 1870s almost usurped their military roles. They did this with great success and today they flourish in most Fante states as influential social and civic organizations with important political, ritual and performance functions. (Ross, 2007). Contemporarily in Kormantse, the *Asafo* Company organizes communal activities and play drums at funerals of members of the company, the chief, *Asafohene* and anyone especially males who die(s) in the community. Drumming is their mode of communication and it is used to announce the demise of an individual in the town. This is the responsibility of the *ɔkyerɛma* / *kyerɛma* (drummer) to announce it with the use of a talking drum. The *Asafo* Company also hoist and display their flags during festivals. The *Asafo* company in Kormantse exist in three divisions, the *Afeefu* or *Asukunfo* whose membership is made up of the youth, the *Kyirem* or *Akomfodz*i are those within the middle age range and the *Assinfo* or *Aduofo* are the elderly. Currently, there exist two *Asafo* companies in Kormantse, each representing the two groups. These Asafo companies are known by a name and a number, typically followed by the town or village they are located in. So, the *Asafo* Company in Kormantse are known as Kormantse Number 1 *Asafo* Company and Kormantse Number 2 *Asafo* Company.

The *Asafo* Company in Kormantse is headed by a Supi (derived from the word Superior) who is superseded by the *Asafohene*. Other positions in the *Asafo* company are the *kyerɛma* who are the drummers, the *Adwomtofo*: the singers, the flag bearers (*frankatofo*), the captain and the ordinary members (**Fig. 4.19).** The *Asafo* Companies in Kormantse are gradually becoming defunct. This is because some people regard it as fetish and for that matter they do not get involved in their activities. The *Asafo* Companies are less important partly due to the lack of interested people to fill certain positions that become vacant due to old age and ill

health of leaders of the group. For instance, Kormantse lacks a regular *kyerɛma* or drummer so they have to hire the services of a drummer from outside the town during festive occasions. This is because the erstwhile *kyerɛma* did not pass on the skill to his children or other males in Kormantse. Also, the selfishness of some leaders has led to the decline in the membership of the group as some of the leaders never tutored and mentored others to be able to succeed them. The *Asafo* Company can be identified with drums and flags of different sizes and length. The flags are made of colours and symbols which are proverbial to the company. The Supi of Kormantse *Asafo* Company Number 2, Mr. Sessah is the only flag maker in Kormantse and its environs. The flags which are proverbial are hand sewn and made from already cut out patterns comprising both humans and animal motif (**Fig. 4.20**).

Fig. 4.19: *Asafo* drummers and dancers at a funeral (Field Photo, 2020)

Fig. 4.20: A hand sewn *Asafo* flag (Field Photo, 2020).

4.5.1 The *Posuban*

The *posuban* is an important structure that is identified with the *Asafo* group. The *posuban* is *a* shrine built of cement blocks which is an embodiment of the history and cultural heritage of the people in the community. The *posuban* is also a symbol of the *Asafo* Company which is imbued with all the values that coastal communities are known to possess. The structure serves as the arsenal and the storeroom for different sizes of sacred drums, gongs, flags and other regalia of the *Asafo* Company. The chief war deity that leads or ushers them to war has its abode in the *posuban*. Each *Asafo posuban is* multi-functional and serves as a locale for at least one of the respective company deities and is also a site for ritual sacrifices and offerings. It is also the main locus of the *Asafo* Company activities, the installation of company officers, during funerals of its members, and in the observation of a variety of festivals (Ross, 2007).

Furthermore, the *posubans* are self-documenting structures **(**Ross, 2007). There are two *posubans* each in Upper Kormantse Number 1 and 2. One *posuban* which can be found in Upper Kormantse Number 2 was built on 22 April, 1973 (**Fig. 4.21**) and has artistic depictions of animals, humans and *adinkra* symbols. The respondents revealed that the

humans depicted on the *posuban* once lived in the past, likewise the animals. The animals depicted on the *posuban* are said to be the powerful animals that inhabited the local environment in the past. Animals depicted on the *posuban* are a lion, an elephant, a shark and a leopard. These represent spirits, terrestrial and aquatic resources of the settlement. Also, it depicts two men dressed in European outfit. Again, the respondents pointed out that the two men represented are the guards to an *Asafo* supi called *Ami Ansaa* who is seen standing in between them. Other images found on the *posuban* are a cannon, three headed dragons with wings, a ship that transported the slaves and *Gye nyame* symbol (an Adinkra symbol). During the celebration Ayiriye festival, the people claim that the *posuban* is draped with one of the lengthy flags of the *Asafo* group. This *posuban* also, holds the drums of Upper Kormantse Number 2 *Asafo* Company.

Fig. 4.21: *Asafo posuban* at Upper Kormantse Number 2 (Field Photo, 2020)

The second *posuban* in Upper Kormantse Number 2 is the *Adaaban posuban* (**Fig. 4.22**). It serves as the venue for the swearing in of an *Asafohene*. This *posuban* depicts a man wielding a hammer in his raised right hand while the left hand, is holding firmly an object over a boulder. Snakes can also be seen entangling the head and the waist of this human figure. The

man is said to be Nana Adaaban, a priest in the past who according to the community members interviewed, was possessed by a spirit and foretold of wars and made guns in readiness for the war. Close to the human figure is a platform with a black and red substance which the respondents say, symbolizes the fire used by the priest in the process of smithing metals. Another human figure standing close to Nana Adaaban, is one said to be a warrior. This warrior has a gun strapped at his back to show his prowess in war. This *posuban* also has a shrine adjoined to it which contains iron ore and slags. This narrative by the community members gives patchy clues of the probable existence of a smithing industry in Kormantse in the past. However, the presence of the priest as the blacksmiths is an indication of the spiritual powers that he wielded and also shows how smiths were feared by the members of the community. According to Childs and Herbert (2005, p. 288), smiths like chiefs were feared as potential sorcerers or wizards because of the power they wielded. The smithing activity may have been done by an ordinary man but was feared because of the power he wielded as a smith.

Fig. 4.22: *Asafo posuban* at Upper Kormantse Number 2 depicting Nana Adaaban (Field Photo, 2020).

The first *posuban* in Kormantse Number 1 is known as the *Nkyinidan* **(**drum room) for *Asafo* drums. It contains the *Asafo* drums, flag and a shrine. The second *posuban* in Upper Kormantse Number 1, shows an artistic depiction of a man who is said to be Nana Kormir and an elephant. According to the informants, the figure represents Nana Kormir; the man who led the first inhabitants to the settlement. The elephant is said to be the elephant he killed when he first visited the site. The elephant was killed and set ablaze at a place called *Kumnsu* according to oral tradition. Hence this *posuban* symbolizes the settlement history of the people of Kormantse (**Fig. 4.23**).

Fig. 4.23: *Asafo posuban* at Kormantse Number 1 (Field Photo, 2020)

CHAPTER FIVE
ANALYSIS OF MATERIAL REMAINS

5.0 Introduction

This chapter provides quantitative and qualitative analyses of artefactual remains recovered from the archaeological excavations conducted. Results from the Scanning Electron Microscopy, Energy Dispersive X-Ray Spectroscopy (SEM-EDX) and X-ray fluorescence (XRF) analysis of tuyeres, slag and ore respectively are also presented in this chapter.

5.1 Artefact Inventory

Diverse local and imported artefacts were recovered from Locus 1 and Locus 2. A total of one thousand six hundred and fifty-three (1,653) materials were recovered from Locus 1, while Locus 2 yielded a total of two thousand, one hundred and forty-eight (2,148) artefacts. In all three thousand eight hundred and one (3,801) artefacts were recovered. The materials recovered were categorized into imported and local materials, faunal and floral remains and remains of iron working activity. The excavations yielded foreign materials such as imported ceramics, smoking pipes, beads and fragments of glass materials. The local materials obtained were potsherds, local smoking pipes, beads and querns. Faunal remains of both aquatic and terrestrial animals were also recovered. The only botanical remains the excavations yielded were palm kernels. Potsherds constituted the bulk of the materials recovered (54.72%) followed by molluscs representing 22.75% of the materials recovered. The rest of the proportions of the artefacts in descending order are pieces of iron slag (7.02%), glass fragments (6.41%), bones (2.31%), metals (1.97%), imported smoking pipes (1.73%) and imported ceramics (1.31%). The others were palm kernels (0.55%), beads (0.42%), tuyeres (0.42%), local smoking pipes (0.18%) and querns (0.15%). The table below illustrates the

quantity of the varied materials recovered (**Table 5.1**).

Table 5.1: Overall artefact inventory from the excavations.

FINDS	LOCUS 1	LOCUS 2	TOTAL	PERCENTAGE
Potsherds	1,122	958	2,080	54.72
Molluscs	108	757	865	22.75
Pieces of Slag	243	24	267	7.02
Glass	39	205	244	6.41
Bone	24	64	88	2.31
Metals	43	32	75	1.97
Imported Smoking Pipes	18	48	66	1.73
Imported Ceramics	7	43	50	1.31
Palm Kernels	21	-	21	0.55
Tuyeres	14	2	16	0.42
Beads	4	12	16	0.42
Local Smoking Pipes	5	2	7	0.18
Querns	5	1	6	0.15
Total	1,653	2,148	3,801	100

5.2 Local Ceramics or Pottery

Pottery is one of the oldest human-made artefacts in the world. Local pottery are porous, low fired clay objects indigenous to Ghana or Africa which are multi-functional in nature. These ceramics usually constitute the majority of cultural materials recovered from many excavations because it does not decay as easily as artifacts made of organic materials. A total of two thousand and eighty (2,080) sherds were recovered from both loci 1 and 2 making it the most recovered materials from the excavations. Locus 1 produced one thousand one hundred and twenty-two (1,122) sherds while Locus 2 produced nine hundred and fifty-eight (958) of the sherds. The sherds were recovered from Locus 1 Levels 1 to 9 and Locus 2 Levels 1, 4, 5, 7 to 12. Both interior and exterior surfaces of the sherds came in colours of, black, grey, red, brown and red black and white. The colours of some of the potsherds were difficult to tell because of their eroded nature. The analysis of the pottery was based on the fabric, form, decoration and functional typology.

Pottery analysis furnishes information on movement, source of clay materials or resources and the function of the pots in its living contexts (Drewett, 2011). Also, it unveils insights on household sizes and household food production. The sherds excavated at Kormantse were in the form of rims, handles, necks, body, base, pedestal and lid. The majority of the sherds (1,467) were body sherds, while rims numbered 496 (16 were carinated) and 18 pedestals were obtained. A total of three (3) bases, 95 necks and 1 lid and handle were recovered from various levels in the Loci (**Fig. 5.1**).

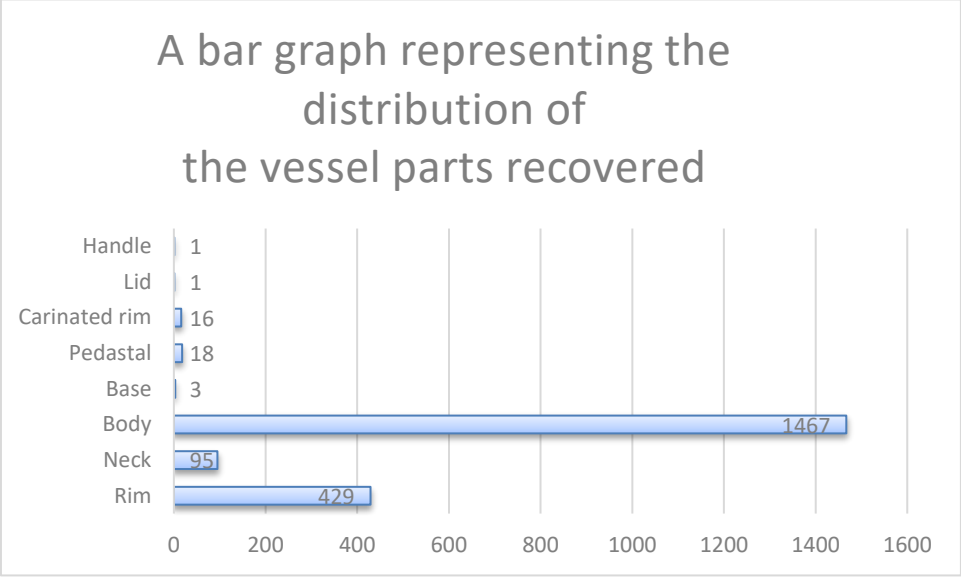


Fig 5.1: A bar graph representation of the vessel parts recovered

5.2.1 Pottery Fabric Characteristics (Temper andTexture)

According to Shepard (1956, p.25), tempering elements can be mixed with the fabric with the intent to mitigate shrinkage, enhance workability and help in the firing and drying processes. Temper is any material (be it natural or artificial) added to clay before firing to improve the quality of the ceramic vessel. Natural tempers include geological materials such as rock fragments (laterites), sand and silt among others, whereas artificial tempers are manufactured materials originally intended for other uses or consciously prepared as fabric additives. An example of artificial temper is crushed potsherds (grog) which is mostly used for tempering. The paste of the sherds recovered from Kormantse were either fine textured or coarse textured. The majority (1,670) of the sherds recovered were coarse in nature. Natural temper in the form of mica was the temper that was observed among all the vessels. However other natural objects like pebbles and quartz were seen in few sherds (**Table 5.2)**.

Table 5.2: Summary of pottery fabric characteristics

				FABRIC CHARATERISTICS							
Locus 1Trench	**level**	**well coarse**	**medium coarse**	**poor coarse**	**well fine**	**poor fine**	**TOTAL**	**uniform**	**micaceous**	**Other materials**	**TOTAL**
1	5	251					251		251		251
1	2	105					105		105	10	115
1	4	63		37	50	34	184	1	171		172
1	3	119					119		119	3	122
1	6	35		108	40	9	192		211		211
1	1	16					16		16	4	20
1	7				113		113		113		113
1	8	45			53	15	113		54		54
1	9	3			30	8	41		39	8	47
Surface	finds		7	2	4		13		4	4	8
Locus 2 Trench											
1	1	45					45		41		41
1	4	49					49		49		49
1	2	186					186		186	12	198
1	11	165					165		185		185
1	12	57					57		57		57
1	3	185					185		185	7	192
1	9	6					6		3	3	6
1	7	10					10		8		8
1	6	110					110		110	6	116
1	8	5					5		3		3
1	10	8					8		5		5
1	5	107					107		107		107
TOTAL		1570	7	147	290	66	2080	TOTAL	2022	57	2080

5.2.2 Pottery Surface Finish Characteristics (Surface Treatment)

The surface treatment identified on the sherds were burnishing, smudging, red slipping and white slipping. Other sherds had two surface characteristics such as red slipped and burnished. Nine hundred (900) were red slipped representing the most occurring surface treatment on the sherds. The next predominant surface treatment was smudged with eight hundred and eighty (880) sherds. Surface treatments were not observed on twenty (20) sherds and one hundred and thirty (130) sherds were eroded. Some of the sherds had a combination of two surface treatments. The interior and exterior of four (4) sherds were red slipped and burnished (**Table 5.3)**.

Table 5.3: Summary of surface treatment on potsherds excavated

Surface treatment	Trench 1	Trench 1	TOTAL
None	15	5	20
Eroded	62	68	130
Slightly burnished	20	14	34
Burnished	78	32	110
Smudged	310	570	880
White slip	1	1	2
Red slip	400	500	900
Slip and burnished	2	2	4
TOTAL	888	1192	2080

5.2.3 Surface Decorations

A variety of decorative patterns which probably served aesthetic or functional purposes were observed on the interior and exterior surfaces of the sherds that were excavated. Multiple decorations of two and three were identified on some of the sherds, however, single decorations were the most popular**.** Other sherds had no decorations on either the interior or the exterior surfaces, and this outnumbered those that are decorated. The undecorated sherds numbered one thousand seven hundred and sixty-six (1,766). The undecorated ones cut across all the vessel part thus, rim, neck, handle, body and pedestal. The most common decorations identified on the sherds in ascending order are groove (177), incision (79), punctation (21), stamps (11), applique (9), perforation (2), wavy-like roulette (2) and notches (1) (**Table 5.4)**.

Table 5.4: Decorations found on the excavated potsherds

DECORATION	LOCUS 1 TRENCH 1	LOCUS 2 TRENCH 1	TOTAL
Undecorated	903	863	1766
Grooves	107	70	177
Incision	49	30	79
Punctation	10	11	21
Stamps	2	9	11
Applique	-	9	9
Perforation	1	1	2
Wavy like roulette	-	2	2
Notches	-	1	1
Grooves and applique	-	2	2
Stamp, notches and incision	-	1	1
Half cresecent moon and punctuation	-	1	1
Perforation and groove	-	2	2
Groove and incision	-	2	2
Incision and comb stamp	1	1	2
Groove and punctuation	-	1	1
Incision and perforation	-	1	1
TOTAL	1073	1007	2080

The majority of the decorations on the sherds recovered were grooves. Grooves were either multiple or single in nature aligned horizontally or vertically. They occurred on the rim, neck and body of the pots (**Fig. 5.2A).** Grooves are achieved when a blunt edged object is pulled over the surface of wet clay before firing (Crossland, 1989, p.19) to produce a broad cut on the vessel. Roulettes were also identified on some sherds. Roulettes are achieved by rolling a tool unto the leather hard pottery leaving the impressions on the tool imprinted on the pottery. Two wavy like roulettes were observed on the exterior of the sherds (**Fig. 5.2B**). Punctations were also found on the sherds obtained. Punctation is a pottery decorative technique which involves single stabbing motion of the tool or finger nail (Shinnie and Bradley,1980, p.128)

creating an indented mark. Punctation occurred on the interior (found on 2 sherds) or exterior (found on 19 sherds) of the sheds, however the most common were those that occurred on the exterior (**Fig. 5.2 C**).

The next dominant decoration was incision. Incision is achieved by dragging a sharp-edged tool on the leather hard clay to produce a deep narrow line or cut in the clay. The incision observed on the sherds were wavy like, crossed incisions, slanted incision, roulette wavy like incision and stamped incisions were found on the rim and body sherds (**Fig. 5.2D).**

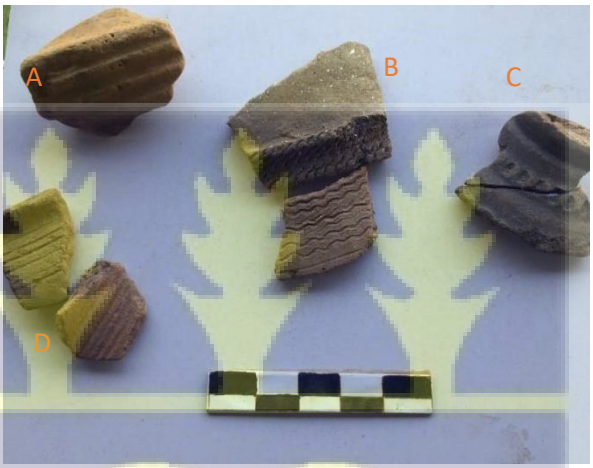


Fig. 5.2: Sample of decorative motifs on pot sherds recovered

Additionally, some sherds were decorated with stamping decoration which involves creating an impression on a leather hard pottery with a stamp or seal. These stamps may have different designs or decorations which are impressed on the sherds. The different types of stamps on the sherds are triangular stamps, mat impressions and comb stamps. Appliques were also found on the interior and exterior of the rims and body sherds. Applique refers to the attachment of some clay onto the surface of the pot. Furthermore, perforations which are small orifices were less popular among the sherds recovered. It was seen on the body sherd. Nine (9) of the sherds had a combination of two decorative motifs namely grooves and perforation (**Fig. 5.4 left**), incision and comb stamp (**Fig. 5.4 right**), groove and incision, incision with

perforations, halfmoon crescent and incision (**Fig. 5.3)**, and grooves and applique. One (1) sherd hard three different decorations thus stamp, notches and incision.

Fig. 5.3: Halfmoon crescent and incision decoration

Fig. 5.4: Sherds with multiple decorations

5.2.4 Vessel Forms

Vessel forms comprise two categories thus bowls and jars. Fifty-nine sherds were identified under bowl and jar forms. A total of four (4) bowl forms with forty-one (41) sherds categorized under them were identified whereas jar forms identified were three with eighteen (18)

sherds within the category. Bowls are hemispherical vessels whose maximum height is significantly less than the maximum width whereas jars are globular in form which lacks any sharply defined shoulder.

5.2.4.1 Bowl Form 1

This bowl form is hemispherical with a broad and thick inverted rim overlying on a constricted neck (**Fig. 5.5)**. The thickness on the rim is more than the body sherd. The outer rim lip is very pronounced and projects out like a flange or carination. The interior and exterior of the sherd has a flowing profile. Four sherds from Locus 1 Levels 3 (two from this level) and 4 (two from this level) had these characteristics. All four sherds have glittering specks of mica in the interior and exterior surfaces. All but one sherd was decorated with multiple grooves on the rim. Two of the sherds were smudged on the rim only and the rim and neck only on the other sherd. The other sherds were red slipped and burnished in both the interior and exterior. The sherds had rim diameters of 6cm, 7cm and 9cm.

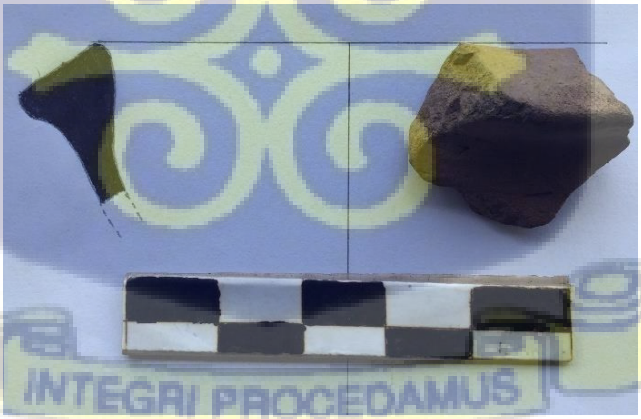


Fig. 5.5: Bowl Form 1

5.2.4.2 Bowl Form 2

This is a hemispherical bowl with either direct or slightly inverted rim and a carination. The rim lip is either rounded or straight (**Fig. 5.6)**. The sherds with these features were from Locus 1 Levels 6 and 7 and Locus 2 Level 5. Three sherds were from Locus 1 Level 7. The rim diameter of the sherds were 4cm, 5cm, 7cm and 9cm. Two sherds have carination at 4cm and the other has carination at 6cm below the rim. One of the sherds has two carinations on the body, the first is at 4cm and the second is 6cm beneath the rim.The exterior of the sherds has angular profile and the interior has a flowing profile. Two of the sherds were smudged in the interior and exterior surfaces while one is smudged only in the exterior surface. The fourth sherd was also smudged in the interior only. Additionally, two of the sherds have multiple grooves at the space that separates the rim and the carination.

Fig. 5.6: Variety of Bowl Form 2

5.2.4.3 Bowl Form 3

This is a hemispherical bowl with a slightly everted rim with a rounded or straight rim lip. The profile of both the exterior and interior are flowing (**Fig. 5.7)**. This bowl form comprises seven sherds from Locus 1 Level 9 and Locus 2 Levels 5, 6, 11 and 12. Three sherds were from Locus 2 Level 5 and 11 (two sherds from this level). The rim diameter ranged from 6cm and 10cm. Decorations are found on the rim, neck and body of the sherds. Multiple grooves are found on the lip, notches and multiple incision on the neck and linear triangular stamps on the body. Smudging is popular among the sherds as five of the sherds are smudged in both the interior and exterior, the exterior only and the interior only. Red slipping was found on both the interior and exterior surfaces of two of the sherds.

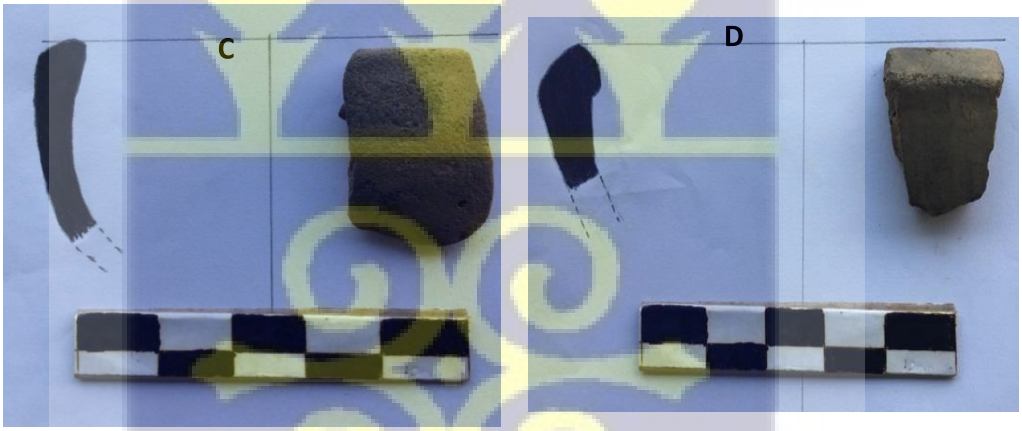
Fig. 5.7: Bowl Form

5.2.4.4 Bowl Form 4

This bowl form is characterized by inverted rim with either rounded or straight rim lip. The profile of the sherd is flowing at both the exterior and interior and angular at both the interior and exterior surfaces for other sherds. One sherd from this category has a handle (**Fig. 5.8A)** and another has an extended inverted rim (**Fig. 5.8B)**, suggesting that it had a lid. Decorations are found on the rim and neck of the sherds. The decorations are single or multiple grooves on the neck and rim respectively. Also, multiple grooves were found on the handle of one of the sherds. The sherds were either smudged on both the interior and exterior surfaces only or on

the exterior only. Other sherds were red slipped at both the interior and exterior surfaces. The sherds with these features were from Locus 2 Levels 2 (five sherds), 3, 4 and 11 (four sherds). The others were from Locus 1 Levels 1, 2 (two sherds), 3 (three sherds), 4 (four sherds), 5 (five sherds) and 7. The rim diameters of the sherds ranged between 5cm and 11cm.

Fig. 5.8: Variety of Bowl Form 4



5.2.4.5 Jar Form 1

This jar form is represented by a single sherd from Locus 1 Level 3. This is a spherical jar with a slightly long everted rim with a square lip. The interior of the sherd flows smoothly into the body whereas the exterior of the sherd flows sharply into the body (**Fig.5.9)**. This sherd is not decorated. There are glittering specks of mica on both the interior and exterior of the sherd and it is red slipped on either side with rim diameter of 10cm.

Fig. 5.9: Jar Form 1

5.2.4.6 Jar Form 2

This jar form is represented by two sherds from Locus 1 Level 5 and Locus 1 Level 6 with rim diameters of 4cm and 8cm respectively. They have a long flaring rim and rim lip is rounded in shape (**Fig. 5.10**). The rim of the sherd from Locus 1 Level 5 was longer than that of Locus 1 Level 6. The sherd from Locus 1 Level 6 has an angular profile at the rim-neck joint in the exterior and a flowing profile at the interior. Whereas the profile of the other sherd is flowing in the exterior and interior. The exterior surface of both sherds were red slipped and one (Locus 1 Level 6) is blackened with soot in the interior which is an indication that it was used for cooking.

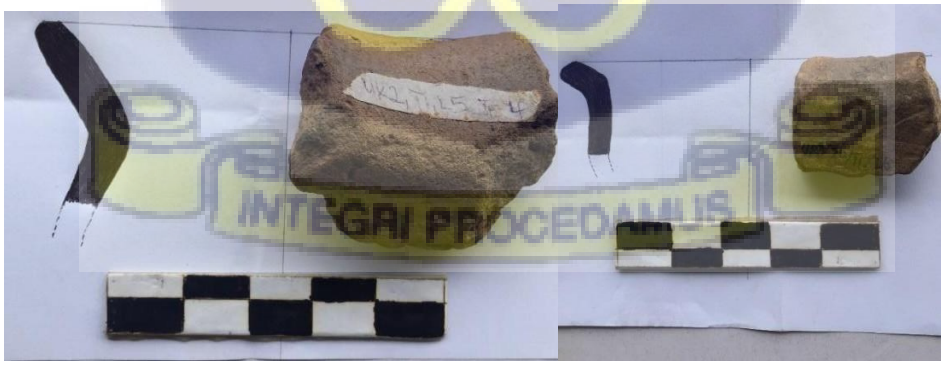


Fig. 5.10: Variety of Jar Form 2

5.2.4.7 Jar Form 3

Jar Form 3 is a globular vessel with flowing profile in both interior and exterior. The rim lip is either square or round in shape and this is the only distinction in the sherds (**Fig. 5.11)**. Fifteen sherds from both trenches were classified under Jar Form 3. Sherds with round rim lip were from Locus 2 Levels 1, 2, 3, 12 and Locus 1 Levels 2, 3, 4, 5, 6, and 11. Those with the square rim lip were from Locus 2 Level 1 and 7. Decorations on the sherds were on the rim lip, the neck and body and in single and multiple patterns. Four of the sherds had vertical grooves on the neck and body while two of the sherds had grove on the rim lip and incisions on the neck and the other has a wavy line incision on the rim lip. The rest, eight in number had no decorations. Red slipping was popular among the sherds and smudged was less popular. The rim diameter ranged from 4cm and 7cm.

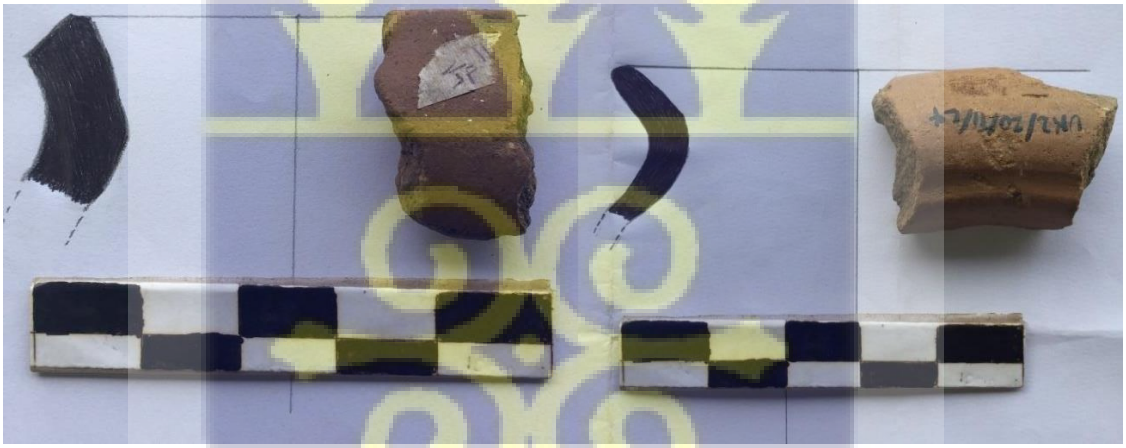


Fig. 5.11: Variety of Jar Form 3

Based on the analysis of the potsherds recovered, some trends were identified. There was a relative homogeneity in the pottery discovered. For example, in every/each level of the excavated trenches where pottery were recovered, mica (a natural temper) was part of the fabric of most of such sherds. The presence of mica as part of the fabric of most of the sherds recovered from the study area could be attributed to the fact that mica was readily available at the study area. Similarly, the paste characteristic of most of the sherds recovered were coarse

textured. For instance, at Locus 1, except for Level 7, all other levels (that is, Levels 1 to 6; and Levels 8 and 9) had sherds whose paste were coarse textured. Likewise, the paste of most sherds from the Locus 2 were well coarse textured sherds (**see Table 5.2 above**).

Again, red slipped sherds, numbering nine hundred (900) which was the most dominant surface treatment on the sherds recovered from Kormantse, were present in all the levels of the trench where pottery were retrieved except for Level 7 of the Locus 2. In the same manner, except for Level 10 of the Locus 2, potsherds that had smudged as their surface treatment were present in all the levels of the excavated trenches where pottery were retrieved. It is well to note that the presence of sooth on sherds is among the numerous indicators in identifying smudged sherds. This could occur as a result of using the vessel as a cooking utensil or sometimes during bush burning. Equally, the surface of some vessels are darkened in their production stage. This is where the surface of vessels are darken by either intentionally adding fresh leaves or grass into fire during the firing of the pot (see Fiador, 2017, p.71; Bredwa-Mensah, 1996, p.54).

Regarding sherds that had burnished surface, except for Levels 1, 7, and 8 of the Locus 1 and Levels 4, 7, 9, and 10 of the Locus 2, this surface treatment was represented in all other levels of the trenches where pottery were retrieved from both Loci. Also, sherds that had rough surface as well as those sherds with smooth surface were represented in all the levels of the trenches where pottery were retrieved from both Locus 1 and Locus 2.

Furthermore, to a greater extent, the predominant decorative motifs (grooves, punctations, and incisions) observed on the sherds runs through all the levels of the trenches where pottery were retrieved. For example, grooves (both single and multiple grooves) numbering one hundred and seventy-seven (177) which was the predominant motifs observed on the sherds

recovered from both trenches were represented in all the levels from which the sherds were recovered except for Levels 8 and 9 of the Locus 1 and Levels 7, 8, 9, and 10 of the Locus 2. Also, punctuation designs (n=21) were present or observed on some of the shreds from all levels of the excavated trench of Locus 1. However, at Locus 2, except for Levels 4, 7, 8, and 9, punctuation motifs were observed on some of the sherds that were recovered from the other levels where pottery were retrieved.

Regarding the various vessel forms (Jars and Bowls) identified, there was no evidence of continuous use of specific vessels. This is because, no vessel form (either a jar or a bowl form) identified was represented in all levels of the excavated loci. For this reason, it is possible that to a large extent, the pottery vessel forms were used, abandoned, and reused by the inhabitants of the sites.

5.3 Faunal Remains

The faunal remains recovered comprised eighty-eight (88) bones and eight hundred and sixty-five (865) molluscs. In all, nine hundred and fifty-three (953) faunal remains were obtained from both trenches. The faunal remains were sent to Specialist laboratory at the University of Ghana, for identification. The identification of the bones and molluscs were done by Prof. Daniel K. Attuquayefio of the Department of Animal Biology and Conservation Science and Mr. Emmanuel Klubi of the Department of Marine and Fisheries Sciences, University of Ghana.

The bones recovered numbered eighty-eight (88) of which twenty-four (24) came from Locus 1 while the majority, sixty-four (64) from Locus 2. Thirty-one (31) out of the eighty-eight (88) of the bones could not be traced to any animal because of their fragmentary nature. The identifiable bones recovered comprised the vertebrae, teeth, humerus, femur, upper jaw with

molars and rib. Others were the carpal / tarsal, lower jaw or tooth and tibia or radius. The bones were categorized into mammal (large and mid-sized) and rodent (small, large and mid-sized) (**see Appendix 3**). The faunal remains of mammals (mid-sized and large) were recovered from Locus 2 Levels 1, 4 and 10. Remains of large rodents were obtained in Locus 2 Levels 2 and 11. Whereas in Locus 2 Levels 3, 5, 6 and 7 both rodents and mammal bones were recovered. In Locus 1 Levels 2, 5 and 7 mammal bones (large and mid-sized) and rodents were obtained from Level 3. Levels 4 and 7 of the same Trench yielded bones of both mammals and rodents. Majority of the bones (64) were identified as belonging to mammals and thirteen (13) were that of rodents. The identified mammals included both wild and domesticate types. The wild ones included antelope (*Antilocapra Americana*), buffalo (*Bubalus bubalis*), deer (*Cervidae*). The domestic ones also comprised sheep (*Ovis aries*), goat (*Capra aegagrus hircus*), pig (*sus*), cattle (*Bos taurus*) and horse (*Equus caballus*). The rodents included wild type such as rat (*rattus*), squirrel (*Sciuridae*), porcupine (*Er Erethizon dorsatum)* and mouse *(Mus musculus)* **(Table 5.5).**

Table 5.5: Identified animal bones from Locus 1 and Locus 2

LOCUS 1 TRENCH 1	**QUANTITY**	**ANIMAL TYPE**	**POSSIBLE ANIMALS**
LEVEL 2	2	Mid-sized mammal (2)	Antelope, sheep, goat, dog, cat
LEVEL 3	2	Small rodent	Mouse
LEVEL 4	8	Rodent (1)	Rat, mouse
		Mid-sized mammal (4)	Antelope, deer, sheep, goat, dog
		Mid-sized rodent (3)	Rat, squirrel
LEVEL 5	6	Mid-sized mammal (1)	Antelope, sheep
		Large mammal (2)	Horse, pig, cattle
		Mid-sized herbivore (3)	Antelope, deer, sheep
LEVEL 7	6	Large mammal (1)	Horse, cattle
		Mid-sized mammal (2)	Antelope, sheep, goat, dog, cat
		Large herbivorous mammal (2)	Horse, cattle, buffalo
		Rodent (1)	Mouse, rat

LOCUS 2 TRENCH 1			
LEVEL 1	6	Mid-sized mammal	Antelope, deer, sheep, goat, dog
LEVEL 2	2	Large rodent (2)	Giant rat, porcupine, squirrel
LEVEL 3	11	Rodent (2)	Mouse, rat
		Large rodent (3)	Giant rat, porcupine
		Mid-sized mammal (6)	Antelope, deer, sheep, goat, dog
Level 4	8	Mid-sized mammal (6)	Antelope, sheep, goat, dog, cat
		Large mammal (2)	Pig, cattle, buffalo
LEVEL 5	7	Mid-sized herbivore (1)	Antelope, deer, sheep, goat
		Large herbivore (2)	Horse, cattle
		Mid-sized herbivore (1)	Antelope, deer, sheep, goat
		Mid-sized rodent (1)	Rat, squirrel
		Small rodent (1)	Mouse
		Mid-sized mammal (1)	Antelope, deer, sheep, goat, dog
LEVEL 6	13	Mid-sized mammal (7)	Antelope, deer, sheep, goat, dog
		Large rodent (2)	Giant rat
LEVEL 7	4	Mid-sized mammal	Antelope, deer, sheep, goat, dog
		Rodent	Mouse, rat, squirrel
LEVEL 8	3	Mid-sized mammal	Antelope, deer, sheep, goat, dog
		Mid-sized mammal (4)	Antelope, deer, sheep, goat, dog
LEVEL 10	4	Mid-sized mammal	Antelope, deer, sheep, goat, dog
LEVEL 11	4	Large rodent	Giant rat, porcupine
LEVEL 12	2	Mid-sized mammal	Antelope, deer, sheep, goat, dog
TOTAL	88		

A total of eight hundred and sixty-five (865) shells made up of both whole and fragmentary molluscs were recovered from Locus 1 and 2. Locus 1 (Levels 2, 3, 4, 5, 6, 7 and 8) yielded one hundred and eighty (108) shells (**Table 5.6**) and seven hundred and fifty-seven (757) shells were obtained from Locus 2 (Levels 1, 2, 3, 4, 5, 6, 7, 10, 11 and 12) (**Table 5.7**).

Table 5.6: Species of molluscs recovered in Locus 1

LOCUS 1								
SHELL TYPE	**T1 L2**	**T1L3**	**T1L4**	**T1L5**	**T1L6**	**T1L7**	**T1L8**	**TOTAL**
Anadara spp.	4	4	10	1	`10	7	4	30
Tympanotus fuscatus	-	4	-	-	-	-	-	4
Archachatina marginata sp.	2	5	6	2	-	-	-	15
Crassostrea sp.	4	4	4	5	1	2	-	20
Thais sp	-	2	1	-	-	-	-	3
Turritella spp.	1	5	5	3	-	-	1	15
Nerita sp.	-	1	-	-	-	-	-	1
Thais haemastoma	-	2	1	-	2	-	-	5
Olivia sp.	-	4	-	-	-	-	-	4
Achatina achatina	1	2	1	-	-	-	-	4
Donax sp.	-	3	-	-	-	-	-	3
Limicolaria sp.	1	1	-	-	-	-	-	2
Fussurell,nuecula		1	-	-	-	-	-	1
Perna sp.	-	-	-	1	-	-	-	1
								108

Table 5.7: Species of molluscs recovered in Locus 2

LOCUS 2											
SHELL TYPE	**T1 L1**	**T1 L2**	**T1 L3**	**T1 L4**	**T1 L5**	**T1 L6**	**T1 L7**	**T1 L10**	**T1 L11**	**T1 L12**	**TOTAL**
Anadara spp.	3	107	74	17	66	20	28	3	2	3	323
Tympanotus fuscatus	-	17	16	10	17	2	18	-	-	-	80
Archachatin. marginata sp.	-	7	2	-	-	4	14	-	-	-	27
Crassostrea sp.	-	17	6	5	42	18	20	-	-	-	108
Thais sp	-	5	1	-	6	4	6	-	-	-	22
Turritella spp.	-	-	30	21	13	18	35	-	-	-	117
Thais haemastoma	-	2	-	1	2	1	-	-	-	-	6
Olivia sp.	-	4	-	-	-	-	1	-	-	-	5
Achatina achatina	-	1	-	1	15	-	-	-	-	-	17

Donax sp.	-	-	-	-	5	-	1	-	-	-	6
Perna sp.	-	1	-	-	1	1	-	-	-	-	3
Tivela tipla	-	-	2	-	1	-	-	-	-	-	3
Turritella meta	-	35	-	-	-	-	4	-	-	-	39
Cypraea sp.	1	-	-	-	-	-	-	-	-	-	1
TOTAL											757

The shells recovered suggest the exploitation of molluscs from aquatic (brackish water, marine, fresh water) and terrestrial resources in the society. Molluscs from the various aquatic sources were the most exploited as they represent 92.60% (801) of the shells recovered. The terrestrial molluscs were less exploited representing 7.40% (64) of the shells recovered. The aquatic (brackish water, marine, fresh water) inhering shells recovered are Anadara spp. (A), Thais sp (B), Crassostrea sp. (D), Turritella meta (E), Tivela tipla and Nerita sp. The others are Olivia sp. (F), Cypraea sp., and Turritella spp (G). In addition were Perna sp., Thais haemastoma, Donax sp., Tympanotus fuscatus (H) and Fussurella nuecula. Three shells of terrestrial source namely Achatina achatina (C), Archachatina marginata sp., and Limicolaria sp (I) were also obtained (**Fig. 5.12)** (**Table 5.8**). The presence of species of cypraea sp. (C*ypraea moneta* and C*ypraea annulus)* in the archaeological record may be indicative of trade and ritual activities **(Fig. 5.13)** as they were used as currency and later became ritual objects in West Africa.

Fig. 5.12: Sample of molluscs recovered from the excavations

Fig. 5.13: Cypraea sp from Locus 2

Table 5.8: Habitats of molluscs species recovered from Locus 1 and Locus 2

SHELL TYPE	HABITAT	LOCUS 1 TRENCH 1	LOCU 2 TRENCH 1	TOTAL	PERCENTAGE
Anadara spp.	Aquatic/Brackish	30	323	353	40.8
Tympanotus fuscatus	Aquatic/Brackish/Fresh water	4	80	84	9.7
Crassostrea sp.	Aquatic/Brackish	20	108	128	148.8
Thais sp	Aquatic/Marine	3	22	25	2.9
Turritella spp.	Aquatic/Marine/Brackish	15	117	132	1.5
Thais haemastoma	Aquatic/Marine	5	6	11	12.8
Olivia sp.	Aquatic/Marine	4	5	9	1.4
Donax sp.	Aquatic/Marine	3	6	9	1.4
Perna sp.	Aquatic/Marine	1	3	4	4.7
Tivela tipla	Aquatic/Blackish	-	3	3	0.3
Turritella meta	Aquatic/Marine/Brackish	-	39	39	4.5
Cypraea sp.	Aquatic/Marine	1	-	1	0.1
Nerita sp.	Aquatic/Marine	1	-	1	0.1
Limicolaria sp.	Aquatic/Marine	2	-	2	0.2
		Total % Of Auaqtic sources			92.60%
Archachatin. marginata sp.	Terrestrial	15	27	42	4.9
Achatina achatina	Terrestrial	4	17	21	2.4
Fussurell,nucula	Terrestrial	1	-	1	0.1
		Total % of Terrestial sources			7.40%
			GRAND TOTAL	865	100

5.4 Botanical Remains

Palm kernels of oil palm tree or the African oil palm (*Elaeis guineensis)* numbering 21 (0.5%) were excavated from Locus 1 Levels 2 to 4 (**Fig. 5.14**). The presence of these give probable indications of the food resources exploited in the past by the people of Kormantse. Palm kernel is significant in the archaeology of food production in Ghana. This is because it is associated with the Kintampo Culture Complex dated to over 2000 BC and is acclaimed as the earliest evidence of farming and sedentism in Ghana. The parts of the African oil palm (the mesocarp, sarp and leaves) have been proven to have rich medicinal benefits (Owoyele and Owolabi, 2014). Also, almost every part of the tree has economic and nutritional values.

Fig. 5.14: Palm kernels recovered from Locus 1

5.5 Local Smoking Pipe

Indigenous smoking pipes are made of clay, stone and metal and are useful indicators of periods (Philips, 1983) especially when style typologies are available. Ozanne's typology of early tobacco pipes in Accra are relied on for parallels in design and possible chronology in this research since it is as yet the only detailed typological scheme Ghanaian archaeologists draw on. However, it was not very efficient in describing all of the excavated local smoking

pipes. This is because his typological scheme was based on the shape of the bases of bowls whereas the retrieved pipes were in fragments with those parts unavailable and examination of their fracture were not useful either. According to Philips (1983), African smoking pipes are categorized into two thus those with an angle between the bowl and the stem (alias elbow bend) and those with no such angle known as barrel pipes or tube pipes (Philips, 1983, p.303). Therefore, local smoking pipes unlike imported ones have two components, the bowl (ceramic socket) and the stem with the latter inserted into the former. Seven (7) bowl fragments of local smoking pipes were recovered from the excavations but it was difficult to put them under the above category due to their fragmented nature. Five were obtained in Locus 1 and two from Locus 2, from the same levels (Levels 5 and 7).

In Level 5 of Locus 1, three bowl fragments were recovered of which one was a fragmented bowl, black in colour with two deep encircling incisions. The second bowl fragment was brown in colour with horizontally aligned triangular stamps (**Fig. 5.15**). It was also smudged and burnished with mica specks on the surface. The third was a cylindrical bowl with one edge extending downwards forming a V-shape or pointed end (**Fig. 5.16**). The outer surface was partly eroded with burnished surface. It also has decorations achieved with the end of a tube-like object stamped at irregular interval on the bowl, creating a bulging portion of the clay with a circle around it and a hole on its apex.

Fig. 5.15: Local smoking pipe bowl with triangular stamps (Left)

Fig. 5.16: Local smoking pipe bowl with a pointed end

In Locus 1 Level 7, two bowl fragments were obtained of which one has a wide or flaring mouth bowl with a cylindrical base. On the bowl are three bands of vertical incised lines. The first two bands have seven incised lines while the third has six. The bowl of the local smoking pipe was black in colour with a burnished surface treatment (**see Fig. 5.17, left**). This type of

smoking pipe fits into the description of Shai series type 1a described by Ozanne (1960, p. 21), as one which develops from a simple conical bowl with a plain cylindrical stem to forms in which both the bowl and the stem are divided into a cylinder surmounted by a cone. He further ascribes a date of circa 1640 (ibid:26) to this category. The second one is brown in colour and burnished with two encircling incised lines appearing near the base. This is a vertically-cut bowl (**see Fig. 5.17, right**).

Fig. 5.17: Local smoking pipes

In Locus 2 Level 5, the bowl retrieved is brown in colour with burnished surface and circular deep incisions (**Fig. 5.18**). The base of this bowl fits Ozanne's type 3a description of pipes with bases or terminals to the stem or both which are square in shape with round projections at each corner (Ozanne, 1960, pp. 5 and 6). This has also been dated to circa 1688 and 1697 (Ozanne, 1960, p.31). In Locus 2 Level 7, a bowl brown in colour, smudged and red slipped surface was obtained. This particular bowl is cylindrical in shape with slightly wide mouth with a ring at the mouth area (**Fig. 5.19**).

Fig. 5.18: Local smoking pipe with square base and round projections at the corner

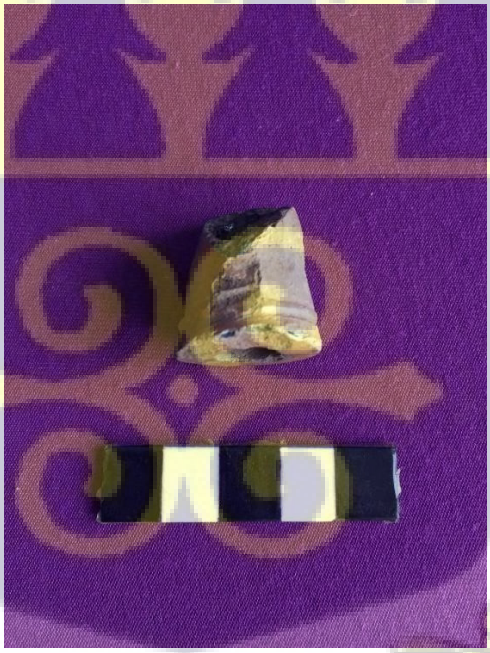


Fig. 5.19: A brown burnished local smoking pipe

All the pipes recovered were either cylindrical or conical in shape and vertically oriented except one which was horizontally aligned with a peculiar shape (**see Appendix 4**). Ozanne (1960) explicates three reasons that accounts for variation in the design of local smoking pipes. The reasons are chronological changes, geographical differences and social differences thus certain pipes were restricted to certain people. Chronological changes and social differences areprobable reasons for the peculiar shape of one of the pipes. Geographical differences will be a cogent reason when two or more sites are the focus. However, it is likely to be the reason for the change when trade is considered as the means of acquisition.

5.6 Querns

Six broken pieces of querns were obtained from Locus 1 and 2. Five came from Locus 1 (Levels 3, 4 and 6) and the rest from Locus 2 (Level 2) (**Fig. 5.20**). The querns were used along with the grind stone to grind cereals, condiments and herbs. Currently, there are a lot of grind stones of different sizes in the settlement, some of which serve as seats for community members. Grind stones are still being used in homes in Kormantse for grinding condiments for food and herbs for medicine because inhabitants claim it is healthier than modern electric blenders. Earthenwares are healthier too, however, grind stones are more durable than earthenwares.

Fig. 5.20: Querns obtained from the excavations

5.7 Metals

Fragments of metallic objects formed part of the material assemblage from the excavations. Locus 1 yielded forty-three (43) metals and Locus 2 yielded thirty-two (32) metals. The metals, seventy-five (75) in total were made up of twenty-two (22) diagnostic ones and fifty-six (56) undiagnostic ones due to their fragmentary and corroded nature. Four (4) pieces were identified as belonging to the base of an object (Locus 2 Levels 1 and 3), four (4) flat rectangular objects were found (Locus 1 Trench 1 Level 3 and Locus 2 Trench 2 Levels 3 and 6) and one concave shaped object (Locus 2 Level 2) (**Fig. 5.21 A and B).** One (1) piece identified as the handle of an aluminium pot locally known as *dadesen* was recovered from Locus 1 Level 4 (**Fig. 5.21 C**). Also, six (6) pieces were identified as nails, two (2) as parts of a basin and four (4) were the rim of a circular object (**Fig. 5.21 D, E, F**).

Fig. 5.21: Metals recovered from the excavations

5.8 Imported Smoking Pipes

Imported smoking pipes can be ubiquitous artefacts on many archaeological sites especially historical sites that were occupied during and after the late 16th Century (Orser, 2002, p.424). They are made from stone, red clay and white clay (*ibid*). Smoking pipes consist of two major elements; the bowl and the stem. A total of sixty-six (66) pieces of clay smoking pipes were recovered from the excavations with fifty-nine (59) and seven (7) representing stem and bowl fragments respectively. Bowl fragments numbered seven (7) and were obtained from Locus 2. Fifty-nine (59) stem pieces were obtained from both trenches, eighteen (18) were from Locus 1 and forty-one (41) were from Locus 2. One (1) whole stem was obtained from Locus 1 Level 6 while the rest were fragmented (**Fig. 5.22**). Out of the fifty-nine (59) stems recovered, fifty-seven (57) were undiagnostic. They had neither decorations nor makers' mark and were either white, light gray or grayish brown in colour. One out of the 59 stem pieces had a heel. Two (2) of the stems were diagnostic and are described as follows.

Fig. 5.22: Smoking pipe stem fragments recovered from the excavations

One (1) stem recovered from Locus 1 Level 5 had the inscription *DA* written on the stem and some other illegible inscription on another side (**Fig. 5.23**). The full inscription is most probably 'DAFT', which represents the makers' name, Henry or William Daft of Nottingham, dated to 1848 or 1874 (Oswald, 1975, p. 78). The other stem from Locus 2 Level 3 shows an encircled animal with spikes on its head, below the back of its neck and has wings and three legs. Its webbed feet have claws and it also has a tail (**Fig. 5.24**). This has been identified as gryphon relief that has been stamped or moulded on the stem. It was made in Chester, England dating from 1700-1720 (web site 5). The pipes retrieved exhibited black staining in the interior surfaces of the bowls and some section of the stems. This is indicative of the smoking process where fire was added to tobacco to produce smoke which darken the inner surface of the bowl. The prevalence of stem fragments on the site can be attributed to the assertion by Hume (1979, p.302), that pipes were long and fragile making them break into numerous pieces when dropped. The bore diameter of all the stems lie within the range of 0.1cm to 0. 6cm. Aside the use of makers'marks and the inscription on stems to trace its origin and chronology, the calculation of bore diameter and pipe stem dating are also means of

establishing the dates of smoking pipes. However, these methods are not applicable in this study because the stems obtained from the excavations were few.

Fig. 5.23: A smoking pipe with the inscription *DA*

Fig. 5.24: Gryphon relief on a smoking pipe

Seven (7) bowl fragments were recovered from Locus 2, one of which was from Locus 2 Level 2 and had makers' mark of a crowned L on the base of the heel (a small flat projection beneath the base of the bowl). The sides of the heel have a shield at one side and an *S* superimposed on a shield with a human figure with raised hands (**Fig.5.25**). The shield has been identified as Gouda shield indicating a Dutch origin (Engman, 2018) but the actual date of manufacture is unknown. Gouda is a Dutch city which was a major production centre of smoking pipes. Many of the imported pipes from Elmina bore the shield of Gouda on the sides of the foot (DeCorse, 2001, p.164). Boachie-Ansah (2015, p. 44) also discovered two bowl fragments of imported smoking pipes with Gouda marks when he excavated Kormantse. Two (2) out of the seven (7) bowl fragments from Locus 2 had decorations. One (1) from Locus 2 Level 4 had on its exterior surface six irregularly achieved short vertically incised lines while the other has decorations that are akin to a tree branch with leaves embossed on it (botanical motif) (**Fig. 5.26**). This bowl from Locus 2 Level 5 is coffee coloured with evidence of weathering. This can be dated to the 19th century as Walker (1975), stated that coloured clay pipes are rare and confined to nineteenth Century products. The colours of the bowl fragments were similar to that of the stem fragments except one which was eroded. Three of the seven bowls had small portion of the stem attached to it which enabled calculation of the angle between the bowl and the stem. The measurements showed that the angle in between the stem and the bowl is obtuse, a characteristic of earliest pipes (Orser, 2002, p. 424). The four (4) undecorated bowls and 57 undecorated stems found at the site were likely of the 19th century British origin (Calvocoressi, 1975, pp. 198-199, Boachie-Ansah, 2015, p. 53). White clay pipes of European origin, particularly English and Dutch, were commonly used as currency to purchase slaves (Handler, 2008, p.3). Although Africans had their own pipes, European pipes were often

preferred to African ones; and African consumers even made distinctions among different European pipes (*ibid*). This is evident in the predominance of imported smoking pipes over local smoking pipes obtained from the site. The pipes were of either English or Dutch origin and this is consistent with the site's contact history with these European nations.

Fig. 5.25: The heel of a smoking pipe with a GOUDA shield (left) and a crowned L (right).

Fig. 5.26: A bowl of a smoking pipe with floral motif

5.9 Imported Ceramics

European / imported ceramics recovered from the excavations were fifty (50) thus forming 1.3% of the artefacts excavated. The four types of wares identified were pearlware, porcelain, stoneware and cream ware (**see Appendix 5)**. The analyses of these wares were based on the ware type, their decorative patterns, and the chronology.

5.9.1 Creamware

Creamware is a type of earthen ware which has an ivory or cream coloured glaze made from white firing ball clay mixed with flint. The clay-flint mix was shaped by throwing on a potter's wheel or by the use of moulds and fired at comparatively low temperature (Halfpenny 2007, p. 28; Hume, 1969, p. 123). Creamware is believed to have been manufactured by Josiah Wedgewood in 1763 and was also known as Queen's ware because the Queen was pleased to give her name and patronage (Halfpenny, 2007). Creamwares came in vessels such as saucers, soup plates, cups and tea pots (Halfpenny, 2007). Twenty-nine (29) creamware sherds were obtained from the excavations with twenty-four (24) from Locus 2 and five (5) from Locus 1. They were categorized into diagnostic and undiagnostic wares. The undiagnostic ones were thirteen (13) in number comprising plain wares without decorations and the diagnostic ones were sixteen (16). The diagnostics wares consisted of mocha motif and floral motif.

5.9.1.1 Mocha Decoration

Five (5) of the sixteen (16) fragments from Locus 2 Level 1, were identified as creamware with black and light brown annular bands with a fernlike ornament decorated on them (Hume, 2001, p.131) (**Fig. 5.27**). Mocha ware is a type of slip decoration that has acid dripped onto it to create the dendritic pattern**.**

This type of design has been identified as mocha (Hume, 2001). Mocha named after the mocho stone is believed to be the most renowned of all the factory-made slip decorations (Sussman, 1997, p.26). It is dated to the 18th Century since the earliest dated example is marked 1799 (Hume, 2001, p.131) and of English origin. Mocha wares were produced in hollow vessel forms such as mugs, jugs and bowls (Richard and Blake, 2006). Four (4) out of the five (5) described above were body sherds while one was a handle (**Fig. 5.27**). This mocha vessel was probably a jug owing to the presence of a handle. Mugs with similar design were found at Elmina (DeCorse, 2001, p.153).

Fig. 5.27: Creamware with black and light brown annular bands with mocha design

5.9.1.2 Floral Motif

Four out of the sixteen (16) decorated cream wares had floral motif in blue, green and brown over white backgrounds respectively (**Fig. 5.28**). Cream wares with floral motifs became a standard part of the artist's vocabulary in the 18th century (Nelson, 1980, p.109). Three of the wares were transfer printed and one was hand painted. Transfer printing is a method of decorating pottery by using an inked, engraved copper plate to make a print on paper by

pressing the wet paper against a glazed pottery surface (web site 6).These wares were recovered from Locus 2 Levels 2, 4, and 6. The remaining seven (7) had decorations but were too small to be identified.

Fig. 5.28: Creamwares with floral motifs

5.9.2 Pearlwares

Pearlware was developed and produced by English potter Josiah Wedgwood in 1779 and became a leading ceramic material from 1810 until 1820. It is refined earthenware with kaolin clay body and has blotches of blue colour through the addition of cobalt blue (Draper 1969, p. 51). Pearlwares are distinguished from creamware by the way in which the glaze appears blue in crevices of foot rings and around handles (Hume, 2001, pp. 129 and 130). Seven (7) sherds recovered from Locus 2, Levels 2, 3, 5 and 6 were identified as pearlwares. Three (3) of the seven (7) pieces of pearlwares were from Level 6. The decorations identified on the pearlwares were willow pattern, blue flow, bouquet and floral motif.

5.9.2.1 Willow Pattern

A sherd from Locus 2 Level 6 was decorated with blue and white willow pattern achieved through transfer printing (**Fig. 5.29**). Willow is one of the several types of blue on-white ceramic materials with depictions of landscapes that were imported into England from China in the eighteenth Century. The Oriental pattern "Willow" first appeared hand painted on eighteenth Century Chinese porcelain, then on English porcelain and earthenware after 1813. The Willow pattern is usually printed on circular or ovate pearlware ceramic materials, with the entire pattern found in a waterside background / landscape in a garden scene.

Fig. 5.29: Blue and white willow printed pearlware

5.9.2.2 Flow Blue

Two of the sherds from Locus 2 Levels 5 and 6 were identified as blue flow wares achieved through transfer printing (**Fig. 5.30**). Flow blue wares are made when cobalt is loaded on the wares to such an extent that the white body appears pale blue or showing flowing dark blue patterns (Scoot, 2002, p.22). The decoration on the sherd from Locus 2 Level 5 was too fragmentary to be identified.

Fig. 5.30: Flow blue designs

5.9.2.3 Bouquet Decoration

Locus 2 Level 3 produced a sherd with intertwining floral motif on its borders. This has been identified as bouquet decoration on a pearlware which was achieved through transfer printing (**Fig. 5.31**). This pattern was made by Knight Elkin and Co from 1826 to 1846 (Coysh and Henrywood, 1989, p.32; Blake and Freeman, 1998, p.107)

Fig. 5.31: Pearlware with bouquet decoration

5.9.2.4 Floral Motif

Locus 2 Level 2, yielded two fragments, one had a floral motif achieved through transfer printing (**Fig. 5.32**).

Fig. 5.32: Pearlware with hand painted floral motif

Another fragment from the same level was a white to cream coloured ware with a polychrome hand painted decoration (**Fig. 5.33**). The fragments of pearlwares recovered were probably components of a plate, bowl or a cup. Pearlwares were introduced as an imitation of Chinese porcelain in the 1770s and gradually begun phasing out in the 1820s(Mazrim, 2008).

Fig. 5.33: Pearl ware with polychrome hand painted decorations.

5.9.3 Stonewares

Stonewares are potteries that are fired to about 1,200°C until vitrified (web site 7). The name stoneware is derived from its dense, stonelike character after it has been fired. Stoneware production in Germany is dated to as far back as the 14th Century whereas in Britain around the 1670s (Wood, 2014). The natural colour of stoneware clay is normally grey but the firing process changes it into light-brown or buff coloured, and different glazes may then be applied. Stonewares made in Rhineland, Lower Saxony and Saxony, made profound impact in the European markets and the colonial trade.

Four fragments of stonewares were recovered from Locus 2 Levels 2, 5, 6 and 7. In Locus 1 Level 2, a light brown German stoneware was recovered (**Fig. 5.34**: **A**). Another fragment from Locus 2 Level 7, was a Rhenish stoneware produced between 1650 and 1775 (DAACS:2018) (**Fig. 5.34**: **B**). Locus 2 Level 5 also produced a salt glazed grey and blue German stoneware (**Fig. 5.34 C**). Level 6, yielded a fragment of a German stoneware identified as Bellarmine bottles (English terminology) or Bartmann Krug (German terminology) or Greybeard (**Fig. 5.34**:**D**). It is a brown German stoneware produced between 1550 into the 19th Century (DAACS:2018) and it comes in varied sizes. The largest is fifteen inches high and the smallest is six inches high (Prime, 1878, p. 297). Stonewares are robust and impervious to water and were useful for decanting, drinking and transportation purposes (Majewski and Gaimster, 2009). A similar Bellarmine bottle was recovered at Elmina (DeCorse, 2001, p. 153).

Fig. 5.34: German stone wares

5.9.4 True Porcelain

Porcelain is hard paste ceramic material made from kaolin (china clay) and feldspar. It is fired to a very high temperature between 1,200 and 1,400 degrees Celsius, and is white, very hard, with comparatively thinner sherds, and usually translucent when held up to a light (Draper 2001, p. 53; Stein 2008, p. 402). Porcelain was originally made in China during the Tang Dynasty (618-907) but imitations of it were produced in Europe in the 18th Century in forms known as artificial or soft porcelain (web site 8). Ten (10) fragments of wares were identified as porcelain, eight of which were from Locus 2 and the remaining two (2) from Locus 1. Seven (7) out of the ten were plain and three (3) were decorated. Out of the three (3), two (2) had hand painted floral motifs and transfer printed respectively (**Fig. 5.35 A** and **C**).The last one has an orange decoration but the specific type of decoration cannot be identified since it appears on a small portion of the paste (**Fig. 5.35B**).

Fig. 5.35: Floral decorated porcelain

5.10 Beads

Beads carry cultural, historical and archaeological significance. They are made of varied materials, but glass and stone beads are the most found in the archaeological record because of their imperviousness to temperature, humidity and insect predation (Wilson, 2003). Beads are objects made of materials such as stone, bone, shell, glass, plastic or wood and comes in varied shapes and sizes which are strung and worn at various parts of the body such as the waist and wrist. A total of fifteen (15) beads were obtained from Locus 1 and Locus 2. Ten (10) beads were obtained from Locus 2 while the remaining five (5) came from Locus 1.

Glass beads constituted majority (thus 13) of the beads recovered. The remaining two (2) were bauxite and plastic beads respectively. The beads were described based on their manufacturing technique, physical attributes and chronology where possible (**see Appendix 6**).

5.10.1 Bauxite Beads

The only bauxite bead (**Fig. 5.36 number 1**) recovered was from Locus 2 Level 3. Bauxite beads are made first by splitting of large bauxite cobbles into convenient sizes through direct

or indirect percussion. Indirect percussion was the commom method of splitting the bauxite beads recovered because according to Bredwa-Mensah (1996) it was used to manufacture short beads whereas direct percussion was for long tubular beads. With indirect percussion, a knife is put at the point on the bead where it is to be cut (Bredwa-Mensah, 1996, p.15). It is followed by drilling achieved by using the bows and spindle drills with scrap iron points. Then grinding of the cut edges with water to smoothen them and polishing before it is strung for use.

5.10.2 Plastic Bead

One yellow plastic bead obtained from Locus 2 Level 4 also formed part of the collection. Plastic beads are made using techniques similar to that of glass beads. They are usually light weight, inexpensive and come in varied shapes and sizes (Durant, 2007).

5.10.3 Mould-pressed Glass Beads

Mould-pressed or moulded beads are made by heating the end of a glass rod over an oil flame or in a furnace until it is melted into a tong like two-piece mould (Karklins, 2012). In Ghana, powdered or fragmented glass placed in mounds is used instead (Wilson, 2013). A pin or pins were pierced through the molten substance to create the perforation. This was the technique employed in making three (3) of the beads which were recovered from Locus 2 Level 3 and the other two from Locus 1 level 3. The bead from Locus 2 Level 3 is white with black spots (**Fig. 5.36 number 3**). One of the beads from Locus 1 Level 3 is white and circular in shape. The other one was brick brown in colour (**Fig. 5.36 number 4).** This bead was made in Europe (Bohemia) in the early mid-1900s (web site 9).

5.10.4 Drawn Beads

Drawn beads are achieved by drawing out a long thin tube up to 1.50ft in length from a hollow of globe of molten glass manipulated by two men (Karklins, 2012). According to Wilson (2003), this method is best suited for mass production of beads. Ten (10) glass beads were identified as drawn beads from Locus 1 Level 7 (2 beads), Locus 2 Level 3 produced 4 beads and Level 5 produced 4 beads. The beads from Locus 1 were polychrome with stripes of white, blue and red and another is a red oval bead (**Fig. 5.36 numbers 6 and 13).** The beads in Locus 2 were tubular brown bead decorated with spiral of white and blue colours (**Fig. 5.36, number 14**) and tubular Turkish blue (Turquoise) (**Fig. 5.36, number 15**). Another bead was black with white encircling it (**Fig. 5.36 number 2**). Others were oval monochrome of the colours white and yellow (**Fig. 5.36 numbers 11 to 13**). The white had tiny white vertical stripes on it (**Fig. 5.36 number 11**). Two were globular monochrome with colours, green and yellow (**Fig. 5.36 numbers 8 to 10**). The last is also globular in shape but polychrome in nature (**Fig. 5.36 number 7)**. It had a core colour of white with vertical blue stripes on it.

Glass beads were first brought into West Africa by Arab merchants from Cairo, other mid-eastern glass centres and India with other trade goods such as copper ornaments in exchange for gold, ivory and slaves (Wilson, 2003, p.32). The coming of Europeans to Africa in the late 1400s supplanted the trade by the Arabs. Wilson (2003) revealed that, the Europeans brought glass beads as presents to the Africans and later used them as items for barter trade. The beads traded by Europeans were mostly Venetian beads, including seven layered chevrons and most are indistinguishable from the ones found in American archaeological sites dating from the same period (Wilson, 2003, p.32). Between the 16th and 18th centuries the quantity of beads

sold into West Africa remained partly low as the use of beads were controlled by chiefs through sumptuary laws and other means (Jarstoff, 1995, p.104). Sumptuary laws dictated what sorts of beads and what sorts of cloth people could wear, according to rank (Wilson, 2003). However, in the 19th century the influence of chiefs in the use and by extension the purchase of beads ceased on account that the British usurped their powers leading to the abolition of many of the restrictions. This was a watershed period as both East and West Africa were flooded with Venetian, Bohemian and Dutch glass beads (Wilson, 2003).

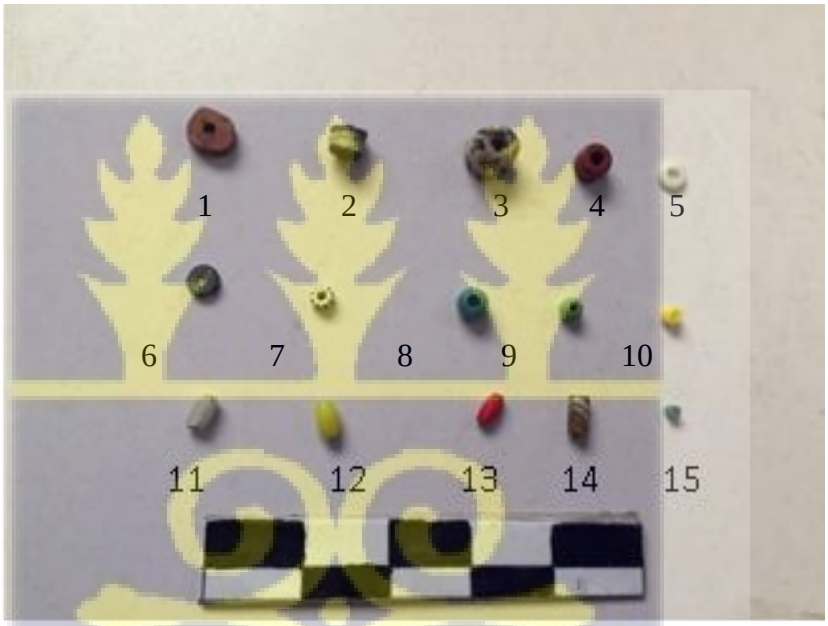


Fig.5.36: Varieties of beads retrieved from the excavation.

5.11 Glass

Bottles of varied sizes, shapes and colours were used in the Kormantse settlement however, only fragments comprising the base, body, finish and neck of the bottles were recovered from the excavations. A total of two hundred and forty-four (244) glass fragments were recovered from Locus 1 (39) and Locus 2 (205). Out of the total, two hundred and thirty (230) were identified as non-diagnostic glass fragments and fourteen (14) were diagnostic because they

had inscriptions on them. These diagnostics ones were in the form of embossment at the base and body sherds of which majority were at the base. Commercial markings found on glass bottles could pertain to the content of the bottle, the producer or the makers' mark, patent dates and instructions for use or dosage (Jones et. al, 1989). Commercial markings include embossments, paper label, applied colour label and glass labels (*ibid*) on glass bottles. Embossments according to Jones, Sullivan and Miller (1989, p.16) was the most common form of commercial marking on containers and tableware in the 18th and 19th centuries. Glass bottle bases with this type of markings were found in Locus 2, Levels 5, 3, 4, 2, 6 and Locus 1 Level 4. The base from Locus 1, Level 4 has been identified as having a seaform colour round bottom bottle with illegible and incomplete inscription (SOST?) on the bottom (**Fig. 5.37**). This however, has been ascribed to from the middle of the 19th Century to the early 20th Century and was manufactured in Britain (web site 10). Round bottomed bottles were designed and mostly used for carbonated beverages, mineral and soda water (Jones et. al, 1989).

Fig. 5.37: Bottomed bottle from Locus 1

Four bases from Locus 2 Level 5 also had inscriptions on the bottom. Two of the bases, by deducing from their sizes, were small bottles. These are circular in shape with the inscription *J*

(superimposed by 105) while the other was a rectangular bottle with the inscriptions *S*. The third one had an encircled *P* with *US* written beside it. These bottles have been identified as medicine bottles. The fourth glass bottle base is green in colour with the inscription 2 on one side of the upper base. In Locus 2, Level 3, two (2) bases were diagnostic. Both were cup bottom moulded bases with the inscription (17 superimposed by 65) and *LL.S* over *11* respectively. The former is small and opaque but the latter is smaller and more transparent. In Locus 2 level 2, the vertical half of a light green bottle in the form which shows the base and body, has the mark *B* in a square at its base and is cylindrically shaped (**Fig. 5.38**). It is identified as a medicine bottle dating to either the 19th or 20th Century. In Locus 2, Level 6 the only diagnostic base was oval in shape, small size bottle with the inscription $7^{1/2}$ on the bottom. Two bases from Locus 2 Level 5 and 3 had a pontil mark (**Fig. 5.38**). Furthermore, four body fragments with embossments were from Locus 2 Levels 5, 3 and 4. Locus 2 Level 5 produced a colourless transparent body fragments with the inscription *HA* separated by a space. From Locus 2 Level 3 two body fragments, coloured green and colourless had the inscriptions *9* and *E M* with *TLE RE* under it respectively. In Locus 2, Level 4, one body fragment had the inscription *COUT* with *LDS ETC* under it. This was identified as a medicine bottle on account of the shape (**Fig. 5.39**) and its small size. According to Wilson and Cromwell (2012), embossing enhances dating opportunities however some of the ones presented above could not be dated and identified because the inscriptions were not complete.

Fig. 5.38: A medicine bottle from Locus 2

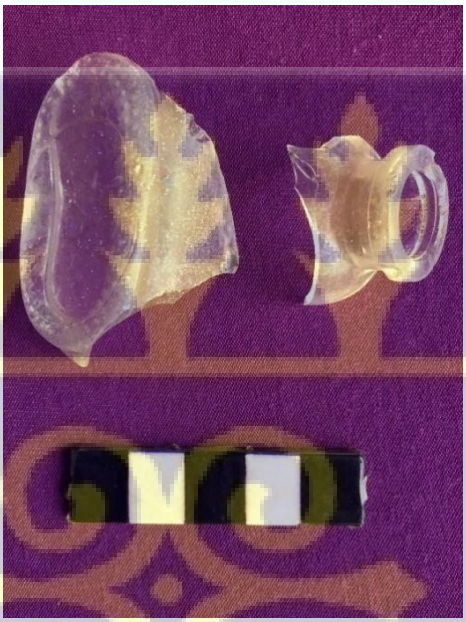


Fig. 5.39: A medicine bottle from Locus 2

Fragments of bottle finish recovered from the excavations were identified as rolled on, crown top rim, blop top, flared finish and ground rim. Finish refers to the entire lip and collar of the bottle. The rolled-on rim or string rim, flared rim and ground rim recovered from the excavations were probably medicine bottles or vaseline container due to their diminutive size (**Fig. 5.40**). Rolled or folded in, finish is most common on early figured flask, medicinal and food bottles which could be dated to from or before the 1870s (Deiss,1981).

Fig. 5.40: Ointment container

5.12 Tuyeres

Tuyeres are generally cylindrically-shaped tubes made out of hardened clay which are often tapered at one end (Okoro, 1989, p.11). They could be made of loam mixed with straw, cow dung and baked (Junner, 1935) and they vary in size and length. The tuyeres serve as the passage of air generated from the bellow into the furnace. Therefore, it connects the source of air to the furnace to facilitate the combustion process. Kense (1983), described one of the methods of making tuyeres. He stated that the clay is moulded around a prepared wooden stick and the stick is removed after drying. The clay object then takes the shape of the stick. Alternatively, a sharp stick may be inserted through a mass of clay (Okoro, 1989, p.11) to create the hole for air passage.

Fragments of tuyeres were recovered from Locus 1 and Locus 2. A total of sixteen (16) pieces of tuyeres were obtained from both trenches with fourteen (14) coming from Locus 1 and two (2) from Locus 2 (**Fig. 5.41**). In Locus 1, the tuyeres were obtained from Levels 3 to 7, while in Locus 2, Levels 3 and 11 yielded the tuyeres. Physical or visual observation of the tuyeres

revealed three attributes. The attributes were tuyeres with vitrified exterior, unvitrified exterior, and unvitrified exterior with slag clogged interior. The unvitrified exterior tuyeres were seven (7) in number (**Fig. 5.41**). One (1) tuyere had slag embedded in its interior with an unvitrified exterior (**Fig. 5.42**) and vitrified exteriors were eight (8) (**Fig. 5.43**). The tuyeres had a thickness ranging between 0.9cm-2.3cm and a length of between 2cm to 5cm. Below is the distribution of the tuyeres found in Trenches 1 and 2 (**Table 5.9).**

Table 5.9: Distribution of the attributes of the tuyeres excavate

LOCUS 1 TRENCH	LEVEL	DEPTH	VITRIFIED EXTERIOR	UNVITRIFIED EXTERIOR WITH SLAG IN THE INTERIOR	UNVITRIFIED EXTERIOR
		(cm)			
1	3	40-60cm			3
1	4	60-80	4		1
1	5	80-100			1
1	6	100-120		1	1
1	7	120-140	2		1
LOCUS 2 TRENCH					
1	3	40-60	1		
1	11	200-220	1		

Fig. 5.41: Samples of unvitrified tuyeres

Fig. 5.42: Tuyere with slag in its interior.

Fig. 5.43: Some of the vitrified tuyeres recovered.

5.12.1 Microscopic Analysis of Tuyeres

Although a physical examination of these clay objects showed that they are tuyeres, they were further subjected to a chemical composition analysis to firm up this observation and to also rule out the possibility of them being components of a fish smoking oven. Fish smoking and the construction of oven for this activity is predominant in the settlement.

Four (4) out of the sixteen (16) tuyeres recovered were subjected to SEM -EDX (Scanning Electron Microscopy, Energy Dispersive X-Ray Spectroscopy) analysis at the Department of Earth Science, University of Ghana. The samples selected were analyzed by Miss Dora Fianyo (Lab technician) in my presence. The samples were randomly selected by the researcher from Locus 1 Levels 4, 5 and 6 and Locus 2 Level 11. The samples comprised those with vitrified exterior, unvitrified exterior and one with slag imbedded in the interior.

Scanning Electron Microscopy, Energy Dispersive X-Ray Spectroscopy (SEM- EDX) are two different machines that provide images of objects in either backscatter or optical images and identifies the elements present in the object respectively (**see Appendix 7**). The SEM is useful in knowing the particle size, texture and distribution of an object. The SEM – EDX machine performs spot analysis, region analysis and map analysis of objects. Spot analysis is carried out by selecting certain spots on the back-scatter image whereas the region analysis focuses on a particular region which is the accumulation of a number of spots on the image. The EDX provides the elemental composition of the spots or regions selected. The EDX also generates map analysis which uses colours to represent the distribution of elements in the objects.

The four tuyeres were prepared by cutting them in cross section and coating them with gold to enhance their electrical conductivity. The tuyeres were then mounted on a stub and inserted into the vacuum chamber of the SEM machine (**Fig. 5.44**). The camera attached to the SEM captured images of the tuyeres and projected them on the monitor in back-scatter image (black and white). The EDX afforded the elemental composition of selected areas (spot analysis) and the entire regions selected (region analysis) on the tuyeres (**see Appendix 7**) in percentages. To arrive at the percentage of each chemical present in the tuyeres, the average of the weight concentration (percentage of only the element without oxide) (highlighted in **Appendix 7**) of

the regional analysis was calculated (**Tables 5.10-5.13**). This is important because, two or more regional analyses were done on a sample.

Fig. 5.44: Tuyeres cut in cross section and mounted on stub

Table 5.10: Average of the elements obtained from the two regional analyses of the tuyeres from Locus 1 Level 4. (Source: Author, derived from lab results)

Element Symbol	Region 1	Region 2	Average = (Region 1+ Region 2) ÷2 %
Oxygen (O)	47.24	52.68	49.96
Silicon (Si)	22.03	32.31	27.17
Carbon (C)	13.34	10.52	11.93
Aluminium (Al)	4.75	2.41	4.65
Iron (Fe)	5.68		5.68
Sodium (Na)	1.42	0.71	1.07
Magnesium (Mg)	1.25	0.83	1.04
Calcium (Ca)	1.02	0.36	1.38
Titanium (Ti)	0.61		0.61
Potassium (K)	0.54	0.18	0.36

Table 5.11: Average of the elements obtained from the two regional analyses of the tuyeres from Locus 1 Level 5. (Source: Author, derived from lab results)

Element Symbol	REGION 1	REGION 2	Average = (Region 1+ Region 2) ÷2 %
Oxygen (O)	45.85	48.62	47.21
Silicon (Si)	26.9	37.89	32.39
Aluminium (Al)	15.54	11.49	13.52
Iron (Fe)	8.69	1.12	4.91
Potassium (K)	0.9	0.88	0.89
Calcium (Ca)	0.86	_	0.86
Titanium (Ti)	0.82	_	0.82
Magnesium (Mg)	0.44	_	0.44

Table 5.12: Average of the elements obtained from the two regional analyses of the tuyeres from Locus 1 Level 6 (Source: Author, derived from lab results)

Element Symbol	REGION 1	REGION 2	Average - (Region 1+ Region 2) ÷2 %
Oxygen (O)	25.48	43.16	34.32
Silicon (Si)	18.98	22.32	20.65
Carbon (C)	_	11.9	11.9
Aluminium (Al)	3.93	8.83	6.38
Iron (Fe)	46.49	7.53	27.01
Nitrogen (N)	_	3.41	3.41
Magnesium (Mg)	_	0.86	0.86
Sodium (Na)	_	0.73	0.73
Potassium (K)	1.28	0.65	0.97
Calcium (Ca)	3.84	0.6	2.22

Table 5.13: An average of the elements obtained from the two regional analyses of the tuyeres from Locus 2 Level 11. (Source: Author, derived from lab results)

Element Symbol	REGION 1	REGION 2	Average - (Region 1+ Region 2) ÷2 %
Oxygen (O)	39.37	38.42	38.89
Silicon (Si)	27.44	24.91	26.17
Iron (Fe)	12.37	10.23	11.3
Aluminium (Al)	10.46	9.89	10.18
Carbon (C)	8.72	11.9	10.31
Calcium (Ca)	0.98	0.98	0.98
Potassium (K)	0.67	0.99	0.83
Magnesium (Mg)	_	1.3	1.3
Sodium (Na)	_	1.12	1.12
Titanium (Ti)	_	0.26	0.26

Table 5.14: Proportion of elements present in all the tuyeres analyzed. (Source: Author)

Element	Locus 1Level 4	Locus 1 Level5	Locus 1 Level 6	Locus 2 Level 11
Oxygen (O)	49.96	47.21	34.32	38.89
Silicon (Si)	27.17	32.39	20.65	26.17
Carbon (C)	11.93	-	11.9	10.31
Aluminium (Al)	4.65	13.52	6.38	10.18
Iron (Fe)	5.68	4.91	27.01	11.3
Sodium (Na)	1.07	-	0.73	1.12
Magnesium (Mg)	1.04	0.44	0.86	1.3
Calcium (Ca)	1.38	0.86	2.22	0.98
Titanium (Ti)	0.61	-	-	0.26
Potassium (K)	0.36	0.89	0.97	0.83
Nitrogen (N)	-	-	3.41	-

The SEM-EDX analysis showed that the chemicals with appreciable proportions in the tuyeres are oxygen (O), silicon (Si), carbon (C), aluminium (Al) and iron (Fe). The others, sodium (Na), magnesium (Mg), calcium (Cal), nitrogen (N), titanium (Ti) and potassium (K) are the other elements present but have comparatively insignificant percentage thus less than 1 percent in the tuyeres (see **Table 5.14 above)**. In all the four tuyeres, oxygen was the predominant element with a percentage of 49.96%, 47.21%, 34.32% and 38.89% in the tuyeres. Oxygen exist as oxides when combined with other elements in every substance. For instance, it exists in ores as iron oxides. Therefore, the oxygen in the tuyeres can be traced to the clay which is the raw material used in making the tuyeres, the slags which the tuyeres may have come into contact with, and the fuel which could be charcoal used to power the furnace. The next dominant element is silicon with percentages of 27.17%, 32.39%, 47.21% and 26.17%. Silicon is the second most abundant element in the earth's crust (Tubana, et. al, 2016) and can be traced to the clay which was the main material used in making the tuyeres. Similarly, the

ore could have contributed some percentage of silicon. The tuyeres obtained contained aluminium percentages of 4.65%, 13.52%, 6.38% and 10.18%. The aluminium in the tuyeres can be traced to the clay which is the raw material and the ore from which the slag was obtained since aluminium is a natural constituent of all soils (Malik et al., 2003). The iron percentages in the tuyeres are 5.68%, 4.91%, 27.01% and 11.3%. Iron is abundant in the earth crust (Ganz, 2009) and the iron in the tuyeres are obviously from either the slag or bloom extracted from the ore which had contact with the tuyeres. The highest proportion of iron (27.01%) was recorded in the tuyeres recovered in Locus 1 Level 6 which had unvitrified exterior and slag clogged or embedded interior (**see Fig. 5.42 above**). The second highest percentage of 11.3% was found in the tuyere from Locus 2 at a depth of 200-220cm. The other elements such as carbon, sodium, magnesium, calcium, titanium and potassium are regarded as impurities due to their low proportion in the tuyeres. They can be traced to decomposed organic matter the tuyeres may have come in contact with. The chemical composition revealed by the analysis gives credence to the physical examination that was done. Thus, the objects are indeed tuyeres employed in iron working activity.

5.13 Slag

Slags are the most common remains of ancient pyrometallurgy and constitute the waste material from the ore during the smelting process and also emanate from the bloom during the smithing process. Slags are therefore categorized into smelting and smithing slag based on the process that produced them. Slags represent important source of evidence in investigating past iron working activities because of a number of attributes they possess. Firstly, slags are almost universally found deposited within or in close proximity to metal production sites, with low probability of extensive spatial displacement (Gethin, 2016). This allows for the explicit

association of the material deposited to the site that is under investigation (Gethin, 2016). Secondly, slags are typically stable in terms of chemical susceptibility to post depositional degradation and will frequently exhibit good preservation in the archaeological record (Gethin, 2016).

Slags are ubiquitous in the Kormantse settlement as heaps and scattered pieces are found on the surface of the settlement. The archaeological excavations also yielded two hundred and forty-three (243) pieces of slag in Locus 1 and twenty-four (24) in Locus 2. In Locus 1, all levels but the last level (160-180cm) yielded slags while levels 1, 3, 4, 6, 8 and 11 also yielded slags in Locus 2. In all, two hundred and sixty-seven (267) pieces of slag were recovered from the excavations. The pieces of slag were in variable colours, shapes and sizes. Physical examination of slag showed that seventy-five (75) can be considered as tapped slag because they had thin cords, wide cord or pudding which resulted from solidification of slag trickles (**Fig. 5.45)**. Tapped slags are slags which flowed from the furnace through the opening at the base of the furnace (Buchwald, 2005). This kind of slag form ropey lavalike structures when it cools. Tapped slags are associated with smelting furnace. One hundred and fifteen (115) out of the two hundred and sixty-seven (267) were categorized under furnace bottom slag as they had irregular cracks and were plano convex in shape. Furnace bottom slags are left to pool in the bottom of the furnace and could be associated with smithing or smelting furnace (Buchwald, 2005). The slags collected came in dark blue and brown colours. The remaining fifty-three (53) slags were difficult to identify due to their diminutive sizes. An examination of the slags through photography by Caroline-Robion-Brunner (a researcher at French National Center for Scientific Research who has conducted iron metallurgy focused researches in Benin and Mali); showed that majority of the slags from Kormantse are smithing slag and a few are

smelting slag. This is consistent with the physical examination which revealed that both smelting and smithing activities were undertaken in Kormantse in the past as evidenced in the recovery of both smelting and smithing slags.

Fig. 5.45: Some slags recovered from the excavations

5.13.1 Microscopic Analysis of Slags

Nine (9) pieces of the slags were subjected to the same analytical technique as the tuyeres thus, SEM-EDX (Scanning Electron Microscopy, Energy Dispersive X-Ray Spectroscopy) analysis which was conducted at the Department of Earth Science, University of Ghana. The SEM EDX process described above applies to the slags too. This analysis was carried out to ascertain the chemical composition of the slag which would enable the determination of the efficiency of the iron working process or activity. This result and that of the ore which will be described later would enable ore provenience identification.

The slag samples were selected by the author based on size, colour and shape and were selected from Locus1, Levels 3, 6, 8, 9 and 11. One slag was selected from each level except Levels 3 and 6 from where four (4) and two (2) slags were selected respectively while the rest were selected from Locus 2 Level 11. Two (2) of the slags were irregular in shape, three (3) had the shape of pudding, another three had the shape of thin cord and one (1) had the shape of wide cords. Alphabets were added to provenience information (for example Locus 1 Level 3A – 3D and Locus 1 Level 6A- 6B) to differentiate two or more samples from a particular level for the SEM-EDX analysis. Like the tuyeres SEM-EDX yielded back scatter images and quantitative values of elements present in the slag respectively (**see Appendix 8**). For the purposes of analysis, the Stoich weight concentration (**see Appendix 8**) was used because it is the standard method applied to this material type (Bachmann 1982; McDonnel 1986). This means that each element was calculated as simple oxides with oxygen values calculated automatically by the SEM software according to stoichiometry. The average of the elements (**Table 5.15-5.19**) was obtained from map and regional analysis of the slags (**see Appendix 8).**

Table 5.15: Average of the elements obtained from the two regional analyses of the slag. (Source: Author, derived from lab results)

ELEMENT SYMBOL	REGION 1	REGION 2	AVERAGE = (REGION 1+ REGION 2) ÷2 %
FeO	71.49	74	72.745
SiO	17.93	16.07	17
AlO	6.37	6.45	6.41
CaO	2.15	1.41	1.78
KO	2.06	0.56	1.31
PO	-	1.51	1.51

Table 5.16: Average of the elements obtained from the two regional analyses of the slag. (Source: Author, derived from lab results)

ELEMENT SYMBOL	REGION 1	REGION 2	AVERAGE = (REGION 1+ REGION 2) ÷2 %
FeO	52.8	69.41	61.105
BO	13.96		13.96
SiO	10.98	14.85	12.915
CO	10.42	6.75	8.585
NO	4.82	-	4.82
AlO	4.41	5.03	4.72
NaO	0.93	-	0.93
KO	0.93	0.48	0.705
CaO	0.91	1.55	1.23
PO	-	1.93	1.93

Table 5.17: Average of the elements obtained from the two regional analyses of the slag. (Source: Author, derived from lab results)

ELEMENT SYMBOL	REGION 1	REGION 2	AVERAGE = (REGION 1+ REGION 2) ÷2 %
FeO	71.65	78.76	75.205
SiO	11.79	12.27	12.03
AlO	8.14	6.62	7.38
CO	5.56	-	5.56
CaO	1.47	1.86	1.665
KO	0.97	0.49	0.73
MgO	0.43	-	0.43

Table 5.18: Average of the elements obtained from the two regional analysis of the slag. (Source: Author, derived from lab results)

ELEMENT SYMBOL	REGION 1	REGION 2	AVERAGE = (REGION 1+ REGION 2) ÷2 %
FeO	78.98	76.92	77.95
SiO	12.12	13.71	12.915
AlO	4.1	5.04	4.57
CO	3.68	-	3.68
CaO	1.13	1.51	1.32
PO	-	1.35	1.35
KO	-	0.76	0.76
MgO	-	0.72	0.72

Table 5.19: Average of the elements obtained from the two regional analyses of the slag. (Source: Author, derived from lab results)

ELEMENT SYMBOL	REGION 1	REGION 2	AVERAGE = (REGION 1+ REGION 2) ÷2 %
FeO	75.24	70.47	72.855
SiO	13.09	13.66	13.375
AlO	4.72	5.94	5.33
CO	3.51	5.48	4.495
PO	1.95	1.47	1.71
CaO	1.49	2.14	1.815
KO	-	0.85	0.85

From the analysis, the major elements present in the slags are iron oxide (FeO), silicon oxide (SiO), aluminium oxide (AlO) and carbon oxide (CaO) (**Table 5.20**). The minor elemental constituents are magnesium oxide (MgO), sodium oxide (NaO), boron oxide (BO), nitrogen oxide (NO), calcium oxide (CO), phosphorous oxide (PO) and potassium oxide (KO). The major elements registered appreciable percentage values thus above 5% whereas the minor ones showed insignificant percentage values of less than 5%. The minor elements in the slags

can be regarded as impurities from the ore, clay and the surroundings. In all the samples, the iron oxide percentages were very high thus between 60 and 75% (72.745%, 61.105%, 75.205%, 77.95%, 72.855%, 72.63%, 75.14%, 70.83% and 74.73%). Silicon oxide percentages were 17%, 12.915%, 12.03%, 12.915%, 13.375%, 13.31%, 10.65%, 13.38%, a n d 13.97% (thus between 12 and 17%). That of aluminium oxide were between 5 and 10% (6.41%, 4.72%, 7.38%, 4.57%, 5.33%, 9.07%, 4.83%, 7.24%, 6.37%). The carbon oxide percentage were 8.585%, 5.56%, 3.68%, 4.495%, 5.7%, 5.11% and 3.6% (thus between 4 and 9%).

Table 5.20: The percentages of the elements present in all the slags analyzed. (Source: Author, derived from lab results)

Element Symbol	L1,L3a	L1, L3b	L1, L3c	L1, L3d	L1, L6a	L1, L6b	L1, L8	L1,L9	T2, L11a
FeO	72.63	75.14	70.83	74.73	72.745	61.105	75.205	77.95	72.855
SiO	13.31	10.65	13.38	13.97	17	12.915	12.03	12.915	13.375
AlO	9.07	4.83	7.24	6.37	6.41	4.72	7.38	4.57	5.33
CaO	1.34	1.08	1.04	0.85	1.78	1.23	1.665	1.32	1.815
KO	0.54	-	0.65	0.48	1.31	0.705	0.73	0.76	0.85
PO	3.12	2.61	1.38	-	1.51	1.93	-	1.35	1.71
CO	-	5.7	5.11	3.6	-	8.585	5.56	3.68	4.495
MgO	-	-	0.38	-	-	-	0.43	0.72	-
BO	-	-	-	-	-	13.96	-	-	-
NO	-	-	-	-	-	4.82	-	-	-
NaO	-	-	-	-	-	0.93	-	-	-

The chemical composition and properties of slags are influenced by ore type, the fluxes added, the furnace construction material, the use of charcoal and the cooling conditions (Bachmann, 1982). Hence, the chemical composition of the slags analyzed reflects Bachmann's assertion. The carbon oxide in the slag could be traced to the charcoal used since carbon is the main constituent of charcoal. The iron oxide present in the slags is traced to the ore from which the slags (by product) and bloom (end product) were obtained. The slags also

contain silicon oxide and aluminium oxides which could be traced to the ore, the furnace and tuyeres construction material (that is clay). The analysis has showed that the slags derived contain elements necessary for iron production.

The determination of the provenance of the ore that were employed in the iron working activity in Kormantse was guided by the principle that the compositional characteristics of smelting and smithing slags can be related to the type of ore (Paynter, 2006). So according to this principle, similarities in the chemical composition of the slag and ore is an indication that the ore in question was the raw material from which the slag was obtained. Samples of ore collected from the Kormantse settlement were subjected to X-ray fluorescence (XRF) analysis. X-ray fluorescence (XRF) works similarly as SEM-EDX, but X-ray fluorescence (XRF) is used for pulverized substances (**Fig. 5.46)**. So, ground ore was put into the X-ray fluorescence (XRF) machine, to produce the elements present in it. The X-ray fluorescence (XRF) result showed that the ore is predominantly laterite dominated by iron (III) oxide (Fe_2O_3) of about (75.6%, 75.5%) with the presence of Aluminium (II) oxide (Al_2O_3) and Silicon oxide (SiO_2) (**Table 5.21**). The other elements have little influence in the make-up of the ore owing to their low percentage.

Fig. 5.46: Some slags recovered from the excavations

Table 5.21: X-ray fluorescence analysis of ore samples collected from Kormantse. (Source: Lab results)

Component	Result 1	Result 2
Iron (III)oxide (Fe2O3)	75.6	75.5
Silicon dioxide (SiO2)	17.3	17.4
Aluminium (II)oxide (Al2O3)	6.7	6.7
Magnesium oxide (MgO)	ND	ND
Phosphorus pentoxide (P2O5)	0.129	0.129
Potassium oxide (K2O)	0.068	0.0694
Calcium oxide (CaO)	0.0176	0.017
Titanium dioxide (TiO2)	0.183	0.18
Manganese (II) oxide (MnO)	0.0073	0.0077
Sodium oxide (Na2O)	ND	ND

CHAPTER SIX
INTERPRETATIONS AND CONCLUSION

6.1 Introduction

This chapter, guided by insights from material culture studies provides a synthesis of the ethnographic research, archaeological research and chemical analysis of materials recovered. The interpretation paints a broad picture of the area in terms of the diet, indigenous medicine, subsistence, religion, culture contact, evidence of iron working in the archaeological record and then zeros in on the crux of the work thus the use of slag and iron ore in shrines in Kormantse. The chapter is closed with some concluding thoughts.

6.2 Interpretations of Artefactual Remains from Kormantse

The archaeological excavations carried out in Kormantse has provided insight into the nature of Kormantse from the pre-colonial times through to the present. The materials recovered namely potsherds, molluscs, iron slags, glass fragments, bones, metals, imported smoking pipes, imported ceramics, palm kernels, beads, tuyeres, local smoking pipes and querns from the loci in Kormantse have shown that the site was a multi-purpose site which has gone through transformations over time. The materials point to evidence of food ways, subsistence activities, culture interaction and iron working activities. Even though the site was not scientifically dated the stratigraphic dating suggest that the site was long settled before the European contact. In both loci which were excavated at 20cm arbitrary level, the recovery of foreign materials ended at Level 9, which was also the sterile level for Locus 1. However, for Locus 2 it ended at Level 12. Unfortunately, these foreign materials were non- diagnostic. In Locus 2 for instance,

exclusively local materials (potsherds and slags) were recovered from Levels 10 to 12. The material manifestation of the cultural way of life of the people as revealed in the archaeological record attest to an indigenous culture. The interpretation of the material culture also affirms the oral accounts and settlement history as this area was identified as the old settlement of Kormantse by the inhabitants. Since both loci were excavated at 20cm arbitrary level, it suggests that recovery of foreign materials ended at the same stratigraphic level (Level 9) for both sites. Nonetheless, Locus 2 showed that prior to the Atlantic period, there were local activities. This confirms Ozanne's (1962) assertion that the presence or absence of certain material types could give indication of the time period. The archaeological materials recovered and analyzed together with the oral accounts collected and ethnography conducted are interpreted in the succeeding paragraphs.

6.3 Evidence of Iron Working at Kormantse

Amongst the repertoire of materials recovered from the archaeological excavations conducted were slag, tuyeres and iron ore. These remnants of iron working activity from the excavations at Kormantse reveal an untold past of the settlement. Also, the archaeological evidence confirmed the ethnographic observations of the use of abundant iron working remains in Kormantse. The examination of the chemical composition and macroscopic characteristics of the fragmentary clay objects (tuyeres) and slags, attested that the remnants were used in iron working activities.

Through SEM-EDX analysis, the claylike objects which are vitrified either in the exterior or interior and also had slag embedded in the interior have been identified as tuyeres. These finds were identified as fragments of tuyeres, because of the presence of elements such as oxygen, silicon, carbon, aluminum and iron which are traceable to clay,

iron ore and wood fuel found in tuyeres. The presence of iron which is a core element in the iron working process and found in all the tuyeres is a testament of the intensive iron working activity at the coastal settlement. Although clay contains appreciable percentage of iron (Fe) it does not rule out the possibility of the analyzed tuyeres as iron working tuyeres, especially, because they were all vitrified tuyeres. Irrespective of the fragmentation of the tuyeres and the fact that the original length of the tuyeres is not known, evidence of vitrification of its exterior and the slag adhering to its interior demonstrates that such tuyeres were placed deep into the furnace (Okoro, 1989, p.146). Their presence therefore indicates the use of bellows since the tuyeres acts as the passage of air from the bellow into the furnace. However, they could have been used in a natural draught furnace and their presence in the archaeological record means bellows were not in use in the smelting process (Okoro, 1989). According to Chaplin (1961, pp.55-56), such objects are known as tewels and were used to regulate the air from the natural draught. The recovery of fragments of tuyeres though not many is a cogent indication of a past iron working activity in Kormantse. The metallurgical industry in Kormantse could have been either a smelting or smithing one on account that both make use of tuyeres. Additionally, the only tuyere recovered in Level 11 of Locus 2 (**Table 5.9**) contained the second highest percentage of iron. It was recovered at a depth of 200-220cm and no imported material was recovered from that level, the level above it and succeeding level. This suggests that the iron working activity in Kormantse likely predates the arrival of the Europeans and bears a stamp of antiquity.

Slags are ubiquitious in the Kormantse settlement as small heaps and scattered pieces are found on the surface of the settlement. Similar finds were recovered archaeologically.

The slags had attributes of tapped slags and furnace bottom slags which are associated with smithing and smelting activities. Tapped slags are associated with smelting because it flows from the furnace through the opening at the base of the furnace (Buchwald, 2005). Furnace bottom slags are left to cool in the bottom of the furnace and could be associated with smithing or smelting furnace (Buchwald, 2005). However, majority of the slags were smithing slags while smelting slags were in the minority. This is suggestive of the existence of both smithing and smelting activities in the past in Kormantse.

The microscopic analysis of the pieces of slags gave insights into the type of iron ore that was exploited and the possible provenience of the ore as well as the efficiency of the iron working process in Kormantse. The SEM-EDX analysis showed that the chemicals present in the slags are iron oxide, silicon oxide, aluminium oxide and carbon oxide. The minor elemental constituents are magnesium oxide, sodium oxide, boron oxide, nitrogen oxide, calcium oxide, phosphorous oxide and potassium oxide. These chemical compositions and properties of the slags were traceable to the ore type, the fluxes added, the furnace construction material and the fuel or charcoal used (Bachmann, 1982). The past smelting or smithing process in Kormantse can be described as inefficient, because all the slags analyzed recorded high proportions of iron thus between 61% and 75%. This shows that in the process of eliminating the impurities or waste (slag) a considerable quantity of iron were also removed. As a result, that which should have been found in high proportions in the bloom (end product), are retained in the waste material. Conversely, this could imply that the ore used had high proportion of iron oxide hence both slag and bloom would retain high percentages of iron. The latter is more probable since analyzed ore samples from the settlement have high iron content (**Table 5.21)**.

The XRF analysis of the ore samples collected in Kormantse revealed that the ore in the settlement is laterite dominated by iron oxide (Fe2O3) of about (75.6%, 75.5%) with the presence of Aluminum (II) oxide (Al2O3) and Silicon oxide (SiO2). Inferring from the elemental composition of the ore analyzed, the ore deposit at Kormantse are viable for iron working activity. Furthermore, there are significant relationships between the ore and the slag retrieved from the site as evident by similar elemental signatures. First, there was similarity in the high percentage of iron in the ore and slag. Second, the sequence of aluminium oxide and silicon oxide in all the slags and ore samples were identical thus the proportion of silicon oxide precedes that of the aluminum oxide. This implies that the ores are potential ore source that were exploited in the production of iron hence the iron working activity was carried out on the settlement. This is based on the principle that the compositional characteristics of smelting and smithing slags can be related to the type of ore (Paynter 2006). This negates the claim by some inhabitants that the slags in the settlement were collected from another location. Large quantities of heavy slags are not easy to move and it would have been unnecessary, undesirable and uneconomical to remove and relocate slag material to any great distance from the proximity of the site, in terms of both manpower and energy expenditure (Gethin, 2016). Hence the similarity in the chemical composition of the slags and ore attest to the fact that the iron working activity was undertaken in the Kormantse settlement and the huge grinding stones in Kormantse were probably initially used as anvils in the smithing activity. This discovery corroborates Penfold's (1971) assertion that the hills around the Coast were inhabited by Fantes who smelted iron prior to the arrival of Europeans. Evidence of iron working has also been found at Akrokowa earth site, Komenda and Coconut grove. The coming of Europeans in the 15th Century is known to have had dire consequences on every aspect of

the African society and indigenous technology was not left out. However , coastal societies were hardest hit than inland societies (Pole, 1974a, p.5). Iron ingots were part of the goods traded by Europeans and according to Pole (1974a) they were cheap and inferior. Goucher (1981, p. 512) intimated that the majority of the iron used in West Africa were manufactured in the region in the 16th Century, and that the imported iron may have fulfilled extra demand. However, by the end of the 19th Century, it was the residue in demand that was obtained from local sources (Goucher, 1981, p. 512). This was the commencement of the demise of the local iron working industry as it gradually began to decline until it became defunct first along the Coast and some years later in the inland societies. Goucher (1981) also mentioned that European technological competition was not the only factor that accounted for the decline and subsequent demise of the industry. Goucher (1981) proposed the ecological impact model as alternative model to the trade impact model by Pole (1974a). A look at the iron working process especially iron smelting in Africa would reveal that it was a very laborious and complex activity which was lengthy and very labour-intensive. For this reason, the cheap and inferior European iron received patronage as it was readily available. In addition, ecological issues related to the deforestation caused by environmental degradation (especially the dependence on charcoal fuels) and increasingly desiccating climatic shifts likely affected the survival of the African metal industry. These pressures of deforestation would have also been intensified by European forest degradation in West Africa (Goucher, 1981, p. 184). The decline and subsequent demise of the African iron industry was achieved by an interplay of factors, thus by both trade and ecological impact models. However, blacksmithing has persisted over the years because it is more related to the crucial role as supplier of equipment for other essential activities, thus to carry out repairs and to forge

implements from scrap iron (McCosh, 1979, p.164) than the production of iron itself (smelting).

6.4 Evidence of Indigenous Technological Activities

The past and present material culture of the people of Kormantse demonstrate technological activities and achievements. The predominance of iron ore, slags, and potsherds widely distributed in the settlement provide an indication of a possible wide scale production activity. The construction of the monumental *posuban* shrines point to artistic skills and craftmanship as well. The presence of large number of potsherds with mica in the fabric as observed during the surface survey that was conducted as well as in the excavated pottery from Kormantse points to a probable past potting industry. The mica in the wares were not applied as a decorative material but was derived from the clay from which the vessels of the ware were made. Mica abounds in soils in coastal settlement and it is likely that pots were locally produced in Kormantse in the past since its soils are mica laden. The different decoration types may also be an indication of the fact that the pottery may have been made by different individual potters with different orientation of skills and styles (Dogbey, 2015) in Kormantse. However, oral tradition does not indicate the existence of a potting industry in the past. According to the people, pots were and are still purchased from the Mankessim market which is also located in the Central Region of Ghana. The presence of large number of sherds on the surface of the land in the old settlement and in the excavations probably reveals the population or family size, large scale production of the pots or extensive use of pots. It also highlights the devastation caused by illegal mining activities (*galamsey*) in recent times in the settlement as digging of the soil for gold could have further fragmented the sherds increasing its quantity.

Similarly, the presence of tuyeres among the excavated cultural materials provides a possible indication of available clay source in the settlement.

6.5 Food Ways and Subsistence Strategies

The excavations carried out at Kormantse yielded direct and circumstantial evidence of the food ways of the inhabitants of Kormantse**.** Material culture such as bones and molluscs as well as palm kernels provide direct insights, whereas pottery, metallic alluminium wares and querns are indirect evidence of Kormantse's food ways. The past inhabitants of Kormantse depended on both aquatic and terrestrial sources of protein to nourish their diet. The terrestrial animals include both wild and domesticated mammals of varying sizes such as antelope (*Antilocapra Americana*), buffalo (*Bubalus bubalis*), deer (*Cervidae*), sheep (*Ovis aries*), goat (*Capra aegagrus hircus*), pig (*sus*), cattle (*Bos taurus*) and horse (*Equus caballus*). Others are rodents of varying sizes such as rat (*rattus*), squirrel (*Sciuridae*), and porcupine (*Erethizon dorsatum*). The exploitation of both domesticated and wild animals by the people of Kormantse pervaded their pre-colonial, colonial and post-colonial periods. Also, the proximity of the settlement to the sea explains why molluscs were the second predominant material (865) retrieved from the excavations. Sea resources such as *Anadara spp.*(Scapharca), *Tympanotus fuscatus* (West African mud creeper), *Archachatina marginata sp.*(giant West African snail), *Crassostrea sp.* (Oyster), *Thais sp* (dog winkle) *and Turritella spp.*(medium-sized sea snails) were integrated in the diets of past inhabitants of Kormantse. Others are *Nerita sp.* (medium-sized to small sea snails), *Thais haemastoma, Olivia sp.* (olive snail), *Donax sp.*(bean clams), *Limicolaria sp.* (tropical air-breathing land snails) *Fussurell nuecula* (cloudy keyhole limpet) *and Perna sp.* There is continuity in the reliance on these aquatic

and some terrestrial sources of protein in contemporary Kormantse. The bones of the various mammals recovered from Kormantse also points to a past economic activity, thus rearing of animals and hunting. The forest surrounding the settlement may have been a habitat for various mammals which facilitated the hunting activities. Currently, pig rearing is a vibrant economic activity in Lower Kormantse, thus those along the coast and is probably an evidence of continuity ofpast subsistence activity of pig rearing.

The recovery of kernels of oil palm or the African oil palm (*Elaeis guineensis*) also hints at the dietary pattern of the past inhabitants of Kormantse. It also points to a past economic activity that has been sustained and continued as the current inhabitants make and sell brooms made out of palm fronds, produce palm oil from the fruit and extract palm wine (local beverage) from the tree for economic living. The fruit and the kernel of the oil palm were both exploited by the past inhabitants of Kormantse for nutritional and medicinal purposes (Owoyele and Owolabi, 2014). This practice is still common among the contemporary inhabitants of Kormantse. In the past, palm oil was purchased by the Europeans as food item on slave ships and as lubricants for machines during the industrial revolution.

Pottery was the most utilized material in Kormantse in the past as it was the dominant material (2,080) recovered from the excavations. The pots that were utilized were spherical with everted rims (jar) and hemispherical with everted, direct and incurved rims (bowls). Gleaning from the rim diameters of the sherds, these jars and bowls ranged from small, medium and large vessels. Local ceramics without base, lid and handle were most popular as few handles, lids and pedestals were obtained. The pots served domestic purposes such as storage vessels, cooking vessels and eating vessels. Bowls are generally

used in food preparation which makes it frequently handled hence prone to breakage. This probably explains why many bowls were recovered from the excavations. Jars on the other hand, are mostly used for storage purposes and are mostly stationary. The bowls and jars recovered were in colours of red, brown, black and grey with either single or multiple surface treatments such as burnished, red slipped and smudged. Based on the predominant surface finish treatment (red slipped and smudged) on the sherds which were represented in almost all the levels of the trenches from which the potsherds were recovered, there was to a large extent a standardization of adopting such surface treatments by the inhabitants or producers of the pots. Also, the presence of mica as a tempering element in the fabric of most of the sherds reveal how producers of the pot made proper use of the minerals which was readily available to them. In terms of decorations, some of the sherds had multiple decorations ranging between two and three decorative patterns while others had single decoration. But the undecorated sherds dominated which suggest that most likely they were used for utilitarian purposes such as eating, storage and cooking bowls. The decorations observed on the sherds were grooves, incision, stamps, roulette, notches and perforation. Sherds with perforations likely served various functional purposes such as steaming or straining food or for keeping and preserving meat. The presence of soot or blackening in the interior and exterior of the sherds recovered is an indication of exposure to fire during cooking. The recovery of the handle of an aluminium pot shows the adoption of aluminium vessels and for that matter European material culture in food preparation but local pots were still prevalent as seen in the archaeological record.

Another indirect evidence of food ways is the querns recovered from the excavations. In

Kormantse, there are both large and small sized grinding stones and the recovery of querns from the excavations gives a complete picture of the use of these stones. These grinding stones were used in the past for grinding both dry and wet substances such as grains and vegetables as observed in some homes in contemporary Kormantse.

6.6 Indigenous Medicine

According to the inhabitants of Kormantse, pots have played and continue to play important role in the preparation of indigenous medicine (herbs) because they are deemed healthier than the aluminum vessels. This assertion was also expressed by respondents in Madina, an urban settlement in Accra (Arkoh, 2017). The pots recovered from Kormantse either small, medium or large could also have been used in the preparation of indigenous medicines for remedying various ailments. Pots used in the preparation of medicine as seen in contemporary Kormantse are locally known as *kukuo* and are globular in shape with everted rim lying on a short neck. The presence of chemicals effective for curing various ailments in sherds recovered from Obosomase in the Eastern Region of Ghana by Asare (2018) is an indication of the extensive use of pottery for medicine preparation in most parts of Ghana. The plants used for medicines were sometimes processed on grindstones which are in abundance and commonly used in the settlement some of which formed part of the material assemblage from the excavations.

6.7 Aspect of Indigenous Religion

The material culture in the excavated assemblage can also be interpreted in line with religious practices, beliefs and values. The faunal remains (molluscs and bones), potsherds and palm kernels recovered from Kormantse also have ritual connotations. The remains of mammals such as goat, cattle and sheep apart from serving as food were also

used for ritual sacrifices. Also, wild mammals such as antelope could have been sacrificed to the deities during festive occasions. Skeletons of an unknown mammal(s) were seen hanging on a tree in one of the shrines in Kormantse. These were probably remains of wild or domesticated sacrificial animals to the deities. Some of these ritual bones could have also gotten into the archaeological record**.** Shells especially cypraea (C*ypraea moneta* and C*ypraea annulus)* apart from being used as currency were also essential material culture in ritual practices in the past and in contemporary Kormantse. Furthermore, the decorative patterns observed on the interior and exterior of the potsherds probably reflect religious purposes of the pots. For instance, in the current settlement, pots with appliques were seen in two shrines in the settlement (**Fig. 4.12)** and this also formed part of the material assemblage from the excavations at Kormantse. Additionally, some of the pots may have served as ritual hearths. Such pots have an opening on their base and had appliques or attachments on them. The presence of soot or blackening in the interior and exterior of the sherds recovered is also an indication of the probable use of some of the sherds as ritual hearths. These pots are still in use in the current settlement (**Fig**. **4.18**). *Ɛtɔ* which is one of the main ritual foods offered in shrines is made from palm oil and mashed yam or plantain and eggs. The palm kernel which is associated with the palm oil may have gotten into the archaeological record as a result of this ritual food.

6.8 Culture Contact

Materials of foreign origin which consisted of European smoking pipes, European ceramics, European beads and European glass fragments formed part of the material culture assemblage and this represents trade relations and culture contact between the

Kormantse's and the Europeans. However, the total number of these materials (451) as compared to local materials were minimal. The imported ceramics obtained were analyzed based on ware type, their decorative patterns, and the chronology.The ware types identified were pearlware, porcelain, stoneware and cream ware. Some of the ceramic types retrieved were Bellarmine bottles (English terminology) or Bartmann Krug (German terminology) or Greybeard stoneware, Rhenish stoneware, creamware, mocha ware, bouquet motif on pearlware, blue and white willow pattern pearlware. These wares which were obtained through trade were probably used for culinary purposes as jugs, jars, plate, cup, bowl and bottles. The materials show that the past inhabitants of Kormantse had contact directly and indirectly with the English and the Dutch based on the origin and dates of the materials.

Imported smoking pipes recovered were more in number than the local ones. The dated pipes were from the 18th and 19th Century and of English and Dutch origin and this is congruent with the history of the site. Handler (2008) argues that European pipes were mostly preferred to African pipes, and that African consumers often discriminated between different European pipes. However, some of the local smoking pipes recovered which were in line with Ozannes typology (Ozannes, 1960) were dated to the 17th Century. This is an indication that the people of Kormantse were not acculturated in the use of foreign smoking pipe prior to the 18th Century.

The glass materials from the Kormantse excavations can be classified into food, liquor, medicine and toiletries. Majority of the glass fragments recovered were not diagnostic enough to facilitate the identification of their origin and chronology. The only bottle that could be dated was ascribed to the middle of the 19th Century to the early 20th Century

and was manufactured in Britain. Past inhabitants of Kormantse patronized European beverages, medicines and ointments. This is evident in the discovery of round bottom bottle, small rounded base bottles, and rolled rimmed bottles. Alternatively, the bottles were probably collected after they were dumped by the Europeans or affluent local inhabitants and reused for secondary purposes such as storing water, palm oil, shea butter, pito (local beer), herbs, bitters or as any other domestic receptacles. In contemporary Kormantse, some farmers store drinking water in large reused beverage bottles. This, they drank while working on the farm. The presence of medicine bottles and containers is probably suggestive of the reliance on foreign medicines in addition to local plant based medicines.

Furthermore, variant coloured glass beads, plastic beads and bauxite beads were obtained from the excavations (**see appendix 6**). The glass beads identified were drawn and mold pressed. The only dated bead obtained was a brick brown mold pressed bead made in Europe (Bohemia) in the early mid-1900s (**web_site** 9). All the beads were of foreign origin except one bauxite bead. Beads were used for aesthetic, religious, ornamental and cultural purposes. They are traditionally worn around the neck, wrist, ankle, waist and fingers for either aesthetic or religious purposes (DeCorse,2001). Beads serve as a symbol of authority when specific types are worn by chiefs and queen mothers in Ghana. In Kormantse, oral traditions revealed that beads featured prominently in the celebration of Okyir festival which is now fused with Ayiriye festival.The beads were adorned all over the body of ladies as they paraded the streets in the community. This activity was meant to attract suitors to the ladies but now this component of the festival has died out probably due to loss of interest in that aspect of the celebration or due to western form of education

and foreign religions. However, in order not to totally forget this aspect of the tradition, only one woman adorns the beads and parades the streets of the town during the festive celebration.

6.9 Rationale for the Use of Slag and Iron Ore in Shrines at Kormantse

The ethnographic and archaeological research has helped to establish four reasons behind the use of iron and slag shrines in Kormantse. African Traditional Religion is the religion that originated in Africa and it is the way Africans relate to the supernatural being (Mligo, 2013). Akan indigenous religious belief system hinges on the concept of a supreme deity and sole creator of the world *Onyame or Nyame* (Creator). *Nyame*, according to the Akans is too great to be reached or worshipped directly because of that intermediaries; deities/*abosom*/lesser gods, spirits and ancestors serve as the link between humanity and God or *Onyame* as well as object of reverence (Blay, 2009; Mbiti, 1990, p.58). These spirits are believed to dwell in shrines. According to Apoh and Gavua (2010, p. 217), there is no standard array of objects or configuration of shrines, however, iron ore and slags are predominant in majority of the shrines in Upper Kormantse. Shrines in Kormantse are in different forms such as cement-block structures, walled trees or an open space shrine. Iron ore and slag constitute the main material culture of all these shrine. The shrines are in varying scale and importance and they serve as community shrines, household shrines and clan shrines. These shrines are concentrated in the old settlement only (**Map 2**), an indication of the antiquity and the importance of African Traditional Religion in the area. It also reflects the resilience of the people of Kormantse in maintaining their African Traditional Religion in the face of the Atlantic influence.

The use of slag and iron ore in shrines in Kormantse is a perpetuation of an age old

practice. The practice of building shrines with iron slag or ore dates back into time according to the oral traditions of the people, since most of the people who have built new shrines with iron slag and ore claimed doing so simply because the practice was handed down to them by their forefathers. Also, majority of the shrines were built so many years ago as gathered from the oral traditions. Again iron ore or slag are used in shrines, because of its availability in the settlement. The slags and ores abound in the Kormantse settlement as seen in the community, even in farms and in the archaeological record. The hills in Kormantse are rich in iron ores as well as the depression area. This could be explained as merely appropriate use of an abundant material in the settlement (Insoll**,** 2006). Also, according to the oral accounts, slag and iron ore are deemed suitable for shrine use owing to the belief that they are sacred and ritual objects imbued with spiritual powers for war and were rained down from the clouds. Their impervious nature makes them ideal for housing spirits. This is evident in some names associated with some of the iron ore and slag shrines such as *Egya Dadeɛ* which means Father of Metal(s) or strong man and *Etuoadze or Otuoadze* means "gun material" or something used to manufacture gun which shows the attribute of the spirits. Mbiti (1990), has also observed that Africans believe they reside in a sacred world, so natural events and objects are closely connected to God. Africans therefore consider natural objects such as rocks and boulders to be the dwelling places of the spirits, the dead or the living dead (Mbiti, 1990, p. 55) just as it pertains in Kormantse. According to Beaudry et al., (1991), context provide meaning and interpretation. Iron slags and ore used in Upper Kormantse as shrines are imbued with medicinal, mystical, and spiritual properties in the context of shrine. Therefore, these iron slag and ores are connected in spiritual expressions and practice as their roles have been renegotiated and redefined according to their secondary context (shrine).

The archaeological research that led to the discovery of remains of iron working activity has offered a unique source of knowledge about contemporary Kormantse and their ties to the past (Rathje, 1979, p.29). This has revealed or confirmed that another rationale for the use of slag and iron ore in shrines at Upper Kormantse which is the old settlement is to preserve the memory of the past iron working history of Kormantse. This is evident in the integration of the iron ore or slag into their indigenous religious activities specifically as shrine paraphernalia in Upper Kormantse. The resilience of the African Traditional Religion has indirectly retained the history of past iron working activities in Kormantse. The fact that the shrines in Kormantse follow exactly the same pattern for years proves their fundamental role in preserving collective memory. It also reveals the activities of contemporary societies who might have inherited past cultural practices. The iron ore and slag shrines can be regarded as mechanisms to keep history cold (González-Ruibal, 2012, p. 26) and the recovery of these same materials in the archaeological record has confirmed its linkage with the people. These ethnographic observations can be explicated as perpetuating in time, meaningful ancestral ways of doing things. Furthermore, it affirms the assertion by Insoll et al, (2009) that shrines especially in the West African contexts appear to serve as symbolic repositories of information as they are vital for recounting history, for remembering important people and events from the past. The use of iron ore and slag in rituals or for religious purposes in Kormantse probably sprung from the association of the whole iron working process with rituals.

Aside the preservation of this history through religion, the community *Asafo* monument also preserves the memory of iron working (specifically black smithing) in the settlement. This makes the *posubans* in Kormantse indeed self-documenting as revealed by Ross

(2007). The presence of a *posuban* which depicts the settlement history of the people and another which depicts iron smithing attest to the fact that the current generation have connections with the people whose history have been depicted in the *posuban*. The *posubans* depicting smithing is known as Nana Adaaban *posuban*. The artistic depictions of a man wielding a hammer raised (believed to be a Priest), an anvil and a furnace (**Fig. 4.21**) gives a clear depiction of a smithing activity in Kormantse. Both smiting and smelting could have been carried out in the settlement but since smelting was done away from the settlement it could not be depicted as smithing which is done in the settlement. The narrative that the Nana Adaaban was a Priest who foretold of wars and made guns in readiness of war could be an indication of the deference that past inhabitants had for blacksmiths or smelters. According to Childs and Herbert (2005, p. 288), smiths like chiefs were feared as potential sorcerers, magicians or wizards because of the power they wielded by reason of their mysterious skills in extracting iron from stones.

Although the iron slags have been referred to as waste or irrelevant and as such are referredto as feaces by the Ngoni of Malawi (McCosh, 1979), there are evidence of its use in some past iron working societies as an important aspect of the society's culture, in the form of religion and ritual purposes as pertains to Kormantse. The association of slag or iron ore with spirits or religion is documented in some African iron working societies such as Igbo (Njoku, 1991), Lawra in the Upper West Region of Ghana and Zanlerigu (Pole, 1974). In the city of Meroe, a temple dedicated to the war god Apedemak is built on a slag mound (Haaland, 2006, p. 147). Another depiction of iron slag in rituals is its use as a burial material which Shepherd (1997) intimates that it ritually symbolizes the corpse as the by-product of a human life transformed by death into a freed and disembodied

spirit and the slag as the by-product of the transformation of iron ore into powerful and dangerous iron. These examples show the association of iron ore and slag with deities and the super naturals as seen in Kormantse. The use of iron ore or slag in rituals has been noted in some past African iron working societies just as has been seen in Kormantse which implies that the Kormantse society was an avid iron working one. It was this activity that produced the abundance of waste or slag which are found everywhere in the settlement. Some residents of Kormantse who are unaware of the process of iron working believe that the slags were carted from another settlement. Also, some say the iron slag existed in the settlement before the arrival of their ancestors implying that they are not descendants of the iron workers. Etsi's (the ancestors of the Kormantses) probably were not iron workers and that iron workers inhabited the settlement prior to the coming of the Etsi's. Also, it could be that the Etsi were iron workers but the history of iron working was not passed down to subsequent generations.

6.10 Conclusion

This archaeological work has yielded relevant finds that bridges the understanding of the current way of life of the people of Kormantse and their past. Also, the study has revealed some insights. First African Traditional Religion shrines doubles as objects or place of worship as well as memory banks. The sacrality of shrines probably accounts for its ability to preserve certain aspect of the past. This provides another perspective for understanding the African Traditional Religion in Kormantse. Secondly, the study has reinforced the importance of archaeology in unearthing history that literature have been silenced on. Importantly, Kormantse has been established through archaeological, ethnographic work and chemical analysis as one of the towns along the southern coast of

Ghana which engaged in iron working activities in the past. The people of Kormantse engaged in both smelting and smithing activities. The smelting activities could have been inefficient owing to the high iron component in the slag, however it is highly probable that the iron ore used was procured from the settlement. The integration of remains of iron working activity into the religious belief of the people of Kormantse has reinforced the fact that iron working activity was shrouded in religious rituals. Lastly, this research has furnished understanding of the nature of the society prior to the coming of the Europeans and this could facilitate the understanding of the type of relationship the people of Kormantse had with Europeans.

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APPENDICES

APPENDIX 1: Questionnaire 1

Name of interviewee
Age
Sex Ethnicity
clan Status
Occupation
Observations
Number of people present
Place
Date

SETTLEMENT HISTORY

1. Where did you migrate from?
2. Who led your ancestors to this site?
3. Why did you settle here?
4. Which events or incidence occurred en route to the new settlement?
5. Are there extant materials which were carried along during the migration?
6. Why is the community called Kormantse?
7. Who were the first settlers?
8. Where is the old settlement located?
9. Why did you migrate from the old site?
10. How old is this settlement?
11. Is there any story that relates the settlement history?
12. What language is spoken by the people of Kormantse?
13. 13.How many languages are spoken in Kormantse?

CLANS

1. How is the society divided?
2. How many clans are there in Kormantse?
3. Name the clans in Kormantse?
4. Where are they found?
5. Who are the leaders of the clans?
6. What is the role of the clan?
7. What materials or animals are associated with each clan?
8. How many ethnic groups are present in Kormantse?
9. Does each ethnic have its own chief/leader?
10. How are chiefs selected in Kormantse?

ECONOMIC ACTIVITIES

1. What is/are the main occupation (s) of the residents?
2. Which one is predominant?
3. What indigenous economic activities existed in the pre-colonial era?
4. Are they still practiced?
5. Which one is associated with males and females?
6. Which economic activities did the Europeans introduce?
7. Are they still being practiced?
8. Why are there so many potsherds on the surface of the land?
9. Are there potters in Kormantse?
10. Were/are there smelters and blacksmiths in Kormantse?

RELIGION

1. Which religious faith do the people of Kormantse adhere to?
2. Which is popular?
3. What kind of religion was practiced before the coming of the Europeans?
4. Which religion (s) did the Europeans introduce?
5. Which one is popular?
6. How many shrines are there in Kormantse?
7. Where are they located?
8. Who are the custodians of the shrines?
9. What are the names of the shrines?
10. What are the roles of the shrines?
11. Which materials are associated with each shrine?
12. Has there been changes in the indigenous religious practices?

FESTIVALS

1. Do the people of Kormantse have any festival(s)?
2. What are the names of the festival(s)?
3. What is the history behind this festival?
4. Why is it celebrated?
5. When is it celebrated?
6. Where is it celebrated?
7. What are some of the practices associated with the celebration?
8. Are there changes the festival celebrated?

MILITARY SYSTEM

1. Who are the Asafo company?
2. What is or are the functions of the Asafo shrine in the society?
3. When were they constructed?
4. What is the meaning of Asafo?
5. How many Asafo companies are there in Kormantse?
6. What is the function of the Asafo company?
7. Which materials are associated with the Asafo company?
8. Which people make up the Asafo company?
9. When did the Asafo company emerge?
10. What were their roles during the pre-colonial era?
11. What is the origin of the Asafo company?
12. What were their roles in the colonial era?
13. Did the coming of the Europeans have any impact on the Asafo company?
14. As there been any changes in the Asafo company?

TRANS-ATLANTIC TRADE

1. Did Kormantse have encounters with the Europeans?
2. Which year or period was that?
3. What role did Kormantse play in the Trans-Atlantic trade?
4. What are some of the impacts of the Trans-Atlantic trade on Kormantse?

RESISTANCE

1. Are there any oral accounts of wars in Kormantse?
2. Do you know about Kormantse's resistance to the building of the trading post?
3. What factors inspired such an action?
4. Which people were involved or spearheaded the revolt?
5. Is there any evidence of this?
6. Why was Kormantse chosen as the location of the first English fort?

APPENDIX 2: Questionnaire 2

Name of respondent
Status in the society Occupation

First *Posuban*

- What is the meaning of Adaaban?
- Who is Nana Adaaban?
- When was it constructed?
- Why was it constructed?
- What role does it play?
- What are the rituals associated with it?
- What are the meanings of the art works depicted?
- What are the uses of the materials in the encircled area?

Second and third *Posuban*

- When was it constructed?
- Why was it constructed?
- What are the rituals associated with it?
- What are the meanings of the artworks depicted?
- Did your fore fathers share memories of iron working with you?
- Has there ever been a black smith in the community?
- Has there been a smelter in the community?

SHRINES

- What are the types of shrine in the settlement?
- Does the location of the shrines have any significance?
- How long have they been in the settlement?
- What is the sex of the deity?
- What are its roles?
- What does the iron ores used to build the shrine signify?
- What is the name of the deity or shrines?
- How long has it been in existence?
- Why are slags used to build shrines?
- What's the use of the slags in the shrine?
- Do u have memories of iron working?
- Are the shrines accessible to all?
- Why are some shrines just slag and others are only ores?
- Who oversees the shrines?

- What are its taboos?
- Who constructed it?
- Is it a community shrine, family or individual shrine?
- What rituals or rites are associated with the shrines and list the materials used?
- Where is the slag or ores gotten from?
- Are there similar shrines down hill?
- What are some of the taboos that are linked to smelting or smithing?
- What other uses are the iron slag or ore put to?
- Why are some shrines built of cement?

APPENDIX 3: Archaeological Bone Identification

Bone Identification by Prof. Daniel Attuquayefio

Lot No.	Label	Number of Bone Pieces	Bone Identification	Animal Type	Possible Animals
1	KTSE 2020 UK2 TR2 L4 (60-80cm) 04/02/2020	8	• Humerus/femur (4) • Unidentified (4)	Mid-sized mammal (3) Large mammal (1)	Antelope, sheep, goat, dog, cat Pig, cattle, buffalo
2	KTSE 20 UK2 TR1 L5 2/2/2020	1	• Vertebra	Mid-sized mammal (1)-Antelope	Antelope, sheep
3	KTSE 20 UK2 TR2 L2 (20-40cm) 2/4/2020	3	• Humerus/femur (2) • Unidentified artefact	Large rodent	Giant rat, porcupine, squirrel
4	KTSE 2020 UK2 TR2 Level 3 (40-60cm) 4/02/20	6	• Vertebrae (3) • Rib (1) • Carpal/tarsal (1) • Humerus (part) (1)	Rodent (2) Mid-sized mammal (1) Large rodent (giant rat) Mid-sized mammal Mid-sized mammal	Mouse, rat Antelope, sheep, goat Giant rat, porcupine Antelope, deer, sheep, goat, dog Antelope, deer, sheep, goat, dog
5	KTSE 2020 UK2 TR1 L2 (20-40cm) 1/31/2020	1	• Vertebra	Mid-sized mammal	Antelope, sheep, goat, dog, cat

6	KTSE 20 UK2 TR1 L7 (120-140cm) 2/2/2020	8	• Vertebrae (3) • Teeth (3) • Humerus (part) (2)	Large mammal (1) Mid-sized mammal (2) Large herbivorous mammal Mid-sized mammal (1) Rodent (1)	Horse, cattle Antelope, sheep, goat, dog, cat Horse, cattle, buffalo Antelope, deer, goat, dog, cat Mouse, rat
7	KTSE 20 UK2 (Farm) TR2 L12 (220-240cm) 2/6/2020	1	• Vertebra	Mid-sized mammal	Antelope, deer, sheep, goat, dog
8	KTSE 20 UK2 TR1 L4 (60-80cm) 2/2/2020	2	• Vertebra (1) • Humerus/femur (1)	Mid-sized mammal Rodent	Antelope Rat, mouse
9	KTSE 2020 UK2 TR2 L1 (0-20cm) 04/02/20		• Unidentified		
10	KTSE 20 UK2 TR1 L3 (40-60cm) 2/1/2020	2	• Humerus/femur (2)	Small rodent	Mouse
11	KTSE 20 UK2 TR1 L4 (60-80cm) 1/2/2020	4	• Humerus/femur (4)	Mid-sized mammal	Antelope, deer, sheep, goat, dog
12	KTSE 20 UK2 TR2	1	• Vertebra	Mid-sized mammal	Antelope, deer, sheep, goat, dog

	L6 (100-120cm) 1/2/2020				
13	KTSE 2020 UK2 TR2 L1 (0-20cm) 4/2/2020	10	• Vertebrae (4) • Humerus/femur (2) • Unidentified (4)	Mid-sized mammal Mid-sized mammal	Antelope, deer, sheep, goat, dog
14	KTSE 2020 UK2 TR2 L8 5/2/2020	3	• Humerus/femur (1) • Unidentified (4)		
15	KTSE 2020 UK2 TR2 L3 4/2/2020	3	• Humerus/femur (2) • Unidentified (1)	Mid-sized mammal	
16	KTSE 2020 UK2 TR2 L5 (80-100 cm) 5/2/2020	11	• Tooth (2) • Lower jaw/tooth (1) • Vertebra (1) • Rib (1) • Humerus/femur (2) • Unidentified artefacts (2)-shell?	Mid-sized herbivore (1) Large herbivore (1) Mid-sized herbivore Mid-sized rodent Small rodent Mid-sized mammal	Antelope, deer, sheep, goat Horse, cattle Antelope, deer, sheep, goat Rat, squirrel Mouse Antelope, deer, sheep, goat, dog
17	KTSE 2020 UK2 T2 L10 (180-200 cm) 6/2/2020	2	• Vertebrae (2)	Mid-sized mammal	Antelope, deer, sheep, goat, dog
18	KTSE 2020 UK2 TR1 L4 (60-80 cm) 2/2/2020	1	• Humerus/femur (1)	Mid-sized rodent	Rat, squirrel

19	KTSE 2020 UK2 TR1 L5 (80-100 cm) 3/2/2020	2	• Vertebrae (2)	Large mammal	Horse, pig, cattle
20	KTSE 2020 UK2 TR2 L6 (100-120 cm) 5/2/2020	10	• Humerus/femur (5) • Tibia/radius (3) • Unidentified (2)	Mid-sized mammal (4) Large rodent (1) Mid-sized mammal (4)	Antelope, deer, sheep, goat, dog Giant rat Antelope, deer, sheep, goat, dog
21	KTSE 2020 UK2 TR2 L7 (120-140 cm) 5/2/2020	3	• Vertebra (1) • Humerus (2)	Mid-sized mammal Rodent	Antelope, deer, sheep, goat, dog Mouse, rat, squirrel
22	KTSE 2020 UK2 TR1 L3 (40-60) Smoking Pipe	1	• Unidentified artefact		
23	KTSE 2020 UK2 TR2 L11 6/2/2020	1	• Humerus/femur (1)	Large rodent	Giant rat, porcupine
24	KTSE 20 UK2 TR1 L5 1/2/2020	2	• Upper jaw with cheek teeth (1) • Unidentified (1)	Mid-sized herbivore	Antelope, deer, sheep

APPENDIX 4: Diagnostic bowl and stem fragments retrieved from the Loci

PART OF SMOKING PIPE	DESCRIPTION AND CHRONOLOGY	COUNT	PROVINIENCE
	It has the inscription DA written on one side of the stem presumably 'DAFT', which represents the markers' name,	1	Locus 1, Level 5

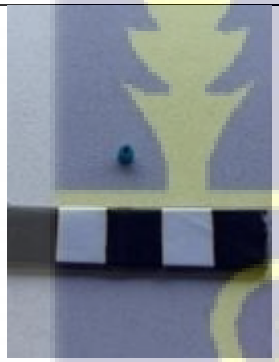
	Henry or William Daft of Nottingham. Dated to 1848 or 1874, England (Oswald, 1975, p. 78)		
	It has an encircled gryphon relief stamped or moulded on the stem of a smoking pipe. Dating from 1700-1720 Chester, England (Web site 5).	1	Locus 2, Level 3

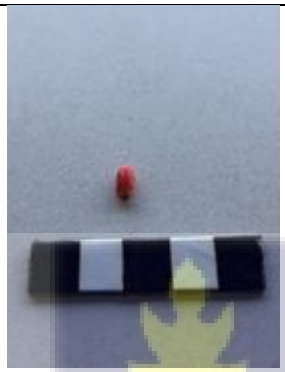
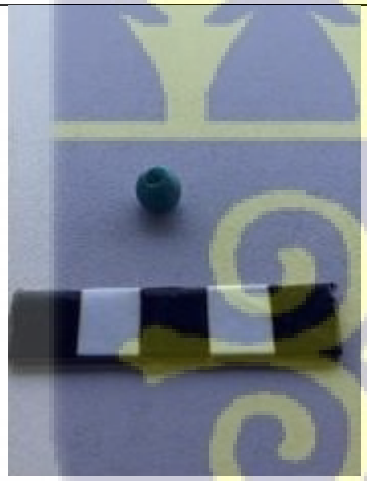
	It has a crowned L on the base of the heel and an S superimposed on a Gouda shield with a human figure with raised hands on both sides of the heel. Dutch origin (Engman, 2008)	1	Locus 2, Level 2
	A coffee coloured bowl with botanical motif. Dated to 19th Century (Walker, 1975)	1	Locus 2, Level 5

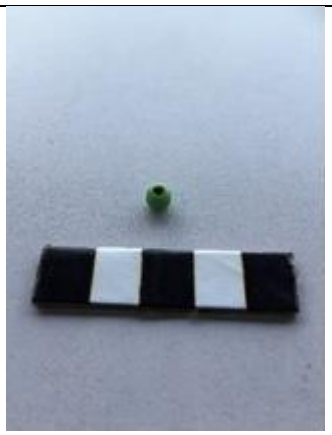
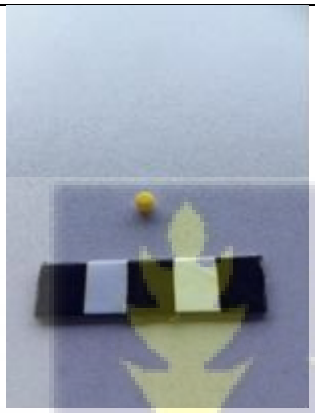
APPENDIX 5: Summary of ceramic types excavated from Locus 1 and 2

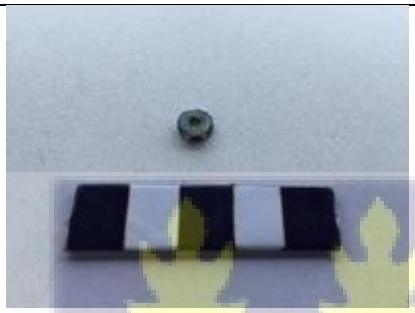
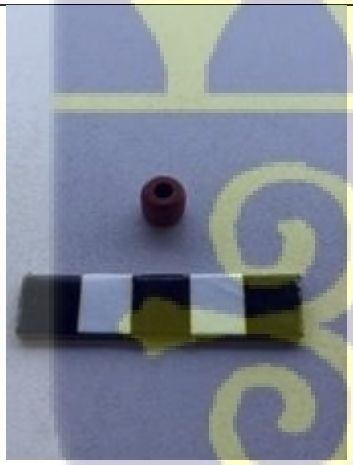
LOCUS	Level	QUANTITY	WARE	DECORATION	FUNCTIONAL TYPE	DATE
Locu2 Trench 1	1	5	Creamware	Mocha ware	a jar	1799
	2	1		Floral motif	a plate	
	4	2		Floral motif	a bowl	
	6	1		Floral motif	a bowl	
Locus 2 Trench 1	2	1	Pearlware	floral motif	a plate	
	3	1		bouquet	a plate	1826
	5	1		blue flow	a plate	
	6	1		blue flow	a plate	
	6	1		willow	a plate	1795
Locus 1 Trench 1	2	1	Stoneware	brown bottle	a bottle	
Locus 2 Trench 1	5	1		grey and blue bottle	a bottle	
	6			brown bottle	a bottle	1550
	7			brown bottle	a bottle	between 1650 and 1775
Locus 1 Trench 1	3	1	True porcelain	floral motif	a plate	
Locus 2 Trench 1	6	1		floral motif		

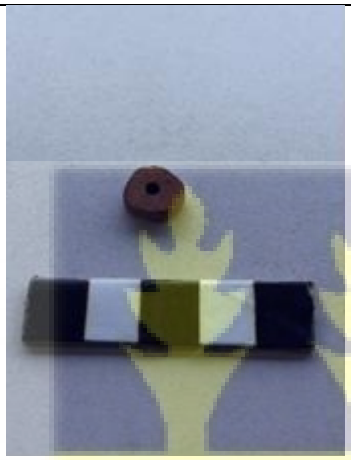
APPENDIX 6: Table 6.37: Summary description of beads recovered from the excavations

TYPE OF BEAD	PICTURE	DESCRIPTION	QTY	PROVENIENCE
Glass bead		Brown tubular drawn bead decorated with white and blue coloured spirals	1	Locus 2 Level 5
Glass bead		Turkish blue tubular drawn bead	1	Locus 2 Level 5
Glass bead		White oval wound bead with white vertical stripes	1	Locus 2 Level 3

Glass bead		Yellow oval wound bead	1	Locus 2 Level 3
Glass bead		Red oval wound bead	1	Locus 1 Level 7
Glass bead		Turkish blue globular wound bead	1	Locus 2 Level 3

Glass bead		Green globular wound bead	1	Locus 2 Level 3
Glass bead		Yellow globular wound bead	1	Locus 2 Level 5
Glass bead		White globular wound bead with blue vertical stripes	1	Locus 2 Level 5

Glass bead		White circular mould-pressed bead	1	Locus 1 Level 3
Glass bead		Circular mould-pressed bead with stripes of white, blue and red	1	Locus 1 Level 7
Glass bead		Brick brown mould-pressed bead. Bohemian bead dated to the mid-1900s	1	Locus 1 Level 3

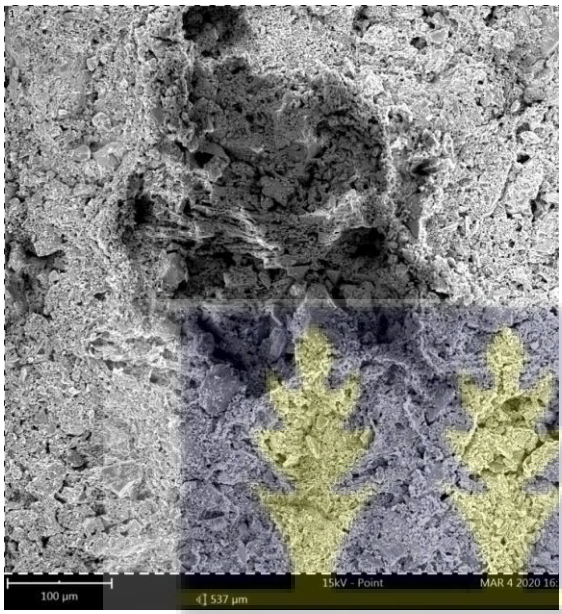
Glass bead		White mould-pressed bead with black spots	1	Locus 2 Level 3
		Bauxite bead	1	Locus 2 Level 3

APPENDIX 7: Tuyeres

SEM - EDX results produced by Dora Fianyo (Laboratory technician), Department of Earth Science, University of Ghana (UG). The lab results are in the form of Back scatter images of region analysis of tuyeres and percentages of elements present in them

LOCUS 1, Level 4

1. Region



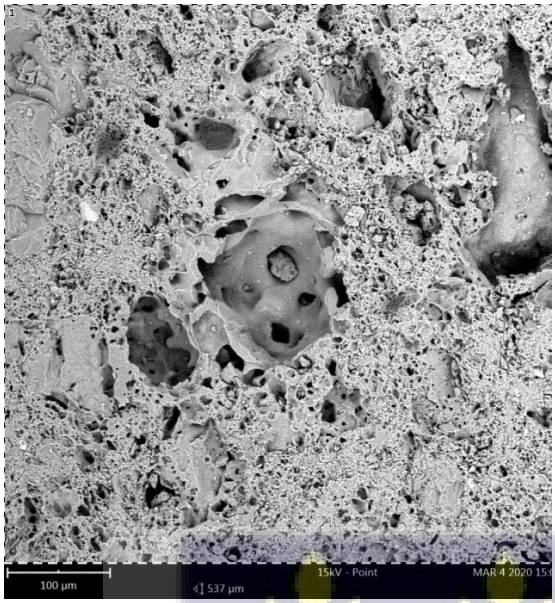
Element Symbol	Atomic Conc.	Weight Conc.	Oxide Symbol	Stoich. wt Conc.
O	54.99	47.24		
Si	14.61	22.03	Si	41.76
C	20.69	13.34	C	25.28
Al	4.75	6.88	Al	13.04
Fe	1.89	5.68	Fe	10.76
Na	1.15	1.42	Na	2.69
Mg	0.96	1.25	Mg	2.37
Ca	0.47	1.02	Ca	1.94
Ti	0.24	0.61	Ti	1.16
K	0.26	0.54	K	1.02

2. Region

Element Symbol	Atomic Conc.	Weight Conc.	Oxide Symbol	Stoich. wt Conc.
O	60.02	52.68		
Si	20.97	32.31	Si	68.29
C	15.96	10.52	C	22.22
Al	1.63	2.41	Al	5.09
Mg	0.62	0.83	Mg	1.75
Na	0.56	0.71	Na	1.50
Ca	0.16	0.36	Ca	0.77
K	0.09	0.18	K	0.39

LOCUS 1 TRENCH1, LEVEL 5

1. Region



Element Symbol	Atomic Conc.	Weight Conc.	Oxide Symbol	Stoich. wt Conc.
O	61.83	45.85		
Si	20.67	26.90	Si	49.68
Al	12.43	15.54	Al	28.70
Fe	3.36	8.69	Fe	16.05
K	0.50	0.90	K	1.67
Ca	0.46	0.86	Ca	1.59
Ti	0.37	0.82	Ti	1.51
Mg	0.39	0.44	Mg	0.81

2.Region

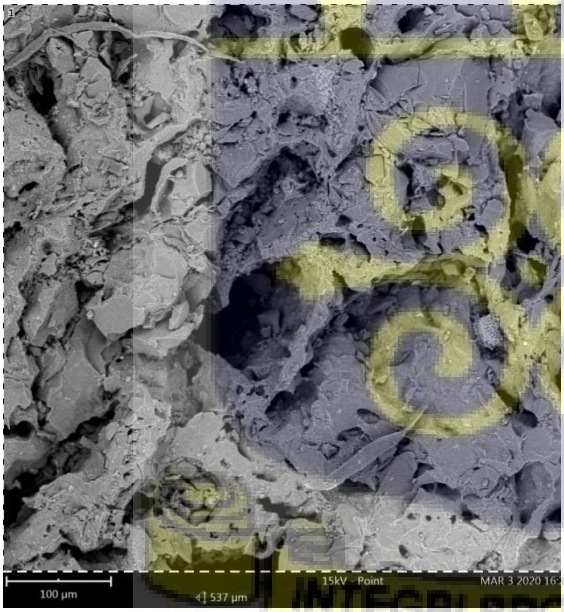
Element Symbol	Atomic Conc.	Weight Conc.	Oxide Symbol	Stoich. wt Conc.
O	56.25	48.62		
Si	24.98	37.89	Si	73.75
C	17.71	11.49	C	22.36
Al	0.77	1.12	Al	2.19
Fe	0.29	0.88	Fe	1.71

LOCUS 1 LEVEL 6

1. Region

Element Symbol	Atomic Conc.	Weight Conc.	Oxide Symbol	Stoich. wt Conc.
Fe	24.67	46.49	Fe	62.38
O	47.19	25.48		
Si	20.02	18.98	Si	25.47
Al	4.32	3.93	Al	5.27
Ca	2.84	3.84	Ca	5.15
K	0.97	1.28	K	1.72

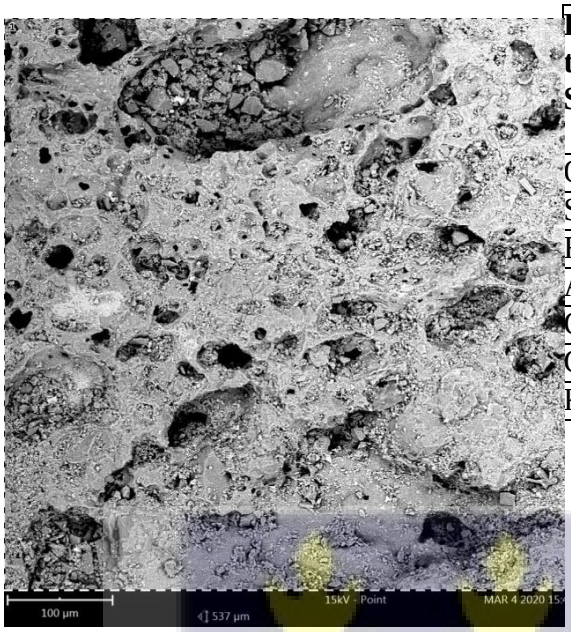
2. Region



Element Symbol	Atomic Conc.	Weight Conc.	Oxide Symbol	Stoich. wt Conc.
O	51.01	43.16		
Si	15.03	22.32	Si	39.27
C	18.74	11.90	C	20.94
Al	6.19	8.83	Al	15.54
Fe	2.55	7.53	Fe	13.25
N	4.60	3.41	N	6.00
Mg	0.67	0.86	Mg	1.51
Na	0.60	0.73	Na	1.28
K	0.31	0.65	K	1.14
Ca	0.28	0.60	Ca	1.06

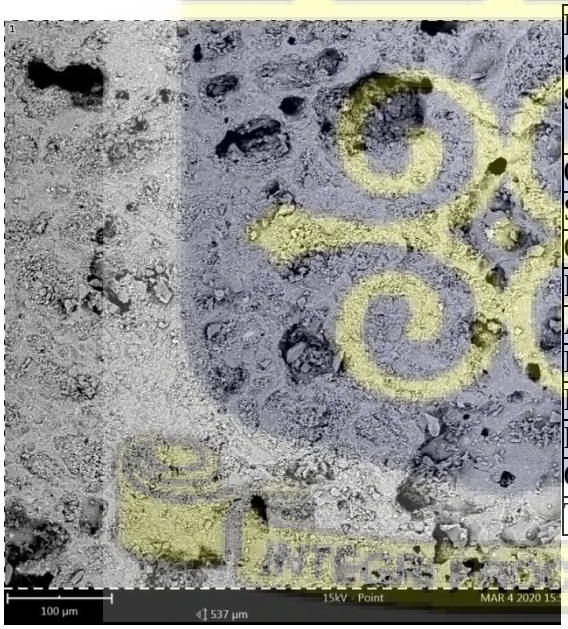
LOCUS 2, LEVEL 11

1. Region



Element Symbol	Atomic Conc.	Weight Conc.	Oxide Symbol	Stoich. wt Conc.
O	51.12	39.37		
Si	20.29	27.44	Si	45.25
Fe	4.60	12.37	Fe	20.40
Al	8.05	10.46	Al	17.26
C	15.08	8.72	C	14.38
Ca	0.51	0.98	Ca	1.61
K	0.35	0.67	K	1.10

2.Region

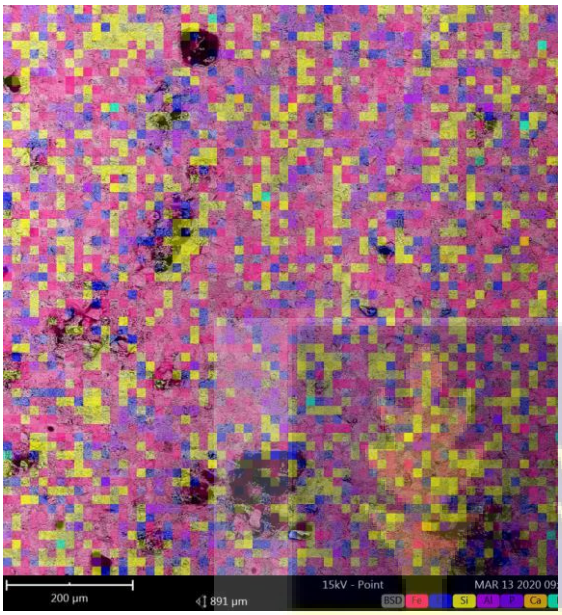


Element Symbol	Atomic Conc.	Weight Conc.	Oxide Symbol	Stoich. wt Conc.
O	48.16	38.42		
Si	17.79	24.91	Si	40.45
C	19.87	11.90	C	19.33
Fe	3.67	10.23	Fe	16.61
Al	7.35	9.89	Al	16.06
Mg	1.07	1.30	Mg	2.11
Na	0.97	1.12	Na	1.81
K	0.51	0.99	K	1.61
Ca	0.49	0.98	Ca	1.60
Ti	0.11	0.26	Ti	0.42

APPENDIX 8: Slags

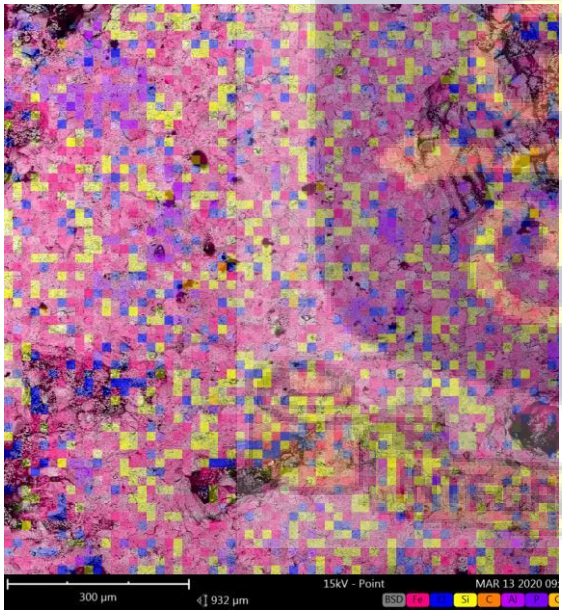
SEM - EDX results produced by Dora Fianyo (Laboratory technician), Department of Earth Science, University of Ghana (UG). The lab results are in the form of Back scatter images of region analysis of slags and percentages of elements present in them.

LOCUS 1 LEVEL 3ACombined map



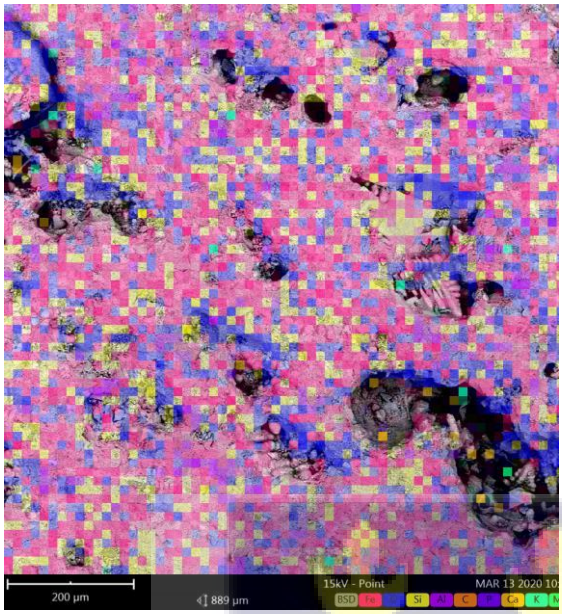
Element Symbol	Atomic Conc.	Weight Conc.	Oxide Symbol	Stoich. wt Conc.
Fe	37.14	60.58	Fe	72.63
O	35.50	16.59		
Si	13.53	11.10	Si	13.31
Al	9.60	7.56	Al	9.07
P	2.87	2.60	P	3.12
Ca	0.96	1.12	Ca	1.34
K	0.39	0.45	K	0.54

LOCUS 1 LEVEL 3BCombined map



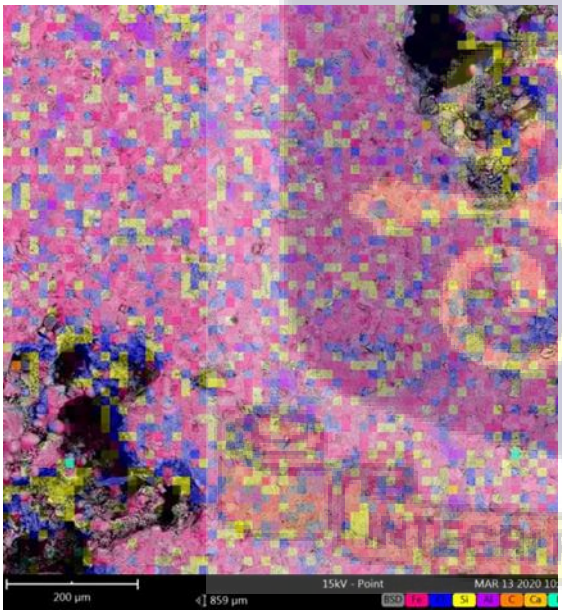
Element Symbol	Atomic Conc.	Weight Conc.	Oxide Symbol	Stoich. wt Conc.
Fe	35.80	62.45	Fe	75.14
O	33.77	16.88		
Si	10.09	8.85	Si	10.65
C	12.62	4.74	C	5.70
Al	4.76	4.01	Al	4.83
P	2.25	2.17	P	2.61
Ca	0.71	0.89	Ca	1.08

LOCUS 1 LEVEL 3C Combined map



Element Symbol	Atomic Conc.	Weight Conc.	Oxide Symbol	Stoich. wt Conc.
Fe	27.98	53.71	Fe	70.83
O	43.95	24.17		
Si	10.51	10.14	Si	13.38
Al	5.92	5.49	Al	7.24
C	9.38	3.87	C	5.11
P	0.99	1.05	P	1.38
Ca	0.57	0.79	Ca	1.04
K	0.37	0.49	K	0.65
Mg	0.34	0.29	Mg	0.38

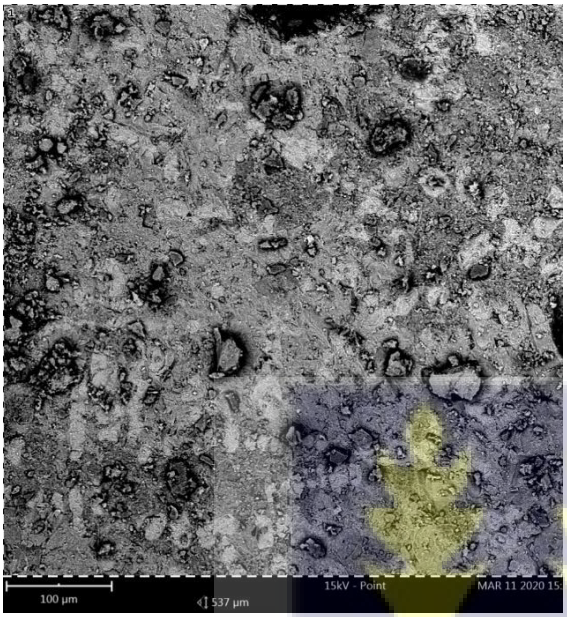
LOCUS 1 LEVEL 3D Combined map



Element Symbol	Atomic Conc.	Weight Conc.	Oxide Symbol	Stoich. wt Conc.
Fe	32.37	58.54	Fe	74.73
O	41.82	21.67		
Si	12.03	10.94	Si	13.97
Al	5.71	4.99	Al	6.37
C	7.25	2.82	C	3.60
Ca	0.52	0.67	Ca	0.85
K	0.30	0.38	K	0.48

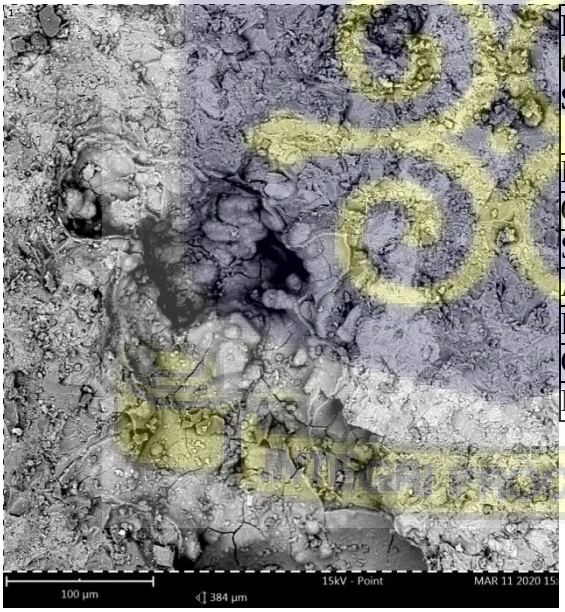
LOCUS 1, LEVEL 6A

1. region



Element Symbol	Atomic Conc.	Weight Conc.	Oxide Symbol	Stoich. wt Conc.
Fe	30.47	54.55	Fe	71.49
O	46.18	23.69		
Si	15.20	13.68	Si	17.93
Al	5.62	4.86	Al	6.37
Ca	1.28	1.64	Ca	2.15
K	1.25	1.57	K	2.06

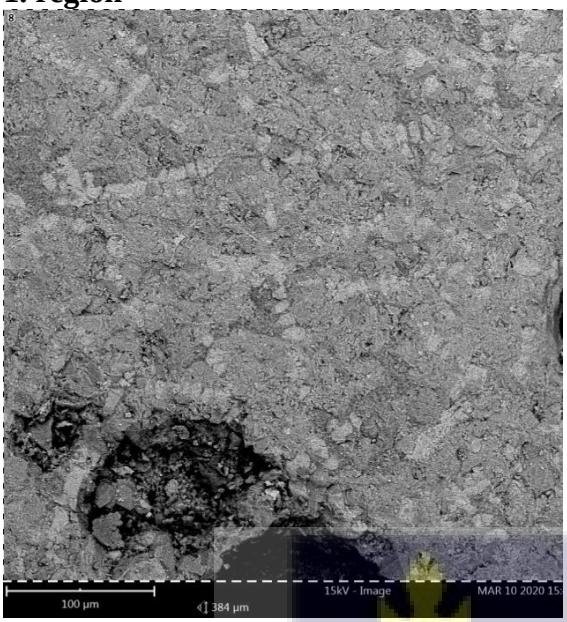
2. region



Element Symbol	Atomic Conc.	Weight Conc.	Oxide Symbol	Stoich. wt Conc.
Fe	31.02	55.81	Fe	74.00
O	47.69	24.58		
Si	13.39	12.12	Si	16.07
Al	5.60	4.87	Al	6.45
P	1.14	1.14	P	1.51
Ca	0.83	1.07	Ca	1.41
K	0.33	0.42	K	0.56

LOCUS 1, LEVEL 6B

1. region

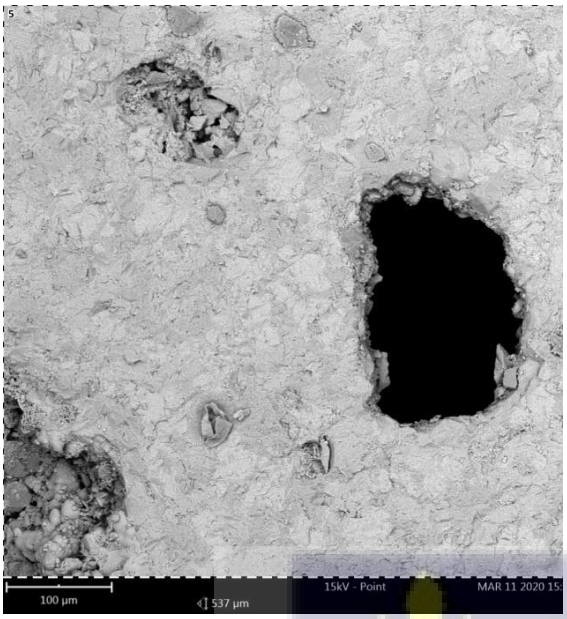


Element Symbol	Atomic Conc.	Weight Conc.	Oxide Symbol	Stoich. wt Conc.
Fe	14.70	38.39	Fe	52.80
O	36.48	27.29		
B	20.08	10.15	B	13.96
Si	6.08	7.98	Si	10.98
C	13.49	7.58	C	10.42
N	5.35	3.51	N	4.82
Al	2.54	3.20	Al	4.41
Na	0.63	0.68	Na	0.93
K	0.36	0.66	K	0.91
Ca	0.30	0.56	Ca	0.77

2. region

Element Symbol	Atomic Conc.	Weight Conc.	Oxide Symbol	Stoich. wt Conc.
Fe	26.64	52.37	Fe	69.41
O	43.56	24.54		
Si	11.33	11.21	Si	14.85
C	12.05	5.09	C	6.75
Al	3.99	3.79	Al	5.03
P	1.34	1.46	P	1.93
Ca	0.83	1.17	Ca	1.55
K	0.26	0.36	K	0.48

1. LOCUS 1, LEVEL 8 (region 1)



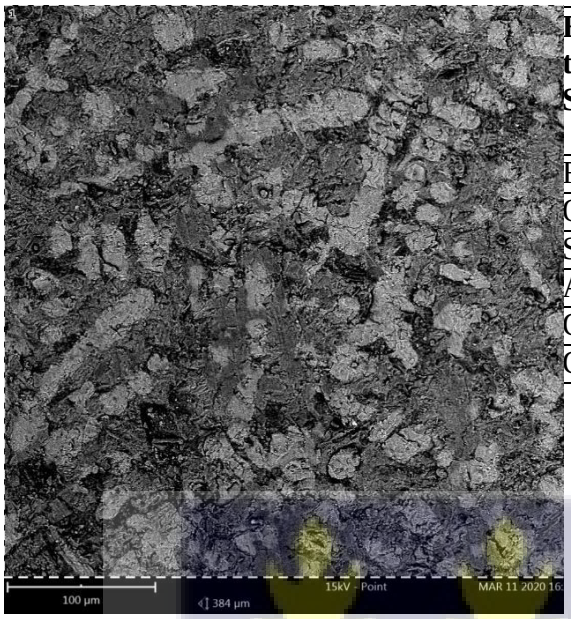
Element Symbol	Atomic Conc.	Weight Conc.	Oxide Symbol	Stoich. wt Conc.
Fe	30.81	56.92	Fe	71.65
O	38.85	20.56		
Si	10.08	9.36	Si	11.79
Al	7.24	6.46	Al	8.14
C	11.11	4.42	C	5.56
Ca	0.88	1.17	Ca	1.47
K	0.60	0.77	K	0.97
Mg	0.42	0.34	Mg	0.43

2. region

Element Symbol	Atomic Conc.	Weight Conc.	Oxide Symbol	Stoich. wt Conc.
Fe	37.91	62.96	Fe	78.76
O	42.16	20.06		
Si	11.74	9.81	Si	12.27
Al	6.60	5.29	Al	6.62
Ca	1.25	1.49	Ca	1.86
K	0.34	0.39	K	0.49

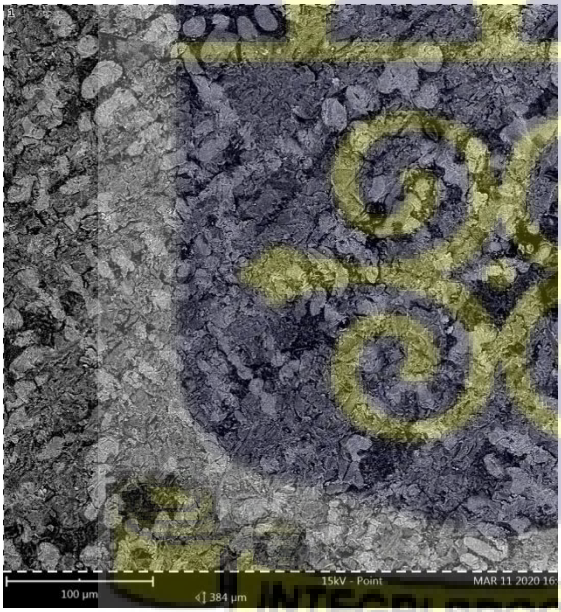
LOCUS 1, LEVEL 9

1. region



Element Symbol	Atomic Conc.	Weight Conc.	Oxide Symbol	Stoich. wt Conc.
Fe	33.57	60.71	Fe	78.98
O	44.64	23.13		
Si	10.24	9.32	Si	12.12
Al	3.61	3.15	Al	4.10
C	7.27	2.83	C	3.68
Ca	0.67	0.86	Ca	1.13

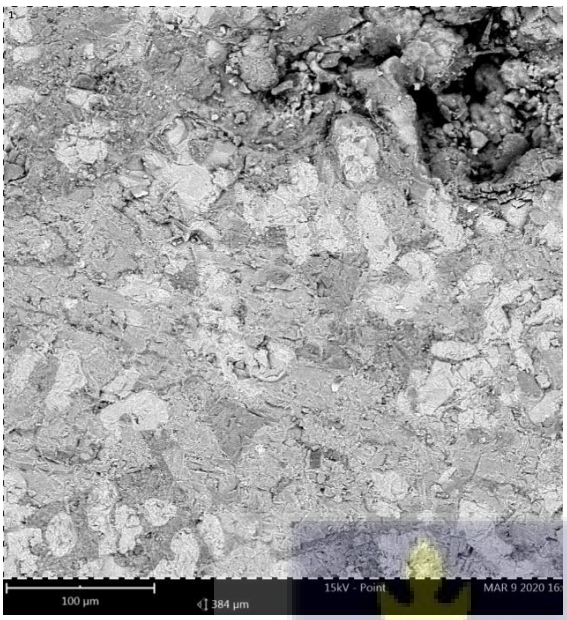
2. Region



Element Symbol	Atomic Conc.	Weight Conc.	Oxide Symbol	Stoich. wt Conc.
Fe	35.24	60.27	Fe	76.92
O	44.16	21.64		
Si	12.49	10.74	Si	13.71
Al	4.78	3.95	Al	5.04
Ca	0.96	1.18	Ca	1.51
P	1.12	1.06	P	1.35
K	0.50	0.59	K	0.76
Mg	0.76	0.56	Mg	0.72

LOCUS 2, LEVEL 11a

1. region



Element Symbol	Atomic Conc.	Weight Conc.	Oxide Symbol	Stoich. wt Conc.
Fe	30.20	56.45	Fe	75.24
O	46.64	24.98		
Si	10.44	9.82	Si	13.09
Al	3.92	3.54	Al	4.72
C	6.55	2.63	C	3.51
P	1.41	1.47	P	1.95
Ca	0.84	1.12	Ca	1.49

2. region

Element Symbol	Atomic Conc.	Weight Conc.	Oxide Symbol	Stoich. wt Conc.
Fe	27.40	53.01	Fe	70.47
O	44.69	24.77		
Si	10.56	10.27	Si	13.66
Al	4.78	4.47	Al	5.94
C	9.91	4.12	C	5.48
Ca	1.16	1.61	Ca	2.14
P	1.03	1.11	P	1.47
K	0.47	0.64	K	0.85