THE DISTRIBUTION AND USE OF CATTLE PRODUCTS IN NORTHERN HIGHLAND ETHIOPIA

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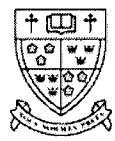

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ABSTRACT

This study is an ethnoarchaeological investigation of the distribution and use of cattle and animal products in the northern highlands of Ethiopia. Ethnoarchaeological methods are utilized to explore many aspects of the role of cattle in highland Ethiopian society at four villages in the Tigrayan administrative region of Gulo-Makeda, in an attempt to provide models to aid the interpretation of the archaeological record in that area. Structured interviews are used to address questions of the ways in which cattle are acquired, exchanged and used in daily agricultural life, the occasion and frequency with which meat is consumed, the manner of slaughter and discard practices. The examination of spatial patterning and site-formation processes associated with the use of cattle is addressed by the observation of two butchering events, as well as a survey of discarded animal bone throughout the village of Mena Beyti.

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Thanks also to my Ethiopian friend and interpreter Berhanou, who accompanied me throughout my time in Gulo-Makeda, allowed me to communicate with my informants, and protected me from dangerous dogs, dangerous chickens and other flying objects. I will always appreciate and never forget the hospitality of all my informants, who gave what they didn't have in time and food, and constantly invited me in for some *sua*. I thoroughly enjoyed my stay in the highlands.

Finally, I cannot forget my parents and my wife Sarah, whose love and support continue to help me reach my goals.

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1.0 Introduction

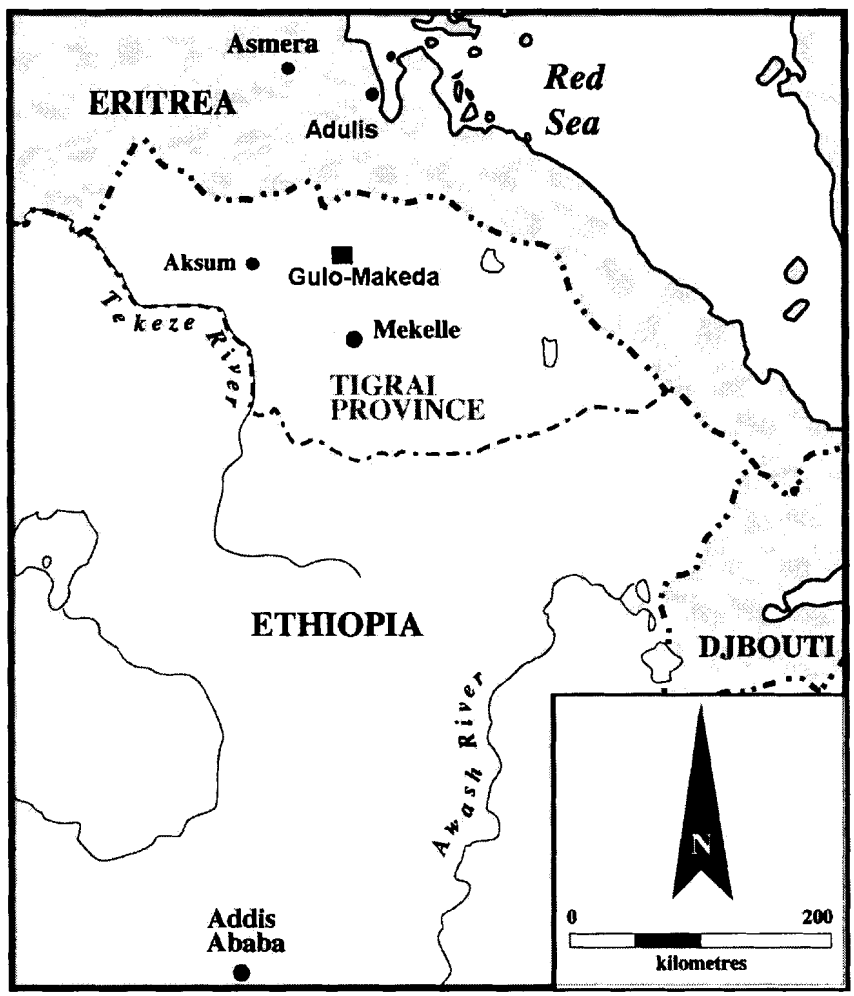

Figure 1. The Gulo-Makeda region of northern Tigray, Ethiopia[1].

This study is an investigation of the distribution system of cattle, other livestock and their products in the Gulo-Makeda region of northern highland Ethiopia (Fig.1). It was completed in the hopes that through an examination of the relationships surrounding livestock and meat distribution, as well as identification of the related

[1] © A.C. D'Andrea, by permission.

discard patterns, we might come to a more complete understanding of the behaviours, interactions and site-formation processes that characterize a rural, northern Ethiopian meat distribution (exchange) system. For archaeologists, a greater understanding of the events behind the deposition of artefacts including faunal remains is essential to a better interpretation of a site, especially in an area where livestock and human life are so heavily intertwined. The apparent importance and widespread use of cattle in the highlands dates back to Pre-Aksumite times, providing the impetus for a study of this nature.

The primary objective is to investigate the mechanisms of the distribution of cattle and their products in Gulo-Makeda. Through the observation of the distribution system of cattle and their specific by-products (meat, bone, and horn), the study intends to describe the spatial patterning of these products, and their associated economic and social relationships. In addition to the description of the economic, social and symbolic relationships between producers and consumers of cattle products, it is hoped the data may be used to identify the site formation processes associated with these relationships and assist in the interpretation of the archaeological record.

1.1 The Importance of Domestic Cattle in Ethiopia: Past and Present

The enormous impact of livestock such as cattle upon daily life in the highlands of Ethiopia may be evident only through an examination of its historical and ethnographic importance in the region. Cattle have been important in the highland region since their introduction onto the Tigrayan Plateau ca. 4000 BP (Clutton-Brock, 2000). Rock art and archaeological evidence suggests that they were likely the means of production for subsistence farmers prior to, during, and well after the emergence of complex society in the highlands.

1.1.1 The Origins of Domesticated Cattle: Zooarchaeological and Archaeological Evidence

Two major diffusion events have characterized the emergence of domestic cattle in Ethiopia. The first, which MacDonald (2000) calls "stimulus diffusion", draws on the available osteological and chronological evidence for cattle keeping to suggest the spread (and radiation) of domestication in Africa from its earliest evidence in Egypt. Although hotly debated, the earliest osteological evidence for the presence of domestic cattle in Africa comes from remains found at the Egyptian sites of Bir Kiseiba and Nabta Playa, which have been dated to between 7500-8000 BP (Gifford-Gonzalez, 2005; MacDonald, 2000). While these specimens, identified as *Bos taurus*, are under debate and few in number, they would signify the first African departure of the genus *Bos* from its wild progenitor, *Bos primigenius* (Marshall, 2000). After these dates, contemporary evidence of domestic cattle appears at sites in the Sudan, Chad, Niger, Algeria, Libya and in the Nile Delta by 6000-6500 BP, suggesting the spread of pastoralists throughout northern Africa (Clutton-Brock, 2000; Hassan, 2000; MacDonald, 2000; MacDonald & MacDonald, 2000; Marshall, 2000). Cattle domestication is thought to have been brought from the Khartoum/Lower Nubia area into Ethiopia by "C-group" pastoralists attempting to escape drought and famine conditions brought on by the onset of a mid-Holocene arid period approximately 4000 BP (Clark, 1980; Clutton-Brock, 2000; Hassan, 2000). By 3500 BP, domestic cattle were present at sites as far south as Lake Besaka and sites as high as Laga Oda in the eastern highlands (Marshall, 2000). The earliest presence of domestic cattle in the northern highlands of Ethiopia appears at Gobedra rock shelter (2000 BP according to Phillipson, 1993) and also at Quiha rock shelter, though the date for this latter site is unclear and identification was based primarily on teeth (Barnett, 1999; Marshall, 2000).

Another diffusion event occurred when a new species of cattle, *Bos indicus*, was introduced to the Ethiopian highlands following a period of pronounced contact between the Horn and the Arabian peninsula. Although contact and trade between the peoples of the Horn of Africa and the Arabian peninsula is thought to have existed at an early date (Phillipson, 1995), archaeological evidence suggests a strong bond between these two areas in the mid-first millennium BP, with the emergence of a kingdom called D'MT (Munro-Hay, 1991). This kingdom, whose elite structures and settlements have been characterized by southern Arabian stylistic inscriptions and symbols, provides us with a picture of a society resulting from the fusion of indigenous Ethiopian pastoral life and southern Arabian symbolism (Fattovich, 1988; 1990; 1996; Fattovich *et al*, 2000).

Nevertheless, the influence of southern Arabian culture upon highland urban development has been called into question, as excavations at sites in and around the Asmara area in Eritrea have provided evidence of a contemporary mixed farming Ona culture with little or no affinity with the Arabian peninsula (Schmidt and Curtis, 2001). Ona sites have produced artefacts such as stone bulls' heads, one of which dates to the D'MT period and is thought to depict a humped (*B. indicus*) cattle species (Schmidt and Curtis, 2001). In the absence of Sabean cultural elements, the presence of *Bos indicus* in the northern highlands at this early date suggests that this type of cattle may have been incorporated into the region *via* Red Sea trading. It has been suggested that the ability of *Bos indicus* to tolerate drier climates, resist disease, and provide milk in arid conditions contributed to the influx of this species into the highlands and, subsequently, the increased prosperity of its people during a pronounced arid period in the early 1st millennium BP (Fattovich, 1997; Schmidt and Curtis, 2001).

1.1.2 Rock Art Depictions

Evidence for the influx of *Bos indicus* is found in the rock art of eastern Africa and the Horn. Depictions of humped cattle yoked to plows driven by thin human figures are both stylistically and thematically different from those of thick human forms in hunting and herding contexts with humpless cattle, found at nearby sites (Brandt & Carder, 1987; Graziosi, 1964b). The humps on the cattle depicted in southern Arabian stylistic rock art refer to the protrusions caused by muscle and fatty deposits in the cervico-thoracic region of *Bos indicus* (Epstein, 1971). Since such deposits are nonexistent in *Bos taurus*, the variations in the rock art have been attributed to the infusion of southern Arabian people, cultural practices and cattle into northern highland Ethiopia. Material culture in the form of humped ceramic and stone bulls recovered at pre-Aksumite archaeological sites but unknown from earlier periods, provides clear evidence of a diffusion event throughout the highlands (Fattovich, 1977; Schmidt and Curtis, 2001)[2].

In Ethiopia, the arrival of pastoral peoples with *Bos taurus* herds from Nubia and *Bos indicus* cattle from the Arabian peninsula provided the prehistoric sources for the emergence of cattle as a central element in highland cultural life (Fig. 2). In the millennia that followed, countless cross-breeding experiments were conducted, resulting in the 18 breeds of domestic cattle that are present in Ethiopia today (Scherf, 2004).

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[2] While humped cattle figurines may be unique to the Ethiopian highlands, cattle figurines in general have been recorded at earlier Sudanese sites and were brought into the West African sahel during the dessication of the Sahara after 4000 BC (McIntosh and McIntosh, 1983).

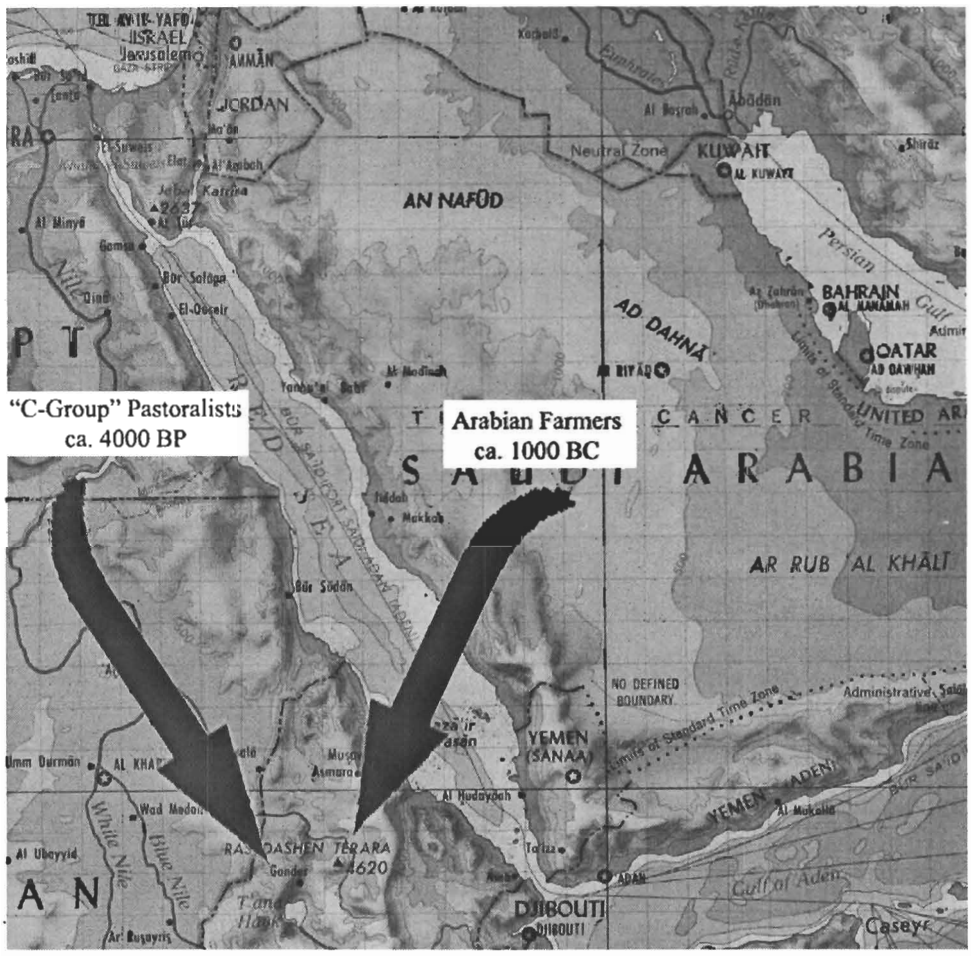

Figure 2. Two separate diffusion events brought domesticated cattle to the highlands[3].

1.1.3 The Aksumite Empire

A clear picture of the origins of urbanism and political centralization in the Ethiopian highlands is not yet available, but what is certain is that the union of indigenous African herders and Semitic farming practices in the first millennium BC slowly culminated in the emergence of a distinct, independent Ethiopian society unique to the Horn of Africa. Archaeological evidence for the urban beginnings of this society has been obtained from nearly ninety sites in Eritrea and Tigray, mostly around the town

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[3] Map courtesy of the University of Texas Libraries, The University of Texas at Austin.

of Aksum (Connah, 2001). Archaeological data in the form of inscriptions, architecture and artefacts suggest that Arabian influences included more than just cattle (Fattovich, 1996). Stylistic engravings of Sabean (South Arabian) script, elite architectural similarities and religious statuettes are cited as the primary evidence that the D'MT monarchy had strong Arabian cultural affiliations (Munro-Hay, 1993). Sabaean inscriptions from this time period mention kings with regal titles (MKRB) similar to those found in Yemen, and religious symbols and engravings suggest the worship of the Sabean moon god ALM'QAH (Phillipson, 1995).

By the first few centuries BC, however, this cultural tradition seems to have undergone some sort of dissolution. It is at this time that Arabian affinities began to fade, to be replaced by an emerging indigenous Ethiopian political entity known as the Aksumite Empire. Whereas the pre-Aksumite entity of D'MT is known from but a few urban centres, most notably Yeha, Matara and Haoulti (Phillipson, 1995), the Aksumite Empire quickly absorbed and politically centralized areas hundreds of kilometres from its home base at Aksum (Fig. 3). As it grew, this new empire eclipsed the Nubian kingdom of Meroë, which had previously benefited from the control of trade routes between Egypt and sub-Saharan Africa (Phillipson, 1995). With Meroitic regions under Aksumite control and the capital city of Aksum located approximately 200 km from the port of Adulis on the Red Sea, the highland Ethiopian civilization expanded to assume control over trade between Egypt and sub-Saharan Africa, as well as all trade in the Red Sea region. This allowed Aksum to export African raw materials such as ivory, gold, obsidian, incense and hides to the Mediterranean, South Arabia, the Persian Gulf and India in return for luxury goods made from precious metals, ceramics and glass (Connah, 2001). Control of the Red Sea trade continued to be a factor in the success of the Aksumite Empire until the seventh century AD, when Arabic control over Red Sea ports cut Aksum off

from the prosperous trade routes (Phillipson, 1995). The loss or disruption of this trade (Connah, 2001; Munro-Hay, 1991; Phillipson, 1995), as well as plague, drought and environmental deterioration (Butzer, 1981; Connah, 2001) have been cited as the major factors leading to the dissolution of Aksum as a powerful political entity. Butzer (1981) in particular suggests that population pressures, the intensification of food production including overgrazing may have led to environmental deterioration in the form of soil erosion, which after AD 700 may have reached catastrophic proportions. Kobischanov (1979) also notes that numerous herds of cattle were at the disposal of the Aksumite king. In fact, Aksumite royal accounting documents provide cattle head counts well into the tens of thousands (Kobischanov, 1979: 159-160). It may be, then that a combination of external factors such as disruption of trade and internal factors such as overgrazing contributed to the decline of the Aksumite Empire. Whatever the reasons for its decline, sometime between the seventh and twelfth century Aksum ceased to be the capital of the Empire, and political influence seems to have drifted farther south with the rise of the Zagwe and Solomonic dynasties (Munro-Hay, 1991).

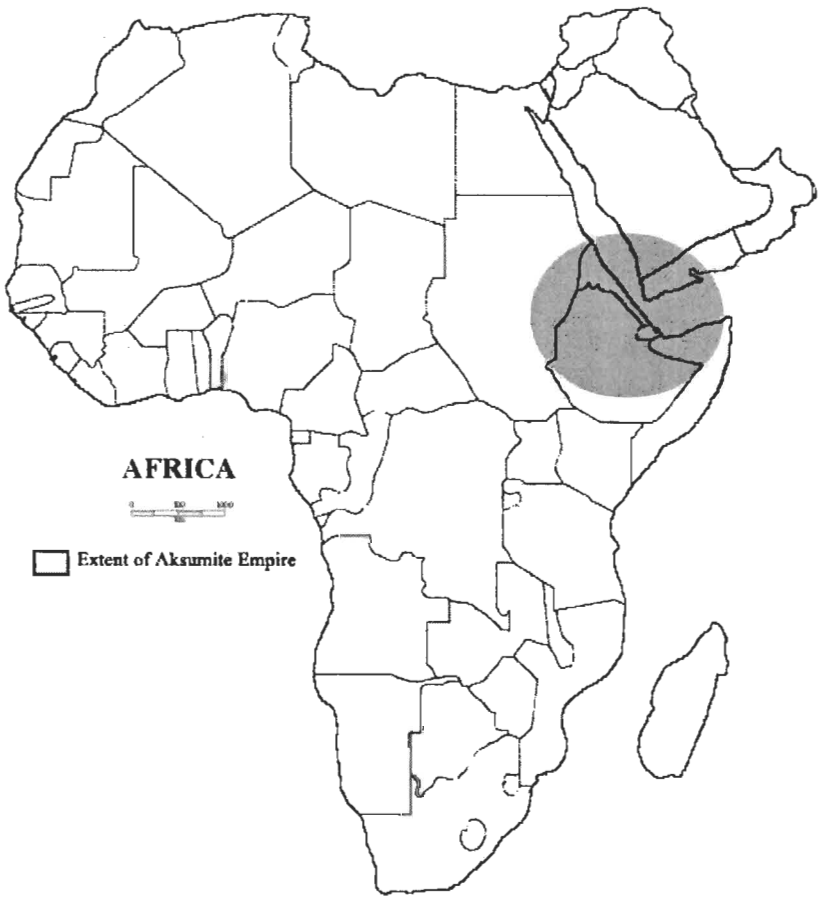

Figure 3. Areas controlled by the Aksumite Empire during its zenith[4].

1.1.4 Gulo-Makeda and Highland Rural Subsistence Economies

While periods of Aksumite imperial fluorescence and decline may be archaeologically visible through monumental architecture and material goods, little is known about the origins of complexity in the Gulo-Makeda region. Particularly unknown is the role that rural subsistence economies played in the emergence of the Aksumite Empire, and how rural and urban economies interacted during that period (Connah, 2001; Phillipson, 2000). In a preliminary assessment of the Aksum archaeological area,

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[4] Modified from: Brock University Map Library. *Africa*. Software Edition. St. Catharines, ON: Brock University Map Library. 2005.

Fattovich *et al.* (2000) specifically identified the introduction of domesticated plants and animals as one of the main steps in the process of state formation in Ethiopia. McCann (1995) suggests that the development of indigenous highland rural agricultural subsistence methods such as the use of the ox and plow resulted in an "ox-plow revolution" that changed the organization of property, gender division of labour, land use and household resources. The developed need for "labour efficiency and productivity of the system" (McCann 1995: 81) resulted in the need for large organizational hierarchies leading to the formation of a state. Other studies concerning indigenous plant domestication and early food production in the Ethiopian highlands (D'Andrea *et al.*, 1999; Finneran, 1998) have reinforced the sentiment that agricultural practices suited to the local environment played a large role in both the subsistence and growth of highland culture and life.

Set within a broader archaeological project investigating the links between rural and urban economies and the rise to social complexity in Ethiopia during Aksumite times (D'Andrea, 2003), this study seeks to define and understand the nature of a rural animal economy in Tigray, and investigate the way in which it interacts with larger, urban economies. Interactions of this type, such as that between Aksum and smaller, rural centres, may have been important for the growth and support of political centralization leading to the development of social complexity in the Ethiopian highlands.

The Aksumite town of Gulo-Makeda, located within the present-day Tigrayan administrative region of the same name, occupied a strategically important location and was able to intercept trade caravans traveling along a well-known trade route (Connah, 2001) between the Red Sea port of Adulis and the Aksumite capital (Fig. 1). As a provincial town centre located southeast of Aksum, Gulo-Makeda was likely supported by local farming and trade networks as well as intermittent trade from the Red Sea and

the capital. However, despite intermittent access to the flow of imported and domestic trade goods *via* trade caravans, the town's economy was likely regularly supported by local exchange networks and goods generated by inhabitant farmers.

1.1.5 Archaeological Background and Evidence of the Importance of Cattle in Aksumite Society

While archaeological research in Ethiopia has been conducted intermittently since the early 20th century, it has been characterized by brief periods of intensive research punctuated by long periods of inactivity. The first, widespread archaeological survey was conducted in 1906 by a German expedition directed by Enno Littmann (Fattovich *et al.*, 2000; Littmann *et al.*, 1913; Michels, 1979). The "Deutsche-Aksum Expedition" (DAE) survey described in great detail the monuments, inscriptions and architecture in and around the town of Aksum, as well as conducting small excavations and recording artefacts.

After a period of research inactivity, the Italian occupation of Ethiopia in 1937 brought Italian researchers to Aksum. In the same year, Ugo Monneret de Villard conducted topographic and geoarchaeological surveys of the town, updating information previously recorded by the DAE (Fattovich *et al.*, 2000; Littmann, *et al.*, 1913). Later, in 1939, Salvatore Puglisi excavated a residential structure and conducted yet further survey of the area surrounding the town (Fattovich *et al.*, 2000).

Research halted during the Second World War, but was picked up in the early 1950s by a series of French scholars, including Francis Anfray, Jean Doresse, Jean Leclant, Andre Miquel and Henri de Contenson, each one of whom expanded knowledge of Aksum (Anfray, 1963; 1967; 1973; de Contenson, 1959; 1961; Leclant and Miquel, 1959). Under French direction, archaeological surveys expanded to the Aksum

hinterland and excavations were conducted on major tombs and cemeteries. During surveys in the Adigrat region to the east of Aksum, Leclant and Miquel (1959) identified "Goulo-Makeda" (an area including three villages) as a potentially important Aksumite site. In addition to recording the presence of rock art at the village of Dahane, they documented several architectural remains (Fig. 4) at both "Menabiet" and "Etchmerra" (Leclant and Miquel, 1959). Anfray continued the research in the 1960s, excavating a residential palace just west of the present town of Aksum and locating the two Pre-Aksumite settlements of Yeha and Matara (Anfray, 1963; 1967; Michels, 1979). Expanding his focus, he also documented a great density of archaeological sites in the Adigrat area, including what he considered to be the remains of urban centres at both "Etch-Mare" (Fig. 4) and "Addi-Aouhne" (Anfray, 1973).

British expeditions began in the early 1970's under Neville Chittick, but were halted in 1974 as a result of the unstable political situation in the country (Chittick, 1974; Hiwet, 1975). After 1974, no archaeological research was conducted until 1993 when a joint project between Boston University (BU) and the Istituto Universitario Orientale (IUO) in Naples resumed excavations. Since then, both the IUO/BU expedition, Cambridge University and the British Institute of East Africa have conducted numerous excavations around the capital city, as well as new surveys throughout the Aksum hinterland (Bard and Fattovich, 1993; 1995; 1997; Bard *et al*, 1997; 1998; Phillipson, 1994; 1995; 1996).

Figure 4. Architectural remains in Gulo-Makeda.

Symbolic links between the power of the Aksumite central authority and the daily life of the people are evident in artefacts recovered at some Pre-Aksumite and Aksumite sites, as well as in rock art depictions throughout the highlands and the Horn of Africa. Michels (1979) and Connah (2001) identified a common pattern of religious symbolism throughout Pre-Aksumite and Aksumite times, illustrated by bronze and ceramic likenesses of bulls and yoked oxen. While these artefacts were found within the larger urban sites of the evolving highland civilization, an affinity for cattle can be seen throughout the region, represented in rock art depictions. Whereas many of the depictions previously recorded throughout the Horn have been interpreted as having been completed by pastoral herders (Brandt and Carder, 1987; Graziosi, 1964a; 1964b), some art clearly depicts interactions between humans and cattle for the specific purpose of farming, including images showing humans driving yoked cattle before them. Most notably, examples of this can be found at two rock shelters located at Amba Fecada, in

the Gulo-Makeda area (Anfray, 1973; D'Andrea, 2003; Leclant and Miquel, 1959; Mordini, 1941; Phillipson, 1995).

1.1.6 Ethnographic Evidence of the Importance of Cattle

Domesticated cattle have a long history in East Africa during which they have been used in a variety of ways to support subsistence needs (Graziosi, 1964; Starkey, 2000). Their use for meat, dairy, hides and horn extraction (Bauer, 1975; Phillipson, 1993) is complemented by their use in labour, such as for threshing, transport, tillage and cultivation (McCann, 1995; Starkey, 2000). Specifically in northern Ethiopia, cattle are used primarily in combination with the *mahresha* plow to facilitate cultivation of soil, a tradition that has existed in the area since at least the first millennium BC (Finneran, 1999; Graziosi, 1964; McCann, 1995; Phillipson, 1993).

The earliest ethnographies of Ethiopian life were written by European explorers and missionaries travelling throughout the country, post-dating Aksumite and Post-Aksumite civilization by some five or six hundred years (Alvares, 1881; Beckingham and Huntingford, 1954). The first western account of the Ethiopian highlands was recorded by the Jesuit Father Francisco Alvares in the early part of the 16th century, as he participated in a Portuguese mission to "Abyssinia" (Alvares, 1881). Shortly thereafter, another Portuguese Jesuit Missionary, Father Manoel de Almeida, wrote the first detailed western account of sixteenth-century Ethiopia when he described his travels throughout the country, providing extensive information on geography, geology, flora, fauna and the local customs of those he encountered (Beckingham and Huntingford, 1954). As more European countries became enamoured with the thought of a self-sufficient Christian empire in the heart of Africa, explorers began to document their travels in Abyssinia (Baratti, 1670; Bruce, 1964; Ludolf, 1684).

It is evident in these early sources that cattle are absolutely essential for survival in rural Ethiopian societies. Subsistence farming is not only a part of life in these communities, it organizes and structures life to such an extent that farming tasks occupy most hours of each day. Although Ethiopians follow the Christian Orthodox calendar, great importance is put upon seasonal changes which define the various stages in agriculture such as plowing, sowing and harvesting. In any given year, the quality of life enjoyed by the people is determined by the quantity of food reaped in the harvest. In recent years in Tigray, a number of poor crop harvests have threatened the lives of highland farmers, as continuous periods of drought and famine have cut annual yields to such an extent that people are becoming accustomed to relying on international aid programs to survive. The precarious nature of subsistence farming in these conditions has only added to the importance of cattle as the primary means of production.

This intrinsic link between cattle and agriculture in Tigray has led Bauer (1975) to suggest an intimate connection between household economics and land distribution, whereby cattle is viewed as capital. This allows more land to be farmed, and greater land allocation results in more prosperous households. Other studies have also noted the use of cattle in East African societies for more than just immediate returns of meat or dairy products (Denbow, 1999; Karp and Maynard, 1983; Phillipson, 1993; Ryan *et al.*, 2000). In fact, the fluidity of cattle as social currency (Schneider, 1974) has allowed a variety of opportunities for individuals to acquire and exchange cattle. The abundance and variety of these exchange practices reflects the importance of the use of cattle in society (Ryan *et al.*, 2000). Some have suggested that exchange and redistribution networks in East Africa are the results of a need to reduce risk from disease, raiding, and drought by dispersing the herd (Denbow, 1999; Ryan *et al.*, 2000). Other strategies such as the acquisition and hoarding of animals can contribute to inequality and

complexity. For instance, unequal ownership of large herds and rights to their allocation (Schneider, 1974) can result in an elite with political and economic influence (Denbow, 1999). This is the archaeological interpretation offered for example in southern Africa in the case of the Bantu-speaking agropastoralists of Botswana and of Great Zimbabwe (Denbow, 1999; Reid, 1996).

1.2 Ethnoarchaeology and Zooarchaeology in Ethiopia

In recent years, the volume of ethnoarchaeological work in East Africa has rapidly increased, due to emerging political stability and the application of new approaches to material culture analysis (MacEachern, 1996; Schmidt, 1983). Africa is a context in which ethnoarchaeology can be effectively applied to develop analytical models for relationships between human interaction and material culture in the past (Gould and Watson, 1982; Wobst, 1978; Wylie, 1982; 1985). However, some scholars (Kent, 1992; Lane, 1996; Shott, 1992; Wylie, 2002) have noted that previous archaeological interpretations by Western researchers have reflected persistent political and racist views of African societies as cultural remnants. Wylie (2002: 138) cites specific examples of the early abuses of ethnographic analogy, in which "Tylorian" or "classical evolutionist" interpretations overextended the bounds of analogical reasoning by projecting the present onto the past on the basis of a few known similarities. The results of these types of analogies were simplistic, self-fulfilling representations of contemporary societies as "primitive" or "savage" survivals of specific stages of prehistory (Wylie, 2002). More recently in the mid- to later twentieth century, interpreters often presented African history as flat and unchanging, remote from the "flow of history" (Stahl, 1993: 241).

While ethnoarchaeologists do not assume direct or overarching relationships between modern and archaeological cultures, they do accept that humans interact with the material world through systematically observable relationships (Stark, 1993). While early studies regarded ethnography as the documentation of unchanging remnants of prehistoric societies (Stahl, 1993), ethnoarchaeology has adopted a comparative method of inductive inference by which specific aspects of present (source) societies (materials, behaviours, or processes) are positively linked to those of archaeological (subject) societies on the strength of common characteristics, and then subsequently weighed against negative points of comparison (Stahl, 1993; Wylie, 1985). According to Wylie, analogical inference "consists of the selective transposition of information from source to subject on the basis of a comparison that, fully developed, specifies how the "terms" compared are similar, different, or of unknown likeness" (Wylie, 1985: 93). Wylie (1985) also states that analogical arguments must be subjected to specific criteria of strength, including: the weighing of positive and negative points of comparison to determine the extent of similarities; the examination of a diversity of possible sources to support or refute the interpretation; and expansiveness of the conclusions relative to the premises. By further subjecting an analogue to both source-side criticism (including evaluations of the duration and quality of fieldwork, as well as the documentation of historical change in the source area) and subject-side testing (through analysis of archaeological material), the principles of connection are established, the criteria of strength are satisfied and a good comparative analogy is developed (Stahl, 1993; Wylie, 1985). It is worth pointing out that source- and subject-side testing should occur during the development of an analogy and not as a concluding critique, since this information is valuable to the modification and creation of better analogues (Stahl, 1993).

The Ethiopian highlands are well suited to ethnoarchaeological research, as previous studies in this region have established good evidence to suggest that the current inhabitants of the Ethiopian province of Tigray are descendants of the Aksumite kingdom (D'Andrea *et al.*, 1999). Particularly, the existence of continuity with respect to agricultural practices such as tilling with oxen and a *mahresha* plough (McCann, 1995; Phillipson, 2000) and the harvesting of crops such as emmer wheat and sorghum (D'Andrea and Haile, 2002), barley, flax, cotton, teff, chickpea and noog (D'Andrea *et al.*, 1999; Phillipson, 2000); fashions such as personal adornment and hairstyles (Phillipson, 2000) as well as continuity in methods of food preparation (Lyons and D'Andrea, 2003) provide evidence for the possibility of other aspects of continuity in the highlands. Further, the rugged highland landscape adds an element of isolation to the region that undoubtedly affected (or hindered) the success of foreign explorers and armies in the past.

Based upon the strength of known similarities (above) and historically-documented relative isolation of the highlands, this study uses a direct historic approach (Stahl, 1993) for a study of the use of cattle and meat distribution in the highlands. In the absence of significant subject-side (archaeological) materials from rural Aksumite sites, the study provides source-side material (a description of current practices involving the use of livestock) in the anticipation of a more sophisticated analogical model to be produced with archaeological data in the future. The villages in Gulo-Makeda are home to hundreds of households of farmers who rely heavily on livestock, especially cattle, to provide a constant source of labour for year-round tasks related to the tending of their fields. In addition to their use in operating the *mahresha* plow, cattle are used for threshing, cultivation and transport, as well as for meat, dairy, and their hides when the need arises (McCann, 1995; Starkey, 2000). This symbiotic relationship between

Tigrayan farmers and their domestic cattle is one that likely developed during the course of three millennia and shows evidence of continuity, allowing both to thrive in the harsh, often dry, highland environment.

1.2.1 Ethnoarchaeology in Ethiopia

Ethnoarchaeological research in Ethiopia began in 1995 as part of the BU/IUO joint archaeological expedition, focusing on traditional pottery manufacture within farming communities around Aksum (Bard and Fattovich, 1997). Brandt (1996) also conducted ethnoarchaeological research during this time, focusing on flaked-stone use in southern Ethiopia. Other ethnoarchaeological studies have also expanded the focus from Aksum and its surroundings, providing insights into life in rural parts of the northern highlands. Since 1996, D'Andrea and Lyons have conducted research in the province of Tigray regarding household agricultural and food-processing practices as an approach to the study of prehistoric agriculture (D'Andrea *et al.*, 1999; Lyons and D'Andrea, 2003). In addition to these prior studies in the highlands, isolation and visible material culture continuity in the area strengthens the argument for the possibility of successful ethnoarchaeological research. On the basis of these criteria, a study of the distribution system of cattle and its products was conducted in the Gulo-Makeda region of the province of Tigray, Ethiopia.

1.2.2 Previous Research Involving Animal Product Distribution

Ethnoarchaeological and zooarchaeological studies involving animal product distribution have been conducted in the Near East (Crabtree, 1990; Zeder, 1988; 1991) and Central Africa (Prins, 1980). Employing zooarchaeology to address questions about urban animal economy dynamics, Melinda Zeder (1988; 1991) analyzed a specialized

subsistence economy in an urban setting in the Near East (Tal-e Malyan, Iran) in order to better understand animal management and distribution in early Near Eastern urban contexts. Using a substantial faunal sample, as well as early Mesopotamian documentation of a major animal redistribution system (the Drehem system), Zeder was able to predict and analyze faunal patterns of meat distribution during this period of increasing urbanization (Zeder, 1988). She found animal part distribution, mortality profile and species measures were important factors in differentiating between direct and indirect distribution. Indirect distribution systems would show standardized, selected parts, uniform age and sex (usually males between 2-3 years), and selection of species for greater meat yields (Zeder, 1988). In addition, part selectivity was considered the most powerful measure for the mode of distribution (Zeder, 1988).

Employing ethnographic research, Prins (1980) observed and documented domestic patterns of meat distribution and exchange within a small community at Bulozi along the Zambezi River in western Zambia. Recording what he perceived as "the old system" (Prins, 1980: 90), he observed a now rare process by which a cow was butchered and divided among all of the villagers for consumption. He noted that the societal hierarchy was reproduced through the dispersal of different parts to different social groups, as well as through the spatial dispersal of the social groups during consumption. However, Prins also noted the inclusion of all villagers in consumption, a priority he felt indicative of "safety first behaviour" (Prins, 1980: 91) to combat famine.

1.2.3 Zooarchaeological Studies

Recent zooarchaeological analyses have employed Zeder's (1988) criteria when dealing with faunal material unearthed during excavations in and around Aksum (Bard *et al*, 1997; Cain, 1999). As part of the BU/IUO research team at Aksum, Chaix analyzed

faunal material from excavations of elite residences on Bieta Giyorgis hill, immediately north of the city of Aksum (Bard *et al*, 1997). The abundance of cattle remains relative to the other faunal material (86%), higher mortality of adult and older animals, even skeletal part distribution and butchery patterns suggested that cattle was the dominant taxon valued for meat, milk and labour locally exploited at the site (Bard *et al.*, 1997).

Chester Cain's zooarchaeological analysis also concentrated on material from in and around the site of Aksum (Cain, 1999). In an attempt to construct a model of domestic animal exploitation, he analyzed and compared units from an urban context at the centre of Aksum and one located at the periphery (Cain, 1999). Cain found a higher mortality of younger animals, selective skeletal part representation and uniform sex and species representations present in the urban context while an even skeletal part representation was present in the assemblage at the periphery. This evidence led Cain to suggest the presence of an indirect meat distribution pattern in the Late Aksumite Period (AD 600-700) between production and urban elite (consumer) contexts, whereby animals were butchered and specific parts transported to the urban context for consumption (Cain, 1999).

1.3 Chapter Summary

This study is an investigation of the distribution system of cattle, other livestock and their products in the Gulo-Makeda region of northern highland Ethiopia. Domestic cattle have had a long history of use by indigenous farmers in the region, beginning nearly 3000 years ago with a gradual influx into Ethiopia of mixed farmers from the southern Arabian peninsula. The combination of an indigenous, pastoral population and Arabian migrants resulted in the development of complex civilization in the northern highlands of what is now Ethiopia. Archaeological research conducted throughout the

twentieth century has yielded artefacts and features which point to cattle as an important tool, if not resource, in the development of the D'MT and Aksumite civilizations between 2-3000 years ago. More recently, the success of ethnoarchaeological research in the area has shown the plausibility of implementing a study of this nature.

CHAPTER 2: METHODOLOGY

2.0 Introduction

Ethnoarchaeological investigations of the use of cattle and its products were conducted at four villages in Gulo-Makeda, an administrative region (*woreda*) in the province of Tigray (Fig.5). The main objective was divided into three distinct aspects of study, each addressed with appropriate field methods. A combination of ethnoarchaeological and zooarchaeological field methods was applied when necessary.

2.1 Geographical and Political Context of the Study

The investigation into the use of cattle and its products in the northern highlands of Ethiopia was part of a larger project entitled "Ethiopian Farmers Today and Yesterday: Archaeological and Ethnoarchaeological Investigations at Gulo Makeda, Eastern Tigrai" (D'Andrea, 2003). This three-year project involving archaeological and ethnoarchaeological research is examining the cultural development of eastern Tigrai from prehistoric through Aksumite times, with emphasis on the role of rural peoples in the origin and development of complex societies on the northern Ethiopian plateau. This thesis attempts to address the ways in which rural peoples utilized cattle in agriculture and in domestic trade (and tribute), both of which may have had an impact in the development of early Ethiopian societies (Connah, 2001). All fieldwork involved in the Eastern Tigrai project, including the fieldwork completed towards this particular thesis, was funded by research grants from the Social Sciences and Humanities Research Council of Canada Research and National Geographic to D'Andrea.

The present region known as Gulo-Makeda *woreda* is rather large, and is itself subdivided into *tabias*, administrative regions comprised of several villages, or *kushets*.

Maps of tabia boundaries are not available. Villages included in the fieldwork belong to the *tabia* known as Shewit Lemlem, centred approximately 15 kilometres north of the town of Adigrat along the Asmara road. Of the three altitude-determined ecological zones in the Ethiopian highlands (*kwolla, woina dega,* and *dega*), Gulo-Makeda and much of the Tigrean Plateau fall within the *woina dega* (1800 – 2400m), or mid-elevation zone (Fattovich, 1977). The *woina dega* is characterized by an arid, sub-tropical climate supporting rather sparse vegetation limited to hardy succulents. The rocky landscape is a mass of mountains and valleys, the only flat land located on valley floors, man-made terraces (Ofcansky and Berry, 1993) and the tops of the *ambas*.

Shewit Lemlem includes a valley running east, curving southeast between three protruding remnants of a volcanic plug known as Amba Fecada (D'Andrea, 2003). The main section of the study area consisted of the valley running east between the south slope of the northern protrusion (also called "Dongollo" by Leclant and Miquel (1959) during their surveys in the region) and the north slope of the southern protrusion (Amba Fecada). The villages of Etchmare and Menabeyti are separated by this valley, which is used communally for grazing livestock (Fig. 6). As it cuts through these two protrusions, the valley turns southeast, supplying water and grazing for the village of Dahane, situated on both the east-facing slope of Amba Fecada and the west-facing slope of the third protrusion, which flank the valley[5]. A fourth village, Adi Ahoune, was also included in the study area, though outside the valley complex noted above. The village of Adi Ahoune was situated along the two slopes flanking a valley located northeast of Adigrat, some 8 kilometres (linear distance) southeast of Etchmare, Menabeyti and Dahane.

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[5] Anfray (1973) provides a basic map of the area encountered in his survey (though Menabeyti is placed too far north on the map)

2.2 Historical Context of Study

Located approximately 15 kilometres north of the town of Adigrat, Shewit Lemlem lies along what would have been an Aksumite land-based trade route leading from the capital city of Aksum to the Red Sea port of Adulis. Its location along this route suggests that it likely witnessed and participated in the flow of goods between the two regions. Archaeological surveys in the area have determined that architectural ruins dating to Aksumite times represent the remains of an important provincial town centre within the Aksumite empire (Anfray, 1973; Leclant and Miquel, 1959). This important historical context makes Gulo-Makeda an ideal setting in which to study the contributions of rural areas in the emergence and establishment of Aksum as an important political entity.

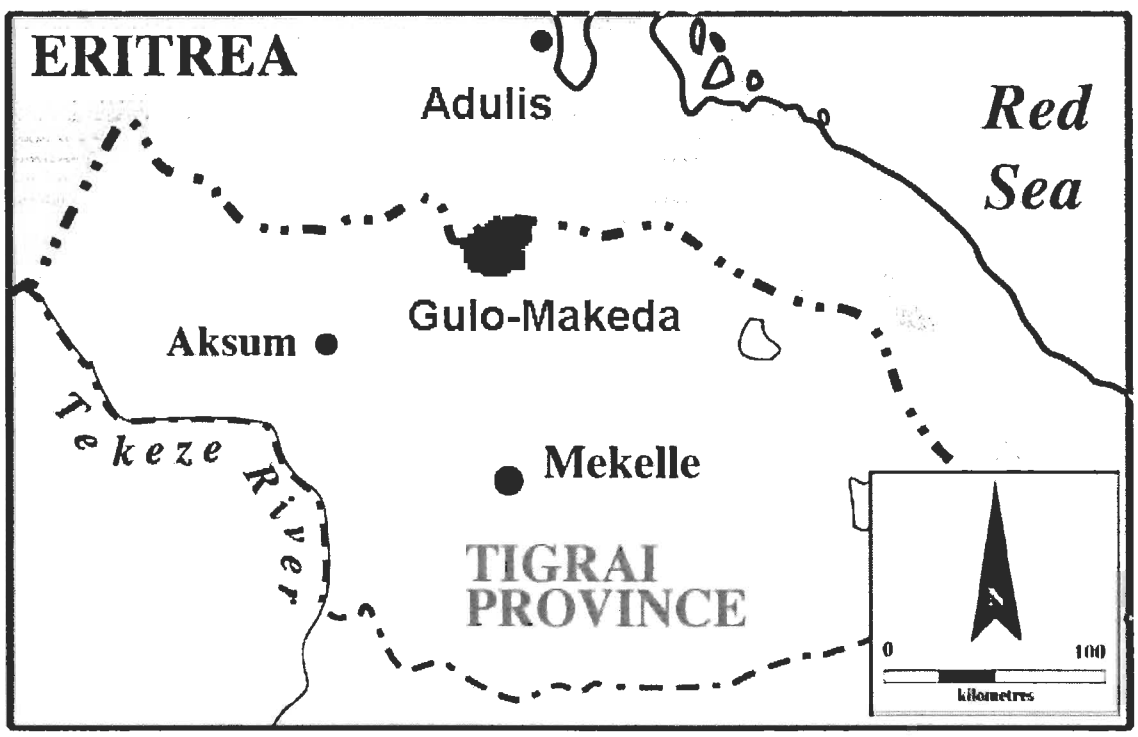

Figure 5. The location of the Gulo-Makeda *woreda* within the province of Tigray, Ethiopia[6].

[6] Modified from Fig. 1, © A.C. D'Andrea, with permission. 2005.

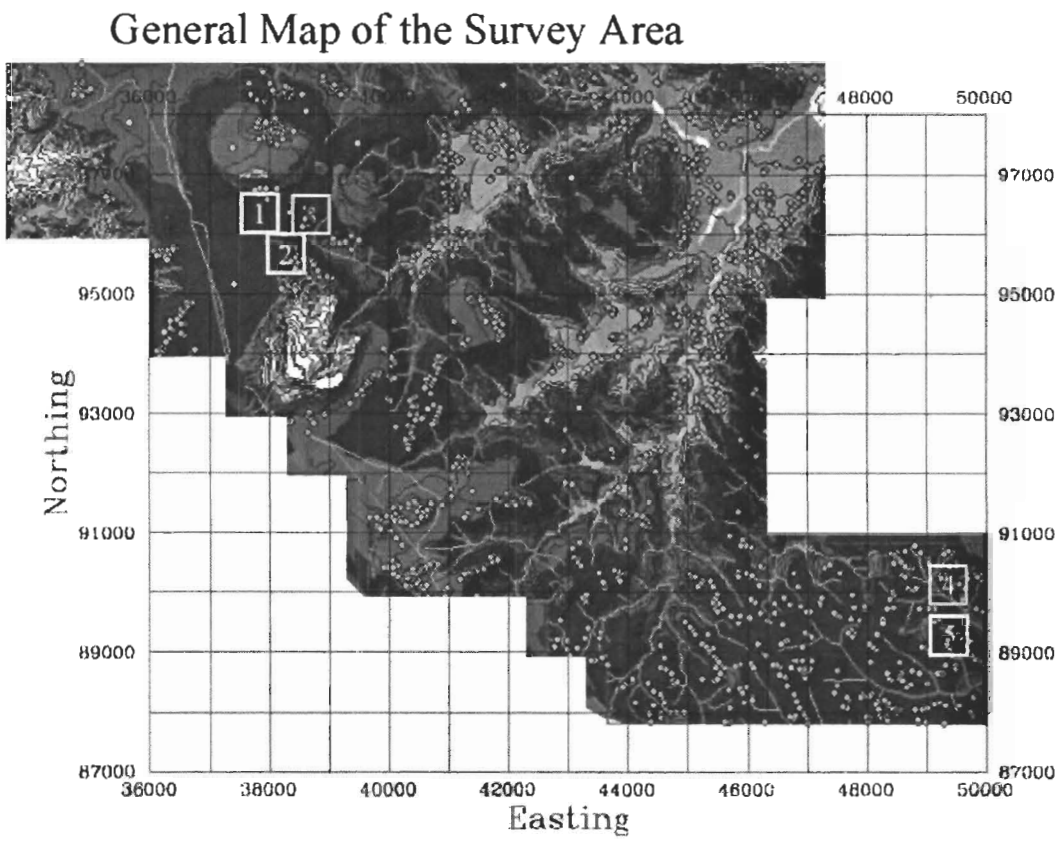

Figure 6. The survey area, including the *kushets* of Etchmare (1), Menabeyti (2), Dahane (3), and Adi Ahoune (5). Note the Asmara road at the western edge of the area.

2.3 Fieldwork Objectives

Ethnoarchaeological and zooarchaeological fieldwork was conducted during a period of six weeks in May and June, 2003. A total of five weeks was spent at Gulo-Makeda, and one week was spent at Adi Ahoune. Ethnoarchaeological field interviews were focused on the three *kushets* of Menabeyti (140 households), Dahane (65 households), Etchmare (65 households), and Adi Ahoune (65 households). A survey of discarded animal bone remains was also conducted throughout Menabeyti over a period of two days.

In order to properly address the use of cattle and products throughout Gulo-Makeda, research had three main objectives:

1) the examination of underlying environmental, economic and social factors affecting the system through the observation and description of the distribution system of cattle and cattle products throughout a village in Gulo-Makeda;
2) the examination of the spatial patterning of cattle products and site-formation processes in order to identify possible archaeological correlates; and
3) the development of models to aid the interpretation of the archaeological and zooarchaeological record.

Each aspect of the research was addressed by the application of a specific relevant field strategy.

2.3.1 The Distribution System of Cattle and Cattle Products

The observation and description of the distribution system of cattle and products throughout Gulo-Makeda was addressed by interviewing a total of 32 households in the four villages within the study area. The total represents a proportionate sample of the households in each village. Specifically, nine interviews were conducted in Adi Ahoune (14%), five were conducted in Dahane (8%), four in Etch Mare (6%) and fourteen in Menabeyti (10%).

In selecting informants for interview, attempts were made to gather information from a proportional representation of the population, both in household number and gender. Structured interviews were scheduled with informants as much as one week in advance, and were conducted with one member at each household with the aid of an interpreter. Few non-structured interviews were conducted at households, although occasionally during an interview an acquaintance of the informant would arrive at the house and participate. Non-structured interviews were also conducted at animal markets on two occasions; questions covered topics such as the distances and time

merchants devoted to bringing livestock to the market, as well as the prices charged for the animals.

The questions posed during interviews were based upon a questionnaire and focused on livestock possession, use and distribution, meat distribution and eating habits, social events involving meat, butchering and resulting bone modifications, bone discard patterns and the uses of animal products (Appendix A). The questionnaire was designed to gather information about all stages of possession, use and consumption of animals and their products, as well as any discard behaviours leading to potential patterning during site-formation process. In many cases subject selection was based primarily on the availability of the informant for interview, informant expertise concerning the topics of interview and degree of participation in processes involving the distribution of animal products.

2.3.2 Spatial Patterning and Site-formation Processes

Data concerning the spatial patterning of cattle products and site-formation processes was gathered through the observation and recording of two butchering events, and intensive pedestrian survey of animal bone discard carried out in the village of Menabeyti. The two butchering events, one wedding and one funeral, were recorded through detailed photography and observation notes. Observations were primarily concerned with the type of animal butchered (cattle *vs.* sheep or goat), the number of participants involved in each case, details of the stages of production, the tools used, the bones discarded (during butchering or after transport) and the uses of the resulting products and by-products. Records of the details of the process focused on archaeologically visible methods of butchering, including the impacts of tools upon bones (cut marks). In both cases, the nature of the celebration required that the

complete animal be transported back to a single dwelling, alleviating the need (and preventing the opportunity) to track specific parts throughout the village.

2.3.3 Zooarchaeological Survey and Analysis

The ground survey was conducted throughout the village of Menabeyti in the course of two days. Beginning at the southwestern-most point of the village, the first day of the survey included all bones found on or near pedestrian footpaths or thoroughfares in the upper west half of the village, while the second day included all bones from the lower east half. For each element encountered, a number of attributes were recorded:

- taxon,
- element (complete or fragmented),
- condition (including burning, weathering and gnawing),
- location, and
- cutmarks (present or absent).

Complete and fragmented elements were recorded. Fragments were identified as proximal or distal wherever possible. Locations or positions of the elements were recorded relative to environmental and cultural features in the village, such as on or alongside thoroughfares, household discard, or within patches of prickly pear cactus (*beles*). Where piles of faunal material were encountered, attributes of each element within the pile were recorded, though tiny (typically less than 1 cm in length), unrecognizable fragments were omitted.

Comparisons were made between information gathered at positively identified butchering sites and data collected at household discard sites throughout the village. Information gathered in both contexts included skeletal part representation, as well as taphonomic condition at the time of observation. In order to facilitate comparison, the

database of observed faunal elements (Appendix B) was divided into four groups, characterized by species (bovid or ovicaprine) and context (butchering site or household discard).

Assemblages were divided into two distinct activity contexts called "household" and "butchering site", and comparisons were made for each skeletal element found at both contexts, in an attempt to discover whether either assemblages were sufficiently distinct from a natural death assemblage to suggest an observable pattern. Expected results figures were drawn from Lyman's (1994) list of natural frequencies and percentages of elements in the bovid skeleton, which was adjusted to provide clear comparisons with the observations. Adjustments included the omission of elements that were not observed during the survey, and subsequent recalculation of proportions of representation. The figures were then compared with the actual or observed frequencies and percentages of bovid elements in a household or butchering site context. This method was repeated for ovicaprine elements found in both contexts.

2.3.4 Models

Models and predictions designed to aid in the interpretation of the archaeological and zooarchaeological record in northern highland Ethiopia were synthesized from the results of this fieldwork and information obtained from previous archaeological excavations in the region.

2.4 Chapter Summary

The primary objective of this study is to investigate the mechanisms of the distribution of cattle and their products in Gulo-Makeda. The objective included a description of the system of use and distribution of livestock meat and products; a

taphonomic study including identification of site-formation processes acting upon discarded animal bone; and an attempt to synthesize this data and previous research in order to assist the interpretation of the archaeological record. Qualitative data was gathered through interviews and observation of butchering events. Following previous ethnoarchaeological and archaeological research involving faunal remains as a standard for comparison, analysis of taxon identification and skeletal part representation were the focus of the quantitative data collection, conducted through ground survey in the village of Menabeyti.

CHAPTER 3: LIVESTOCK POSSESSION, USE AND DISTRIBUTION THROUGHOUT THE REGION OF GULO-MAKEDA

3.0 Introduction

This chapter examines the role of livestock in the households and regional economic and social life of *tabia* Shewit Lemlem in Gulo-Makeda. In each section, results are stated as a summary of all interviews conducted in each of the four villages studied in Shewit Lemlem. Each summary represents answers that were substantiated several times by most informants. It is worth noting that more intra-site behavioural variation was observed than inter-site variation, suggesting a common perception/behaviour throughout the Shewit Lemlem area. However, where the inverse is the case, the causes and effects of these results are noted.

3.1 Domestic Animals in Gulo-Makeda

Families in the *tabia* typically possess a small range of domestic animals for various uses, including labour, subsistence, market products and defence.

3.1.1 Cattle

A total of 44 oxen were counted among the 32 households interviewed, representing an average of 1.4 oxen/household. However, only 25 (78%) of the 32 households visited actually owned oxen. Cattle are the primary focus of livestock possession, most useful for labour, but also valued as wealth and for their meat. The ownership of cattle is a main source of wealth in Shewit Lemlem. The more oxen one owns, the greater the crop yield (including harvested crops and dividends from lending

out oxen). Every household possesses plots of land to farm, thus requiring the use of at least one pair of oxen to operate a plow (Fig. 7). Households owning less than two oxen are forced to borrow one in exchange for a share of the agricultural output. Therefore those households that have two or more oxen are at a distinct advantage over those having one or none at all. It is often the case, however, that neighbours and family members take turns borrowing each other's livestock for plowing, thus alleviating the need for payments in the form of harvested crops, as well as maintaining important social ties within the community.

Of the 18 varieties of cattle present in Ethiopia (Scherf, 2004), four types are identified by farmers in Gulo-Makeda: *barka*, a breed of *Bos indicus* or zebu cattle; *habab*, a hybrid of zebu and *Bos taurus*; *raya*, a long-horned *sanga* breed; and "village oxen", a smaller hybrid of *Bos taurus* and *sanga* breeds. The different cattle breeds vary enormously in terms of economic value, maintenance costs and, according to informants, actual labour output. Since recent periods of drought have rendered agricultural yields unstable and reduced the carrying capacity of grazing lands, purchasing and maintaining livestock requires a delicate balance of the use of available resources. As a result, these factors must all be considered before the decision to purchase such an animal can be made.

It is widely acknowledged throughout Gulo-Makeda that *barka* and *habab* are the largest and most powerful type of oxen, ideal for plowing fields. Owing to a long history of use in farming (see Chapter 1), zebu cattle have been bred over many generations for robusticity and strength. These large, humped oxen allow highland farmers to till tougher soils, plow at greater speeds, and sustain longer periods of plowing between rests. However, this farming proficiency comes at greater cost as these animals are more expensive and consume more food. These high purchase and maintenance costs

are usually enough to deter potential buyers, who opt instead for less favourable but more affordable types of cattle.

More cost-effective for farmers with few resources are the *raya* and "village" oxen. Though slightly smaller in size and noticeably weaker than *barkas* or *habab*, these animals are cheaper and require less food to maintain their strength. The benefits of these reduced expenses far outweigh the increased labour and time requirements of longer and slower plowing periods, especially during drought periods as was the case in the summer of 2003. Thus, there were far more of these types of oxen in use than *barka* or *habab* in the study area.

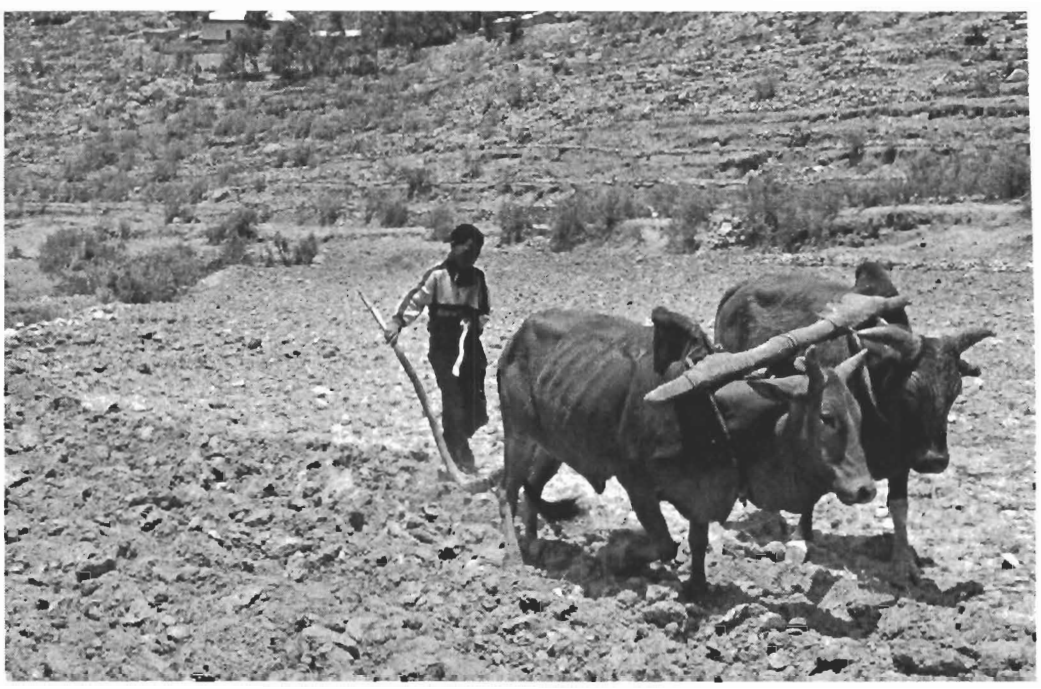

Figure 7. The use of oxen to operate the mahresha plow.

In addition to the breed, farmers also pay close attention to the age of oxen when purchasing these animals for plowing. Informants stated that it was the farmer's responsibility to teach oxen to plow. The most effective strategy to train oxen was to hitch a young ox with an older one, creating an "apprenticeship" between the two.

Hitching two young, inexperienced oxen together often created problems for the farmer, as younger oxen tend to be more disobedient.

3.1.2 Cows

A total of 26 cows were present in all households interviewed, though only 20 (62.5%) of 32 households owned cows or calves. Although not as prized for their labour as oxen, cows are also among the most important domestic animals in the farm households. In addition to supplying milk and, when necessary, meat, cows are valued for their reproductive abilities. If allowed to reproduce, a cow may yield male offspring which can be used in the fields once they reach a mature age. In this way, farmers can obtain oxen for plowing without having to purchase them at the market.

3.1.3 Sheep and Goats

Sheep and goats are kept by some households, but are not as necessary for basic subsistence and are not used as any form of labour. These animals cost less to buy at market, so families may at any time possess enough money to purchase an animal for its meat. Those families that do have sheep or goats own only two or three, just for consumption. The three households that possess a large number (between ten and twenty) belong to animal merchants, engaged in selling the animals or their skins to market or other villagers. Sheep far outnumber goats throughout the *tabia*; half the households interviewed owned sheep, only two households owned goats. Villagers claimed the local vegetation at grazing areas is not diverse enough to support the diet of goats. Nevertheless, goats are always readily available at the markets in Fatsi and Adigrat.

3.1.4 Donkeys

A total of 41 donkeys were present in the interviewed households; 17 of 32 households possessed donkeys. Donkeys are used solely for transport in Tigray, and throughout Ethiopia. They are often fitted with makeshift metal panniers for transporting heavy items such as rocks, but in Gulo-Makeda villages their load is usually straw from the fields or bundles of firewood. Donkeys are not eaten – if a donkey dies, it is thrown to the outskirts of the village, close to a water source where the heavy rains can wash away the carcass and accompanying odour.

3.1.5 Chicken

Although only 8 (25%) of the interviewed households owned chickens, observations of several chickens running throughout the villages and in households not interviewed lead me to suspect that there are more present than recorded. Informants indicated that the previous government administration allotted a number of chickens to each household as part of a program to diversify available food sources (eggs and poultry) in an affordable manner. Chicken coops are present in many households, and although hens are raised primarily as a source of eggs, poultry presents a viable meat alternative when families have no access to cattle, sheep or goats. Chickens are managed by women in the household, who often sell eggs for supplemental income (Diane Lyons, pers. comm.).

3.1.6 Dogs

Dogs are prolific in Gulo-Makeda. They were present in each village studied, and were used by many households as guard dogs, a task which they pursued with

much vigour and success. Dogs were not consumed in any way by the people, even after death. In death they were treated as were donkeys – deposited on the outskirts of a village near a water source. Although extremely effective at defending the house during the day, dogs were often allowed to roam about the village by night. This fact had a significant impact upon the taphonomic investigation detailed in Chapter 6.

3.2 The Use of Livestock Products in Shewit Lemlem

The use of livestock for plowing, food (through meat or milk), transportation (donkeys) or defence (as in the case of dogs) satisfies many of the requirements of daily life in Shewit Lemlem. However, in order to extend the usefulness of these animals after death, rural farmers have become adept at integrating animal products, especially those of oxen or cows, into their day-to-day material culture. In particular, cow, ox, sheep and goat hides, dung, horns and cow's milk have become integral to the daily life of rural villagers.

3.2.1 Hides

Throughout the study area, visible on every occasion a goods market was visited, women (and occasionally men) displayed baby carriers in the form of knapsacks made from goat hides. This is a common craft, usually performed by women but occasionally performed by some men. Goatskin is harvested during the butchering of the animal, is cleaned and left to dry. The hair is then removed with a scraper, and the hide is washed. It is stretched during the drying stage, and treated with oil made of crushed flax seeds in order to make it flexible. The hide is then shaped into a flat piece with added straps to go around a woman's body. The hide segment holds the baby in place against the mother's body, creating a 'baby carrier'. Goatskin baby carriers are

often decorated with beads and cowrie shells in various colours and designs, depending upon the choice of the maker. This craft is but one way in which rural villagers gain income, used to purchase household necessities for their families.

Sheep hides are most often used as padding for benches within households. One such house belonged to a leather merchant, who purchased sheep or goats from neighbours and sold them at the local market. Sheep and their products were readily available in Shewit Lemlem, but sheepskin was rarely found in and among houses, as people preferred to use goatskins.

Most other products made from hide are manufactured from cow or ox hides, and cover a wide range of household uses. A common use of hides is to make *maasi*, or bedding. Once a cow or ox hide is collected, it is soaked in bovine urine for one week. When supple, the hair is scraped off and the hide washed in water. Pounded flax is then rubbed on the skin, and it is put outside to dry. Once dry, the skin is folded and left untreated for a month. After this time, the hide is laid flat on the ground and rubbed with the feet, in order to separate and extract the dry flax. When this is accomplished, the *maasi* is draped over a large, raised bench in the interior of the house and is used as bedding. During butchering, various segments of hide are collected for miscellaneous uses. On one occasion, the skin of the face was used as padding for the *mahresha* yoke, and on another, hide from the tail was used to cover a knife handle.

Another use for cow and ox hide is as leather rope, or *mezahan*. These long leather ropes are typically made from cow or ox hide and are used to fasten parts of the *mahresha* plow together. Other uses for these ropes include the leading of an ox or cow and the binding of its feet during preparations for butchering. Yet another use was to fashion leather handles which are used to shake milk containers called *hamham* (meaning gourd), in which butter and cheese are made.

3.2.2 Dung

Nearly every day in the fields, women collect and transport cow and ox dung from the grazing areas back to the household. Since wood is scarce, and needed for building materials, dung is the primary fuel used in household stoves, or *mogogos*. It is typically laid to dry along walls or other places which catch the wind (Fig. 8). Once dry, it is broken up into pieces and thrown into the fire during food preparation.

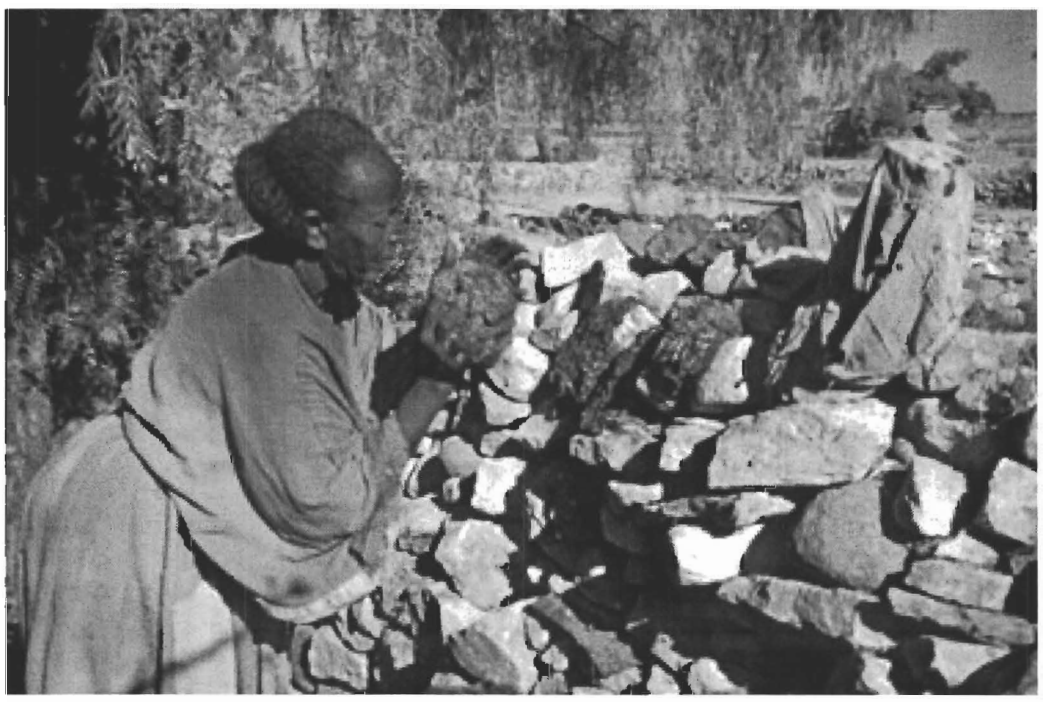

Figure 8. Cow dung is laid out on a wall to dry[7].

3.2.3 Horns

In Shewit Lemlem, ox horns are often placed on walls in household interiors, used as hangers for various objects including everything from baskets or coats to *mahresha* parts (Fig. 9). Horns are also used in the manufacture of bellows pumps for

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[7] Photo courtesy of Dr. A.C. D'Andrea.

blacksmiths, or to make trumpets for children. In some areas of Gulo-Makeda, ox horns (especially those of the long-horned *raya* species) are used to manufacture *wonja*, or decorative horn cups. In Shewit Lemlem, however, this practice is known but not currently employed.

Figure 9. Ox horns used to hang agricultural implements in the home.

3.2.4 Milk

Cow's milk is consumed by everyone in Shewit Lemlem, and some use it to make butter and cheese. Many informants stated that cow's milk is currently difficult to obtain in the area, as the present drought has caused the malnourishment of the herd. Butter and cheese is made by placing a quantity of milk in a clay container called a *laga* or a gourd container called a *hamham*, and using leather handles to shake it until it thickens into butter. The butter is strained and separated from the remaining liquid, called *huken*, using a filter and is stored in a proper container (Fig. 10). If cheese is the

desired outcome, the *huken* is put into a cooking pot, called a *disti*, and heated for five minutes. After the remaining liquid, called *maichaba*, is poured out, only the cheese remains in the *disti*.

Goat's milk is also consumed occasionally in Shewit Lemlem. Interestingly, it is referred to by many informants as having medicinal qualities, and may be used to treat everything from heart conditions to cancer. As previously stated, the local farmers feel that the vegetation in Shewit Lemlem will not support the keeping of many goats, so these animals must be obtained from the local livestock market.

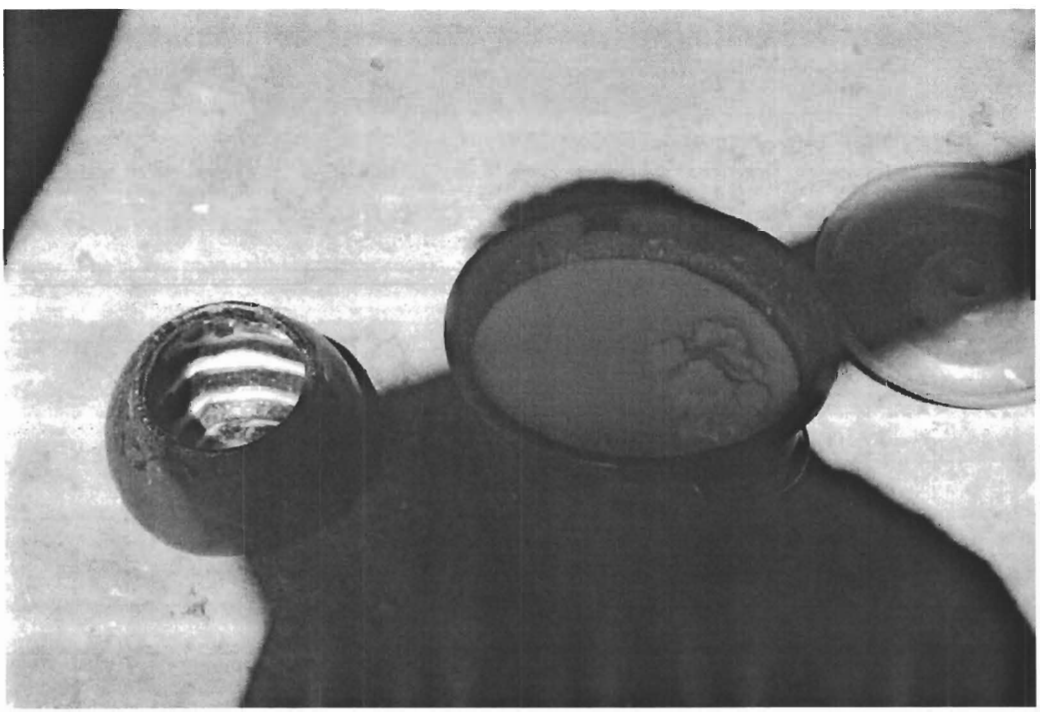

Figure 10. Butter and huken stored in a plastic container.

3.3 The Market System of Exchange and Distribution of Animals

Market exchange is the most important mode of commerce in rural Ethiopia. Local markets supply all manner of goods, as well as providing a forum for farmers and villagers to sell their wares and generate income for the household. Most importantly, the market represents the hub of a regional economic network through which individuals

can access goods they cannot otherwise produce themselves, fulfilling and supplementing subsistence requirements for their families. It is through such networks that the exchange of animals between villages and between regions is mediated.

Both goods and animal markets are strategically situated to maximize access to villages dispersed throughout the countryside. The locations of these activity centres reflect areas to which a large portion of the population has access, whether by road or footpath. In the Shewit Lemlem area, both Fatsi and Adigrat are most easily accessible to the surrounding populations. As such, markets occur at both places; each has its own market day every week. The growth of Fatsi in this manner is a recent development resulting from the displacement of the previous market and government administration offices at the town of Zalembessa during the border conflict with Eritrea.

Although animal and goods markets are held within the same town or village, they are held in separate areas of the town. Animal markets are found within an enclosure or in an open area, but are always separated in some way from the goods market. In Adigrat, a town with a population of 5,000, the two markets are held at opposite ends of the town, roughly one kilometre apart. Participation in the Adigrat animal market is large enough to justify a separate schedule from the goods market, though the two often occur simultaneously. Only the men go to the animal market to do business, while women congregate at the goods market. This may reflect a sexual division of labour with respect to household economics, whereby men tend to manage the livestock through exchange and ownership, while women oversee the management of foodstuffs and household tools.

In the animal market, cattle, sheep and goats are the main commodities, though donkeys occasionally appear as well. The animals are gathered into loosely defined areas and are grouped by type. Cattle are the most abundant and largest animals, and

occupy the most area. Often those merchants selling cattle as labour animals will set aside a tract of land to display the animals' abilities in ploughing. Sheep and goats, sold only for meat, are less abundant and occupy the smallest section of the market.

3.3.1 Origins of the Market Supply

The market supply of animals is a reflection of the economic wealth and needs of the surrounding population. More specifically, the ages and types of animals represented at the market are inherently tied to their usefulness in highland Ethiopian society. For example, oxen are valued for labour-intensive tasks such as plowing and threshing. As such, they reach their peak usefulness at older juvenile and young adult ages, and if cared for properly can then be used for plowing for up to 10 years. Once deemed too old or weak for plowing duties, oxen are sold for meat to others in the village or to the animal market. Cows, valued for milk and reproductive abilities, are also kept for a significant amount of time until deemed no longer able to reproduce or give adequate amounts of milk. Sheep and goats, on the other hand, are used primarily as meat and consumed once they reach the peak meat-bearing age of 1-2 years. These animals are usually kept in small quantities by farm households, which often sell off extra animals for money to avoid having to feed them. Thus, an animal market is likely to be characterized by a greater number of older cattle (10-14 years) and young, juvenile or subadult sheep and goats.

That being said, this pattern may fluctuate depending upon the demand of the consumers of animals and animal products. Such fluctuations may occur both at the outset of the plowing season and during specific holidays associated with meat consumption. Since meat is only consumed during church holidays and important social events, most families, having little wealth, must acquire their meat from the market, the

volume of animals available for sale fluctuates with the timing of this demand. Also, it is to be expected that the demand for young, healthy oxen increases immediately before or during plowing season, when these assets are needed most. Therefore, the age demographic of cattle for sale likely responds accordingly.

3.3.2 Regional Social and Economic Interactions

As outlined above, the size of an animal market is directly related to the number of people that can access the location from the surrounding countryside. This also applies to merchants that supply the animals for sale. In an attempt to discern the boundaries of social and economic interactions around a highland, rural village animal market, a survey of the origins of animal merchants at the Adigrat animal market was completed.

In preparation for the animal market day, animal merchants lead their cattle, sheep and goats from as far south as Wukro, a distance of approximately sixty kilometres or six hours by foot from Adigrat (Fig. 11). Travel to Adigrat from the north, south and west, however, is facilitated by the existence of well-traveled footpaths. Individuals traveling from outlying villages in the countryside are required to follow footpaths winding through the mountains, thus distance is typically measured by traveling time instead of actual kilometres. Despite the facilitation of the footpaths, the extent of the region within which merchants could move animals to Adigrat increases along the Asmara road and decreases through the mountains, resembling more of an ellipse than a circle around the town. It is also interesting to note, however, that the cost of animals increases in proportion to the traveling costs (in time or kilometres) of the merchants. In this way, merchants may be drawn from a greater distance with expectations of greater profits.

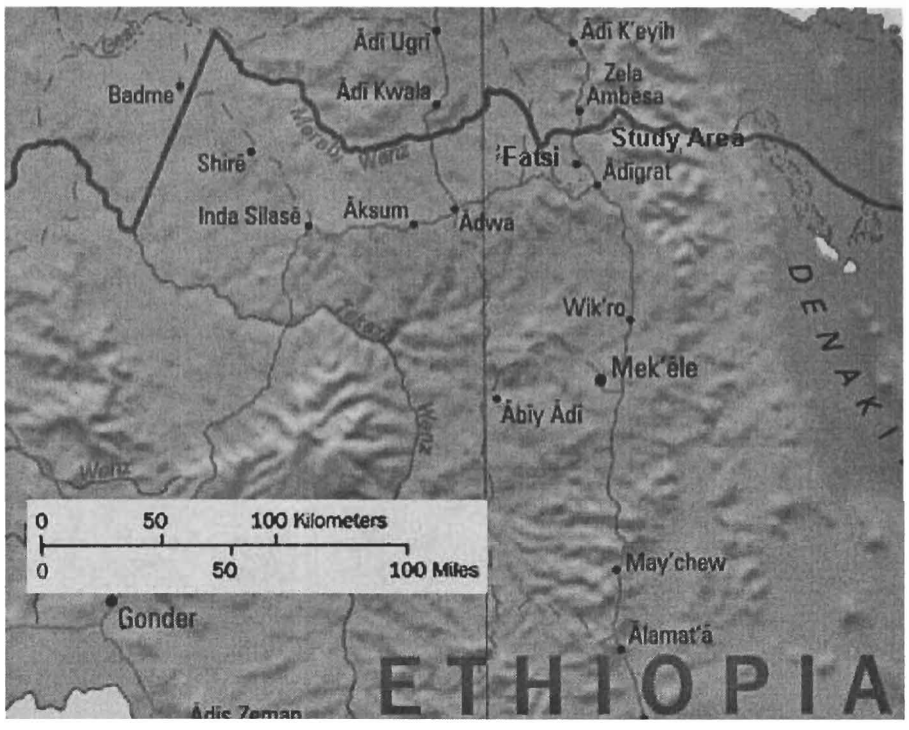

Figure 11. Regional map of northern Tigray[8].

3.3.3 Animal Merchants and Livestock Economy in Gulo-Makeda

Within each village in the *tabia* there are a small number of self-employed animal merchants who do not travel extensively from town to town to buy or sell animals, but whose dealings extend only to the village and local market. Typically these individuals have some prior experience in the buying or selling of animals, and will apply their knowledge and expertise when required. These local animal merchants are only concerned with the needs of friends and neighbours residing in the same village to purchase animal products, or an animal for consumption during a celebration.

Anticipating the needs for an animal during a celebration, the animal merchant will offer his services to a group of people planning to purchase an animal. If accepted, the merchant will travel to the local market and select an adequate animal with his own

[8] Map courtesy of the University of Texas Libraries, The University of Texas at Austin.

money. The merchant then returns with the animal to be reimbursed and given an added commission for his efforts. As a further reward, the merchant is sometimes given the head or hide of the slaughtered animal.

Conversely, an animal merchant may facilitate the selling of animals from the village to the local market, by purchasing extra or unwanted animals from the village and personally offering them up for sale at the market. In this way, the animal merchant can supplement his income while maintaining his farming duties and social ties to the village.

In sum, the livestock economy in Gulo-Makeda is defined by market exchange networks driven by the supply and demand of farmers and their families. Local exchange networks between villages and the market intersect with larger exchange networks between towns such as Wukro and Adigrat to supply the region with a constant flow of animals meeting the daily and annual requirements for subsistence and celebration. Animal merchants operating locally facilitate the flow of animals between the urban market and rural villages, while merchants travelling far distances facilitate this flow between urban centres. In this manner, all villages have access to all types of animals to meet the social and economic requirements for daily life.

3.4 Meat Consumption and Division in Gulo-Makeda

Meat is not consumed on a regular basis in Gulo-Makeda, but is tied to religious festivals and social celebrations. Typically only four types of animals are eaten in Gulo-Makeda: cattle, sheep, goat and chicken (though most informants prefer not to eat chicken if they can afford something else). The difference in cost to purchase the animals can be quite staggering – cattle often command a market price several times higher than that of sheep and goats. For example, at the Adigrat animal market the

price of sheep and goats was between 70 and 280 Birr, while the price of cattle was between 600 and 1500 Birr.

3.4.1 Religious Festivals

Throughout the year, the Ethiopian Christian Orthodox church holds festivals to celebrate significant events in the history of the religion. In chronological order by the Ethiopian calendar, these events are *Johannes, Mezkel, Debre Damo, Mariam Tsion, Kulibi, Ledet, Timkat*, Good Friday, *Fasika*, and *Hawaryat* (Table 1).

Table 1. Ethiopian Orthodox Christian festivals.

Festival	Date	Meat Consumed
Johannes (New Year)	September 1	Sheep/Goat, Cow/Ox
Mezkel (The Finding of the True Cross)	September 17	Sheep/Goat, Cow/Ox
Debre Damo (The Feast of St. Aregawi)	October 14	Sheep/Goat, Cow/Ox
Mariam Tsion (The Feast of St. Mary)	November 21	Cow/Ox
Kulibi (The Feast of St. Gabriel)	December 19	Sheep/Goat, Cow/Ox
Ledet (Christmas)	December 29	Sheep/Goat, Cow/Ox, Chicken
Timkat (Epiphany)	January 11	Cow/Ox, Chicken
Good Friday	March/April	Sheep/Goat, Cow/Ox
Fasika (Easter)	March/April	Sheep/Goat, Cow/Ox
Hawaryat (The Feast of St. Abuna)	August 5	Chicken

At each festival (with the exception of Good Friday), Tigrayans belonging to the Christian Orthodox church celebrate by slaughtering an animal and indulging in a feast of meat dishes and *sua* (the local beer) with family and/or friends. However, all festivals are not equal across the region, as some towns profess to have a greater connection to certain celebrated events or saints. This variable emphasis on specific feasts causes

people in some regions to abstain from meat on some holidays. In Shewit Lemlem, only *Johannes, Mezkel, Mariam Tsion, Ledet, Timkat, Fasika* and *Hawaryat* are celebrated by the consumption of meat. On each occasion, different types of meat are consumed by families depending upon their economic situation.

The two main factors affecting the nature of the celebration and the type of meat consumed during these festivals are the economic situation of families and the cost to purchase an animal for its meat. The wealthiest of families is able to slaughter one of their own household stock or purchase an animal for consumption within the home. Often this was a sheep or goat because household cattle were too important to sacrifice for meat, and cattle were too expensive to purchase from the market for this purpose. Unfortunately, a distinct lack of funds and livestock prevented many families from celebrating in this manner.

3.4.2 Social Events

The major social events requiring the consumption of meat are weddings and funerals. Both events involve the entertainment and participation of large numbers, often hundreds of people, to celebrate the joining of two families through marriage or to remember the life of the deceased. Such events may occur at any time during the year, at the convenience of the host family and those neighbours who assist in the preparations. Typically, because large numbers of people are involved in these types of social events, the host family slaughters oxen in order to support the meat requirements of the feast. Since few families have the ability to spontaneously sacrifice an ox or two for meat, the celebrations usually occur once the host family has saved enough money to purchase the required animals for the feast.

3.4.3 Meat Division – The Lottery System

A viable alternative to the purchase of one's own animal for consumption is to gather a group of family or friends together to share in the expense and consumption of the meat. Groups can be composed of any number of individuals at any time, but often include extended family members or friends. Participation in such groups requires only a contribution of money; membership is neither restricted nor constant. Since groups of this nature require the participation of a number of families, an ox or cow is purchased to ensure an adequate quantity of meat for the members and their families. In order to accomplish this, a number of people pool their funds until the amount is sufficient to purchase a cow or an ox from market. Once the money is collected, the group either purchases an animal from the local animal merchant (if such an agreement has been reached) or elects two representatives to travel to the market and select a suitable animal.

Once the animal is purchased and transported back to the village, it is slaughtered and divided up among the participants of the group. A skilled butcher (usually a participant) is selected by the group to divide the meat evenly between the participants. As it is separated from the animal, all the meat is divided into equal portions called *karima*, which are placed in a row along the ground. Each *karima* contains meat from all parts of the animal, to ensure equal quality as well as quantity. Participants each write their names on separate pieces of paper which are then folded up many times and mixed together[9]. One participant, selected by all, is blindfolded and places each piece of paper upon a *karima*, until all the packages of meat are thus

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[9] Some informants note that in times before paper was plentiful, participants used sticks to cast lots.

claimed. Participants then search for their names and claim their packages. Through this "lottery system" of meat division, each member of a group sharing meat is guaranteed not only an equal portion of meat, but also an unbiased selection of the meat.

Figure 12. Meat packages prepared for lottery division[10].

Although no such occurrences of meat division were witnessed during the field work, the above procedure was described consistently by 85% of informants interviewed (the remaining 15% did not provide details of the process or were not asked). However, this practice (Fig. 12) was witnessed just north of Mekelle in 1997 and 1998 during preparations for the feast of St. Mary (Diane Lyons, pers. comm.). The notion of dividing goods or property through a lottery system is not confined to meat division; Bauer (1977), in his study of Ethiopian highland society, noted that as part of the *risti* system of

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[10] Photo courtesy of Dr. Diane Lyons.

ownership a lottery was also used in situations where divorced couples settled the division of household property. Another parallel to the lottery meat division was noted by Tronvoll (1998), in his analysis of Eritrean highland land tenure systems at the village of Mai Weini. As part of the *shehena* system of land tenure and redistribution, he noted that village land was redistributed every seven years by lottery system or *echa*. The lottery system of land division was carried out under the supervision of an appointed committee to ensure the fair and equal distribution. Tronvoll described *echa*, "the drawing of lots", in this way:

> "Each *gebar* [landowner] taking part in the actual redistribution will put his stick, called *bet'ri*, in a pile. The *aqwaro* [dividers] will appoint one man to step out of earshot while they number the plots. Thereafter the man will be called back and asked to draw a *bet'ri* out of the pile, and the owner of the *bet'ri* will be given plot number one. The owner of the next *bet'ri* drawn will get plot number two, and so on. This is repeated for each of the two categories of land, giving every *gebar* and equal share of the field as a whole." (Tronvoll, 1998: 241)

Tronvoll's narrative of using a lottery system to redistribute land follows closely with Gulo-Makeda informant accounts of lottery meat division, outlined above. It is perhaps a closer parallel than the process described by Bauer, since in cases of divorce ownership of communal property is only divided between two individuals. Nevertheless, the division of communal property and meat by lottery in highland Ethiopian and Eritrean societies indicates a distribution practice used in the highlands in different circumstances.

3.4.4 Meat Preservation

On occasions when a single family may butcher an animal yet fail to cook or finish all the meat in one sitting, the meat must be preserved to avoid spoilage. It is generally acknowledged that meat will stay fresh up to a period of 2-3 days after butchering. If the family cannot consume it in that time, a knife is used to cut the meat

into small pieces. Salt is added to the meat in order to keep flies away and to prevent bad smells from developing within the home. Once salted, the meat is hung on a wire, suspended near the ceiling of the interior of the dwelling until dry- a duration of up to one month. Once dried, the meat is pounded in a *mogu*, a large, elongated mortar traditionally used for dehusking grain (D'Andrea and Mitiku, 2002). The finished product is dried, powdered meat with a consistency of sawdust. It is kept in a sealed container, and may be added any time in the future as a flavouring to soup broth or sauces. In this form, the meat is edible as long as the supply lasts.

3.4.5 Discussion

The role of livestock in Gulo-Makeda is two-fold: the possession and exchange of animals at the village and regional levels supports a local economy, while the availability of these animals is crucial to social and religious celebrations. In order to fulfill daily farming requirements, networks between villages supply the means to obtain and/or sell livestock, and local animal markets provide a forum for exchanges between those with livestock surplus and those in need. At the village level, some individuals create a social and economic niche for themselves, becoming known as animal merchants. These villagers facilitate exchanges between neighbours or family members and the local markets, and receive compensation in the form of hides or other animal products.

In addition to providing farmers with the means of subsistence through plowing and transport, livestock offer villagers a means of fulfilling their social and religious obligations throughout the year. During social events such as weddings and funerals, host families reinforce their ties to extended families, neighbours and the church (represented by the local priests and deacons) by providing them with large quantities of

food and drink. The large volume of people in attendance demands food quantities only oxen or cattle can provide, and so the feasts hinge upon the availability of these animals for slaughter and consumption.

Religious events also demand the slaughter of animals, but these celebrations are generally shared amongst the immediate family, thus demanding less meat. For these occasions families may choose either to slaughter their own animal (typically sheep or goat), or pool their money with others to purchase and share in the consumption of a cow or an ox. If sharing, individuals engage in a lottery system of meat division whereby everyone receives an equal portion of meat, both in quality and quantity. Such a system of random, equal distribution of goods has interesting parallels in other aspects of highland society (in land and property division), suggesting an underlying egalitarian ethos amongst peer relations in the region.

3.5 Chapter Summary

In rural villages within the *tabia* of Shewit Lemlem, in Gulo-Makeda, animals are a source of food, labour, wealth, defence, and additional material goods integral to daily life. They are distributed and exchanged through a market system, which connects rural inhabitants locally and regionally. The supply of animals at livestock markets reflects the economic wealth and needs of the population, as well as meat consumption patterns in the society. Meat is consumed during Christian Orthodox holidays, during feasts celebrating weddings and for funerals. Typically, cows or oxen are slaughtered for large social events such as weddings or funerals, while sheep or goats may feed a single family during Christian Orthodox saints' holidays. During religious celebrations, neighbours within a village may choose to pool money together in order to purchase an ox or cow for slaughter. In this case, the meat is divided through a lottery system,

whereby each participant receives an equal share. Leftover meat is often preserved for later consumption.

CHAPTER 4: BUTCHERING PRACTICES

4.0 Introduction

Meat consumption in Gulo-Makeda is relatively rare and often involves the cooperation of several people desiring equal portions; it follows that butchering must be a uniform process undertaken by trusted individuals. Butchering is always done by males; females generally do not cut meat, and handle meat only to cook it or process it for preservation. This chapter examines the butchering practices in Gulo-Makeda through the role of skilled butchers, the butchering site locations and a detailed account of the butchering process observed during two events.

4.1 Skilled Butchers

Every male has at least some rudimentary butchery skills, passed down from father to son or learned through observation of one of many events that occur throughout his lifetime. Such skills are required to feed the family when specialists are either not required or unavailable, and when the family can afford to butcher their own animal. However, when butchering is required for a momentous event or for a number of people representing many different families, individuals with specific butchering knowledge are often approached.

In each village of Shewit Lemlem there is at least one man who is known for his abilities in the slaughtering of livestock. The number of skilled butchers varies from village to village, and some people will go to other villages to seek out their butcher of choice if he is available. A total of three butchers live in Menabeyti, and they offer their services to all those living in their own village as well as in Etchmare and Dahane. Although Etchmare and Dahane each have at least one person who is considered skilled

at butchering, villagers usually prefer to patronize one of the three from Menabeyti. Their fame throughout the surrounding villages is a result of their apprenticeship under a legendary butcher, once known throughout Gulo-Makeda as the most skilled at his craft. Through verbal and practical instruction he passed much of his knowledge onto his three young apprentices, who now inhabit the village of Menabeyti. Just as this master butcher travelled widely, even to the 10 kilometre-distant border town of Zalambessa to butcher animals, his apprentices may travel up to one half an hour away to provide services during important events and occasions of meat-sharing. During important social events such as weddings or funerals, when often more than one animal is slaughtered and many people offer help, these skilled butchers are responsible for both the butchering of the animals and the organization of the required labour.

The skills they bring with them on these occasions encompass a detailed knowledge of the anatomy of the animals they butcher, as well as notable abilities in dividing the meat up equally and quickly. Knowledge of the anatomy of a cow or an ox facilitates the butchering process, allowing the butcher to extract organs intact for consumption and separate meat from bone and cartilage. Another advantage to this anatomical knowledge is that it also allows the butcher to distinguish the best cuts of meat. According to skilled butchers in Shewit Lemlem, the best cuts of meat on cows or oxen are located around the hindquarters and thighs (*talag* and *tanash*), on the ribs (*bogun*), and around the shoulder and back (*simti*) of the animal. These choice cuts are equivalent to the North American round and loin, rib, and chuck beef cuts respectively (Fig. 13). A 19th century account of Ethiopian butchering practices by Parkyns referred to these same cuts as "tannash", "tallak", and "shint" (Parkyns, 1966). During occasions of meat-sharing between families, these are best cuts, so it is most important that these meats be divided up equally before others.

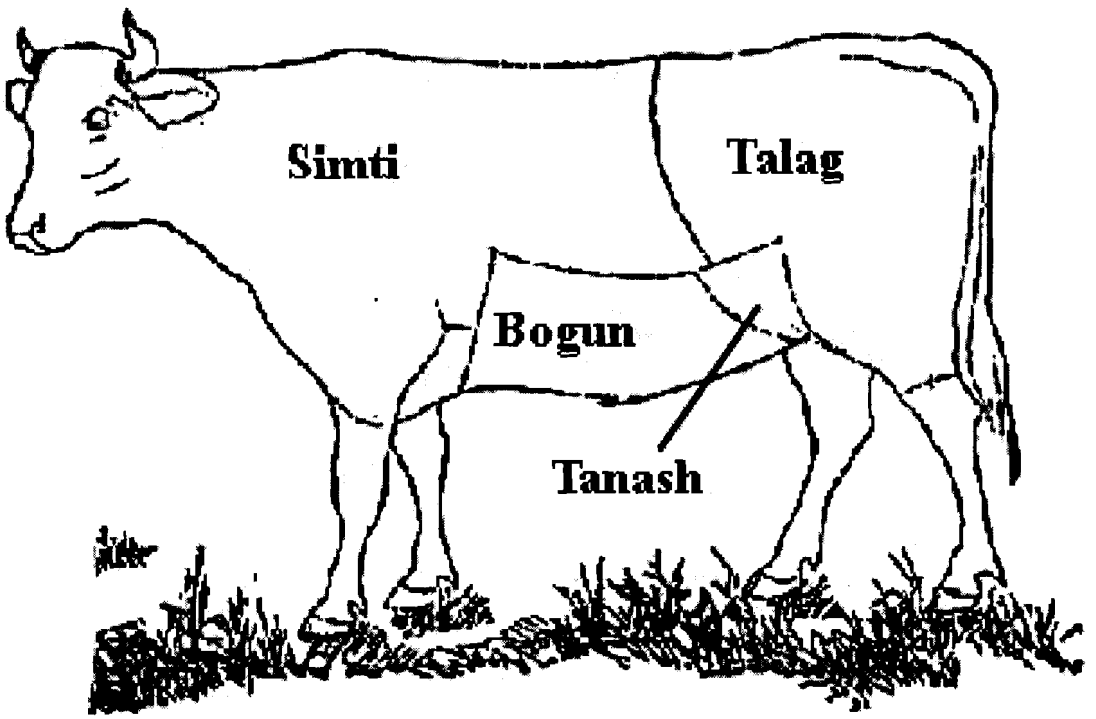

Figure 13. Ethiopian cuts of beef[11].

During the butchering process, the communal nature of the lottery system of meat division demands that all the meat be divided up equally in both quantity and quality. Thus, another important skill for a master butcher is the ability to use the proper tools, a knife and axe (Fig. 14), both quickly and efficiently. While speed is not essential for efficient meat division, it is often used to display the extent of knowledge and expertise on the part of the butcher; when more than one slaughter is carried out simultaneously, the butchers will often compete to finish first, taunting each other in the process. Precision, on the other hand, is essential for extracting the maximum amount of meat and organs from an animal, thereby maximizing the amount (yield) of food for consumption. This allows proper separation of meat from the bone and cartilage, and the extraction of whole organs for processing and later consumption.

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[11] Modified from original image "meat_ox1t.gif" at http://www.cooks.com/rec/story/83/. 2005.

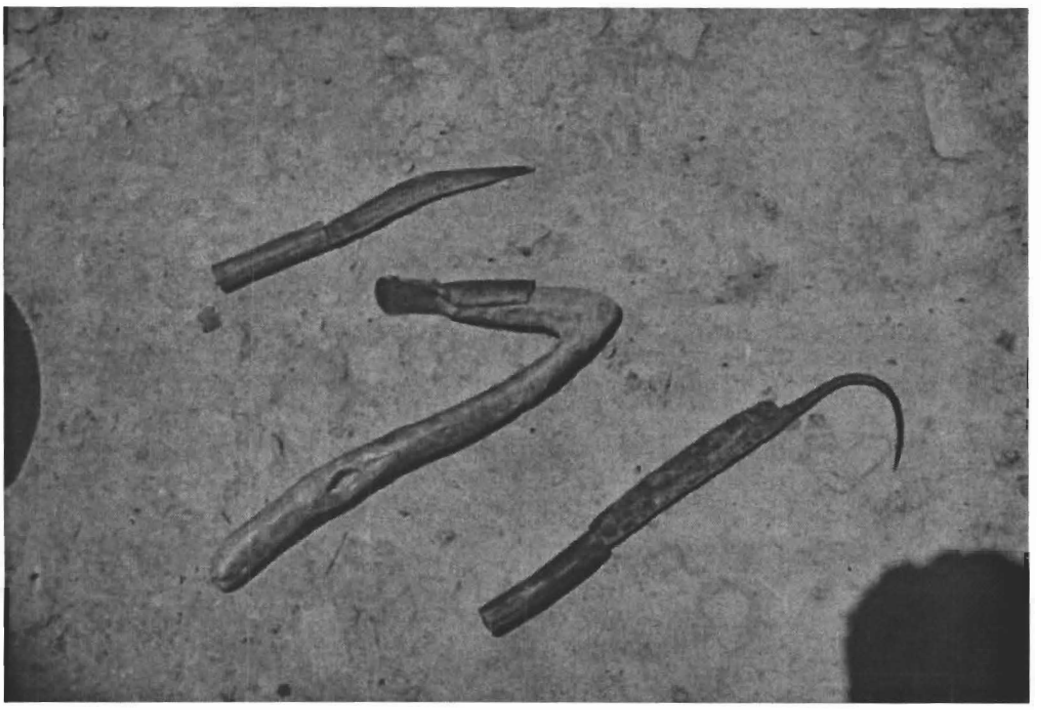

Figure 14. An axe and knives: the tools used to butcher an animal.

4.2 Butchering Sites: Locations and Ideals

In Shewit Lemlem, both the context and specific location of an animal slaughter depend upon a number of variables acting in concert. It was observed that butchering contexts in the villages are divided into two categories: household sites and common sites. The context within which butchery occurs depends on the rationale for the slaughter or the nature of the celebration, as well as the number of guests involved. As stated in Chapter 3, meat is consumed during religious festivals and important social events such as weddings and funerals. The choice of butchering context is dictated first by the nature of the celebration, and then by the number of participants or consumers involved. While large social events typically involve a multitude of people (often in the hundreds) from the surrounding area including neighbouring villages, the celebrations are usually directed towards specific individuals or families. As such, the event is hosted by a single family at one dwelling, requiring the organization and redistribution of food to

occur at that central place. In order to facilitate this, the butchering process takes place in close proximity to the family compound, in a household context.

During religious celebrations, the butchering context depends upon the number of consumers, and whether a family can afford to butcher an animal for its own use. If a single family has enough wealth to purchase livestock for its own consumption, the family may choose to purchase a smaller animal. In such a case, the number of consumers involved is equivalent to the size of the immediate family, and the meat requirements may be met by butchering a sheep or goat. The small size of such an animal and the ease with which it is slaughtered allows the processing and redistribution of meat to occur in a household context. Further, the fact that all the meat belongs to members of one family allows the redistribution to occur at the family's dwelling. Therefore, a family that can purchase and slaughter their own animal for meat consumption will do so within or immediately adjacent to the family compound. If, however, a family cannot afford to (or chooses not to) purchase an animal for its sole consumption, members may contribute money towards the communal lottery meat division as discussed above. The involvement of a number of families, immediate or extended, increases the number of consumers and therefore the meat requirements of the activity. Small animals such as sheep and goat can no longer satisfy these requirements, and so a cow or ox must be butchered, increasing the labour requirements of butchery and meat division. In order to facilitate access for all and satisfy the meat transportation needs of the cooperating participants/ families, the butchering takes place in a communal area.

4.2.1 Communal Butchering Sites

With the exception of Adi Ahoune, there is at least one communal butchering site in each village in the study area. Specifically, there are three in Menabeyti and one in each of Etchmare and Dahane. These are unofficially designated areas within a village where the butchering of a cow or ox occurs repeatedly for various celebrations throughout the year. The sites are known to all, used by all, and restricted to no one in the villages. Although some families habitually tend to reuse one communal site, it is more a result of convenience than hereditary right. No one has hereditary ties to common lands or areas in the villages. Spatially, communal butchering sites exist in specific locations that satisfy a number of criteria concerning the butchering process and widely held ideals or beliefs concerning the acquisition of meat.

4.3 The Butchering Process

The slaughtering of animals may take place in a variety of contexts or locations, and for a variety of reasons, yet despite minor variation the process itself seemed to be quite consistent. Two separate observations of butchering in Shewit Lemlem suggest that in the *tabia* (if not the *woreda*), shared values apply to specific animal parts during a slaughter. During the course of fieldwork both instances of butchery involved oxen slaughtered for two important social occasions, a funeral and a wedding. On both occasions, a skilled butcher was employed to organize the butchering, cleaning, and transporting of the meat and organs from the butchering site to the house for preparation and cooking.

It is important to note here that during the butchering process, many activities occurred simultaneously, and several individuals took part in various ways. During the preparations for major social events such as weddings and funerals, many people were

present, both male and female, to help the host family prepare for the coming feast. While women prepared the cooking facilities, men were engaged in erecting large shelters, butchering animals and preparing meat. Simultaneous events occurred within the butchering process as well, such as the washing of the internal organs, division of the meat and careful flaying and preservation of the hide.

4.3.1 Butchering Event #1 – "tezkal" in Dahane

In Shewit Lemlem, funeral rites (apart from burial) consist of three separate events. The first, which occurs 12 days after the individual's death, is the preparation of *sua* for all priests in attendance. If the family is able, they may also choose to slaughter a sheep or goat for the event. This manner of celebration is repeated for the second event, which occurs 40 days after death. The third, and by all accounts most important, rite is called *tezkal* – a large feast held one year after the death of an individual by the family of the deceased. During this feast, oxen or cows are slaughtered and large quantities of *sua* are prepared, as the family often hosts and feeds hundreds of people. At the feast, guests may eat and drink with family and friends at the house, or simply take food and drink away with them.

Such a large feast requiring an immense amount of meat and *sua* is often very expensive to organize, so *tezkal* may actually be held whenever the family has sufficient funds. There is no restriction or rule about the number of animals slaughtered for *tezkal*, which can vary from one or two to more than ten. Informants were adamant that the number of animals butchered or quantity of meat supplied had no bearing on the status of the deceased or the host family.

Informants from the area stated that a village can have up to 5 funeral feasts in a year, though in 2003 that number was reduced because of the drought. The impact of the high casualty rate in the recent border conflict with Eritrea on this figure is unknown.

On Saturday, 10 May 2003, three oxen were butchered simultaneously in preparation for a funeral feast to be held on the following day. The event(s) began shortly after 6 AM, though observation of the activities commenced at 6:30 AM. The oxen were butchered on a plot of land on the southeast side of the host household, located on the eastern side of the *kushet* of Dahane.

By the time observation had begun, the animals had their throats slit and were already dead. All three animal carcasses were positioned identically, heads facing east, 5-10 metres apart. Eucalyptus leaves had been put down beneath the bodies of the oxen, in order to protect exposed meat from contact with the soil. Each carcass was surrounded by 8 men, though actual butchering on each was conducted simultaneously by 3 individuals acting in concert. The top of an oil drum had been fashioned into a container and positioned nearby, and those that were not involved in butchering preparations were sent to get water from the nearest source. Of the 3 individuals conducting the butchering on each animal, one was a skilled butcher from Menabeyti; the skilled butcher coordinated and supervised the process. Those men who were not butchering were holding the animal in position by the legs to facilitate the process.

Once the animal was lying supine, its limbs spread by the assistants, the butcher used a knife to make a deep ventral incision along the mediane from throat to pelvis, thus exposing the internal organs. A lateral incision, piercing only the skin, was then made from one distal tibia to the other along the ventral side, passing across the central incision at the pubis. A similar lateral, ventral incision was made from metacarpus to metacarpus (Fig. 15). Final incisions were made around the proximal ends of the four

metapodia[12], the hide was peeled back and the four extremities were dismembered by hand from the carcass at the carpals and tarsals. These four dismembered elements were then tossed aside while the group continued butchering. The extremities were discarded at the site, not transported to the home with other elements.

Figure 15. Initial incisions.

Once the initial incisions had been made, the hide was carefully peeled back by hand and flayed from the meat with a knife when necessary. The skin was handled in this manner to expose the ventral side of the torso and allow the extraction of organs. During the process, the animal's hide was gradually separated and laid out beside the carcass in order to prevent meat from coming into contact with the ground. The

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[12] Similar butchering practices were documented among the Kamba of eastern Kenya, who used the hide covering metacarpals as sheathing for handles of knives and swords (Gramly,1974).

sternum, exposed by the initial incision, was pierced and chopped out using an axe, and the rib cage was opened (Fig. 16). The lungs and heart were then carefully cut out and subsequently washed carefully a few metres away in the prepared oil drum[13]. The oil drum was then moved to a position just below the pelvic region in preparation for the extraction of the stomach and intestines. One of the butchering team used the esophagus to pull the remaining internal organs out of the body cavity and into the pre-positioned container. The organs were carefully moved a few metres away, where they were rinsed clean by two individuals while the others remained to finish the butchering.

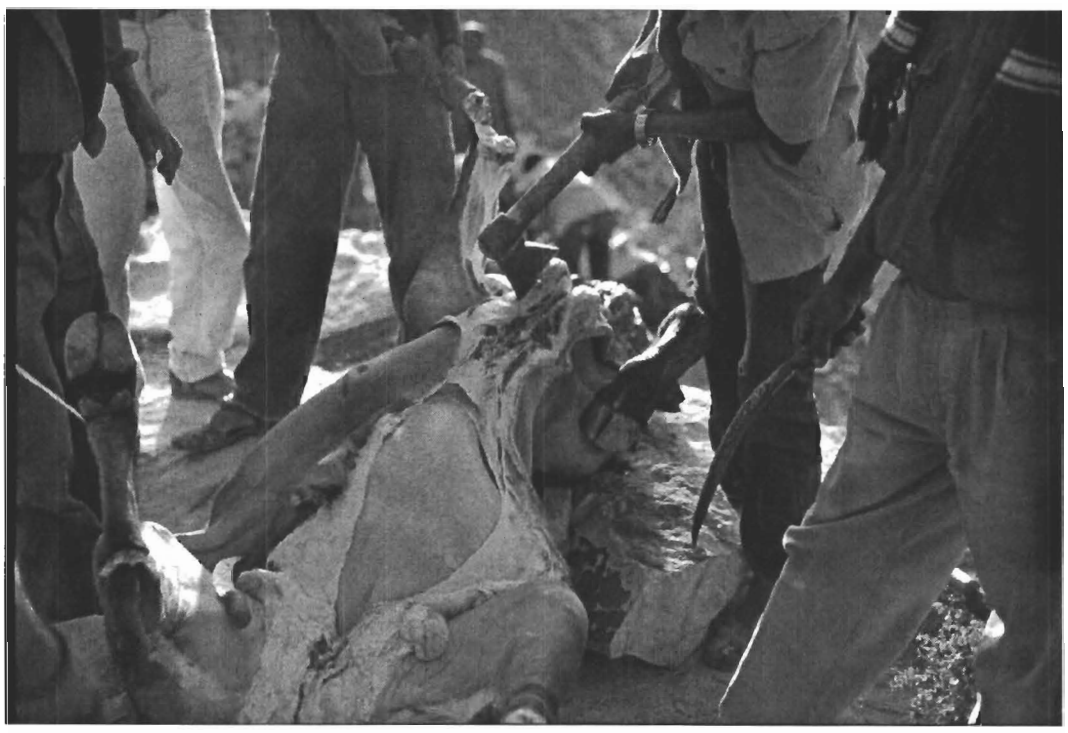

Figure 16. Separation of sternum with an axe.

Once the cavity was empty of internal organs, the carcass was laid on its right side. A knife was used to separate the front limb at the scapula and then the back leg at the pelvis. The scapula was extracted whole and thrown to the side. Two males began

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[13] The washing and preparation of internal organs and the butchering of the animal carcass were carried out simultaneously in two separate activity areas, separated by 3 metres.

to transport the meat, beginning with the left front and hind limbs, to the host house for storage and processing.

With the left limbs separated and out of the way, the men began to work on the left side of the rib cage. Using both a knife and axe, the group chopped the rib bones out from the meat (Fig. 17). Simultaneously, the axe was used, occasionally in conjunction with a log or large piece of wood, to chop the rib bones from the vertebral column (Fig. 19). Once each rib section was separated from the vertebral column, loose ribs were extracted from the surrounding meat and were casually thrown to the side, out of the way of the butchers (Fig. 18). Although some ribs were in fact transported with the meat (Fig. 20), most were discarded in the manner above.

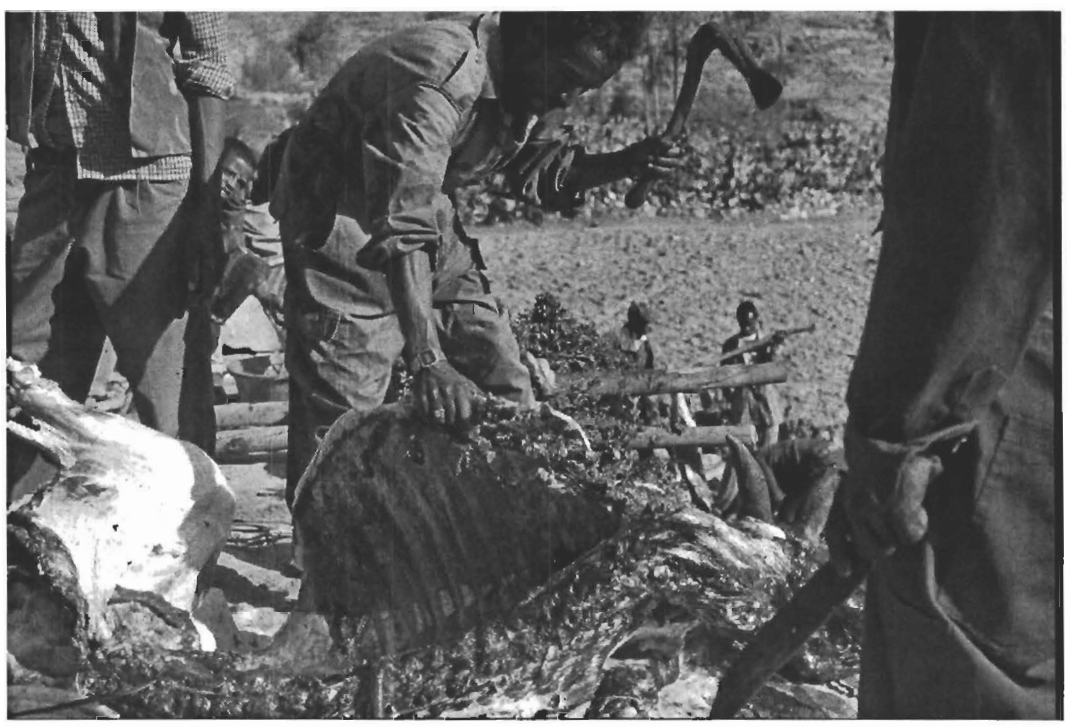

Figure 17. The use of an axe to separate ribs.

After the extraction of all elements and meat from the left side of the carcass, the animal was carefully rolled onto its left side, exposing the right limbs and ribs. As with the left side, the hide was carefully stripped from the flesh and laid beside the carcass.

The limbs and ribs were extracted in a similar fashion, leaving only the hide, cranium and vertebral column.

Figure 18. Extracting ribs from the meat.

The vertebral column was chopped from the cranium and sectioned, to be carried back to the host house. Tissue from the column was to be boiled down and consumed along with the other meat dishes. Finally, the cranium, with horns still attached, was carried off to the house where meat from the tongue and surrounding the mandible could be harvested. At 8:35 AM, the last remaining part of the cow, the hide, was folded over a piece of wood and carried to the house by two men. The only remaining evidence for the butchering event at the site consisted of blood stains on the rock, as well as scattered eucalyptus leaves, rib elements and scapulae.

Figure 19. A piece of wood was often used to brace the axe blows.

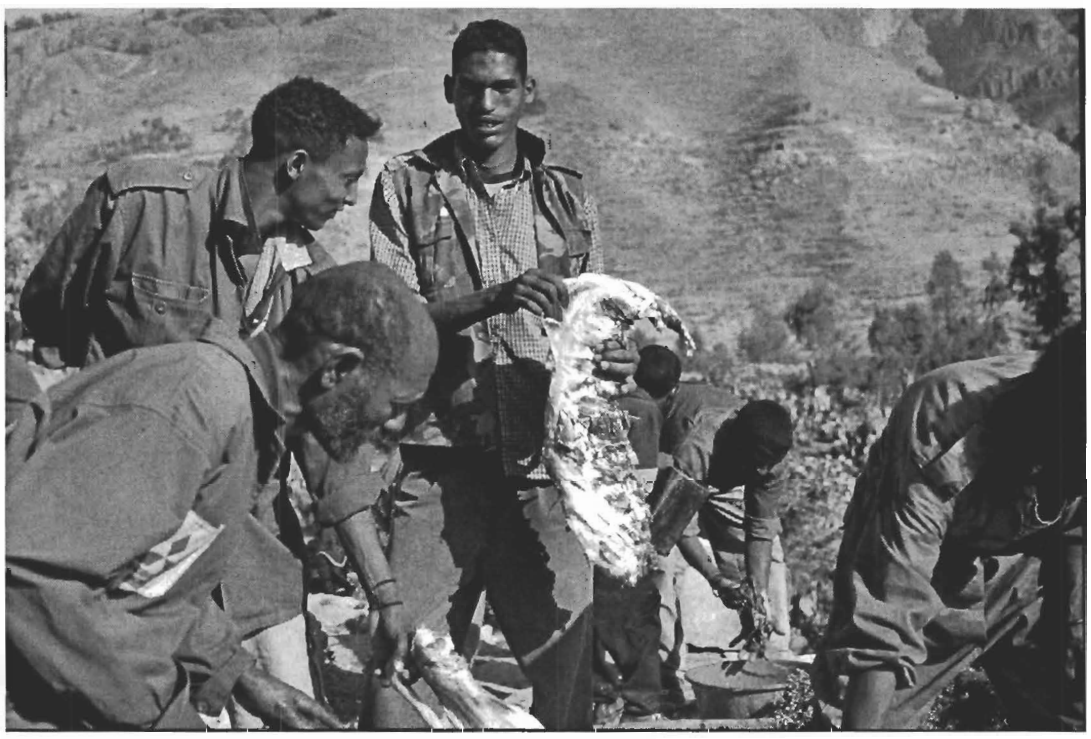

Figure 20. Some ribs were transported with the meat.

The complete process, from the time the animal was slaughtered until the hide and cranium were transported to the host house, required approximately two hours, four individuals to butcher each of the three oxen, and at least two individuals per animal for transportation of the products to the house.

4.3.2 Post-butchering Funeral Feast Preparations

Immediately following the transport of the last meat-bearing elements and hide to the host house, all those taking part in the processing of the meat and organs gathered inside the house. Inside, the men (butchers and priests) gathered in one corner adjacent to the door, using the available light to dice the fresh meat on a large cutting board. The women were all gathered in the opposite, darker corner and lit a number of stoves. While four men diced the meat with knives, others sat nearby casually drinking *sua*; the women prepared to cook a dish called *dulet* made with diced organs. The three crania from the recently butchered animals were stacked neatly behind the cutting board, while the fresh meat was hung by leather ropes from the ceiling.

The first items to be processed by the men were the internal organs – the heart, liver, and stomach. Once chopped, the organs were given to the women, to be cooked alongside the *injera*. As soon as the food was ready, all in attendance stood as the priests offered a prayer for the soul of the deceased. Then the *dulet* was consumed by the priests in attendance, as well as by those who had helped in the butchering and preparation of the meat.

4.3.3 Butchering Event #2 – Wedding Celebration

The preparations involved in the planning and execution of a wedding in Shewit Lemlem required the aid of nearly all the people in a village. As with the funeral celebration, much of this activity involved the cooperation and participation of people from many different villages. All were concerned with the preparation of copious amounts of food and drink to feed potentially hundreds of guests. However, unlike the funeral celebration, feasts were held at two different villages on the same day, as both the bride's family (in a nearby village) and groom's family (in Menabeyti) celebrated the union.

In the days leading up to the wedding date, the families of both villages organized the aid of a number of villagers both women and men, in the preparation of the houses and food. Extra efforts were made to accumulate large quantities of *sua* (there were at least 10 plastic oil barrels in the courtyard of the groom's family on the day before the wedding). One woman from Menabeyti, known for her skill in the manufacture of temporary clay stoves was asked to direct the creation of an additional one within the host household courtyard, for use on the wedding day. Still other efforts of the women were directed at collecting dried cow dung for use as fuel in the *mogogos*.

On the day before the wedding, 30 men from Menabeyti assembled at the host house to help erect a large shelter. The shelter, which was to house many of the guests, consisted of a number of large, slender eucalyptus poles upon which a tarpaulin was placed. A number of large stones from the fence surrounding the compound were dragged into the shelter and placed along the walls at the base of the interior, to act as seats during the celebration. Simultaneously, five men began to direct a cow into the open field adjacent to the host house, in preparation for butchering.

The cow to be slaughtered did not come from the market – it was owned by the host family for many years. Its age was estimated at around 12 years, and if not slaughtered for the wedding, the family had planned to sell the cow to the market for its meat.

At 6 AM, with the aid of a *mezahan* (a leather rope made of cow hide), the five men coaxed the cow to a suitable location on the field. Once the animal was faced northeast the rope was taken off the horns and the cow wrestled to the ground. While one man held the animals head upside down by its horns (exposing the neck), the others quickly tied a rope around its legs. Since one of the butchers happened to be a priest, the animal was blessed by a quick prayer before the throat was cut and the blood drained. As the blood was drained the men took care to cover it immediately with soil to keep animals and children from coming into contact with it.

With the animal supine, two men held the legs apart while another two began to cut through the abdomen with curved knives, following the patterns of the funeral butchering. As before, the lower legs were cut at the joints, then manually broken off and tossed aside. The following, in chronological order, is a detailed description of the activities that occurred during the butchering event. Approximately one half hour after the butchering process had begun (6:35 AM) care was taken to protect the meat from contact with the ground by placing eucalyptus leaves and gathering the loose hide to the sides of the carcass. Three men were holding the limbs while another two were engaged in cutting the skin. Beside the carcass, the top of an oil drum was prepared as a container and filled with water in preparation for cleansing the organs.

At 6:40, the butchers began to cut off the left limbs at the shoulder and pelvis, and the abdomen was split open to expose the organs. Using a knife and axe, the butchers separated the front limb, tossing aside the extracted scapula. The scapula

showed cut marks at its distal edge (Fig. 22). The limb was then transported up to the house by one man. Approximately 45 minutes into the process (6:45), the rear left limb was separated and brought to the house, the chest was split open with an axe, and the intestines were exposed and the esophagus was used to pull the stomach out of the cavity and into the prepared container. The liver and intestines were also lifted into the container. The heart and lungs were extracted and separated, and a cloth was used to soak up blood from the interior of the cavity. One man used a knife to cut open the heart and washed it thoroughly in the container.

At this point in the process, two distinct activity areas had emerged roughly two metres apart: the butchering area where the meat was separated, and the cleaning area, where organs were washed (Fig. 21).

Figure 21. Cattle organs being washed during a slaughter.

At 48 minutes in the butchering area, the liver and intestine were separated. Nearby, the stomach was cut open and emptied of its contents. In order to keep the stomach lining moist, a piece of the lung was inserted into the opening, and the stomach was placed so that the lining faced down. Out of respect for the groom, more men soon

joined the activities, until two were butchering, two held the carcass in position, and two metres from the body three men cleaned the fluids and dirt off the organs.

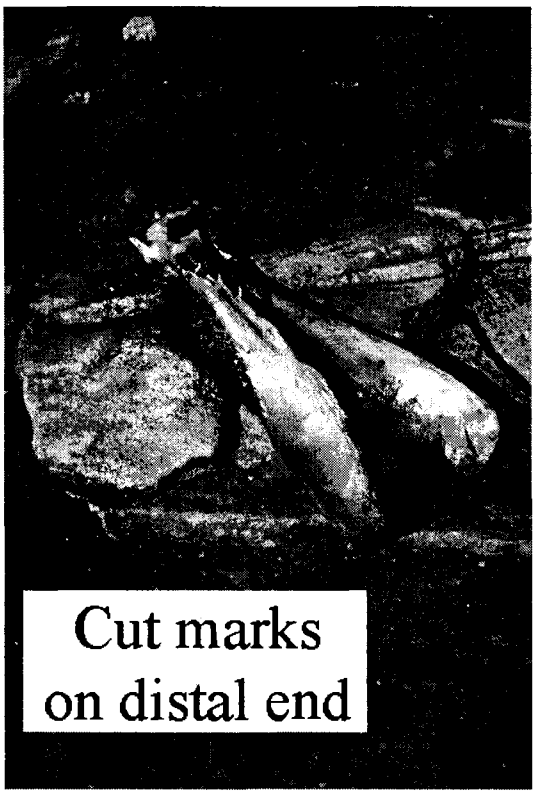

Figure 22. Cut marks were evident on the distal end of a scapula.

At 6:54, the skin had almost entirely been separated but was left at the side of the animal to protect the meat from contact with the dirt. Pieces of the stomach were cut and brought from the cleaning area, to be thrown into the body cavity. This process expanded and loosened the tissue, so it could be easily cut and cooked. Tradition among the men held that if the tissue expanded too quickly, it was an indication that he had been "bad" the year before[14].

At 7:00 in the cleaning area, the intestines were trimmed with a knife. At the butchering area, the third limb was separated and brought to the house. *Simti* meat

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[14] Omens involving the stomachs of slaughtered oxen were documented among the Oromo peoples of southern Ethiopia in the mid-19th century (Pankhurst, 1990: 203).

(surrounding the backbone) was cut out and brought up to the house. By this point, all the choice cuts of meat had been brought to the house for processing. Approximately ten minutes later, the last limb was brought up and the intestines were drained. The chest (including the sternum and the meat surrounding it) was extracted and brought to the house for processing and cooking. By 7:13 the butchers had begun to separate the right ribs using an axe and knife. The ribs were tossed to the side. In the cleaning area, the intestines were rinsed out with water.

One and a half hours into the butchering process, at the butchering area, the neck was separated from the carcass. At the cleaning area, the stomach was shaken out and rinsed thoroughly. The neck was brought to the house, and the butchers began to cut out the left ribs. A few of the men brought the washed organs up to the house on a platter to be diced and cooked. Pieces of the intestines, liver, stomach and heart were combined and cooked to prepare a dish called *dulet*, which was served to those who had helped with the butchering and preparation of the house.

With little of the original body left at 7:45, the spinal column and pelvis were cut out of the carcass. The cow's cranium was severed and laid aside. A few minutes later, the pelvis was separated from the spinal cord with an axe and knife. Both elements were then brought up to the house, to be boiled and discarded. Finally, the tail was separated from the pelvis and the hide, now completely separated from all elements, was folded up and carried into the house to dry.

The butchering process was completed by 8 AM as the cranium was the last element brought into the house. Further processing of the head involved the extraction of the meat from the mandibular area, the stripping of the hide from the cranium, and the extraction of the brain and tongue. The meat from the mandible and tongue was later cooked and consumed. The brain held no value for the villagers; it was simply

discarded. The cranial hide was later wrapped around a yoke and acted as padding for the oxen pulling a *mahresha* plow.

4.4 Discussion

Despite the fact that the observed butchering events occurred in preparation for two very different occasions, the butchering process itself appeared to have little variation. The tools, number of participants involved and the methods and manner of meat separation were identical. The butchering of an ox in both cases required 3-5 individuals using a knife and axe. Four basic steps characterized the process:

- the hide was carefully and gradually separated from the body during the process.
- the organs were extracted and washed in a nearby activity area.
- focusing on one side at a time, the butchers first separated the legs and the scapulae and pelvis, then chopped the meat out of the rib sections.
- once the cranium, backbone and pelvis were divided and carried away, the hide was folded and transported elsewhere.

Variation between the two events occurred only in the order by which different parts of the animal were separated. During the wedding preparations, the butchers separated the limbs from the carcass before extracting the organs, whereas during the funeral preparations this order was reversed. Intriguingly, the same butcher was in charge of both events witnessed, suggesting that some slight variation exists between all butchering events regardless of those participating. Yet, while subjectivity on the part of the butcher affects the order of the events, most butchering events are quite similar. One striking similarity between the two observed butchering events was the appearance of the site immediately after the activities ceased. In both instances, only ribs, scapulae,

metapodia and phalanges remained, strewn about over piles of eucalyptus leaves covering the blood-soaked ground (Fig. 23).

Figure 23. Post-butchering activity area.

While usual practice in the village was to butcher cattle at one of the common butchering areas, both butchering events occurred next to specific households. As previously stated, the reasons for the two butchering events dictated the locations at which they occurred. Since both events happened in preparation for large social events (as opposed to religious holidays), the focus of the celebration and the distribution centre of the food were located at a single dwelling. Therefore, performing the butchering process in close proximity to the host household facilitated and sped up transport of the meat and organs to their destination. Both butchering events occurred on the eve of, and in preparation for, celebratory feasts marking major social events (a funeral and a wedding) in the communities of Dahane and Menabeyti. The preparations and

celebrations involved large numbers of people from different villages, there to assist or participate in the feast.

At present, there are a number of competing theories surrounding the impetus for feasting behaviour and the desired consequences of holding ritual celebrations involving the consumption of large amounts of food. Dietler (2001: 65) defines 'feasting' as "a form of ritual activity that involves the communal consumption of food and drink." Assuming this is a workable definition, Dietler and Hayden differ fundamentally on the impetus for this ritual behaviour (Dietler and Hayden, 2001). Following Bourdieu's theory of practice, Dietler sees feasting as a way to convert economic capital into social capital, with political power the desired result. Hayden adopts a cultural ecological position, viewing feasting as an adaptive strategy with the desired result of survival and reproduction. Both theorists agree that feasts involve strategic, self-interested political action, and that they serve to define and reproduce social categories (Dietler and Hayden, 2001). Therefore, while the desired consequences are different, an essential component to feasting theory is competition. Dietler does suggest, however, that his definition of competition doesn't necessarily entail "aggressive domination and relentless accumulation of power" (Dietler, 2001: 77), but also may include continual renegotiation of relative asymmetries in relationships between people – that is to say, in terms of competition, feasting may simply be a way of maintaining one's status among peers. Although he associates "limited, fluctuating resources vulnerable to overexploitation" with hunter-gatherers, Hayden (1996) also acknowledges that feasts in this type of situation may not have a competitive aspect, but can serve functions related to rituals and the creation of social bonds in conditions of food stress.

In the Ethiopian Highlands, drought has been a regular occurrence throughout history, cited as one of the main causes of recorded famines since medieval times

(Pankhurst, 1985). The devastating effects of drought throughout history and into the present have decimated crop yields and livestock numbers, to the point of relegating the country to reliance on foreign aid for subsistence. Within an environment of such limited and unpredictable resources there is little room to accumulate food for anything other than one's own subsistence. That feasts occur in a society constantly battling drought and famine suggests a motive other than personal advancement. In fact, in addition to wedding and funeral feasts there are also smaller, more regular feasts of bread and beer hosted by small groups, which serve to establish a mutual bond of obligation and assistance during difficult times (Diane Lyons, pers. comm).

With respect to the Dahane funeral, the creation and maintenance of social ties seemed of paramount importance; even though three oxen were slaughtered for the event, no massive accumulation occurred prior to the celebration. A good indicator that aggressive feasting competition was less important to the inhabitants of Shewit Lemlem was the ritual by which they prepared for funeral feasts. The family of the deceased was allowed to hold *tezkal* (the ritual feast celebrating the one-year anniversary of the dead) *at any time* after burial. This almost infinite window of time to prepare for a feast contrasts strongly with other funeral feasting rituals, such as that of the Akha, in which a large feast is held immediately after burial (Clarke, 1998:115). The short window of time allowed (between death and burial) for the preparation of such a large feast suggests that the Akha have the means to accumulate large amounts of food in a very short time.

The argument for competition through feasting seems more plausible in that society, given the presence of such an abundance of food. In Shewit Lemlem, where food remains perhaps perpetually scarce, the large window of time within which families may prepare a feast ensures that all families may accumulate enough food to feed the participants, even if it takes many years to do so. In this way, all families have at least

the opportunity to prepare and host an 'empowering feast' as Dietler defines it, thus maintaining their status amongst peers without great economic risk to themselves.

4.5 Chapter Summary

When an animal must be slaughtered, the inhabitants of a village in Shewit Lemlem typically consult a well-known, skilled butcher who possesses an intimate knowledge of the anatomy of an ox or cow. Skilled butchers use this knowledge in order to quickly and effectively separate the best meat and most useful parts of the animal from the carcass. The context within which butchery occurs depends on the rationale for the slaughter or the nature of the celebration, as well as the number of consumers involved. Nevertheless, when selecting a specific location for butchering, skilled butchers adhere to common ideals about the conditions of a locale.

Two butchering events were observed and documented, one for a wedding and one for a funeral. A pattern of basic characteristics and events was evident at both processes.

CHAPTER 5: SPATIAL DISTRIBUTION OF FAUNAL REMAINS IN MENABEYTI

5.0 Introduction

As discussed in Chapter 3, ground survey of faunal remains was conducted in the village of Menabeyti (Fig. 24). Beginning at the southwest boundary of the village, the survey proceeded northeast, including roads, household refuse pits, cactus patches, and communal activity areas. Following the natural spatial divisions within the village layout, survey on the first day included all roads and houses located on the western half of Menabeyti (areas A-C, Fig. 25). The survey was continued and completed on the second day in the eastern half of the village (areas D-F, Fig. 25).

During the survey attempts were made to observe and record the following information: taxonomy, bone identification, context in which the bone was found, the condition of the bone and the presence (if any) of bone modification.

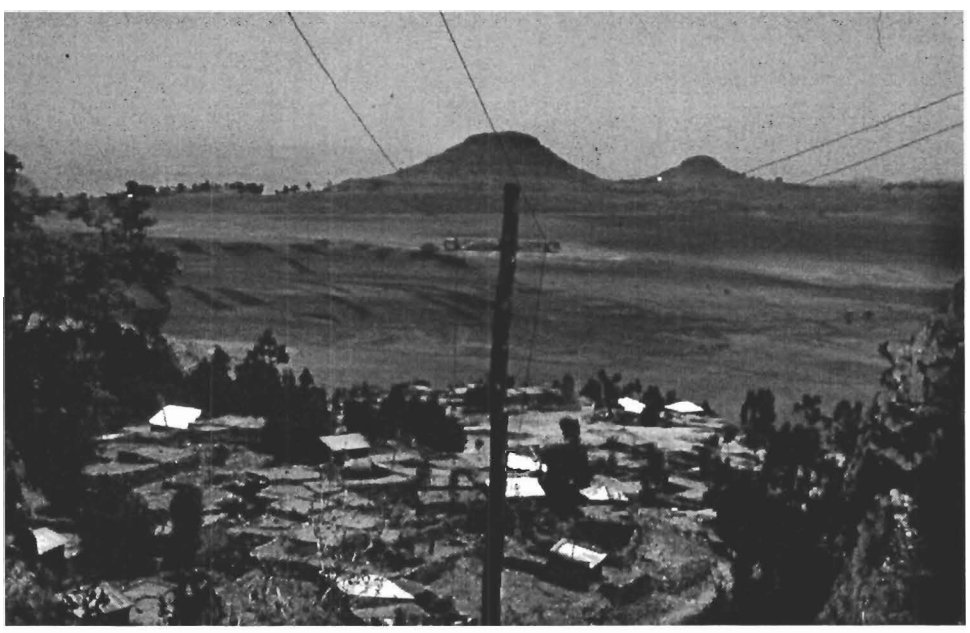

Figure 24. Looking NW over "Upper Menabeyti".

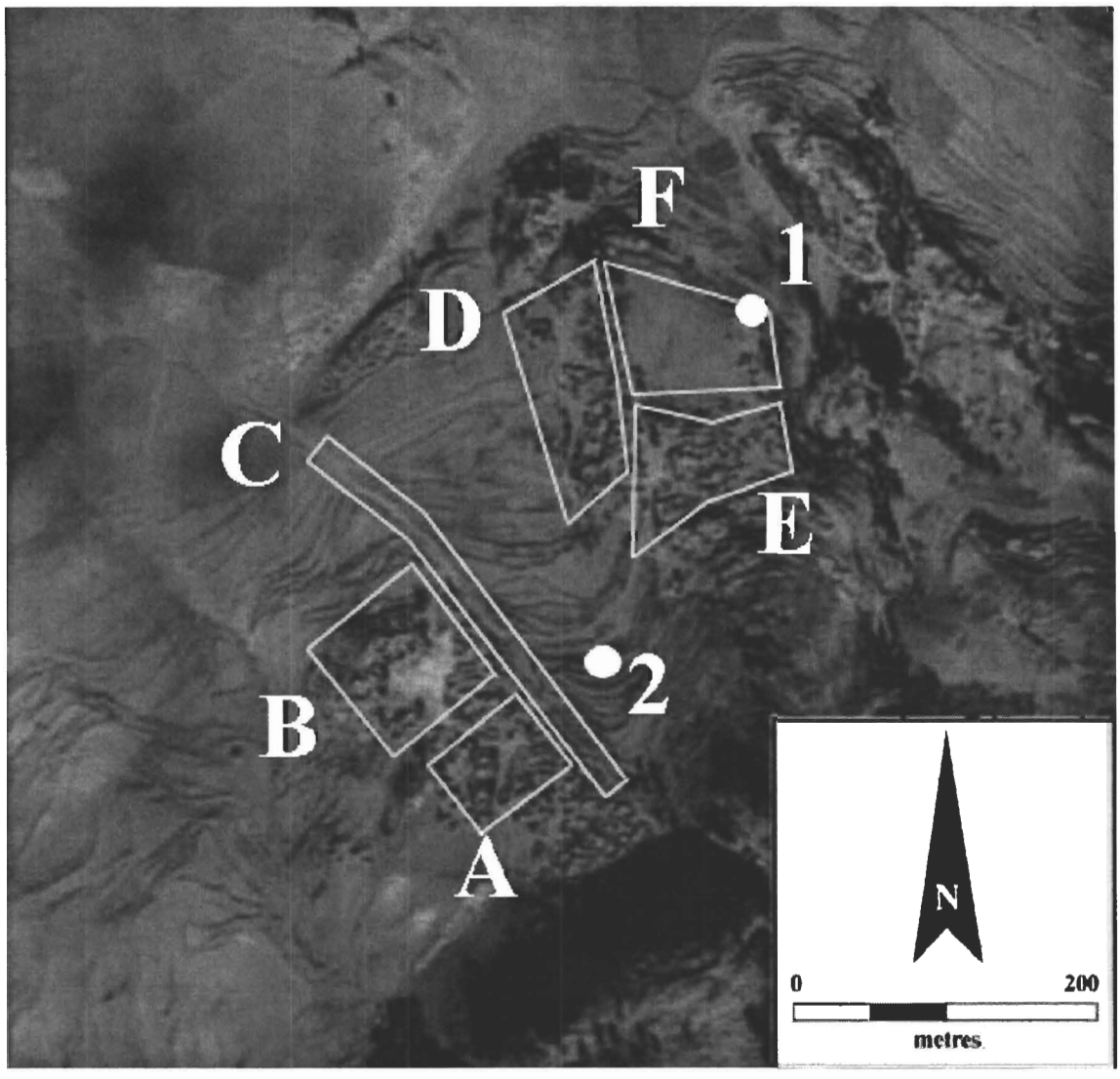

Figure 25. A map of the village of Menabeyti, showing the areas surveyed (A-F). White dots indicate the two common butchering site contexts (1 and 2) within the village.

5.1 Taxon Frequencies and Quantitative Biases

Overall, five taxa are represented in the specimens, including cattle *(Bos taurus)*, ovicaprine (*Ovis aries* and *Capra hircus*), donkey *(Equus asinus)* and chicken *(Gallus gallus)*. Calculations of the observed specimens are shown in the form of NISP in Table 2. A total of 939 bone specimens were observed throughout Menabeyti, including 13 unidentified specimens. Omitted from these results are a number of minute bone chips, whose size and number precluded identification and counting in the time allotted for the

survey. As these bone chips were unidentifiable and therefore exempt from categorization into specific genera or species, their omission does not affect the validity of the data – in fact, their inclusion would only have increased the NISP totals under the "unidentified" category and left little or no impact on the faunal analysis, which was based on the comparison between taxa. The totals for *Ovis aries* and *Capra hircus* specimens are combined into the category "ovicaprine"; while both species are known to be present in Gulo-Makeda (see Chapter 3), it was difficult to clearly distinguish between the two during the survey.

Table 2. Species frequency from Menabeyti ground survey.

Species	Common Name	NISP Totals	Percent of Sample
Bos taurus	Domestic Cattle	704	74.8
ovicaprine	Sheep or Goat	224	23.9
Equus asinus	Donkey	2	0.2
Gallus gallus	Chicken	3	0.3
Unidentified		8	0.8
Totals		941	100

The dominance of cattle bones (representing 74.8% of the sample) and ovicaprine specimens (23.9%) is readily apparent in the above table. This is likely a result of both utilization and size of the species and their products. Bovine and ovicaprine species are both valued for their meat (and other products), and are slaughtered within the village. The bones from these animals are robust enough to ensure at least partial survival through taphonomic processes and carnivore modifications. While chicken is also consumed in the household, the small size and gracile nature of the faunal remains was a likely cause of the low representation during the survey.

The distinct under-representation of *Equus asinus* may be attributed to the disposal of donkey carcasses outside the village upon death. Since these animals are

used primarily for labour and not for meat, neither tissue nor bone represents potential products for highland farmers. Concerns about hygiene and odour make the villagers reluctant to leave dead donkeys near activity areas, so the complete carcasses are left near a water source outside the village. Sources of moving water such as creeks and streams serve to wash away exposed tissue, thus eliminating the bad smell of the carcass.

The under-representation of *Gallus gallus* bones may be attributed to poor preservation and human consumption. When a family eats chicken, the bones are often cooked in order to add flavour to the next meal. The smallest bones may even be inadvertently consumed during the meal if they are not detected. Those bones that are extracted from the food after cooking are either fed to the dogs or thrown to the nearest bone refuse area. Once thrown out as refuse, poor preservation of the bones may be the result of natural taphonomic processes or canine consumption.

Thus, while bovine and ovicaprine bones are accurately represented as a result of consumption and discard, human transport and taphonomic processes may cause donkey and chicken bones to be notably absent or under-represented in a highland Ethiopian village context.

5.2 Breakdown of Faunal Distribution into Contexts

While the Menabeyti ground survey was conducted in two days in two separate halves of the village, the natural spatial divisions within the village did not accurately represent different contexts or activity areas throughout. By separating the various features within the village into different human activity contexts, it is possible to determine patterns associating human behaviour with the distribution of faunal remains. With respect to this study, the most prominent behaviours affecting the distribution of

animal bone are activities carried out at common butchering areas and household or casual refuse areas[15].

As stated in Chapter 4, Menabeyti has three communal butchering areas, where individuals from different families may butcher and divide up the meat and products of a cow or an ox. They are located (from east to west) in the northeast corner of an open field; to the north of the village facing the piles of straw; and approximately 50 metres east of the western group of houses in a terraced eucalyptus grove. While the northeast corner of the open field is thought to be a common ox-butchering locality, the field is surrounded by houses and may thus also be open to household bone discard activity. This concern was validated near the end of the fieldwork when butchering was also observed at the south end in association with a wedding (an activity performed in close proximity to the household). Nevertheless, despite the dual nature of the use of the field and the possible impacts upon the data set, the faunal assemblage thought to be associated with common butchering areas was spatially distinct. The uniformity of the process and behaviours of bone discard during communal ox butchering events should be visible in the analysis. Ultimately, this assemblage represents an activity deliberately located away from most houses and involving only one genus, *Bos*. As a result, the assemblage should be dominated by cow or ox bones immediately discarded during the butchering process. More specifically, bone discard witnessed during the butchering process of oxen shows that there should be a bias towards ribs and scapulae in the bone distribution, to the exclusion of important meat-bearing elements such as limb bones.

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[15] The term "area" is used here because this is a more accurate reflection of the casual way the highland villagers conduct activities involving animal bone. Animals are seldom butchered in exactly the same spot each time, yet they may always be butchered at the same "place"; animal bone may always be discarded to the same "place", which represents an area that is metres in diameter.

The other village context or activity area is represented by the faunal assemblage found throughout the roads and alongside domestic compounds of Menabeyti. The activities associated with this assemblage include household butchering and discard, as well as the casual discard of animal bone outside of the household compounds. Since both the processing and discard behaviours responsible for this assemblage are believed to occur at or near the households, the skeletal part distribution should include both meat-bearing and non-meat bearing elements (Bartram, 1993). Also, although household butchering events typically involve goat or sheep, in the case of large social events such as weddings or funerals oxen are also butchered close to the host household. Therefore, the bone assemblage should be rich in both ovicaprine and *Bos* bones with an even skeletal part distribution.

5.3 Expected Frequencies of Skeletal Elements

The comparison and analysis of the faunal assemblages at these two different activity contexts should reveal that the pattern of discard associated with the ox-butchering process at communal sites will be distinct from the pattern of household consumption and bone discard. In order to accomplish this, the observed frequencies of each bone element are compared with a model for expected frequencies of skeletal elements in a post-mortem context.

Table 3. Frequencies and percentages of major elements in the bovid skeleton (from Lyman, 1994: 98)

Occurrence of Elements in Bovid Skeleton		
Element	Frequency	% of Total
Cranium	1	0.8
Mandible	2	1.6
Atlas	1	0.8
Axis	1	0.8
Cervical	5	4.0
Thoracic	13	10.3
Lumbar	7	5.5
Sacrum	1	0.8
Innominate	2	1.6
Rib	26	20.6
Sternum	1	0.8
Scapula	2	1.6
Clavicle	0	0.0
Humerus	2	1.6
Radius	2	1.6
Ulna	2	1.6
Carpal	12	9.5
Metacarpal	2	1.6
Femur	2	1.6
Patella	2	1.6
Tibia	2	1.6
Fibula	2	1.6
Astragalus	2	1.6
Calcaneum	2	1.6
Other Tarsals	6	4.8
Metatarsal	2	1.6
First Phalanx	8	6.3
Second Phalanx	8	6.3
Third Phalanx	8	6.3
Total	126	100.0

Lyman's (1994: 98) comprehensive list of the natural frequencies of the major kinds of elements in the bovid skeleton can be used as a standard against which to compare and analyze skeletal representation in both butchering site and household discard contexts. However, the natural abundance of some elements in a single skeleton, such as ribs, may cause them to have higher observed specimen numbers than those elements that are paired (Reitz and Wing, 1999). In order to prevent these

figures from skewing the data collected during the bone survey and to facilitate comparison, NISP frequencies will be displayed as percentages of the assemblage. Using the natural element frequencies (NEF) found in Lyman (1994), the expected frequency of each element is calculated as a percent of the total number of major elements found naturally in the bovid skeleton. Table 3 shows figures from this list represented as percentages of the total number of major bone elements.

Thus, in a natural assemblage unaffected by human activity or destructive taphonomic processes, one would expect to find that the recovered/observed frequency of each bone element is determined by its natural frequency in the animal skeleton. Deviations from this pattern must then signify that the recovery of the assemblage has been affected by taphonomic processes due to cultural or natural phenomena.

5.4 Observation and Comparison

A total of 117 bone elements from both *Bos* and ovicaprine species were found in association with the common butchering areas, in contrast to 821 bone elements found in household discard areas. The patterns of skeletal representations differ greatly between the two.

Significant statistical differences between the expected bone assemblage (from the list of expected frequencies) and the observed assemblages were evident, with respect to the presence or absence of specific bone elements. The presence of both bovine and ovicaprine horn was notable as it is not included in the original list of expected frequencies of bone elements. Notable absences from the assemblages include the sternum, patella, carpals and tarsals. Though no sternal elements were recovered, the absence of the patella, carpals and tarsals may be explained by the

dismemberment and immediate discard of the lower legs of animals during the butchering process (see Chapter 4). Since no effort was made to separate the elements in the lower leg (or the tissue covering them), the patella may still have been articulated with the limbs, and the carpals and tarsals with the metapodia and phalanges. Not immediately visible during the survey, they would have escaped observation and recording. Another possibility for the lack of recovery of these elements is their vulnerability to taphonomic processes. Brain (1981:22) has shown a distinctly low, nearly non-existent survival rate for these small bones in archaeological fossil assemblages.

The absence of the above elements from the Menabeyti assemblage may cause a distortion in the representation proportions, as elements that had survived the site-specific cultural and natural taphonomic changes might show up in an abundance greater than normal. In order to address this issue and clarify comparisons, Lyman's (1994) list of expected frequencies (and proportions) of skeletal elements must be adjusted to exclude those elements that were absent during the Menabeyti survey. Following this, any comparisons will accurately display similarities or differences between the expected frequencies and observed frequencies of skeletal elements found at Menabeyti village. Table 4 shows the adjusted proportions, in percentages, of expected element frequencies, including only those elements found during the survey.

Table 4. Adjusted expected frequencies compared to observed frequencies of bovine skeletal elements[16].

Element	Bos	% Bos Assemblage	Expected Frequency (EF)	% EF
Cranium	36	5.2	1	1.0
Mandible	46	6.7	2	2.0
Vertebra	55	8.0	25	26.0
Scapula	62	9.0	2	2.0
Ribs	198	28.7	26	27.0
Humerus	52	7.5	2	2.0
Ulna	23	3.3	2	2.0
Metapodial	48	6.9	4	4.0
Femur	36	5.2	2	2.0
Tibia	47	6.8	2	2.0
Innominate	40	5.8	2	2.0
Horn	25	3.6	2	2.0
Atlas	12	1.7	1	1.0
Phalanges	11	1.6	24	25.0
Totals	691	100.0	97	100.0

Nearly all elements recorded during the survey occurred in or close to the frequency expected from a natural assemblage, with few exceptions. The most notable exception is the low representation of observed phalanges (1.6%), as compared to the natural or expected frequency (25%). In Menabeyti, the phalanges observed during the survey were still articulated and covered with tissue when encountered. As documented in Chapter 4, phalanges are separated from animal carcasses with attached metapodia during butchering events. One possibility for the absence of these bones during the survey is that these extremities, commonly discarded at common or household butchering sites, may have been obstructed or covered by household litter or (in the case of common butchering areas) vegetation, and evaded observation. Another possibility is that the absence of these elements was due to carnivore scavenging and transportation, further discussed in Chapter 6.

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[16] Loose teeth and unidentified bones representing a total of 13 elements were omitted.

5.4.1 Household Context

The household bone assemblages are characterized by a fairly complete skeletal representation of both bovine and ovicaprine taxa. Although *Bos* is the predominant taxon, representing 582 of the 821 bones around the households, ovicaprine bones (numbering 213) are also abundant.

The pattern of even or general skeletal part representation is immediately evident in the *Bos* household assemblage, as shown in Table 5. Although ribs are the most abundant element at 18%, a wide range of elements represent between 6-10% of the total bones surveyed. These include the cranium, mandible, vertebrae, scapulae, humerus, metapodia, femur, tibia, and innominate bones.

Many of the percentage figures for the observed frequency of *Bos* elements are much higher than those of the expected frequency, as taken from Lyman (1994). Elements such as the cranium, mandible, scapula, humerus, ulna, metapodial, femur, tibia, innominate and atlas all represented a higher percentage of the observed frequency of the assemblage than those suggested by Lyman. One main reason for this may be attributed to the variation in skeletal representation between the two; Lyman's table of expected elements counts 29 different bones, while the observed table of data from the survey is a sum of only 15. Small and slender bones such as the sternum, clavicle, carpals, tarsals, fibula, and patella were absent from the observed table, which may have resulted in an increase in the percentage of representation of those elements which were counted.

Table 5. Observed frequency and percentage of total *Bos* elements found in a household context.

Element	Bos	% Bos Assemblage	Expected Frequency (EF)	% EF
Cranium	35	6.1	1	1.0
Mandible	46	8.0	2	2.0
Vertebra	55	9.5	25	26.0
Scapula	48	8.3	2	2.0
Ribs	104	18.0	26	27.0
Humerus	52	9.0	2	2.0
Ulna	23	4.0	2	2.0
Metapodial	43	7.5	4	4.0
Femur	36	6.2	2	2.0
Tibia	47	8.2	2	2.0
Innominate	40	6.9	2	2.0
Horn	25	4.3	2	2.0
Atlas	12	2.1	1	1.0
Phalanges	11	1.9	24	25.0
Totals	577	100.0	97	100.0

Three elements that showed a lower-than-expected representation in the assemblage were the vertebrae, ribs, and phalanges. The low representation of ribs and phalanges is consistent with their discard at butchering sites during butchering events, as discussed in Chapter 4 (assuming phalanges remain articulated to metapodials through the butchering event, as documented). The low representation of vertebrae is unexpected, but may be attributable to carnivore modification (discussed in detail in the next chapter), or to the practice of boiling those elements to extract the fat for food. Informants (and observations) indicated that upon butchery and division, the vertebral column was transported back to a household for fat extraction. After boiling the elements and extracting the fat (typically used to add flavour to dishes), vertebrae were discarded in a household context. As bones are boiled, proteins and fat leach out rendering the element more brittle and fragile and as such, more susceptible to destruction.

Overall, the higher than expected percentages of limb bones appear to reflect the practice of transporting those elements back to the households during and after each butchering event, whether that event occurs at a butchering site or near the household. The lower-than-expected percentages of the ribs, phalanges and vertebrae appear to reflect discard at butchering events, or in the case of vertebrae reflects post-butchering processing practices of some elements at the household.

Table 6. Observed frequency and percentage of total ovicaprine elements found in a household context.

Element	Ovicaprine	% Assemblage
Cranium	24	11.3
Mandible	18	8.4
Vertebra	21	9.8
Scapula	13	6.1
Ribs	18	8.4
Humerus	21	9.8
Ulna	2	1
Metapodial	16	7.5
Femur	4	1.9
Tibia	36	16.9
Innominate	17	8
Horn	19	8.9
Atlas	2	1
Teeth	0	0
Phalanges	2	1
Totals	213	100

A similar pattern of skeletal representation is seen in the observed frequency of ovicaprine bones found in a household context, with some notable exceptions. Again, a wide range of elements each representing between 6-10% of the assemblage were recorded, including mandible, vertebrae, scapulae, ribs, humerus, metapodia, innominate, and horn (Table 6). However, whereas ribs were the most common *Bos* element recorded in the household context, the ovicaprine assemblage is dominated by the presence of tibia (16.9%), and to a lesser extent by crania (11.3%).

According to informants, ovicaprines are always butchered within or near the household, so household discard should include elements discarded at butchery and after processing and consumption. Since all elements should be accounted for in this context, one would expect a percent occurrence similar to that found naturally in the ovicaprine skeleton. Interestingly, among the least represented ovicaprine elements in the household context is the femur. Only four femur specimens were observed during the survey, representing only 2% of the assemblage. The low occurrence of the femur is unexpected, since it is typically an important, meat-bearing element. The particularly high occurrences of crania and tibias as compared to other ovicaprine elements in a household context may reflect differential preservation of gracile bones.

5.4.2 Butchering Site Context

Two of the three common butchering sites in Menabeyti were included in the bone survey, and are attributed to a butchering site context for reasons given above. At all the observed butchering sites, *Bos* was the dominant taxon represented with few ovicaprine bones. This is particularly true at the two documented common butchering sites, which are located well away from village households.

5.4.3 Site 1

A total of 116 elements were identified at the common butchering sites, but few anatomical parts were represented. Site 1 (Fig. 26) was located at the northeast corner of an open field within the village boundary. The field itself, approximately 100 metres long and 50 metres wide, represented the most northern and eastern extent of the village of Menabeyti. Footworn paths throughout the rocky field, as well as two large animal bone scatters and the butchering site itself suggested that the field was used for

a variety of activities, including transportation, discard and butchery. However, the butchering remains (located 30 metres from the nearest bone scatter) were clearly separate from all other features and thus believed to represent a distinct activity area.

Figure 26. Northeast field in Menabeyti. Butchering Site 1 is indicated by the arrow.

At the site, 31 bones were observed. However, only three *Bos* elements were represented in varying numbers (Table 7). Specifically, ribs (71%) were the most abundant element, followed by scapulae (16%) and metapodia (13%). No other anatomical areas were represented by the site assemblage.

Table 7. Bone Assemblage found at Butchering Site 1.

Butchering Site 1					
Animal	**Element**	**Frequency**	**%**	**Expected**	**% Expected**
Bos	Metapodial	4	13.0	4	12.5
Bos	Ribs	22	71.0	26	81.3
Bos	Scapula	5	16.0	2	6.2
Total		**31**	**100.0**	**32**	**100.0**

When compared with Lyman's expected frequency table, each of the three elements observed at the butchering site occurred in such a great abundance that it would suggest a pattern of intentional selection and discard. The high frequency of these three elements, combined with the absence of all other elements, is consistent with the butchering practices witnessed and documented in Chapter 4. Specifically, this pattern is consistent with the practice of discarding ribs, scapulae and metapodia immediately upon separation from the carcass at the butchering site.

5.4.4 Site 2

Site 2 was located high up on the northern slope of Amba Fecada, approximately 50 metres east of the highest dwelling in the western half of Menabeyti. The extent of the site included three terraces within a grove of eucalyptus trees (Fig. 27). Immediately below the grove, a path connected the southwestern and southeastern halves of the village. Scattered throughout the three terraces, a total of 85 bones were counted, all of which were identified as *Bos*.

As with Site 1, the site was composed of only a few elements, in varying frequencies. Again, ribs were the most abundant element (84.7%), followed by scapulae (11.8%) and metapodia (2.3%); however, one cranium was also present (Table 8). Ribs and scapulae were slightly overrepresented in this assemblage, while metapodial elements were underrepresented.

Figure 27. Butchering Site 2. Note proximal scapula in foreground, ribs in background.

Table 8. Bone assemblage found at Butchering Site 2.

Butchering Site 2					
Animal	**Element**	**Frequency**	**%**	**Expected**	**% Expected**
Bos	Cranium	1	1.2	1	3.0
Bos	Metapodial	2	2.3	4	12.0
Bos	Ribs	72	84.7	26	79.0
Bos	Scapula	10	11.8	2	6.0
Total		**85**	**100.0**	**33**	**100.0**

In sum, the bone assemblages found at two of the three common butchering sites used by the village of Menabeyti are characterized by a concentration of few categories of skeletal elements. Most significantly, all elements belong to *Bos* with no presence of ovicaprine bones. The pattern evident in the assemblages is of a small but uniform skeletal representation, including primarily ribs, scapulae, and metapodia in frequencies expected from natural anatomical occurrences. Notably, the combination of

ribs and scapulae comprised 87% and 96% of the bone assemblages at Butchering Sites 1 and 2, respectively.

5.5 Discussion

Despite the fact that only two common butchering sites were recorded in detail, a consistent and identical pattern of taxonomic and skeletal representation was observed at similar sites in adjacent villages. This communal butchering site bone pattern differed markedly from that found in and around a household site/context, in that only a few skeletal elements of one taxon were represented. The overwhelming dominance of *Bos* ribs and scapulae (and to a lesser extent metapodia and crania) at the communal butchering sites was a striking contrast to the more complete skeletal representations of the bovine and ovicaprine taxa around the households and through the streets of Menabeyti.

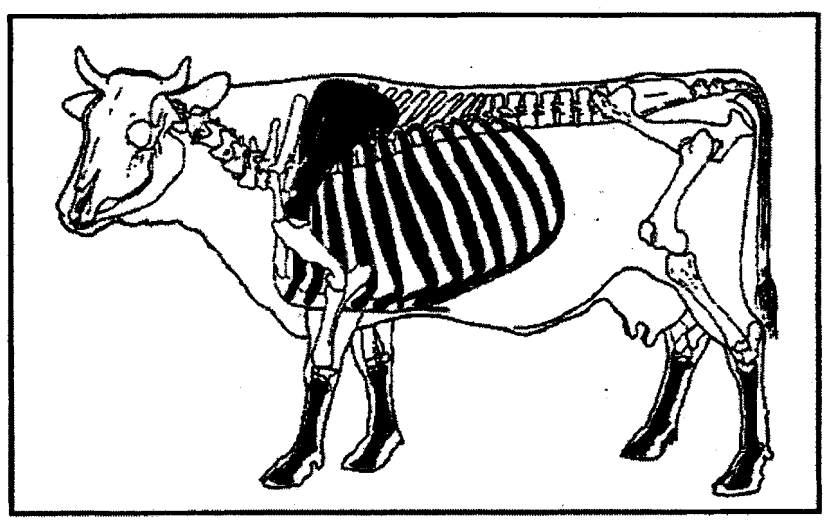

Figure 28. Cow skeleton showing the elements left at a butchering site[17].

[17] Modified from image "Fig.35.gif" from site http://www.deldot.net/static/projects/archaeology/william_strickland_plantation/ecofact_analy_faunal_2.html. 2005.

The appearance and abundance of cattle ribs, scapulae and metapodia (Fig. 28) in the absence of most other elements seems to correspond to the butchering techniques observed and outlined from the two butchering events in Chapter 4. The extraction and discard of these three elements from the carcass during butchery were observed and documented on both occasions, as was the transport of most other elements from the butchery sites. This close correspondence between the observed butchering events and the patterns visible in the bone survey suggests that butchering (of cattle) follows a common technique that is repeated.

From the discussion in Chapter 3, it is known that those events occurring at communal sites typically reflect meat division practices connected to religious celebrations, which involve individuals from different families. Meat division is carried out through a lottery held at the site of butchery, and animal parts are transported from the site to many different houses *via* the participants. During large social events such as funerals and weddings, however, butchering occurs at or near the host household, and all desired elements are transported from the site to a single house. While the meat division practices and destinations of transport are undoubtedly different in each of these situations, the commonalities in the bone assemblage at the butchering sites are remarkably similar. The identical bone assemblages observed at both communal butchering sites and during the butchering events suggest that the difference in meat division between the two types of events does not impact the resulting bone assemblage at the butchery location.

5.6 Chapter Summary

A pedestrian survey of discarded animal bone was conducted throughout the village of Menabeyti. The assemblage was separated into two discard activity contexts,

one resulting from household discard, and one from two butchering sites. Each assemblage was then compared to expected frequencies drawn from the natural occurrence of each element in the bovine skeleton. The observed frequencies in the household context were much higher than expected, reflecting the activity of transporting meat to the houses for consumption. Observed frequencies at the butchering sites yielded a pattern supporting the practice of extracting and discarding specific elements observed during the butchering events in Chapter 4.

CHAPTER 6: ANALYSIS OF BONE DISPERSAL AND MODIFICATION PATTERNS

6.0 Introduction

This chapter examines the variety and extent of bone modification observed during the Menabeyti survey, and attempts to account for the taphonomic patterns that emerged. Through analysis of the prevalent environmental conditions and cultural behaviour affecting animal bones in Menabeyti, an overall pattern of use and deposition is established, whereby faunal materials may be seen to enter the archaeological record.

6.1 Bone Modification

The translation of the word 'taphonomy' is "laws of burial" (Olson, 1980: 5). While the bones recorded during the Menabeyti survey were definitely not buried, they had been extracted from their biological context (*i.e.,* the articulated animal skeleton) and lay in an environment where they were subject to various types of modification. So in fact they can be said to have been in the process of burial, or acted upon by taphonomic forces.

It is important to note that the bones had not yet entered into an archaeological context, but were still vulnerable to cultural and natural transformations after the survey was complete– they still played a passive role in the environment, even if simply viewed by villagers as obstructions or hazards that must be moved. Therefore, the quantifications of modification listed below, while useful to this study, must not be assumed to be a complete representation of the future archaeological record. Rather, they represent a picture of the condition and distribution of faunal material after discard

but before entering into an archaeological context. The focus of this taphonomic study is placed upon the identification of the types of forces acting upon bone elements in an active context, in order to gain a clearer picture of how the bones may be modified in this specific society.

6.2 Results

In addition to recording the identification, anatomical position and locations of bone elements in the survey, any observable modifications were noted. Not including articulated bones or those with tissue remaining (both conditions representing a lack of modification), the bone modifications recorded included cut marks, gnaw marks, weathering, burning, and fracturing. Aeolian and fluvial modifications are not relevant. Following Hill (1980), the results are described at two levels: first, an explanation or definition of the modification; and secondly, inferences suggesting the cause of the morphology in the given environment.

In all, 214 (22.8%) of the total elements showed signs of modification, manifesting at least one of the types listed above. Of those 214 modified bones, 182 were of *Bos*, while 32 were ovicaprine. Many other elements were not modified, as they were still articulated in some way, had tissue remaining to cover the bone surface, or simply lay sun-bleached and whole showing no signs of modification. Despite the relatively low incidence of modification in the sample, it is assumed from the locations in which they were found that most bones had undergone transport, though the method went unobserved during the study.

Table 9. Modifications of *Bos* elements.

Element	Modifications of *Bos* Elements					TOTALS
	Cut Marks	Gnawing	Weathering	Burning	Fracturing	
Cranium				1	1	2
Mandible		1	1		2	4
Vertebra	1	5	1			7
Scapula		5	1		3	9
Ribs	76	4	3	2	6	91
Humerus	4	3	1	1	3	12
Ulna	2					2
Metatarsal	3				1	4
Femur	2	3		3	11	19
Tibia	5	2	2	1	7	17
Pelvis		4	2	1	1	8
Horn			4	1		5
Atlas		1				1
Phalanges				1		1
TOTALS	93	28	16	11	36	182

Table 10. Modifications of ovicaprine elements.

Element	Modifications of Ovicaprine Elements					TOTALS
	Cut Marks	Gnawing	Weathering	Burning	Fracturing	
Cranium		1		2	1	4
Mandible			2			2
Vertebra						0
Scapula					1	1
Ribs		1				1
Humerus	1	2	1		2	6
Ulna						0
Metatarsal	1			1		2
Femur						0
Tibia	4	1	2		6	13
Pelvis		1			2	3
Horn			1			1
Atlas						0
Phalanges						0
TOTALS	6	6	6	3	12	33

6.2.1 Cut Marks

Cut marks made by metal cutting implements such as knives and axes, took the form of extremely thin, linear gouges or striations visible to the unaided eye. As striations made by knives and axes were macroscopically visible immediately following observed butchering events (see Chapter 4), it was assumed that such marks were visible without the use of a microscope.

Cut marks appeared on a total of 99 bones in the sample, representing just under 50% of all modified bone (214). Of those 99 specimens, 93 were *Bos* and 6 were ovicaprine. On *Bos* bones, cut marks appeared on the tibia, femur, metapodia, humerus, ulna and one vertebra, and were present in abundance on the ventral ends of rib bones. In fact, 76 (82%) of the 93 *Bos* bones showing cut marks were rib bones, found at the butchering sites. Of the 6 ovicaprine bones with visible cut marks, 4 were tibia. Marks also appeared on one humerus and one metapodial.

In Shewit Lemlem, incidences involving cut marks on animal bones were confined to butchering events, such as those witnessed for weddings or funerals, or events celebrating religious holidays. During these butchering events, specific techniques for tissue separation and dismemberment consistently produced cut marks at certain points of the bovid anatomy. For example, cut marks found on the tibia and metapodia were likely the result of the lateral and circumferential incisions made to separate the hide during the early stages of the butchering process (see Chapter 4). Similarly, marks found on the humerus and femur were by-products of the dismemberment of the fore- and hindquarters of the animal. The ubiquitous marks on the ventral ends of rib bones were the direct result of the use of an axe to separate meat from the ribs and the vertebral column (Fig. 17).

6.2.2 Fracturing

"Fracturing" was seen as the result of a green or fresh fracture along the diaphysis or midshaft of long bones such as femora, humeri, and tibia. That is, as Hill puts it, a "smooth diagonal fracture...at a relatively low angle to the long axis of the bone." (Hill, 1980: 141). Such intense breakages in robust animal long bones were assumed to be the product of intentional human force, applied during butchering or processing. However, fracturing is not limited to human agents, and may have a number of other causes, such as trampling. Nevertheless, all bones exhibiting the type of fracturing described above were placed in this category. While other bones exhibited various signs of cracking and breakage, the modifications took a less discriminatory pattern. As a result, these bones were catalogued as "weathered".

Fracturing, which occurred in 47 of the 214 bones exhibiting modification, represented 22% of the assemblage, second only to cut marks (see Tables 9 and 10). It most often affected bones of *Bos*, with 35 occurrences. Fracturing was observed on the femur (11) and tibia (7), but also in the ribs, scapula, humerus, mandible, cranium, metatarsal and pelvis. In the ovicaprine assemblage, fracturing occurred in 12 instances: most in the tibia (6), but also in the pelvis, humerus, scapula and cranium.

6.2.3 Bone Marrow Extraction

One common cause of fracturing, referred to several times by informants, was the extraction of marrow from long bones. In Shewit Lemlem, bone marrow is used both as food and as a softening agent for leather products made from animal hides. Marrow is applied to hide products such as *meran* and *mezahan* either immediately after manufacture or after long periods of disuse, to soften the brittle leather and prevent

cracking. According to informants, robust long bones like the femur and humerus have the most marrow and are thus preferred for marrow extraction.

Great care is taken in the selection of marrow bones – only those of healthy animals are judged to be worth the effort. A common statement among informants was that if an animal carries a lot of meat, it will likely have good marrow. Thin and sick animals are assumed to lack enough marrow to justify bringing the bones back home for extraction. Marrow is extracted from oxen, cattle, sheep, goats and even chicken bones. The extraction process begins with the bones typically heated for a time over a fire so that the marrow liquefies and pools at one end. The bones are then left to cool. Once cool, the bone is broken midshaft with a hammer or large stone and the marrow is extracted. It is then placed in a container, where it can be accessed in the near future for use as food or to soften hide products.

Since marrow extraction is typically only attempted on femora and humerii, this activity cannot be assumed to be the cause of fracturing in all bone elements. As previously stated, a number of other actions can apply the force necessary to cause spiral fractures in exposed bones. However, the bovine bones that were most affected by fracturing include the femur, tibia, ribs, scapula and humerus. The femur, humerus, and to a lesser extent the tibia are all long bones that are often broken during marrow extraction. The ribs, scapula, mandible, metatarsal and pelvis are all in anatomical locations which are vulnerable to chopping, cutting, and the violent separation of tissues during butchering events. Of the bones most commonly fractured, the scapula is the most vulnerable to breakage by trampling, given its broad but thin cross-section.

6.2.4 Gnawing

In locales where there are carnivores and scavengers present, gnawing is most likely to occur on discarded bones. A number of taphonomic studies involving bone scavenging have shown that the pattern of gnaw or tooth marks appearing on the bones depends upon the dental pattern of the scavenger (Haynes, 1983). For example, whereas rodents typically leave large incisor marks, carnivorous animals such as dogs and hyenas tend to be the most destructive with their teeth (Haynes, 1983). Common scavenging and gnawing patterns result in degraded or worn bone processes, and tooth punctures on thin bones (Marean *et al.*, 1992). Jourdan (1976) found that dog scavenging occurs in stages, with the ultimate goal of access to the interior marrow of bones. The initial gnawing stage includes both epiphyses and diaphysis, as the dog attacks tough portions of the bone, after which the attention turns completely to the epiphyses and marrow cavities (Jourdan, 1976).

A total of 34 bovine and ovicaprine bones (16% of the modified bone total) showed evidence of gnaw marks, punctures or tooth-worn processes. Of those, 28 were bovine. Gnaw marks were found with the highest frequency on vertebrae, scapula, ribs and pelvis, but also occurred on the humerus, femur, tibia, and once on each of the mandible and atlas. Scavenging marks were also found in 6 instances on ovicaprine bones, twice on the humerus and once on each of the cranium, ribs, tibia and pelvis.

Informants stated that, while hyenas had been present around the village of Menabeyti in the past, none had been seen near the houses in the last 20 years. There were, however many dogs residing in the village. Kept as guard dogs and pets, the dogs were allowed to roam about the village at night. Other scavengers present in the area were porcupines, evidence of which was found 100 metres north of the village in the form of quills. Previous studies have noted that African porcupines are capable of

collecting and transporting bones from villages to a lair hundreds of metres away (Brain, 1981). Unfortunately, since no porcupines were observed (only quills were seen) in or around Menabeyti, the impact of porcupine scavengers on the modified bone assemblage is uncertain.

6.2.5 Weathering

The process of bone weathering has been described and divided into stages by a number of researchers (Behrensmeyer, 1978; Saunders, 1977). Behrensmeyer (1978: 153) gives the most comprehensive definition of weathering as "the process by which the original microscopic organic and inorganic components of bone are separated from each other and destroyed by physical and chemical agents operating on the bone *in situ*, either on the surface or within the soil zone." Another definition is given by Miller (1975: 217), who notes that weathering is the outcome of the "effects on bone of saturation, desiccation, and temperature changes." Whether one looks at the process microscopically or macroscopically, the end result of weathering on bone is exfoliation as the bone loses moisture, leading to cracking, splintering and flaking of the outer surface. Behrensmeyer's (1978) six stages of weathering follows bone material from the initial greasy, tissue-bearing stage (Stage 1) to complete decomposition as the material becomes fragile and falls apart *in situ* (Stage 6).

If one were to follow Behrensmeyer's six stages of weathering as outlined above, all discarded bones would have fit into these taphonomic categories. A number of bones not included in the weathered category still possessed tissue, or remained articulated with other bones. Nearly all bones examined in the study had no tissue or grease remaining on them, but many did not display any cracking. For the purposes of this study, bone elements were considered "weathered" if they displayed any of the

observable traits of Behrensmeyer's (1978) Stages 2-4 – that is, any bone that had experienced a period of drying and exfoliation due to exposure, and showing extensive surface flaking or cracking as a result. A total of 21 of the 214 modified bones displayed this degree of weathering, representing 10% of the modified bone sample. Of these, 15 elements belonged to *Bos*, while 6 were ovicaprine. Elements affected were: bovine horn, ribs, tibia, pelvis, humerus, scapula, vertebrae and mandible, and ovicaprine mandible, tibia, humerus and horn.

When considered in the context of local climate and microenvironment (including soil and vegetation), the extent of weathering can provide approximate data about the duration of the exposure of a bone, and perhaps its age since death and discard. However, these inferences may be problematic in a case where deposited bone is transported and redeposited *via* cultural or natural processes. In such instances, bones may be exposed to a number of varying microenvironments, each with different weathering rates. As this is likely the case in Menabeyti, the importance of noting weathered bones was not to determine actual time since discard, but to distinguish in relative terms between those which had been modified after only short periods of exposure and those which had lain untouched long enough to exfoliate. An abundance of weathered bones showing no other types of modification would suggest that most bones were unaffected by other taphonomic processes (including scavenging, fracturing and burning), but lay untouched or simply transported from one place to another.

6.2.6 Burning

Many researchers, when studying burning as a taphonomic process, often refer to bones burnt accidentally during food preparation (Lyman, 1994). These studies often focus on burnt bone at archaeological sites to infer the presence of humans. As with the

weathering process, various researchers have divided the burning process into a number of arbitrary stages, all based upon colour (Brain, 1981; Lyman, 1994; Shipman *et al.*, 1984). All scales refer to the change in the colour of bones exposed to excessive heat, as they become charred and black at lower temperatures and subsequently calcined and white at higher temperatures (Lyman, 1994: 387).

Informants in Shewit Lemlem mentioned the burning of bone refuse as an occasional practice. The rationale behind the gathering and burning of defleshed bones was both to minimize odour from animal carcasses and (in gathering the bones into piles) to prevent people from stepping on potentially sharp, fragmented bones. The leaders of the local *tabia* occasionally instructed the villagers to burn bones as well. As a result, some bones were gathered up and burnt while others, exuding no bad odours and posing no hazard to pedestrians, were left alone. Those bones deemed hazardous through offensive smell or physical presence are gathered into piles along the periphery of village foot paths and burnt.

During the two days in which the surface survey was undertaken, only two such piles were observed. The piles included *Bos* crania, ribs, humerus, femur, tibia, pelvis, horn and phalanges, as well as ovicaprine crania and metatarsal. In all, 14 burnt bones (11 *Bos* and 3 ovicaprine) represented only 6% of the modified bone assemblage in the village. However, in the final days of the field study period (approximately two weeks after the survey was completed), more piles of burnt bone were observed on the eastern side of the village, including many of the bones recorded during the survey (Fig. 29). The gathering and burning of these bones cleared many village thoroughfares and pedestrian areas of potentially hazardous bone impediments.

The frequency of gathering and burning of large numbers of bone in Menabeyti is uncertain, but could coincide with the preparation for large social events such as

weddings. The clearing and burning events had been concentrated in one section of the village where a local wedding was to take place within a few days.

Figure 29. Bone gathered from the streets of Menabeyti and burnt[18].

6.3 Discussion

In defining the process of weathering, Behrensmeyer notes that "physical damage caused by carnivore mastication, trampling, fluvial transport, and geochemical

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[18] Photo courtesy of Dr. Diane Lyons.

changes which take place diagenetically during fossilization are excluded...although such processes are closely related to weathering in its broader context." (Behrensmeyer 1978: 153). This statement provides a very good example of the range of taphonomic conditions affecting both recently and previously deposited bones in the village of Menabeyti. Only the five most common (or most observable) modifications were noted in the study.

While it is not surprising that human intervention accounted for the majority of animal bone modification in a village setting, it is interesting to note that certain modifications were associated with different activities. The presence of cut marks on animal bones anatomically situated near joints can be directly associated with butchering behaviour and the presence of fracturing on bones, especially the robust long bones of cattle, can be associated with marrow extraction. Both of these modifications result from behaviour involving the acquisition of food or the processing of animal products, either through the division of meat or by the destruction of bone to obtain marrow. A third human modification of animal bones, burning, is the result of another aim altogether. As above, burnt bone in the villages has nothing to do with the acquisition or preparation of food, but is the result of sanitation practices employed occasionally throughout the village. This is in contrast to assumptions often made which link burnt bone found at an archaeological site with food preparation over a fire.

The five most observable modifications on discarded animal bone within the village of Menabeyti are noted in this chapter, but there are likely others that may act more subtly or over a longer period of time that were not visible during the field research. For example, it is suspected that in addition to the taphonomic categories identified in this study, the local environment also acts upon deposited bone. The field study was completed just prior to the annual rainy season, when periodic but heavy rains fall daily.

Such rains, in combination with the steep slopes in villages situated on the sides of mountains (such as Menabeyti), may act to transport bones throughout the village. Soil acidity might also act upon bones allowed to lie untouched even for a brief period of time.

6.3.1 Bone Dispersal Patterns: Humans, Dogs, and the Beles Patch

Overall, animal bone dispersal in Menabeyti resulted from decisions made by humans before butchering events occurred, but was impacted by discard practices and carnivore involvement during and after deposition. The discard and dispersal pattern occurred in three stages: primary discard, carnivore dispersal, and secondary discard.

Initially, the type of animal butchered and the location of the event depended upon the nature of the social event, the number of consumers and financial status. Butchering events then occurred in one of two contexts: a common butchering area (typically only for cattle butchery) or near a household. During these butchering events, bone was cut intentionally or accidentally while meat, tissue and bone were separated. Due to traditional butchering methods, ribs, scapulae and metapodia were left at the site of butchery while all other bones were transported to the household for further processing. If an animal such as a sheep or goat was butchered within or near a household compound, all processing occurred at the site of butchery and all bones were discarded together. If the butchering site was situated away from the household, bones brought to the household with the meat were discarded immediately adjacent to the household, thrown either to the *enda dukee* (household garbage area) or to the nearest *beles* (*Opuntia ficus-indicus*) patch. These actions represent the typical primary discard behaviours involving animal bone.

Many Menabeyti households keep dogs for household security purposes, to guard against livestock or property theft. During the night, when livestock and family are secure within the household compound, the dogs are allowed to roam throughout the village. It is likely during this period when dogs have unlimited access to discarded animal bones at butchering sites or household discard areas. Carnivore dispersal occurs when domestic dogs gain access to freshly discarded animal bones at one or both of the aforementioned sites, and transport bones to a suitable location for gnawing. According to informants it is common for dogs to return to the compound and deposit animal bones they have picked up during those nightly village wanderings.

Secondary discard occurs when family members gather bones brought home by the family dog and throw them away from the house. Typically, these bones are thrown to the nearest convenient location, the *beles* patch. If villagers are intent on cleaning the domestic and adjacent areas, previously discarded bone (not necessarily transported by the dog) may also be included in this secondary discard action. All bones, regardless of origin, are tossed conveniently aside into the nearest *beles* patch.

This human-animal-human bone transport and discard cycle can occur repeatedly, as dogs continue to bring home bones that may have been discarded twice or even three times. It is this continuous cycle of interaction that forms the basic pattern of bone discard throughout the village of Menabeyti. It is important to note however that not all discarded animal bones are subject to this cycle. Some bones, burnt or lacking tissue, may not appeal to dogs and may be left in their initial primary discard locations.

It was difficult to determine just how many bones had actually been transported or gnawed by dogs. Informants repeatedly mentioned that their dogs constantly brought bones home and gnawed on them, yet during the survey only a total of 34 bones showed observable gnaw marks. Nearly as many (31) were recorded as having tissue

still attached but lacked any gnaw marks on the bone, as would be expected if many dogs were roaming about the village looking for food. Previous studies (Haynes, 1980; Kent, 1981) have shown that in some cases (especially when animals are well fed), carnivores may chew on bones only until all the tissue is removed, leaving no evidence of gnawing. Jourdan's (1976) analysis of the stages of scavenging by dogs indicated that the initial stage of scavenging consisted only of a superficial gnawing including the consumption of outer tissue covering all parts of the bone. In cases such as these, the only evidence of canine behaviour comes from the spatial distributions of the bones themselves (Kent, 1981: 367). Jourdan (1976) also mentions the fact that carnivores such as dogs can occasionally neglect some consumable elements in favour of others.

6.4 Chapter Summary

Taphonomic analysis of the faunal assemblage was conducted during the survey in the village of Menabeyti. The high incidence of cut marks on ribs is consistent with their violent extraction during butchering events, as documented in Chapter 4. Fracturing patterns on the femur may be attributed to the practices of marrow extraction, during which these elements are heated and intentionally broken by humans. Despite the low incidence of observed gnaw marks, the high volume of domestic dogs in the village as well as informant testimony suggests that these animals may be more responsible for the movement of bones throughout the village than previously thought. An overall cyclic pattern of discard involving humans and dogs was identified, whereby humans initially discard faunal material, dogs bring it back to the house, and humans discard this material for a second time.

CHAPTER 7: DISCUSSION

7.0 Introduction

An analysis of a meat distribution system in Gulo-Makeda, from the use of livestock to discard practices of the inhabitants of the village of Menabeyti, provides a detailed illustration of the importance of the interaction of animals and human society in highland Ethiopia. Archaeological information (see Chapter 1) suggests that people have occupied villages and used cattle in the highlands for over three thousand years. Is it possible to determine which aspects of this relationship have undergone change and which have remained continuous throughout the years? What are the possible archaeological correlates of present-day behaviours involving animals?

This chapter provides an overview and analysis of the data collected, and attempts to weigh observed similarities and known historical changes between the ethnographic source and archaeological subject highland Ethiopian cultures with respect to the use of livestock. Archaeological relevance of the data is established through comparison with available zooarchaeological data collected from sites in and around Aksum, and the potential for the development of models applicable to the archaeological record is discussed. This chapter also discusses the impact of the identification of spatial patterning with respect to faunal material in a rural village, and the plausibility of applying this information towards the interpretation of an archaeological site in the future.

7.1 Reflections of a Meat Distribution System

This investigation of meat distribution in Shewit Lemlem provides excellent background information regarding the impact of human behaviour upon the final location of animal bone in a village setting. Beginning with the use of animals in daily highland

Ethiopian life and ending with the deposition of animal bone elements in the soil, we can see an illustration of the products, both social and physical, of the interaction between humans and animals – one that archaeology alone cannot generate. These interactions, difficult to discern at archaeological sites, are the connections between seemingly arbitrary faunal remains uncovered in excavation units and the complex lives of humans interacting in a sedentary, rural setting.

The versatile utility of cattle for tilling soil, for milk and meat, and as an exchange medium of wealth has made these animals the most valued among livestock in the highlands. It is primarily, however, the subsistence, social and religious practices (including holidays and celebrations for weddings and funerals) of Tigrayan farmers that have required the employment of these animals and in turn the demand for their ownership, lease and use in nearly every household in the region. The regional demands for suitable draft animals and sources of meat for group consumption have required the creation of a network of livestock exchange, distinct from other markets, occurring at both local and regional levels throughout Gulo-Makeda. At the two livestock markets observed during the study and from local informants at the four villages within the study area, it was determined that livestock exchange was occurring both at the village and also at the regional level. Animal merchants, whether those dedicated to small profits while aiding friends and neighbours in their village or those who travelled many hours by foot to exchange livestock, were the main catalysts of this network. Nevertheless, the market for these animals, locally and regionally, always originated with their demand for plowing, or to symbolically legitimize religious holidays, funerals and weddings.

As a result of their necessity for plowing and maintenance costs, the consumption of the meat of cows and oxen was confined to specific events, occurring

during religious and social celebrations. Although the Ethiopian Christian Orthodox calendar officially lists ten holidays, on average most Gulo-Makedans celebrate seven, as listed in Chapter 3. At each religious event, villagers may choose to purchase a small animal (sheep or goat) and celebrate with their immediate family, or they may pool money together with others to purchase and slaughter a cow or ox for meat. If they choose to pool money, the animal purchased is led to a neutral area ideal for butchery, where a butcher of mutual consent performs the meat division. In order to ensure all receive an amount of meat proportional to their contribution, a strict method of equal meat division based on a lottery system is employed.

Social events such as weddings and funerals demand the butchering of at least one ox or cow in order to provide enough meat for the large number of guests in attendance. In each case a single family hosts the event at their house and purchases an animal, but the celebration often involves hundreds of friends and family members. Therefore, the domestic location of the slaughter reflects the need for facilitation of transport and expediency of cooking a large quantity of meat for many people.

It is worth noting here that a particular method and order of butchering is strictly adhered to during all events, allowing for visible patterns for both skeletal element representation and taphonomy. Synthesizing these patterns and those for butchering site locations noted above, one can see a clearer reflection of social and butchering behaviours in the presence and location of specific, discarded bone elements. The most obvious pattern in both observed butchering events was the extraction and immediate discard of the scapula, ribs, and metatarsals at the butchering site. Further investigation at sites of previous and multiple butchering events suggested that the presence of these three elements was a good indicator of the location of a butchering activity. A ground survey of discarded bone elements throughout Menabeyti showed clear differences

between common butchering areas within the village and household butchering and discard areas. Most notably, common butchering areas were defined by the sole presence of bovine bone, represented by only three types of elements: ribs, scapulae, and metapodials. Household and discard areas were markedly different, including the presence of both bovine and ovicaprine elements, with a more generalized skeletal representation.

The observed taphonomy of animal bone throughout the village reflected in large part the butchering, processing, and discard behaviours of inhabitants, as well as the effects of carnivore scavenging during the cyclic process of discard. Cut marks found on bovine distal humeri and tibiae, as well as a large number of ribs, reflects the techniques of butchering that are applied consistently to bovines and ovicaprines during meat division, as described in Chapter 4. Large numbers of fractured femora attest to the widely-practised extraction of marrow from that element once meat has been separated from it. Gnaw marks, as well as evidence of weathering and burning on bones reflect the consistent discard behaviour involving both human and carnivore agents. Animal bones discarded at or near the house are intentionally separated from most other household refuse, which is dumped immediately outside the front entrance in a disposal area (*enda duk'ee*). Animal bone, which is seen as a potential health and safety hazard, is usually thrown away from the house and village thoroughfares into the nearest convenient patch. Though many of these bones lie untouched and display varying conditions of weathering, at least 16% are scavenged by one of a number of domestic dogs which reside throughout the village. Gnaw marks found on the bones attest to the scavenging and recovery of these elements, which are habitually brought home by the dogs. Villagers immediately recover the bones from their dogs and redeposit them into the nearest *beles* patch. Occasionally, bones which are strewn about the village are

collected into piles and burnt in order to eliminate foul odours. This cycle of immediate discard, carnivore recovery and secondary discard occurs constantly in nearly every home sampled in the four villages, and this behaviour is evident in the observable taphonomy.

Since livestock, especially cattle, are used for household economic benefit, to celebrate or mourn on social occasions, and to venerate saints on holy days, the use of these animals and their role in daily human interactions permeates every aspect of life (economic, social and symbolic) in northern highland Ethiopia. Thus, an understanding of the use and products of cattle and other livestock in this area will lead to a greater understanding of the complex and dynamic interactions between the people and the land they inhabit.

7.2 Continuity and Change in the Consumption and Use of Animals and the Environment

Ethnoarchaeologically speaking, by describing the system of cattle and meat redistribution throughout villages in Gulo-Makeda and noting the processes that result in the discard of animal bone, we are identifying faunal material (potential artefacts) within a "behavioural systemic context" (David and Kramer, 2001) before and as it proceeds towards an archaeological context. As valuable as this study is towards illuminating cultural life in the present, it is weak in the absence of the identification of the possible changes which preceded it. In other words, we must attempt to answer the question "what has changed and what has survived?" in order to determine the impact of major social and environmental changes upon daily life as observed in the present. More specifically, which aspects of the activities associated with the use, redistribution and

discard of animals and their products have continued through to the present, and which have changed dramatically over time?

7.2.1 Continuities

Good evidence for continuity in the northern highlands, with respect to livestock, appears in the use of cattle, their role in the local economy, and in the context and manner in which they are butchered.

7.2.2 The Use of Cattle

If one accepts the considerable amount of archaeological evidence supporting the continuous use of cattle for plowing in this region dating from approximately 2500 years ago (see Chapter 1), an inference can be made that cattle were indeed as economically important then as they are now. Indeed, cattle were a form of wealth in the Aksumite period, as these animals were one medium of exchange for taxes and tribute paid to rulers (Kobischanov, 1979). In this manner, royal estates acquired herds in the thousands from subjugated peoples and Aksumite households to build up the economic wealth of the Empire, seen in inscriptions recovered at archaeological sites (Kobischanov, 1979). This practice (and, it seems, the quantity of cattle exchanged) continued during the feudal period of the early Middle Ages (Pankhurst, 1990). The importance of cattle for working the fields has also been documented by early explorers from medieval times (Beckingham and Huntingford, 1954) through the Gondar Period of Ethiopia in the 17th century and on into the 19th century (Pankhurst, 1990). All accounts describe agricultural practices as they are depicted in highland Ethiopian rock art: farmers made use of a plough drawn by two oxen (Graziosi, 1964b; Pankhurst, 1990).

Nineteenth century accounts of religious festivals, including monthly Saints' days celebrations, describe the events as "times of much feasting, enjoyment and alms-giving when agricultural labour was suspended" (Pankhurst, 1990: 189), similar to the description of activities given in Chapter 3. Contemporary accounts of funerals mention the hosting of feasts by the family of the deceased at which hundreds of people attended (Pankhurst, 1990). Pankhurst (1990) also notes the apparent importance of cattle as a commodity during the early medieval period with respect to tribute paid by peasants to local nobles, and as dowry during the formation of wedding contracts[19].

7.2.3 Animal Exchange Networks

Taking into consideration the Aksumite accounts of cattle collection and exchange as a medium of economic wealth mentioned above, there is good evidence to suggest that animal exchange networks have existed in the northern highlands since Aksumite times. However, cultural and natural events accompanying the decline of Aksumite influence may have potentially impacted or changed these networks. During the ninth century, the Aksumite Empire suffered a number of disasters, including war with adjacent and subjugated groups (Kobischanov, 1979; Munro-Hay, 1991), lesser rainfall and environmental deterioration (Butzer, 1981; Munro-Hay, 1991), famine and pestilence which devastated both human and cattle populations (Munro-Hay, 1991; Pankhurst, 1985). Population numbers also may have suffered decline during the tenth and eleventh centuries, as Coptic Christians emigrated from the devastated area (Munro-Hay, 1991).

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[19] Pankhurst also notes that although marriage was deeply influenced by Christian teaching at that time, it was essentially secular, as is the case today. Currently priests have no responsibilities during wedding ceremonies in Shewit Lemlem.

Nevertheless, human and cattle populations must have gradually recovered during a period of two or three centuries, since observers in the Middle Ages recount herd numbers similar to the abundance of Aksumite times. While it is extremely difficult to calculate the actual abundance of cattle in the region, reports from early explorers such as the Portuguese Jesuit Almeida in the mid-17th century state that it was "a fine thing to see the great herds of very handsome oxen and cows grazing in the meadows, especially in Tigre..." (Beckingham and Huntingford, 1954). Still one hundred years earlier, in the mid-16th century, a Portuguese embassy recorded "beautiful herds of cows" including an estimated "fifty thousand" head of cattle (Alvares, 1881: 106).

Despite this apparent wealth of livestock, the feudal nature of society during that period undoubtedly concentrated the wealth of the herds into the hands of the ruling class. Pankhurst (1990) suggests that tribute and taxation paid by the peasantry to the rulers in the form of cattle is at least as old as the Emperor Amda Seyon, who ruled in the early 14th century, and under whose rule operated officials with the title of "Scribe of Cattle" (Pankhurst, 1990: 7). Add to this the presence of disease, theft, and looting by groups of soldiers (Ali, 1998), and one can imagine that while nearly every household, then as now, required two head of cattle in order to operate the *mahresha* plow, not every household possessed this number. The inequity in livestock ownership would have created a demand which could only have been addressed through economic exchange, or through the sharing of oxen. Thus it is very likely that a market system of animal exchange should have existed in the past as in the present. Pankhurst (1990) describes short- and long-distance trade markets in medieval times:

> "Short-distance trade was centred entirely on local markets, usually held weekly, and based virtually entirely on barter. They were attended almost exclusively by the populace of the area, and buyers and sellers both consisted mainly of the peasantry. Articles dealt in...consisted principally of local produce...as well as cattle, horses, mules and other livestock, hides and skins, and sometimes cotton.

> Some of the larger markets were situated at the "chief towns", but others were located in the countryside." (Pankhurst, 1990: 49-50).

Such a network of market exchange, allowing everyone from the rural peasantry to wealthy nobility to have access to goods and livestock and virtually connecting the entire country, is similar to that which is practised at present in the rural areas of the highlands. While extensive road construction during the Italian attempts at colonization in the 19th and 20th centuries may have impacted access and communication (Marcus, 2002), it is likely that the existing network was allowed to continue facilitating the flow of goods and livestock between major towns and cities in the north.

7.2.4 Butchering Practices

The uniformity with which informants from four different villages described the process of butchering an animal, as well as the tools used to do so and the distinction between usable and unusable parts of an animal suggest the existence at present of a common, regional thread of knowledge concerning animal slaughter and meat division. Ethiopia's rich past involving the possession, use and consumption of cattle is referred to in Aksumite inscriptions (Kobischanov, 1979; Munro-Hay, 1991), all of the earliest accounts by western explorers (Alvares, 1881; Beckingham & Huntingford, 1954), documented by historians of the middle ages (Marcus, 2002; Pankhurst, 1990), and noted in ethnographies conducted in the mid-twentieth century concerning weddings (Bauer, 1977; Misginna, 2002) and funerals (Tessema, 2002). Although no historical or ethnographic accounts offer specific details concerning the manner and method of animal slaughter in the past or present, archaeological evidence of cattle butchering practices has been gathered through the observation of cut marks on faunal material recovered at excavations near Aksum (Bard and Fattovich, 1997; Bard *et al.*, 1998; Cain, 2000; Finneran, 2000).

Chaix analyzed faunal material recovered during the 1997 BU/IUO excavations at Aksum, and observed the consistent occurrence of cut marks on specific elements. He identified and analyzed a total of 2189 animal bones from sites on Bieta Giyorgis hill at Aksum as part of a joint investigation by Boston University and Istituto Universitario Orientale Naples. Chaix found that domesticated cattle was the predominant species, followed by domesticated caprids including sheep and goat (Bard and Fattovich, 1997). Most of the cattle remains were from adults and older individuals, possibly indicating that cattle were not bred for meat, but were used for plowing and milk production (Bard and Fattovich, 1997). Chaix also observed that all bone elements were represented in the remains, suggesting a local exploitation of cattle from slaughtering to meat consumption (Bard and Fattovich, 1997). Cut marks appeared consistently on the cranium, vertebrae, ribs, ulna, acetabulum, proximal and distal tibia, metatarsals, and phalanges (Bard and Fattovich, 1997). The placement of the cut marks observed on the ulna, ribs, acetabulum, proximal and distal tibia, and metatarsals corresponds with the general pattern of animal slaughter characteristic of the butchering process in Shewit Lemlem, including the quartering of the body through disarticulation of the limbs, sectioning of the ribs and skinning of the hide at the lower extremities, as well as the processing of vertebrae for cooking. This archaeological evidence, as well as the pattern of strict adherence by skilled butchers to the customs and knowledge transferred to them by elders provides a good argument for butchering practices as a continuous aspect of life in the highlands.

7.3 Change During the Last Millennium: Warfare, Famine, Populations and the Environment

Since the end of the Aksumite period between the eighth and twelfth centuries AD, the northern highland region of Ethiopia has seen dramatic environmental changes as a result of devastating civil warfare and political upheaval, famine, drought and pestilence (Ali, 1998; Marcus, 2002; Pankhurst, 1985; 1990). Pankhurst (1985) found numerous references to famines and plagues in both Ge'ez and Muslim texts from the 13th-15th centuries, which speak of the plagues as punishments from God. In addition to the loss of human and cattle lives, the custom of fleeing from disease-infected areas (Pankhurst, 1985: 17) may have resulted in population migrations or shifts throughout the country at this time.

7.3.1 The Middle Ages

Between the 13th and 16th centuries Christians from the northern highlands and Muslims from the south and east began a struggle for control of caravan routes to the coast (Lapidus, 2002). Throughout this time, Pankhurst (1990: 25) writes that Ethiopia had no fixed capital, but was ruled by a monarch from temporary, mobile camps which served as 'moving capitals'. It is claimed that these mobile camps were so large that within a period of four months they exhausted a region's supplies (such as wood and cattle) for a decade (Pankhurst, 1990).

In the mid-16th century, artillery was first used in Ethiopia during warfare against a Muslim ruler from the east, Ahmad Grañ, who rebelled against the Ethiopian monarchy and began a twenty year military campaign against the highlands (Pankhurst, 1990). It was only with the aid of the Portuguese and their firearms that the Ethiopian army was

able to defeat and kill Grañ (Pankhurst, 1990). Nevertheless, moving capitals and artillery warfare opened a new and destructive chapter to the cultural and environmental history of the highlands.

7.3.2 The 18th and 19th Centuries

Pankhurst (1990) quotes the 18th century accounts of the Scottish explorer James Bruce when he describes the results of civil warfare near the Blue Nile as a ravaged peasantry and landscape – ruined houses, burnt crops and an absence of people and livestock. Indeed, the feudal and diverse nature of Ethiopian society seemed to contribute to constant imperial and regional conflict during the first half of the 19th century (Marcus, 2002). The devastation continued during a ten-year period at the end of the 19th century when the country suffered the decimation of its cattle, a widespread famine, internal civil wars and a war with Italy (Marcus, 2002; Pankhurst, 1985).

In 1888, Ethiopia suffered through the loss of what may have been ninety percent of all its cattle by infection of rinderpest, which drove the price of cattle up to 30-40 times greater than normal (Pankhurst, 1985). Coinciding with the decimation of the herd, a three-year period of drought began, causing a massive harvest failure in the northern provinces of Tigray, Gonder, Bagemder and Gojjam. The lethal combination of the destruction of crops and cattle caused a famine which spread throughout the country killing an estimated one-third of the entire population (Pankhurst 1985). Even those that benefited most from the feudal structure of society felt the scarcity of food, and regional chiefs and their armies began to raid the countryside for provisions (Ali, 1998; Pankhurst, 1985).

Also during this time, the death of the Emperor Yohannes IV in 1889 led to the rise of Prince Menelik to the throne (Ali, 1998). However, Menelik was challenged by the

Tigrayan chief *Ras* (Prince) Mangasha Yohannes and Tigrayan nobles, who united to resist the new Emperor's rule (Ali, 1998). In order to bring the province under his power, Menelik launched a number of military raids into Tigray between 1889 and 1894 (Ali 1998). As the soldiers moved through the countryside, they raided homes and fields for food and forests for firewood, defence and shelter, often unsuccessfully as the area already suffered from the famine noted above (Ali 1998). Shortly after the defeat of *Ras* Yohannes in 1895, Menelik mobilised Ethiopian troops from all over the country (numbers estimated at 140,000) to Adwa to fight the Italians who advanced from the north (Ali 1998)[20]. Marcus (2002) records that in 1896 the Italian-Eritrean army held the area between the towns of Adigrat and Idaga Hamus. In the surrounding area of Adigrat, the devastation of the gathering of provisions to house and feed first the Italian troops and then the massive Ethiopian army must have seriously taxed the region of food and wood. This devastation of the land likely continued after the battle of Adwa, as troops passed through the area on their return.

7.3.3 The 20th Century

Tigray was the scene of a second battle between the Ethiopians and Italians during the 1930's, as the Mussolini regime intended to establish permanent control over all of Ethiopia (Ofcansky and Berry, 1993). In 1935 a large force of Italian troops marched from Italian-occupied Eritrea into the province of Tigray with the aim of reaching the capital city of Addis Ababa and wresting control of the country from the hands of Emperor Haile Selassie (Marcus, 2002). After two days of bombing at Adwa, a failed Ethiopian counterattack staged near Mekelle was the only forceful response to

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[20] Interestingly, Ali (1998) notes that the Italian occupation force had already constructed forts at the towns of Adigrat and Mekelle.

Italian troop incursions supplemented by air power and chemical weapons, and within eight months Italy annexed the country of Ethiopia – though they were quickly expelled at the end of the war (Marcus, 2002; Ofcansky and Berry, 1993).

In 1973 famine struck Tigrayan and other northern populations, and the slow response of the government to the mounting disaster exposed its lack of relief planning and contributed to the growing discontent among the population of imperial rule (Marcus, 2002). The crisis was eventually ameliorated, but only after thousands of people had died or resettled in towns hoping for government aid, which was extremely slow in coming (Marcus, 2002).

The Ethiopian government's failures to address the famine problems led to military action in 1974, when Emperor Haile Selassie was overthrown by the Dergue, a socialist committee comprised of young military officers and led by Mengistu Haile (Ofcansky and Berry, 1993). Although the Dergue was initially supported by those who advocated economic and political reform, and who decried the government's unwillingness to change, the socialist committee quickly became the object of discontent for those who challenged military rule of the country (Ofcansky and Berry, 1993). Two groups centred in the north of the country organized before and during this turbulent time: the Eritrean People's Liberation Front (EPLF), which had long sought for Eritrean independence from Ethiopia; and the Tigrayan People's Liberation Front (TPLF), which was the focal point for alienated farmers who opposed the Dergue's oppressive nationalization policies including land redistribution and higher taxes (Marcus, 2002). The conflict between an alliance of these two groups and the Ethiopian government, including military battles in Eritrea and throughout Tigray, continued unabated until the defeat of the Dergue and the exile of its leader Mengistu Haile in 1991 (Marcus, 2002).

Despite being highly critical of the imperial reaction to famine, the Dergue regime also experienced the strain of food shortages in 1984-1986 that was the product of a combination of failed crops, drought, and locust plagues (Marcus, 2002; Ofcansky and Berry, 1993). The problems of mobilizing international food aid were exacerbated by the government's unwillingness to ship food to rebel areas in the north, as well as continued warfare in the highlands (Ofcansky and Berry, 1993). The Dergue's response was to initiate two programs, a resettlement program which forced 600,000 people to move from affected areas to regions in the south, and a villagization program which forced families to abandon farming homesteads for life in planned villages situated along communication lines and main roads (Ofcansky and Berry, 1993).

The continued movement of people during these times of stress, whether as refugees searching for aid or as involuntary recipients of government relief, has likely had an impact on property ownership and village organization in all of the communities within the study area. In fact, many informants recalled having been expelled and resettled from Eritrea during the struggle for independence, while others had been separated from family members during the border conflict.

7.3.4 Ethiopia-Eritrea Border Conflict

Though it was spared the devastation of Italian artillery fire that had occurred around Adwa, the area north of Adigrat saw bombing and warfare during the Ethiopian-Eritrean border conflict between 1997 and 2001 (Marcus, 2002). Border land claims arguments between Ethiopia and newly-independent Eritrea resulted in conflict along the northern Ethiopian (Tigrayan) border during the years 1998-2000 (Marcus 2002). Two large battles took place between the two armies around the area of the town of

Zalambessa (approximately 5-10 km north of the study area) in 1999 and 2000 (Marcus 2002).

The environmental impacts of the conflict can be seen throughout the area, in which the rusting remains of tanks rest along the side of the road. In some of the villages within the study area, inhabitants were seen to use remnants of bombs and artillery shells as fences. Active minefields immediately north of the study area were marked off with fences, but fatalities still claimed the lives of humans and livestock who stray from safe paths. Impacts were felt socially and economically as well - some villages have nearly doubled in size, as refugees from Eritrea fled to join their families just prior to the conflict, and many villagers still complain about encamped soldiers stealing livestock and food for provisions. By 2003 emotions still ran high amongst the people, who routinely conducted funerals for loved ones who lost their lives during the two-year conflict.

7.3.5 Deforestation In and Around Gulo-Makeda

Of all the consequences of the conflicts affecting the study area, two of the most relevant to the present study are the massive deforestation and the apparent expulsion of wild animals such as hyena and wolves. At present, the groves of trees that are present throughout the study area are composed primarily of an introduced species of eucalyptus, a fast-growing and hearty plant that can survive in the dry, dusty highland conditions (Friis, 1995). Australian eucalyptus species were first introduced into Ethiopia in 1895, and are today grown for construction timber, fuel, as shelter in farmland, and to create shade groves in villages and church areas (Friis, 1995). It may be recalled from Chapter 4 that common butchering areas are usually situated near eucalyptus trees, as leaves are strewn about the ground to protect the hide and fresh meat from contact with

the dirt. Assuming that the use of plants and leaves to protect the meat during butchering events is one aspect of continuity in the behaviour of highland farmers, it is possible that previously deforested groves of trees other than eucalyptus were sites of common butchering areas.

Today, informants recall that under the Dergue regime, eucalyptus (and generally forest) preservation areas were established and encouraged as part of a national reforestation plan (D'Andrea, personal communication, 2005). Since the area has had a long history of deforestation, possibly including the period of the Aksumite Empire (Butzer, 1981; Pankhurst, 1990) and a recent period of reforestation, the possibility for changes in the situations or locations of common butchering areas in rural areas exists.

7.3.6 The Introduction of Beles into Ethiopia

The introduction of *beles* into Ethiopia may also have impacted the use of cattle in Tigray. Originally introduced into North Africa from Mexico in the 16th century and Ethiopia by missionaries (Mitiku *et al.*, 2002; Tegegne, 2001), *beles* quickly became widely distributed throughout arid regions of the country, including the Tigrayan highlands (Tegegne, 2001). Currently, this invasive and ubiquitous plant is being investigated for its potential benefits as a famine food and source of cash income (Abay, 2003; Brutsch, 1997; Mitiku *et al.*, 2002).

Clearly the introduction of *beles* has had an impact on behaviours involving livestock, including daily animal care and refuse discard. Informant accounts indicated that in Shewit Lemlem, *beles* is ground or chopped up and mixed with salt as feed for livestock during the rainy season, when stored fodder supplies run low. Some informants even noted that *beles* mixed with salt is fed to their livestock year-round to keep up the health of the animals. Living *beles* patches are also exploited as convenient

areas for bone discard (see Chapter 6) after the consumption of meat, since these areas are deemed relatively inaccessible for pedestrians and livestock (and therefore safe from contact).

7.3.7 Expulsion of Wild Scavengers

The apparent expulsion of wild scavengers, particularly hyenas, has also likely changed the way rural farmers regard their environment. Ethiopians have a long history of regarding hyenas as fierce, wild, and evil creatures (Beckingham and Huntingford, 1954; Bruce, 1964; Lobo, 1984; Pankhurst, 1990). Hyenas are feared by the people because these scavengers were capable of preying upon human flesh. In Ethiopia this belief translated into the superstition that blacksmiths were *buda*, or sorcerers who had the ability to change themselves into hyenas at night and attack humans (Pankhurst, 1990). The Portuguese missionary Almeida (Beckingham and Huntingford, 1954) in 1646 described the fierceness of hyenas and their ability to attack humans and animals. The Portuguese Jesuit Lobo (Lobo, 1984), in 1660, noted that the Amharic term for 'hyena' was synonymous with the concept of evil; and James Bruce, during the civil wars in 1770, described an account of blinded prisoners "turned out to the fields, to be devoured at night by hyaena" (Bruce, 1964: 61). English travellers Nathaniel Pearce and W.C. Plowden, between 1830 and 1850, documented several accounts of farmers taking measures to protect themselves from hyenas while travelling at night or while protecting their crops (Pankhurst, 1990).

Informants stated that they had not seen hyenas or wolves in the area for over 20 years, noting the possibility that warfare had "scared them off". The absence of these potentially harmful scavengers in the area has allowed villagers to relax their vigilance over the herd somewhat, no longer worrying about losing an animal to predators

(although some villagers still prefer to take precautions). This absence may also have impacted the locations of butchering events and bone discard within the village. As villagers are no longer worried about prowling scavengers attracted to animal carcasses or discarded bones, they may have begun to butcher animals and discard animal bones closer to domestic areas, often conducting both types of activities immediately outside their own courtyards. This behaviour may have changed since a time when the safety of people and animals amidst the presence of hyenas and wolves forced the locations of butchering and discard activities away from domestic areas.

While the apparently drastic changes to the environment resulting from warfare and the provisioning of soldiers has over time likely affected the locations of butchering and animal bone discard activities in rural villages within Gulo-Makeda, it is possible that these events have not changed individual *perceptions* of the locations of ideal butchering and discard sites, as documented in Chapters 4 and 6. The continuities in butchering techniques, religious practices and the preparations for social events spanning hundreds if not thousands of years in the Ethiopian highlands may have imprinted local or cultural ideals upon rural inhabitants concerning the methods and locations of these activities. The ideals passed down through traditional practices have in essence translated into cultural norms that transcend changes to the environment or social structure. In this manner, rural farmers of the Ethiopian highlands have continued to practice these aspects of life even as major international events surrounded them.

7.4 Present-day Behaviours and Archaeological Correlates: The Makings of an Archaeological Site

Given the continuities that have persisted in rural, highland Ethiopian daily life with respect to meat division, butchery, consumption and the discard of animal bone

refuse, it should be possible to make inferences regarding the local archaeological record. However, in order to construct successful hypotheses concerning the archaeological correlates of present-day behaviour in Gulo-Makeda, one must first determine which behaviours or actions associated with meat consumption and discard would or would not leave traces in the archaeological record. The identification of behaviours with direct archaeological correlates (visible in the archaeological record) may assist archaeologists in translating or associating faunal remains with specific activities, especially those involving the interactions between livestock and humans in a rural village setting.

7.4.1 Animal Redistribution in Northern Ethiopia

Cain conducted zooarchaeological research of Aksumite livestock by analyzing zooarchaeological materials from two excavation sites within and around the town of Aksum, Ethiopia (Cain, 2000). Based upon the variations in body part representation between the Aksumite urban K site and the outlying agricultural D site, he theorized that the local economy of Aksum was based upon a system of animal redistribution whereby animals and their products were transported from areas of "production to areas of consumption" *via* animal markets, and that this may have sustained and supported elites and specialists within the Aksumite capital who otherwise had no direct access to meat and livestock (Cain, 2000: 148).

Cain observed that cattle dominated the taxa throughout the Aksumite contexts, representing a total of 86.1% of the assemblage, while caprines were the second most common taxon. At D site, located on the outskirts of the old town of Aksum, the cattle assemblage was dominated by cranial (41%) and axial (26%) fragments, followed by humerus (6%) and femur (5%). At K site, located within the boundaries of the town,

cranial (19%) and axial (47%) fragments also dominated the assemblage, though at quite different proportions (Cain, 2000: 91). The various representation of axial (specifically rib and vertebral) and cranial fragments led Cain to the interpretation that D site represented a location of specialized agricultural production with direct access to whole animals, while K site represented a location of specialization and consumption with limited or indirect access to animals and their products (Cain, 2000).

Table 11. Body part representation comparison between the Menabeyti and Aksumite cattle assemblages.

	Menabeyti Assemblage		(Cain, 2000)	
Element	Household (%)	Butchering Site (%)	D Site (%)	K Site (%)
Cranial	6.1	0.6	40.8	19.2
Humerus	9.0	0.0	5.7	3.9
Ulna	4.0	0.0	2.0	1.0
Axial	42.7	91.7	26.3	46.7
Femur	6.2	0.0	5.3	4.3
Tibia	8.2	0.0	2.0	3.0
Metapodial	7.5	7.6	8.8	8.5
Phalanges	1.9	0.0	3.5	8.9

The observations of the distribution and use of animals in Gulo-Makeda have shown that an intricate system of animal markets and merchants facilitating the distribution of livestock and livestock products within and between rural villages does currently exist, and that this may be a plausible insight into the domestic livestock economy of the Aksumite Empire. Certainly, the extensive use of cattle for agricultural and subsistence purposes in rural Tigray, as well as the dominance of this taxon (75%) in discard assemblages throughout the village of Menabeyti, correlates with Cain's (2000) observations of cattle dominance (86%) of the zooarchaeological record at the two Aksumite sites mentioned above. However, some interesting variations do exist between the faunal assemblage analyzed by Cain and the Menabeyti assemblage

observed in this study. Table 11 shows the Menabeyti cattle bone body part representations divided into household and butchering site contexts, with the figures for butchering site percentages representing an average drawn from both Site 1 and Site 2 assemblages (Tables 7 and 8).

The body part representations of the household cattle cranial and axial (including rib, vertebra, scapula and innominate bones) skeleton observed in this study (from Table 5) are quite similar to the totals observed at K site[21], moreso if the cranial data are omitted (since crania tend to fragment easily, this may skew NISP totals in favour of a higher representation of this element). Interestingly, representations of the remaining body parts, including fore- and hind limbs, at Menabeyti are similar to the totals observed at D site and are slightly higher than those at K site. However, the overall pattern of K and D sites, and the Menabeyti household assemblage is one of generally even representation in which most elements are present, with high incidence of cranial and axial bones (Table 11). The butchering site representations are vastly different from the other three contexts, as only three elements are present. Of those three, cranial elements are extremely under-represented, while axial elements (with a percentage approximately twice that of K site and the household assemblage) are exceedingly over-represented.

If D site was indeed the location of specialized agricultural production of livestock and products at the periphery of an urban centre and K site the location of central urban consumption (Cain, 2000), then it is likely that the Menabeyti household assemblage is a good example of a site or village at which both livestock production and consumption

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[21] Aksumite cattle representation totals for D and K sites taken from Cain (2000: 91). For comparative purposes, elements include only those common to this study and Cain (2000).

occur locally. It is, as observed, the location at which animal butchering, redistribution, consumption and discard all occur, so the assemblage shows no unnatural abundance or absence of specific body parts apart from slight variations from the expected natural occurrence (Table 11). However, the butchering site assemblage reflects patterns of neither specialized production nor specialized consumption, but a distinctly different activity visible through its faunal remains. Unlike Cain's assemblages, which are drawn from within a large urban area, the Menabeyti assemblage is from a rural village. The butchering of cattle at a designated site within a rural village is an activity of production that leaves few traces other than household discard, since most parts of the body are transported back to various houses for processing and consumption.

While zooarchaeological analysis of faunal remains may show evidence of behaviours such as butchering, consumption and discard, the exchange and redistribution of livestock often leaves little or no trace in the archaeological record and must be inferred through indirect evidence such as ethnographic or ethnoarchaeological information. However, butchering and discard practices do leave archaeologically visible remains, and the observations generated during this study provided a behavioural background to supplement the potential associated archaeological data.

7.4.2 Butchering patterns

One of the most interesting results obtained in this study is the identification of a pattern with respect to butchering activity, whereby specific skeletal elements were discarded at or near the site of butchery. As previously discussed, identical butchering techniques and tools were used during all cow or ox butchering events. As a result, it was possible to observe the specific patterns of the on-site discard of scapulae, ribs and metapodials at each event. Employing this model during the survey, it was possible to

accurately identify actual butchering sites located throughout the village of Menabeyti, including multiple-butchering event sites such as common butchering areas. Since all other elements (except the cranium in one instance – see Chapter 5) are consistently brought to houses after division, the presence of ribs and scapulae at a site can be a good indicator of butchering activity in that location.

Chaix's analysis of cut marks on cattle bone recovered from sites near Aksum (Bard and Fattovich, 1997) reveals similarities between butchering activities from the past and those of the present. Specifically, the location of cut marks on archaeological material corresponds with butchering activities observed during this study, such as disarticulation and skinning of particular body parts. These similarities suggest that the mechanics of butchering a cow or ox may represent one aspect of continuity in butchering practices in the highlands with respect to livestock and meat consumption.

Expanding upon this pattern, and given the meat consumption and division practices identified herein, it should be possible to determine the rationale for the butchering of an ox or cow, based on the location of the ribs and scapulae. If *Bos* elements associated with a butchering event are located at or near a domestic structure, it may be inferred that the animal was butchered in preparation for a large social event, such as a wedding or a funeral. In this case, it should also be noted that the household butchering of a cow or an ox should result in a more general skeletal representation, as the butchering site elements (ribs and scapulae) are joined by other, discarded bone elements. If, however, cattle ribs and scapulae are located at a great distance from the nearest domestic structure, and represent a small but specific skeletal representation, it may be inferred that the animal was butchered for a small number of people. The distant location of this type of assemblage from households may represent strategies to

avoid predation by wild animals or for equitable meat division (part of which is the selection of a 'neutral' site).

7.4.3 Bone Discard

Another important conclusion was the identification of the cycle of household bone discard involving humans and dogs, discussed in Chapter 6. This cycle involves the initial household discard of animal bones by human inhabitants towards the nearest convenient *beles* patch, where it is deemed innocuous to pedestrians and livestock. Due to the large population of domestic dogs located throughout the villages, however, some bones are scavenged by dogs and brought back to houses. Once discovered by the human occupants, however, the bones are once again discarded towards the nearest *beles* patch.

The variables affecting the locations of discarded animal bone in the village were identified as human behaviour, carnivore scavenging (with specific attention to modification marks on bones, absence of specific elements, and relative bone density), and possibly fluvial processes. With respect to human behaviour, the aforementioned discard behaviours were complicated by additional periodic (but ostensibly random) gathering and burning of some of the bones by the villagers at the request of the *tabia* leaders. Fortunately, the bone gathering and burning seemed to affect only those bones deemed hazardous to pedestrians, close to domestic areas. Bones identified at the common butchering areas were left untouched, potentially preserving the common butchering site pattern.

Despite the nearly unanimous accounts of domestic dogs gnawing on discarded bones, few of the bones encountered during the survey showed canine scavenging impact marks such as scoring or puncturing. While it is possible that those bones

gnawed by dogs were consumed completely, eliminating them from the bone survey, or error on the part of the researcher failed to identify "less conspicuous" tooth marks (Blumenschine and Marean, 1993, p. 280; Fisher, 1995, p. 39), the sheer number of untouched, weathered, and tissue-bearing bones encountered in the presence of approximately 20-30 domestic carnivores was unexpected. However, while excavating faunal remains from the Rancho La Brea asphalt deposits, Spencer *et al.* (2003) concluded that despite the low incidence of carnivore modification (2%) in the sample, the *absence* of specific elements, notably limb bones, suggested the presence of scavengers. The rationale was that scavengers had likely taken bones away from the uncomfortable setting of the tar seep for consumption (Spencer *et al.*, 2003). A low incidence of observable carnivore modification was also the case in Menabeyti, but unlike the assemblage analyzed by Spencer *et al.*, the Menabeyti assemblage featured no distinct absence of limb bones. Nonetheless, the dispersed nature of discarded animal bone throughout the village is consistent with both informant testimony and with previous observations concerning scavenging by domestic dogs, which are opportunistic by nature (D'Andrea and Gotthardt, 1984).

Despite the considerable amount of work done on the dynamics of carnivore scavenging with respect to bone density and utility indices at kill sites (Binford, 1978; Lam *et al.*, 1999; Lyman, 1994; Marean *et al.*, 1992), the scattered nature of rural, post-discard village assemblage precludes a satisfactory analysis of the impact these two variables had on carnivore selection. Most of the research conducted on carnivore selection based on bone density, grease and marrow content, or utility has assumed (or observed, as in the case of a controlled experiment) that assemblages start with anatomically complete carcasses in the presence of a variety of scavengers (Marean *et al.*, 1992). The research does not take into account butchering situations in rural villages

such as that in Menabeyti, where humans completely dismember an animal, extract most or all of the meat and tissue from its carcass, and discard the elements in various locations. In such a case, scavengers are already limited in their choice of elements, and those elements that are present are boiled and cracked, leaving little tissue behind. Elements specifically selected by carnivores (in this case domestic dogs) would be conspicuous only in their absence, or their overwhelming presence in a definite carnivore lair. Unfortunately, time in the field did not allow for a longitudinal study whereby the movements of bones from initial discard sites to final locations *via* carnivore transport could be tracked. The results were composed primarily of the locations of bones which may or may not have been transported by domestic dogs, with no initial starting location available for comparison.

The final variable with the potential to affect bone dispersal throughout the village is fluvial transport. Voorhies' (1969) study focused on orientation of bones as an indicator of the direction of flowing water. While bone orientation was not recorded in the field, a number of elements were found in the middle of thoroughfares travelling down a steep slope on the west side of the village of Menabeyti. The combination of slope and brief but heavy rains during the rainy season suggests the possibility of fluvial transport in this area. Unfortunately, the field study was carried out prior to the rainy season in 2003, so attempts to predict the effects of fluvial transport would be speculative.

7.5 Chapter Summary

Systems of livestock use and distribution, and meat division and consumption throughout villages in Gulo-Makeda are integral to the daily lives of rural farmers in the northern highland region of Ethiopia. A strong analogy between behaviours such as

these in the present and similar activities in the past can only be established by answering the question "what has changed and what has survived". In Tigray, strong evidence exists for continuities in the use of cattle, the existence of animal exchange networks, in butchering practices and meat consumption. However, these continuities are also mitigated by the impacts of environmental changes such as deforestation and expulsion of wild scavengers resulting from hundreds of years of near-constant warfare, as well as the introduction of prickly-pear cactus and the re-establishment of eucalyptus groves in rural areas. Despite these mitigating factors, patterns of butchering and bone discard in rural villages of Gulo-Makeda do have potential archaeological correlates, which should be visible in the archaeological record. At this time however, there is very little relevant archaeological data with which to test these observations – they constitute a good model which may in the future aid the interpretation of archaeological sites.

CHAPTER 8: CONCLUSIONS

8.0 Summary of findings

The consideration of the number of variables affecting multiple discard events and manipulations of animal bone renders the generation of hypotheses concerning spatial data in the archaeological record problematic. Bone refuse in domestic areas (near houses and pedestrian pathways) were subject to multiple human discard events, carnivore scavenging, bone burning events, and possibly fluvial processes. However, bone assemblages at nearby common butchering areas (by definition flat and unsusceptible to fluvial processes) seemed to remain relatively untouched by humans or carnivores after a single butchering event, potentially preserving the context upon entry into the archaeological record. These assemblages and the behaviours or activities that accompanied them are the most likely aspects of butchering and rural life to be reflected in the archaeological record, due to the preservation of animal bone after primary discard.

Contrary to previous studies involving livestock or meat distribution and consumption (discussed in detail in Chapter 2), this study was conducted in a rural village site setting. The relatively remote location of the villages within the study area may have affected the nature of the distribution of livestock and goods. Whereas Cain's (2000) faunal analysis showed a focus of large-scale accumulation of livestock on the outskirts of Aksum and trends towards selective transportation into the city, rural villages operate on a much smaller scale of accumulation and of spatial transportation. Farmers in rural villages are able to accumulate what is necessary to fill daily requirements of tillage and consumption, so there is a smaller quantity of animals that are exchanged and distributed throughout. Further, there are no craft specialists to be supported in a

rural farming village; crafts are produced on a part-time basis, for supplemental income only. Therefore the slaughter of animals and transportation of meat occurs for the purposes of direct distribution as opposed to indirect distribution through institutions such as butcher shops. This means that livestock and their products are exchanged and distributed within the village, or within a very short distance therefrom.

Patterns involving small scale and direct livestock and animal product distribution in a rural village can only be identified within the context of the village itself, and so activities involving faunal material must be distinguished from each other. In this case, a pattern of butchering site discard was supported by direct qualitative observation and in turn by quantitative comparison after the survey was completed. This pattern was clearly distinct from household discard practices and represented a discrete activity with some potential to be recognized in the archaeological record. Specifically, the representation of cattle ribs, scapulae and metapodials at butchering sites provided a model of discard activity that could be directly linked with behaviour. While the discard of ribs at a butchering site is a unique practice, it may reflect culturally-specific butchering strategies designed to anticipate culinary processing within the household (Gifford-Gonzalez, 1991). Further, the identification of the site-formation processes, including human discard behaviour and carnivore manipulation, acting upon the faunal assemblage was most important in the attempt to provide a clear picture of the many forces acting upon deposited faunal material and in turn link cultural practices involving animals with their potential material correlates in the archaeological record.

Changes in the form of environmental degradation (and subsequent reforestation), civil warfare, mobile courts and population shifts resulting from droughts and famine have significantly impacted the study area in the past. Each of these factors may have contributed to alter butchering practices since the Aksumite period. As

documented, eucalyptus leaves and *beles* patches are integral to butchering and discard practices, yet these two species have only recently (within the past few hundred years) been introduced to Ethiopia. Butchering and discard practices throughout a rural village in the past may very well have been affected by the floral antecedents of eucalyptus and *beles*, resulting in shifts in the spatial locations of the activities. The civil warfare, mobile courts and population shifts experienced by the inhabitants in the past may have decimated herd sizes and the availability of cattle for slaughter, and in turn may have placed more emphasis on the importance of butchering skills to extract the maximum amounts of meat from what little was available.

Despite the success of the research in identifying patterns of cultural activity involving faunal material, as well as the identification of the site-formation processes affecting that material during and after initial deposition, it should not be considered an ideal model towards the interpretation of an archaeological site. However, the results of the study have provided a good basis for understanding the cultural and natural parameters within which faunal material is distributed and transported throughout a rural village in this part of the northern highlands. As such, they may in the future provide one aspect of applicable models towards interpreting zooarchaeological materials excavated at a rural site.

8.1 Main Contributions of Research

The main contributions of this research are the identification of systems of inter- and intra-village livestock use and exchange throughout Gulo-Makeda, the recording of archaeologically-visible patterns resulting from specific and consistent butchering activities, and the analysis of animal bone use and discard in a rural village in the northern highlands of Ethiopia. Livestock use (for agricultural and food production) and

patterns of exchange within and between villages and markets in the Gulo-Makeda area provides a good example of how highland rural communities interact and sustain themselves economically, socially and physically. Since the interaction of populations across a landscape is necessary for the development of a region as a political entity, this system of exchange may have been one of the ways in which rural areas contributed to the development of complex society in the northern highlands in the past.

A total of 18 cattle breeds are currently found in Ethiopia, but only 4 breeds are used in Shewit Lemlem. While robust cattle are available for plowing, many households possess smaller, weaker breeds because of the high costs of supporting livestock. Hybrid cattle breeds are preferred in this region because they eat less fodder – an important quality for livestock in an area that is susceptible to chronic drought periods. Thus, an important aspect of the use of cattle in Gulo-Makeda is the selection (and propogation) of specific breeds of livestock which are suited to specific conditions (in this case, more resistance to drought).

Archaeologically-visible patterns of butchering activity provide a necessary link between human behaviour and faunal material in the archaeological record. The observation of a consistent method of butchering leaving a specific animal body part representation provides a model of behaviour and its archaeological correlate, which may in the future assist in the interpretation of faunal material recovered from a rural archaeological site. The lottery system of meat distribution, for example, is an important and equitable method of ensuring that many people can afford to eat meat on occasion. This system is not unique to Shewit Lemlem, and the practice may extend farther than the borders of Gulo-Makeda. However, while the lottery concept is the same, there may be some regional variation in the process or the location of the activity between villages or *tabias*. For example, in the village of Adi Ainawalid, near Mekelle, the lottery system

was practiced but the location of the butchering depended upon those involved and was not associated with a specific place, as with common butchering sites in Menabeyti (D. Lyons, personal communication). This is something that should be considered in future studies, as the process itself and regional variation of the practice is still poorly understood.

This study has added to our understanding of taphonomic factors operating on zooarchaeological material in two ways. First, most zooarchaeological research in Ethiopia has focused on urban centres such as Aksum. This study has expanded the research by providing a rural model of interaction between humans and animal products. Secondly, while many studies have concentrated on the taphonomy of animal bones at kill sites, the current one has focused on systematic animal slaughter at butchering sites close to habitation areas.

8.2 Future Work

The analysis of the use and discard pattern of livestock and its products in a rural setting should provide a good basis for future investigations in Tigray. Specifically, longitudinal studies such as the tracking of animal bone movements from initial discard sites to final locations via carnivore, human or natural transport would give more insight into the spatial variations between bones in behavioural and deposition contexts. Other studies that focus on the analysis of excavated animal remains, such as Chaix (Bard and Fattovich, 1997) and Cain (2000), are approaching Aksumite archaeology with a new and valuable perspective, one that takes into account the lives of the general population in addition to elite structures and remains. Behavioural models aiding the interpretation of faunal material can be supplemented by more ethnoarchaeological study involving livestock, in both urban and rural centres. Conversely, an increase in the attention paid

to faunal remains at both urban and rural Aksumite sites will provide a greater volume of reference and information on the use of animals in the past, from which new archaeological and ethnoarchaeological studies can draw.

APPENDIX A: ETHNOARCHAEOLOGICAL QUESTION GUIDE

A. General Questions

Name:

Age:

Number of members in the household:

Occupation:

B. Livestock/Land Use

1. General

Number of oxen owned:

Number of cows owned:

Number of sheep owned:

Number of goats owned:

Number of donkeys owned:

Number of chickens owned:

Do you own any other type of livestock? How many?

What do you feed the animals?

Where do you feed them?

How often?

2. Grazing

Where does the livestock graze?

At what time of year does the livestock graze?

Are the grazing fields communal or private?

Where are the grazing fields located?

Order of grazing (if applicable)?

Who watches over the animals while they graze?

3. Plowing

What is the average/maximum work life of oxen?

How do you teach oxen to plow?

What do you do with the oxen once they have exceeded their work life?

How many different types of oxen are there?
What are the characteristics of each (strengths/weaknesses)?
How much do they cost to purchase and maintain?
Do you lend/borrow animals to plow?
From a relative? A neighbour?
What do you give/receive for these services?

~~C. Meat Consumption~~

1. General

How often do you eat meat ?
When during the year do you eat meat?
During which holidays do you eat meat?
What type of meat do you consume?
Where do you get the meat from?
Do you ever slaughter your own livestock for meat?
Do you often purchase livestock from the market for meat?

2. Communal Consumption of Meat

Do you ever share the meat with anyone other than your family?
How do people share/divide meat?
How many people gather in a group in order to purchase and share meat?
How much money (average) will people pay to receive a share of the meat?
Who purchases the animal from the market?
How many people are required to purchase/transport the animal back from the market?
Do those that purchase or transport the animal from market receive anything in return for their services?
Who butchers/divides the meat?
How is the meat divided?
How do you decide who gets which quantity of meat?
Who receives the bones with marrow?

Who receives the hide? The head? The tail?
Is this process of meat division often done?
Since when has this been the manner of meat division?
Will this process occur anytime soon?
How does the meat get from the butchering site to the homes?

D. Butchering Practices

1. Butchers

Who butchers animals in the village?
Does each person butcher animals for their respective family?
Are there individuals who are better than others at butchering?
Do they ever butcher animals for others?
Do you ever butcher animals for others?
How often are they/you called to butcher animals?
Are there any skilled butchers in this village?
How many are there?
From where did they/you learn how to butcher?
What makes a skilled butcher better than others at meat division?
Does the butcher receive anything in return for slaughtering an animal?

2. Butchering Site

Where do you butcher an ox/cow?
Where do you butcher a sheep or goat?
Where is the best place to butcher an ox/cow? Sheep/goat?
How do you select a place to butcher?
What are the qualities of an ideal butchering site?
Are there any places or areas in the village where many people go to butcher an ox/cow?
Are these places available to all or just certain individuals/families?
How many communal butchering areas are there in the village?

Where are they located?

3. Tools and Process

What tools are used to butcher an animal?
How many different tools are used?
What are the strengths of each tool – why is it used?
Do you own any of these tools?
How old do animals get before they are butchered for meat?
What is the best age for slaughter?
Which are the best cuts of meat?
What is the process/order of meat division?

4. Cooking and Preservation

How do you cook the meat?
What do you do with leftover meat?
Do you ever use/eat bone marrow?
How do you separate the marrow from the bones?
Do you use any specific tools?
Is there a way to preserve it?
What is the process of meat preservation?
How long will leftover meat last if not preserved? If preserved?

E. Animal Products

What do you do with ox horns? Goat horns?
How often is this done?

What do you do with the hide of cow/ox? Sheep/goat?
How often is this done?

What do you do with the cow's milk? Goat's milk?
How often is this done?

Do you use the blood of a cow/ox for anything? Is the blood of a sheep/goat used? Is chicken blood used for anything?
How often is this done?

What do you do with cow/ox dung?
How often is this done?

Do you make anything with any of these products?
How are the products used?
Do you make any products to sell?
Where do you sell them?
How much do these products cost to purchase at market?

F. Discard Practices

What do you do with donkeys or dogs if they die?
What do you do with bones at the butchering site?
Where do you throw them?
What do you do with unused parts of a slaughtered animal?
What do you do with bones after you have separated all the meat?
At home, where do you throw animal bones? Why do you discard them there?
Does your dog/ a dog ever access the bones near your home?
What does the dog do with the bones?
Where does the dog bring them?
If your dog brings bones back to your home, what do you do with them?
Where do you put them?
Do you ever burn the bones lying around your home or the village?
How often do you burn them?
How do you burn them?
Why to you burn them?

APPENDIX B: ANIMAL BONE SURVEY DATA TABLE

Village Area	Animal	Bone Element	Location	Condition
Area A	Bos	Rib	Near beles	Tissue, Gnawing
	Bos	Horn	Near beles	Weathered
(proceeding from	Bos	Pelvis (fragment)	Near beles	Gnawing
southwest corner	Bos	Phalange	On slope	Tissue
traveling east and	Ovicaprine	Tibia (Distal)	Near beles	Spiral fracture
then northwest)	Bos	Rib fragment	Near beles	Weathered
	Ovicaprine	Tibia (Proximal)	Middle road	Weathered
	Ovicaprine	Mandible fragment	Near beles	Weathered
	Bos	Pelvis	Near beles	Gnawing
	Ovicaprine	Tibia (Proximal)	Near beles	Spiral fracture, Gnawing
	Bos	Mandible fragment	In beles	Fragment
	Bos	Femur (Proximal)	Near beles	Spiral fracture
	Ovicaprine	Tibia (Proximal)	Near beles	Spiral fracture
	Bos	Metapodial	Near beles	Clean
	Bos	Vertebra	Near beles	Weathered
	Bos	Scapula	Near beles	Tissue, Gnawing
	Ovicaprine	Pelvis fragment	Near beles	Fractured
	Bos	Humerus	Near beles	Spiral fracture
	Ovicaprine	Mandible fragment	Near beles	Weathered
	Ovicaprine	Humerus (Distal)	Near beles	Spiral fracture
	Bos	Rib fragment	Near beles	Fractured
	Ovicaprine	Scapula (Proximal)	Near beles	Fractured
	Bos	Metapodial	Near beles	Tissue, Articulated
	Bos	Humerus (Distal)	Near beles	Fractured
	Ovicaprine	Metapodial	Near beles	Tissue, Articulated
	Bos	Metapodial	Near beles	Tissue
	Ovicaprine	Vertebra	Near beles	Clean
	Ovicaprine	Pelvis	Middle road	Fractured
	Ovicaprine	Vertebra	Near beles	Clean
	Bos	Tibia (Proximal)	Near beles	Fractured
	Ovicaprine	Metapodial	Middle road	Clean
	Bos	Horn	Middle road	Weathered
	Bos	Cranium fragment	Middle road	Fractured
	Bos	Vertebra	Middle road	Gnawing
	Bos	Mandible fragment	Middle road	Fractured
	Bos	Tibia (Distal)	Middle road	Spiral Fracture
	Chicken	Unidentified	Middle road	Clean
	Ovicaprine	Tibia Shaft	Middle road	
	Ovicaprine	Tibia (Distal)	Near beles	
	Ovicaprine	Mandible fragment	Near beles	
	Bos	Pelvis	Middle road	Fractured

Village Area	Animal	Bone Element	Location	Condition
Area A	Ovicaprine	Tibia (Proximal)	Near beles	Cut Marks
(continued)	Ovicaprine	Cranium fragment	Near beles	Fractured
	Bos	Horn	Middle road	Weathered
	Bos	Phalange	Near beles	Clean
	Bos	Scapula fragment	Near beles	Fractured
	Bos	Femur (Proximal)	Near beles/fence	Spiral Fracture
	Bos	Tibia (Distal)	Near beles/fence	Cut Marks at Fracture
	Ovicaprine	Vertebra	Middle road	Clean
	Bos	Scapula	Along East fence	
	Bos	Tibia (Distal)	Middle road	Spiral Fracture
	Bos	Vertebra	Along West fence	Articulated
	Bos	Humerus (Distal)	Along West fence	Spiral Fracture
	Bos	Femoral Head	Along West fence	Clean
	Ovicaprine	Tibia (Distal)	Along East fence	Spiral Fracture
	Bos	Pelvis	Along West fence	Weathered
	Ovicaprine	Tibia (Distal)	Middle road	Spiral Fracture
	Bos	Ribs (5)	West Corner	Fractured
	Bos	Cranium	West Corner	Tissue
	Bos	Rib	West Corner	
	Bos	Scapula	West Corner	
	Bos	Humerus (complete)	East Corner	Weathered
	Bos	Ribs (20)	East Corner	Fresh
	Bos	Scapula (2)	East Corner	Fresh
	Bos	Phalange	East Corner	Fresh
	Bos	Mandible	East Corner	Weathered
	Bos	Pelvis	East Corner	Weathered
	Bos	Rib Fragment	East Corner	Weathered
	Bos	Vertebra	North Corner	Clean
	Ovicaprine	Tibia	North Corner	Weathered
	Bos	Pelvis	North Corner	Tissue
	Ovicaprine	Metapodial	North Corner	Clean
	Ovicaprine	Vertebra	South Corner	Clean
	Ovicaprine	Metapodial	South Corner	Clean
	Bos	Rib	South Corner	Gnawing
	Chicken	Unidentified	South Corner	Clean
	Bos	Horn	Middle Road	Weathered
	Bos	Phalange	Middle Road	Clean
	Bos	Scapula	West corner	Fractured
	Bos	Rib	Middle Road	
	Bos	Mandible	East Corner	Gnawing
	Bos	Vertebra fragment	East Corner	Gnawing
	Bos	Metapodial (Distal)	East Corner	Chopped, spiral fracture
	Bos	Tibia (Distal)	Middle Road	Cut Marks
	Bos	Rib fragment	Middle Road	
	Bos	Scapula	Middle Road	
	Bos	Mandible	Middle Road	

Village Area	Animal	Bone Element	Location	Condition
	Bos	Vertebra	Middle Road	Clean
	Bos	Rib	Middle Road	Gnawing
	Bos	Mandible	Middle Road	Fractured
	Ovicaprine	Metapodial	Middle Road	Clean
	Bos	Scapula	Middle Road	
	Bos	Rib fragment	Middle Road	Gnawing
	Ovicaprine	Horn	Middle Road	
	Ovicaprine	Horn	Middle Road	
	Bos	Horn	Middle Road	
Area B (proceeding from southeast corner, traveling west and north)	Bos	Humerus	SE Corner (garbage)	
	Bos	Mandible	SE Corner (garbage)	
	Bos	Metapodial	SE Corner (garbage)	
	Bos	Horn	SE Corner (garbage)	
	Bos	Pelvis	SE Corner (garbage)	
	Bos	Rib	SE Corner (garbage)	
	Bos	Tibia	SE Corner (garbage)	
	Bos	Vertebra	SE Corner (garbage)	
	Bos	Cranium	SE Corner (garbage)	
	Ovicaprine	Humerus (Distal)	Middle Road	
	Bos	Metapodial	Middle Road	
	Ovicaprine	Cranium	East Side	
	Ovicaprine	Vertebra	East Side	
	Ovicaprine	Metapodial	East Side	
	Bos	Cranium	Middle Road	
	Bos	Mandible	Middle Road	
	Bos	Ulna	Middle Road	
	Bos	Tibia	Middle Road	Weathered
	Ovicaprine	Mandible	Middle Road	
	Ovicaprine	Rib	Middle Road	
	Bos	Mandible	Middle Road	Fresh
	Ovicaprine	Scapula	West Side	
	Bos	Pelvis fragment	Middle Road	
	Unidentified	Horn	West side	
	Bos	Rib fragment	Middle Road	
	Ovicaprine	Rib fragment	Middle Road	
	Unidentified	Horn	Middle Road	
	Bos	Pelvis	Middle Road	Tissue
	Bos	Pelvis (complete)	East side	Tissue
	Bos	Humerus (Proximal)	Middle Road	Tissue
	Bos	Scapula	Middle Road	Fresh
	Bos	Metapodial	Middle Road	Tissue, articulated
	Bos	Humerus/Ulna	Middle Road	Articulated
	Bos	Metapodial (2)	Middle Road	

Village Area	Animal	Bone Element	Location	Condition
Area B	Bos	Metapodial		
(continued)	Bos	Scapulae (4)	Middle area	
	Bos	Ribs (25)	Middle area	
	Ovicaprine	Scapula	Middle area	
Area C	Bos	Humerus	Middle road	Tissue
	Bos	Metapodial	Middle road	
(proceeding from	Bos	Pelvis	Middle road	Tissue
south to north)	Bos	Mandible	Middle road	
	Bos	Vertebra	Middle road	
	Bos	Metapodial	Middle road	Tissue
	Ovicaprine	Metapodial	Middle road	
	Ovicaprine	Scapula	East side	
	Ovicaprine	Tibia	East side	
	Ovicaprine	Tibia	East side	
	Bos	Metapodial	East side	
	Bos	Scapula	Middle road	Gnawing
	Ovicaprine	Metapodial	West side	
	Bos	Humerus		
	Bos	Metapodial		
	Bos	Mandible		
	Bos	Horn		
	Bos	Cranium		
	Bos	Scapula		
	Bos	Vertebra		
	Ovicaprine	Cranium	Middle road	
	Bos	Metapodial	Middle road	
	Bos	Mandible	Middle road	
	Ovicaprine	Pelvis	West side	
	Bos	Mandible	East side	
	Bos	Phalange	East side	
	Bos	Scapula	East side	Gnawing
	Bos	Metapodial	East side	
	Bos	Vertebra	East side	Articulated
	Bos	Atlas	Middle road	
	Bos	Metapodial	East side	Tissue
	Bos	Atlas	Middle road	Gnawing
	Bos	Vertebra	East side	
	Bos	Cranium (2)	Southwest corner	
	Bos	Vertebra	Southwest corner	
	Bos	Mandible	East side	
	Bos	Humerus (Distal)	Middle road	Gnawed, weathered
	Ovicaprine	Humerus	Middle road	Gnawed
	Ovicaprine	Pelvis fragment	Middle road	
	Bos	Cranium	East side	
	Bos	Mandible	East side	
	Bos	Femur	East side	
	Bos	Ulna	East side	

Village Area	Animal	Bone Element	Location	Condition
Area C	Bos	Mandible	Middle road	
(continued)	Bos	Tooth (Molar)	Middle road	
	Ovicaprine	Mandible	West side	
	Bos	Cranium	East side	
	Bos	Horn	East side	
	Bos	Tibia	East side	
	Bos	Mandible	East side	
	Ovicaprine	Metapodial	Middle road	
	Bos	Metapodial	Middle road	
	Ovicaprine	Pelvis	Middle road	
	Ovicaprine	Vertebra	Middle road	
	Bos	Horn	Middle road	
	Bos	Atlas	Middle road	
	Bos	Vertebra	Middle road	
	Bos	Atlas	East side	
	Bos	Mandibles (2)	East side	
	Bos	Metapodial	East side	
	Bos	Femur (Distal)	East side	Spiral fracture
	Bos	Mandible	East side	
	Bos	Femur (Proximal)	East side	Spiral fracture
	Bos	Pelvis (Acetabulum)	West side	
	Ovicaprine	Tibia	Middle road	
	Bos	Rib fragment	East side	
	Bos	Atlas	Middle road	
	Bos	Tibia (Distal)	East side	Spiral fracture
	Bos	Scapula (Proximal)	East side	
	Bos	Vertebra	Middle road	
	Bos	Rib fragment	Middle road	
	Bos	Rib	Middle road	
	Ovicaprine	Pelvis fragment	Middle road	Gnawing
	Ovicaprine	Metapodial shaft	West side	
	Bos	Scapula	Middle road	
	Bos	Rib	East side	
	Bos	Rib	Middle road	
	Ovicaprine	Rib	East side	
	Bos	Tibia (Distal)	Middle road	Cutmarks, spiral fracture
	Bos	Vertebra	Middle road	
	Ovicaprine	Horn	Middle road	
	Bos	Tibia (Proximal)	East side	Gnawed, weathered
	Ovicaprine	Rib	Middle road	
	Bos	Mandible	West side	
	Bos	Tibia (Distal)		
	Bos	Vertebra	Middle road	
	Bos	Femur (Distal)	West side	Spiral fracture
	Bos	Vertebra	East side	
	Donkey	Full leg	East side	Tissue, articulated
	Bos	Rib	Middle road	
	Bos	Femur (complete)	Middle road	Gnawed

Village Area	Animal	Bone Element	Location	Condition
Area C	Ovicaprine	Mandible	Middle road	
(continued)	Bos	Pelvis	Middle road	
	Bos	Metapodial	West side	Spiral fracture
	Bos	Femur (Distal)	East side	Cutmarks, spiral fracture
	Bos	Scapula	Middle road	
	Ovicaprine	Cranium	East side	
	Bos	Metapodial	W Side, house	
	Bos	Scapula	W Side, house	
	Bos	Mandible	W Side, house	
	Bos	Cranium	W Side, house	
	Ovicaprine	Vertebra	Middle road	
	Bos	Cranium	East side	
	Bos	Tibia (Proximal)	East side	
	Bos	Cranium (fragment)	East side	
	Bos	Vertebra	East side	Gnawed
	Ovicaprine	Horn	Middle road	
	Bos	Metapodial (Distal)	Middle road	
	Ovicaprine	Vertebra	East side	
	Bos	Vertebra	East side	
	Bos	Cranium	Middle road	
	Bos	Metapodial	East side	
	Bos	Mandible	East side	
	Bos	Humerus (complete)	East side	Clean
	Ovicaprine	Cranium	Middle road	
	Bos	Horns	Middle road	
	Bos	Vertebra	Middle road	
	Bos	Femur (Proximal)	East side	Spiral fracture
	Bos	Cranium	East side	
	Bos	Horn	East side	
	Bos	Metapodial	East side	
	Bos	Pelvis	East side	
	Bos	Tibia	East side	
	Bos	Vertebra	Middle road	
	Bos	Cranium (5)		
	Bos	Humerus		
	Bos	Vertebra (complete)		
	Bos	Pelvis (2)		
	Bos	Metapodial		
	Bos	Tibia		
	Bos	Horn		
	Bos	Pelvis	Middle road	
	Bos	Metapodial	Middle road	
	Bos	Ulna	East side	
	Bos	Humerus	East side	
	Bos	Tibia (Distal)	East side	
	Bos	Mandible	East side	

Village Area	Animal	Bone Element	Location	Condition
Area C	Bos	Humerus (Proximal)	East side	
(continued)	Bos	Scapula	East side	
	Ovicaprine	Tibia	Middle road	
	Bos	Tibia (Distal)	Middle road	Spiral fracture
	Bos	Cranium	Middle road	
	Bos	Tibia (Proximal)	Middle road	Spiral fracture
Area D	Donkey	Articulated leg		Burnt
	Bos	Femur		Burnt
(proceeding from	Bos	Humerus		Burnt
south to north)	Bos	Cranium		Burnt
	Bos	Phalange		Burnt
	Bos	Horn		Burnt
	Bos	Tibia		Burnt
	Bos	Pelvis		Burnt
	Bos	Rib		Burnt
	Ovicaprine	Cranium		Burnt
	Ovicaprine	Horn	In beles	Weathered
	Ovicaprine	Mandible	In beles	
	Ovicaprine	Cranium	Middle road	Gnawing
	Ovicaprine	Pelvis	Middle road	
	Bos	Horn	In beles	
	Bos	Mandible	In beles	
	Bos	Humerus	In beles	
	Ovicaprine	Cranium	West side	
	Ovicaprine	Unidentified frags	West side	
	Bos	Tooth (2)	West side	
	Ovicaprine	Tibia	East side	Long fracture, cut mark
	Bos	Ulna	West side	Tissue
	Bos	Tibia	West side	Tissue, gnawing
	Bos	Cranium (2)	In beles	
	Ovicaprine	Unidentified frags	In beles	
	Ovicaprine	Humerus	E Side	Gnawing
	Bos	Rib	E Side	
	Bos	Metapodial	E Side	
	Ovicaprine	Tibia	E Side	
	Ovicaprine	Humerus	W Side	
	Ovicaprine	Rib	W Side	Gnawing
	Bos	Humerus/Ulna	W Side	Articulated
	Bos	Rib	Middle road	
	Bos	Horn	W Side	
	Ovicaprine	Vertebra	Middle road	
	Bos	Vertebra	In beles	
	Bos	Ulna	In beles	
	Ovicaprine	Tibia	In beles	Cut Marks
	Bos	Humerus (distal)	In beles	
	Bos	Tibia (distal)	In beles	
	Ovicaprine	Pelvis	In beles	

Village Area	Animal	Bone Element	Location	Condition
Area D	Bos	Rib fragment	In beles	
(continued)	Bos	Horn	E Side	
	Ovicaprine	Tibia	E Side	
	Ovicaprine	Metapodial	E Side	
	Ovicaprine	Rib	E Side	
	Ovicaprine	Vertebra	E Side	
	Ovicaprine	Humerus	E Side	Fractured
	Bos	Metapodial	E Side	
	Ovicaprine	Vertebra	E Side	
	Bos	Scapula	E Side	
	Bos	Pelvis (2)	E Side	
	Bos	Rib fragment	E Side	
	Bos	Rib fragment	W Side	
	Bos	Femur (distal)	W Side	
	Ovicaprine	Vertebra	W Side	
	Ovicaprine	Tibia (proximal)	W Side	
	Bos	Humerus (proximal)	W Side	Gnawing
	Bos	Atlas	W Side	
	Bos	Femur (proximal)	W Side	Cut Marks, gnawing
	Ovicaprine	Atlas	W Side	
	Bos	Pelvis	W Side	
	Bos	Scapula	W Side	
	Bos	Ulna	Middle road	Clean
	Bos	Humerus	Middle road	
	Bos	Metapodial	Middle road	
	Bos	Vertebra	Middle road	
	Bos	Femur minus head	East side	
	Bos	Tibia	East side	
	Bos	Sacrum	West side	
	Bos	Tibia (proximal)	Middle road	
	Ovicaprine	Pelvis	Middle road	
	Bos	Tibia (distal)	Middle road	Cut Marks
	Bos	Rib	Middle road	
	Bos	Phalange	Middle road	
	Bos	Mandible		
	Ovicaprine	Vertebra		
	Ovicaprine	Pelvis		
	Ovicaprine	Mandible		
	Ovicaprine	Humerus (distal)		
	Ovicaprine	Tibia	Near beles	
	Bos	Scapula	Near beles	
	Ovicaprine	Femur (distal)	Near beles	
	Ovicaprine	Scapula	Near beles	
	Bos	Rib	Near beles	
	Bos	Vertebra	Near beles	
	Bos	Tibia	Near beles	
	Ovicaprine	Horn	Near beles	
	Bos	Cranium	Near beles	

Village Area	Animal	Bone Element	Location	Condition
Area D (continued)	Bos	Humerus (proximal)	Empty home	Gnawing
	Bos	Rib	Empty home	Cut Marks
	Ovicaprine	Femoral shaft		
	Ovicaprine	Cranium		
	Bos	Metapodial		Cut Marks
	Ovicaprine	Humerus (distal)		Weathered
	Ovicaprine	Pelvis		
	Bos	Cranium		
	Bos	Femur (distal)	Empty home	Weathered, gnawing
	Ovicaprine	Atlas	Middle square	
	Ovicaprine	Rib	Middle square	
	Bos	Humerus/Ulna	Middle square	Tissue, articulated
	Ovicaprine	Horn	Middle square	
	Bos	Distal Fem/Prox Tib.	Middle square	Tissue, articulated
	Ovicaprine	Tibia	Middle square	
	Ovicaprine	Scapula	Middle square	
	Ovicaprine	Humerus	Middle square	
	Bos	Vertebra	Middle square	
	Bos	Metapodial	Middle square	
	Bos	Pelvis	Middle square	
	Bos	Scapula	Middle square	
	Bos	Phalange	Middle square	
	Ovicaprine	Ulna/Humerus	Middle square	Tissue, articulated
	Ovicaprine	Horn	Middle square	
	Bos	Humerus (distal)	Middle square	Cut Marks
	Bos	Tibia (distal)	Middle square	Cut Marks
	Bos	Ulna (proximal)	Middle square	
	Bos	Rib	Middle square	Cut Marks
	Bos	Scapula	Middle square	Gnawing
	Bos	Pelvis		
	Bos	Rib		Cut Marks
	Bos	Scapula		
	Bos	Metapodial (2)		
	Bos	Cranium, Horn		
	Ovicaprine	Horn	Enda Dukee	
	Bos	Humerus/Ulna	Near middle	Tissue, articulated
	Bos	Humerus (proximal)	Near middle	
	Bos	Vertebra	Near middle	
	Bos	Pelvis	Near middle	
	Bos	Tibia	Near middle	
	Bos	Ulna	Near middle	Cut Marks
	Bos	Cranium	Near middle	
	Bos	Mandible	Near middle	
	Bos	Horn	Near middle	
	Bos	Tibia (distal)	Near middle	
	Bos	Rib	Near middle	
	Bos	Femur (complete)	Near middle	

Village Area	Animal	Bone Element	Location	Condition
Area D	Bos	Vertebra	Near middle	
(continued)	Bos	Femur (distal)	Near middle	
	Bos	Metapodial	Near middle	
	Ovicaprine	Rib	Near house	
	Ovicaprine	Tibia	Near house	
	Ovicaprine	Mandible	Near house	
	Ovicaprine	Horn	Near house	
	Ovicaprine	Metapodial	Near house	
	Ovicaprine	Scapula	Near house	
	Ovicaprine	Pelvis	Near house	
	Ovicaprine	Humerus	Near house	
	Bos	Rib	Near house	Cut Marks
	Ovicaprine	Horn	Near house	
	Bos	Tibia (distal)	Near house	
	Bos	Humerus (distal)	Near house	
	Ovicaprine	Tibia	Near house	
	Ovicaprine	Metapodial	Near house	
	Ovicaprine	Pelvis	Near tree	
	Ovicaprine	Vertebra	Near tree	
	Bos	Vertebra	Near tree	
	Bos	Cranium (3)	House pit	
	Bos	Ulna	House pit	
	Bos	Tibia	House pit	
	Bos	Pelvis	House pit	Gnawing
	Ovicaprine	Cranium (2)	House pit	
	Ovicaprine	Phalange	House pit	
	Bos	Ulna/Humerus	House pit	
	Bos	Ulna/Humerus	House pit	Cut Marks
	Bos	Humerus (distal)	House pit	Cut Marks
	Bos	Pelvis	Middle N of area	
	Bos	Scapula	Middle N of area	Gnawing
	Bos	Vertebra	Middle N of area	Cut Marks
	Bos	Rib	Middle N of area	
	Bos	Pelvis	Middle N of area	
	Bos	Atlas	Middle N of area	tissue
	Bos	Pelvis	Middle road	
	Bos	Metapodial	West side	
	Bos	Humerus (proximal)	West side	
	Ovicaprine	Tibia	Middle road	
	Bos	Femur (distal)	Middle road	
	Bos	Humerus (distal)	Middle road	
	Bos	Vertebra	Middle road	Gnawing
	Ovicaprine	Mandible	Middle road	
	Ovicaprine	Metapodial (Distal)	Middle road	
	Ovicaprine	Tibia (distal)	Middle road	Cut Marks
	Bos	Metapodial (Distal)	Middle road	Cut Marks
	Bos	Femur (proximal)	Middle road	Spiral fracture
	Bos	Pelvis	Middle road	Gnawing

Village Area	Animal	Bone Element	Location	Condition
Area D	Bos	Vertebra	Middle road	
(continued)	Ovicaprine	Tibia (2)	Middle road	
	Ovicaprine	Metapodial (Distal)	Middle road	Cut Marks
	Bos	Atlas	Middle road	
	Ovicaprine	Vertebra	Middle road	
	Bos	Metapodial	West side	
Area E	Bos	Rib	West side	
	Ovicaprine	Mandible	West side	
(proceeding from	Bos	Rib	West side	
south to north)	Bos	Vertebra	West side	
	Ovicaprine	Horn	West side	
	Bos	Scapula	Middle road	
	Bos	Femur (distal)	Middle road	Spiral fracture
	Bos	Horn	Middle road	
	Ovicaprine	Mandible	Middle road	
	Ovicaprine	Vertebra	Middle road	
	Bos	Rib	West side	
	Bos	Mandible	Middle road	
	Bos	Rib	West side	
	Ovicaprine	Pelvis	West side	
	Ovicaprine	Mandible	West side	
	Ovicaprine	Rib	West side	
	Bos	Vertebra	West side	
	Bos	Femur (distal)	East side	Spiral fracture, burnt
	Bos	Rib	East side	Weathered
	Bos	Pelvis	East side	
	Bos	Pelvis	West side	
	Bos	Scapula	Middle	
	Bos	Ulna	Middle	
	Bos	Humerus (distal)	Middle	
	Bos	Scapula	SW Side	
	Bos	Tibia (distal)	SW Side	
	Bos	Pelvis	SW Side	
	Bos	Rib	SW Side	
	Bos	Rib	Middle	
	Ovicaprine	Mandible	House garbage	
	Ovicaprine	Humerus/Ulna	House garbage	
	Ovicaprine	Scapula	House garbage	
	Ovicaprine	Rib	House garbage	
	Bos	Scapula	House garbage	
	Chicken	Unidentified	House garbage	
	Bos	Rib	SE Garbage	
	Bos	Femur (proximal)	SE Garbage	
	Bos	Vertebra	SE Garbage	
	Ovicaprine	Mandible	SE Garbage 1	
	Ovicaprine	Tibia	SE Garbage 1	
	Ovicaprine	Scapula	SE Garbage 1	

Village Area	Animal	Bone Element	Location	Condition
Area E (continued)	Ovicaprine	Rib	SE Garbage 1	
	Bos	Tibia	SE Garbage 2	
	Bos	Scapula (3)	SE Garbage 2	
	Bos	Rib	SE Garbage 2	
	Bos	Pelvis	SE Garbage 2	
	Bos	Vertebra	SE Garbage 2	
	Ovicaprine	Humerus	SE Garbage 2	
	Ovicaprine	Cranium (2)	SE Garbage 3	
	Bos	Atlas	SE Garbage 3	
	Bos	Mandible	SE Garbage 3	
	Bos	Rib	SE Garbage 3	
	Bos	Scapula	SE Garbage 3	
	Bos	Vertebra	SE Garbage 3	
	Ovicaprine	Scapula	Middle Garbage	
	Ovicaprine	Tibia	Middle Garbage	
	Ovicaprine	Humerus	Middle Garbage	
	Ovicaprine	Metapodial	Middle Garbage	
	Ovicaprine	Cranium	Middle Garbage	
	Bos	Ulna	Quarry area	
	Ovicaprine	Cranium	Quarry area	
	Bos	Humerus (proximal)	East side	
	Bos	Tibia (Distal) (2)	West side	
	Bos	Metapodial	West side	
	Bos	Rib	West side	
	Bos	Mandible	Middle	
	Ovicaprine	Tibia	Middle	
	Bos	Rib	Middle	
	Ovicaprine	Mandible	E Side	
	Bos	Humerus (distal)	Middle road	
	Bos	Vertebra		
	Bos	Horn	East side	
	Bos	Cranium	West side	
	Bos	Rib	West side	
	Bos	Vertebra	West side	
	Bos	Rib	East side	
	Bos	Vertebra	East side	
	Bos	Metapodial	East side	
	Ovicaprine	Femur	Middle road	
	Bos	Vertebra		
	Bos	Rib		
	Bos	Vertebra		
	Bos	Humerus (distal)		
	Bos	Ulna		
	Ovicaprine	Metapodial		

Village Area	Animal	Bone Element	Location	Condition
Area E	Bos	Rib		
(continued)	Bos	Scapula		
	Bos	Atlas		
	Bos	Humerus		
	Bos	Metapodial		
	Bos	Pelvis		
	Ovicaprine	Femur		
	Ovicaprine	Vertebra		
	Bos	Rib		
	Bos	Vertebra (full 2)		
	Bos	Mandible		
	Bos	Scapula		
	Bos	Horn		
Area F	Bos	Mandible		
	Bos	Cranium		
(proceeding from	Bos	Tibia (Distal)		
west to east)	Bos	Humerus (proximal)		
	Bos	Femur (proximal)		
	Ovicaprine	Horn		
	Ovicaprine	Humerus		
	Ovicaprine	Scapula		
	Bos	Ulna		
	Bos	Humerus		
	Bos	Mandible		
	Bos	Leg		Articulated
	Bos	Distal Femur/Tibia		
	Bos	Cranium		
	Ovicaprine	Humerus		
	Ovicaprine	Tibia		
	Ovicaprine	Mandible		
	Bos	Distal Humerus/Ulna		
	Bos	Pelvis		
	Bos	Femur (proximal)		
	Bos	Femur (Distal)		
	Bos	Horn		
	Bos	Mandible		
	Bos	Humerus		
	Bos	Humerus/Ulna		
	Ovicaprine	Scapula		
	Bos	Tibia		Weathered, cracking
	Bos	Humerus		
	Bos	Mandible		
	Bos	Scapula		Weathered, fracture

Village Area	Animal	Bone Element	Location	Condition
Area F (continued)	Ovicaprine	Tibia		Spiral fracture
	Bos	Fibula shaft		
	Bos	Unidentified frag		Spiral fracture
	Bos	Femur (proximal)		Spiral fracture
	Bos	Humerus		
	Bos	Mandible		
	Bos	Femoral head		
	Unidentified	Unidentified		
	Bos	Scapula fragment		
	Bos	Tooth fragment		
	Bos	Vertebra		
	Bos	Unidentified		
	Bos	Vertebra		
	Bos	Tibia (distal)		Spiral fracture
	Bos	Ulna (proximal)		
	Bos	Humerus (distal)		
	Bos	Vertebra		
	Bos	Tibia		
	Bos	Metapodial		
	Bos	Mandible		
	Unidentified	Unidentified frags		
	Bos	Mandible fragment		
	Bos	Unidentified		
	Bos	Humerus head		
	Bos	Unidentified		
	Bos	Mandible		
	Bos	Vertebra		
	Bos	Vertebra		
	Bos	Humerus		
	Ovicaprine	Humerus		Cut Marks
	Bos	Femur (distal)		Spiral fracture
	Unidentified	Unidentified frag		
	Ovicaprine	Humerus (distal)		Cut Marks
	Ovicaprine	Humerus (proximal)		
	Unidentified	Unidentified frag		
	Bos	Tibia (proximal)		
	Bos	Scapula		
	Bos	Horn		
	Bos	Horn		
	Bos	Scapula		
	Ovicaprine	Tibia		
	Unidentified	Humerus head		
	Ovicaprine	Horn		
	Bos	Mandible		
	Ovicaprine	Cranium		

Village Area	Animal	Bone Element	Location	Condition
Area F	Bos	Cranium		
(continued)	Bos	Humerus (proximal)		
	Bos	Vertebra		Gnawing
	Ovicaprine	Humerus		
	Ovicaprine	Phalange		
	Ovicaprine	Cranium fragment		
	Ovicaprine	Phalange		
	Ovicaprine	Cranium fragment		
	Ovicaprine	Cranium fragment		
	Ovicaprine	Cranium fragment		
	Ovicaprine	Horn		
	Bos	Pelvis		
	Ovicaprine	Tibia (proximal)		
	Ovicaprine	Vertebra		
	Ovicaprine	Horn		
	Ovicaprine	Cranium		
	Bos	Pelvis		
	Ovicaprine	Horn		
	Ovicaprine	Tibia (proximal)		
	Bos	Femur (distal)		
	Unidentified	Unidentified frag		
	Bos	Horn		
	Ovicaprine	Pelvis		
	Bos	Vertebra		
	Bos	Humerus (distal)		
	Bos	Humerus (distal)		
	Ovicaprine	Ribs (3)		
	Bos	Pelvis		
	Ovicaprine	Metapodial		
	Ovicaprine	Metapodial		Burnt
	Bos	Vertebra (2)		
	Bos	Tooth (2)		
	Ovicaprine	Humerus (proximal)		
	Bos	Vertebra		
	Bos	Tibia (distal)		
	Ovicaprine	Metapodial		
	Ovicaprine	Rib fragment		
	Ovicaprine	Scapula fragment		
	Ovicaprine	Vertebra		
	Ovicaprine	Rib fragment		
	Bos	Scapula (proximal)		
	Ovicaprine	Vertebra		
	Ovicaprine	Mandible		
	Ovicaprine	Metapodial		
	Bos	Femur (distal)		Burnt
	Bos	Pelvis (2)		
	Bos	Mandibles (2)		
	Bos	Rib		

Village Area	Animal	Bone Element	Location	Condition
Area F (continued)	Bos	Femur fragment		
	Bos	Tibia		
	Bos	Scapula		
	Bos	Humerus		
	Bos	Scapula		
	Bos	Mandible		
	Bos	Scapula		
	Bos	Humerus		
	Ovicaprine	Cranium		
	Ovicaprine	Vertebra		
	Ovicaprine	Pelvis (2)		
	Bos	Mandible		
	Bos	Tibia (distal)		
	Bos	Cranium		
	Bos	Vertebra		
	Ovicaprine	Cranium		
	Ovicaprine	Rib fragments (2)		
	Bos	Femur (2)		
	Bos	Rib		
	Ovicaprine	Horn		
	Bos	Humerus		
	Bos	Rib		
	Bos	Ulna		
	Bos	Tibia		
	Bos	Rib fragment		Burnt
	Bos	Metapodial (distal)		
	Ovicaprine	Metapodial		
	Ovicaprine	Horn		
	Ovicaprine	Tibia (distal)		
	Ovicaprine	Cranium fragment		
	Bos	Atlas		
	Bos	Tibia (distal)		
	Bos	Femur (distal)		
	Bos	Scapula		
	Bos	Mandible (2)		
	Bos	Tibia		
	Bos	Rib		
	Bos	Phalange (3)		
	Ovicaprine	Metapodial		
	Ovicaprine	Metapodial		
Butchering Site 1 (ENE Corner of open field)	Bos	Scapula (5)		
	Bos	Ribs (22)		
	Bos	Metapodial (4)		
Butchering Site 2 (3 Terraces in eucalyptus grove between east and west half of village)	Bos	Scapula (10)		Cut Marks (distal)
	Bos	Ribs (72)		
	Bos	Metapodial (2)		
	Bos	Cranium		

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