LATE IRON AGE ECONOMIES OF MOUNT KENYA REGION

A case study of Kiburu, Kangai and Kanyua archaeological sites

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By

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Cover: Kiburu Hill Side

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ABSTRACT

Earlier Iron Age investigations in Kenya concentrated on the Lake Victoria Basin and the coast of Kenya, mainly focusing on origins and technological aspects of iron, with brief statements on economies. The pioneering work on Iron Age in the Mt. Kenya region was part of the British Institute of East Africa "Bantu Studies Project" which was primarily established to conduct research related to Bantu speakers culture. During this project, both Kwale ware (a Bantu speakers pottery) and Gatung'ang'a/Maore pottery (makers unknown) were found in the same archaeological contexts in both Mt. Kenya region and North eastern Tanzania. Although it could not be ascertained that the same cultural groups made Gatung'ang'a and Kwale ware, it was generally assumed that Gatung'ang'a ware is a pottery of Bantu speakers. This interpretation does not only have consequences on pottery chronology, and inhabitants of the region but also it has effectively obscured studies related to Iron Age economies of Mt. Kenya region since the economy of Bantu speakers is generally accepted as cultivation.

I have demonstrated that, Gatung'ang'a pottery might not be a product of Bantu speakers using excavated archaeological materials from Kiburu, Kangai and Kanyua sites in Mt. Kenya region, and other Iron Age materials excavated earlier. In addition, I have used historical, oral and linguistic sources as complementary sources to indicate that Mt. Kenya region was occupied by communities that practiced both hunting and herding economies, and engaged in trade with the coast.

I recommend that, in order to make more informed choices about the pottery and the economies of the Mt. Kenya region, further research and chronology of Mt. Kenya pottery should be established so that Gatung'ang'a pottery can be put in its rightful place. This will provide conclusive evidence on economies and inhabitants of the region. In addition, systematic surveys and excavations covering the 500-kilometer region between Mt. Kenya area and the coast would be an important contribution towards our understanding of early trade connection between the two regions.

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1. INTRODUCTION

1.1 Background

Since the pioneering work of LSB Leakey in the early 1930s, significant contributions to our understanding of human origins and Stone Age cultures in particular, have been achieved in Kenya. The sites bearing materials with Stone Age evidence in Kenya are found along the Rift Valley region; hence, the Rift Valley became the preferred area of archaeological research, leaving most of Kenya unexplored. Not until 1965 did the British Institute in East Africa (BIEA), engage in Iron Age studies with special emphasis to Bantu speakers. (Bantu is a language that is spoken in most parts of Central, East and Southern Africa). Earlier research had shown that the Bantu speakers brought with them the knowledge of Iron working technology, agriculture and settlement, which Phillipson (1993) named the "Chifumbaze complex". The Chifumbaze complex was archaeologically identified through a common pottery tradition that included Urewe, Lelesu and Kwale wares in East Africa. This pottery tradition is found around the interlacustrine and coastal regions except for Lelesu ware, which is found in central Tanzania. The aim of BIEA at the time was to offer archaeological evidence showing expansion of Bantu speakers in East Africa. The Early Iron Age research, therefore, was concentrated on the interlacustrine and coastal regions leaving the interior and the highlands of Kenya unexplored.

Through surveys and minor excavations, Iron Age research in the highlands of Kenya has investigated pottery of traditions in this region and attributed it to Bantu speakers. Hence, it appears that, the economies of Iron Age in Mt. Kenya region were based on Agriculture. However, agriculture has not been evident in either the site structures or the recovered materials. Evidence that I will discuss later in this thesis also suggests that Bantu speakers did not make the Iron Age pottery of Mt. Kenya. Hence, Iron Age economies of Mt. Kenya region may not be well understood.

The question I wish to address is of economies and the inhabitants of Mt. Kenya region during the Iron Age. Economies in this context include all the means of subsistence, trade, and exchange, which are evident from archaeological material and the structure of the archaeological sites in the region. The purpose of this research is to identify who the inhabitants were, whether farmers, pastoralists or hunter-gatherers rather than language groups.

The Kikuyu who live in Nyeri, Murang'a and Kiambu districts, and Meru, Tharaka, Chuka, Embu and Mbeere currently occupy Mt. Kenya region as shown in Figure 1. The earliest dates for Iron Age sites around the Mount Kenya region are from Gatung'ang'a site in Nyeri. Five radiocarbon samples from Gatung'ang'a site were analysed in the Department of Geology, University of Helsinki with the following results: 810±130 B.P., 820±130 B.P., 850±150 B.P., 690±100 B.P., and 600±80 B.P. (Siiriainen 1971, p. 205). These dates included both what Siiriainen conceded as Kwale and Gatung'ang'a ware. The pottery in this region shows traits of Kwale ware, generally accepted as belonging to Bantu-speakers e.g. Soper (1967a), but in the Mt. Kenya region, Kwale ware and Gatung'ang'a pottery always occur in association (Siiriainen 1971; Soper 1979; Cummings 1978). Unlike Kwale ware, archaeologists have reluctantly assigned Gatung'ang'a pottery to Bantu speakers since it does not conform to any known pottery of Bantu speakers and there is no evidence to show that Kwale ware and Gatung'ang'a ware were made by culturally different people. Compared to third century A.D. dates obtained by (Soper 1967a) from Kwale type-site, eleventh to fourteenth century dates for Kwale ware in Mt. Kenya region are too late. In addition to the constant association of Mt. Kenya region Kwale with Gatung'ang'a ware, and the discrepancy in the dates with Kwale type-site, history and oral traditions suggest that the Bantu speakers occupying this region, arrived here between the 16th and 18th centuries A.D. (Muriuki 1974). Moreover, there has not been any evidence of linkage between the Iron Age potteries with present day pottery of the Bantu speakers in the area.

Likewise, linguistic evidence has not accounted for the late arrival of the Bantu speakers in this region, since they left their place of origin during the last millennium B.C. (Phillipson 1977, p. 227). They have termed the Bantu language spoken in this region as conservative and still undergoing sound shift that occurred in other Bantu languages more than one thousand years ago (Nurse 1982). Despite the shortfalls of correlations between Archaeology and other disciplines like linguistic, history and oral traditions, I will use them as complementary sources of information to put into perspective the current situation of Mt. Kenya region economy and its' inhabitants. Marshall (1990) noted that the problem such correlations is that linguists, historians, ethnographers, and archaeologists use different kinds of information, and therefore, group cultures in different ways than archaeology.

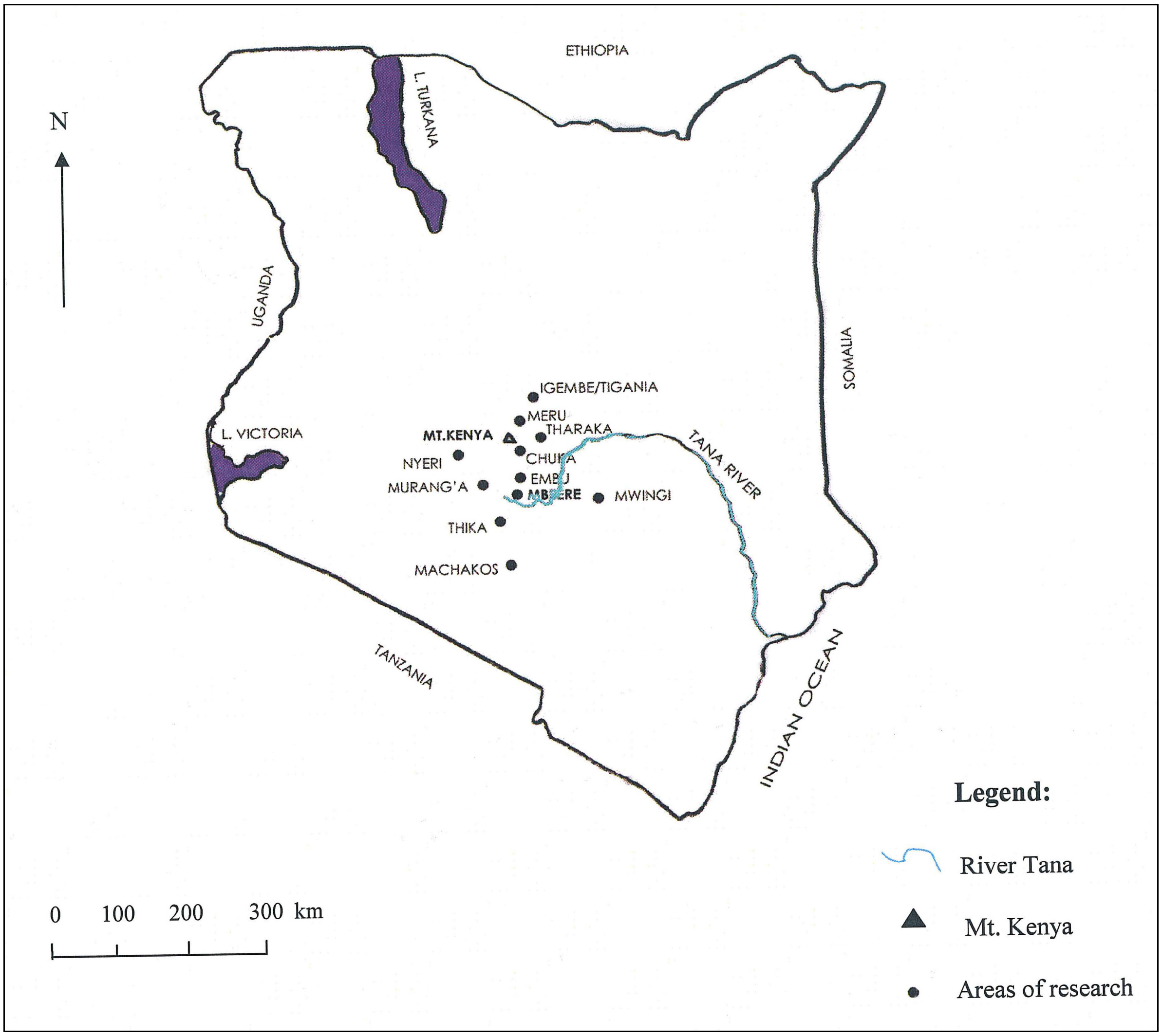

Figure 1 Map showing Mt. Kenya region

Assigning Mt. Kenya pottery to Bantu speakers would suggest that a population that was practicing agricultural economy inhabited Mt. Kenya region during the Iron Age, since the Bantu speakers are agriculturalists. In my attempt to shed more light to the economies, I excavated Kangai, Kanyua and Kiburu Iron Age sites in Mbeere area of Mt. Kenya region, to find more supportive evidence since what was available in the stores of National Museums of Kenya was not sufficient. Kangai site produced iron furnace, fragments of tuyere, slag and pottery, Kanyua produced only tuyeres and slag while the most interesting in relation to the economies was Kiburu site, since it produced Gatung'ang'a pottery, beads, cowry shells, bones and complete iron ornaments, hammer stones and grindstones. The 11th to 14th century A.D. radiocarbon dates obtained by both Siiriainen (1971) for Gatung'ang'a site and calibrated dates; 1000 AD, 1490 A.D. and 1430 A.D. by Soper (1976) for Chyulu hills site were used to approximate the age of Kiburu, Kangai and Kanyua sites. Thus, the period under investigation lies between 11th and 15th century A.D.

I have attempted to reconstruct the Late Iron Age economies of this region and to identify the probable inhabitants but it is not possible to say conclusively who they were, although it seems quite clear, as I will discuss later, that the inhabitants during the period in question were not Bantu speakers. It is also probable that both hunter-gatherers and herders lived side by side in the Mt. Kenya region, and that a population involved in both economies (hunting and herding) occupied Kiburu site. From the recovered archaeological materials, exotic beads and cowry shells it is also apparent that the inhabitants were involved in long distance trade since these materials have coastal origin. It is however, not clear the means by which these materials reached Mt. Kenya region (500 km away) during that early period. It is, suggested therefore, that, "down the line" model of trade was used or these exotic artefacts were a result of gift exchange.

Several archaeologists including Taylor (1966), Siiriainen (1971, 1978), Soper (1976, 1979), Cummings (1978) Kiriama *et al* (1994), and more recently Ngari (2004) have investigated Mt. Kenya region before. I chose the Mbeere region for this research because it offers great opportunity for Iron Age studies in the central Kenya highlands, and many archaeological sites here are undisturbed. This coupled with well-written history of the people by Mwaniki (1973) and Muriuki (1974) can shed more light on the unresolved Iron Age questions.

1.1.1 People of the Mt. Kenya region

Although the migrations of Bantu speakers are beyond the scope of this thesis, it is difficult to talk about the peopling of Mt. Kenya region without discussing the movements of Bantu speakers. The purpose of this section is to familiarize the reader with the current occupants of Mt. Kenya region and to explain how they got there. Even though there exist several myths of origins, I have only discussed historical events as recorded by various scholars.

Linguistic and archaeological evidence placed the general area of origin for all the Bantu speakers in Africa around the Cameroon. Phillipson (1993, p. 187) suggests that the Bantu speakers started their expansion during the 5th century B.C. Due to several discrepancies between the Bantu speakers of Central Kenya and north western Tanzania, and other Bantu speakers, it has not been possible to place the former two groups within the first wave of advance of the Bantu speakers. Phillipson (1977, pp. 225, 230) suggests that they were part of the second wave of advance, originating from Shaba, a region in the present Democratic Republic of Congo around 1000 A.D.

Linguistic sources have classified all the Bantu speakers of Mt. Kenya region as Thagicu. Bennett (1967, cited in Muriuki 1974) argues that Thagicu is a group of dialects, or very closely related languages, spoken to the east and south of Mt. Kenya. It includes Kikuyu, Kamba, Mbeere, Meru, and Chuka, Segeju, and Sonjo of Tanzania. Apart from the Kamba Kenyatta (1938) just as several other writers, refer to Bantu speakers of Mt. Kenya region collectively as Kikuyu. Likewise, they present the Mt. Kenya history of origin as a collective one (e.g. Lambert 1950 cited in Muriuki 1974; Munro 1967). Although Munro (1967), Fadiman (1973) and Muriuki (1974) consider research by Lambert (1950), on the migrations of Mt. Kenya people as one of the most important contributions on the topic, his work is criticized for interpreting the Meru evidence as a general movement of all the Bantu speakers of Mt. Kenya (Munro 1967). The critics of Lambert assert that only the Meru and Tharaka oral traditions have claims of coastal origins. Munro (1967) claims that the language of the two has close affinity with the coastal languages and it fits better with the movement of the coastal people rather than the highland people. Fadiman (1973, 1993) has discussed the Meru migrations from the coast and points to a place they called Mbwa as their original home. He claims that, due to persecutions by Arabs at the coast, the Meru moved out with first group arriving in the Mt. Kenya region about 1730 A.D. and the last one arrived around 1750 A.D. Muriuki (1974, 1978) among others has tackled the aspect of migration of other Mt. Kenya Bantu speakers. He argues that the Kikuyu arrived in different groups, just like the Meru, although the Kikuyu refer to Tigania and Igembe shown in Figure 1 as their original homeland. They arrived in their current habitants during the 16^{th} century A.D. According to Muriuki, the push factor was a series of wars and raids by the neighbouring pastoralists. The Embu, the Mbeere and Chuka are included in the Kikuyu history of migration.

The Kamba also fall in this group but their history of coastal origins is different from Kikuyu and Meru history (Munro 1967; Fadiman 1973; Muriuki 1974). Their oral traditions point to an area around the Mt. Kilimanjaro region in Tanzania. Phillipson (1977) ties this to the presence of pottery in this area, which resembles the modern Kamba pottery. According to Lambert (1929; cited in Fadiman 1973), the pre-Kamba arrived in this region before 1300

A.D., followed by the pre-Chuka and early element of the Tharaka around 1300 A.D. Later the pre-Kikuyu settled in the Mbeere area in the 1400 A.D. The pre-Kikuyu then sent offshoots, which gave rise to the Embu and Kikuyu. The Embu reached their land around 1425 A.D. while the Kikuyu finally arrived to their present day country around 1545 A.D. All the scholars agree that the Mbeere split from the Embu after their settlement in Embu region (e.g. Mwaniki 1973 and Muriuki 1974). Muriuki (1974) suggests 15th century as Mbeere's date of arrival to their present land. Munro (1967) has criticized the above dates, arguing that, the dates are derived from scanty evidence, while others are derived from estimates of the rate of occupation per square mile without taking into account growth or decline of the population and the density of settlements. Just like all the Bantu speakers of other regions in Africa, the Bantu speakers of Mt. Kenya region rely on agricultural economy. They occupy fertile land where they do horticultural, arable, and cash crop farming. They also keep domestic animals such as cattle, goat and sheep in small scales.

1.1.2 Mbeere Land

This section deals with Mbeere land in particular, since this is where I carried out the surveys and excavations. It is to present a general overview of the land and the current climatic conditions, and to indicate of how such factors might have affected the prehistoric settlements if they were anything close to what they are today.

According to Mwaniki (1973) Mbeere region is about 1014 square kilometres in area with relatively low altitude except for two hills Kiang'ombe (1804 m) and Kianjiru (1495 m). The land slopes from 1219 m to just under 61 m above sea level to the east and Northeast as it joins the Tana River. About one third of the land lies to the west of the Tana bank; between 610 and 914 meters, the rest is 91-122 meters above sea level. Mwaniki (1973) notes that rainfall is inadequate, unreliable and poorly distributed in most periods. Muriuki (1974) writes that rainfall is mostly controlled by altitude hence, the lowlands where the Mbeere occupies today receives between 500 mm –750 mm annually unlike the high altitude areas which receive up to 2250 mm annually. The Soil is sandy, grey or reddish-brown in colour with productive soil found only around riverbeds. Most of the land is stony with scrub thorny acacia trees of mainly less than 20 feet high.

1.2 Previous Archaeological Work

This section contains a summary of previous Iron Age research in Kenya, and puts it in a wider spatial and temporal context. I will discuss Iron Age studies in Mt. Kenya region, then Iron Age work in general, with special emphasis on pottery and Bantu speakers, since part of my research is focused on these topics. The section is thus relevant in providing the necessary background in order to understand the period in question and the background leading to my research. I have divided the description of the Bantu speakers Iron Age pottery into two, that is, the early Iron Age pottery that was identified by potshards, with bevels and flutes on the rim and the shoulder (Chami 1994), and other types of Iron Age pottery that have been found in association with Early Iron Age pottery.

1.2.1 Previous archaeological work in Mt. Kenya region

Taylor (1966) did the pioneering archaeological work around the Mt. Kenya region. He studied the Gumba pits in Fort Hall currently Murang'a district. The Gumba pits are scattered all over Mt. Kenya region, and Bantu speakers of Mt. Kenya believe they were homes of the Gumba. Taylor points out that the Gumba pits occur on higher areas of plateaus and they are rarely more than seven surviving together. He hypothesizes that the presence of the Gumba pits on the top of hills and not lower grounds is a result of population pressure. Population pressure, as will be seen later in my discussion, might have been a key factor in not only the distribution of the Gumba pits, but also, in the general settlement patterns in the region by people practicing different economies. Taylor further suggests that these pits were likely used as animal traps rather than dwelling places. During his work, he collected from the surface one potsherd akin to Kwale ware and others, which he could not tell whether they were Kikuyu or Gumba pottery. Other artefacts included obsidian blades, quartz anvils, and hammer stones.

Siiriainen (1971) excavated a Gumba pit in Gatung'ang'a, Nyeri. He recovered 230 shard of two types of pottery tradition, and he defined 17 of them as being related to Kwale ware, and the other 213 as distinct type of late Iron Age, which he named Gatung'ang'a ware after the type-site. He found Kwale and Gatung'ang'a pottery in association and using radiocarbon dating method he dated them to between 11th and 14th century A.D. Siiriainen (1971) also observed that neither the pits nor Gatung'ang'a ware were attributable to the culture of current Bantu speaking people in the region. However, since Kwale ware is associated with Bantu speakers, Siiriainen speculated that an earlier group of Bantu speakers unrelated to the current inhabitants lived here (Siiriainen, 1971, p. 233). Since both wares occurred together, Siiriainen concluded that two groups of people the pre-Bantu, and the Gumba co-existed. Other items recovered were iron slag, bones, hammer stones and tuyeres. Siiriainen points out that the purpose of the pits is obscure and they might have been used either as storage, rubbish or even offering pits connected with iron working, or may originally have been smelting furnaces or forges thoroughly scraped after use and secondarily filled with slag, broken vessels and food refuse. Soper (1976) conducted surveys and excavations of archaeological sites in the Chyulu hills, and he found pottery similar to Gatung'ang'a ware and features of clay mounds. The mounds produced iron artefacts, bones and beads as well as human skeletons.

Cummings (1978) surveyed and excavated Iron Age sites on the upstream of the grand falls of Tana River. His survey work revealed two deposits containing Kwale-related early Iron Age pottery, as well as surface evidence of a later Iron Age occupation and extensive iron-smelting activities. He recorded pottery with Kwale features, such as thickened, bevelled and fluted rims with comb stamping on the shoulder of the vessels and a second set of pottery ware, which he describes as typical later Iron Age material predominantly rocker-stamped bands on the necks of the vessels, which is a feature of Gatung'ang'a ware.

Based on Siiriainen's description of Gatung'ang'a ware, Diblasi and Mahlstedt (1979) reported similar pottery from sites in Thika area and along the Tana River. Similarly, Soper (1979) found Gatung'ang'a ware in the Mbeere region and its surrounding areas. During the surveys, he observed pottery with fluted and bevelled rims similar to Kwale tradition in association with Gatung'ang'a ware. Based on Siiriainen's earlier speculation, Soper assigned these to earlier group of Bantu speakers. Kiriama *et al.* (1994) conducted further surveys and recorded 69 Iron Age sites within the Mbeere region. They did not do any excavations, but they reported the presence of both Kwale and Tana ware pottery. Kiriama, however, points out that, the sites that they identified occur away from the Gumba pits. He also concluded that, since the Bantu speakers of Mt. Kenya region attribute Tana ware to the Gumba, if this is true, Tana ware (known as a Bantu pottery in other regions) must be older than Kwale ware since the Bantu speakers arrived in the region after the Gumba. It is however, likely that they erroneously identified Gatung'ang'a ware as Tana ware.

1.2.2 Introduction of Iron Age and associated pottery of the early Bantu speakers

Iron Age research in the mid last century focused on the origins of Iron technology in Africa, and its relationship with migrations of the Bantu speakers (Munene 1993). The general idea was that the Bantu-speaking peoples spread in a north-to-south direction, carrying the knowledge of iron technology, with the evidence mainly provided by linguistic studies (Forslund 2003, p. 11). Apart from linguistic evidence, archaeologists have used pottery like, Urewe, Lelesu Kwale and related pottery to trace Bantu speakers wave of advance in East and Southern Africa. In Kenya, most research was concentrated around the Lake Victoria region where Urewe pottery was found. Leakey (1948 cited; in Wandibba 1990) first reported Urewe ware, which is the oldest of all the Iron Age pottery, and later it was found in other countries around the interlacustrine region. The research that followed focused on tracing routes of the Bantu speakers wave of advance, using the presence of this pottery.

Figure 2 illustrates some of the possible routes and methods suggested for introduction of iron in Kenya in addition to Bantu speakers theory. The proponents of Bantu migrations (e.g. Huffman 1994 and Phillipson 1977) consider iron, pottery and agriculture as innovations spread by Bantu speakers to the east, central and southern Africa over 3000 years ago. Phillipson (1977) has discussed in detail the possible routes from Cameroon that led to the spread of iron working in this part of Africa. They proposed two directions of advance from Bantu speakers origin that is, a westerly and easterly route. Based on technical linguistic evidence, Ehret (2001) is questioning the existence of a westerly branch. Phillipson (1977) claims that Kenya benefited from the easterly route, where Bantu speakers introduced iron around the Lake Victoria region together with agriculture and pottery. In addition to iron, pottery (Urewe, Lelesu and Kwale) and agriculture, Phillipson (1993) adds that, the Bantu speakers had settled village life, and it is these cultural aspects that he collectively named the Chifumbaze complex. He introduced this term, to differentiate the early Bantu speakers culture from other Early Iron Age societies in Africa. Using channelled pottery ware, which is akin to Urewe ware, Oliver (1966) proposed south to north Bantu speakers movement. This argument claimed that pottery of the Bantu speakers from the south had earlier dates than pottery of the Bantu speakers in the north. This line of thinking contrasted sharply with Phillipson's model of proto Bantu speakers direct movement from Cameroon to interlacustrine region. Oliver's proposal was, discredited by other researchers (e.g. Schmidt, 1975) who argued that the random nature of these early dates did not constitute sufficient evidence.

Vansina (1995), on the other hand, concurs with the introduction of root crops by Bantu speakers, but does not agree with the introduction of agriculture or migration of Bantu speaking people. Based on linguistic evidence, he argues for a gradual expansion of families and mixed groups of people. His argument tallies with the wave of advance model as discussed by Anthony (1990) in his article *Baby and the Bathwater*. He continues to argue that the languages used by Bantu speakers today have developed over a long period due to encounters and mixing with other linguistic groups.

With the availability of new archaeological data, linguistic and historical research, the migration of Bantu speakers has undergone much criticism. Bradley & Robertson (2000) argue that the migration theory has gone through several modifications and with the proponents establishing it as a fact without testable data. They assert that there was no mass movement of people 2000 years ago, and that the terrain separating the Bantu speakers place of origin and their supposedly new homes is impassable; hence, the proposed migrations would have led to massive deaths. Based on earlier radiocarbon dates from excavations in Tanzania, Schmidt (1975) suggests that there was prior knowledge of iron working in this region even before the Bantu migrations. As such, Vansina (1995) advocates for the exclusion of migration theory to open up for more research. Critics of the migration hypothesis e.g. Collet (1988) have pointed out that in East Africa, a number of traits used to identify early iron producing communities in East Africa, in particular permanent settlement and food production, occurred thousands of years before iron production. This led to the suggestion that either iron smelting technology diffused into East Africa, or these early food-producing communities invented it.

Chronologically, the pottery that follows Urewe is the Kwale ware dated to 3rd century A.D., first reported by Soper (1967a) from the south-eastern coast of Kenya. Connections to the Kwale pottery are as far south as southern Mozambique. Soper (1982) speculates that Urewe ware, Kwale ware and undated Lelesu ware from central Tanzania are only different because of the geographical space between them. Phillipson (1993) proposes that Kwale ware was probably introduced to the East African coast during the second century A.D. by a southerly route through central Tanzania, where Chifumbaze sites such as Lelesu have been reported.

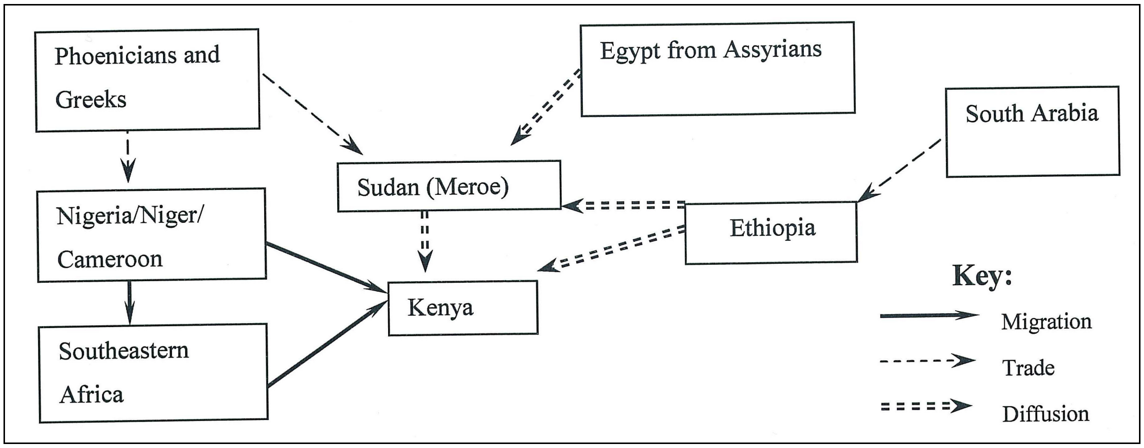

Figure 2 Possible routes and methods of emergence of iron technology in Kenya

1.2.3 Other Iron Age pottery of Bantu speakers

The main discussion in this section is the Iron Age pottery that is contemporaneous with Gatung'ang'a ware. Odner (1971a, 1971b) excavated pottery related to Kwale and Gatung'ang'a Iron Age pottery around Mt. Kilimanjaro and North Pare in Tanzania. He also equated this pottery with Maore ware a ninth century A.D. pottery, excavated in South Pare by Soper (1967b). Odner (1971a) concluded that Maore and Kwale wares represented a cultural continuity of the makers, especially when same shard exhibited traits of both wares. However, he pointed out that the nature of their relationship was not clear.

Other archaeological sites that are contemporaneous with Maore and Gatung'ang'a ware include sites with Tana ware pottery, also referred to as TIW (Chami 1994). Haaland & Msuya (2000) excavated in Tanzania, Dakawa site dated to ninth century A.D., and were able to trace the sequence of Kwale and Tana ware pottery. They reported transitional features on Tana ware as evidence to show that, it was an immediate descendant of Kwale ware. In Kenya, sites producing Tana ware date to between eighth and eleventh century A.D. (Horton 1996; Abungu 1989).

Chami (1994) studied the origins of Tana ware in more detail through excavations of sites in the hinterland and Tanzania littoral. The aim of his excavations was to trace the origins of Tana ware pottery. He addressed the question of the time gap between Kwale ware and the Triangular Incised/Tana ware and the cultural connection between the two traditions, and found common features in the pottery decoration, which suggested transitional phase in the 4th century A.D. This led him to conclude that Tana ware must have originated from the hinterland of Tanzania before spreading to the coast. In the 1980s, Mutoro studied the Bantu

Mijikenda settlements in the hinterland and their relations with the Swahili (coastal dwellers). Mutoro's research was mainly to study the connection between the Bantu speaking Mijikenda people and the coast. During the excavations, he recovered Tana ware pottery, which he approximated to be of the late first millennium A.D. (Abungu 1994; Mutoro 1994/95).

1.2.4 Iron working technology

In a pioneering study on the Iron technology, combining ethnographic studies of modern smelting with archaeological material of ancient smelting, Avery & Schmidt (1983) concluded that African smelting had developed in ways that did not match the characterization based on the European traditions known at that time. The view of indigenous development was strengthen by their studies in the Kagera region of Tanzania, which implied that indigenous African techniques, such as preheating of the air blast in iron smelting, predated similar innovations in Europe by nearly two millennia.

Following the preheating theory by Schmidt and Avery, Kiriama (1986) studied the iron slag from early Iron Age sites in Kenya and concluded that the technology was similar. This preheating theory has received a lot of criticism due to the methods used for recording temperatures and also the critics disagree that very high temperatures were attainable through preheating of tuyeres alone (e.g. Rehder 1986; Eggert 1987).

More evidence on the technological, social and economic aspects of iron working populations in East Africa has been derived from ethnoarchaeological work among the Fipa people of Tanzania and the Oska Dencha village of Ethiopia where Haaland recorded former iron workers reproducing the processes of Iron smelting and smithing (Haaland & Haaland 2002, 2004). Schmidt (1975) did similar work among the Buhaya of Tanzania.

1.3 Problem Statement

No research has so far, been done to compare Maore, Gatung'ang'a and Tana ware as possible descendants of Kwale ware. Hence, only temporal relationship can be established between them. Apart from excavations at the coast, no Iron Age sites have been excavated in the Kenyan highlands with a view to understand either the technology or social, cultural and economic systems of the time. However, in other regions of East Africa, several researchers have recently addressed these issues. Mapunda (1995) did research with the aim of establishing the archaeological potential of south western Tanzania, and to reconstruct the socio-economic and cultural history during the Iron Age. MacLean (1996) conducted similar research in Uganda, addressing the possible social and economic impacts of the inception of iron technology within a distinct geographical area, the western basin of Lake Victoria. As noted by many African scholars, (e.g. Munene 1993), Iron Age research in Kenya has been concentrated mostly on the Lake Victoria basin, and later the coast, leaving the Kenyan highlands and the rift valley unexplored. Abungu (1994) attributes the past omission of Iron Age research in the hinterland to the fact that the coastal towns were perceived as belonging historically within an Islamic and Indian Ocean context, and as such, the question of their relationship to the cultures of the African hinterland hardly arose. He also points out that it was emphasized earlier that the terrain behind the coast was environmentally harsh and unattractive to settlement and trade routes. MacLean (1996) makes similar observations, arguing that physical inaccessibility and political instability have resulted in large areas of the continent remaining virtually unknown archaeologically, creating the basic problem of limited and uneven archaeological records.

Excavations and surveys of Iron Age sites around Mt. Kenya region have raised questions about the makers of Kwale and later Iron Age pottery. As was pointed out, earlier researches in the past have attributed all the Iron Age pottery encountered in this area to Bantu speakers without conclusive evidence. According to Hall (1996), African archaeology has been significantly influenced by its social and political milieu, and its often-unanticipated findings have altered strongly rooted interpretations of African history. In the case of Mt. Kenya region, assigning all Iron Age pottery to Bantu speakers can probably be attributable to the directions of research at the time, which was labelled "Bantu Studies Project". According to Siiriainen (1978), the 'Bantu Studies Project' was run from 1965 by the British Institute in East Africa, and supported by Astor Foundation. Besides the archaeology the purpose of this project was to cover oral traditions, physical anthropology and linguistics of the Bantu speakers however, archaeology became the main field since the essential problems were observed to lie so far back in time. Soper (1979, p. 35) explains that,

> *"This was to be done by locating as many sites as possible relating to the period of migrations, the aboriginal inhabitants and old occupations sites of more than two or three generations ago. In addition, caves and rock-shelters were to be examined and all opportunities taken to search for earlier material, particularly in open exposures such as pits and road cuttings. It was hoped to collect sufficient material by surface collection or excavation where appropriate to attempt a pottery classification which would provide a sequence spanning the period of the formation of the present peoples"*

Consequently, all Iron Age research in the region followed this trend. Sites surveyed by e.g. Taylor (1966), Siiriainen (1971), Soper (1976, 1979), and Cummings (1978) mostly produced both Iron Age pottery with attributes of Kwale pottery and a later Iron Age pottery namely; Gatung'ang'a. Terming the Mt. Kenya pottery as Bantu speakers pottery poses several problems:

a) The pottery of current Bantu speakers in the region has no resemblance with the pottery recovered from the Mt. Kenya Iron Age sites

b) The local Bantu speakers do not associate with the recovered archaeological pottery or the people who made it.

c) Gatung'ang'a and Kwale wares are found in the same archaeological contexts, hence it is difficult to distinguish the cultural boundaries. From its known distribution, Kwale ware is generally known as a Bantu speakers pottery. Unlike Kwale ware, Gatung'ang'a ware is not well understood.

d) Bantu speakers in the region associate Gatung'ang'a pottery with the Gumba (hunter-gatherers).

From arguments (a) and (b), Siiriainen concluded that an earlier Bantu speaking people must have preceded the makers of Gatung'ang'a pottery. This conclusion became the premise by which all the other researchers judged Iron Age pottery found around the Mt. Kenya region, despite the fact that both Kwale and Gatung'ang'a ware, were always found together. For example, Muriuki (1974) cites Siiriainen (1971) conclusion and suggests that these early Bantu speakers might have been the Thagicu. Later, Siiriainen (1984) cites Muriuki, to conclude that Gatung'ang'a ware was a product of Thagicu.

1.4 Research Objectives

Using archaeological materials from Mt. Kenya region, both from Kangai, Kanyua and Kiburu sites, and other earlier archaeological evidences, I intend to achieve the following objectives.

1. To reconstruct subsistence economy of Mt. Kenya populations between eleventh and fifteenth centuries A.D.
2. To establish evidence of trade contacts between Mt. Kenya populations and the coast between eleventh and fifteenth centuries A.D.
3. To clarify the issues of possible inhabitants of Mt. Kenya region between eleventh and fifteenth centuries A.D.

By achieving the above outlined objectives, I hope this research will form at least in part a base upon which similar research in the Mt. Kenya region can build upon.

2. SITES SETTING AND EXCAVATIONS

With the encroachment of cultivable land by farmers, archaeological sites in Kenya are found only in the marginal areas, where no crop growing is possible. In Mbeere region, most Iron Age sites are located on rocky hills where land has remained undisturbed for centuries; hence, archaeological materials are relatively well preserved. I selected Kangai, Kanyua and Kiburu sites (Figure 3) for excavations since each contained unique archaeological remains. Kangai site is 8.9 kilometres from Kanyua and 9.4 kilometres from Kiburu site, and Kiburu site is 0.735 kilometres from Kanyua site. Although evidence shows that the three sites are contemporaneous, Kangai site may not have direct relationship with Kiburu and Kanyua due to the distance between them but Kanyua being the closest Iron-working site to Kiburu site, I presume that there was some form of relationship between them.

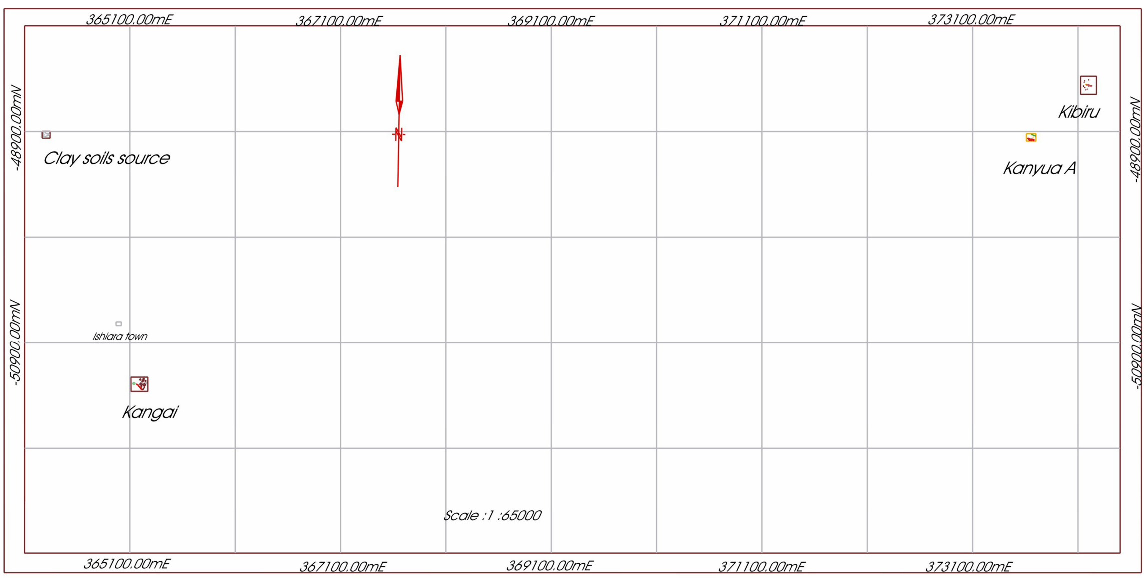

Figure 3 Spatial distribution of excavated sites (the corners of the sites mark the coordinates of the actual sizes that were mapped). Map by Stephen Manoa (BIEA).

2.1 Kangai Site

Based on the surface debris and archaeological features, Kangai site is approximately 500 square meters with an altitude of 857 meters above see level, lying between 00^{o}.46′ S and 037^{o} 78′ E. Kangai site contains evidence of a prehistoric settlement indicated by seven mud mounds suspected to be dwelling remains, and an area for iron working. The features marked 1-8 in Figure 4, are made of compact soil comprising of clay and sand. In between the mounds is an iron working area (feature 8) measuring 9.6 metres by 10.8 meters with mud walls around it. In the middle of the iron working area, remains of an *in situ* furnace, iron slag, pieces of tuyere and potshards were recovered. To the western side of the settlement, across a near by seasonal riverbed, there are three stone mounds suspected to be burial mounds. one of them is shown on Figure 4 as feature 9.

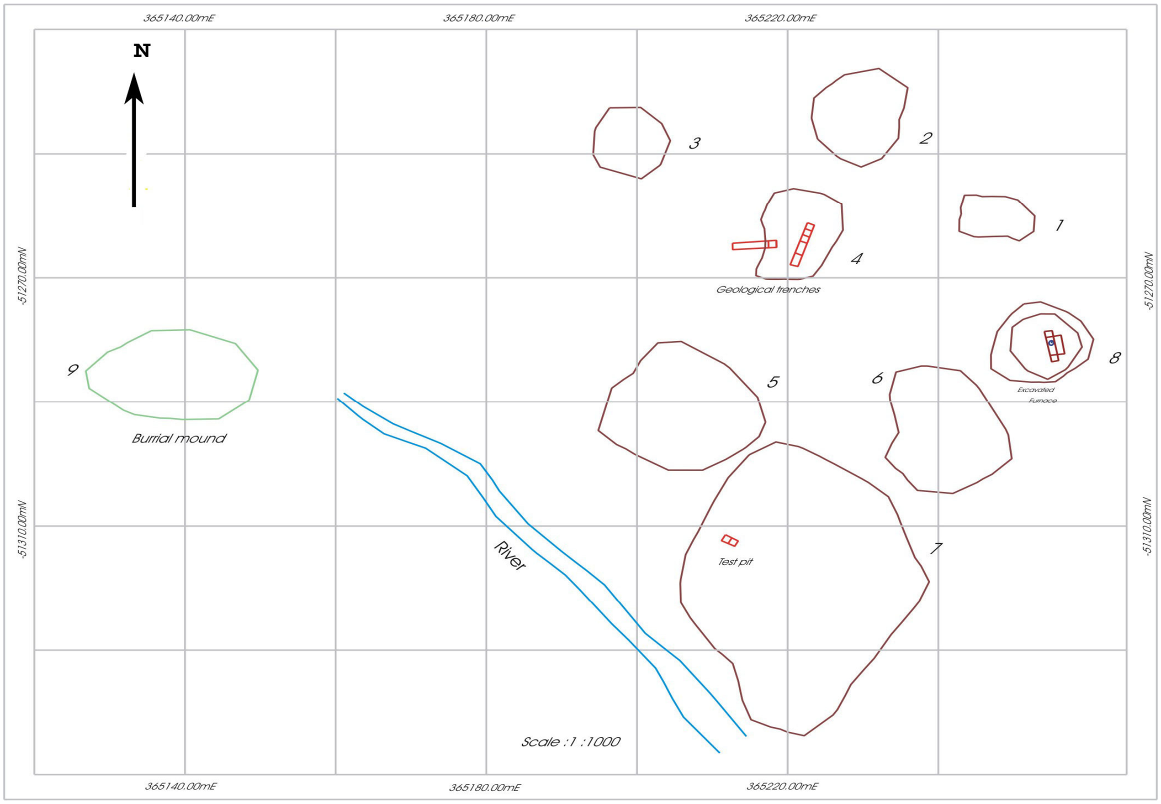

Figure 4 Topographical map of Kangai site.

Datum point was set at the north most point of the site, and used for all the depth measurements. The iron working area and mound seven exhibited more surface materials than the other mounds; hence, they were chosen for excavation. Apart from the archaeological excavations, two geological trenches were dug on mound four; the trenches were dug down to 2 meters before the bedrock was reached with no change of soil colour or texture, which was compact red sandy clay. The aim of digging the geological trenches was to establish the layers producing archaeological material although we failed in accomplishing this since the compact soil was artificial having been part of the mud structures.

Excavations commenced after grids were set up as shown in Figure 5, all the squares produced no archaeological materials except for broken pieces of furnace wall, pieces of slag and few potshards on the surface. Part of an in situ furnace however, protruded on the surface of square N 99-100/ E100-101 and square N 100-101/ E 100-101

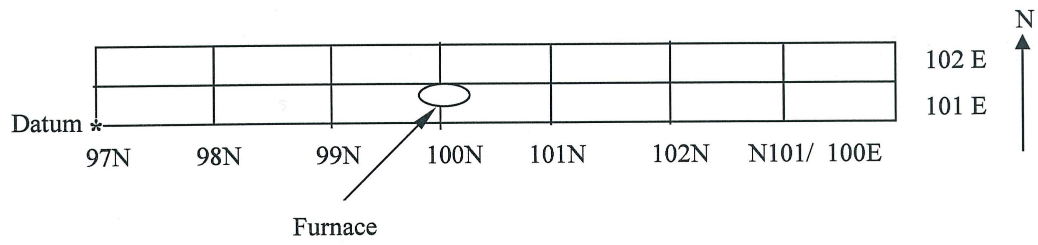

Figure 5 Position of furnace in the excavation.

The interior of the *in situ* furnace was filled with soil and four pieces of *in situ* tuyeres (Figure 6) whose measurements and positions were recorded before removal. The second excavation was at feature number seven (Figure 4) where six squares (1m x1m) were excavated to establish the source of pottery, iron slag, and pieces of tuyeres that were appearing on the surface. The surface of mound number seven had loose calcium carbonate concretion and sandy clay, but where the cultural materials might have been eroding from had greyish silt mixed with ashes. Presence of ash might be an indication that this area was probably dwelling floor or a dumping ground. Soper (1976) surveyed and excavated similar mounds in Chyulu hills of the present day Kamba land (east of Nairobi) and found postholes, which made him suspect that the mounds were either dwelling places or enclosures for livestock. In one section of the surveyed areas of Chyulu hills, Soper found nine mounds and excavated the biggest, which produced a skeleton of a young individual with three of his lower incisors missing, while the second mound produced a skeleton of a child. He suspected that the young individual must have died immediately after constructing his dwelling place and was buried there. He describes the probable sequence of events leading to his burial as follows: a) Excavation of the main pit and trench and erection of fence or roofed structure, b) after a relatively short interval, the burial in the bottom of the pit, c) destruction of structure, d) infilling of pit, probably with topsoil from surrounding area incorporating shards and bone fragments, and d) construction of the mound. Soper points out that, these burials do not conform to pre Kamba (inhabitants of Chyulu hills before the Bantu speakers) disposal of dead bodies. Apart from the skeletons other artefacts recovered during the excavations include, pottery of Gatung'ang'a ware, cattle bones, elephant bone and arrowheads. He obtained calibrated radiocarbon dates of AD 985, 1490 and 1430. However, he suspects that the A.D. 985 date is wrong and may have been a result of intrusive charcoal.

Description of the mounds and Gatung'ang'a pottery of Chyulu hills by Soper (1976) fits well with the archaeological remains, of Kangai site. Although the mounds at Kangai site were not excavated, Chyulu hills dates of fourteenth to fifteenth century can be assigned to Kangai site, based on the pottery and mounds similarity, and hence, I have used for Kangai site in this thesis.

2.2 Kanyua Site

Kanyua site is located 9.4 kilometres north east of Kangai site, at an elevation of 749 meters above sea level, between 00.44′ S and 037.86′ E. It is located on the right side of the road leading to Muthanthara and about 200 metres from Kang'ote seasonal river bridge as shown in Figure 7. The surface of Kanyua site is rocky with loose sandy soil hosting short acacia thorn bushes. This site had several tuyeres and iron slag on the surface, which were expected to offer additional information to the few recovered at Kangai site.

Figure 6 *In situ* tuyere pieces inside the furnace from Kangai site (left) and *in situ* tuyere from Kanyua site (right).

Two square test pits (1m x 1m) were excavated and produced over fifty tuyere pieces before they were exhausted at 50 cm depth. The tuyeres seemed to have been intentionally buried together, since the area surrounding the two squares did not show evidence of surface or insitu archaeological material. It is, however, possible that all the other cultural materials had been washed away by erosion although no traces were noticeable down the slope. A tree trunk and its roots might have protected the area with the tuyeres from advancing runoffs.

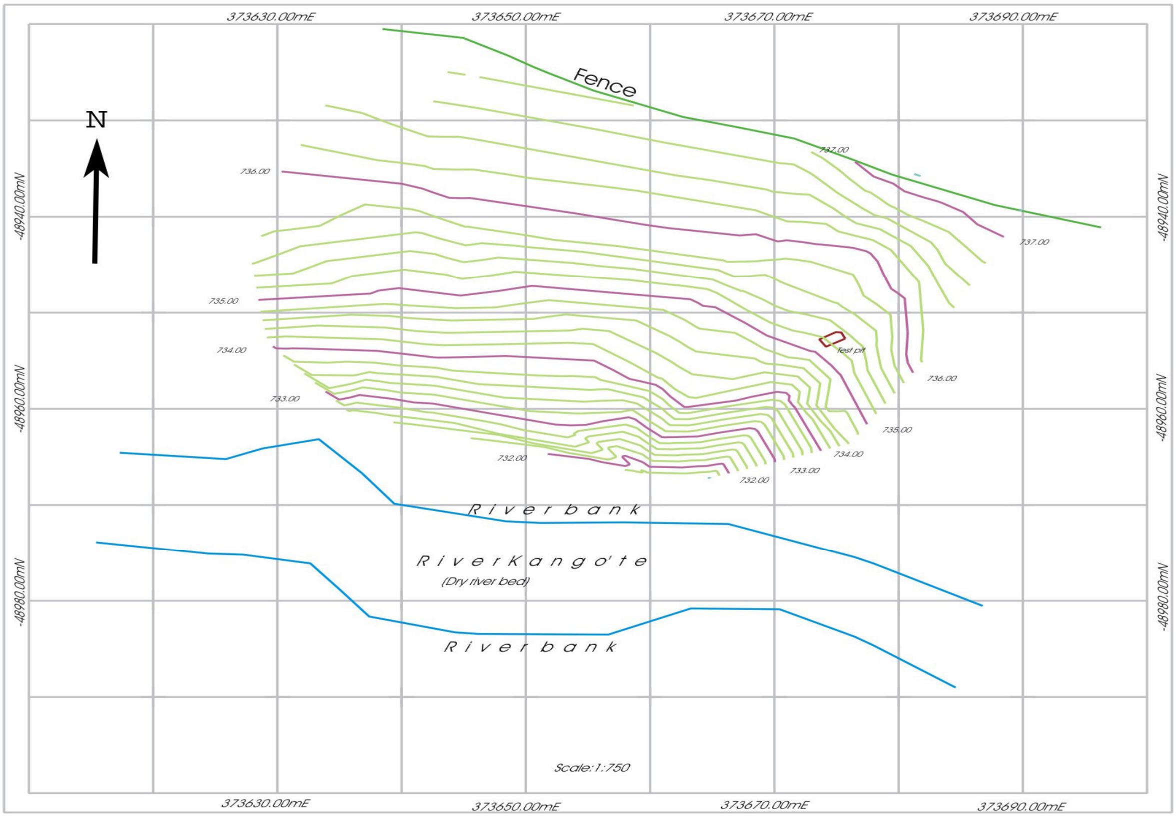

Figure 7 Topographic map of the Kanyua site. Map by Stephen Manoa (BIEA).

2.3 Kiburu Site

Kiburu site is located 0.735 km to the north east of Kanyua site, it lies on 00 ^{o}.43′ S 037^{o}.86′ E with an elevation of 899 meters (Figure 8). The site is located on Kiburu hills whose vegetation is acacia thorny bushes. Kiburu site structure and surface materials suggest habitation but without any evidence of iron production or forging, although there is evidence of iron and pottery usage. Kiburu hills face Kamarandi hills to the south and Ndenderu hills to the east.

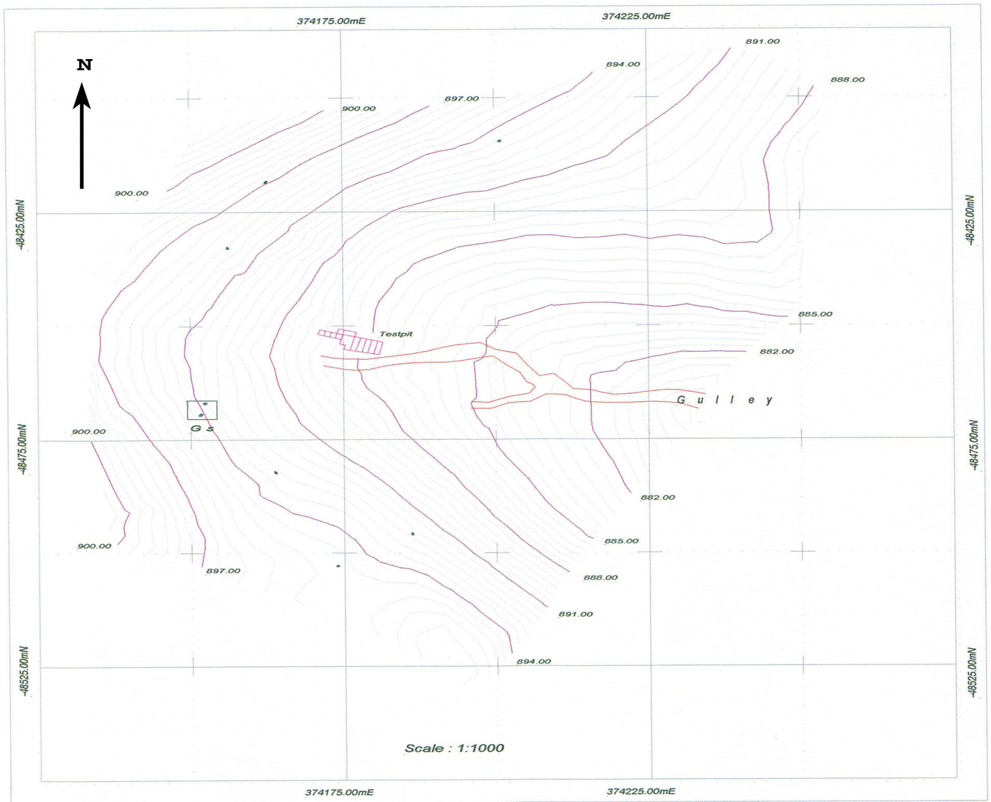

Figure 8 Topographic map of Kiburu site (main contour intervals are 3m and the minor are at 0.5 m intervals; the black spots are grindstones scattered on the site). Map by Stephen Manoa (BIEA).

The site is large covering at least 1000 square meters. A scatter of pottery, beads, shells, iron and slag are exposed on the surface. The area selected for excavation was based on the presence of archaeological material on the surface and the greyish soil indicating occupation debris. Excavations using 10 cm units were done on thirty four squares (Figure 9) with trenches set parallel to the slope; all the soil was sieved for small finds.

The upper part (north of the hearth Figure 9) of the excavated area had compact soil, which was removed with use of nails while the lower parts (south of the hearth) had loose soil which was removed with the point of a trowel. There were no marked differences in the soil composition except for the texture, which had been caused by the site activities. Most materials including burnt bones and baked stones were recovered from around the hearth area.

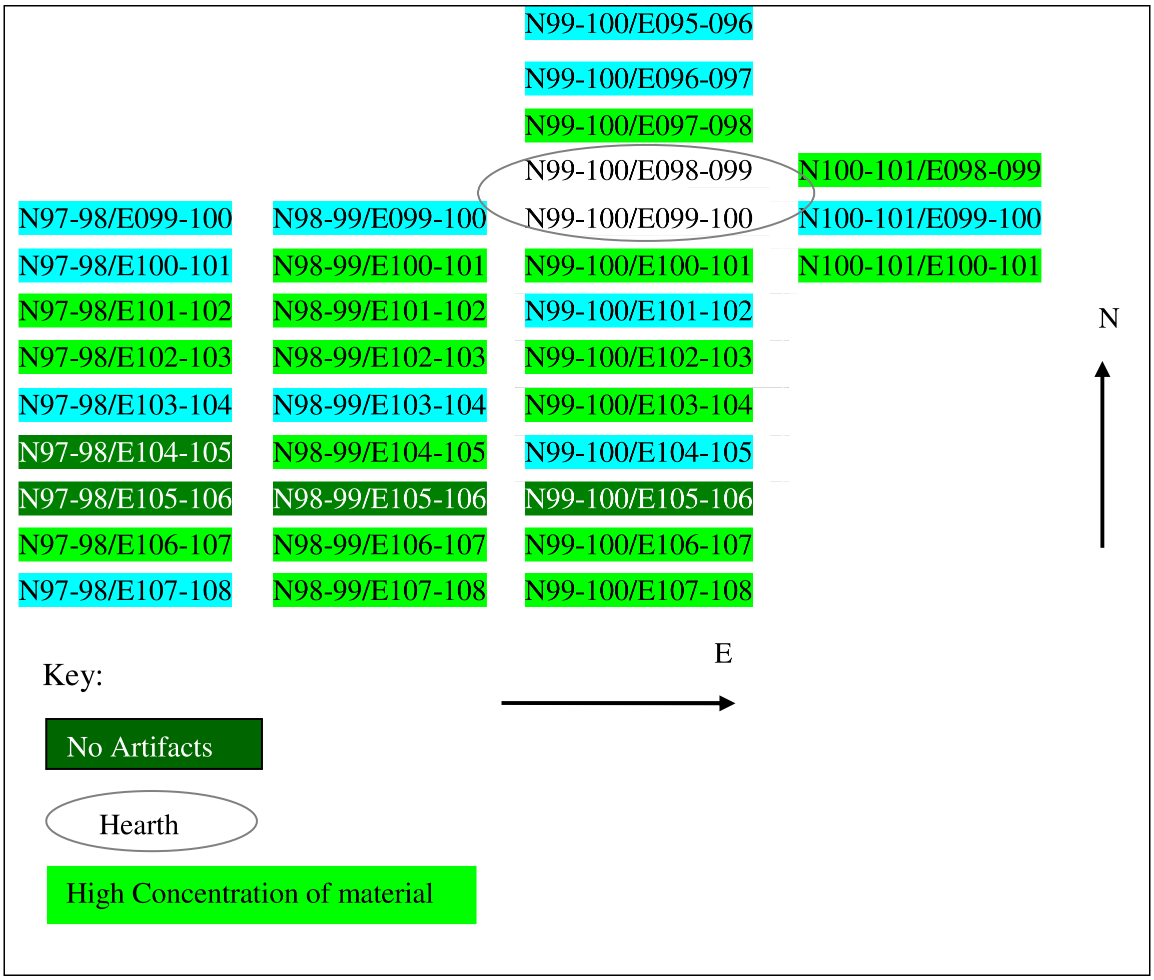

Figure 9 Excavated squares of Kiburu site

3. DESCRIPTION AND ANALYSIS OF THE RECOVERED MATERIALS

The description of materials is done with a view of giving the reader a visual presentation of the finds, their range and dimensions. Although dimensions are given, no regional comparisons are made as it was not important for this study, but the approach was found necessary as a basic archaeological procedure for any interested party and for future reference. However, other aspects used in the presentation have been used in the reconstruction of Mt. Kenya economies as will be seen in the succeeding chapters.

3.1 Bone

3.1.1 Distribution

A total of 2098 bones were collected from Kiburu site making it the largest type of material. The faunal remains ranged from bovid size 2 to size 4 with both domestic and wild game (Appendix A). The domestic animals included cattle and sheep/goat bones. Most bones were in a fragmentary form but in a good preservation state. The highest number came from level 2 (0-10cm) 1126 bones, followed by level 3 (10-20cm) with 503 bones. Level 1 and 5 produced the least.

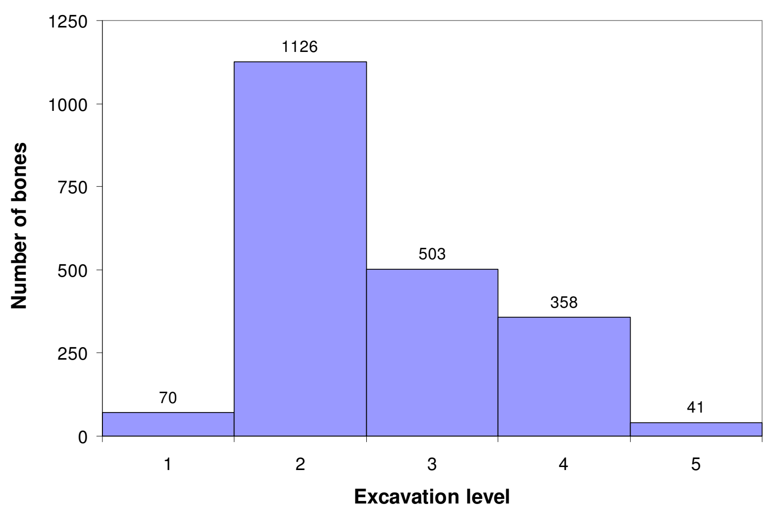

Figure 10 Distribution of bones by level.

There was a large number of identifiable pieces in almost all the excavated squares. Squares 23 to 26 however, did not yield any bones, which was the same case with beads and shells. The area with a hearth, that is squares, 4, 5, 7, 8 and 9 produced only 6.3% of identifiable bones and 11.3% of non-identifiable bones.

3.1.2 Number of identifiable specimens

Due to the fragmentary state of the bones, most of them were identified up to family level see (Appendix A).

Table 1 Number of Identifiable Specimens (NISP).

Body Part	Right	Left	Total
Radius Proximal	4	1	5
Radius Distal	2		2
Radius Shaft			6
Humerus Proximal		1	1
Humerus Distal	2	7	9
Humerus Shaft	1		1
Ulna Proximal		1	1
Ulna Distal	1	1	1
Ulna Shaft	7	7	14
Femur Proximal		2	2
Femur Distal		1	1
Femur Shaft	6	3	9
Tibia Proximal		1	1
Tibia Distal	1	2	3
Tibia Shaft	7	7	14
Metacarpal Proximal	4	7	11
Metacarpal Shaft	2	4	6
Metapodial Distal			7
Metapodial Shaft			12
Metatarsal Distal			1
Metatarsal Proximal	1	1	2
Metatarsal shaft	3	1	4
Patella	4	1	5
Magnum	2	1	3
Inominate	4	2	6
Illium	3	6	9
Unciform	3	1	4
Scapula	6	12	18
Astragalus	5	6	11
Mandible	10	15	25
Molar 1	5		5
Molar 2	17		17
Molar 3	1		1
Pre Maxilla	4		4
Maxilla	4	4	8

The bones mostly belonged to bovid size 2 see bovid sizes table by Brain (1974) in (Appendix A). These are animals weighing between 4-19 kg they include; *ovicaprine (*goats/sheep), *gazella thomsoni, gazella granti* (gazelles), *aepyceros melampus* (impala) , and *Tragelaphus scriptus* (bushbuck) among others. Other bovid sizes were 1,3 and 4. Size 1 was represented by a *rhincotragus kirkii* (dikdik). Others in size 1 would be *sylvicapra grimmia* (common duiker) and *tragelaphus spekei* (sitatunga) while size 3 was only identified to family level. Bovid size 3 however includes (*connochaetes taurinus* (wildebeest), *Kobus ellipsiprymnus* (common waterbuck) *Acelaphus buselaphus* (hartebeest) among others. There were several size 4 bones but only one juvenile *bos taurus* (cattle) was identified. Table 1 presents the number of identifiable specimen whose rights and lefts were identified positively.

3.1.3 Minimum number of individuals

Using table 1 above and the detailed table in appendix A, I used the most frequent element for each bovid size to calculate the numbers represented. Molar 2 was used for calculating the number of *ovicaprines*, and only one deciduous premolar was positively identified as belonging to *bos taurus*, mandibles belonged to gazelle and 1 mandible, tibia and ulna were positively identified as dikdik. Others were 2 mandibles belonging to a rodents

Table 2 Minimum number of individuals by species.

Family	Body element used	Minimum number of individuals
Bovid size 1	Mandible	1
Bovid size 2	Humerus	7
Bovid size 3	Calcaneum	1
Bovid size 4	Radius	1
Rodents	Mandible	1

3.1.4 Economic importance

Using a method explained by Daly (1969) I calculated the economic importance of each animal according to the meat it produced during the occupation of the site. For the juvenile *Bos Taurus,* it is not known whether it had reached its maximum weight, but both cases of culling at very early age and after maximum weight were considered. Two juvenile *ovicaprines* were also represented but these were not included in the animal protein provision because from the bones they died at very early stage hence, difficult to estimate the weight. The figures and amounts of meat are presented in Table 3. “Other” appearing in Table 3 means one size 3 bovid that was not identified to species level.

Table 3 Estimated contribution of animal protein by weight and percentage by species.

Animal	Number	Live weight (kg)	Meat weight (kg)	Animal protein contribution (%)
Dikdik	1	5	2.5	1.6
Ovicaprine	2	30	30	10
Bostaurus	1	367	183.5	66
Gazelle	1	36	18	6.5
Rodents	1	0.7	.49	0.84
Other bovid size 3	1	77	38	13.8

On the other hand, if the *Bos Taurus* had been killed very young probably for culling, the presentation of animal protein would have been as follows: - domestic animals 10% and 90% would have come from wild game.

3.1.5 Marks on the bones

Most bones exhibited different cut marks produced during skin, tissue or marrow removal. Removal of the tissue and skin was done with a sharp object while the removal of bone marrow was done with a blunt object. This is evident from the nature of the marks on the bones. Some of the long bone proximal ends showed signs of utilization, probably due to being used as hammers or probably for removal of bone marrow from other bone shafts. Apart from the marks, 14 of the excavated squares produced nineteen burnt bones mostly of bovid size 2. The burning might have happened during meat roasting or the bones had earlier on been tossed into the fire Figure 1

Figure 11 Burnt bone from Kiburu excavation.

3.2 Pottery

Most of the pottery described and presented below came from Kiburu site between the depths 0-40 centimetres. In describing the pottery, three aspects were considered: a) potsherd distribution by weight and number within the excavated area, b) surface treatment (decoration) of individual potshards, and c) pottery form, which was inferred from the rim profiles. Vessel shape was determined after studying the drawings of the diagnostic potshards.

3.2.1 Shards distribution

Most of the shards came from surface level (1) representing 42% of the collection as shown in Figure 12, however, this does not correspond with the weight. Level 0-10cm (2) had the highest weight with 36 % representation in the excavation (Figure 13). The surface shards were more fragmentary, which accounted for their higher representation. The ones from lower levels are few but heavier. As shown in the figures below, the number and weight correspond for levels 2-5 unlike the surface level where the shards are higher than the weight. On average level 2 produced most material among the excavated levels. The same pattern is evident for bones and beads. After level 2, the shards decrease in both numbers and weight. The weight measurements confirmed that the entire shard collection belonged to the same occupation period since they exhibited the same pattern in all the levels.

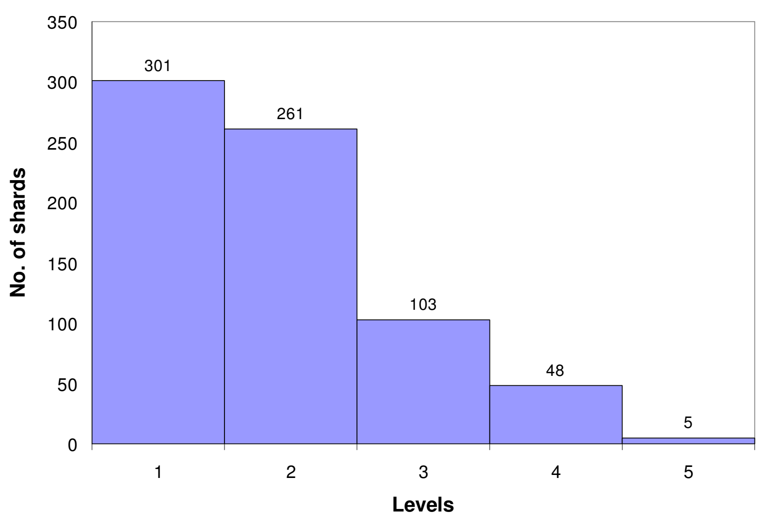

Figure 12 Presentation of number of potshards.

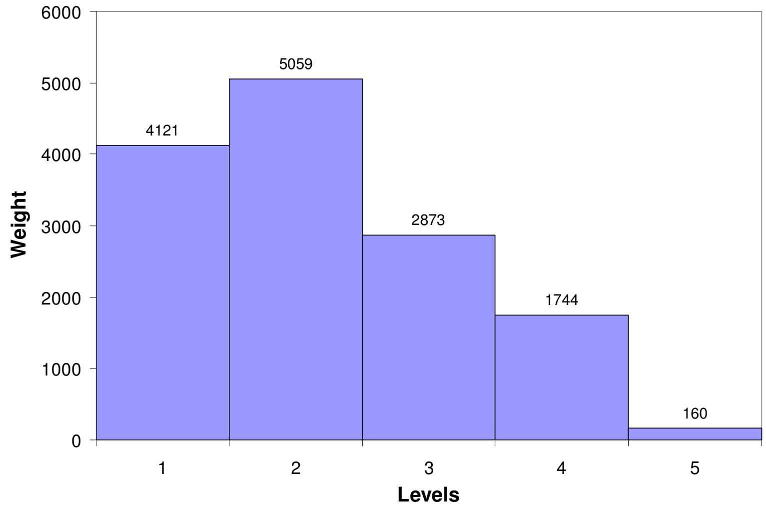

Figure 13 Presentation of potsherd by weight per level.

All the (34) excavated squares had an average of 21 shards per square. The weight was 139576 g with an average of 410.5 grams per square. Majority of the shards came from grid E99-100/ N100-101 producing 46% of all the excavated shards and 45% weight.

The other pattern displayed here is that the squares where hearth was recovered produced less number of shards as compared to the squares above and below them. The decline is more evident in the middle of the hearth. As one moves north and south of the hearth the number of shards increase. Below the area of higher concentration of shards, some squares produced nothing while others produced as little as below 10 potshards from the surface to the depth of 20cm. This probably means that the inhabitants of this site, used to sit around the fire place for their meals and tossed the bones all around them.

3.2.2 Decoration

From all the 718 collected shards, decorated ones were represented by only a small percentage (5.7%) with all the decoration appearing below the rim. Some shards had more than one decoration style applied on the surface for example; punctates and grooves shown in Figure 15 (f), (o), and Figure 16 (k) raised ridge with punctates. The shards are tempered with sand, which may be natural temper as is evident with the local clay although some are also tempered with crushed mica. This temper is characteristic of the potshards reported by Soper (1979) from the same area and the surrounding areas of Chuka, Embu and Meru. The colour of the potshards was brownish for the majority although not burnished and a few had a mixture of black and red resulting from uneven oxidation processes. As shown in Figure 15**,** the decorations included, punctates/dotted impressions (j-o), vertical and horizontal grooves/flutes (f-i) after Soper (1979), while **Figure 16** shows looped grooves (j), looped incised lines (h-i), notches on raised ridge (k), notched lips (l and m), and oval/crescent (a-c) shaped impressions, after Siiriainen (1971).

3.2.3 Vessel form

Of seven hundred and eighteen collected potshards, only 75 (10.4%) were clearly rim shards. These were studied to give an indication of vessel forms. Figure 14 shows the distribution of each form of rim profile by surface treatment. Decoration for all the rim shards followed the same pattern, appearing below the rim. Plain ones were dominant in all the categories. Majority of the rim shards were found to have out turned profiles, followed by upright rims and in turned having the lowest

Table 4 Type of rim profiles.

Rim profile	Decorated	Plain	Total
Up right	4	20	24
Out turned	15	27	42
In turned	5	4	9

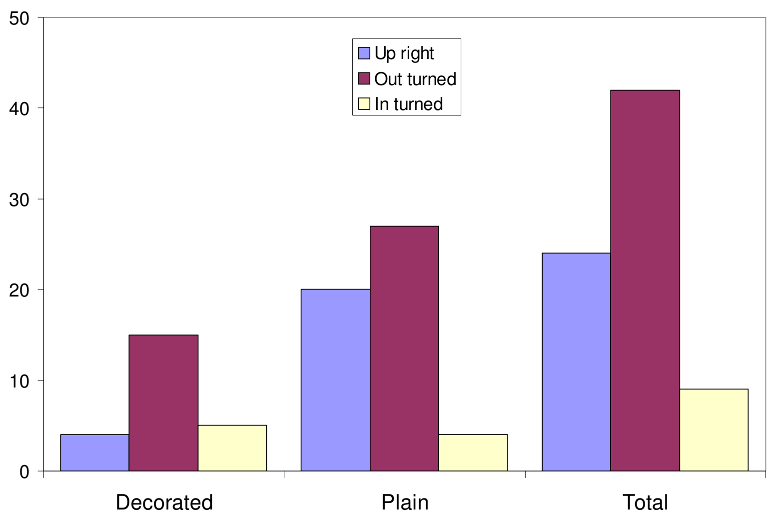

Figure 14 Representations of rim types.

Due to the fragmentary and eroded state of the potshards, it was impossible to measure rim diameter or even to reconstruct vessel forms very accurately. An attempt to construct the vessel forms was done following (Siiriainen 1971; Odner same volume). They used rim inclination (whether out turned rim, upright rim or in turned rim) and rim profile curve variables (whether necked vessels, necked vessels with corner point in the shoulder and vessels without neck), to reconstruct the vessel forms of Gatung'ang'a and Mt. Kilimanjaro (Tanzania) pottery. It should be noted here that this method was found most appropriate as Kiburu pottery has affinity with Gatung'ang'a and Mt. Kilimanjaro pottery. Kiburu pottery was found to contain mainly out-turned and upright rims Figure 15**.** In his description, Siiriainen included "necked vessels but without a corner point in the shoulder". This was omitted in this work, as most rim shards did not have shoulders.

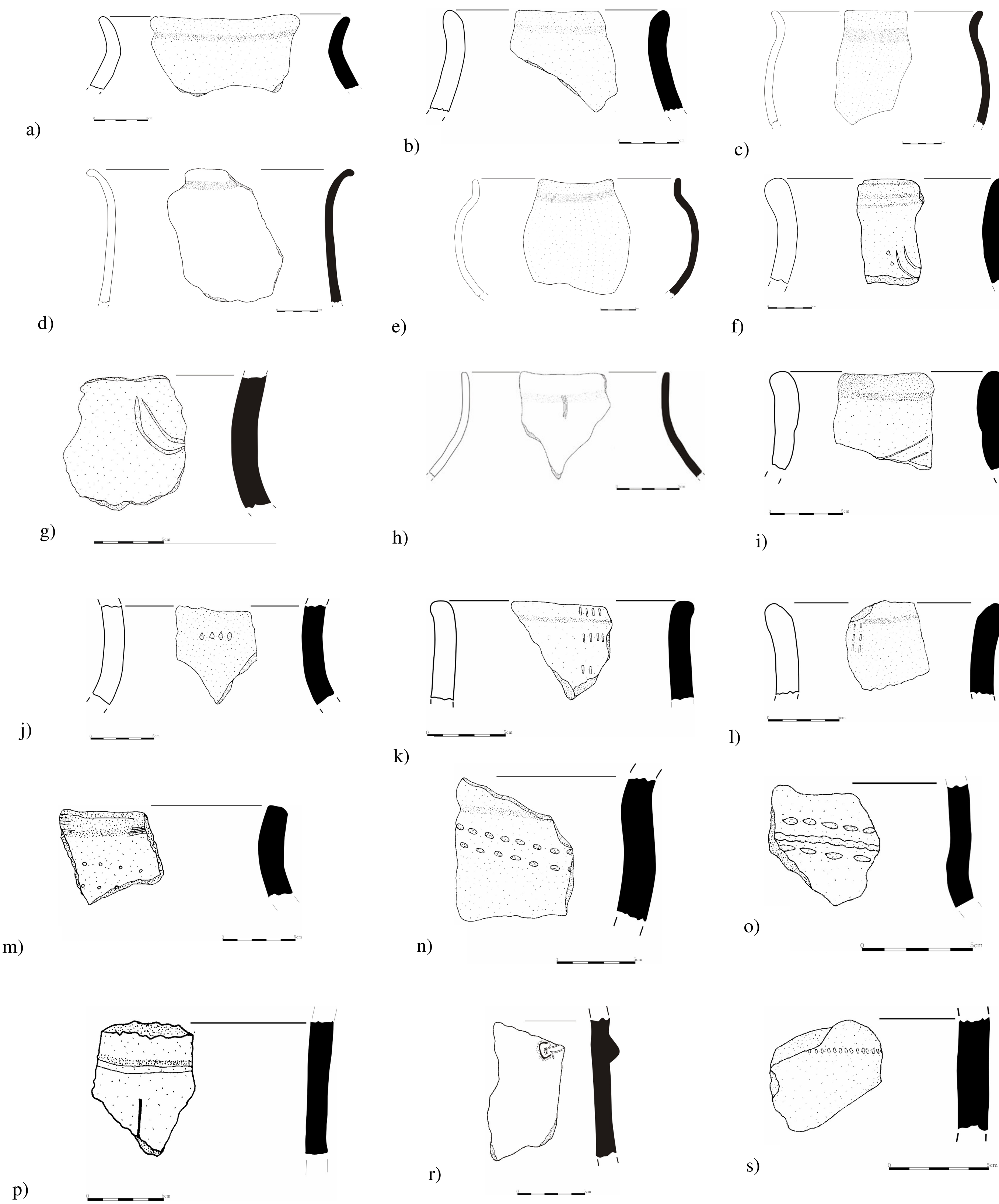

Figure 15 Vessel shapes: out turned vessels (a-e), grooved shards of out turned vessels (f and h), punctates (j, m, n, o and s), and up right rim vessels (i, k, l); drawings by Philip Owiti (BIEA).

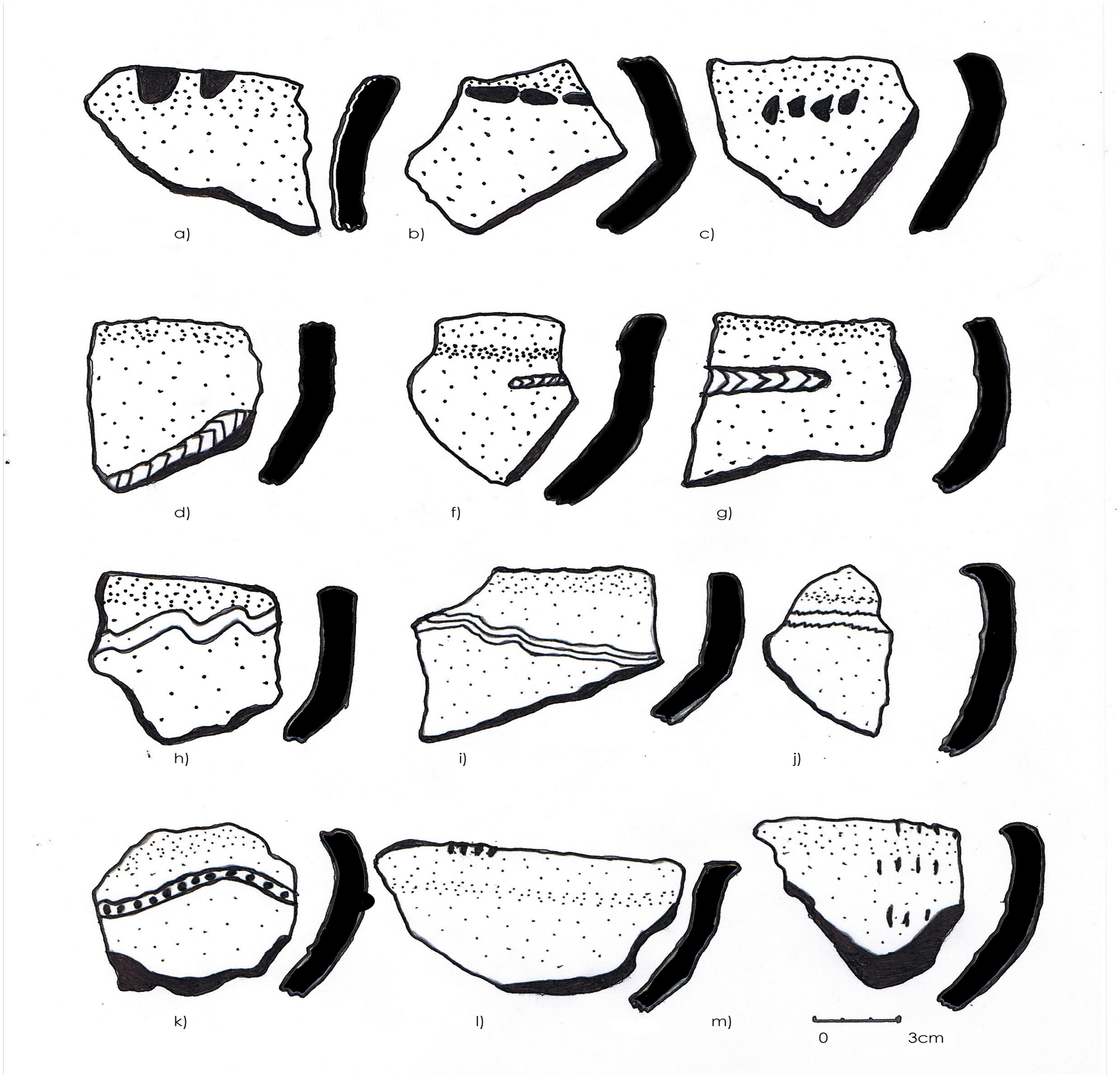

Figure 16 Decorations on pottery illustrating oval/crescent shaped impressions (a-c), pronged instrument impressions (d-g), looped incised lines (h-i), looped grooves (j), notches on raised ridge (k), and notched rims (l and m); drawings by Freda Nkirote.

Only 5 potshards (0.4%) in both surface and excavated materials had shoulders. Therefore, the form here is limited to rim description and should be taken as indicator of vessel type and not absolute vessel form. However, there were some potshards, which were very distinctive and clearly showed that the vessels had round bases. Despite the fact that vessel forms were difficult to reconstruct, I observed that most of them were necked and were of small and medium sizes. Two of the vessels with measurable height were 14cm and 17cm respectively.

3.3 Beads

3.3.1 Bead description

Ninety one beads were recovered from 60% of the excavated area of Kiburu site. Most were recovered from levels 10-20cm (2 and 3) see Figure 18.

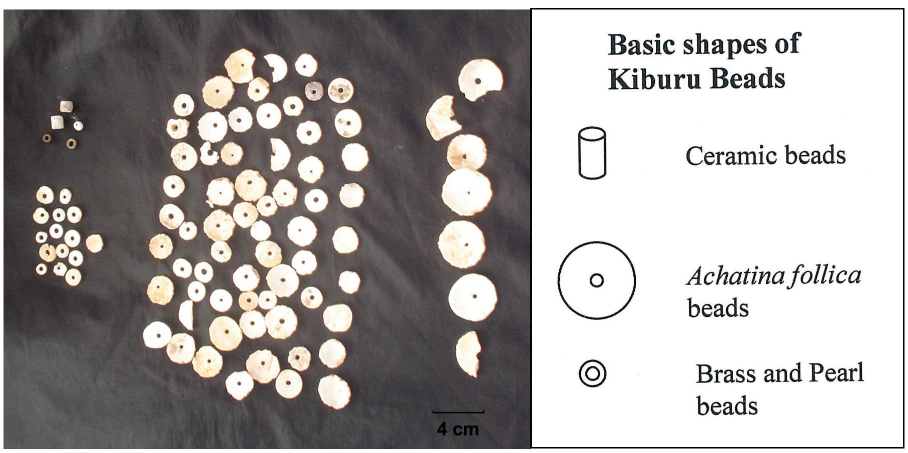

Figure 17 Kiburu site beads.

In this section, a method of classification of beads and pendants described by Kinahan (2000) was applied. This classification was based on several attributes such as a) material, b) dimensions, c) colour, d) general form of the beads, e) decoration and f) method of manufacture. Not all the attributes listed above were used for Kiburu beads. Only material, colour, shape and diameter were considered. Of the 91 beads, 1 was pearl bead, 3 were ceramic and I was brass. The remaining 86 were of *achatina follica* shell (a giant African land snail), and were white in colour. The brass and pearl shell beads did not have colour but the ceramic ones were blue and red in colour. The outer diameter of the beads ranged from less than a centimetre to 3 centimetres. Twenty of the beads were less than 1 cm, 64 were between 1 and 2cm while 7 were between 3 and 4cm. Pearl, ceramic and brass beads all measured less than 3 centimetres.

A description of bead making by Carey (1986) fits well with Iron Age beads of Kiburu. She describes the process of making beads as involving chipping a shell fragment to the approximate shape and drilling a hole after some blanks have been pierced. They were then stringed and rubbed a long a grindstone till they were satisfactory finished. Presence of unfinished but chipped shells shown in Figure 17 and presence of grindstones are indications that this method was used here.

3.3.2 Bead distribution

The pattern displayed is more or less the same as the shards pattern. Just like the pottery, the area above the hearth represented only 3% of the collected beads. Occurrence of beads increased further below but squares N97-98/E104-105, N98-99/E104-105, N97-98/E105-106and N99-100/ E105-106 produced nothing. The area also produced only 5% of all the collected pottery. Immediately after, the number increased again with the majority of excavated squares producing a minimum of 4 beads.

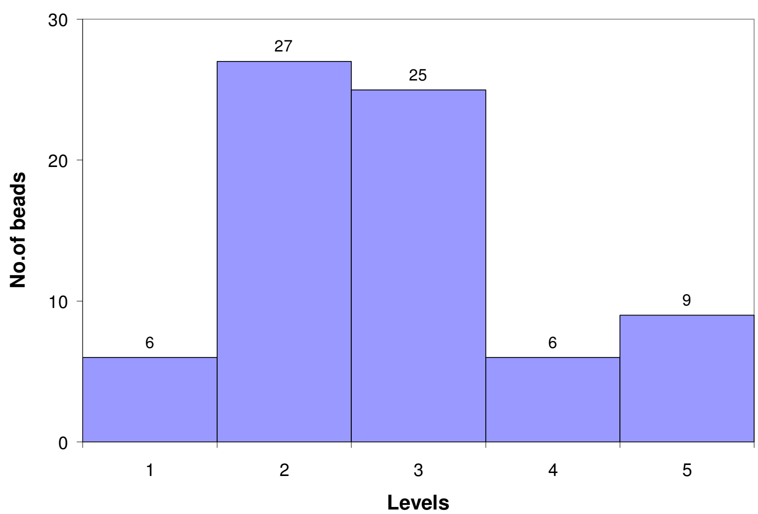

Figure 18 Beads distribution by levels.

3.4 Pendants

Two pendants were recovered from different squares and depths. The pendants are made of copper and bone respectively. The bone pendant measures 3 x 1.6 cm with a pattern of incision and dotted percolations not penetrating the rare side. It is not pointed but it probably broke during its period of use or while in the ground. It is unlikely that it broke after being discarded because the colour of the whole pendant is uniform not showing any signs of later developments after deposition. It has 2 probable string holes unlike the copper pendant. The copper pendant on the other hand is pointed and measures 3 x 0.9cm. Like the bone pendant, it has percolations that do not penetrate to the rare side (Figure 19).

3.5 Metals

Eight pieces of iron were collected during the excavation. These include rings, bangle and spiral rods. The rings measure between 1 and 1.5 cm and the spirals are 20 cm (not in the picture) 7 cm, 6 cm and 3 cm respectively. The iron bangle was a surface collection with a diameter of 8 cm.

Figure 19 Copper and bone pendants (left) and metal ornaments from Kiburu site (right).

3.6 Cowry Shells

Thirty one cowry shells were recovered from 0 to 30 cm depths. They were found in the artefact concentration areas in association with beads, bones and pottery. Thirteen of the cowry shells were complete and 18 were fragments that did not conjoin (see Figure 20). All of them had their backs removed probably for stringing or fixing on the garments.

3.7 Hammerstones and grindstones

Four small hammerstones that weighed 600 g, 300 g, 200 g and 100 g respectively Figure 20 were collected. Three of the hammer stones were smooth and one was rough with 2 flat surfaces with signs of utilization. Fifteen grindstones were also found and recorded but were left in situ. They might have been used for polishing the beads among other purposes.

Figure 20 Cowry shells with removed backs (left) and utilized hammer stones (right).

3.8 Tuyeres

From Kiburu site, only a few tuyere fragments were collected. However, just below the hill as seen earlier (Kanyua site) several tuyeres were excavated whose full length was not possible to measure as they were all broken and had vitrified ends. The thickness of tuyere walls ranged from 11mm-35mm. The tuyeres were of two types; one type with funnel like (flare) end and the other one straighter. On the flared ends, some tuyeres had finger impressions and decoration of horizontally incised lines as shown in Figure 21. The lip of the flared tuyeres had the thickness of 32mm-35mm and circumference of 16 cm to 22 cm. The inner diameter was 4cm and 7cm for the outer diameter. The smaller tuyeres had the inner diameter of 3cm and outer diameter of 5cm.

Across section of the tuyere revealed three different colours. The inner colour was greyish followed by black and reddish in that order. This was observed for all the tuyeres both the wide mouthed and the narrow mouthed ones. Some tuyeres seemed to have double walls (Figure 21 left). This was not a common feature as it was exhibited by only three of the collected tuyeres. It is not yet clear why this was done but probably to strengthen an original layer or to seal some cracks which probably would be the case if they were reused. Another reason for this could be the concentration of higher temperatures on the inner walls. This is however unlikely reason since the double walls are evident throughout the length of the tuyeres.

 

Figure 21 Flared lip tuyere with incision and finger impressions (left) and tuyere with double walls (right).

3.9 Furnace

The recovered furnace seemed like a low shaft furnace built with blocks of clay **(**Figure 22). Most of the blocks that made the upper parts of the furnace were already eroded and the remains were 2 layers excluding the base. Due to previous use, they were blackish in colour and had the texture of basalt rock.

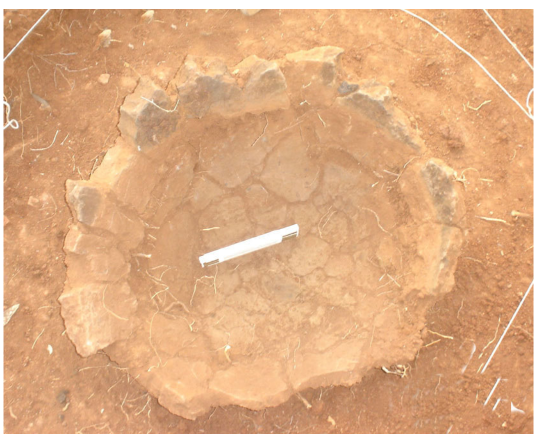 

Figure 22 *In situ* furnace before removal (left) and piece of broken furnace wall (right).

The joints between the blocks were clearly visible with 16 blocks of an average width of 14 cm and thickness of between 4 and 6 cm. All the blocks above the ground had slag attached to them but there was no slag attached to the blocks below them or at the bottom of the furnace. Three pieces of tuyere and small amounts of slag were recovered inside the furnace. These blocks were cemented with clay, the ones at the bottom of the furnace being more closely attached than the ones above the ground level. They were again plastered all round with more clay (an outside layer) as shown in Figure 22 right.

The furnace base had a diameter of 34 cm, with the depth of 30 cm below the surface (46cm below datum) and 20 cm above the surface. The circumference above the ground was 117cm (Figure 23).

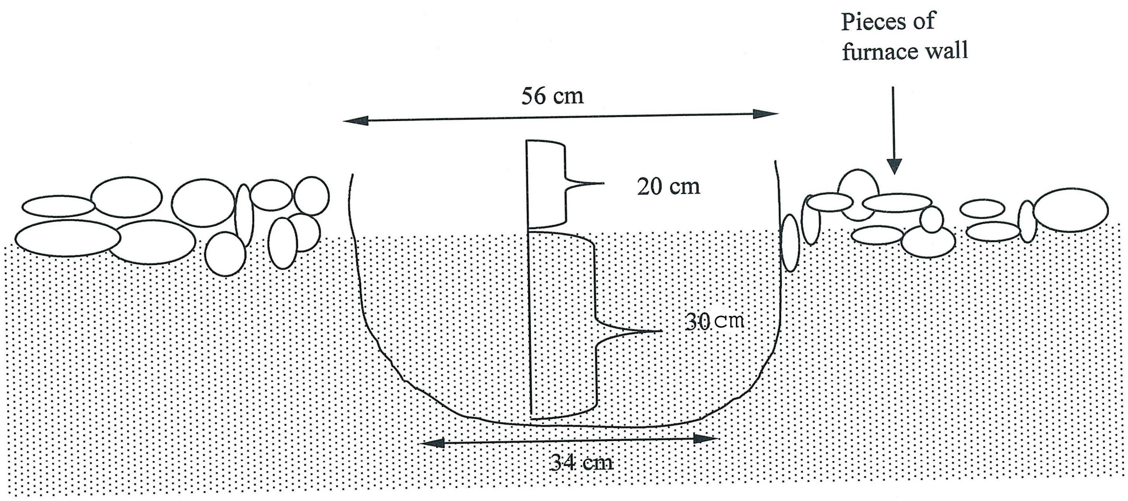

Figure 23 Cross-section of the in situ furnace.

After studying the furnace in situ, across section was cut and further excavations were done under the furnace. Here, a termite hole was exposed (Figure 25, left) without any indication of ritual materials.

3.10 Slag

The slag observed and collected exhibited different characteristics. One type was smooth and with flow marks while the other type was spongy and porous (Figure 24). One big piece weighing over 15 kg might have been from a slag pit. This slag cake was dark and rounded and without metal lustrous. Majority of the slag were blue gray and showed metal lustrous colour on the top face.

The presence of Iron working artefacts and iron working area point to an Iron Age people at Kangai and Kanyua site, while the presence of finished iron objects in Kiburu site, point at a group of users. It cannot be said with certainty that the same group of people used all the three sites. Kiburu site, which forms the bulk of discussion in this thesis, did not have any sign of iron working.

Figure 24 Some iron slag from Kangai Site (left) showing slag flow and (right) slag cake.

3.11 Rock engravings

Seven rocks with engravings were collected on the surface of Kiburu site. The engravings were geometric grids (Figure 25 right). These require further research, as they are currently too meagre to deserve a lot of attention.

Figure 25 Termite hole at the bottom of the furnace (left) Engraved piece from Kiburu site (right).

Ngari (2004) reported two decorated triangular stones from Kiburu, which he suspects might have been used for ritualistic purposes.

4. LATE IRON AGE ECONOMIES OF MT. KENYA REGION

In the first part of this chapter, I will discuss various materials recovered from Mbeere sites and their contribution in understanding of Mt. Kenya region economy between 11th and 15th century A.D. As discussed in chapter one, this is the period within which Mt. Kenya Late Iron Age material lies, including the material that I recovered from Kiburu, Kangai and Kanyua sites. The economies are based on the finds, which include faunal remains, pottery, grindstones, iron, cowry shells, and ornaments. The latter two have been used to infer trade with the coast or exchange between individuals.

4.1 Faunal Remains

Faunal remains play an important part in archaeological record as a direct indicator of some of the prehistoric sources of animal proteins. Jones (1992) cited in Thomas (1993) states that knowledge of past dietary inventories, and of the status of food taxa (wild or domesticated; native or introduced, etc.) are vital components for any attempt to reconstruct past human food webs and broader subsistence systems. Kiburu site and other sites of the same region have produced faunal remains of both domestic and wild game. Regrettably, the area excavated in Kiburu was quite small relative to the site size; therefore, the analysis of fauna remains will serve as an indicator of what the economy might have been

Apart from food sources, Bunn & Kroll (1986), Fisher (1995) argue that skeletal part frequency data can provide key evidence on the taphonomic history of an archaeological bone assemblage. They have discussed "schelpp effect" also discussed by Daly (1969), to describe the taphonomic phenomena where generally the heavier, and less nutritious portions of a carcass tend to remain at animal kill sites, while the lighter and more nutritious portions and even whole carcasses of smaller animals tend to be transported away from animal kill sites. Daly (1969) argues that more settled groups tended to do the rough butchering at the kill site, returning to the settlement with the meat. In this case, only distal portions of the long bones and the feet appear at the site since the axial skeleton and the hip and shoulder girdles had been discarded at the site. White (1956) points out that bones can be used to address questions such as if people exercised choice in the age of the animals they killed, which elements were brought into the camp or village and which elements were left at the kill, among other questions. Equally, Bond (1996) has demonstrated that faunal remains can be used to understand past human-animal relationships he gives an example of the deposition of animals, on a cremation pyre and then in the urn, in Anglo-Saxon. In summary, Daly (1969) argues that the main function of the analysis of faunal material is to aid in determining the economic basis of a culture, whether it be hunting, herding trapping or stealing. Its further function can be to suggest human behaviour patterns, such as hunting techniques, butchering styles, and seasonal or regional dietary selection.

4.1.1 Kiburu bone composition

As part of their economy, Mt. Kenya populations practiced both herding and hunting. Herding is not evidenced directly by the bone collection, but it can be implied from the presence of domestic animals. The importance of the represented animals in protein provision is demonstrated through the amounts each group of animal provided. To determine the relative economic importance of each species, I used a method suggested by White (1956) cited in Daly (1969). The meat weight for each species, White assumes to be 50% of live weight for long legged animals, such as deer, and 70% of live weight for short-legged animals such as pig or bear. The statistics show that although there was only one *bos taurus* it provided most of the meat as compared to the *ovicaprines* and other bovids. The calculations were based on the assumption that the *bos taurus* though a juvenile might have reached it's maximum weight. The intake of wild fauna as compared to domestic is much lower. While the domestic animals provided 76 % of the available protein during the occupation, the wild game provided only 24 %. This means that they did not spend most of their time hunting but probably herding or other economic activities. On the other hand, the contribution of domestic animals would be only 10% if the *bos Taurus* died at a very young age (the age of its death was not determined). Daly (1969) comments that specimens of the very small animals tend to be rather scarce, either because their bones were eaten. This might explain the low representation of small animals like dikdik and rodents; many gastropod shells were however, recovered. These were clearly not used for making beads or any other purpose but food. Apart from *achatina follica* (which will be discussed shortly below) all the other gastropods shells were very weak and withered giving them undesirable character for any modifications as ornaments or any other purpose. The possibility of these gastropods being secondary deposits can be explored though unlikely, since they were recovered in big quantities as shown in Appendix A.

Though this was not done in detail, butchering practice at Kiburu site shows that only smaller animals were either slaughtered or brought to the site whole. Presences of *gazelle* *thomsoni* axial bones in the site, attest to this assumption. Butchering practices differ, and provide evidence of economic and social differentiation (David and Kramer 2001). Bunn (1993 cited in David and Kramer 2001) clarifies that the Hadza typically transport essentially entire field butchered carcasses of all but the largest animals, while abandoning mainly some axial elements at kill sites. Thomas (1993) claims that recent approaches to understanding past human subsistence have gone beyond mere inventories of food items towards an appreciation of the diversity of animal and plant foods exploited in the past by various peoples, of how they were exploited and, even more important, understanding the relationships between subsistence systems and ecological and cultural systems. Similarly, Fisher (1995) argues that bone surface modifications constitute a crucial line of evidence for investigating a variety of issues, including subsistence adaptations, the evolution of economic and social patterns, ritual behaviours and site formations. He exemplifies this with what he calls "cohnchoidal flake scars" on bones produced by hammerstone during bone marrow extraction, which provides important insights into subsistence practices. These observations are evident in Kiburu where none of the long bones was found intact; they were all intentionally broken as evidenced by percussion marks on some of them. A blunt object was used to break the bone, which is assumed here, that they were broken in order to obtain bone marrow, necessary for additional proteins and minerals.

Other evidences exhibited by the bones are the meat processing methods. Although it cannot be said with confidence, most bones exhibited a brownish colour, which would be interpreted as resulting from boiling. It is not however; clear whether this change of colour resulted from preparation or long period of burial. Presence of pottery and a fireplace in association with bones, strengthen this interpretation. Nineteen burnt bones as seen in the previous chapter were recovered from 14 squares of the 34 excavated squares. Although it is not certain whether they were tossed in the fire after removing the meat, it is possible to speculate that they might have gotten burnt during meat roasting.

4.1.2 Species preferences

The faunal analysis in the previous chapter shows that people of Kiburu site during the period under discussion were selective in their choice of animal proteins. Daly (1969) stipulates that the range of species found in an archaeological site is indicative of site environment and of its occupants' subsistence. In reference to animal proteins, the subsistence of Kiburu site occupants comprised mainly of bovid. It is evident that they preferred bovid as opposed to *equid, suid*, carnivals and primates, which were abundant in this area until recently. Similarly, the bone composition also shows that, they preferred smaller bovid to large ones. Although the excavated area is too small to make a conclusive statement, the recovered fauna is almost exclusively of bovid except for one rodent and a house rat (which probably might have come to the site after it was abandoned). Lack of other animal species might imply that they either avoided them or the gazelles and dikdiks were easy preys. In addition, no faunal remains of either wild or domestic fowl were recovered. This might mean that they were not keepers of domestic fowl and they avoided wild fowl in their diet. Another striking feature of the recovered fauna is the lack of fish bones. Kiburu site is located at a walking distance from the Tana River banks. Fishing activities from Tana River today sustains the economy of some families living close to it (personal observation). It is thus surprising that this did not form part of the economy of the prehistoric people living here at the time. Taboo against eating fish by Cushitic-speakers and some Nilotic speakers is recorded by (Phillipson 1977; Ehret 1974; and Huntingford 1953). Moreover, Ehret (1974) argues that the eastern Cushitic speakers have a taboo against eating wild game and fowl a trait also exhibited by Maasai pastoralists (Huntingford 1953). Consequently, absence of these bones could indicate that the prehistoric people here selected what was acceptable for them to consume.

4.1.3 Other bone uses

Prehistoric people used bones for different purpose. These include utility tools like harpoons and harmers as well as ornaments. Kiburu occupants utilized the bone as tools and ornaments. Some heads of long bones showed evidence of having been used as hammers. These might have been used to execute lighter jobs like smoothing of beads or breaking other bones for marrow. The other purpose exhibited is the use of bone as a material for making ornaments. Presence of a bone pendant attests to this. This pendant was the only one of its kind, which makes it difficult to say whether it was manufactured in the site, or if it was brought in.

4.1.4 Herding

As part of economy of Kiburu, occupants might have been practicing herding. This can be inferred from the presence of bones of juvenile *ovicaprines* and *bos taurus*. However, due to the presence of wild game it is not certain if they were breeding them and hunted part-time or if these got into the site as gifts or another form of exchange. Sharer and Ashmore (1993) suggest that the presence of large numbers of young animals remains may indicate direct access to the control of a herd, or selective culling before breeding age to weed out certain characteristics. This, however, cannot be ascertained since only 2 *ovicaprine* and 1 *bos taurus* juveniles were found. Likewise, Marshall (1990) argues recent studies by anthropologists and veterinarians show that there are strong patterns of livestock culling among contemporary pastoralists throughout Africa. She continues to argue that, culling is done to ensure growth and continuity of food production. She points out that, those pastoralists in an unstressed situations wait until the animals have reached an age when growth has slowed, while the ones in stressed conditions will cull their animals at very early stage. Therefore, culling would explain the presence of juvenile bones if this is taken as a pastoralist site. On the other hand, in some communities up to date, young ones of cattle, goat and sheep are given as part of bride wealth. Example is the Nilotic speakers (Huntingford 1953). This phenomenon could also be exemplified by many cases cited by David and Kramer (2001) of how modern hunters interact with their neighbours and exchange items. They point out that the influence of other groups and technologies on these communities introduces further complications rendering even more difficult such aims as interpreting Plio-pleistocene scavenging.

4.2 Pottery

Pottery has been used and is still being used as an important instrument in the reconstruction of prehistoric diets. Through study of food remains that impend on the inside of the pottery, it is possible to extract and study them. However, in the following discussion, I will only limit myself to Mt. Kenya region pottery form to give an indication of uses and I will demonstrate that pottery making might have been part of Mt. Kenya peoples' economy between 11th and 15th century. Discussion of domestic or wild plants has regrettably been omitted due to lack of evidence. Due to logistic and time constrain, I was unable to do a detailed study on pottery in search of food remains.

4.2.1 Pottery forms

Pottery was and is still used to transport, cook, serve and store a wide range of solid and liquid foods as well as to contain other supplies. It is also used for specialized functions, such as burial urns and incenses burners for ritual (Sharer and Ashmore 1993).

Sharer and Ashmore (1993) claim that vessels with necks are assumed to have been used for storing and dispensing liquids as they are today in most areas of the world without running water; the restrictive neck helps to control spillage and reduce waste. Wider mouthed vessels are usually seen as stationary waste storage jars. The rims at Kiburu site, exhibited necked pots as well as bowls. Though the sample of rim shards was small, material from Gatung'ang'a excavated by Siiriainen (1971) and material from Mbeere and its environs collected by Soper (1979) have exhibited the same pottery forms. Presence of pots indicates that the populations in Mt. Kenya region might have used them for liquid storage or food preparation. Some potsherd had black substances on the outside, which might indicate cooking as a method of food preparation. They may have used them also for fetching and storage of water. Kang'ote River, which is about 800meters away from the site may have required that they obtain or manufacture containers for fetching and storing their water among other liquids.

Bowls on the other hand, although they comprise the smaller proportion of the pottery forms, are important in that, they indicate that they might have been used for storing grains. I have not established farming as one of the occupations for Kiburu population but whether they did it or acquired grains from their neighbours, it is probable that they used the pottery for it's storage.

4.2.2 Pottery manufacture

Using X-ray florescence, a constituents analysis method, I was able to establish clay provenance of Kiburu and Kangai sites pottery. With the help of University of Nairobi, Nuclear physics departments, pottery samples from both Kiburu and Kangai were analyzed. Analyses were done on two samples one from Kiburu site and the other from Kangai site, which revealed the same types, distribution and proportions of minerals. The results were then compared with those of the local clay. These were found to be identical in mineral composition and distribution (appendix B). It can be inferred here that Kiburu populations during the time in question, might have been producers of pottery as part of their economy. This might have been manufactured for local use or trade with the neighbours. It is not however; very clear from the excavated materials whether they actually produced it or obtained it from the neighbours since no pottery manufacturing tools were recovered. Nevertheless, its presence in the site, its recovery from both surface, and excavated levels seem to suggest so. It is worthy noting that potshards are the most abundant artifacts on the surface of uncultivated Mbeere land.

4.2.3 Grindstones

Grindstones are essential in establishing prehistoric economies especially economies of farming populations. They are primarily used for processing grains. Sharer and Ashmore (1993) however point out that grindstones do not in themselves unequivocally imply the deliberate growing of domesticated grains. However, they are also found in non-farmer sites, where they had been used for processing grains obtained from farmers by hunter-gatherers or by pastoralists. They were also used for grinding ochre, processing wild plants, smoothing of beads among other purposes (Wright 1994). Although it is not certain what they were used for, grindstones were important to Kiburu site users. This is evident from the fact that they are found all around the outer ring of the site. Fifteen grindstones, which had been used extensively, were observed but were not removed from the site. Until further research is done on the residuals, it cannot be said conclusively the exact role they played in the economy of Kiburu populations between 11th and 15th century.

4.2.4 Iron production and artifacts

As seen in the preceding chapter, Kangai and Kanyua sites, iron production was part of the economy of the region although these sites are yet to be demonstrated to belong to the same period as Kiburu site. Kiburu site produced small amounts of slag, which could indicate iron production, but nothing major to allow conclusive evidence. It is nevertheless evident that Kiburu site occupants were users of iron artefacts these are represented by ornaments presented earlier. Since it is probable that the Kiburu site occupants did not make iron themselves, it is possible that they traded or got it as product of exchange from neighbours. Presence of meagre traces of slag and tuyere pieces attests to the fact that iron production was done in the close vicinity.

4.2.5 Beads

The Kiburu site beads were represented by different materials, most of them being of *achatina follica*. The others were copper alloy, ceramics, and pearl. *Achatina follica* is a giant land snail found around mount Kenya among other places (Tattersfield, Warui et al. 2001) while pearl is only found at the coast. Presence of unfinished beads in addition to the local occurrence of the raw material indicates without doubts that Kiburu occupants made beads. These might have been made for both trade and personal use. Beads have been reported as having played an important role as items of trade with the coast (Chami 1994; Chittick 1984; Abungu 1989; Horton 1996). However, the most important east African coast trade beads are of glass material. At Kiburu site, no glass beads were recovered but another site within Kiburu area, excavated by Ngari (2004) produced glass beads. The presence of pearl recovered during my excavations, undoubtedly confirms trade or some form of exchange with the coast.

4.3 Cowry Shells

Hildburgh (1942) presumes that, because of their most prominent common characteristic, the long narrow opening in their undersides, cowries have received the generic name of *Cypraea*, associated with Cypria a Latin title of Venus who was the principal divinity of Cyprus and a cowry was called by the ancient Romans Concha veneris. *"One of the Indian Ocean's most characteristic products is the cowry, the pre-colonial currency of choice in much of Africa. Of more than two hundred species some trickled into Egypt and Nubia in pre-dynastic times. One species out performed all others, the money cowry (cypraea moneta)"* (Mitchell 2005, 118).

4.3.1 Qualities of cowries

Mitchell (2005) attributes the success of *cypraea moneta* to the following attributes;

- Impossible to counterfeit,
- Without any other practical value, cowries would be traded accurately by weight, and volume and number,
- They were difficult to break, and only slowly lost their colour and lustre.
- Hildburgh (1942) shares Mitchell (2005) observations about the qualities of cowry but adds three more qualities-
- The facility with which a hole could be made by merely breaking thorough the thin wall of the domed surface
- They are common enough into the districts where they are found and often cheap enough, to permit a growth in their employment if there be a growth in a vogue of their use or in a belief in the efficacy as occult agencies
- Close resemblance of the underside to an image of the vulva and the strong suggestion that same underside gives of the half-closed lids of a human eye.

4.3.2 Uses of cowries

The shape of the cowry portrays a visual representation of a vulva. Cross-culturally, symbolism related to fertility is important; hence cowry shells, due to their likeness to female sexual organs, have been interpreted as symbolizing vulva through out the world. Hilburgh (1942) argues that from circumstantial evidence, it would appear probable that cowries and other similar images with a vulva implication served in Egypt as amulets. He also claims that, Europe in general, the cowry served purposes that included both the safeguarding of the carriers from the effects of evil eye envy and witchcraft. In addition to protection, Eldwin (1942) argues that in Baster State, India they were also used for charm, gambling, and currency, as well as also symbolic to the departed among others but he, however, points out that they did not have any vulva importance. Hutton (1940) claims that in Assam as in Borneo and in Melanesia cowries were made to do duty as eyes in carved representations of the human figures and emphasis that they were only surrogate of human eye with no importance as vulva. In West Africa, they were used in a very unique way as reported by Gollmer (1885). He gives a whole range of methods that cowries were attached to strings to convey messages in symbolic language. For example; One cowry indicated defiance and failure, two cowries strung together face to face indicated relationship and meeting. Carey (1986) discusses the use of cowry shells from the Indian Ocean as a valued costly import or as symbol of fertility, since the shell's slit is likened to a woman's sexual organs. She argues that they are used as pendants or appliqué beads on female clothing, especially pubic aprons on royal insignia and in other contexts where prosperity is important. This use she assigns to Sudan and the horn of Africa down Tanzania. During the earlier times, cowry shells were also used as medium of trade.

4.3.3 Temporal and spatial distribution of cowries

The temporal and spatial distribution of cowries in human societies is wide and important considering that they are only found in the East African coast and Maldives coast. Hilburgh (1942) and Mitchell (2005) report of cowries use all over Europe and in pre-dynastic Egypt and Nubia. The Italian traveller Codamosto (1455), cited in Hilburgh (1942), gave an account of the Songhay kingdom where cowries were used for currency. Hilburgh also cites Ibn Batuta (1352) report on the cowries in Melle in the Maldives. Mitchell (2005) claims that they were circulating among farming communities in Southern Africa in the first millennium A.D. and were carried in bulk across the Sahara to the Sahel (9000 km) from their source in the eleventh and twelfth centuries. Likewise, Jeffreys (1948) mentions that although the cowries are only found in Indian Ocean, they had spread to Benin by 1480. Other account of their use in West Africa is Gollmer (1885) who claims that they were used as money as well as in their idolatrous worship. Apart from the distribution in Europe, Asia and Africa, Wintermberg (1924) claims presence of cowry shells in archaeological sites in Ontario, which were introduced by Indians during the 17^{th} century.

The above temporal and spatial distribution shows that presence of cowries 500km from the coast during the time in question is not a wonder since they have been found in areas much further. It is also possible that a centre existed somewhere between the coast of East Africa and West Africa during the early centuries AD that enabled the above distribution. If some trade routes existed from the coast through central Kenya to the north as indicated by Allen (1993) and Miller (1969 cited in Chami 1999), then these Kiburu cowries could be interpreted as some remnants of such trade route.

4.3.4 Cowries of Kiburu site

It is not possible to say at this point if the cowries at Kiburu were used for money or other purposes but it is possible to use this evidence to show that there were definitely contacts with Indian Ocean coast, since these are not found anywhere else. The fact that they are the type of cowries that are used for money, it is possible that they were used as a medium of trade. Phillipson (1977) points out that excavations at Kilwa 350km to the south of Zanzibar, and Manda and Lamu archipelago of the northern coast of Kenya showed that manufacture of shell beads appeared to have been a major industry of the site's inhabitants during 9^{th} century A.D. He points out that cowry shells were collected and may have been used as a medium of exchange. Whichever contest, the cowry shells were used in Kiburu, may not be evident from the materials presented, but just as the Maore ones, they all had their backs removed. What is clear is that there was movement of goods from the coast to Kiburu site and Mbeere region at large before the 16^{th} Century. The Mbeere people at the time exchanged, and traded with their coastal partners.

Just like Mt. Kenya region, Spear (1981) posits that Maore site presented numerous shell beads, cowries with their backs removed, and double glass beads. Which he referred to as all trade items obtained from the coast. Given all the varieties of cowry uses discussed above, it would be an oversimplification to assign Kiburu site cowries only the purpose of trade, but until more evidence of other uses is recovered, I will limit myself to trade. This trade may have been indirect where items passed from one individual to the other through hand to hand transmission and finally to the consumer.

4.4 Exchange and Trade

Although the excavated area of Kiburu site was relatively small, it produced 96 cowries, 2 items of copper alloy, pearl and ceramic beads. The first three items are considered trade items since they are exotic to the area. It is not certain if the ceramic beads were foreign but for this purpose, I will assume they were foreign to the site since only 3 were recovered and there was no evidence of local production. The main aim of this section is to provide evidence that trade with the coast started earlier than 18th century when written documents of trade with interior started to appear (Brown 1970). Presence of the mentioned exotic items are attributable to two systems either exchange or trade, which are difficult to distinguish in an archaeological setting unless there are other factors clearly showing evidence of trade. Although trade might be the most likely system, exchange cannot be ruled out since the items are in small quantities and during the period in question, exchange was important for security and forging of good relationships. Bearing in mind the distance of Kiburu (approximately 500km away) from the coast, and absence of the elaborate road networks of today, I will explore the possibilities of either of the two in the next few paragraphs

4.4.1 Exchange

Why would people of Mt. Kenya region exchange their items or services for exotic items with neighbours or the coast? The aspect of exchange or sharing in early communities social system was very important. Gardner (1991) claims that in order to restrict personal property, sharing and gift giving was an important mechanism. Younger (2005) argues that gift giving was ubiquitous feature in egalitarian societies around the world. At the individual level, generosity was a means of establishing and maintaining personal reputation; it created a network of mutual obligation among the members of a population, as such, it was an essential ingredient in social cohesion. Likewise, Kent (1993) suggests that sharing also solidified social bonds that united nuclear families into consolidated social wholes in ways, that clan age sets or special associations did in other more complex societies. Younger (2005) claims that societies living in resource rich environments in which sharing was not essential for survival;

offer a particular vivid illustration of the role of giving in maintaining the social fabric. Kiburu site, based on its location where there was abundant of wild game and a forest to tap from, represents such an area.

Kent (1993) introduces the concept of egalitarianism where in highly not stratified societies social roles are organized by the absence or rigid status, age, or gender differentiation. Egalitarianism is the term that is used to refer to forager societal organizations (Younger 1995). Flanagan (1989) claims that theoretically, an egalitarian society would be one in which every individual is of equal status, a society in which no one outranks anyone. Kent (1993) however, claims that without sharing egalitarianism would be particularly difficult to achieve in regard to the outcome of specific activates, such as hunting which are known to be based on equal, often innate, abilities like eyesight, or on skills acquired through training or experience. Woodburn (1982) describes egalitarian as a term derived from legality, which was introduced into English with its present meaning in a poem by Tennyson in 1864 to suggest politically assertive equality of the French variety. As observed by Kusimba and Kusimba (2000) symbiotic relationships of trade and exchange bind relationships of populations practicing different economies in many parts of Africa, with diversity of habitat due to soil, altitude and rainfall differences. One form of exchange as discussed by Dark (1995) is reciprocal exchange, which he describes as transfer of materials or services based on the requirements that each gift of materials or services is repaid by material /services of equal or greater value. He continues to argue that, in economies using only specific types of material for specific types of exchange (such as exotic shells in marriage payments) can be described as prestige goods.

Mutoro (1998 cited in Mitchell 2005) claims that except for gold, neither the commodities sought nor the scale on which they were traded abroad may have required deep sustained penetration of the interior of East Africa. Instead, glass and shell beads may have moved through multiple, shorter distances inter community exchanges that principally involved foodstuffs and spouses. Similarly, both Wiesnner (1982) and Cashdan (1985 cited in Mitchell 2005) argue that, for San groups in northern Botswana repeated reciprocal exchanges not only establish and maintain social ties that reduce economic risks, but also provide individuals with information on the status of their relationship. Maschio (1998) discusses the importance of exchange among the Auto, a Melanesian people of south-western New Britain, who judge acts of giving and receiving to possess moral value. Another example is by Huntingford (1953) Nilotic speakers who give either one or more of the following for bridewealth; oxen, calves, heifers sheep or goats. He also points out that among the Hadzapi, bridewealth is in form of gifts of arrows (5-15) and the girl is given a few beads. More examples are given by Muriuki (1974) in Mt. Kenya region where the Bantu gave Dorobo, domestic animals for bridewealth and as payment for land. Same is the case with the Yaaku living on the northern side of Mt. Kenya who had to leave their cave dwellings in the 19th century in order to raise cattle that was used as bridewealth with Maasai neighbours. Cronk (1989) argues for this as the main reason for the Yaaku's cultural and social change. These exchanges would help in cementing relationship between different players hence establishing food and other securities. Dark (1995) points out that social exchanges can be 'economic' in character, and economic exchanges can be 'social' in character as such economic and social life cannot be separated. It is for this reason I explore the possibility of trade below.

4.4.2 Trade

Several early documents on Indian Ocean trade with East African coast give the nature of trade, items, partners and the routes that were used in the early centuries AD. From these early written sources *Periplus of the Erythrean sea* (AD 40-70) for example, provides evidence that East Africa was already involved in trade with India, Persia, and Egypt as early as 40 A.D. (Chami 1994; and Kusimba 2004 citing Casson 1989). Chami (1994) writes that the *Periplus of the Erythrean sea* and Ptolemy's *Geography* (AD 140) are important in indicating the routes of the early trade. The other available sources are early documents from Arab, Chinese, Roman and Portuguese writers. All these are, however, restricted to the East African coast and outside world. However, some indications for trade with interior can and have been derived from the trade items listed in these documents and as well as archaeological evidence. One of the sources in this regard is Cosmas Indicopleustes (6th Century) who writes more about the interior, and reports that Axumites used land route to East Africa and carried salt, iron and cattle which they bartered for gold (Chami 1994; Allen 1993). Allen argues that out of central Kenya, they probably brought back a little gold, and ivory, rhino horn, leopard skins, aromatic gums and minerals such as rock crystal (Allen 1993, p. 59). In addition, Ricks (1970) points out that East African sandalwood and ivory were exchanged for pearls, cloth, dates and purple dye with Persia during the reign of Ardashir (AD. 226-241). He explains (citing Hududu al'Alam A.D. 950) that pearls were an important item of trade for the city of Siraf as were linen napkins and veils. Citing Idris (ca. A.D. 1150), Ricks continues to explain that Ivory, gold and teakwood (found in Mt. Kenya forest) from East Africa as well as skin and ambergris from the Somali coast were traded in the markets of Kish in exchange for pearls, piece goods, dates and dried fish from Persian gulf region. Horton (1996) argues that Items such as sandal-wood and leopard skins receive sporadic historical mention but they attest to the long distance trade with the interior. Similarly, Allen (1993) speculates that Egyptian traders in the 9th century may have followed the Rift right down into Central Kenya so as to avoid serious trouble from swelling rivers as described by Cosmas Indicopleustes. He continues to suggest that the existence of long distance trade routes to the interior after c 950 is proved by the discovery of rock crystals at the appropriate levels in Shanga and Manda, and of haematite at Shanga. He claims that the crystals might have been obtained from Kitui approx. 220 miles inland and haematite from the foothills of Mt. Kenya. Other evidence is provided by Allen (1993) of pre-1175AD Chinese description of tiung-Iji in reference to export of frankincense tree (Boswellia sp), which he points out that it is commonest in Majjertein Highlands but also grows elsewhere in the horn as far south as dry regions of the north-eastern slopes of Mt. Kenya. Likewise, Horton (1996 b) points out that; connections with the interior were through Lamu archipelago linking the Tana river and Mount Kenya, and the Zanzibar channel linking Usambara hills and the Maasai plains. Equally, Miller (1969 cited in Chami 1994) suggests that spices were carried to the Nile and the Red Sea from East Africa through Central Kenya.

Assuming the exotic items found in Kiburu site were products of trade I will in this discussion use Renfew's (1969) definition of trade in its widest sense to mean 'the reciprocal traffic, exchange, or movement of material or goods through peaceful human agency.' Reconstruction of life cycle of Kiburu material is difficult due to the distance from the source and lack of similar sites in between. This absence is caused by the fact that there has not been any systematic archaeological surveys or excavations between the coast and Mt. Kenya region. I will, therefore, explore the unscheduled trade model "Down the line" by Reinfew (1975 cited in Dark 1995; Sharer and Ashmore 1993) to illuminate how it might have been conducted. Beale (1993) discusses a similar model "Trickle trade" where movement of trade materials and goods can be explained by the mechanism of village to village or nomad to village. In this model, life cycle materials, changes hands over very short distances and does so a large number of times over a long period in moving from its source to its final consumer and discard state (Figure 26). Beale explains that, such trade does not necessarily go in any particular direction, but given a large number of small transactions the tendency is for the material to fall off exponentially in quantity with distance from the source. This model of trade or exchange would be the preferred or the most likely mode practiced by Kiburu populations since the political system here was most likely not centralized before the coming of Bantu speakers during the 16th century. As such, individuals either practicing herding or hunting and gathering would have been involved in interpersonal trade exchanges with neighbours or costal traders. This way, items like cowries would move long distances and exchange hands with many people though not in an organized manner until they reached the end user. De Maret (1999) claims that in the 11th century in Kisalian the first cowries from Indian Ocean found in graves may have reached there through hand-to hand-transmission rather than existence of a trading network. Posnasky (1981) argues that cowries and other marine shells found on excavation sites in Zambia from the fourth to sixth centuries AD and sites in Zimbabwe indicate the beginnings of more than a local trade.

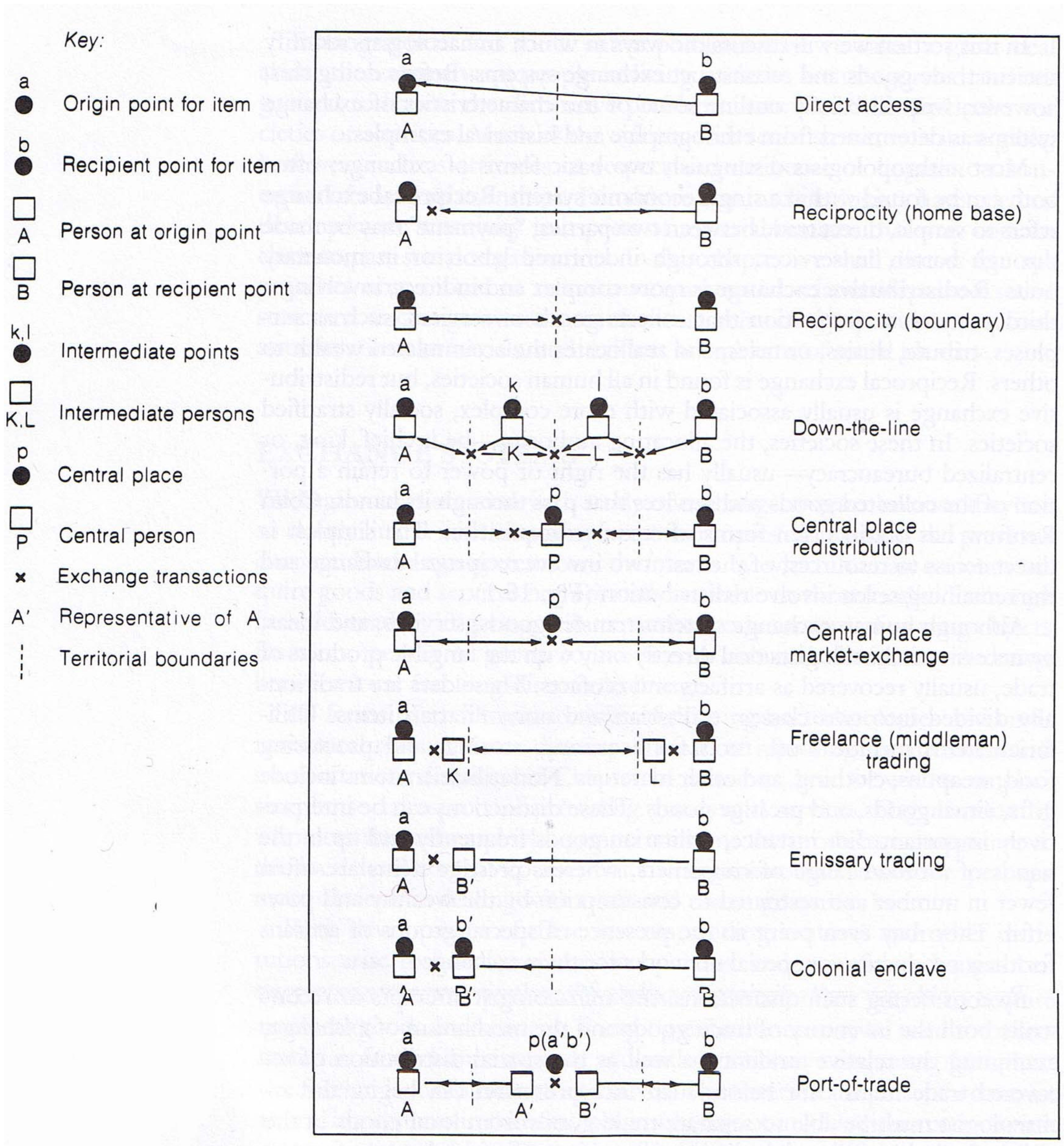

Figure 26 Models of trade by Renfrew (1975) cited in Sharer and Ashmore (1993).

Another issue of early trade worth of consideration is how the partners managed to establish trust between them and the means by which they ensured its' sustainability. One way is what has been described as blood brotherhood. The issue of blood brothers has come up once and again in the matters pertaining to forging relationships between hunter-gatherers and their pastoral or agricultural neighbours. For example, Kusimba and Kusimba (2005) give a case where hunter-gatherer relationships with Wataita neighbours in the hilly and mountainous regions of Tsavo were based upon blood brotherhoods. Another example is Muriuki (1974) where hunter-gathers of Mt. Kenya region had blood brotherhood relationship with the Kikuyu agriculturalist. This obviously must have helped in forging a favourable environment for trade and exchange. Horton (1996a citing Duyvendak 1949) discusses ways the transactions took place: he claims that to establish trust between widely differing ethnic and economic groups all (whether young or old), drew blood on pieces of cloths and swore an oath and only then would they trade their goods. He interprets this as blood brother ritual that took place between traders and apparently large numbers of the local population, thus ensuring security.

Other methods that might have been applied to ensure honesty and safety during transactions is magic and instilling of fear. This is not evident in the prehistoric trade but based on the account given by Horton (1996a) it can be inferred. He writes that according to the tenth century Buzurg, on the Somali coast when merchants got to Berber they had to take escorts with them for fear that a native will seize and geld them. In historical documents, e.g. Hollis (1909) gives accounts of having used Dorobo hunter-gathers from Mt. Kenya region, as guides. Allen (1993) mentions such services as being offered by hunter-gatherers but are not preserved in archaeological evidence. Apart from the excellent knowledge that the hunter-gatherers have of their terrain, it is possible that they easily succeeded in creating demand for these services through instilling fear in the traders. This method played a great part in keeping the coastal traders from going to the interior to purchase goods directly and sustained the trade monopoly of the middlemen like the Kamba of Central Kenya during the 18^{th} century.

On magic, Horton (1996a) gives the example citing Duyvendak (1949), of where the traders' ship got stuck in the ocean because they conducted illegal trade. This form is also possible with hunter-gathers as they are reputed as great medicine men and rainmakers (Huntingford 1953).

4.4.3 Other evidences of early coastal trade and commodities

Based on the summary of the contents of early documents given by (Chami 1994; Horton 1996b), Ivory and tortoise shell feature prominently. Al-Idrisi (1100-66) adds fruits, sorghum, sugar-cane, bananas, rice and camphor trees, also points out that pearl-fishing and cultivation of aromatic plants was taking place in Malindi, Mombasa and Sofala (Chami 1994, p.27). Other items of trade mentioned in the Chinese documents include perishable goods like cloth, rice, soap, wheat, indigo, butter and oils as imports while the exports included slaves, ivory, crystals, skins and tortoise shell (Horton 1996b; Chami 1994). According to Nicholls (1971) the middlemen i.e. the Nyamwezi, Kamba and Yao, took back to the coast, gum, honey, beeswax, grain rice rhino-horn and skins, beet nuts and sesame, cattle sheep, goats, fowls, ghee, and sugarcane

Slaves have long been important in East Africa's Indian Ocean trade, Kusimba (2004) laments that this has been avoided in many records because it was not legitimate. He continues to argue that old historical records mention indications of slave trade as early as 860. For example, Al-ldrisi (1099-1165) who wrote that foreign merchants would lure children to their ships with dates and kidnap them. Slaves must, however, have been obtained mostly from the African mainland. Chain links found at Manda and Shanga may attest to this trade (Horton 1996a). More evidence of slaves comes from Pouwels (2002) who refers to a notorious "Zanj" slave rebellion in Southern Iraq as evidence of extensive slave trafficking from east Africa as early as the ninth century. He continues to argue that, slaves were being exported from East Africa to Sind and other Indian locations as early as the eleventh century. Pouwels (2002) also claims that, Tuan Ch'eng-shih mentioned that cloth was traded directly for slaves, which was the most important item that coastal towns exchanged with their non-Muslim. Similarly, Ricks (1970) argues that during the 12 century Cairo Geneza documents indicate that competition between Aden and Kish for markets of East Africa, in particular for slaves, resulted in several naval clashes between the two states.

I would like to bring to the attention of the reader the fact that the Bantu speakers of Mt. Kenya region as discussed in the introduction, point to Manda and Lamu archipelago as their place of origin. They followed the River Tana banks from the coast to their present habitants. As such, it is possible that, the early inhabitants of Mt. Kenya region and the coast were able to move between the two places to facilitate trade. Mathew (1956) points out that Lamu Island had become the chief centre of Swahili culture in the 17th century perhaps because a trade route that penetrated far inland up the Tana River intersected here the monsoon route to Arabia and India. Brown (1970) suggests that the Kamba traders were probably trading with the coast for many years before such trade was mentioned in writing. Her reason is that trade in ivory at the coast was of long standing and the Kamba were actively engaged in that trade. Likewise, Sutton (1973) points out that recent research has emphasized that the long distance trade was not suddenly implanted on the interior rather it grafted itself onto the older local patterns and regional networks. This is exemplified by all the caravan routes, which were pioneered mainly by interior peoples. Further illustration on early trade is by Birmingham (1970) who points out that from early iron age onwards, the tools, weapons and a basic condiment of many homesteads were often obtained only by the indirect filtration of commodities coming from an area far beyond the social and political horizons of the people concerned. He continues to add that there is remarkably little evidence to suggest that local trade from village to village with a given population was restricted to local products. Chami & Msemwa (1997) write that the Indonesians brought spices from South and East Asia to be ferried to the Mediterranean through the Horn or the interior and if they survived, they carried back glassware and bronze work, clothing brooches, armlets and necklaces. Chami & Msemwa (1997) continue to say that by the 7^{th} century many sites found all over the interior, the coast, and the islands indicate the existence of a network of exchange of goods and ideas.

It is likely that the interior trade became more elaborate due to the control exerted at the coast. The emergence of stone buildings like Kilwa, Manda, Shanga, Kaole created a wealthy elite. Chami (1994) argues that prestigious items in archaeological sites like metal objects, glazed wares etc indicate their wealth. This elite can be inferred from what Horton (1996a) discusses as sponsorship in Shanga where only senior clans had the right to admit traders into Shanga enclosure and to trade for that matter. This kind of organization, may have given them more control and power to send parties in the interior for trade commodities. This might explain why trade with interior intensified after 9^{th} century A.D. Mt. Kenya area having been rich with ivory, leopard skin, rhinoceros horn, and other forest products, must have been one of areas where early trade with the coast extended.

5. DISCUSSION

The purpose of this section is to describe the economy of the inhabtitants of Mt. Kenya region during the Late Iron Age. Although the analysis is primarily based on Kiburu, Kangai and Kanyua sites, comparison is also made with other contemporary sites in the region, Gatung'ang'a site (Siiriainen 1971), South Pare, Embu, Mbeere, Chuka and Chyulu hills sites (Soper, 1976 and 1979), and North Pare, Mt. Kilimanjaro, Usangi hospital sites (Odner, 1971) among other sites mentioned in the preceding chapters.

5.1 Economic adaptation

5.1.1 Environment

Several factors indicate that the inhabitants of Maore and Gatung'ang'a sites were pushed into marginal areas, presumably due to population pressure. These factors include a) the physical location of sites, b) soils c) rainfall and d) temperatures

a) Physical location of the site

All the sites with Gatung'ang'a or Maore ware believed to be contemporaneous are located on the hills. Kiburu site is located on Kiburu hill, Gatung'ang'a site is on a hill, which Siiriainen (1971) describes as partially cultivated and partially pasture land, the other sites like north and south Pare, and Kilimanjaro are as suggested by the names, located on Pare Mountains and Mt. Kilimanjaro respectively.

b) Rainfall

Rainfall in all these areas as reported by the researchers is controlled by altitude and prevailing winds. While the surrounding areas of higher altitudes receive reliable and adequate rainfall, the areas around Gatung'ang'a and Maore sites receive unreliable and poorly distributed precipitation. The Mbeere region for example receives 500-750 mm annually, while other neighbouring areas receive more than 2250mm annually (Table 5). Mbeere Special Rural Development Programme (MSRDP) recorded the statistics shown in table 5 over a period of 10 years. Kiburu site is located in the same division (Evurori) as Ishiara although its altitude is 899m above sea level. Most of the population in Mbeere is confined to high attitude areas with adequate and reliable rainfall making Evurori division moderately populated compared to other areas of lower altitudes with 25-100 persons per kilometre (appendix C). Ishiara area seems to have a higher population than the surrouding area, this can be explained by the fact that it is a town. Table 5 shows that within the 10 years of rainfall recording, Ishiara had 4 years of less than 762 millimetres of rainfall suggesting that, if these severe conditions were similar during the Iron Age a similar distribution of population would be expected.

c) Soils

In most parts of Mbeere, especially lowlands like Kiburu, the soil is grey or reddish-brown, mostly sandy and rocky. Likewise, in other sites of similar adaptations as Kiburu, infertile porous soils are commonly reported. Due to the porosity of the soils water is quickly drained making it unsuitable for crop growing.

d) Temperatures

Besides the above outlined negative factors, the other major problem in these areas is water. This problem is aggravated by high temperatures, which are in the range of 30 degrees Celsius. According to the MSRDP report, most parts of the area have an average of 7-9 hours of sunshine daily. These severe conditions may suggest that the occupants of these marginal areas might have been forced into these regions because of pressure on the resources. The Presence of grindstones in these areas might however, cause doubts on the above observations since they are commonly associated with cultivation. As discussed in Chapter 3 grindstones were important to the inhabitants of the Kiburu site, in particular, since about fifteen of them were found on the surface. The degree of wear show that they had been used extensively. Their position in the site is shown in chapter 2 within the topographic map of Kiburu. Although they are mostly found with agricultural communities, it is possible that in Kiburu site, they were used for processing forest products, grinding of ochre (small pieces of ochre were recovered) smoothing of beads etc. Several uses other than grinding of domestic grains can be associated with grinding stones as discussed in the preceding chapter.

Table 5 Rainfall distribution in Mbeere region (after MSRDP, 1970)

Station	Elevation (m)	Yearly average (mm)	No of years recorded	No. of years with less than 762 mm
Embu I.A.	1,448	1374	10	0 in 10 years
C.C.M. Rumbia (Siakago)	1219	1336	8	0 in 8 "
Kanyuambora	1128	1299	9	1 in 9 "
Kiritiri	1128	984	10	4 in 10 "
B.A.T.	1113	1285	10	1 in 10 "
Kiambere	1052	939	8	3 in 10 "
Meka Sisal	1036	965	5	1 in 5 "
Ishiara	838	962	10	4 in 10 "

5.1.2 Pottery

Cultivation as a form of economy of Mt. Kenya region during the Iron Age cannot be inferred through the recovered pottery since as discussed in Chapter four, no analysis of plant remains were done, therefore, the recovered pottery was only used to illustrate food processing and its functions. In this section, rather than putting more emphasis on the application of pottery, I have posed questions related to Kwale and Gatung'ang'a wares as pottery of Bantu speakers, which has contributed in part to the poor understanding of Mt. Kenya economies during the Iron Age. For the purpose of the following discussion, I have referred to Kwale ware as either "Gatung'ang'a Kwale ware" denoting all the pottery labelled as Kwale ware in Mt. Kenya region, and "Maore Kwale ware" denoting the North eastern Tanzania Kwale ware. The Kwale ware (described after the type-site) is either referred to as "typical Kwale ware" or just as "Kwale ware"

Kwale ware is dated much earlier (latest dates in 6^{th} to 7^{th} centuries A.D.) than Kwale pottery of Mt. Kenya region, which is dated to between 11^{th} and 14^{th} centuries A.D., and thus it is at least 500 years older than Gatung'ang'a Kwale ware. With the available archaeological material, it is difficult to interpret this pottery of Mt. Kenya region as pottery remains of Bantu speakers. Siiriainen (1971) found it difficult to assign Gatung'ang'a pottery to the current Bantu speakers of Mt. Kenya region, and attributed it to an earlier group of Bantu speakers whom he assumed had lived in the region earlier. History and oral traditions of Mt. Kenya region suggest that the current occupants arrived after the 15^{th} century A.D. (see chapter 1). Is it then possible as Siiriainen suggests, that an earlier group of Bantu speakers, was responsible for the Gatung'ang'a Kwale pottery in the Mt. Kenya region? Siiriainen (ibid) points out that the archaeological remains in Gatung'ang'a, including pottery, were ascribed to the Gumba by local traditions and that the first Kikuyu known to have settled on the Gatung'ang'a hill is the present landowner. Therefore, he suggests that the Gumba were a remnant of the original Early Iron Age Bantu population although he comments that it is contrary to the traditions, which say that the Gumba spoke an entirely different language from the Kikuyu. On page 224 (footnote), Siiriainen hypothesizes that the Gumba may have learnt the knowledge of iron production from the early Bantu population; then sometime between c. 1350 and 1600 A.D. the early Bantu speakers vanished leaving the Gumba to inhabit the areas alone until the Kikuyu came; he further comments that this hypothesis is very improbable. Nevertheless, he attributed Gatung'ang'a Kwale ware to an earlier group of Bantu speakers. In addition to Siiriainen's observations, based on the environmental information discussed earlier, is it possible that these early Bantu speakers might have chosen to occupy marginal areas? Why are there no traces of cultivation in Gatung'ang'a and related sites attributed to earlier Bantu speakers? If there were earlier Bantu speaker in the region, where did they go? Who replaced them? why did they not occupy the fertile areas of Mt. Kenya region? The Meru, Chuka, Embu and Kikuyu currently occupy most of the Mt. Kenya areas, known to posses the most fertile soils and most suitable climate for crop growing in Kenya .

The Kwale ware of Maore and Mt. Kenya region have an additional feature "rocked zigzag lines"(Siiriainen 1971, p. 220) which are not a feature of the first description of Kwale ware by Soper (1967a, p. 16). The feature was suggested as a feature of Kwale by Odner (1971b, p. 135). This feature which both Siiriainen (1971) and Odner (1971) saw as a Kwale pottery feature, formed the basis of classifying Gatung'ang'a and Maore wares as direct descendants of Kwale ware. Since this feature was not found in the typical Kwale ware, is this pottery to be presented as Kwale ware or can it be interpreted as a different tradition, based on all the factors discussed above which do not fit with the arrival of Bantu speakers in the Mt. Kenya region, pottery attributes or economy of Bantu speakers? Can we say it was a later development of pottery produced by Bantu speakers or could it have been made by non-Bantu speakers as suggested by oral and historical sources since there were no Bantu speakers in the area? Soper (1979, p. 43) describes the Kwale ware of Mt. Kenya region as "somehow modified and rougher and probably later Kwale type." If this Kwale pottery of Mt. Kenya region was a later development of Kwale type, is there a representation of the original Kwale ware in the region? Soper (ibid) has suggested presence of typical Kwale ware, but so far, no comparisons have been done to distinguish what has been termed as typical Kwale and later Kwale ware. It is not clear either whether Gatung'ang'a is found in association with the typical Kwale ware, but Soper suggests that it cannot yet be conclusively proved that Gatung'ang'a' ware developed directly out of Kwale.

Since the Gatung'ang'a ware and the "Gatung'ang'a Kwale ware" occur in association in Central Kenya and North eastern Tanzania, does this imply a continuity of population? Soper (1979, p. 43) and both Siiriainen (1971, p. 223) and Odner (1971, p. 148) have suggested continuity of population. The continuity of population is adequately supported, but the question of the makers is not properly understood. Historical, oral and linguistic evidence have lend support to the presence of Cushitic speakers and Nilotic speakers in these regions during the second millennium A.D. could it then be possible that one of these groups made Gatung'ang'a and Maore pottery?

If the Kwale pottery of Mt. Kenya and Maore is accepted as representing typical Kwale pottery, without further evidence, the question should be redirected to whom the makers were, since it seems that Soper (1967b, p. 34) equally felt that there was no sufficient evidence to qualify it as a Bantu speakers pottery:

> *"Kwale ware forms part of a very early, probably primary, Iron Age complex which includes the Dimple-based ware of the interlacustrine region of East Africa and almost certainly the Channelled wares of Zambia and Rhodesia, and given the resemblances of the pottery there must be some connection between its makers. It has been reasonably argued that this complex represents the first expansion of Bantu peoples over a large part of southern Africa* ***but this hypothesis cannot be considered proved****… Information on the economy of Iron Age populations is rather scarce owing to the rarity of sites suitable for excavations"*

Evidence of Kwale ware, has been found in other areas of Tanzania since Soper found the type-site in 1967 but, these sites have not been used to show its' authenticity as a Bantu speakers pottery, but to show its distribution. I will very briefly return to this problem in my conclusion.

5.1.3 Osteological material

I have shown in the preceding chapters that, the fauna remains of Kiburu site and of Gatung'ang'a and other contemporarily sites mentioned above composed of both domestic and wild games. This is a case of a confused scenario for any one trying to reconstruct the economy of Kiburu and other contemporarily sites with similar adaptations. The faunal material of Kiburu site, puts more importance to domestic animals as protein providers than the wild game, although this situation is complicated since the recovered bones included three, juveniles and one of the most important animal protein provider (from the calculations presented in chapter 3) was a *bos taurus.* It is not known if the *bos taurus* was killed for culling, and if so, at what age, although I calculated the animal protein importance as if it had attained its maximum weight before death. If this was the case then it stands that, domestic animals were the most important for animal proteins because they provided 76% while the wild game provided 24%. However, if the *bos taurus* was culled at a very early age then the scenario would change such that wild game would be more important providing 90% of the animal protein. Thus, it is difficult to know the actual importance of the wild game or domestic animals based on the material at hand; hence making it impossible to assign the sites to either hunters or herders.

On animal protein selection, it has been shown that not all the animals were exploited and the range hunted was only limited to small and medium bovid. Although other animals in the class of *equids, suids*, primates and reptiles were abundant in the Mt. Kenya region and missing in the faunal collection, of most interest was fish. Tana river, delta, and estuary, currently supports subsistence and commercial fisheries providing the main livelihood for more than 50,000 people (Nippon Koei 1989 cited in IUCN report 2003) and yielding fresh water catch of up to 500 tones a year (Welcomme 1985 cited in IUCN report 2003). It is equally important to note that Tana River is located about 3 kilometres west of Kiburu site (walking distance). Given this information, the fact that Late Iron Age inhabitants of Kiburu site did not exploit the abundant fish of Tana River, leaves a lot to be desired.

Possibility of bone decay under burial condition was considered but was found improbable since the other bones were in a good preservation state (based on my observation and discussions with the faunal analyst at National museums of Kenya). As discussed earlier, although the pottery was badly weathered, it was a result of physical or mechanical erosion since they are inorganic matter. The bones on the other hand, since they are organic material, would be consumed through chemical reactions. If the chemical deterioration agents were present, this would have been evident in the surviving bones. Therefore, the fact that this was not evident in any of the recovered bones, attests to the fact that no fish bones were left in the site. It has been argued that Cushitic speakers have a taboo against eating fish (Ehret 1974; Phillipson 1977) and thus, users of Kiburu site might have been intentionally avoiding fish for unknown reasons. Based on the faunal evidence provided and discussion on the same, I suggest that although it is not in the scope of this thesis to assign Kiburu or any other site to any particular linguistic group, a case for Cushitic speakers should be addressed by future research.

5.1.4 Iron

Iron artefacts and iron smelting or smithing objects collected during my research, point to a population with Iron technology skills. These were earlier assigned to Bantu speakers based on pottery as seen above, but they could have belonged to pastoral groups as well. The economy of Kangai and Kanyua sites obviously included iron working since the objects recovered were not complete iron objects but iron working remains (furnace, tuyeres and slag). It is also evident that these sites were situated close to water sources, (see topographic maps in chapter 2) which might have been the case because the iron ore was panned from riverbeds. On the other hand, Kiburu site was situated away from any water source with the nearest being almost a kilometre away. Moreover, only finished items were found with some traces of some iron slag, which did not constitute enough evidence for iron production. These were not enough to conclude that iron production or forging was taking place in Kiburu site, but based on the dates of iron working sites in the region like Kangai it is possible as discussed earlier to treat both sites as contemporaneous. The dates for Kangai site were assigned using c 14 dates obtained by Soper (1976) from Chyulu hills sites (discussed in chapter 2) which exhibited similar archaeological remains as Kangai site; hence, this date puts Kangai and Kiburu within the same temporal period and it is an indication that the inhabitants of this area had iron working technology. However, I have interpreted Kiburu site occupants as users of iron objects but not as producers until further information is attained. It is worth noting that Kangai and Kanyua sites, although they showed evidence of iron production, no complete iron artefacts were recovered. Would it be possible that they made iron bloom for coastal trade? This line of thought is provoked by information in the old written records on coastal trade pointing at iron as both import and export item of trade. Brown (1970, p. 6) and Sasson (1967, p. 10) have cited Al Indris comment that iron was more valued than gold in the Indian Ocean trade and that, wrought iron was a very important item of trade during the 12th century A.D. Brown mentions that it might have been brought in from Pare Mountains, which is rich in iron mines. Chami (1984, p. 46) suggests that East African coast might have exported iron ore and imported finished goods.

5.1.5 Trade and exchange

Trade items recovered at Kiburu site, which is 500 km from the coast of Kenya, were cowry shells beads and copper ornaments. In the preceding chapter, I have shown that although trade with the interior appears in written record after 18th century, it was going on earlier than that as attested by trade materials. Several writers and travellers from, India, Persia, Egypt, and Arabian countries, China, Rome and Portugal, have recorded the Indian Ocean trade with east

African coast since beginning of the first millennium A.D. Sadly, what is recorded is mainly concerned with the coast but not the interior. Probably, this is because these East African trading partners did not penetrate the interior; hence, they were not witnesses of where the items they received at the coast came from, in addition they may not have differentiate what was acquired from the coast, from what was obtained from its immediate hinterland. However, even if they knew the exact locations, regions like Mt. Kenya or any other specific interior places would have no meaning to their readers at that early period. The early written sources have nevertheless, played a very important role in pointing out the routes and materials that were traded. It is possible to trace through these documents early trade with the interior as early as 9th century A.D. Most of the trade items e.g. ivory, rhinoceros horn, leopard skin, honey, gum, and rock crystal among others as recorded in the old written sources are examples of what might have been obtained from Mt. Kenya region. Other items of trade that might have been obtained from Mt. Kenya region were perishable and hence not recoverable in an archaeological context. From the coastal trade partners, apart from cowry shells, pearl and copper ornaments Mt. Kenya region might have received, salt, cloths and spices among other items. The trade with interior might have grown more rapidly with the creation of trade elite at the coast. The elite might have made it possible for trade to flow smoothly as well as sending missions to the interior, which their overseas trading partners could not do earlier. The overseas trading partners, I suppose, were largely disadvantaged by their inability to speak the local languages and further scared by all the scarily stories they were told by local traders about the vicious people of the interior.

Due to lack of elaborate road networks at the time and the long distance between the two regions (500 km), I have hypothesized that a down-the-line mode of trade was used as opposed to centralized trade. This is attested by the amounts of exotic items recovered since as discussed earlier, this mode of trade entails passing of items through several hands before it reaches the end user; hence, the items reduce considerably in number with the distance. This was taken as an explanation for the few amounts of copper and pearl.

Although trade was considered the most probable reason for the presence of the said exotic items of Kiburu site, exchange could not be ignored. During the early times as seen in the preceding chapter, exchange played a very important role in terms of ensuring good relations with the neighbours and food securities. Many examples were given of modern hunter-gather societies who are always exchanging items with either farmers or pastoral groups within their neighbourhood. This aspect of hunter-gatherer societies may account for the presence of exotic items in the site as well as the domestic animals (assuming that the site was occupied by hunter-gatherer community). Since Mt. Kenya forest was an area of abundant forest resources, the purpose of exchange may not have been primarily to ensure food security, but for strengthening social relations between individuals and groups. Consequently, exotic items like cowry shells, copper and pearl ornaments might have been exchanged as prestige goods. Exchanging of exotic items or prestige goods has continued to be a practice in modern societies, for the same purposes.

5.2 Previously Suggested Economies

This section seeks to compare my findings on Mt. Kenya economies during the Late Iron Age with what has been suggested as economies of areas with Gatung'ang'a or Maore ware. Unlike the inhabitants, economies were not of much interest to the previous researches, however, based on the little that is said, there were no indications of cultivation in Gatung'ang'a site (Siiriainen 1971, p. 219). This is rather surprising considering that, Siiriainen attributed the pottery material to Bantu speakers. He also points out that all the identifiable bone material that is; ox/cow (*bos taurus*) 2 astragali, 1 calcaneum, 6 tarsals-carpals, 2 metatarsals-metacarpals, 9 phalanges, 1 sesamoid, 1 humerus, 1 femur and 62 teeth; ovicaprine: 11 teeth were from domestic animals (the identifications were done by a student in the Veterinary Department, University of Nairobi). Siiriainen further suggests that the teeth might be secondary deposition having been brought to the lower layers by burrowing animals. Soper (1967b) claims that there was no conclusive evidence indicating that the inhabitants of North eastern Tanzania smelted or worked iron as opposed to obtaining it ready-made from somewhere else. Soper also suggests that these inhabitants consumed considerable quantities of wild animals and also kept or had access to caprines and cattle, and inferred cultivation or grains from the presence of querns and rubbing stones. Odner (1971a) argues that in North Pare there is direct evidence that people kept caprines and circumstantial evidence that they had cattle and cultivation. He also points out that beads made of seashell are commonly found in South Pare indicating trade with the coast. Likewise, Soper (1967b) has also mentioned contact with the coast in regard to beads and shells, although he has not qualified it as either exchange or trade.

The above paragraphs show that presence of mixed domestic and wild game bones, shells, copper and beads, suggest that people occupying Maore sites practiced similar economies as Mt. Kenya region communities during the Iron Age. Although both Soper (1967b) and (Odner 1971) have suggested a cultivating economy, they had no direct evidence of such economy and thus, they inferred from "querns and rubbing stones", in the case of Soper and "other circumstantial evidence" in the case of Odner. Siiriainen on the other hand put it clearly that there were no indications of cultivation in Gatung'ang'a site. I would like to bring to the attention of the reader that, I have interpreted agriculture by Siiriainen, Odner and Soper to mean cultivation, since agriculture was obvious from the domestic animal bones.

5.3 Probable Inhabitants

The discussion that follows is not intended to assign Mt. Kenya region during the late Iron Age to any language group but to try to discuss whom the possible inhabitants were based on the economies. Where necessary I will only mention language groups to illustrate my points. It may be noted that cultivating community is not discussed as possible inhabitants since there is no conclusive evidence so far indicating their presence.

5.3.1 Pastoral community with a hunting economy

In this section, I am suggesting that the inhabitants of Kiburu site might have been pastoral people who had lost their animals and turned to hunting economy as they tried to rebuild a viable herd. The reasons for this loss of cattle could be related to several factors such as drought, animal diseases and attacks from wild animals. We know from written reports such as, Mbeere Special Rural Development Programme (1970) that tsetse flies are a feature of this environment that for so long as adversely affected progress in the area. They also report that during pre-colonial times, a most severe famine and rinderpest epidemic occurred in the early thirties where several Mbeere people lost their herds. In addition, the report cites tick borne diseases as some of the most severe in the area. It is therefore, probable that the former inhabitants of Kiburu, which is in Mbeere, suffered the same misfortunes in the prehistoric times. No direct evidence of this scenario exists at present but the animal disease data at least suggest why many foragers in Kenya until recently spoke Cushitic rather than click based languages (Cronk 1991; stiles 1981cited in Gifford-Godnzalez 2005). Presumably, the loss of herds also occurred during prehistoric times, Gifford-Godnzalez (2005) gives examples of archaeological sites like Prolonged Drift (citing Gifford *et al*. 1980) and Naivasha Railway rockshelter (citing Onyango Abuje 1977a) as representing such occurrences. When the loss occurred the pastoralists were compelled to take up other adaptations for survival. The behaviour of pastoral people joining hunter-gatherer or their farming neighbours is one that can be demonstrated using modern populations. For instance, the Maasai pastoral community in Kenya has sections that were originally pastoralist and later turned to hunting after losing their cattle; examples of these have been discussed by Maguire (1928) and Kenny (1981). Some pastoralists move to join hunters for brief periods, while others move permanently. Another example is from the Khoikhoi herders of southern Africa. Having lost their cattle, Spear (1981) argues that, the only way in which they could later return to being Khoikhoi was to attach themselves as clients to rich Khoikhoi. He claims that the large aggregations of Khoikhoi broke down into smaller and smaller groups who were forced to rely more on hunting and gathering for their subsistence, thus becoming san. In addition, Gifford-Godnzalez (2005) argues that the act of joining or interacting with foragers through marriage, clientship, or exchange of products could be used as security measure just in case they lost their stock. In this way, some hunter-gatherers would have assimilated herding groups, and so herders could fall back among hunter-gatherer groups in case of stock loss (Gifford-Gonzalez 1998 cited in Marshall and Hildebrand 2002)

Another factor of importance in this part of discussion is the ideology of pastoralists towards cattle. This issue is well discussed by Robbertshaw and Collett (1983a) pastoralist who had lost their stock would have preferred to stay in the areas suitable for pastoralism in order to rebuild their herds rather than move to better agricultural lands. Sites producing a mixture of wild and domestic fauna may represent the remains of people whose herds had been depleted, and who had been therefore, forced to put increased efforts into hunting and farming until domestic herds were replenished (Robbertshaw and Collett 1983a, p. 296). The ideology of pastoralism here refers to the importance attributed to the cattle by the pastoralist. Their lives depend on the cattle and they are permanently occupied in finding pastures for them. They will rarely kill the cattle unless there is a great need. When they have to exchange cattle with neighbours for social obligations or food, they give the old and weak ones like in the case of Maasai (Huntingford 1953). Marshall (1990) clarifies that killing juveniles for culling at very early stage is done only when the pastoralists are living in areas of limited pastures, otherwise they wait until the animals have approached their maximum weight in unstressed situations before killing them. In addition, she points out that only male calves are culled to protect females from food competition; hence, ensuring maximum growth and productivity.

5.3.2 Hunter- gatherer community

Assuming hunter-gatherers and not pastoralists or farmers occupied Kiburu site I will in the next few paragraphs discuss possible reasons for the admixture of the bones.

The most probable explanation is that communities practicing different economies lived in this region during the same period, consequently, exchanging their products such that the hunter-gatherers traded forest products for farm products. As Spear (1981) postulated, forest hunter-gatherers could exchange animal and forest products with savannah farmers for food, pottery or ironware. This is in the local histories of Mt. Kenya region as recorded by Muriuki (1974) and Kenyatta (1938). To illustrate this symbiosis further, Spear (1981) points out that in Zambia, late Stone Age rock shelters and early Iron Age settlements were located quite near one another, indicating that Stone Age hunters must have coexisted for some time with Iron Age farmers in the same areas. In addition, he points out that Iron Age pottery was found in association with stone tools in the rock shelters of hunter-gatherers, showing that the two people conducted some trade with one another.

The other possibility is that the people of Mt. Kenya region practiced mixed economies implying that they may have been hunter-gatherers with domestic animals. Headland and Reid (1989) argue that modern hunter-gatherers are heavily dependent upon both trade with food producing populations and part-time cultivation or pastoralism. They also point out that recent publications on a number of hunter-gatherer societies established that symbiosis and desultory food production observed among them today are neither recent nor anomalous but represent an economy practiced by most hunter gatherer for many hundreds if not thousands of years. Likewise, Lyton *et al* (1991) argue that instead of conceiving the transition from hunting and gathering to herding or cultivation as an evolutionary progression from one distinct type of society to another, we should explore the usefulness of treating them as alternative strategies, which are singly or in combination appropriate to particular social or natural environments.

6 CONCLUSION AND FUTURE RESEARCH

6.1 Conclusion

Based on the presented archaeological finds and earlier archaeological works I have in the discussion above shown that the economies of Mt. Kenya region during the Late Iron Age were multiple. It is apparent that, hunting, herding, iron working and trade are clearly represented by the recovered materials. It is also clear that although cultivation is inferred by earlier researches, there is no conclusive evidence to indicate that it was practiced by either Kiburu, Kangai or Kanyua site users or the rest of Mt. Kenya region during the Late Iron Age. This is also the case with Tanzanian sites bearing Maore pottery, which has the same attributes and is considered contemporaneous with Gatung'ang'a.

Trading economy was inferred from exotic items, with their nearest habitat (in relation to Mt. Kenya region) being the Kenyan coast, which is 500 km away. I have argued for down the line mode of trade or reciprocal exchange. Both modes are suggested because it is impossible based on the available material to speak in favour of one and not the other. Distinction between trade and exchange would however, be possible with recovery of more exotic materials and also after establishing the users of the sites, since people practicing cultivation, herding or hunting have different forms of political and social organizations, which would be reflected on the recovered items or /and their spatial distributions.

I have also shown that based on the available evidence, it would be impossible to say conclusively who the inhabitants were even on a broad sense based on the economies. A case for herders who had lost their animals was suggested and various reasons were given for the suggestion, however, based on the materials and site locations hunters tend to have a stronger case. The only factors in favour of a pastoral groups or herders are presence of domestic animals and location of the site. These cannot be taken *per se* as indicators, since as discussed above, hunter-gatherer communities either practice small scale herding, or they have access to domestic animals through exchange with their pastoral neighbours. It has also been put forward that presence of domestic animals could also be attributed to marriages where they are given as bridewealth.

In the light of the given evidence, I conclude broadly that the multiple economies exhibited in Mt. Kenya region mean that different groups of people practicing different economies co-existed. They traded or exchanged items between themselves either as diplomatic ventures or social obligation like bridewealth. It is also my conclusion that the users of Gatung'ang'a and Maore ware were people who had been pushed into the marginal areas by either cultivating or pastoralists communities. In the first part of the discussion, I showed that location, rainfall and soil in this region were factors that might have played an important role in the settlement patterns. Pastoralists require water for their animals and they will therefore, choose areas that are close to the sources of water. They also prefer to have their animals graze in the plains rather than hills and forests. Thus, these conditions attest to the fact that users of Gatung'ang'a and Maore, moved to the areas of less competition. On the other hand, it may be argued that hilly locations offered them excellent view of the grazing wild animals and probably they could easily plan methods of approaching and killing the animal/animals in view.

I hypothesize that the pottery material of Gatung'ang'a and Kwale ware in Mt. Kenya region and North Pare region is not a Bantu pottery but a product of either Cushitic or Nilotic speakers. Owing to the fact that an additional attribute was added to the original Kwale ware and the fact that Bantu speakers arrived in these areas after these two wares had stopped to be produced. Having not been able to assign Mt. Kenya pottery to the current Bantu speakers, it was suggested that an earlier group of vanished Bantu speakers made it. There is no support for the suggested earlier Bantu speakers from archaeological, historical, oral or even linguistic sources. In addition, the locations of the sites bearing the Gatung'ang'a and Maore pottery have been shown to be dry and infertile rendering cultivation impossible. Bearing these factors in mind, if the status of Kwale ware in Mt. Kenya region is accepted without further evidence, then what should be questioned is not its existence, but whom its maker might have been in all the sites where it has been identified. It seems that, archaeologists readily accepted all the assumed Bantu speakers early Iron Age pottery without enough evidence, and later, research continued without aiming at finding more evidence to legitimise it as a pottery of Bantu speakers, but to find its temporal and spatial distributions. Consequently, even where there was no other evidence apart from the assumed pottery, for the presence of Bantu speakers there was reluctance to explore possibilities of having other linguistic groups as the probable legitimate makers.

6.2 Suggestions for Future Research

Although there seem to be a strong case for hunters, presence of domestic animals in Kiburu site and other contemporary sites require further investigations, as they cannot be wished away. They have complicated the issue of inhabitants of Mt. Kenya region during the Iron Age, who otherwise, can be identified to linguage level if more archaeological evidence is sought through further excavations and employment of multidisciplinary approach. For Mt. Kenya region in particular, Mbeere region offers great research opportunity for this kind of research and I hope that the work I have presented in this thesis will form at least in part, the base for further investigations.

Regrettably, archaeological research in the Mt. Kenya region has been minimal, and its contributions towards the peopling of the region and their economies are quite inadequate. Oral traditions, linguists and historians have made many assumptions regarding the inhabitants of the region but these are yet to be supported by archaeological evidence. For example; archaeologists have assumed that Gatung'anga' ware is a Bantu pottery, and this has been published in several literary works although there is clearly no archaeological evidence to support this assumption. Oral traditions and historical records attribute Gatung'ang'a pottery to hunter-gatherers and archaeologists have contradicted this attribution without sufficient evidence. This calls for more coordinated research in order to correct or confirm this interpretation because the little data and its interpretation have remained *status quo* since the first and last research in the matter was conducted in 1971.

I also recommend that, to complement the work of historians who have pointed to early coastal trade with Mt. Kenya region, systematic surveys and excavations should be conducted covering the 500 kilometres between Mt. Kenya area and the coast to establish more evidence of trade. Recovery of more archaeological evidence will help in distinguishing whether the exotic items discussed in the text were from trade or exchange; hence, enhancing our knowledge of Mt. Kenya economies and providing concrete evidence that trade extended 500 Kilometres into the interior as early as the beginning of the second millennium A.D.

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APPENDIX A: Additional Faunal Data

Table 6 Bone list from Kiburu site by level

LOCATION	Depth	Taxonomic ID	R/L	Element	Px / Ds	Size	Comments
N-99-100, E99-100	Surface	Gastropod		Cowrie Shell			
"	"	Mammal		Shell			Terrestrial
"	"	Bovid		Bone frags.		2	Pieces
N98-99, E100-101	Surface	Bovid	Rt	Radius	Px	4	
"	"	Bovid	Rt	Unciform		4	
"	"	Bovid	Lt	Metacarpal	Px	2	
"	"	Bovid	Lt	Scapula		2	
"	"	Bovid	Rt	Scapula		2	
"	"	Bovid	Rt	Humerus shaft		2	
"	"	Bovid	Lt	Metacarpal	Px	2	
"	"	Bovid		Phalanx 1		2	
"	"	Bovid		Phalanx 1	Ds	2	Juvenile
"	"	Bovid		Phalanx 1		2	
"	"	Bovid		Phalanx 1		1	
"	"	Bovid		Phalanx 2		2	
"	"	Bovid		Axis		2	
"	"	Bovid	Lt	Humerus	Px	2	
"	"	Bovid	Rt	Astragalus		2	
"	"	Bovid	Lt	Astragalus		2	Juvenile
"	"	Bovid		Phalanx 3		2	
N98-99, E100-101	Surface	Bovid	Rt	Mandible		1	
"	"	Bovid		Metapodial shaft		1	
"	"	Ovicaprid	Rt	M1		2	
"	"	Bovid		Phalanx 1	Ds		2 Pieces
"	"	Bovid	Rt	Scapula frag.		2	
"	"	Mammal		Ulna frag.		4	
"	"	Mammal	Rt	Femur		2	
"	"	Gastropod		Shell			2 Pieces
"	"	Mammal		Rib frag.		4	
"	"	Mammal		Rib frag.		2	8 Pieces
"	"	Mammal		Vertebra frag.		2	
"		Mammal		Bone frags.			
N98-99, E99-100	Surface	Mammal		Bone frags.		4	
N99-100, E103-104	Surface	Bovid		Phalanx 3		2	
N97-98, E102-103	Surface	Bovid	Rt	Mandible condyte		2	
N97-98, E100-101	Surface	Ovicaprid	Lt	Mandible frag.		2	
"	"	Bovid		Phalanx1		2	
"	"	Gastropod		Shell			9 Pieces
"	"	Bovid	Lt	Ulna frag.		2	
N98-99, E101-102	Surface	Mammal		Vertebra frag.		2	
N99-100, E98-99	Surface	Mammal		Longbone frag.		2	
N100-101, E99-100	Surface	Bovid	Rt	Patella		4	

LOCATION	Depth	Taxonomic ID	R/L	Element	Px / Ds	Size	Comments
N100-101, E99-100	Surface	Gastropod		Shell			4 Pieces
N100-101, E98-99	Surface	Bovid	Rt	Petrosal		2	
"	"	Mammal		Rib frag.		2	2 Pieces
"	"	Mammal		Bone frags.		2	3 Pieces
N97-98, E103-104	Surface	Mammal		Bone frags.		2	3 Pieces
N99-100, E101-102	Surface	Gastropod		Shell		2	4 Pieces
N100-101, E99-100	0-10 cm	Ovicaprid	Lt	MT		2	
"	"	Ovicaprid	Lt	M2		2	
"	"	Bovid	Lt	Metacarpal	Px	4	
"	"	Bovid		Metapodial shaft		4	
"	"	Bovid		Metapodial Epiphysis	Ds	2	Juvenile
"	"	Bovid	Rt	Scapula frag.		2	
"	"	Mammal	Rt	Tibia frag.		4	
"	"	Bovid	Rt	Radia/Ulna	Ds	2	
"	"	Bovid	Rt	Ischium frag.		2	
"	"	Bovid	Lt	Tibia shaft		2	
"	"	Bovid	Lt	Humerus shaft		2	
"	"	Bovid	Rt	Pubis bone		2	
N100-101, E99-100	0-10 cm	Mammal		Bone frags.			32 Pieces
N97-98, E101-102	0-10 cm	Ovicaprid	Lt	M2		2	
"	"	Ovicaprid	Lt	M2		2	
"	"	Bovid	Rt	P2, P3		2	
"	"	Ovicaprid	Rt	M2		2	
"	"	Ovicaprid	Lt	M1		2	
"	"	Bovid	Lt	Astragalus		2	
"	"	Bovid	Lt	Astragalus		2	
"	"	Bovid	Rt	Astragalus		2	
"	"	Ovicaprid	Lt	M1,		2	
"	"	Ovicaprid	Rt	M1,		2	
"	"	Bovid		Metapodial shaft		3	
"	"	Bovid	Lt	Mandible condyte		2	
"	"	Bovid		Metapodial frag.		4	2 Pieces
"	"	Bovid	Rt	Mandible frag.		2	
"	"	Mammal		Cervical vertebra		4	
"	"	Mammal		Rib		4	
"	"	Mammal		Thoracic vertebra		2	
"	"	Bovid	Rt	Femur Epiphysis		2	Juvenile
"	"	Bovid	Lt	Radius		2	
N97-98, E101-102	0-10 cm	Mammal		Rib frag.		2	14 Pieces
"	"	Cowrie		Shell			
"	"	Gastropod		Shell			11 Pieces
"	"	Mammal		Skull frag.			
"	"	Bovid	Lt	Magnum		2	
"	"	Bovid	Rt	Scaphoid		2	
"	"	Mammal		Neural spine		2	
"	"	Mammal		Centrum		4	

LOCATION	Depth	Taxonomic ID	R/L	Element	Px / Ds	Size	Comments
N97-98, E101-102	0-10 cm	Mammal		Lumbar Vertebra		2	
"	"	Mammal		Bone frags.		2	127 Pieces
N99-100, E99-100	0-10 cm	Bostaurus	Rt	P3, Deciduous		4	Juvenile
"	"	Bovid		Metatarsal	Ds	4	
"	"	Mammal		Cervical vertebra		4	
"	"	Mammal		Rib frag.		4	
"	"	Bovid		Phalanx 3		4	
"	"	Bovid	Lt	Femur	Ds	2	
"	"	Bovid		Metapodial Epiphysis	Ds	2	
"	"	Bovid		Metapodial	Ds	2	
"	"	Bovid	Lt	Humerus frag.	Ds	2	
"	"	Bovid	Rt	Ischium frag.		2	
N99-100, E99-100	0-10 cm	Ovicaprid	Lt	M2		2	
"	"	Bovid	Rt	Scapula		2	
"	"	Bovid	Lt	Patella		2	
"	"	Mammal		Bone frags.		2	92 Pieces
N98-99, E99-100	0-10 cm	Bovid	Lt	Metacarpal	Px	2	
"	"	Bovid	Rt	Ischium frag.		2	
"	"	Bovid		Phalanx		2	
"	"	Bovid		Phalanx		2	
"	"	Bovid	Lt	Innominate frag.		2	
"	"	Mammal		Thoracic vertebra		2	
"	"	Mammal		Rib frag.		4	3 Pieces
"	"	Mammal		Bone frags.		4	
"	"	Mammal		Rib frag.		2	3 Pieces
"	"	Gastropod		Shell			11 Pieces
"	"	Bovid	lt	Metatarsal	Px	2	
"	"	Mammal		Bone frags.		2	46 Pieces
N99-100, E100-101	0-10 cm	Thomson's Gazelle	Rt	Mandible		2	
"	"	Thomson's Gazelle	Lt	mandible		2	
"	"	Ovicaprid	Lt	Mandible		2	Juvenile
"	"	Bovid	Lt	Scapula		2	
"	"	Bovid		Phalanx1		2	
"	"	Bovid	Lt	Astragalus		2	
"	"	Mammal		Sacram		2	
"	"	Mammal		Lumbar Vertebra		2	5 Pieces
"	"	Bovid		Phalanx		4	
"	"	Mammal		Lumbar Vertebra		4	
"	"	Bovid		Tibia shaft		2	
"	"	Bovid	Rt	Metacarpal frag.	Px	2	
"	"	Mammal		Vertebra		4	
"	"	Gastropod		Shell			5 Pieces
"	"	Mammal		Bone frags.		2	39 Pieces
N100-101, E100-101	0-10 cm	Ovicaprid	Lt	Maxilla P2, P3, P4		2	

LOCATION	Depth	Taxonomic ID	R/L	Element	Px / Ds	Size	Comments
N100-101, E100-101	0-10 cm	Ovicaprid	Rt	M2		2	
"	"	Bovid	Rt	Radia/Ulna		2	
"	"	Bovid		Radius shaft		2	
"	"	Bovid	Lt	Ulna		2	
"	"	Bovid		Phalanx		2	
"	"	Bovid	Rt	Metatarsal		2	
"	"	Bovid		Metapodial shaft		2	
"	"	Bovid		Phalanx 3		2	3 Pieces
N100-101, E100-101	0-10 cm	Mammal		Caudal bone			
"	"	Gastropod		Shell			3 Pieces
"	"	Mammal		Bone frags.			4 Pieces
"	"	Mammal		Vertebra frag.			4 Pieces
"	"	Mammal		Bone frags.			34 Pieces
N98-99, E101-102	0-10 cm	Bovid	Rt	Metacarpal		2	
"	"	Bovid		Phalanx1		2	
"	"	Bovid	Rt	Metacarpal	Px	2	
"	"	Bovid	Rt	Femur shaft			Juvenile
"	"	Bovid		Phalanx1		1	
"	"	Cowrie		Shell			
"	"	Mammal		Bone frags.			
"	"	Mammal		Rib frag.			2 Pieces
"	"	Mammal		rib frag.			7 Pieces
"	"	Mammal		Bone frags.			23 Pieces
N99-100, E101-102	0-10	Bovid	Rt	Innominate		2	
"	"	Bovid	Lt	Humerus	Ds	2	
"	"	Bovid	Lt	Ilium		2	
"	"	Ovicaprid	Rt	M2,		2	
"	"	Bovid	Rt	P2,		2	
"	"	Bovid	Rt	Magnum		2	
"	"	Ovicaprid	Rt	P4,Deciduous		2	
"	"	Cowrie		Shell			
"	"	Gastropod		Shell			
"	"	Mammal		Neural spine		2	
"	"	Mammal		Bone frags.		2	28 Pieces
N98-99, E103-104	0-10 cm	Bovid	Lt	Pre-maxilla			
"	"	Bovid	Rt	Infraorbital bone		2	
"	"	Bovid	Rt	Fibula		2	
"	"	Bovid		Phalanx1		2	2 Pieces
"	"	Bovid		Horncore		4	
"	"	Bovid	Lt	Incisor		2	
"	"	Mammal		Hyoid bone		2	
"	"	Mammal		Bone frags.		2	
"	"	Mammal		Bone frags.			16 Pieces
N99-100, E98-99	0-10 cm	Bovid		Phalanx 2		2	
"	"	Bovid	Rt	Ulna frag.		2	
"	"	Gastropod		Shell			14 Pieces
"	"	Bovid		Incisor root		2	

LOCATION	Depth	Taxonomic ID	R/L	Element	Px / Ds	Size	Comments
N99-100, E98-99	0-10 cm	Mammal		Bone frags.		4	7 Pieces
N97-98, E103-104	0-10 cm	Bovid	Rt	Semilunar		2	
"	"	Bovid	Lt	Ischium		2	
"	"	Bovid	Lt	Humerus shaft		2	Juvenile
"	"	Bovid	Lt	Olecranon process		2	
"	"	Bovid	Lt	Scapula		2	
"	"	Bovid	Lt	Pre-maxilla		2	
"	"	Bovid	Rt	Radius	Px	2	
"	"	Bovid	Lt	Tibia Epiphysis	Px	2	
"	"	Mammal		Bone frags.			22 Pieces
N98-99, E102-103	0-10 cm	Bovid	Lt	Occipital Condyle		2	
"	"	Bovid		Metapodial Epiphysis	Ds	4	
"	"	Bovid	Lt	Humerus	Ds	2	
"	"	Bovid		Phalanx 2		2	
"	"	Bovid		Phalanx 3		2	
"	"	Bovid	Rt	Incisor		2	
"	"	Rodent	Rt	Femur			Cf. house rat
"	"	Bovid	Rt	Infraorbital bone		2	
"	"	Bovid		Phalanx 1 frags.			2 Pieces
"	"	Gastropod		Shell			7 Pieces
"	"	Mammal		Bone frags.			41 Pieces
N100-101, E98-99	0-10 cm	Mammal		Bone frags.			27 Pieces
N99-100, E103-104	0-10 cm	Cowrie		Shell			
"	"	Mammal		Bone frags.			43 Pieces
N97-98, E102-103	0-10 cm	Bovid	Lt	Ilium		2	
"	"	Bovid	Lt	Ilium			
"	"	Bovid	Lt	Ilium			
"	"	Bovid	Rt	Ilium			
"	"	Bovid	Lt	Humerus	Ds	2	
"	"	Bovid	Rt	Calcaneum		2	
"	"	Bovid	Rt	Radius Epiphysis	Ds	2	Juvenile
"	"	Bovid	Rt	Ulna		2	
"	"	Gastropod		Shell			21 Pieces
"	"	Mammal		Bone frags.			45 Pieces
N97-98, E100-101	0-10 cm	Mammal		Bone frags.		2	34 Pieces
"	"	Mammal		Rib frag.		2	4 Pieces
"	"	Gastropod		Shell			6 Pieces
"	"	Mammal		Rib		4	1 Piece
N99-100, E102-103	0-10 cm	Ovicaprid	Lt	M2		2	
"	"	Ovicaprid	Rt	P4, Deciduous		2	
"	"	Mammal		Bone frags.		2	12 Pieces
N99-100, E97-98	0-10 cm	Ovicaprid	Lt	M2		2	
"	"	Ovicaprid	Lt	P4		2	
"	"	Bovid	Lt	Navicula Cuboid		2	
"	"	Bovid	Rt	Navicula Cuboid		2	

LOCATION	Depth	Taxonomic ID	R/L	Element	Px / Ds	Size	Comments
N99-100, E97-98	0-10 cm	Gastropod		Shell			7 Pieces
N98-99, E100-101	0-10 cm	Bovid		Phalanx 1	Px	2	
N98-99, E103-104	0-10 cm	Mammal		Vertebra frag.			2 Pieces
N99-100, E103-104	10-20 cm	Bovid	Rt	Radius		4	
"	"	Bovid	Lt	Humerus		2	
"	"	Bovid	Rt	Femur Epiphysis		2	
"	"	Bovid	Lt	Astragalus		2	
"	"	Bovid		Phalanx 1		2	
"	"	Mammal		Bone frags.		4	2 Pieces
"	"	Bovid	Lt	Pre-maxilla		2	
"	"	Mammal		Rib frag.		2	7 Pieces
"	"	Mammal		Bone frags.			18 Pieces
"	"	Gastropod		Shell			4 Pieces
N100-101, E98-99	10-20 cm	Ovicaprid	Lt	Mandible		2	
"	"	Bovid		Phalanx 3		4	
"	"	Bovid		Phalanx 2		4	
N100-101, E98-99	10-20 cm	Bovid	Lt	Navicula Cuboid		4	
"	"	Mammal		Sacram		4	
"	"	Bovid	Lt	Tibia shaft		2	
"	"	Bovid	Rt	Tibia shaft frag.		2	
"	"	Mammal		Lumbar Vertebra		2	
"	"	Bovid	Lt	Incisor		2	
"	"	Gastropod		Shell			
"	"	Bovid		Tooth frag.		4	
N99-100, E101-102	10-20 cm	Ovicaprid	Lt	Mandible		2	Juvenile
"	"	Bovid	Rt	Radius		4	
"	"	Bovid		Phalanx 1		2	
"	"	Mammal	Lt	Scapula		2	
"	"	Gastropod		Shell			10 Pieces
"	"	Mammal		Bone frags.		2	13 Pieces
N99-100, E99-100	10-20 cm	Bovid	Lt	Ulna		4	
"	"	Ovicaprid	Rt	M2		2	
"	"	Bovid		Phalanx 2		2	
"	"	Bovid		Metapodial frag.		2	
"	"	Gastropod		Shell			5 Pieces
"	"	Mammal		Bone frags.		2	
N97-98, E101-102	10-20 cm	Ovicaprid	Lt	M2,		2	
"	"	Ovicaprid	Lt	M1,		2	
"	"	Ovicaprid	Rt	P5,		2	Juvenile
"	"	Bovid	Rt	Semilunar		4	
"	"	Bovid	Rt	Scaphoid		4	
"	"	Bovid		Phalanx 1		4	
"	"	Mammal		Ribs			6 Pieces
"	"	Mammal		Thoracic vertebra frags.			3 Pieces
"	"	Mammal		Bone frags.		2	19 Pieces
N99-100, E95-96	10-20 cm	Cowrie		Shell			

LOCATION	Depth	Taxonomic ID	R/L	Element	Px / Ds	Size	Comments
N99-100, E95-96	10-20 cm	Bovid	Lt	Femur Head		2	
N98-99, E103-104	10-20 cm	Bovid	Rt	Innominate		2	
"	"	Bovid	Rt	Astragalus		2	
"	"	Bovid	Rt	Ulna frag.		2	
"	"	Mammal		Bone frags.		2	24 Pieces
N98-99, E100-101	10-20 cm	Bovid	Lt	Femur shaft		2	
"	"	Bovid	Rt	Humerus	Ds	2	
"	"	Bovid	Lt	Tibia Epiphysis	Ds		
"	"	Gastropod		Shell			
"	"	Mammal		Bone frags.			13 Pieces
N99-100, E102-103	10-20 cm	Bovid	Rt	Metacarpal		2	
"	"	Bovid	Lt	Humerus shaft		2	
"	"	Bovid	Rt	Humerus shaft		2	
"	"	Bovid	Lt	Unciform		2	
"	"	Mammal		Bone frags.		2	
N97-98, E103-104	10-20 cm	Bovid		Radius shaft		2	
"	"	Bovid	Lt	Metatarsal		2	
"	"	Bovid	Rt	Unciform			
"	"	Bovid	Rt	Scaphoid		2	
"	"	Cowrie		Shell			
"	"	Mammal		Bone frags.		2	14 Pieces
"	"	Gastropod		Shell			6 Pieces
N99-100, E100-101	10-20 cm	Bovid	Rt	Patella		4	
"	"	Bovid	Rt	Patella		2	
"	"	Bovid	Rt	Metatarsal		2	
"	"	Bovid		Metapodial	Ds	2	
"	"	Bovid		Phalanx		1	
"	"	Bovid		Phalanx	Ds	2	
"	"	Rodent	Rt	Tibia			
"	"	Mammal		Rib frag.		2	14 Pieces
N99-100, E98-99	10-20 cm	Bovid		Atlas frag.		2	
"	"	Bovid		Metapodial frag.		2	
"	"	Bovid	Rt	Calcaneum frag.		2	
"	"	Mammal		Cervical frag.		2	3 Pieces
"	"	Mammal		Bone frags.			12 Pieces
"	"	Gastropod		Shell			12 Pieces
N98-99, E99-100	10-20 cm	Bovid	Lt	Radia/Ulna	Px	2	
"	"	Bovid	Rt	Metacarpal		2	
"	"	Bovid	Lt	Radia/Ulna	Ds	2	
"	"	Mammal		Sacram		2	
N97-98, E102-103	10-20 cm	Mammal		Bone frags.		2	19 Pieces
N100-101, E99-100	10-20 cm	Mammal		Caudal bone			
"	"	Mammal		Bone frags.			17 Pieces
N98-99, E99-100	20-30 cm	Bovid	Rt	Metatarsal		2	
"	"	Ovicaprid	Rt	Mandible		2	
"	"	Bovid	Lt	Humerus	Ds	2	
"	"	Bovid	Rt	Humerus	Ds	2	

LOCATION	Depth	Taxonomic ID	R/L	Element	Px / Ds	Size	Comments
N98-99, E99-100	20-30 cm	Bovid	Lt	Calcaneum		2	
"	"	Gastropod		Shell			14 Pieces
"	"	Mammal		Rib frag.			2 Pieces
N99-100, 101-102	10-20 cm	Bovid	Lt	Navicula Cuboid		2	
"	"	Bovid	Rt	Navicula Cuboid		2	
"	"	Bovid		Metapodial	Ds	2	
"	"	Bovid		Phalanx 1		2	
"	"	Mammal		Lumbar Vertebra		2	3 Pieces
"	"	Mammal		Cervical vertebra		2	2 Pieces
"	"	Mammal		Bone frags.		4	2 Pieces
"	"	Mammal		Bone frags.		2	27 Pieces
N99-100, E102-103	20-30 cm	Ovicaprid	Lt	Mandible		2	
"	"	Bovid	Lt	Scapula		2	
"	"	Bovid	Rt	Tibia	Ds	2	
"	"	Bovid		Phalanx		4	
"	"	Bovid		Sesamoid		4	
"	"	Bovid	Rt	Tibia shaft		2	
"	"	Ovicaprid	Lt	Maxilla		2	
"	"	Mammal		Thoracic vertebra		2	
"	"	Mammal		Cervical vertebra		2	
"	"	Bovid	Lt	Tibia		2	
"	"	Mammal		Bone frags.		2	
N97-98, E101-102	20-30 cm	Ovicaprid	Lt	Mandible		2	
"	"	Bovid	Rt	Magnum		4	
"	"	Bovid	Rt	Unciform		4	
"	"	Bovid	Rt	Cuneiform		4	
"	"	Bovid	Rt	Pisiform		4	
"	"	Gastropod		Shell			2 Pieces
"	"	Mammal		Bone frags.		2	26 Pieces
N98-99, E102-103	20-30 cm	Mammal	Rt	Ilium		4	
"	"	Mammal		Ribs		2	6 Pieces
N98-99, E101-102	20-30 cm	Ovicaprid	Rt	Maxilla		2	
"	"	Mammal		Rib		4	2 Pieces
"	"	Mammal		Rib		2	8 Pieces
"	"	Mammal		Vertebra frag.		2	3 Pieces
"	"	Bovid		Sesamoid		4	
"	"	Mammal		Bone frags.		2	16 Pieces
N98-99, E100-101	20-30 cm	Ovicaprid	Lt	M2		2	
"	"	Bovid	Rt	Femur		2	
"	"	Ovicaprid	Lt	P4,Deciduous		2	
"	"	Gastropod		Shell			5 Pieces
"	"	Mammal		Bone frags.			18 Pieces
N99-100, E99-100	20-30 cm	Cowrie		Shell			
"	"	Mammal		Bone frags.		2	12 Pieces
N98-99, E102-103	20-30 cm	Ovicaprid	Rt	M3		2	
"	"	Bovid	Rt	Mandible condyte		2	
"	"	Bovid		Phalanx 1		2	

LOCATION	Depth	Taxonomic ID	R/L	Element	Px / Ds	Size	Comments
N98-99, E102-103	20-30 cm	Bovid		Phalanx 1		2	
"	"	Bovid		Phalanx 2		2	
"	"	Mammal		Bone frags.		2	21 Pieces
106E-N97	0-10 cm	Ovicaprid	Lt	M2, frag.		2	
"	"	Bovid	Rt	Tibia Epiphysis	Ds	2	
"	"	Mammal		Femur Shaft frag.			
"	"	Mammal	Lt	Femur head			
"	"	Bovid	Lt	Ulna frag.		2	
"	"	Mammal		Radius shaft frag.		2	
"	"	Mammal		Ribs		2	2 Pieces
"	"	Gastropod		Shell frags.			12 Pieces
"	"	Mammal		Bone frags.			27 Pieces
"	10-20 cm	Bovid	Lt	Innominate frags.		2	
"	"	Bovid	Rt	Astragalus		2	
"	"	Mammal		Bone frags.			26 Pieces
"	"	Gastropod		Shell frags.			7 Pieces
"	20-30 cm	Ovicaprid	Lt	Mandible frag.		2	
"	"	Bovid	Rt	Astragalus		2	
"	"	Bovid	Lt	Scapula		2	
"	"	Mammal		Sacram vertebre			
"	"	Bovid	Rt	Radius	Px	1	
"	"	Bovid	Rt	Calcaneum		1	
"	"	Bovid	Rt	Ulna frag.		2	
106E-N97	20-30 cm	Mammal	Rt	Patella			
"	"	Mammal		Rib frags.			3 Pieces
"	"	Gastropod		Shell frags.			9 Pieces
"	"	Mammal		Bone frags.			12 Pieces
"	30-40 cm	Bovid		Mandible bone		2	
"	"	Mammal		Bone frags.			8 Pieces
106E-N98	0-10 cm	Mammal		Thoracic vertebra			
"	"	Bovid		Phalanx 2		2	
"	"	Bovid		Phalanx 3		2	
"	"	Mammal		Scapula frag.			
"	"	Bovid		Metapodial frag.		2	
"	"	Mammal		Cervical vertebra		2	
"	"	Bovid	Rt	Mandible frag.		2	
"	"	Mammal		Femur frag.			
"	"	Mammal		Bone frags.		2	18 Pieces
"	"	Gastropod		Shell frags.			7 Pieces
"	10-20 cm	Mammal		Atlas frag.			
"	"	Mammal		Axis			
"	"	Bovid		Metacarpal frag	Px	2	
"	"	Mammal		Vertebra frag.		2	
"	"	Bovid		Phalanx 1	Px	2	
"	"	Mammal		Bone frags.			24 Pieces
"	"	Gastropod		Shell frags.			14 Pieces
"	20-30 cm	Ovicaprid	Rt	P3, 4, Maxilla		2	

LOCATION	Depth	Taxonomic ID	R/L	Element	Px / Ds	Size	Comments
106E-N98	20-30 cm	Ovicaprid	Lt	P2, 3, 4, Maxilla		2	
"	"	Bovid		Axis		2	
"	"	Bovid	Rt	Radius		2	
"	"	Bovid		Metapodial shaft frag.		4	
"	"	Bovid		Proximal Sesamoid		2	
"	"	Bovid		Phalanx 2		2	
"	"	Mammal		Rib frags.			4 Pieces
"	"	Mammal		Skull frags.			
"	"	Bovid		Tooth frags.			4 Pieces
"	"	Mammal		Bone frags.			29 Pieces
"	"	Gastropod		Shell frags.			7 Pieces
"	30-40 cm	Bovid	Lt	Radius Epiphysis	Ds	4	
"	"	Mammal		Rib		4	1 Piece
"	"	Bovid	Lt	Metacarpal	Px	2	
"	"	Bovid		Tibia shaft		2	
"	"	Bovid	Rt	Tibia Epiphysis	Ds	2	
"	"	Bovid	Rt	Lateral + Mid Cuneiform		2	
"	"	Bovid		Phalanx 2		2	
"	"	Bovid		Phalanx 3		2	
"	"	Mammal		Bone frags.		2	23 Pieces
"	"	Gastropod		Shell frags.			5 Pieces
106E-99N	Surface	Bovid		Phalanx 2		4	
"	"	Gastropod		Shell frags.			5 Pieces
"	0-10 cm	Bovid		Phalanx 3		2	
"	"	Bovid		Metapodial	Ds	2	
"	"	Mammal		Long bone frag.		4	
"	"	Mammal		Bone frags.		2	21 Pieces
"	10-20 cm	Ovicaprid	Rt	M2		2	
"	"	Bovid	Lt	Navicular cuboid		2	
"	"	Bovid	Lt	Ulna shaft frag.		2	
"	"	Bovid		Radius shaft frag.		2	
"	"	Bovid	Lt	Mandible frag.		2	
"	"	Bovid		Phalanx 1	Px	2	
"	"	Bovid		Metapodial shaft		2	
"	"	Rattus Rattus	Lt	Mandible			
"	"	Mammal		Bone frags.		2	36 Pieces
"	20-30 cm	Bovid	Lt	Tibia		2	
"	"	Bovid	Lt	Humerus	Ds	2	
"	"	Ovicaprid	Rt	M2, M3, Maxilla		2	
"	"	Ovicaprid	Rt	P4		2	
"	"	Bovid	Lt	Metacarpal	Px	2	
"	"	Bovid		Proximal Sesamoid		2	
"	"	Mammal		Mandible bone		4	
"	"	Mammal		Rib frags.		2	
"	"	Mammal		Bone frags.			28 Pieces

LOCATION	Depth	Taxonomic ID	R/L	Element	Px / Ds	Size	Comments
106E-99N	20-30 cm	Gastropod		Shell frags.			10 Pieces
"	30-40 cm	Gastropod		Shell frags.			5 Pieces
107E-97N	Surface	Bovid	Lt	Humerus		2	
"	"	Bovid	Rt	Tibia		2	
"	"	Bovid		Metapodial shaft		2	
"	"	Bovid		Axis		2	
"	"	Bovid		Phalanx 1		2	
"	"	Mammal		Thoracic vertebra		2	
"	0-10 cm	Gastropod		Shell frags.			7 Pieces
"	"	Ovicaprid	Lt	Mandible m2		2	
"	"	Bovid	Lt	Scapula		2	
107E-97N	0-10 cm	Bovid		Axis		2	
"	"	Bovid	Rt	Ilium			
"	"	Bovid	Lt	Tibia shaft		2	
"	"	Bovid		Radius shaft frag.		2	
"	"	Mammal		Rib frags.			4 Pieces
"	"	Mammal		Vertebra frag.			5 Pieces
"	"	Mammal		Bone frags.		2	44 Pieces
"	10-20 cm	Bovid	Lt	Tibia	Ds	2	
"	"	Bovid	Rt	Ischium		2	
"	"	Bovid	Lt	Ilium		2	
"	"	Bovid		Phalanx 1		2	
"	"	Bovid	Lt	scapula		2	
"	"	Mammal		Vertebra frag.			4 Pieces
"	"	Mammal		Bone frags.			23 Pieces
"	"	Gastropod		Shell frags.			1 Piece
107E-98N	Surface	Ovicaprid	Lt	P4		2	
"	"	Bovid	Lt	Mandible condyle		2	
"	"	Mammal		Bone frags.			8 Pieces
"	0-10 cm	Gastropod		Shell frags.			6 Pieces
"	"	Bovid	Lt	Humerus shaft		4	
107E-98N	0-10 cm	Bovid		Phalanx 3		4	
"	"	Bovid		Phalanx 2		4	
"	"	Bovid	Lt	Ulna		4	
"	"	Bovid	Rt	Metatarsal frag.	Px	4	
"	"	Bovid	Lt	Femur	Px	2	
"	"	Bovid	Rt	Navicular cuboid		2	
"	"	Bovid	Lt	scapula		2	
"	"	Mammal		Rib frags.		2	6 Pieces
"	"	Mammal		Bone frags.			52 Pieces
"	10-30 cm	Bovid		Tibia shaft		4	
"	"	Ovicaprid	Rt	Mandible		2	
"	"	Ovicaprid	Lt	Maxilla		2	
"	"	Bovid	Rt	Metacarpal	Px	2	
"		Bovid	Lt	Astragalus		2	
"	"	Bovid	Lt	Scapula		2	
"	"	Mammal		Rib frags.		4	

LOCATION	Depth	Taxonomic ID	R/L	Element	Px / Ds	Size	Comments
107E-98N	10-30 cm	Mammal		Thoracic vertebra		4	
"	"	Mammal		Bone frags.		4	11 Pieces
"	"	Mammal		Bone frags.		2	25 Pieces
"	20-30 cm	Ovicaprid	Rt	Maxilla		2	
"	"	Ovicaprid	Rt	Mandible		2	Juvenile
"	"	Bovid		Axis		2	
"	"	Bovid	Rt	Radia/Ulna		2	
"	"	Bovid	Rt	Navicular cuboid		4	
"	"	Bovid	Lt	Ischium		4	
"	"	Mammal		Rib frags.		2	10 Pieces
"	"	Mammal		Long bone frag.		4	1 Piece
"	"	Mammal		Bone frags.		2	21 Pieces
107E-99N	Surface	Mammal		Bone frags.			5 Pieces
"	10-20 cm	Ovicaprid	Rt	Mandible		2	
"	"	Bovid	Lt	Femur shaft			
"	"	Bovid	Rt	Innominate		2	
"	"	Bovid	Lt	Scapula		2	
"	"	Bovid	Lt	Tibia shaft		4	Juvinile
"	"	Mammal		Lumbar			2 Pieces
"	"	Mammal		Bone frags.			69 Pieces
"	"	Gastropod		Shell frags.			6 Pieces
"	20-30 cm	Bovid	Rt	Scapula		4	
"	"	Bovid	Rt	Calcaneum		3	
"	"	Bovid	Lt	Ilium		2	
107E-99N	20-30 cm	Bovid	Rt	Scapula		2	
"	"	Bovid	Rt	Ulna frag.		2	
"	"	Bovid	Lt	Calcaneum		2	
"	"	Bovid		Metapodial	Ds	2	
"	"	Bovid	Rt	Premaxilla		2	
"	"	Bovid	Rt	Mandible bone		2	
"	"	Mammal		Bone frags.		2	23 Pieces
107E-99N	Surface	Gastropod		Shell frags.			3 Pieces

Table 7 Bovid sizes (After Brain 1974)

BOV 1		Weight (kg)
Dikdik	*Madoqua kirkii*	4.5-5
Suni	*Neotragus moscathus*	4.5-7
Blue duiker	*Cephalophus monticola*	6-7
Cape grysbok	*Raphicerus melanotis*	7-9
Red duiker	*Cephalopus natalensis*	9-14
Klipspringer	*Oreotragus oreotragus*	10-16
Steenbok	*Raphicerus campestris*	11-15
Common duiker	*Sylvicapra grimmia*	11-21
Oribi	*Ourebia orebi*	14-19

BOV II		Weight (kg)
Springbok	*Antidorcas marsupialis*	18-52
Mountain reedbuck	*Redunca fulvorufula*	23-27
Grey rhebuck	*Pelea capreolus*	23-27
Bushbuck	*Tragelaphus scriptus*	23-27
Blesbok	*Damaliscus dorcas*	32-81
Impala	*Aepyceros melampus*	36-69
Reedbuck	*Redunca arudimum*	45-104
Puku	*Kobus bardonii*	56-84

BOV III		Weight (kg)
Lechwe	*Kobus lechwe*	77-130
Nyala	*Tragelaphus angasii*	91-114
Sitatunga	*Tragelaphus spekei*	91-114
Tsessebe	*Damaliscus lunatus*	117-158
Red hartebeest	*Alcelaphus lichtensteinei*	106-172
Lichtenstein's hartebeest	*Alcelaphus lichtensteinii*	146-205
Kudu	*Tragelaphus strepsiceros*	150-296
Black wildebeest	*Connochaetes gnou*	158-272
Waterbuck	*Kobus ellipsiprymnus*	158-272
Gemsbok	*Oryx gazella*	182-238
Sable	*Hippotragus niger*	205-274
Blue wildebeest	*Connochaetes taurinus*	205-274
Roan	*Hippotragus equines*	223-299

BOV IV		Weight (kg)
Buffalo	*Syncerus caffer*	367-837
Eland	*Taurotragus oryx*	396-945

APPENDIX B: Additional Pottery Data

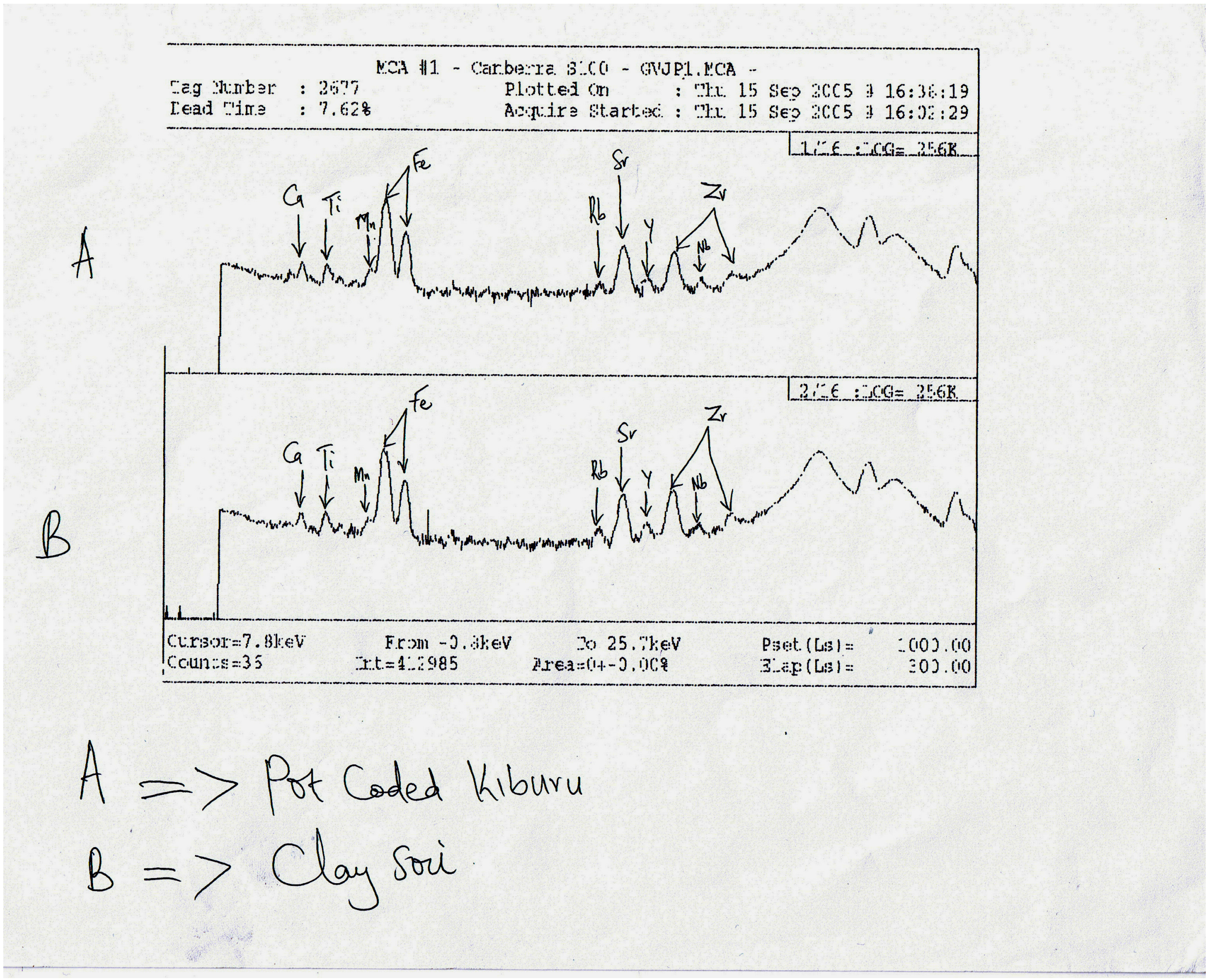

Figure 27 Clay constituent analysis results from Kiburu pottery and clay source(by University of Nairobi, Nuclear Physics Department)

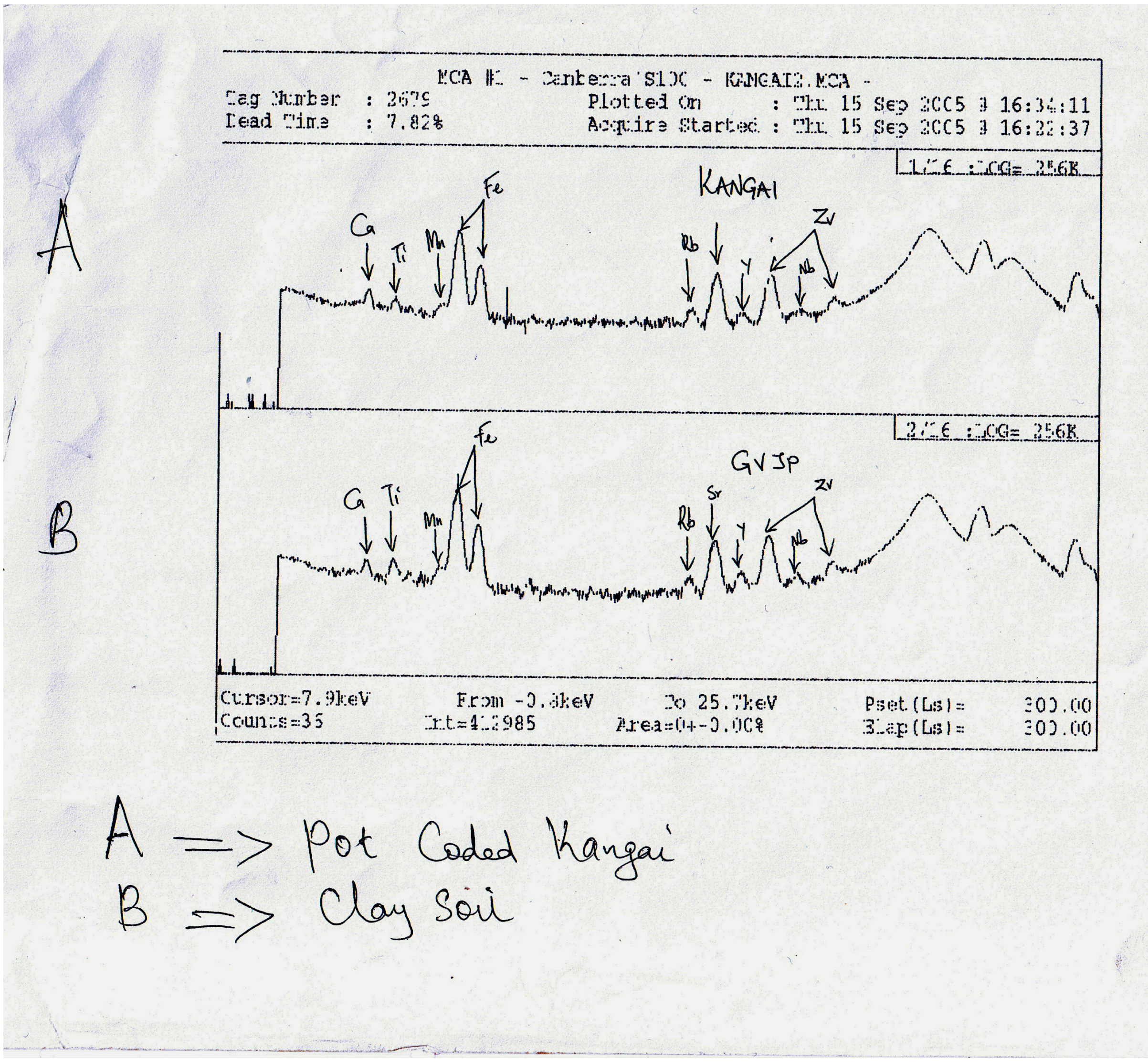

Figure 28 Clay constituent analysis results from Kangai pottery and clay source (by University of Nairobi, Nuclear Physics Department)

APPENDIX C: Additional Mbeere Region Data

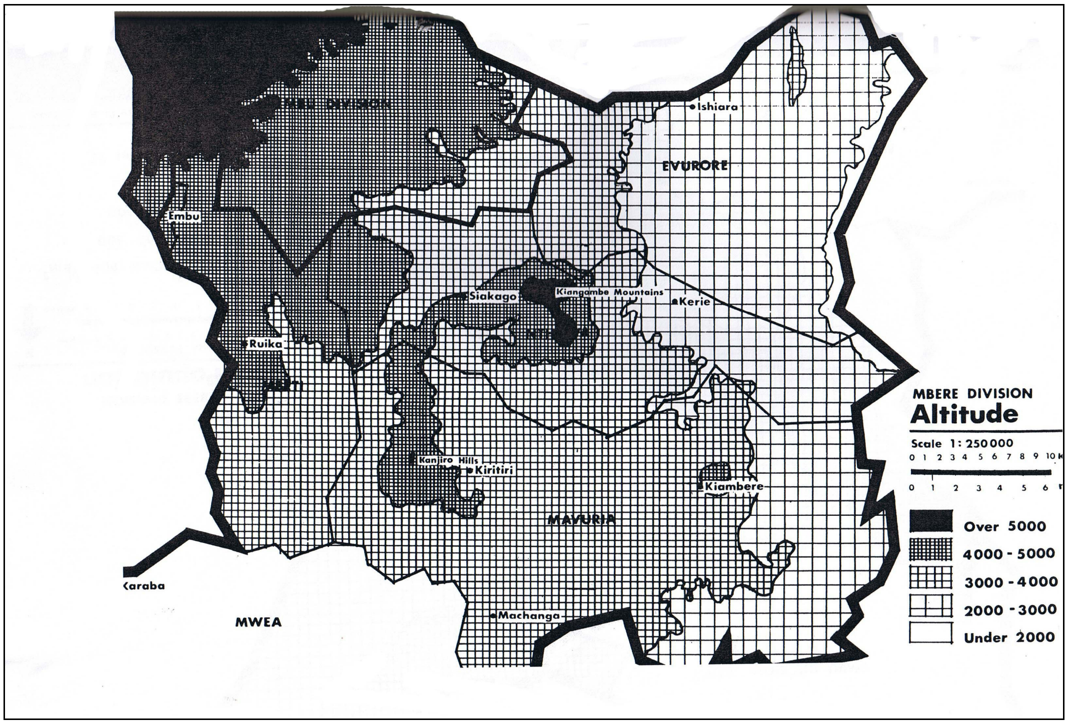

Figure 29 Altitude of Mbeere region (after MSRDP, 1970)

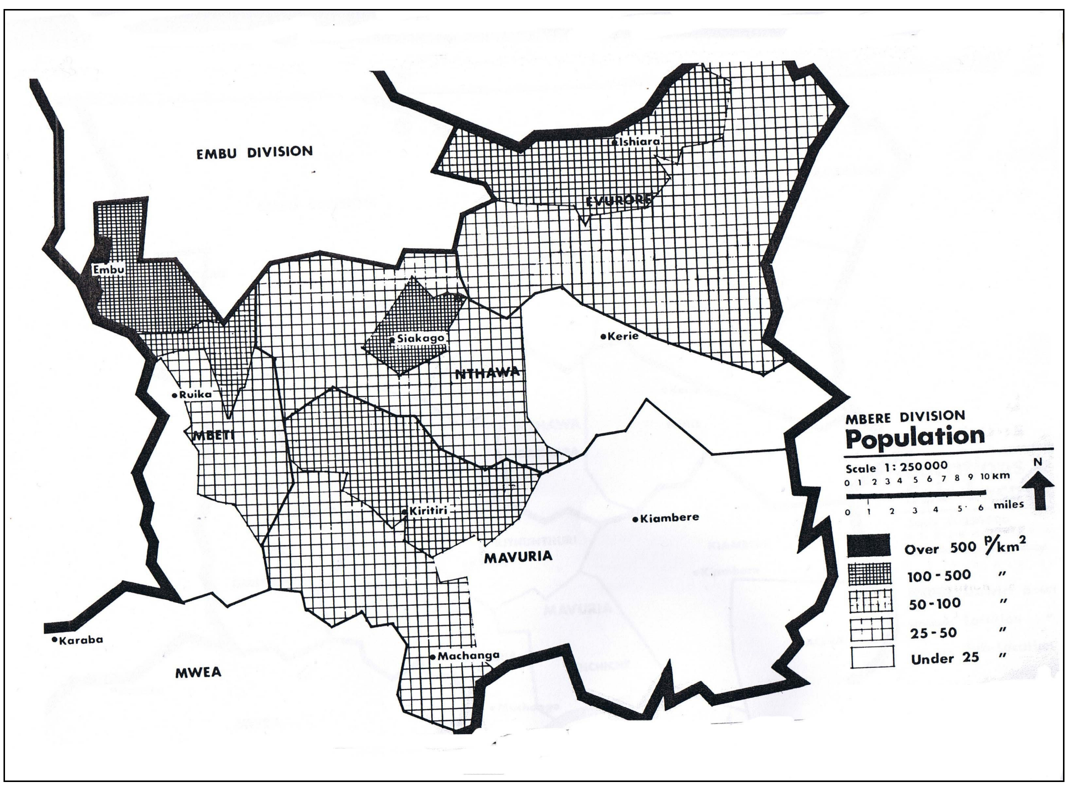

Figure 30 Population distribution in Mbeere region (after MSRDP, 1970)