KWAGANDAGANDA: AN ARCHAEOZOOLOGICAL CASE STUDY OF THE EXPLOITATION OF ANIMAL RESOURCES DURING THE EARLY IRON AGE IN KWAZULU-NATAL

by

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SUMMARY AND KEY TERMS

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Summary

KwaGandaganda is an Early Iron Age (EIA) site in the Mngeni valley (KwaZulu-Natal, South Africa). Three cultural phases, Msuluzi, Ndondondwane and Ntshekane, dating between AD 620-AD 1030 were identified. The objective was to establish the extent of animal exploitation during the EIA in KwaZulu-Natal by means of faunal analysis, using internationally accepted methods. The collection included 41 006 fragments of which 22.9% were identifiable. A large number of species (68) were identified, including *Rattus rattus*. The collection yielded the largest quantity of ivory chips ever found on an EIA site in southern Africa, as well as an extensive variety of pathological specimens, mostly from *Bos taurus*. Several possible divining bones were present in the sample. Herd management, hunting strategies, gathering activities, fishing and trading of animal goods during the EIA were discussed, while the consequences of the unique excavation methods (i.e. the use of bulldozers) were also commented upon.

Key terms

KwaGandaganda; Early Iron Age; faunal analysis; KwaZulu-Natal; Msuluzi; Ndondondwane; Ntshekane; animal exploitation; herding and hunting; fishing; trade.

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INDEX

INDEX

Index (continued)

CHAPTER 3 - ETHNOGRAPHIC INFORMATION

Index (continued)

Index (continued)

Index (continued)

LIST OF FIGURES

LIST OF FIGURES

List of Figures (continued)

List of Figures (continued)

LIST OF TABLES

LIST OF TABLES

List of Tables (continued)

List of Tables (continued)

List of Tables (continued)

List of Tables (continued)

List of Tables (continued)

List of Tables (continued)

LIST OF PLATES

LIST OF PLATES

List of Plates (continued)

LIST OF APPENDICES

LIST OF APPENDICES

CHAPTER 1

CHAPTER 1

INTRODUCTION

1.1. Primary objective of this study

The primary objective of this project is to establish the exploitation of animals during the Early Iron Age (EIA) in KwaZulu-Natal by analysing the faunal material from KwaGandaganda. The results will be used in an attempt to investigate the use of domestic stock during the EIA in KwaZulu-Natal, and the role that it played in social, ritual and economic patterns. An attempt will also be made to determine the herding and hunting strategies during the EIA.

KwaGandaganda is a very large EIA site with a series of cultural successions and is situated in the Mngeni valley near Durban (Figure 1.1 and Plate 1). It was excavated by Gavin Whitelaw (Natal Museum) as part of a cultural resource management project. KwaGandaganda was named after the Zulu word *ugandaganda,* meaning "tractor" or "bulldozer", since part of the excavations was done with Clark Michigan 280B and Caterpillar 824B wheeldozers. After excavation, KwaGandaganda was flooded by the now completed Inanda Dam. Since the site is destroyed, it is important that all possible information be derived from the remains that were excavated.

KwaGandaganda is one of a few sites in the eastern region of South Africa with sufficiently large faunal samples to allow authoritative research. The EIA faunas from most of the KwaZulu-Natal sites are often badly eroded and subsequently of limited use. The KwaGandaganda fauna is therefore of particular importance to provide information on the EIA of the region. Preliminary reports on some of the assemblages (done by Dr I. Plug of the Archaeozoology Department, Transvaal Museum, Pretoria), show that the site has great research potential for faunal analysis and that the samples are bound to contribute valuable information on EIA activities relating to herding, the procuring of animal protein and possibly of social, ritual and economic practices.

Before an attempt can be made to determine the role and economic and social value of animals during the EIA in KwaZulu-Natal, it is essential to give a short overview of the information already known on the EIA, with particular reference to the animals present during that period.

1.2. Background to the Early Iron Age

The term "Early Iron Age" was used during the 1960s as the typological link between Iron Age assemblages in eastern and south-central Africa which contained "dimple-based" and "channeldecorated" pottery, dated to the first millennium AD. At this time the term was applied to regions north of the Limpopo River. In South Africa it was not until 1973, when several sites with related pottery were dated to the first millennium, that the term was accepted (Maggs 1995:171).

It was during the first few centuries of the first millennium AD that new techniques of food production and systems of sociocultural and economic organisation appeared in southern Africa. Domestic animals were introduced to the area; new ecological relationships were established as fields were cleared for sorghum, millet and other crops; iron and copper were mined, smelted and worked; and semi-permanent villages were established (Denbow 1983:5; Maggs 1984b:354).

These new techniques of food production and changes in the sociocultural and economic systems provided archaeologists specialising in the EIA with numerous research opportunities. The result was a diversity of EIA research directions such as linguistics, pottery, domestication of animals, settlement patterns and migration routes. An aspect that has been receiving more and more attention from recent research, is the interaction between the EIA peoples and the animals that they utilised. It is in this research area that the discipline of Archaeozoology plays a major role.

The methodology and techniques of Archaeozoology allow the exploration of aspects of sociocultural change relating to the introduction of domestic animals, not possible by any other means. The impact of the introduction of domestic animals ranged from different patterns of land use to competition with indigenous fauna for grazing and water, and the settlement of larger populations in more permanent villages, thus leading to the growth of complex societies. The people that moved into an area with their cattle also had to take into account the endemic diseases (e.g. those carried by ticks and tsetse flies) that could eliminate or seriously affect the health of their herds.

1.2.1. Dispersion of the EIA to southern Africa

The earliest radiocarbon date for the Iron Age in southern Africa is recorded from the site of Silver Leaves near Tzaneen in the Northern Province, i.e. AD 270±60 (Klapwijk 1973:324; Klapwijk & Huffman 1996:92).

Exactly from where and how the EIA came to southern Africa is still the subject of various hypotheses. Controversy exists about the theories on how the dispersion of the EIA took place, on the associated cultural traditions, and on their relationship to one another. It is generally accepted that one of the early routes was along the eastern coastal lowlands, and the other from southern Malawi (Nkope) and Zimbabwe (Gokomere/Ziwa). However, research indicates that there may have been alternative western routes as well, if the *ca* 380 BC date for cattle in Zambia (from Salumano, an EIA site) is accepted. This date is based on associated *in situ* charcoal (Plug pers. comm.). This "Western Stream", which includes pottery styles made by Bantu-speaking agriculturalists who spread into southern Africa from the northwest, was first identified by

Phillipson (1977), but is nowadays generally referred to as the Kalundu Tradition (Huffman 1990:4; Whitelaw 1998:5).

Linguistic studies proved that the southward population movement more or less correlates with the above routes, and that the language(s) of the EIA people may have been ancestral to the present-day Bantu languages. Few of the EIA sites have yielded human skeletal material, but the little that has been found displays predominantly Negroid characteristics, very similar to the present populations of the region (Inskeep 1978:123; Plug & Voigt 1985:191).

The spread of the EIA into the areas south, east and west of the initial focus point was rapid and settlements were already present in the former Transvaal by the third century AD and at least in the early fourth century AD in KwaZulu-Natal. Evidence for EIA communities occurs on the coast south of KwaZulu-Natal, while the southern limit appears to be at the Chalumna River in the former Ciskei. This southern boundary of the Iron Age did not change for more than a thousand years. It is speculated that it may be the result of an ecological constraint on the spread of a mixed-farming economy based on tropical and subtropical cultigens, and also a change in the rainfall regime from summer to winter (Plug & Voigt 1985:191).

There is general agreement among archaeologists that in South Africa at least, the EIA arrived as a package which included metallurgy, crop cultivation, settled village life, distinctive ceramics and domestic stock. The EIA peoples had an entirely different way of life and system of beliefs than the Late Stone Age (LSA) people that they encountered at the time. Archaeologists studying the EIA are convinced that the populations were larger than the LSA groups already existing in the area, but small compared to those of the Late Iron Age (LIA). The EIA developed from small self-sufficient communities at the village level during the early stages to highly specialised economic production units with an emphasis on trade during its later phases (Maggs 1984b:331; Maggs 1995:173; Plug & Voigt 1985:191).

The archaeological record shows that a number of changes had already taken place towards the end of the first millennium. In KwaZulu-Natal these involved a complete break in the long sequence of ceramic style and settlement location patterns. Archaeologists (Mazel 1989:1-168) argued that at the beginning of the first millennium, hunter-gatherers moved from the higher grassland areas of the Thukela Basin into the wooded valleys, perhaps drawn by the presence of agriculturalists (Maggs & Whitelaw 1991:18). According to Plug and Voigt (1985:200), Iron Age occupation in KwaZulu-Natal expanded from the river valleys and coastal lowlands into the grasslands around AD 900. The period between AD 900 and AD 1400 seems to be sparsely populated, but from AD 1400 there is an increase in the number of sites in the grassland areas.

1.2.2. Settlement during the EIA

EIA settlements were established in only a limited portion of the available landscape. With the exception of the eastern coastal forest, virtually all settlement took place in savanna areas. The

EIA peoples strongly favoured valley-bottom sites beside lakes and rivers. They also chose to live on relatively level sites with deep, arable soil. At excavated Iron Age villages evidence of structures such as huts (daga and poles), pots (broken pottery vessels) and furnaces (slag and clay pipes) has been found (Maggs 1984a; Whitelaw 1994a; Whitelaw 1994b). Meyer (1997:40) states that settlement tendencies and the remains of cultural products "....may be interpreted as material evidence of Iron Age values, survival skills and achievements, and of the patterned and innovative relationships of the human population with the environment."

Some archaeologists suggest that the early communities were small and that the communities were dependent upon insecure "close-neighbour" relationships. According to Whitelaw (1997:448) this has been proven incorrect by recently gathered data from the Congo Republic, which suggest that the initial expansion of agriculturists into South Africa originated from hierarchical societies. This would mean that some EIA villages were fairly large and, even in favourable environments, located a distance of several kilometres apart.

It also seems that some EIA communities occupied large villages for relatively long periods of time. This suggests that agricultural production was an important means of subsistence. Cultivation was probably a primary economic activity, but one should not ignore the other contributors to the subsistence pattern, i.e. herding and hunting (Maggs 1984a:199; Maylam 1986:3).

In KwaZulu-Natal, south of the Pongola River, no EIA sites have yet been found above an altitude of 1000 metres (Maggs 1995:172). All sites in this region occur in the coastal lowlands or the inland river valleys. Most of the coastal sites are situated less than three kilometres from the sea in high rainfall areas, and most inland sites are in valley bottoms close to rivers or major streams. The inland valley sites seem to have been located on fertile soil, albeit in areas of lower rainfall. This, and the numerous grindstones and pits (probable grain stores), suggest that these EIA people were cultivators (Maggs 1995:172; Maylam 1986:3).

The settlement layout was arranged according to the central cattle pattern (CCP), which will be discussed in detail in 1.2.3. The villages were generally around eight hectares in size, some being perhaps as large as 20 hectares or more. According to Maggs (1980a), pits from about 1 m to 2,5 m deep, containing domestic debris and often a buried (but bottomless) pot, are typical and may be the only "structures" remaining on eroded sites. Some pits may have been dug for grain storage before being used for refuse. Pieces of burnt daga with stick and thatch impressions from many sites suggest a widespread, uniform type of hut construction (Maggs 1980a:111-145).

1.2.3. Central cattle pattern (CCP)

Kuper (1980, 1982) was the first researcher to recognise the existence of a number of underlying similarities in the social structure, marriage practices, kinship terminology and settlement layout of Nguni speakers of the Eastern Cape, Natal and neighbouring areas (Lane 1995:54). Kuper formulated an explanatory model for these similarities and Huffman (1990, 1993) labelled it the CCP model. So far the CCP has been traced from the present to as far back as AD 600 at Broederstroom, west of Pretoria (Huffman 1990:1).

The most important aspect of the CCP model is the organisation of settlement space, which is determined by a set of attitudes concerning the symbolic value of cattle, the relative status of men versus women, and the spiritual significance of ancestors. These attitudes are widely shared by speakers of the various southern Bantu languages (Lane 1995:54).

According to Lane (1995:55), it may be inferred from Kuper (1980, 1982) and Huffman (1982), that there are eight characteristics common to the CCP, regardless of the ethnic identity of the group occupying the settlement, i.e.

> "1. Cattle byres are generally located at the centre of the settlement, or socially equivalent subsection such as a ward.
> 2. Cattle byres usually contain elite male burials and storage facilities for communal grain stocks.
> 3. The men's court is generally situated either in the cattle byre or adjacent to it.
> 4. Houses are arranged in an arc around the central cattle byre.
> 5. The house (or houses) of the senior resident is typically situated opposite the entrance to the cattle byre.
> 6. Other houses are arranged to the right and left of this, according to seniority.
> 7. Individual houses are divided internally into right and left sections, which generally have corresponding male or female associations.
> 8. There is also a front/back, secular/sacred division of household space, which is generally oriented at right angles to the male/female, right/left division."

According to Huffman's (1990:7) description of the CCP, it is *ideally* characterised by:

- a central area of stock byres
- storage facilities controlled by a central political authority
- high status burials and a men's court, all surrounded by a zone of circular huts with central fireplaces, low status burials and privately owned grainbins.

Whitelaw (1995:37) describes the CCP as follows:

> "In this homestead layout.......the wives live in circular houses arranged in ranked order around a cattle byre. Each house is divided into male and female sides by a central hearth. Wives store their grain near the houses, but grain controlled by the village head is kept in granaries or pits close to or in the central byre. In normal day-to-day life women are excluded from this area. Not only is the cattle byre a male area, it is also strongly associated with the ancestors, and it is thus the focus of social and ritual attention in the settlement. Close to the byre is the assembly area where the men gather to socialise, make important decisions and hold court. Ceremonies such as weddings take place in the byre, and important people are buried there."

Archaeologists in general regard the CCP homestead layout as evidence for a patrilineal society in which cattle were exchanged as bridewealth for wives. Some eastern Bantu speakers who have a bridewealth system do not have the CCP organisation, but the reverse is not the case: every group of eastern Bantu speakers with the CCP also exchange cattle for wives. This is because of a structural relationship between spatial organisation, language and culture in these societies (Huffman 1990:7; Whitelaw 1995:37). If Whitelaw's (1994b:49) identification of the CCP on KwaGandaganda is valid, the importance of cattle should be reflected in the faunal sample.

1.2.4. Iron and copper working

Iron working is characteristic of most EIA sites. Iron smelting is evident on many sites, indicating that most villages could produce their own requirements. Often the scale of production, judging by the amount of waste materials, was relatively small but in some cases there is sufficient evidence to suggest that there was a surplus that could have been traded (Maggs 1984a:199; Maggs & Whitelaw 1991:17). The self-sufficiency of settlements in terms of iron working may also reflect a more fundamental self-sufficiency in both economic and political terms, implying that it would not be necessary for them to trade, for example, cattle for hoes.

The smelting of iron was considered by Bantu speakers to be associated with procreation and was therefore surrounded by ritual prohibitions such as seclusion. The smelting of iron took place in a secluded area, away from the settlement, and the women were not allowed to attend this. Forging was seen as little more than a physical talent and it often took place in the central area of the settlement (Huffman 1990:7).

While evidence for iron production is common on first-millennium agriculturalist sites, that of copper production is less so. There seems to have been some trade in copper, but the scale of production and the degree of specialisation did not come close to the production of iron. Copper items were essentially decorative, e.g. beads and bangles (Maggs 1984a:199).

Several small copper beads were found in a seventh-century context at KwaGandaganda. This is of particular interest because, according to Maggs and Whitelaw (1991:17), copper production was not practised in pre-colonial Natal. These beads therefore point to the extensive trading networks suggested by the east coast marine shells identified on the site by Whitelaw (1994b:44).

1.2.5. Domestic plants in the EIA

EIA people are credited with introducing domestic plants such as sorghum, cow peas, beans and millet to southern Africa, for evidence of neither these, nor of agriculture as an economic activity has been found at LSA sites. Cow peas (*Vigna unguiculata*), ground beans (*Voandzeia subterranea*), and sorghum are dated to about the ninth century from Lanlory and Leopard's Kopje (situated in Zimbabwe), while sorghum and "beans" have been identified from a twelfth-century Toutswe context at Thatswane in Botswana, and sorghum at Schroda in the Limpopo

Valley. At Silver Leaves in the Northern Province, grain was found in pottery dating back to ±AD 270 (Klapwijk 1973). There are few other identified crop plants and these date mainly from late in the Iron Age. However, there is a possibility that "soft" plants and vegetables were grown during the EIA, but they were not identified in the archaeological deposits as they probably leave no trace.

At two EIA sites in KwaZulu-Natal, Magogo and Ndondondwane, plant material has been identified from flotation samples. At Magogo, dated to the sixth or seventh century, the millets *Eleusine corocana* and cf. *Pennisetum typhoides* are cultigens and *Citrullus* sp. and cf. *Sorghum* sp. may be likewise. The ninth century site of Ndondondwane has also produced *Pennisetum typhoides* (bulrush millet). Indirect evidence on the size and location of settlements and the number of grindstones support the view that cultigens were staple items of the diet (Maggs 1984a).

Traditionally, the staple diet of people is of vegetable origin. It was usually the task of the women to tend the crops and provide for the family's needs. Fields were worked until they became unproductive, whereupon new lands were opened. When no more suitable agricultural land was available, the whole village was moved. According to Plug and Voigt (1985:202) this may be one of the reasons why some Iron Age sites were inhabited for short periods only.

1.2.6. The use of domestic animals in the EIA with reference to the dispersion of these animals to southern Africa

Although there are still many gaps in the record, it is generally accepted that domestic animals were introduced into southern Africa between 2100 and 1800 years ago. Archaeologists do not know for certain how and by what routes the diffusion of domestic animals took place. According to Plug (1996:515) this lack of clarity can be ascribed to inadequate research as a result of political instability in some countries, lack of trained archaeologists and economic constraints.

Reasons for the initial keeping of domestic livestock are numerous. Clutton-Brock (1995:165) suggests that "...it only became essential to keep a store of livestock once the early Bantu-speaking people (living in settlements using iron) began to expand beyond the numbers that could be supplied from hunted meat".

The following reasons also apply:

- livestock can easily be moved in the event of threat
- livestock are economically safer than cultivated crops, because they can be moved out of a drought area and also because droughts affecting crop production are far more frequent than droughts affecting livestock
- the storage capacity of livestock is greater than that of plant material
- livestock herds increase in number with little effort on the part of the owner (Denbow 1983:45; Maggs & Whitelaw 1991:19).

Domestic animals including cattle, small stock, dogs, pigs, chickens and rats are known from EIA sites where bone preservation is adequate, although not all from the earliest phase of the EIA. At present we have little knowledge of the animal breeds that were involved during the introduction of domestic stock to southern Africa.

A considerable variation in the ratio between domestic and wild animals can be expected at different sites. Available evidence from some EIA sites indicates that there was already a predominance of domestic stock over wild animals in terms of dietary input (Plug 1996:515-520). The domestic animals (and their presence on EIA sites) that will be discussed in detail are dogs, chickens, pigs, rats (the European houserat, as opposed to the numerous indigenous rat species), sheep/goats and cattle.

– **Dogs**

  Dog remains have been recorded from a number of Iron Age sites in southern Africa, dated to the late first millennium AD, although no finds as yet predate the 6th century AD. The earliest evidence for dog was found at Diamant (in the Waterberg region of the Northern Province), dating ±AD 570 and also on Bosutswe (eastern Botswana) dating ±AD 700. These finds predate those previously recorded at Mapungubwe and other Limpopo Valley sites of *ca* AD 800 (Clutton-Brock 1995:161; Plug 1988:17; Plug 1996:515).

  Little is known about the physical appearance of these animals, but according to Plug (1988:17) they could have looked like the dogs found today in rural areas. The presence of domestic dogs is seen as evidence of one of the significant changes of the millennia. Dogs would not only have facilitated herding, but would also have made a major contribution to successful hunting (Maggs & Whitelaw 1991:7).

– **Chickens**

  Faunal samples from EIA sites indicate that chickens were not common. On most of the EIA sites they are not represented at all, e.g. Nanda in KwaZulu-Natal and the Greefswald sites in the Limpopo Valley. However, a number of "guinea fowl" size remains were identified from these sites. These may well include chicken, as at that time reliable criteria to distinguish between chicken and guinea fowl skeletal elements were not yet determined. Bosutswe samples (from eastern Botswana) contain chicken remains from the earliest period of occupation and the remains of chickens were also found in a limited, preliminary survey of the KwaGandaganda faunal material (Plug 1996:515).

– **Pigs**

  According to Plug (1996), the position of pigs in the EIA is as yet uncertain. Suid remains occur on most EIA sites, but these are all of warthog and bushpig.

Tentative identification of pigs at Ndondondwane in KwaZulu-Natal (ninth century) has not yet been supported by evidence from other sites. Although this indicates that pigs were not generally kept, it does not mean that domestic pigs were entirely absent from the EIA (Plug 1996:515).

– **Rats**

Although rats are not generally seen as domestic animals, they form part of the discussion since they are always found in relation to man. The European brown houserat (*Rattus rattus*), a species not indigenous to Africa, occurs on a number of EIA sites. As yet none of the finds predates AD 700, with the earliest find at Pont Drift in the Limpopo Valley. The presence of *Rattus rattus* could have opened the way for the spread of virulent epidemics (Plug 1996:515; Plug, Dippenaar & Hanisch 1979:82; Plug & Voigt 1985:230).

– **Sheep and goats**

Although both *Ovis aries* (sheep) and *Capra hircus* (goat) remains occur in EIA deposits, sheep remains are generally more numerous than those of goats. Sheep are recorded first from LSA/Khoi pastoralist sites dating to 2100 years ago, e.g. Spoegrivier, situated in the Western Cape Province just south of Hondeklipbaai (Vogel et al. 1997:246). It seems likely that sheep may have moved south along the west coast of southern Africa, arriving in the western Cape around 2000 years ago.

Goats had reached the Iron Age sites of South Africa by the fourth century AD, with the earliest evidence found at Happy Rest, an EIA site situated west of Louis Trichardt in the Soutpansberg (Voigt & Plug 1984:221). It seems that goats were of lesser importance in the EIA than sheep. This trend seems to have been widespread in southern Africa and there are few archaeological records of goat remains in the region (Clutton-Brock 1995:163).

Little is known about the physical appearance of these animals, i.e. woolly/hairy and fat-tailed/thin-tailed. Metapodial shafts suggest that the animals were generally long-legged, much like the "unimproved" sheep and goat breeds still found today. It may be assumed that the early sheep in southern Africa were hairy, since the modern "indigenous" sheep tend to have hair rather than wool. Faunal remains do not provide evidence whether the sheep were fat- or thin-tailed, since there are no osteomorphological differences between the sacrum and the caudal vertebrae of fat-tailed and thin-tailed sheep. However, on the evidence recorded by early European settlers at the Cape of Good Hope, it is most likely that the Iron Age sheep would have been fat-tailed. The presence of thin-tailed sheep cannot be ruled out, but is at present impossible to prove (Plug 1996:515; Plug & Voigt 1985:221).

In present-day Bantu-speaking societies, sheep and goats are more readily slaughtered for meat than cattle. There is no ethnographic evidence to suggest that the situation was different in the past. In modern times, sheep are generally preferred to goats because of the fat that can be obtained from the sheep's rump and tail.

– **Cattle**

The domestication of cattle occurred in several different phases, in areas ranging from the Near East, Mongolian China and Pakistan. Recent genetic research (Hanotte pers. comm.; Plug pers. comm.) has indicated that virtually all southern African indigenous cattle is of taurine origin, African taurine in particular. This evidence is based on genetic studies of DNA, and has shown that *Bos taurus* was also domesticated in North Africa, ±8000-10 000 years ago. This strain is present in all the taurine cattle in Africa, and indicates that the previous assumption that the Zebu strain is present in many breeds in southern Africa, is untrue. It also proves that the domestication of *Bos primigenius* also took place in Africa, and that this regional variant is the main ancestor of African cattle (Plug pers. comm.).

Previous research indicated that, apart from the *Bos taurus* domesticated in North Africa, at least three cattle breeds reached Africa during prehistoric times: the Hamitic longhorn (dispersed from Egypt along the coast of North Africa); the humpless shorthorn (dispersed from Egypt to West Africa after they interbred and ousted the Hamitic longhorn in Egypt); and the Zebu, a breed with a very large hump (it reached the African continent via the horn of Africa not earlier than 1500 years ago, approximately five thousand years after the shorthorn) (Plug n.d:3). However, taking into account the abovementioned results of the new genetic research, the Hamitic longhorn and the humpless shorthorn are both taurines, and could have originated in Africa.

The earliest evidence of cattle in southern Africa comes from Salumano, an EIA site in Zambia (*ca* 380 BC). It is the only site on the subcontinent with a BC date for cattle. Other dates for cattle are between *ca* AD 250 and AD 550, for example Broederstroom and Happy Rest (Plug 1996:516).

In South Africa there appear to be fewer breeds than in the rest of Africa. This may reflect on the shorter history of cattle in the south, but it is also possible that some breeds may have become extinct as a result of European programmes to introduce so-called "improvement" (Clutton-Brock 1995:164). According to Plug (pers. comm.) modern genetic research done by the Animal Improvement Institute of South Africa, the Food and Agriculture Organisation (FAO) and the Organisation of African Unity (OAU), will clarify this issue. It is only through genetic research that true breeds will be distinguished from regional varieties.

According to Plug (n.d:4), the dispersal of cattle breeds to southern Africa is mainly related to the diffusion of the Iron Age cultures through southern Africa. Although these people had knowledge of herding practices they did not live from herding alone, they also hunted and gathered food. The environment was also of great importance, since the presence of tsetse flies in certain regions (such as the Kruger National Park), prevented them from herding. The peoples in those areas had to depend on largely hunting/gathering or agriculture, if the area permitted the latter.

Since most faunal samples are heavily fragmented and few bones complete, knowledge of the size and physical characteristics of EIA cattle is limited. Fragments of longbone articulations and the size of some of the phalanges suggest that the animals were often large and robust (Plug 1996:515).

The status of cattle particularly during the earliest phase of the EIA is not clear, but the fact that cattle were of great social and economic importance during this time is reflected in the presence of large samples of cattle remains in EIA sites, dung deposits and the layouts of settlements (CCP model). This indicates regular use of these animals but there is as yet no evidence of the purpose of slaughter, whether ritual, social or for food only. It seems at present doubtful if meat distribution practices during slaughtering can be identified from the archaeozoological record unless more spatial representative samples become available (Plug 1988:17-21; Plug pers. comm.).

1.3. Climate and herding

The climate of a certain area no doubt has a direct and important influence on the herding practices utilised by the people occupying that specific area. Denbow (1983:38) argues that, given that climatic and environmental conditions are not likely to have changed dramatically over the last 2000 years, some EIA communities could have experienced rapid increases in herd size during the first millennium AD. In addition, the increased herd structures could have led to periods of rapid social and cultural change, followed by periods of relative stability. Once herd sizes have peaked, however, subsequent fluctuation in populations due to local overgrazing and drought may have led to a stabilisation of herd numbers. The effect of such a concentration of grazers in a sweetveld environment is likely to have been devastating (Maggs 1984a:199).

Contrary to Denbow's statements, Tyson's climatic studies (1986) have indicated that changes in the climate of the eastern parts of southern Africa did occur in the last 2000 years. Tyson and Lindesay (1992) suggested sufficient changes in the temperature and rainfall to influence farming activities in these areas. Huffman (1996a) correlated these suggested changes in the climate with archaeological evidence and proposed that the locations of Iron Age sites provide evidence for past climates. This is based on the fact that the domestic grains that the Iron Age people cultivated needed a sufficiently warm and wet climate to allow the grains to reach maturity. This type of climate is also essential for the herding of domestic animals, since sufficient grazing is needed to maintain herds, but unreliable rainfall leads to great fluctuations in the availability of water and grazing. As a result of insufficient grazing and water, one can also expect minor changes in the species distribution of wild animals.

Tyson and Lindesay (1992) and Huffman (1996a) established that

- the climate between AD 250 and AD 600 was warmer and wetter with a cooler, drier period thereafter (until AD 900)
- the climate between AD 900 and AD 1300 was again warmer and wetter
- around AD 1300 the start of the "Little Ice Age" had a severe impact on the farming areas, i.e. cold, dry conditions.

It is indisputable that natural vegetation depends on rainfall, temperature and humidity to generate sufficient nutrients for the maintenance of a herd (Bonsma 1980:33). According to Dahl & Hjort (1976:17), unreliable rainfall leads to great fluctuations in the availability of water and grazing, both seasonally and over long periods. Research has indicated that four years of drought are enough to destroy the basic structure of indigenous herds (Voigt 1986:19), and it is also known that a decrease in the amount of water and suitable grazing has a direct negative influence on milk production (Dahl & Hjort 1976:37). Therefore, the total number of animals maintained in any area depends on the total nutritional level of that environment.

Regarding herding practices, it is important for a sufficient number of animals to survive a natural disaster such as a drought so that the household utilising the animal products can exist while the herd is being rebuilt. The number of animals needed to maintain a longtime continuous production is much larger than the number of animals immediately utilised at a certain period. Most pastoralists try to keep as many female cattle as possible in order to safeguard milk production and to secure reproduction of the herd. One mature bull can usually serve 50-60 cows, but pastoralists should keep more bulls than the necessary minimum as a security against losses. The remaining bull calves are usually castrated or slaughtered (Dahl & Hjort 1976:29).

1.4. Summary

In this chapter, the primary objective of this study, namely to establish the exploitation of animals during the EIA in KwaZulu-Natal by analysing the faunal material from KwaGandaganda, was discussed. A general background to the EIA was given, with specific reference to the animals that were utilised during that period. The influence of the climate on herding practices was also discussed.

It became clear from a survey of studies done on EIA sites, that domestic animals such as cattle, small stock, dogs, pigs, chickens and rats have been identified on these sites although not all from the earliest phase of the EIA. Little knowledge of the animal breeds that were involved during the introduction of domestic stock to southern Africa is available. A considerable variation in the ratio between domestic and wild animals can be expected at different sites, although available evidence from some EIA sites indicates that there was already a predominance of domestic stock over wild animals in terms of dietary input.

With the background of this project in mind, the objective of this study will be pursued in the course of the next few chapters. In Chapter 2 the excavation of KwaGandaganda, particularly the natural environment and cultural setting of the site, will be discussed with reference to the EIA in general. Since no archaeozoological study is complete without the use of ethnographic information, Chapter 3 will incorporate a summary of ethnographic information relevant to this study. In Chapter 4 the methods used during the analysis of the fauna from KwaGandaganda will be discussed, as well as the problems and limitations encountered during the research. In Chapter 5, the results of the faunal analysis will be presented, while the discussion thereof will follow in Chapter 6. Chapter 7 will incorporate the conclusions made during the study, as well as the recommendations for further studies.

CHAPTER 2

CHAPTER 2

KWAGANDAGANDA: THE CULTURAL AND NATURAL SETTING

2.1. Introduction

In this chapter the discovery of and reasons for excavating KwaGandaganda will be highlighted. The excavation will be discussed and the different cultural phases identified at KwaGandaganda, i.e. the different phases of occupation by EIA farmers, will be outlined. This will be followed by a detailed description of the natural environment of the research area. Special attention will be paid to faunal samples retrieved from other EIA sites in KwaZulu-Natal, with specific reference to those sites on which the cultural sequence of KwaGandaganda is based.

2.2. The archaeological excavations

2.2.1. Discovery of the site

KwaGandaganda was discovered in 1983 when the Directorate of Water Affairs (Department of Environmental Affairs) requested the Natal Museum Archaeology Department to undertake a survey of the section of the Mngeni valley due to be flooded by the new Inanda Dam. It was during this survey, carried out between April and September 1983 by members of the Archaeology Department and the Natal branch of the South African Archaeological Society, that the team recorded 24 new sites. The sites ranged from the Early Stone Age through to the Late Iron Age. Early Iron Age material occurred on eight of these sites, KwaGandaganda being one of them. Several sparse artefact scatters were the only indication of deposits beneath the surface. The Department of Water Affairs decided to fund an archaeological rescue project, and Gavin Whitelaw from the Natal Museum Archaeology Department started excavations in May 1986 (Whitelaw 1994a:1; Whitelaw 1994b:1).

2.2.2. Excavation methods and sample retrieval

KwaGandaganda occupied an area of approximately 140 000 m^2 (14 hectares) of which ± 900 m^2 (0.6%) were excavated (Whitelaw pers. comm.). This percentage does not include the soil strips cleared with the bulldozer, but the features that were initially opened this way and that were excavated, are included. The methods of excavation of the site were discussed and described by Whitelaw (1994a, 1994b), but for clarity on the different trenches and excavation levels, the following needs to be highlighted.

According to Whitelaw (1994a:46) several sparse artefact scatters were the only indication of deposits beneath the surface. He placed grids (numbers 1, 2, 3, 5 and 6) consisting of 2 x 2 m squares over five of these scatters, and Grid 4 in an area where moles had brought dung nodules to the surface. He excavated metre-wide trenches (Trenches 1-8), divided into "units" of between two and four metres long, and 1 m^2 test-squares (Test-Squares [TS] 1-77), to establish the extent of certain features. Squares 1 to 26, each originally 3 x 3 m, were positioned around and between features in an attempt to discover others hidden beneath the surface (Figure 2.1a and Figure 2.1b).

Towards the end of the fieldwork a large part of the site was excavated with Clark Michigan 280B and Caterpillar 824B wheeldozers. According to Whitelaw (1994a:47) the damage to artefacts and features was minimal.

> "After initial experimentation with the technique, we removed the vegetation and topsoil in a series of parallel strips across the site. The scraped strips were separated by unscraped strips of approximately equal width, onto which the topsoil and vegetation was pushed........the precise depth of the scraped spits depended on soil texture and moisture" (Whitelaw 1994a:47).

> "This technique produced a clean four metre wide strip in which artefact occurrences and features were easily visible. Each was numbered (Survey Points [SVP] 1 to 183), mapped and many were excavated. The criteria I used to select SVP features for excavation were richness of deposit (eg. small scatters, dense concentrations of material), type of remains (dung patches, daga concentrations, ashy middens) and the need to investigate temporal context" (Whitelaw 1994a:47-48).

The remainder of the excavations was done by conventional methods using spades, picks, brushes, trowels and sieves. The finest mesh used for sieving, was three millimetres (Whitelaw pers. comm.).

After excavation most of the faunal material was submitted to the Archaeozoology Department of the Transvaal Museum for identification and analysis. The marine shells were identified by Whitelaw (assisted by D. Herbert and R. Kilburn), and the fish remains from Square 25 were identified by C. Poggenpoel. The analysis of the cultural material and the determination of the cultural affinities of the site were described in detail by Whitelaw (1994a, 1994b). For clarity, a short discussion of the assigned cultural phases on KwaGandaganda will follow, as well as a short summary of the major finds and features.

2.2.3. The cultural setting of KwaGandaganda

Four EIA phases are generally recognised in KwaZulu-Natal on the basis of ceramic styles, i.e. Matola (the oldest), Msuluzi, Ndondondwane and Ntshekane. According to Whitelaw (1994a:14) "....most Matola sites in Natal lie within 8 km of the coast but related sites occur throughout the lower lying eastern parts of the subcontinent in the Transvaal, southern Mozambique and Zimbabwe." The phases that succeed the Matola phase, i.e. Msuluzi, Ndondondwane and Ntshekane, occur on sites along the coast and in river valleys below 1000 m above sea level throughout KwaZulu-Natal. There is broad agreement among archaeologists that these three phases form a single stylistic sequence (Whitelaw 1994a:14).

On the basis of pottery similar to that found on the sites of Msuluzi Confluence, Ndondondwane and Ntshekane, Whitelaw (1994a:48) assigned three of the abovementioned four phases to KwaGandaganda. In addition there was evidence of a Late Iron Age or recent occupation. According to Whitelaw (1998:5-6; pers. comm.) the chronological division of the relevant phases are as follows:

–	Msuluzi	AD 620 - AD 780
–	Ndondondwane	AD 780 - AD 970
–	Ntshekane	AD 970 - AD 1030

After assigning the three phases of Msuluzi, Ndondondwane and Ntshekane to KwaGandaganda, Whitelaw submitted charcoal from three features (associated with each of the phases) for dating to the Schonland Research Centre, University of the Witwatersrand. The radiocarbon dates were calibrated with the 1993 Pretoria Calibration Programme (Talma & Vogel 1993, as referred to in Whitelaw & Moon 1996:73), and range from the beginning of the seventh century to the early eleventh century AD (Whitelaw 1994b:18; Whitelaw & Moon 1996:74; Whitelaw pers. comm.). The results of the dating tests were as follows (the calibrated dates are in brackets, with central intercepts in bold):

–	Msuluzi	Wits 1918	1395±60 BP	(AD 644-**667**-696)
		Wits 1938	1315±60 BP	(AD 674-**717,737,762**-798)
–	Ndondondwane	Wits 1919	1245±60 BP	(AD 769-**823,827,857**-892)
		Wits 1937	1260±60 BP	(AD 717-737; 762-**798**-887)
–	Ntshekane	Wits 1920	1080±60 BP	(AD 974-**1007**-1029)

2.2.4. Major finds and features

With reference to the major finds and features, only aspects of the excavation that might have an influence on the interpretation of the faunal analysis will be considered here. The rest of the finds and features were discussed in detail by Whitelaw (1994a; 1994b).

- **Msuluzi**
  A byre with a diameter of approximately 20 m was identified as dating to the Msuluzi phase. Another possible byre was identified but not confirmed. Other features from this phase include nine middens, pits, patches of dung and ironworking debris.

An important sector of the Msuluzi excavations is the excavation of Square 25. According to Whitelaw (1994a:72; pers. comm.) the excavation of Square 25 was more extensive than in other areas of the site. The Square 25 midden enclosed an area of nearly 400 m^2 and had a depth of 90 cm. Initially only 9 m^2 were excavated, but a further 9 m^2 were later removed because of the richness of the midden. Whitelaw (1994b:32) is of the opinion that the Square 25 midden accumulated rapidly, since the Msuluzi pottery and the fragile bones were very well preserved. Square 25 is not only important because of its volume of material, but also because this midden is associated with a men's assembly area, since it yielded fragments of ceramic sculpture and evidence of ivory carving, a predominantly male craft. The Square 25 midden also produced two human burials, i.e. the skeleton of an approximately 60-year-old man and the remains of a premature baby (Whitelaw 1994b:32-35; 52-54). Implications regarding the extensive excavations in this area include the possible proportional over-representation of the Msuluzi faunal material in the total sample.

- **Ndondondwane**
  Six livestock byres associated with the Ndondondwane phase were identified, their diameters ranging from 17-25 m. Whitelaw (1994b:47) suggested that, since the dung in the byres were roughly similar in depth, they could have belonged to different families in the settlement; or they could have been the result of new byres being established next to old ones. Several ashy middens (± 12) and an ironworking area, likely to be a forge base, were located close to the byres and were probably related to the court or men's assembly area. Other identified features include granaries and pits. The features associated with the Ndondondwane phase yielded a rich assemblage of artefacts, including ceramics (such as bottomless pots), a concentration of initiation-related objects such as ceramic sculpture, worked bone, shell disc-beads, slag, tuyères, grindstones, charcoal and faunal material. A midden close to one of the byres yielded ivory shavings as well as a complete elephant tusk (Whitelaw 1994b:19-32; 46-52).

- **Ntshekane**
  KwaGandaganda was apparently abandoned after the Ntshekane phase, and the remains of several daga structures were the most important Ntshekane phase features. Other finds included one or possibly two pits, four ashy middens and artefacts such as potsherds, bones, beads, charcoal, tuyère nozzles, slag fragments and grindstones which were found in association with granaries. No livestock byres were found associated with the Ntshekane phase. The Ntshekane deposits were generally shallower than those of the earlier phases, therefore indicating that occupation during this period was brief (Whitelaw 1994b:18-19; 45-46).

Whitelaw (1994b:45) noted that the artefacts and features, with the exception of the pit(s), typically occur in the residential areas of traditional settlements in southern Africa and therefore probably demarcate the Ntshekane residential area on KwaGandaganda. Although the absence of livestock byres during this period is difficult to explain, Whitelaw (1994b:46) ascribed it to two possible reasons, namely the use of earlier, established byres; or the shorter occupation resulting in shallower dung accumulation, making it more difficult to identify. However, the absence of residential structures and debris in the centre of the supposed village may suggest that the byres were situated there.

Regarding the settlement layout of KwaGandaganda in general, Whitelaw (1994b:49) stated that the "....layout, with central cattle byres and occasional pits surrounded by houses and raised granaries is archaeological evidence for the Central Cattle Pattern (CCP), the settlement pattern associated with patrilineal Bantu speakers who exchange cattle for wives."

Whitelaw (1994b:49) also made the suggestion that, because of the complex relationship between homestead layout and worldview, one can use the recent ethnography of Bantu speakers in southern Africa to interpret KwaGandaganda in more detail.

Whitelaw (1994b:49) suggests that the layout of KwaGandaganda seems to have been "fixed" for the duration of the Ntshekane and the Ndondondwane phases, since forging remains from both phases seem to have been in the same part of the site. He emphasises this by stating that it is probable that the Ntshekane phase byres were also situated in the same area as the Ndondondwane phase ones.

Other finds on KwaGandaganda (Whitelaw 1994b:35-45) include:

- several small ceramic items such as figurine bodies and limbs, modelled cattle horns and a single ceramic bead
- metal items such as iron beads, copper beads, a copper earring and several pieces of iron bar, nodules and a plate
- a single snapped glass cane bead
- several worked stones such as upper and lower grindstones, a fragment of a talc schist bowl and a ground stone pipe
- worked bone such as several complete bone points/linkshafts, bone splinters, ivory shavings, an ivory bracelet, a possible sweat scraper, a bone pendant, a pierced canine tooth, a bone copy of a canine tooth, an ivory copy of a canine tooth, bone beads and a broken, ground tablet of bone with dot-in-circle impressions on one face
- worked shell such as *Achatina* shell disc-beads, ostrich eggshell beads, marine molluscs such as *Cypraea annulus* with their dorsal surfaces removed, and others that were pierced or shaped.

According to Whitelaw (1994b:38-42) several of the items excavated on the site could indicate trade relations with settlements in other regions. These include:

- copper beads (since there is no evidence of precolonial copper mining in the region, they were either traded, or were manufactured on site with imported copper metal)
- the glass bead and possibly the stone pipe (indicating Indian Ocean trade relations)
- ostrich eggshell beads (probably brought onto the site already manufactured).

Whitelaw (1994a:107-108) also considers KwaGandaganda as the site of a political capital/centre, because of

- the fixed use of space over a long period
- the size and rapid accumulation of the Msuluzi assembly-area midden
- the large quantity of ivory
- the richness of the site in so-called foreign artefacts such as marine shells, glass, copper beads, ostrich eggshell beads and exotic ceramics
- large numbers of bone points
- the presence of artefacts associated with centralised initiation schools.

According to him, the status of KwaGandaganda may have changed over time, since no Ndondondwane deposit was as rich as the earlier Msuluzi deposits. Whitelaw (1994a:109) states that KwaGandaganda may have lost its capital position by the late eighth century, but may have retained some of its status until at least the end of the Ndondondwane phase.

2.3. The natural environment

Humans are part of the natural environment, therefore their actions and structures of the past and present are influenced by the environment. Consideration of the role played by environmental factors has been an integral part of archaeological research since interest in the prehistory of southern Africa accelerated in the 1960s.

Today's archaeological sites were living sites once, constructed within an environment suited to and also adapted to human needs at that time. Conditions may have changed since then and the time of excavation in the present. Whilst studying an archaeological site, the archaeologist must always keep in mind that the environment may have been different at the time at which the site was occupied.

Environmental factors such as soil conditions, climate, erosion and other factors also influence the post-depositional preservation of faunal material up to the time that the archaeologist excavates the remains. These factors will have left their mark on the residue and must be identified as well.

According to Acocks (1988:9) there is no direct historical evidence one can use to reconstruct past environments, such as evidence in the form of samples of veld types that could be revisited and re-analysed today. The only evidence available is indirect, for example:

- rather vague descriptions of veld types given by early travellers
- the naming of Vasco da Gama of the east coast as the land of fire (veld fires observed from the sea).

Thus, when studying past environments, one is dependent on the study of the veld as it is today, and compare it to those aspects that can be reconstructed from the study of faunal and botanical remains, soil samples and other environmental indicators obtained from archaeological and other deposits.

When applied to humans the term *environment* relates to the totality of natural objects and their interrelationships which surround and routinely influence the lives of people (Fuggle & Rabie 1992:4). An environment can be seen as comprising two sets of factors, namely abiotic components (landscape and climate) and biotic components (fauna and flora).

By discovering the regional identity of KwaGandaganda through the abiotic components, a basis is formed for the subsequent consideration of the biotic components (Hall 1981:25).

2.3.1. Abiotic components

KwaZulu-Natal is noted for the variation in scenery presented by the altering topography, ranging from impressive mountains to plateaux, upland areas, basin plainlands, deeply incised river valleys, and picturesque coastal hinterland and lowlands. It is in one of these deeply incised river valleys, the Mngeni valley, that KwaGandaganda is situated.

> "KwaGandaganda lay within a large bend of the Mngeni River that, in terms of settlement location preferences of EIA agriculturists, offered one of the finest positions in the area flooded by the Inanda Dam. It was also selected because the area was relatively flat, large enough to support a sizeable settlement and had deep, fertile colluvial soil which was sufficiently alkaline to ensure the preservation of bone" (Whitelaw 1994b:1-3).

According to Du Plessis (1973:277-278), there are two interpretations of the origin and meaning of the naming of the Mngeni River.

- The word Mngeni means *the enterer*, because "....the river metaphorically, if not actually 'enters' the earth at several of its falls". In this case the name was probably derived from *ngena* > *umNgeni*: enter, entrance.
- In the opinion of ethnologists (not named) the meaning of the word Mngeni is *at the Acacia trees.*

According to Van Huyssteen (1994:60), the name "uMngeni" is derived from the noun *umunga*, a species of thorn tree. Van Huyssteen states that the spelling "uMngeni" is the only correct and acceptable form to the Zulu informants that she interviewed.

The rivers in KwaZulu-Natal run from west to east. All forms of life are dependent on water, and it is not difficult to see the close relation between the distribution of plants and animals, and the availability of water. Air and ground temperature also have a distinctive influence on the distribution patterns of life on earth.

2.3.1.1. Topography

The topography of the Mngeni valley area is generally very steep and rugged with many prominent cliffs. KwaGandaganda is situated at an altitude of 127 m above sea level. The river valley narrows upstream and downstream of the Inanda Dam, reducing the size of suitable settlement sites next to the river. The location of this site is typical of that of first-millennium agriculturist settlements, and it offered one of the finest positions in the area since the terrain was relatively flat and large enough to support a sizeable settlement (Whitelaw 1994b:46).

On the west KwaGandaganda was bordered by the Mngeni River which was relatively wide and shallow. The river could be crossed easily, even in summer. To the south and east the site was bordered by hilly terrain.

2.3.1.2. Climate

Daily temperatures are usually influenced by latitude, distance from the sea, and altitude. The low-lying areas of northeastern KwaZulu-Natal, the coastal areas and the major river valleys are characterised by high temperatures. Winter temperatures are generally low and are related to distance from the coast (Development Bank of Southern Africa 1988:2.41).

KwaZulu-Natal lies in the summer rainfall zone of South Africa. In the KwaGandaganda area the climate is humid to subhumid and the temperatures are mild to subtropical. In December the mean temperature is 24 °C and in July 15 °C. Summer rainfall from October to March is approximately 575 mm. The winters are dry, the rainfall from April to September being approximately 175 mm (Moll 1976:49). Climatic hazards include occasional droughts and light frosts.

KwaGandaganda falls in the area referred to as the Coastal Lowlands Bioclimatic group (Table 2.1). Although there is a considerable variation between the climates of the subregions, the climate of the valley is generally hot and moist in summer and cool in winter with cold nights (The Development Bank of Southern Africa 1988:2.33).

2.3.1.3. Geology and soils

According to Thomas (1951:115), the total catchment area of the Mngeni River is 4381 km^2

(1690 sq. miles). The surface geology of the Mngeni consists of rocks of the Karoo Sequence, Table Mountain Sandstone, Old Granite and gneiss. The characteristics of soils are influenced by the parent material of the underlying geology, while their formation is affected by other environmental factors such as topography, drainage and climate - particularly rainfall, aridity and temperature. Soil depth in KwaZulu-Natal is very variable and soils are chemically rich but generally tend to be impervious and readily eroded (Pentz 1951:69).

According to Whitelaw (1994b:2-3) the KwaGandaganda site lies on deep, fertile colluvial soil which was sufficiently alkaline to ensure the preservation of bone. At the time of occupation, the soil on this site would have been suitable for sorghum and millet cultivation. The savanna woodland would have provided edible plants, sweet-veld grazing for domestic herds, and wood for domestic and industrial fuel (Whitelaw 1994b:3; Whitelaw 1995:39).

The geomorphology of the KwaZulu-Natal river valleys was far more stable through the Iron Age than that of the coastal plain. The rate of soil development in the riverine areas is such that they are likely to have been *in situ* for considerably longer than the past two millennia. Some changes in the immediate riverine environment will have taken place as a result of the evolution of river courses, periodic flooding and some soil redeposition but these would not have been substantial (Hall 1981:141).

2.3.2. Biotic components

2.3.2.1. Vegetation

The appearance of vegetation is influenced by physiographic factors such as topography, elevation, slope, drainage, flooding, erosion and sedimentation. The distribution of vegetation is determined by climate, altitude and distance from the sea. The mountain regions have a higher rainfall than the plains, while deep valleys are usually drier and hotter than the plains (Development Bank of Southern Africa 1988:2.7).

The vegetation of the Mngeni valley area has been described by numerous writers, but for the purpose of this chapter, the most recent publication is used, namely *Vegetation of South Africa, Lesotho and Swaziland* (Low & Rebelo 1996). They divide the abovementioned area into seven biomes with 68 vegetation types.

The following environmental zones are either situated within the KwaGandaganda area or within a few days' walking distance from the KwaGandaganda area:

- Valley thicket (Part of the Thicket biome)
- Coastal Bushveld-Grassland (Part of the Savanna biome)
- Coast-Hinterland Bushveld (Part of the Savanna biome)

2.3.2.1.1. Valley thicket (Thicket Biome)

Synonyms for this vegetation type used by other writers are: Valley Bushveld (Acocks 1988), Kaffrarian Thicket, Xeric Kaffrarian Thicket, *Spirostachys africana* Woodland (Moll 1976).

As the name implies, this veld type is found in the valleys of the numerous rivers, mostly draining into the Indian Ocean. These valleys are hot and receive less rain than the intervening ridges, from 500-900 mm per annum. It is a very dense thicket of woody shrubs and trees which occur in the river valleys of the eastern parts of the Western Cape, extending through the eastern Cape to KwaZulu-Natal. This thicket is invasive to savanna and grassland. In the past their distribution was controlled by large browsers such as rhino and kudu, but with their numbers depleted it is now spreading into many other vegetation types in the Eastern Cape.

According to Low and Rebelo (1996:16), "....the flora has transitional Tongoland-Pondoland and Afromontane affinities. The closed canopy is up to 6 m in height and woody evergreen species are dominant, rather than succulent trees or shrubs". In the drier regions valley mist provides moisture. There is a great diversity of species in this thicket type.

According to Whitelaw (1993:49) the composition of stands of indigenous bush suggests the KwaGandaganda area was originally covered by Moll's (1976) *Spirostachys africana* Woodland, a subsection of his Dry Valley Scrub and Bushland Mosaic. This closed woodland occurs ".....mainly on dry northwest-facing slopes at altitudes between 152 and 457 m.....", but also "....on the alluvial soils of the valley floor, below 305 m. It is particularly extensive to the Mngeni and Mvoti River Valleys" (Moll 1976:52).

The dominant tree of this Woodland is *Spirostachys africana* (Tamboti), with other fairly common trees such as *Combretum molle* (Velvet bushwillow), *Acacia robusta* (Enkeldoring), *Schotia brachypetala* (Weeping boer-bean) and *Sclerocarya caffra* (Marula).

2.3.2.1.2. Coastal Bushveld-Grassland (Savanna Biome)

This mosaic of vegetation types occurs from just above sea level to about the 300 m altitude. The terrain is more or less flat to gently undulating, but rises overall quite steeply towards the interior. The area is deeply dissected by the many rivers which drain eastward across KwaZulu-Natal.

The climate is humid with only one or two months with little or no rain. The vegetation is restricted to sandy soils of marine origin and is influenced by salt spray, fire and grazing. The water table plays a crucial role in defining plant communities on the geologically young substratum.

The remaining forest patches are characterised by species such as *Drypetes gerrardii* (Forest Iron Plum), *Vepris undulata* (White Ironwood), and grass species such as *Aristida junciformis*

(Ngongoni Bristlegrass), *Sporobolus* spp., *Digitaria* spp., and occasionally *Themeda triandra.*

2.3.2.1.3. Coast-Hinterland Bushveld (Savanna Biome)

This vegetation type occupies an irregular area of rolling country on the lower escarpment slopes of the Drakensberg in the Melmoth-Eshowe area, at an altitude of 450-900 m above sea level. The area is cooler and drier than the coastal belt. The vegetation is an open Sweet Thorn *Acacia karroo* savanna or scrub, with Ngongoni Bristlegrass *Aristida junciformis* almost entirely dominant.

Valley Thicket occurs in numerous lower altitude valleys. In more sheltered valleys or on slopes well-developed forests are present. The Coast-Hinterland Bushveld, by contrast, occupies the more exposed upland hilltops and ridges.

In the Savanna Biome, summer rainfall is essential for the grass dominance. Most of the savanna types are used for grazing, mainly by cattle or game. In the case of the Coast-Hinterland Bushveld where *Aristida junciformis* became dominant (almost to the exclusion of other grasses), the vegetation is highly nutritious in early summer but when new growth stops it soon becomes unpalatable as the season advances. This is usually due to a very low nitrogen to carbon ratio which makes it indigestible to livestock (Low & Rebelo 1996:81).

Sweetveld vegetation contains grasses which remain palatable for most of the year. This usually occurs on the richer, more alkaline soils.

2.3.2.2. Fauna

Present wildlife in KwaZulu-Natal is only a poor reflection of past diversity. Historical sources describe a wide variety of mammal species in the province. Today most of the larger game are restricted to the few game parks and nature reserves. Some glimpse of the faunal richness of the province can be gleaned from the animal remains from EIA sites such as Ndondondwane, Msuluzi Confluence and Ntshekane, which will be discussed in 2.3.2.2.1. Checklists of current fauna and distribution of Iron Age fauna of the KwaGandaganda area can be obtained from the works of Maggs (1980a, 1980b), Mentis (1974), Plug (1993a, 1996), Plug and Voigt (1985), Voigt (1984b), Voigt and Von den Driesch (1984), and Whitelaw (1993, 1994a, 1994b).

The historical distribution of ungulates in KwaZulu-Natal as described by Du Plessis (1969) is listed in Table 2.2. The most common larger mammal species to be found in KwaZulu-Natal at present are listed in Table 2.3 (adapted from Skinner & Smithers 1990). Only the larger fauna (bigger than hares) was considered.

I refer in particular to past and present large mammal fauna, since these form the bulk of the KwaGandaganda sample and other archaeological faunal samples identified. The other, nonmammalian fauna such as reptiles, fish, birds and molluscs are not dealt with intensively, since they rarely occur abundantly in EIA deposits. However, useful references in this regard are:

- Branch (1988) for information on reptiles
- Smith and Heemstra (1986) for information on fish
- Maclean (1993) for information on birds
- Appleton (1996) and Steyn and Lussi (1998) for information on freshwater and marine molluscs.

Further attention will be given to the fauna of the EIA in 2.3.2.2.1. where the fauna from the sites on which the cultural sequence of KwaGandaganda is based will be discussed, as well as in Chapters 5 and 6, where the faunal analysis of KwaGandaganda and the results thereof will be discussed in detail.

2.3.2.2.1. The fauna from the sites on which the cultural sequence of KwaGandaganda is based

KwaGandaganda was occupied for more than one phase of the EIA. As stated earlier, pottery from three different cultural phases were recovered, indicating either a single long-term occupation with evolutionary change, or a series of occupations between the beginning of the seventh century to the early eleventh century AD. Based on characteristics of the pottery, this period is divided into three phases, namely: Msuluzi (7th-8th centuries), Ndondondwane (8th-10th centuries) and Ntshekane (10th-11th centuries). Whitelaw (1994b:17) states that KwaGandaganda appears to have been occupied continuously between the Msuluzi and Ntshekane phases, rather than having been abandoned and re-occupied.

Since the main aim of this project is to do a case study of the exploitation of animal remains during the EIA in KwaZulu-Natal, the following discussion will be focussed on the animal remains found on the sites associated with the cultural phases on KwaGandaganda (see Figure 1.1). The faunal analysis done for each site will be discussed briefly. For a detailed species list of each site, see Table 2.4. Unfortunately the quantification methods used in each analysis differed, e.g. Msuluzi Confluence: values given are Minimum Number of Individuals; Ndondondwane: values given are Number of Identifiable Skeletal Parts; Ntshekane: although the quantification method used is not mentioned in the article, the values could only be Minimum Number of Individuals if the total sample figures are considered.

- **Msuluzi Confluence**

  Since weathering had reduced most of the bone on the site to splinters and dust, only a small sample of 138 identifiable bones was retrieved from Msuluzi Confluence. An unusually high minimum number of individuals (MNI) were identified, i.e. 21 (Table 2.4). This can probably be attributed to the quantification techniques used and its associated problems (refer to 4.3.1). The influence that this situation has on the interpretation of a sample will be discussed in Chapter 6 (6.2).

Just over half of the individuals identified were bovids. The domestic bovids provided the main source of food to the inhabitants and probably occupied more of their time than did hunting or snaring. Sheep and/or goats appear to have been more numerous than cattle. Five of the ten specimens were young individuals (i.e. younger than 10 months) and sexually immature. Of the remaining five specimens, two other would have been old enough to have calved or dropped lambs at least once before being slaughtered. According to Voigt (1980:141), such a high slaughtering rate among young animals would severely limit the growth of flocks and herds and is not easy to explain (Brown 1984:5; Voigt 1980:140-145).

The non-domestic animals represented in the faunal collection were a hare, tortoise, fish, shellfish (representing snaring, fishing and collecting activities), and also wild bovids (representing hunting). A baboon tooth was also found but is not easily explained. Since Msuluzi Confluence is more than 100 km away from the coast, the cowrie specimen that was found could represent trade contacts with the coast or could indicate that the occupants undertook expeditions to the coast (Voigt 1980:143).

– **Ndondondwane**

Apart from a preliminary species list, no other data on the fauna of Ndondondwane have been made available. According to the preliminary report (Voigt & Von den Driesch 1984:95-104), sheep/goat outnumber cattle. Dogs, chickens and domestic pigs have also been identified in the assemblage (Table 2.4).

Rattus rattus is not indigenous to southern Africa. The faunal sample from Ndondondwane provides an early (eighth century) date, similar to the documented presence of this species at EIA sites in the Limpopo Valley and Botswana (see Plug & Voigt 1985).

Evidence of ivory production, particularly bangles, has also been found on Ndondondwane.

– **Ntshekane**

No numbers regarding the total sample of the fauna analysed from the EIA site Ntshekane were published. It is difficult to estimate how big the sample was, since Brown (1984:9) describes it as "a fair amount of faunal material", but judging from the totals that I believe to be MNI counts, it could not have been more than a few thousand fragments. Domestic bovids dominated the sample with sheep/goats in the majority. Most of the sheep/goats were slaughtered when mature, as were the cattle (to a lesser extent). In this sample, as opposed to the Msuluzi sample, the majority of the sheep/goats were mature enough to breed, i.e. 16 out of 19 (Brown 1984:9; Maggs & Michael 1976:705-740).

2.4. Summary

In this chapter the discovery of KwaGandaganda, the reasons for excavation, the methods used during the archaeological excavations, and the cultural and natural environment of the site were discussed.

Considering the cultural environment of KwaGandaganda, the three cultural phases that were assigned to the site on the basis of pottery similar to that found on the sites of Msuluzi Confluence, Ndondondwane and Ntshekane, were discussed shortly.

The excavation methods were not discussed in detail since all the information is available in Whitelaw (1994a, 1994b). However, aspects of the excavation that might have an influence on the interpretation of the faunal analysis have been considered, and include the major finds and features associated with each cultural phase. Criticism on the methods used will be highlighted in the chapter concerning problems and limitations encountered during the faunal analysis (refer to 4.2.1).

The natural environment of KwaGandaganda was discussed in great detail in this chapter, since humans are part of the natural environment and their actions and structures of the past and present are influenced by the environment. Specific reference was made to the fauna of the area at present and during historical times, with detailed faunal lists specifying the fauna identified on the sites associated with the cultural sequence on KwaGandaganda.

In the next chapter, available ethnographic information on the use of domestic animals and relevant non-domestic animals will be discussed. The primary problems encountered by archaeozoologists in connection with the use of ethnographic data will also be highlighted.

CHAPTER 3

CHAPTER 3

ETHNOGRAPHIC INFORMATION

3.1. Introduction

Without the use of ethnographic information, a study such as this one will be critically incomplete. No remains on any archaeological site can be interpreted without consulting ethnographic material. Therefore, this chapter comprises mainly a brief ethnographic background of the use of domestic animals (cattle, sheep, goats, dogs and chickens in particular) by Bantu speakers and also includes ethnographic information on the use of relevant non-domestic animals. A small part of this chapter will also be devoted to a short discussion on ethnographic information concerning dental alteration patterns among traditional peoples; and to the utilising of worked bone implements in the day-to-day life of the people.

Before ethnographic information can be incorporated into research projects, however, the problems in connection with the use of ethnographic data by archaeozoologists and other researchers should be reviewed.

3.2. Problems in connection with the use of ethnographic data

According to Orme (1981:25), the application of anthropology in archaeological contexts has proved of value in advancing our understanding of the past. But the circumstances appropriate to its use and the kind of results that can be achieved vary, and it is important to recognise this. Faunal remains on an archaeological site do not directly reflect all aspects of the economic and social importance of livestock, therefore detailed anthropological studies are needed to assist the archaeozoologist in interpreting the results of the bone analysis.

Orme (1981:27) highlights at least two problems concerning the use of ethnographic analogy, e.g. the bias of the ethnographer in the field, and the bias of the archaeologist in selecting material from the ethnographic literature. I should like to point out another problem, e.g. the fact that there is no consensus on the diffusion of domestic animals and the relating cultures throughout southern Africa.

3.2.1. Ethnographic information and archaeozoological requirements

Ethnographic research and fieldwork seldom address the issues that are useful for the interpretation of faunal remains. Published ethnographic information only occasionally provides some useful information, always incidental in nature. The objectives of ethnographers and/or anthropologists in their studies are often quite different from the objectives of the archaeozoologist and the information he/she requires.

Anthropologists usually focus on one or two aspects that serve their specific interests. For example, when they look at the use of meat, they would concentrate on its day-to-day uses, whereas archaeo(zoo)logists would want to know where the meat came from, how, where and when the animal was slaughtered, the different uses of the bones and meat, slaughtering and distribution patterns and refuse disposal. In contrast to Gelfand (1971) and Plug (1988), who described herding and hunting methods in great detail, and Quin (1959) who described food use in great detail, details in most of the other references were lacking (see for example Huffman 1982; Inskeep 1978; Krige 1936; Maylam 1986; Mönnig 1967).

In order to study the problems of the spatial distribution of bone, it is useful to have access to detailed ethnographic studies on settlement patterns and information on the methods of bone disposal and carcase dispersal of an animal within a homestead. Economy is concerned with the way in which a society procures, allocates and consumes material resources (Huffman 1990:5), but there is minimal information on butchering procedures and almost none on cooking methods and its effect on bones. No information is available on the rate of accumulation of middens and kraal deposits. Through ethnographic studies one can accumulate data on animal husbandry practices which may enable us to define EIA herd and flock sizes and the carrying capacities of different areas (Voigt 1984a:355). Ethnographic studies should also provide valuable data on the exchange of goods between different communities, the status symbols within these communities (e.g. skins/teeth/claws of carnivores), and social obligations of people in the communities (Plug pers. comm.).

Voigt (1984a:355) also pointed out the urgent need to conduct ethnoarchaeological studies on the settlement patterns of communities living in traditional settings, as these are presumably best comparable with Iron Age settlements. Such studies would yield information on spatial distribution, bone disposal and dispersal practices, butchering procedures and cooking methods and their effect on bones. However, few such communities still exist today and research opportunities are therefore limited.

3.2.2. Bias of the archaeologist in selecting material from ethnographic literature

Through the years archaeologists have made extensive use of anthropological information, yet many have a limited understanding of anthropology. As a result there is little cooperation and the full potential of its contribution to archaeology is largely ignored. There would be no archaeological interpretation as we know it without ethnography, both at the level of the recognition and interpretation of artefacts, and at the level of discerning and explaining the processes of human cultural development (Orme 1981:1).

Orme (1981:27) argues that archaeologists select only those elements of ethnographic information that come closest to their own cultural experience which they project, probably unconsciously, into the past. There is also the danger of the single parallel. When there is archaeological evidence to be explained, and the ethnographic literature provides a single neat example that appears to have all the answers, it is tempting to apply this example to the past without considering possible alternatives or other parallels that might have existed. A single parallel can never give the same thorough understanding of the data, and it would often be better to use no ethnography at all than to be misled by the mere appearance of similarity.

In other words, when using ethnographic analogy, one must remember that the uses, rules, roles and concepts currently exercised in ethnographically studied societies are applicable to past societies that display similar artifacts. However, this assumption may also be wrong - and the objects/items may look the same, but could have been used differently. These problems must always be kept in mind and considered.

3.2.3. The diffusion of domestic animals and associated traditions in southern Africa

Archaeologists in South Africa have not reached consensus on the diffusion of domestic animals and related cultures in southern Africa. For example, although the existence of the CCP is widely acknowledged, the origin and diffusion of the CCP is still obscure (Plug pers. comm.).

According to Huffman (1990, 1993) and Whitelaw (1994a, 1994b) evidence of the CCP is visible at Broederstroom and KwaGandaganda. Maggs (1995:176) agrees that evidence from some EIA sites seems to confirm that elements of the CCP are present. However, there is a variety of evidence which, Maggs believes, is ambiguous or contradictory. He states that the very importance of cattle and the centrality of their pens are not entirely established. Also, according to Maggs, Hall (1987) has argued that a different mode of production may have pertained to the EIA in which the accumulation of livestock played a minor role when compared with the later period.

Maggs (1995:176) concludes that it may well be possible to trace elements of the CCP back into the EIA, but states that there is some evidence from this period that does not readily fit in with the ethnography of the southern Bantu speakers on which this pattern is based.

Another important factor that could influence the use and usefulness of ethnographic sources to reconstruct the past, is the cultural break between the EIA and the LIA in KwaZulu-Natal. According to Whitelaw, a stylistic disjunction in the ceramic sequence early in the second millennium AD in KwaZulu-Natal points to the arrival of a new group of agriculturalists (the so-called Blackburn tradition), possibly the first settlement of Nguni-speaking agriculturalists in the region. According to Whitelaw, the Msuluzi-Ndondondwane-Ntshekane continuum most probably represents the cultural heritage of Shona speakers (Whitelaw 1998:6). Although the

Shona and Nguni share many cultural features and practices of patrilineal Bantu-speaking agriculturalists, the proposed historical discontinuity in KwaZulu-Natal nevertheless implies that historical and ethnographic sources on animal exploitation in KwaZulu-Natal should be viewed and utilised with circumspection.

3.3. Brief ethnographic background

While the following ethnographic background was put together, the problems associated with the use of ethnographic sources were kept in mind. The study mainly concentrates on the ethnographic sources on the southeast Bantu-speaking peoples of southern Africa, with specific interest in the domestic and non-domestic animals utilised by the people. In the light of the setting of KwaGandaganda in KwaZulu-Natal, the ethnography of the Nguni (particularly the Zulu) is highlighted. Furthermore, since other researchers made the assumption that the EIA people from KwaGandaganda were probably Shona speakers (see 3.2.3), it is also necessary to look into the ethnography of the Shona, as well as their neighbours, the Venda.

3.3.1. Domestic animals

As indicated by archaeological, historical and ethnographic evidence, herding played a key role in EIA communities. Faunal analysis done on KwaZulu-Natal sites such as Ndondondwane, Nanda, Msuluzi Confluence and Ntshekane, and also on other EIA sites in southern Africa such as Broederstroom, Bosutswe and Mapungubwe, has undoubtedly proven that domestic animals had an increasing significance during this period (Huffman 1990, 1993; Plug 1993a; Voigt 1983).

Referring to the discussion of domestic animals during the EIA in Chapter 1 (1.2.6), it is apparent that the abundance of domestic stock has fluctuated in the EIA in southern Africa, from virtually absent to abundant. The samples from the EIA in the Kruger National Park analysed by Plug (1987a, 1988) showed that herding was of little importance in this time and region, and was surpassed by hunting and gathering to obtain animal protein. On Bosutswe, an Iron Age site in eastern Botswana, the faunal remains showed a marked increase in domestic animal remains from the earlier to the later occupations, and on other EIA sites such as Broederstroom and Ndondondwane evidence for domestic stock was abundant, proving that hunting was probably of little importance on these sites (Huffman 1993; Plug 1994; Voigt & Von den Driesch 1984).

The abovementioned differences regarding the fluctuation in the size of domestic stock samples can be attributed to social factors as well as environmental factors such as the distribution of tsetse flies.

3.3.1.1. *Bos taurus*

Since take-off from herds is generally confined to non-reproductive animals (males and very old or sterile females), it has often been argued that traditional African pastoralism seeks to maximise herd growth in terms of animals rather than productivity per acre or weight per beast (Denbow 1983:29-47; Huffman 1990:1; Maggs & Whitelaw 1991:20; Plug & Voigt 1985:202). Large herds of cattle, regardless of the animals' condition, generally served as a means to estimate a man's wealth and social status, and to allow him to fulfil his ritual and social obligations.

Cattle did not function solely as a source of food in southern African societies. They were seldom slaughtered to provide daily meat but mostly to celebrate special occasions and for religious purposes. Gelfand (1971:126-127) states that among the Shona in particular, there were several well-defined occasions on which cattle were slaughtered, for example:

- the ritual sacrifice of a beast (usually a bull) that was given to a woman when her daughter got married
- at the end of a burial service when the mourners return to the village
- at a wedding ceremony
- on very important occasions such as the installation of a new chief
- when a very important, much respected visitor came to a village.

Cattle were also seen as a source of milk and hides (for shields, blankets and robes) and as a hedge against drought and other risks. In addition, cattle in many ways acted as intermediary symbols linking families to the spiritual world and to future generations. Cattle constituted the bridewealth exchanged for a wife, her labour and the right to all her children born. In recent times, cattle were so important in the day-to-day lives of southeast Bantu speakers that many have developed an extended vocabulary associated with cattle and also composed poems praising the attributes of their cattle. Voigt (1983:65) reported that the Venda, for example, use their cattle for riding. She also speculates that the cattle from Mapungubwe could have been used for pulling sledges. Because of their multiple values the demand grew for more and more cattle (Denbow 1983; Gelfand 1971; Grivetti 1976; Kuper 1982; Van Warmelo 1935).

Among the Shona the slaughtering of cattle took place just outside the village, where the animal was tied to the trunk of a tree with its head in close contact with it. Gelfand (1971:121-122) describes the slaughtering procedure as follows:

> "A man lifts up an axe and with a swift, heavy blow cracks the back of the head just behind the horns. The animal sinks to the ground senseless from the blow. Quickly the neck is cut across the front with firm sweeps of a knife. The blood that flows is caught in a receptacle.......and skinning begins. Next the meat of the front abdomen is removed, then the inner organs including the liver, intestines, heart and lungs. "

Regarding the slaughtering patterns of cattle, it is well known that the Zulu saw the skulls of cattle as status food, which means that only the people of high status (initiated men) consumed it. With the Tswana, it was customary for adult men to eat the heads of the cattle, while during the traditional slaughtering of cattle on the day of a Pedi wedding ceremony, the cattle head was awarded to the visitors as proof that they had attended the marriage ceremony. In a certain sense, the guests must have been seen as important, if only for the day (Grivetti 1976; Quin 1959).

The abovementioned information regarding cattle in traditional societies conforms with the Central Cattle Pattern (CCP) model as described by Kuper (1980, 1982) and Huffman (1982), and as discussed in Chapter 1 (1.2.3). Since the existence of the CCP in the Late Iron Age is most certainly true, it would probably be possible to extrapolate the information from EIA sites to establish the existence of the CCP in the EIA as well.

3.3.1.2. *Ovis aries* and *Capra hircus* (*Ovis/Capra*)

According to Bryant (1967:339), the crew of the ship *Noord* reported goats as being in "swarms" in KwaZulu-Natal as long ago as 1689. Although both *Ovis aries* and *Capra hircus* remains occur in EIA deposits, sheep remains are generally more numerous than those of goats (Plug & Voigt 1985). This indicates that the numbers of goats apparently increased in the LIA. Since the environmental conditions probably deteriorated during the LIA in KwaZulu-Natal (refer to 1.3), it can possibly be attributed to the fact that goats are more resistant to poor environmental conditions since they are grazers as well as browsers and eat a greater variety of plants and parts of plants than do sheep.

Traditionally, among the Sotho-Tswana (e.g. the Tswana and Pedi), and the Nguni (e.g. the Zulu), goats or sheep alone were not regarded as wealth, only when owned in addition to cattle. Cattle could under no circumstances be kraaled together with sheep or goats. The byre for sheep and goats was built separately, away from the gathering place of the men. As was the case with the cattle, sheep and goats were only the property of men, and women were not even permitted to enter their byre.

Gelfand (1971:131-133) describes the slaughtering of sheep and goats among the Shona in great detail. The killing of these animals mainly involved the severing of the live animal's neck with a knife, after which the blood is collected in a pot and cooked. After skinning the dead animal, the body was disjointed through the shoulder and hip bones. The ribs were then removed with an axe. After that, the ".....forelimb, shoulder and thighbone are dissected from the rump with a knife, leaving one hind leg attached to the part left behind the thighbone, which includes the spine and half the rib length. The other hind leg also remains attached to the coccyx and part of the lumbar spine. The lowest two ribs on each side of the spine are removed later and given to the herdsmen......"

According to Plug (pers. comm.), sheep and goats in modern African societies are also used for ritual slaughter, sacrifice and to fulfil social obligations. According to Küsel (pers. comm.), sheep in modern societies are still used ritually and often very specific traits are desired by the individual requesting the animal. The colour, size or sex of the animal is dictated by the person who requests it as an interpretation of the requirements of the ancestral spirits or of the occasion. In traditional societies, the goat specifically provided the people with a small conveniently-sized animal for smaller ceremonial occasions, and was mainly used as a sacrifice to minor ancestral spirits or for the entertainment of visitors (Bryant 1967; Gelfand 1971; Mönnig 1967; Quin 1959).

Traditionally, the Pedi slaughtered sheep only on ceremonial occasions but goats were killed for food. They had a saying: "Pudi ke morôgô wa mang le mang", meaning "the goat is anyone's relish" (Quin 1959:101). The slaughtering does not involve any particular method. Quin (1959:102) states that, although the goat was regarded as the Pedi's main supply of meat, it does not imply that slaughtering of goats occurred regularly since they always wanted to keep a large herd and did not want to reduce the numbers of their livestock. In general among the Bantu-speaking people, except the Zulu, the milk of the goats was drunk and used in the preparation of other foods (see Bryant 1967:338-339).

Although younger sheep/goats were not usually slaughtered, they were sometimes utilised for certain purposes such as the use of lamb skins by the Zulu in the making of men's clothing, noted by Bryant (1967:341). He states that the young lambs had a beautiful, glossy skin. They had to be slaughtered at a young age for this specific purpose since the glossiness disappeared as the animal grew older.

Evidence regarding the breeds and physical characteristics of sheep/goats among African societies from the EIA is limited. However, historical evidence proved that Zulu sheep belonged to the fat-tailed breed, which appeared to do well in dry and arid conditions. Bryant (1967:340-341) also states that the African fat-tailed sheep had a form of coarse hair - not wool. In general, all southern African indigenous sheep have hair rather than wool and it is therefore unlikely that EIA sheep were woolly.

3.3.1.3. *Canis familiaris*

Grivetti (1976:224) noted that, with the exception of the domestic dog, all animals raised by the Tswana (referring specifically to the Tlokwa) were used as food. The dogs were classified as cultural contributors in Table 5.37 since they live in close association with humans. Where dogs live among, but not with humans, they form their own packs and social systems, independent of human interference.

Dogs were the invaluable allies of the hunters. According to Shaw (1974:98), they were used to track the game and to follow it until exhausted. Little is known about the physical appearance of these animals and they probably looked very much like the dogs found in rural areas today. Bryant (1967:327) stated that the Zulu possessed a breed of dog suggestive of a small hyaena, smallish in size but stout of build with a shorter, squarish muzzle, short light-brown hair, fierce in temperament and carrying a slight mane along the neck and spine.

Traditionally, dogs usually belonged to the men. It is not known whether the people preferred to have male or female animals and they were not really seen as part of the family. The animals did not stay in the huts with the people but roamed around freely. Dogs were not fed regularly and had to scavenge around the residents' living areas to obtain food (Mönnig 1967:164).

3.3.1.4. *Gallus domesticus*

In general, chickens in the Bantu-speaking communities are rarely fed and are allowed to roam around freely. They are mainly kept for food, but their eggs are never gathered as this would cause minimal breeding (Mönnig 1967:164). It was noticed by Gelfand (1971:117, 150) that among the Shona, eggs were not eaten as it was feared that if a woman ate them she might become sterile. However, chickens were occasionally killed for food by the Shona. Bryant (1967:346) states that the Zulu did not eat their chickens, certainly not until long after their contact with Europeans.

According to Küsel (pers. comm.), chickens in the modern Zulu societies have higher status and value than dogs. The latter have virtually no status at all, and puppies can be bought for R5-00 as opposed to R25-00 or more for a chicken, while eggs are not sold at all. The only exceptions are the very few dogs that are regarded as excellent hunters. These animals may raise a fair price.

Faunal samples from EIA sites identified before 1990 indicate that chickens were not common and often not present in the faunal assemblages. However, this may be due to the fact that, in earlier years, it was often not possible to distinguish between chicken and guinea fowl bones. Techniques have improved since then and it is now possible to distinguish between the two species. Plug (1996:517) noted that chickens were introduced fairly early in the EIA and were identified in the earliest period of occupation on Bosutswe in eastern Botswana.

3.3.2. Non-domestic animals

According to Shaw (1974:97), hunting is essentially an occupation of men. Oral traditions indicate that hunting played an important role in the past, both as a recreational and ritual activity of the men (Shaw 1974:98), and as an important source of food (Plug & Voigt 1985:202). Gelfand (1971:143) states that hunting was an everyday affair in the life of the Shona and game was an important source of protein. All hunting took place during the day, since at night the hunters were exposed to attack by predators such as lions. A wide variety of hunting equipment was traditionally used, e.g. spears, shields and throwing sticks. Packs of dogs were used to flush birds and to run down smaller mammals, and game traps and snares were also utilised to obtain meat. The Zulu and Shona in particular used game pits to catch the larger animals, while the Shona and the Venda also made use of hunting-nets (Gelfand 1971:135; Hall 1977:1-12; Stayt 1931:79). Shaw (1974:97) described two types of pit-falls:

> "Deep, straight pits were dug at gaps in fences of stakes that were placed across a narrow valley, or, in open country, arranged in a V-shape with the pit at the apex. The hunters gathered in a group and chased the game towards the fence, and the animals,

> making for the gaps, fell into the pits. They were then dispatched with an axe or a spear. The second type of pit was intended to catch animals singly. The bottom was set with sharply-pointed wooden stakes, pointing upwards, and the whole covered lightly with branches or grass."

It is not always easy to distinguish between hunted and snared animals, but Plug (1988:328) noted that hares, large rodents and birds were usually snared while the larger antelopes and carnivores were hunted. According to Shaw (1974:97), a snare consisted of "....a rope with a noose (which) was attached to a sapling which sprang back and tightened the noose round the leg of the animal that had released the trigger". There is no ethnographic evidence of procedures followed when skinning and slaughtering wild animals.

The ethnographic evidence discussed below concerns only those species identified in the KwaGandaganda sample.

3.3.2.1. Primates

Quin (1959:124) notes that the vervet monkey was eaten by the Pedi men and boys only. The skin of this animal was used as ornamental dress. The humerus and femur had medicinal value to the Pedi, and were cut into rings and given to coughing children to wear as necklaces. The Zulu were prohibited to eat the meat of monkeys, regarding it as a taboo animal, but the pelts of *Cercopithecus* provided them with of one of their most highly prized girdles (Bryant 1967; Krige 1936).

Gelfand et al. (1985:308) state that among the Shona the urine of a baboon was used as an aphrodisiac, while the fontanelle of a baboon was used as a talisman and tied around an infant's neck to prevent depressing of the fontanelle.

In certain Sotho tribes baboons were eaten, albeit by the men and boys only. It usually involved certain rituals such as turning the face of the skull away from the person eating it. The skull of the slaughtered animal was impaled at the homestead's entrance gate while the skin was worn as ornamental dress. Baboons were important to the diviners since they often included the astragalus in their divining sets, used grounded baboon bones for medicine, the skin to make a cap and long neck-hairs to make a necklace. Among the Nguni, it was noted that baboons were seen by the Zulu diviners as their cattle, e.g. belonging to them. They apparently used the baboons as messengers, since only they were able to see these messengers (Bryant 1967; Quin 1959).

3.3.2.2. Carnivores

Sotho and Nguni people usually did not eat carnivores, but when they did it was the food of the men and boys only. Animals such as black-backed jackals were not eaten, but the skins were made into caps or ornamental dress. The honey badger was also not eaten, but it had significance for the diviners who used certain skeletal parts in their divining sets. The mongooses were eaten but the diviners also used their skin as containers for divining sets. Another use for mongoose skins was as decoration of animal skin blankets (Krige 1936; Quin 1959).

In certain Pedi tribes, the spotted hyaena was the totem animal and was therefore not killed. In other tribes, the skin was offered to the chief for ceremonial dress while the diviners used certain parts of the carcase. The brown hyaena, however, was eaten and the skin used as a floor mat (Quin 1959:125). Plug (pers. comm.) commented that in present-day societies, hyaenas are closely associated with black witchcraft and to be called a hyaena is apparently one of the worst insults. Although it is noted in ethnographic sources that hyaenas occurred in KwaZulu-Natal during historic times, no possible use of this animal was recorded from the Nguni tribes (see Bryant 1967:365).

Leopards were usually not eaten by the Pedi, but the whole animal was delivered to the chief who used the skin as a regal robe. The hunter of the leopard was rewarded with an animal, usually cattle. The skull of the leopard was impaled at the entrance to the chief's enclosure to impress his visitors with the bravery of his people. Lion meat was also not eaten but the animal was skinned in the veld by the hunter who discarded the meat and delivered the skin to the chief's kraal. The fat and diaphragm had special significance to the diviners since it was used to make medicine. Lions' claws and astragali were also included in the divining sets (Quin 1959).

Gelfand (1971:137-138) notes that among the Shona, a leopard's skin was reserved for the chief's councillor, but that the flesh was eaten by the hunters. The head and skin of a lion were the property of the Shona chief. The Shona did not eat the flesh of the lion, except for the heart and the liver which were believed to give strength to the individual who consumed it. The Shona considered the lion as the most feared of animals. Shona diviners used its heart and some parts of the lion's body in charms to give strength and bravery. The skin was used by some diviners to sit on while treating patients (Gelfand et al. 1985:307).

Although these animals were rarely hunted among the Venda, the capture of either a lion or a leopard was always an occasion of great rejoicing. The skins of both these animals were considered to be the property of the chief (Stayt 1931:77).

Among the Zulu, the heart, eyes, fat and flesh of lions were mixed with tree bark to be used to cure fear and nervousness. It was also important for the Zulu king to eat some of the lion's flesh mixed with other medicines, presumably to give him strength and courage (Krige 1936).

3.3.2.3. Large mammals

The large mammals such as *Loxodonta africana*, *Ceratotherium simum*, *Hippopotamus amphibius* and *Giraffa camelopardalis* were probably caught in pitfall traps. Other known methods of obtaining these animals are scavenging and the very risky method of hunting hippopotami from boats, using weapons such as harpoons (see Hall 1977). Shaw (1974:98) described the following impressive elephant hunting technique:

> "Elephant would be stalked by a group of hunters and efforts made to separate one from the herd. Then the main party would attack the animal with spears or arrows while one of their number would approach from behind and hamstring it."

Among the Sotho tribes, elephant meat was eaten by the whole family. The Zulu, however, also used the heart, eyes, fat and flesh of elephants to mix with tree bark and used this as a cure for fear and nervousness. Elephant flesh was not consumed by young Zulu people (Krige 1936; Quin 1959).

It is said that, among the Venda, an elephant hunter was respected and admired by all men since only the very courageous men dared to attempt the capture of this large animal. The tusks of the elephant were always considered to be the exclusive property of the Venda chief who traded it for other items. However, it was taboo for the chief to see the elephant's trunk, but the reason for this is unknown (Stayt 1931:77).

Gelfand et al. (1985:307) note that among the Shona the skin and the dung of the elephant was used by the diviner for a variety of ailments, for example the prevention of the developing of depressed fontanelle in babies. Other parts of its body are also used in charms to make an infant strong and grow big. The elephants tusks, however, were the property of the chief, as well as its feet, since they trod his ground.

The meat of the hippopotamus was eaten by the Sotho and Nguni peoples and they also sang praise songs for this animal. Certain people such as the Zulu warriors were prohibited from eating hippopotamus flesh but the reason for this is unknown. It is said that the hoofs and teeth of the hippopotamus were the sole property of the Shona chief, should a hunter kill it (Gelfand 1971; Krige 1936; Quin 1959).

Giraffes, white rhinos and black rhinos were eaten among the Sotho. However, it is said that traditionally, Zulu peoples were forbidden to touch the flesh of rhinos. Again, the reason for this is unknown (Krige 1936:388).

3.3.2.4. Ungulates

According to Stayt (1931:77) buck were usually tracked down by dogs, after which the exhausted animals were cornered and killed by the men with a spear or an axe. The buck then belonged to the man who first wounded it, or to the owner of the dog who first put it up and gave chase. The meat was generally divided among the hunters.

Among the Bantu-speaking tribes of southern Africa, the common duiker could usually be eaten by all members of a family. The skin was usually used as a crupper for the men, or several skins were sewn together to form a blanket. (It is not clear from the source used what exactly a crupper is, but it is accepted to be a kind of G-string rather than a loin-cloth.) The astragalus was included in the diviner's divining set while the horns were used as medicine phials. Some tribes regarded the common duiker as a totem animal and did not kill it. The uses for a steenbok are the same as that of the common duiker, except that the astragalus was not utilised as part of a divining set. Impala were usually eaten and the skins were sewn together in a blanket. Kudu skins were converted into a blanket and the horns were used as trumpets at marriage ceremonies. The bushbuck's skin was used as ornamental dress, while the horns were used as head decorations or as medicine phials (Quin 1959:126).

Warthogs were eaten by the Pedi and the Shona without skinning the animal; only bristles were scorched off. The warthog's astragalus was included in divining sets (Gelfand 1971:136; Quin 1959:126). With reference to bushpigs, Campbell (1822:268) notes among the Tswana that people attending a "pitso" (tribal gathering attended by the men only) were wearing a kind of white turban "....made from the skin of the wild hog, the bristles of which are as white as the whitest horse-hair".

Among the Venda Stayt (1931:78) notes that bushpigs were considered to be the most cunning of all field raiders and could only be caught by being driven into a noose trap. The bushpig was listed as a source of food for the Tswana and the Shona while, for some unknown reason, Zulu warriors were prohibited from eating it. Zulu diviners believed that pigs were too fat and that the fat could make them "slippery", causing them to make mistakes. Zulu girls were also not allowed to eat pigs since it was feared that they may give birth to children that are as ugly as these animals (Gelfand 1971:136; Grivetti 1976:99; Krige 1936:388).

Quin (1959) and Gelfand (1971) states that the Pedi and Shona people were allowed to eat the zebra's meat but, according to Krige (1936), the flesh from zebra was never touched among the Zulu.

3.3.2.5. Small mammals

The pangolin (scaly anteater) had special significance in the Pedi culture since the finder of the animal was not allowed to kill it. He had to carry it to the chief's village and hand it over while it was still alive. In turn, he was rewarded with another animal, usually cattle. The chief then released the pangolin in his cattle byre to run around freely and "propagate" calves. After a while, it was killed and skinned, upon which the chief's heir had to cross over the skin three times without his elbows and knees slipping off the skin. He was then considered a worthy successor to his father. The pangolin's meat and skin was then used by the chief for private purposes (Quin 1959:125-126).

Stayt (1931:80) notes that among the Venda, the pangolin was also the property of the chief and was therefore not killed. Among the Shona the pangolin was also of special interest to the chief, and anyone who caught one, were to take it to the chief immediately (Gelfand 1971:136).

Hammond-Tooke (1989:119) mentions that in recent times it was poached and killed for medicinal purposes to such an extent that it has become an endangered species. It can therefore be assumed that the pangolin was also utilised by diviners in traditional medicine.

Hyraxes were usually eaten and the skins sewn together to be used as blankets. The Pedi also used the urine and faeces of hyraxes for medicinal purposes (Quin 1959).

Rodents and hares were mostly eaten and certain restrictions had to be met with by the Pedi. For example, cane rats were only eaten by the men and the boys while the hares were eaten by all family members. Other rats and mice were only eaten by the boys and young men herding the stock. The tails of hares were used as head-dress decoration while the boys used the skins of springhares to wear as cruppers. Among the Tswana, the springhare is rejected as food since some believe that, like women, it has menstrual periods. The custom of eating small rodents was also observed among the Tsonga and Sotho. While rodents are not totally rejected as food for children by the Tswana, some people refuse to eat them, stating that they look like rats (Grivetti 1976; Junod 1913; Quin 1959).

Among the Shona a porcupine's quill is used by diviners to cure nose-bleeding. Apparently the quill was burnt and the smoke directed into the patient's nose (Gelfand et al. 1985:310).

3.3.2.6. Birds

Traditionally, the Bantu-speaking tribes of southern Africa ate most kinds of birds except those specially protected by taboos. According to Shaw (1974:97-98) birds were killed with throwing sticks and with bows and arrows. A special type of blunt wooden arrow was used for shooting birds so as to disable them without any damage to the flesh. Smaller birds were of greater significance in the diet since they were more easily caught. Herdsmen and boys usually caught and ate the smaller birds (Grivetti 1976; Quin 1959).

Vultures were usually killed by the diviners but not eaten. Their feathers were used in head-dress. As with the pangolin, Hammond-Tooke (1989:119) referred to the vultures as being poached to be used for traditional medicine. Gelfand et al. (1985:311) state that the Shona diviners mixed the heart of a vulture (because of its visual powers) with other ingredients and then used the mixture to treat divining bones to make them "see". Portions of a vulture's head, legs and heart was also placed in or near the diviner's *gona* (a horn or calabash filled with special medicine) to help the diviner foretell the future.

With reference to ostriches, the meat and eggs were usually eaten and the feathers used as part of a head-dress. Ground eggshells had medicinal value and were used for earache (Quin 1959:122).

3.3.2.7. Reptiles

Reptiles in general played a big role in traditional folklore but few were utilised for food.

Exceptions include the tortoise and rock monitors. Land tortoises were eaten and the tortoise-shells were used as food receptacles. Among certain tribes, however, the water turtle was not eaten since it apparently emits a vile odour which is claimed to terrify cattle (Grivetti 1976; Quin 1959).

Snakes were generally rejected as food by the Bantu-speaking peoples since it was believed that an ancestor spirit frequently reveals itself in the form of a snake or other small animals. Sometimes snakes were used by the diviners who used the skins, meat, fat and poison glands in their potions. An example is the Shona where the head and tail of the black mamba were used as a cure for a physical disorder characterised by pain and swelling of the joints (Eiselen & Shapera 1962; Gelfand et al. 1985; Grivetti 1976; Quin 1959).

From ethnographic sources it was noted that several of the Bantu-speaking peoples, e.g. the Pedi and Zulu, did not eat crocodiles and water monitors. However, the brains and fat of both these animals were greatly sought after by the diviners for medicinal purposes (Krige 1936; Quin 1959). Among the Venda, the brain of the crocodile is thought to contain a deadly poison that could cause immediate death. Venda chiefs are said to have swallowed stones from the crocodile's stomach to prolong life (Stayt 1931:81).

Stayt (1931:81) notes that the Shona did not kill any animals that were associated with witchcraft. They were apparently "....especially afraid of the crocodile, whose dung is sent by sorcerers to injure people. It is the sign of witchcraft and its emblem appears on one of the divining bones". However if a crocodile was found already dead, it was skinned in the presence of the chief. The stones in its stomach were removed since they were believed to prolong the life of the person who swallowed them (Gelfand 1971:138).

3.3.2.8. Fish

In several ethnographic sources consulted, a general aversion was noted among the Bantu-speaking peoples towards the eating of fish. It is said that fish were generally rejected as a food source because of the belief that, should fish be removed from the water, the river would dry up. Fish were also classified as water snakes and therefore not killed because of the connotation between snakes and ancestor spirits (Grivetti 1976; Krige 1936; Quin 1959).

Fishing was not popular with many of the Nguni and Sotho people but in the traditional Tsonga and Mpondo societies, fishing was a very important activity. In general fishing was not regarded as a sport like hunting, but merely as a means of adding to the food supply (Shaw 1974:98). Among the Shona, Gelfand et al. (1985:308) note that the diviners used the head of the barbel in a potion as a cure for depressed fontanelle. Gelfand (1971:158) also notes that the Shona were very fond of eating fish, but it did not comprise an important source of protein for them. However, it is uncertain whether this fondness for the eating of fish existed before contact with Europeans.

Stayt (1931:80) notes that among the Venda fishing was a favourite pastime of the young boys, but was disliked by the grown men and taboo for women. It is again not clear whether this was before or after contact with the first Europeans.

Whitelaw (pers. comm.) speculated that KwaZulu-Natal EIA people caught marine fish by means of lines or traps, particularly in Natal Bay or other estuaries and lagoons. Several species seem likely to have been caught by line fishing, e.g. musselcracker and galjoen. Shaw (1974:98) described the fishing techniques used by the Mpondo and Tsonga peoples:

> "Mpondo men used to spear fish in shallow pools while the woman occasionally caught them by hand in the rock pools. Tsonga women use a conical basket trap, with a hole in the top. The trap is pushed down in shallow river water or pools, and any fish trapped removed by hand through the top. Tsonga men at the coast build a weir across the mouth of a river or an arm of the sea, with gaps in which a valved basket trap is placed with the mouth against the receding tide."

3.3.2.9. Molluscs

Plug (1988:327) states that shellfish such as the freshwater mussels are a good source of protein, and that the shells were also utilised among traditional African societies, sometimes as clay rubbers and to work skins, and sometimes to manufacture beads. Marine shells such as *Cypraea* sp. (usually with their dorsal surfaces removed) were commonly attached to clothing, or to objects such as baskets. *Nassarius kraussianus*, a very small gastropod, were used as beads, while other marine shells such as *Polynices mamilla* were also used as ornaments (Voigt 1983:120-121). Among the Shona, Gelfand et al. (1985:311) note that diviners used powdered marine shells to cure a variety of ailments.

Although *Achatina* species are regarded as a delicacy among the Bantu speakers, the shells are also utilised in bead-making, as rubbers for claypots and also as scoops. Among the Shona, the snails were employed by diviners to cure tropical ulcers by heating the powdered shell and applying it to the ulcers (Gelfand et al. 1985:311).

It should be noted, however, that *Achatina* shells identified in archaeological deposits are not always necessarily directly associated with the people that occupied the site. They could have been late intrusions, since these animals aestivate during the dry seasons and could easily have buried themselves in the soft archaeological deposit, causing some disturbance (Plug 1988:328).

3.3.3. Dental alteration

The practice of dental alteration was a widespread custom north of the Zambezi in precolonial times. According to sources referred to in Whitelaw (1994a:93), it was still practised in central and southern Africa early in the 20th century.

Dental alteration consisted of several distinctive patterns. In some cases all four lower incisors and the central upper incisors were removed, as is the case with the human remains excavated from Nanda. The crown of the canines were also reduced to blunt points. Another form of dental alteration consisted of a V-shaped gap that was chipped between the upper central incisors. This form of mutilation was noted on human remains found on Mapungubwe-related sites such as Skutwater and K2. Yet another form of dental alteration involved the filing of the incisors or canines to produce a variety of patterns (Morris 1989:132-133).

Although dental alteration has a long tradition in Africa, specimens excavated on Nanda (an EIA site on the northern bank of the Mngeni River) were the first to record dental extraction and mutilation from the EIA in KwaZulu-Natal (Morris 1993:96). Other EIA sites in southern Africa where dental alteration patterns have been recorded include Lanlory (Zimbabwe), Broederstroom (west of Pretoria) and Klein Afrika in the Northern Province (Huffman 1990:9).

It is generally agreed that dental alteration could have been associated with the rites of passage concerning initiation rituals, or as part of an identity-creating process (Mitchell & Plug 1997:158).

3.3.4. Worked bone

The working of bone was a craft that was mainly practised by the men, but there is little record of the techniques used. Before the introduction of glass beads, animal products such as claws and teeth were strung to make necklaces. Bone beads were also manufactured. Divining sets such as the ones used by the Venda were very often carved out of bone. Shaw (1974:121) states the following about the working of bone:

> "Horns were......used for whistles and musical horns, and for snuff-boxes, and the solid horn was carved into spoons, snuff-spoons, small snuff-boxes and the mouthpieces of pipes. Bone was similarly carved to make snuff-spoons, small snuff-boxes and awls. Ivory was used for more ornamental purposes......"

Kirby (1935:622-623) writes about a bone whistle made from the tibia shaft of some animal. The bone had both ends cut off transversely. He noted whistles made from goat, sheep and antelope tibiae only. Among the Pedi, such a whistle is used by the persons looking after the cattle herds, for signalling to each other and to the herds. Shaw (1974:108) also notes the use of whistles made of animal bone or horns. She states that although diviners made use of whistles, they were generally used by the boys. Whistles made of horns were used by the men for signalling in hunting or in war.

3.4. Summary

In this chapter the problems in connection with the use of ethnographic data were discussed, and a brief ethnographic background on the use of domestic and non-domestic animals was provided. The background concentrated mainly on the use of animals by the southeast Bantu-speaking peoples of southern Africa, with specific interest in the ethnography of the Nguni (particularly the Zulu) and the Shona, as well as their neighbours, the Venda. The chapter also included short discussions on dental alteration and bone working.

In the following chapter the methods of analysis of the faunal collection of KwaGandaganda will be discussed in detail, as well as the problems and limitations experienced during the analysis of the fauna.

CHAPTER 4

CHAPTER 4

METHODS OF ANALYSIS

4.1. Introduction

Excavated animal bones are valuable in providing insight into the past activities of humans. To interpret faunal material, archaeozoologists need to consider many factors and methods as there are various problems and limitations inherent in the material and methodology. This can be problematic if an objective and substantial faunal report is to be presented.

The usefulness and validity of the results of bone analysis in a study such as this, depend largely on the methodology used during site surveying and excavation, and particularly on retrieval and laboratory techniques. Therefore, it is of vital importance that as much information as possible be retrieved from the excavated material.

According to Brain (1974:1) the aims of the analysis and interpretation of the faunal material from an archaeological site are the following:

> "…..to establish what agents were responsible for collecting the bones; to reconstruct aspects of the behaviour of the animals or men which contributed to the assemblage and to provide reconstruction of the environment which existed when the accumulation was being formed."

Before an archaeologist or archaeozoologist can proceed with the analysis of cultural or faunal material from an archaeological site, it should be remembered that archaeological culture is not necessarily similar to ethnological culture, e.g. pottery and iron could have been traded from another group with a different culture, and might therefore not have been manufactured locally (Plug 1988:8). It should also be kept in mind that the excavated material represents only a sample of the original site and the archaeologist is seldom able to tell whether his/her assumptions are correct. The development of more sophisticated techniques should allow for better and more comprehensive interpretations of excavated material and the traditions they represent.

4.2. Problems and limitations experienced during the research project

Archaeozoologists generally agree that the efficiency of any method used in faunal analysis is dependent on the sample size, but the question of the minimum sample size required for faunal analysis and quantification cannot be answered satisfactorily. Nevertheless, it is readily accepted that confidence in the validity and reliability of the results and interpretations of bone samples are directly related to sample size, i.e. the larger the sample, the greater the validity of the results.

The potential size of a faunal sample depends on deposition, attrition and excavation. The first two are beyond the control of the archaeologist but excavation and retrieval procedures can be controlled. The onus rests on the fieldwork team to ensure maximum retrieval of the available material.

Bone preservation on southern African EIA sites is usually very poor and a sample of 2000 identifiable bones is regarded as large (Plug 1988:72). KwaGandaganda and Ndondondwane are two of the few EIA sites for the eastern region with sufficiently large faunal samples to allow for authoritative research. The EIA faunas from most of the KwaZulu-Natal sites are often badly eroded and subsequently of limited use. The KwaGandaganda fauna is therefore of particular importance to provide information on the EIA of the region. However, there are numerous other problems and limitations to take into consideration when doing faunal analysis.

A major difficulty confronting archaeozoologists is how to distinguish between factors that have contributed to the patterning observed in the archaeological record, e.g. behavioural, environmental, preservational and others (Thackeray 1984:349). I have found that the following factors were the main contributors to the problems and limitations that were faced during the faunal analysis of KwaGandaganda, i.e. selection of the site and retrieval methods; bone preservation and multi-agent involvement in bone accumulations; quantification problems and the destruction of KwaGandaganda. These research problems can be divided into two groups, e.g. archaeological and ethnographic research problems.

4.2.1. Excavation of the site and retrieval methods

The results produced by archaeozoologists working on faunal material from sites, and the accuracy of the conclusions, depend to a large extent on the available samples. Archaeozoologists have to depend on the excavator not only for the correct dating of the samples, but also for the manner in which they were recovered. Not always so obvious, is the importance of careful recovery methods. Without careful selection of the areas to be excavated, meticulous excavation, sieving, sorting and documentation techniques, the sample may be too "biased" for estimating the characteristics of the assemblage (Payne 1975:7; Plug 1988:72).

An archaeologist usually excavates only a certain proportion of a site. Depending on the information that the archaeologist expects to obtain from a site, excavations can range in size from a few test pits or trenches to large horizontal sections where whole living areas are uncovered. Even in the latter case, however, usually only a part of the site is excavated. Excavated faunal collections are therefore only samples of the total amount of bone in the deposit. As the accumulated bone is a sample from some original skeletal population, and this, in turn, only a selection of the animals that were available at the time, the remains excavated are samples from samples (Plug 1988:72).

Another factor that influences the outcome of archaeozoological research, is whether the choice of excavation areas on the site was random or calculated. Excavators intending to study the animal bone material from their sites in terms of economy, must consider these factors when selecting the area to be excavated. All archaeological material is by nature of the discipline selected, and further selection of the material during excavation, will compromise the results. Since quantitative analysis forms the basis of archaeozoological studies, it is required that all material (faunal or otherwise) be excavated and made available for analysis. Faunal remains should receive as much attention from the excavator as other finds (Plug pers. comm.; Uerpmann 1973:308).

To establish the extent of certain features on KwaGandaganda, metre-wide trenches divided into units of between two and four metres long, and 1 m^2 test-squares were excavated. In an attempt to discover other features hidden beneath the surface, squares 1-26, each originally 3x3 m, were positioned around and between features. Towards the end of the fieldwork, a large part of the site was excavated with Clark Michigan 280B and Caterpillar 824B wheeldozers. According to Whitelaw (1994a:7-8), damage to artefacts and features was minimal and was caused mostly by the wheels when they lost traction and spun. During identification of the faunal material, it became evident that this was not the case since a large part of the bone collection was rendered unidentifiable because of fresh breaks. A large portion of the material with fresh breaks could not be fitted together (which indicates that the retrieval of the broken bones was poor), and this implies that the damage was either caused by the wheeldozers, or by manual excavation. The number of non-identifiable bones with fresh damage was not calculated, but the specimen cards of the identifiable fragments indicated that ± 7% of these specimens had fresh damage. Compared to the conditions of bones from other archaeological sites where excavation damage is usually below 0.1% of the sample (Plug pers. comm.), I would venture to say that the wheeldozers caused much more damage than was generally assumed.

A problem in archaeofaunal research which is often not considered by both project excavators and faunal analysts concerns that of basic recovery techniques and their effects on the sample. It is critical to interpretations of subsistence patterns that all the faunal remains present in a site be recovered. Although this is the ideal, it is not always possible. Unfortunately, an entire spectrum of small and medium-sized animals is often under-represented or not recovered because of the use of a screen mesh size that is too large. Microfauna such as rats, mice, other small mammals and small molluscs, is particularly important as they are extremely sensitive to environmental conditions (James 1997:385). The bones of small animals such as rodents and birds are not well represented in the faunal collection, and it is possible that potentially useful material was lost during excavation at KwaGandaganda.

While implementation of better recovery techniques may be more time-consuming, a more accurate picture of prehistoric subsistence patterns and environmental conditions will emerge as a result of such efforts. Considering the amount of funding that is currently spent on archaeological projects (especially those that are conducted as part of cultural resource management programmes), at least a portion of the cultural deposits should be screened with small mesh sizes. Since some of these sites, such as KwaGandaganda, have been destroyed in the wake of modern construction and development, there is no prospect to re-excavate the site (James 1997:396).

4.2.2. Bone preservation

All archaeozoological assemblages have been affected to some degree by post-depositional processes. These processes can impact on archaeozoological assemblages in two ways, e.g. it can increase the fragmentation of bone, thus lowering its identifiability and it can destroy some or all of the bone, leaving behind only non-organic artefacts in the most extreme cases (Marean 1991:677).

All archaeozoological assemblages are somewhere between perfectly preserved and totally destroyed. According to Klein and Cruz-Uribe (1984:3), faunal material passes through several stages before it reaches the analyst. As it passes to a new stage, it loses some of the information it previously contained. They divided the stages into five different assemblages, i.e.

- life assemblage (community of live animals in their "natural" proportions)
- death assemblage (carcases that are available for collecting by people, carnivores and any other bone-accumulating agents)
- deposited assemblage (carcases/portions of carcases that came to rest on a site)
- fossil assemblage (animal parts that survive in a site until excavation or collection)
- and a sample assemblage (part of the fossil assemblage that is excavated).

The ideal faunal sample comprises the bones of every animal utilised by a community. Unfortunately, the ideal sample is never found (Brown 1984:5). In most instances, if the bones in an assemblage are well preserved and fragmentation is limited, the fossil assemblage probably resembles the deposited one quite closely. On the other hand, if bone preservation is poor and fragmentation is extensive, then post-depositional leaching, profile compaction and other processes may have altered the deposited assemblage considerably.

Faunal remains on archaeological sites are often very fragmented, either through human activity or preservation factors. This renders a high proportion of the assemblage unidentifiable. In general, delicate bones (e.g. birds) are not as well preserved as large bones (e.g. bovidae), therefore small animals are likely to be under-represented in faunal assemblages. Very large animals also tend to be under-represented. Microfauna such as rodents preserve well, and often rodent bones are complete when found. Their absence is more likely due to poor retrieval.

Faunal analysis in the Archaeozoology Department of the Transvaal Museum has proved that Bov I bone fragments can be more readily identified than similar sized fragments of Bov II, Bov III and Bov IV animals. Bones that fuse early in an animal's life also tend to preserve better than those that fuse later. There may also be differences in bone preservation between different classes (e.g. mammal bones versus bird bones) and species (e.g. sheep versus impala bones) but studies on the differential preservation of skeletal parts of the African bovid species and other animals have not yet been done (Plug 1988:71).

In general, it appears that the denser and more compact a bone is, the greater are its chances of preservation. It is well known that the structural density of an animal's bones varies with the age, sex and nutritional status of the animal. Lyman (1994:234-258) discussed the structural density of bones and the possible reasons why bones with high structural density tend to preserve better in archaeological deposits than those with low structural density. According to him

- skeletal parts with low structural densities are more easily destroyed
- bones with low bulk density have the greatest porosity
- bones with low structural densities have greater chances of transportation by fluvial processes
- bones with low structural densities will more often be destroyed by carnivore ravaging than bones with high structural densities
- humans tend to select bones with high structural densities for tool manufacturing.

Brown (1984:4-5) states that remains of more friable material such as fish and bird bones might not be recovered due to preservational factors. Lyman (1994:434-450) quotes several researchers regarding the differential preservation of bird and fish bones in relation to the preservation of mammal bones in general. According to these researchers, there are numerous reasons for the rarity of these animals' bones on archaeological sites, e.g.

- since bird bones are adapted for flight, the bones are thin-walled to decrease the weight and are therefore more vulnerable to destruction
- certain bird and fish bones have greater potential for fluvial transport
- bird and fish carcases are quickly removed by scavengers
- fish bones rarely preserve in acidic sediment
- the generally small size of fish remains results in failure to recover them unless special techniques are employed
- certain fish remains (such as teeth and scales) seem to weather more slowly than others (such as fin spines and skull bones).

Our experience at the Transvaal Museum proves the view that fish and bird bones do not preserve as well as mammal bones to be false, since fish bones were exceptionally well preserved in the late Pleistocene and Holocene deposits of Rose Cottage (near Ladybrand in the Free State), Likoaeng (in Lesotho) and Sehonghong (also in Lesotho), often better than the mammalian bones. Bird bones were well preserved on Spoegrivier (situated in the Western Cape Province just south of

Hondeklipbaai), in deposits dating back to 4 000 BP. The fact that these fish and bird bones occur on some sites and not on others may have more to do with cultural use, food preferences and refuse disposal methods than with preservational factors or their presumed fragility (Plug pers. comm.).

Plug (1988:71) groups the various attrition agents that are activated once bones were deposited on a site into two categories, namely those that relate to environmental conditions and those that relate to the abovementioned preservation properties of faunal remains. Some of the environmental conditions which may negatively influence bone preservation are the acidity of the soil; erosion of the deposit; climatic conditions such as rainfall and extreme heat or cold, which promote weathering of the bones; carnivore and rodent activities and trampling of the deposit by humans or animals, causing fragmentation and abrasion.

According to Voigt (1984a:353), the post-depositional history of the site (e.g. re-occupation of the site, disturbance by digging of pits; ploughing) also impacts negatively on the assemblage. In an ideal situation the analysis should take into account the effects of settlement patterns in relation to social organisation; the existence of specialised activity areas; the presence/absence of domestic dogs (carnivores can be complete destroyers of evidence, e.g. chicken bones are consumed *in toto* by dogs, leaving nothing behind); and the effects on the pattern of bone preservation of methods of butchering and preparation of food. All these factors are further intensified by the length of time that the site was occupied.

4.2.3. Multi-agent involvement in bone accumulations

Various agents can contribute faunal material to a deposit. Brain and Turner (1984:341) divide the contributing agents in two categories, e.g.

- abiotic agents (for example deposit compaction and movement, ungulate trampling and water transportation)
- biotic agents (for example humans and animals).

In order to be able to identify the agents involved, Voigt (1984a:352) states that one has to be able to define the characteristics of each type of bone assemblage by recognising the damage inflicted on a bone by the agent involved, e.g. porcupine and other rodent gnawing, carnivore bitemarks and human slaughtering damage.

According to Brain and Turner (1984:340) identification of potential agents can be done in two ways. One way is to be on the lookout for diagnostic traces of human activity such as artefacts, hearths and structures; species-typical bone-modifications such as carnivore and porcupine gnawing-marks and traces of abiotic collecting agents, for example water transport evidenced by sediment studies. Another way is to identify specific animal remains whose involvement in the accumulation of the assemblage may be suspect. Such animals include hyraxes, porcupines, terrestrial molluscs, certain carnivores and birds.

The problem of biotic accumulating agents on an EIA archaeological site seems to be less complex than when one is dealing with the debris of a cave site. When dealing with an EIA site, it can be accepted readily that the assemblage is largely the result of human activity (Plug 1988:68; Voigt 1984a:352), although damage caused by rodents, carnivores, termites, burrowing animals, and tree and plant roots is common and needs to be recorded. Abiotic agents such as erosion, water redepositioning and surface deflation can also disturb the deposits and place items out of context.

Unfortunately, even the deposits accumulated solely through human activities present the archaeozoologist with various problems. Where possible collections include people and one or more other bone-accumulating agents, the common problem is to determine how much bone is truly "cultural" (Klein & Cruz-Uribe 1984:6). The faunal samples derived from such deposits reflect cultural habits relating to animal use, butchering techniques, carcase distribution and methods of refuse disposal. Consequently samples retrieved from these deposits are already bone samples as selected for disposal by the people that lived on the site, and do not necessarily reflect the true animal use on that site. Not all animals that are used or consumed by a community have their remains incorporated in archaeological deposits. These missing animals include those that leave no discernible traces such as insects, and those that are defleshed at the killing site. Some animals may have been consumed and are not represented on the excavated part of the site, since the remains were left at the killing site after the animal had been slaughtered and eaten. Although much of this behaviour can be tested against ethnographic information, the identities and economic value of these invisible contributors can only be guessed at and cannot be considered in quantification (Brown 1984:5; Plug pers. comm.; Stiner 1991:455).

Problems also arise when only parts of animals were brought back to the site. In such instances only selected skeletal elements become incorporated in the deposit. This may lead to under-representation of some and over-representation of other skeletal parts. Selective deposition would also occur if bones were deliberately destroyed for some reason or another, or if certain skeletal elements were accumulated for ritual or social purposes. Finally, there remains the problem of possible accumulation by man of bones of animals killed by creatures other than humans. No recognisable evidence would be visible on these bones, indicating who or what killed the animal (Welbourne 1971:10-14).

4.3. Faunal analysis

Analysis of the remains of the larger mammals (hares and larger) from archaeological and palaeontological sites have been a part of the Transvaal Museum's research programmes for several years, beginning with the pioneering work of Dr C.K. Brain in the 1960s.

Once the faunal samples have been excavated and taken to the laboratory for analysis, the archaeozoologist attempts to extract the maximum amount of information from the material. How accurate and detailed this information will be depends largely on the abilities of the worker. An archaeozoologist needs to have knowledge of the fauna of the area, detailed knowledge of skeletal anatomy and the ability to interpret the results (Plug 1988:73).

Identification of the retrieved bones might seem the most straightforward and fundamental of processes, yet it is fraught with practical and theoretical difficulties. One of the basic goals of archaeozoological analysis is to determine which animals were chosen for exploitation by particular archaeological cultures. This is comparatively easy, but explaining why those animals were chosen while others were not can be considerably more difficult (Holt 1996:89).

It is obvious that any interpretation of bone assemblages from archaeological sites should be approached with care. The following two examples may illustrate this sufficiently.

- Bones of domestic stock alone are not proof of a pastoralist occupation since there is historical evidence of stock-theft by hunter-gatherer groups. To distinguish between pastoralism and stock-theft, one needs to take into consideration the ages and sexes of the animals represented in the bone sample. A true pastoralist group may wish to maintain or perhaps increase the size of their herd and will therefore slaughter the predominantly older and infertile animals. People who exist by stealing livestock will slaughter whatever they can find (Plug pers. comm.).

- Driver (1992:35-47) has discussed the problem of attributing species level identification to fragmented archaeological material, particularly the extent to which the context of the bones and received information tend to limit the range of taxa to which a specimen can potentially be identified. When the identification of a specimen is attempted, usually those species which are thought likely to have occurred at a particular place and time will be considered. A species which may be morphologically quite similar but has never before been identified from that time or region may not be considered (O'Connor 1996:9-10).

Relevant interpretations can only be made through the correct application of the prescribed archaeozoological methods. To identify bone fragments to species level one needs to have detailed knowledge of animal comparative skeletal anatomy and must have access to a good comparative collection. For the purpose of this project, the Transvaal Museum's comparative skeletal collections in the departments of Archaeozoology, Mammalogy and Ornithology were used, and Du Plessis (1969), Smithers (1983) and Skinner and Smithers (1990) were consulted for information on animal distribution.

Initially the faunal fragments from KwaGandaganda were sorted according to levels and divided into two main groups, i.e. identifiable and unidentifiable bone. Unidentifiable remains are those fragments that cannot be identified with confidence to species or a group. The presence of such material in a sample is still useful as it indicates that at least some complete carcases and not only parts of carcases were deposited on the site. It frequently provides evidence of butchering methods and carcase distribution. These fragments were therefore sorted into categories such as enamel fragments, skull fragments, vertebrae, ribs, miscellaneous skeletal fragments (all the items fragmented beyond recognition) and bone flakes (fragments originating from the shafts of the major limbs with no diagnostic features or articular facets). (See an example of the form used to list non-identifiable faunal material at the Transvaal Museum in Figure 4.1.)

All fragments, unidentifiable as well as identifiable, were counted and weighed. These data provide insights into and add information on skeletal part representation, fragmentation trends, taphonomy and pathology.

Identifiable remains were sorted into animal groups, and within each group, into cranial and post-cranial remains. A numerical catalogue system was set up for the identifiable faunal material. All data were recorded on printed cards, each card containing all the relevant information about individual bones or groups of bones. Identifiable material was numbered with indelible ink. This number appears on the card of the specimen (Figure 4.2).

Sometimes the faunal material is too fragmentary to identify to species level. When this happens, it is generally not possible to do more than to group it into broader categories, e.g. "suid", "small/medium/large carnivore" and "small/medium/large bird" (Table 4.1a). Bovid fragments were grouped into four size classes (Table 4.1b). These groups are based on the live-weights of the different bovid species according to Brain (1974).

All the complete, identifiable bones were measured with dial calipers (accurate up to 0.1 mm) according to internationally accepted techniques. The reason for this is to compare the animals with present-day specimens to find out whether there are any differences in height, posture and general size. Comparisons can also be made on animal size differences within the site and with other EIA sites. The technique of bone-measuring is fully explained in Von den Driesch (1976), while the osteomorphological differences between *Bos taurus* and *Syncerus caffer* are outlined in Peters (1988).

The basic data on the cards were written in numeral book catalogues. These catalogues are handed over to the excavator when the collection is returned. Although time-consuming, this double system ensures that the Department of Archaeozoology has a complete record of each identifiable piece, and the excavator has a complete record which will enable him to locate and identify individual specimens.

Only the cards remain at the Transvaal Museum. Together with the detailed tables, they form a concise record of the faunal remains from KwaGandaganda.

An important factor that should be kept in mind with faunal analysis is that, after initial analysis, the bones should be accessible for re-examination by other specialists. The portion of the material identified is an important indication of the accuracy of the results of any study. If the analyst only identified 5 000 pieces of bone according to species from a site that yielded 12 000 pieces, the degree of identification would therefore be 42%. An author should always specify the unidentified portion of the material to make it possible for other analysts to test his/her findings (Uerpmann 1973:307-322).

4.3.1. Quantification techniques

One of the problems concerning methods of quantification is whether the remains of animals, hunted or domestic, in an archaeozoological sample give a true picture of the proportional representation of various species in an environment or of the relative representation of domestic species. A high proportion of sheep bones, for example, may simply mean that sheep were killed in preference to cattle which may have been retained for ritual purposes (e.g. the paying of bride price). Therefore the samples of bones from these animals may not give a true picture of the constitution of the herd populations from which they are drawn. This problem is a research project on its own, since many archaeozoologists have tried to refine their quantification techniques to make it possible for them to identify not only the number of animals excavated in the samples, but also to establish the size of the herds from which these animals were obtained (Welbourne 1971:11).

Lyman (1994:111) states that ".....both how quantitative units are defined and how they are operationalized must be explicit in order to ensure concordance between the counting units used and the research question addressed in those units". In other words, the faunal analyst must make clear which of the bone fragments/elements are counted, as well as how they are counted, so that another researcher, using the same methods, may be able to duplicate the results. Quantitative methods of bone analysis have been described and criticised in much of the literature, and the debate is still continuing. No attempt will be made to continue the debate in this work, but some of the methods will be used and the results discussed in the relevant chapters.

A short description of each of the techniques follows. More information on the advantages and disadvantages can be found in De Wet (1993), Lyman (1994), Plug (1984), Plug (1988), and Plug and Plug (1990).

- **Number of identified skeletal parts (NISP)**
  The NISP of a species is determined by counting all the identified fragments of that species present in a sample. This method is very easy to use and it is also very

easy to incorporate additional data. When NISP is corrected for skeletal complexity (see below), it is the best method used to estimate the animal abundances in a faunal sample. Used without adaptations, some serious problems could arise with the NISP method. These include over-representation of those species with more initial skeletal elements to contribute, and under-representation of species that have fewer skeletal elements. According to Plug (pers. comm.) and Lyman (1994:111), another problem experienced using the NISP is differential fragmentation of skeletal elements, since bones that have broken in smaller identifiable pieces tend to distort the total count of the relative abundance of that species in the particular sample. (For example, half a Bov I tibia is equal to one NISP, while 30 Bov IV tibia fragments are equal to 30 NISP although they could all possibly have come from one single tibia.)

- **Quantifiable skeletal parts (QSP)**

  To determine relative animal abundance using NISP corrected for skeletal complexity, the NISP for each species or animal size group is divided by the number of identifiable bones in the skeleton of the particular species or group. According to Plug (1988:75) the distal and proximal ends of longbones should be regarded as separate elements as bones are seldom found complete in southern African archaeozoological samples. The ratios thus calculated can be used to compare animals with different numbers of skeletal elements and to calculate meat distribution. For an example of identifiable bones (QSP) in different animal groups, see Tables 4.2 and 4.3. This method can be adapted for each collection provided that the criteria established for QSP on that collection are consequently applied to all the identifiable remains in that collection (Plug pers. comm.).

- **Minimum number of individuals (MNI)**

  The frequency of the most abundant (identifiable) skeletal part of each species in the sample determines the MNI count. In Iron Age sites teeth are generally used for this purpose as these are often the best preserved in an archaeofaunal sample. In principle not only teeth have to be used but any skeletal part present in the sample. For example: if the most common skeletal part of a species represented in a sample is the calcaneum, the MNI count will be based on the number of these bones. If the bones have not been sided (left/right), the MNI count is equal to the total number of calcanei divided by two as there are only two of these bones in an animal's skeleton. Therefore, if the sample has eight calcanei, the MNI count would be four. If there are three left and five right calcanei, the MNI count would be five, representing five different individuals. The MNI method can be further refined by taking sex and age into consideration. For example, if the five right calcanei are from adult animals and one of the left from a juvenile, the MNI count will increase to six.

The biggest shortcoming of the MNI count is that it is used to calculate ratios as if MNI counts are exact figures, which they are not (De Wet 1993; Plug 1984; Plug 1988; Plug & Plug 1990). Another shortcoming of using the MNI count is that no standard method exists. Due to most researchers not being explicit how they calculate the MNI, the results thereby attained are incomparable between different samples. Some analysts randomly select a method that they think would be most suitable for the material at hand. Voigt (1983:11) and Lyman (1994:100-102) indicated the different methods that can be used to calculate MNI. For the purpose of this project, I chose to refine the technique as much as possible, and therefore included side (left/right), sex (male/female) and age (age classes as described in Tables 4.4-4.6) in the MNI calculations.

– **Relative frequencies (RF)**

This technique has been described as being basically an NISP count to which at least two corrections were made. It can be applied to any sample regardless of size. Relative frequencies are determined as follows (Plug 1988:81):

1. The number of each skeletal element recovered (e.g. scapula, femur, humerus) per species is divided by the number of times it appears in the skeleton. The figure obtained averages left and right element distributions.
2. The sum of these corrected frequencies per species is then divided by the number of different skeletal elements of that species found in the samples, thus eliminating the advantage a species might gain by having more skeletal parts represented.

An example:

32 different *Raphicerus campestris* skeletal elements were recovered from a site. Of these, 14 were humeri. This number is divided by two (because there are two humeri per skeleton):

$$14 \div 2 = 7$$

The sum (7) is then divided by the number of skeletal elements of that species found in the samples (32):

$$7 \div 32 = 0.22$$

Computer simulations by Gilbert et al. (1981) have revealed that the RF method is only reliable when dealing with large samples (Plug 1988:82).

– **The Petersen Index**

This technique was described by Petersen in 1896 to estimate the abundance of an

animal population in an area, and it involves the capture and recapture of animals. The technique is described as follows:
1. A small number (n) of animals are caught, counted, tagged and returned to the population.
2. After a while a second group of animals (m) are captured and counted. The number of animals present in the second sample which were tagged in the first sample, is also counted (x).
3. To estimate the size of the total living population (N) the following formula is used:

$$N = nm \div x$$

According to Plug (1988:80), Fieller and Turner (1982) adapted the Petersen Index as a method to quantify faunal remains. They calculated animal abundances represented by faunal remains as follows:
1. Left (L) and right (R) bones are regarded as two independent samples, equivalent to n and m above.
2. The number of matched left and right bones (pair=P) represents the number of tagged animals. (It is essential that the matched pair must be from one individual because if they do not the calculation will be invalid.)
3. To estimate the size of the total faunal population (N) represented by the bones, the following formula is used:

$$N = LR \div P$$

According to Plug (1988:81) this method is not feasible with faunal remains from southern African sites because the samples are almost all fragmented and matched pairs of bones cannot be identified reliably. The resulting estimates would therefore overestimate abundances. This method also assumes exact symmetry of left and right bones in a skeleton. This is not necessarily true, as many individuals favour one side above the other, thereby influencing muscle use and subsequent skeletal characteristics develop on the bones of the favoured side only (Plug pers. comm.).

4.3.2. Taphonomy

Taphonomy is defined as "....the study of the transformation of materials into the archaeological record" (Bahn 1992:489). In other words, it is what happens to animal remains between the death of the animal and fossilation/destruction/excavation. According to Lyman (1994:1), "....the reason archaeologists should be concerned with taphonomy is that it involves the formation of what is often a major part of the archaeological record". It is a contributing factor in determining the quality and quantity of the samples excavated.

An archaeological collection is only a sample of a sample of a sample, and an archaeozoologist has no control over taphonomic processes. When it comes to the identification of a bone to species level, taphonomy need not be considered. If more detailed information is required, it becomes essential to consider the taphonomic stages and processes to see what information can be retrieved with the elimination of biasing factors (De Wet 1993:6).

Five types of damage to the bones were recorded during the analysis, i.e. human damage (mainly chop/cut marks); burning (burnt bone is dark brown, black or calcines white); weathering (trampling by cattle and people, effect of plant roots, water/acidity levels of the ground); carnivore (perforations or crushing caused by carnivore teeth) and gnawing (i.e. rodents).

4.3.3. Sex determination

The sex of the animals in the archaeofaunal deposit can provide information about herd management (animal husbandry) and human predation patterns. Several skeletal parts can be used for the sexing of animal remains, e.g. pelvis, skull, horn shape and texture, the absence of horns in the female of many bovid species, primate canines and the general size of many of the bones. Unfortunately, most of these remains must be relatively complete for accurate determination (Plug 1988:52; Plug pers. comm.).

4.3.4. Age determination

There are several methods to determine the age of an animal at the time of death. Each of these methods is discussed briefly below.

- **Eruption sequence and wear patterns of teeth**
  In various mammal species teeth erupt in a predictable sequence. The age categories in Table 4.4. and Table 4.5. refer to domestic livestock and were applied to the KwaGandaganda material. Where tooth samples were very small, or where reliable information on age determination was not available, the six age classes based on relative age were used (see Table 4.6). No attempt was made to revisit ageing categories once the analysis was completed, since the numbers and species of wild animals were too limited to spend much time on tracing the relevant literature.

- **Counting of tooth cementum layers**
  This method of age determination is based on the fact that tooth cementum layers are deposited seasonally. Unfortunately, the method is too slow and too costly to apply in an average archaeozoology laboratory. Another disadvantage is that the

teeth have to be cut up to obtain microscope sections, thereby destroying the archaeological specimen. This method was therefore not applied to the KwaGandaganda material.

– **Fused and unfused epiphyses**

  The fusion of the various bones occurs at different rates, thus making it possible to determine the relative age of the animal at the time of death. One can only use this method to determine if an animal was neonate, juvenile, sub-adult, adult and often whether it was mature or aged. No definite ageing can be attempted as too little is known about fusing rates of bone in the various animal species.

4.4. Summary and Conclusion

The fact that KwaGandaganda was destroyed when the Inanda Dam was built stresses the need for careful examination of all the finds. Since KwaGandaganda is one of the few coastal EIA sites in the eastern region that has yielded sufficient faunal material for authoritative research, it is essential that as much information as possible is extracted from the sample. Preliminary reports on some of the faunal assemblages from KwaGandaganda have shown that the site has great research potential for faunal analysis and that the samples are bound to contribute valuable information on EIA activities relating to herding, the procuring of animal protein and possibly of social, ritual and economic practices and how these could compare to more recent practices.

In this chapter the different methods of faunal analysis and the problems and limitations that were encountered during the research project were discussed. Although the Petersen Index and the Relative Frequency methods were not used during analysis of the KwaGandaganda faunal material, it was necessary to give a brief overview of some of the methods more frequently used in archaeozoological quantification. The quantification techniques used in this study are based on the application of NISP, QSP and MNI.

In the next chapter, the results that were obtained by means of the faunal analysis will be presented in detail.

CHAPTER 5

CHAPTER 5

THE FAUNAL ANALYSIS: RESULTS

5.1. Introduction

In this chapter the results of the faunal analysis of the various phases on KwaGandaganda will be presented in the form of total sample counts, species lists, skeletal parts representation, estimated number of animals present, age and sex composition of the animals, dietary contributions, taphonomy and pathology. The methods used during the analysis have been described in Chapter 4. The significance of the results of the faunal analysis will be interpreted and discussed in Chapter 6.

As mentioned earlier (refer to 2.2.3), Whitelaw (1994a:48) assigned three cultural phases to KwaGandaganda. In addition there was evidence of a Late Iron Age or recent occupation. According to Whitelaw (1998:5-6; pers. comm.) the chronological division of the relevant phases is as follows:

–	Msuluzi	AD 620 - AD 780
–	Ndondondwane	AD 780 - AD 970
–	Ntshekane	AD 970 - AD 1030

From the documentation received from the excavator, it was difficult to decide where to place some of the features within the site's sequence of cultural phases. Sometimes the excavator was uncertain whether a feature belonged to a certain phase because of the presence of evidence belonging to two or more phases. If there was uncertainty about the identity of the phase because of the presence of two possible phases, I grouped the phases together and designated them as mixed units. The following phases and mixed units were thus identified:

- Msuluzi (Ms) phase
- Ndondondwane (Nd) phase
- Ntshekane (Nt) phase
- Msuluzi/Ndondondwane (Ms/Nd) mixed units
- Msuluzi/Ntshekane (Ms/Nt) mixed units
- Ndondondwane/Ntshekane (Nd/Nt) mixed units
- Unknown (?) phase

The classification of the trenches, squares and test squares into the different phases are outlined in the total sample tables, Tables 5.1-5.7.

While interpreting the results, I decided to combine the results of all the units that occurred in the same areas described by Whitelaw (1994a, 1994b) as a byre, midden, slag concentration, pit remains and granary remains. These units are reflected in Figures 5.1a-5.1g.

Apart from the tables included at the end of this chapter, tables with detailed information on the bones of every small unit or level exist. They are not relevant here, but are available on request and are housed in the Archaeozoology Department at the Transvaal Museum.

5.2. Total samples submitted to the Transvaal Museum

The total sample of bone and shell fragments of all units and phases combined numbers 41 006 with a mass of 160 864 g. Of these fragments, 9374 specimens (22.9%) were identifiable. In all the phases, the unidentifiable sample was larger than the identifiable sample (Figure 5.2a). However, the identifiable sample from the Ntshekane and Ndondondwane/ Ntshekane phases had each ±10% more identifiable bones than the rest of the phases (Figure 5.2b). Where available, the raw data extracted from the samples are represented in the total sample tables, Tables 5.1 - 5.7. The total number and mass (g) of identifiable and unidentifiable fragments are included, as well as the number and percentage of burnt bones. These sample totals exclude the fish and marine mollusc shell remains that are outlined in Appendix 1 and Appendix 2.

It is clear from Tables 5.1-5.7 that the bulk of the KwaGandaganda fauna came from the Ndondondwane phase with a total of 22 647 fragments and a mass of 100 098 g. Of these, 5230 fragments, or 23%, with a mass of 56 393 g were identifiable. Most of it was excavated in Trench 2.

The percentage identifiable fragments in the total sample ranged between 33% in the Ntshekane phase to only 19% in the Msuluzi phase. In the Ndondondwane and Msuluzi phases, most of the unidentifiable fragments were bone flakes while in the Ntshekane phase miscellaneous fragments were more common.

The highest percentage of burnt fragments occurred in the Msuluzi/Ntshekane mixed units, namely 50%. The percentage of burnt fragments in the other phases ranged between 17% in the Ndondondwane phase to just over 1% in the Ndondondwane/Ntshekane mixed units.

5.3. Animal species present

A total of 68 species were identified in the KwaGandaganda faunal sample. This does not include those animals classified according to size range, e.g. Bov I-IV, large carnivore, small rodent or medium fish. For a complete list of animal species identified on KwaGandaganda, see Table 5.8. Table 5.9 lists all the species identified per phase, and Tables 5.10-5.16 the species for each of the different combined units as presented in Figures 5.1a-5.1g. Mammal remains constitute the bulk of the sample and include some human remains as well as a variety of domestic and non-domestic animals. Bird, reptile, amphibian, fish and terrestrial, freshwater and marine mollusc specimens were present in small quantities in the samples examined. The fish and mollusc remains are in addition to those listed in the Appendices.

Appendix 1 lists the fish species from Square 25, as identified for the Natal Museum by Cedric Poggenpoel, and lists the mass of all the fish bones found in each provenance. This information has not been published in detail.

Appendix 2 lists the number of identifiable shells and shell fragments of marine and freshwater molluscs in each phase (identified by Gavin Whitelaw), the number of worked shells, as well as the mass of shells found in each assemblage.

Appendix 3 provides a list of the mass of all the microfauna excavated from each provenance. Identification of the microfauna will be done at a later stage since the material was received too late to be incorporated in this dissertation.

Referring to the abovementioned Tables, it is clear that the greatest variety of species was found in the Ndondondwane phase, and the smallest variety in the Msuluzi/Ntshekane mixed units. This could be the result of sample size as the sample from the Ndondondwane phase was considerably larger. It can therefore be assumed that in the phases with relatively few identifiable fragments, the number of species will be reduced proportionally.

Comparing the species lists for present and historically known distribution of the larger mammals (Tables 2.2-2.3) with the KwaGandaganda species list, it is clear that several species exotic to the region have been identified. Referring specifically to the distribution of the larger mammals in the historical past, Du Plessis (1969) did not document the giraffe, grysbok, impala or waterbuck as endemic to the KwaGandaganda region, but they did occur in the northern parts of KwaZulu-Natal. According to Smithers (1983), the giraffe is exotic to the KwaGandaganda region but all the other medium to large animals have been documented from there in recent times. Mentis (1974) also did some work on the recent distribution of wild animals in KwaZulu-Natal. According to him the elephant, white rhino, zebra, warthog, hippopotamus, giraffe, impala, buffalo, kudu, eland and waterbuck are all animals exotic to the region.

Although most of the species occurred in all the phases, the following species occurred in one phase only, and had only limited representation:

- Msuluzi phase: leopard, serval, wildcat
- Ndondondwane phase: lion, hyrax, giraffe, kudu, waterbuck
- Ntshekane phase: grysbok, bushbuck
- Msuluzi/Ndondondwane mixed units: white rhino.

Not all of the identified species are considered contributors to the diet or culture of the community, and some could have been intruders from a later stage. These possibilities will be highlighted in 5.8.

5.4. Skeletal parts representation

Skeletal parts representation in each phase has been listed for *Bos taurus* (Table 5.17), *Ovis aries* (Table 5.18), *Capra hircus* (Table 5.19), *Ovis/Capra* (Table 5.20) and Bov I-IV (Tables 5.21-5.24). The skeletal part counts for identified antelope species have been incorporated in the Bov I-IV samples. These tables reflect the percentage of skeletal part representation before correction for skeletal complexity.

In Figures 5.3-5.8, the skeletal remains of the abovementioned animals and groups have been assembled in a graph format using QSP counts, therefore corrected for fragmentation and skeletal complexity. One horncore would thus represent one animal. More than one indicates an over-representation, while less than one would indicate an under-representation of the specific skeletal part in a phase.

As mentioned earlier (refer to 5.3), *Homo sapiens sapiens* remains were also identified. These remains were excavated in Square 25 (layer 2, Msuluzi phase) and included fragments of a scapula, humerus, rib and clavicle as well as a premolar tooth fragment with heavy wear. The human remains will be discussed further in Chapter 6 (6.4.1).

In the following sections I will mainly refer to the three primary cultural phases since the skeletal parts representation in the mixed units reflect that of the major phases involved. However, the data and information of the units not mentioned were incorporated into the appropriate Figures and Tables for easy reference.

- ***Bos taurus***

  The difference in the total sample size of each phase was also reflected in the QSP counts of the various species. The QSP counts of *Bos taurus* elements for the various phases are: Ndondondwane, 1159; Msuluzi/Ndondondwane, 220; Ntshekane, 182; Msuluzi, 174; Ndondondwane/Ntshekane, 90; Unknown, 37 and Msuluzi/Ntshekane, 8 (Figure 5.3).

  In almost all the phases the mandible ramus/condyle was the most common element followed by the distal metapodial. In the Ndondondwane phase horncores, teeth, atlas and axis were particularly well represented compared to the other phases. In the Msuluzi phase teeth and occipital condyles are well represented, and in the Ntshekane phase teeth, proximal metatarsals, astragali and calcanei.

- ***Ovis aries* and *Capra hircus***

  A relatively small sample of the bones could be positively identified as *Ovis aries* (Table 5.18). The QSP count for this species totaled only 315 for all the phases combined. Of these 158 are from the Ndondondwane sample. With a QSP count of only 49, the *Capra hircus* sample is not considered to be fully representative (Table 5.19). A more accurate description of skeletal parts representation of these species is outlined below.

- ***Ovis/Capra***

  The QSP count for *Ovis/Capra* is again the highest in the Ndondondwane phase with 1535, followed by: Msuluzi, 820; Msuluzi/Ndondondwane, 460; Ntshekane, 140; Unknown phase, 57; Ndondondwane/Ntshekane, 52; and Msuluzi/Ntshekane, 14 (Table 5.20). Figure 5.4 illustrates the *Ovis/Capra* remains in each phase, based on QSP counts. It is clear that the pelvis acetabulum is by far the best represented in almost all the phases. In addition, various teeth, the calcaneum, pubis and scapula blade were fairly numerous in the Ndondondwane phase; in the Msuluzi phase teeth, the mandible condyle/ramus and proximal metapodial were more common; in the small sample of the Ntshekane phase the scapula blade and proximal metapodial are best represented.

- **Bov I**

  Bov I samples had relatively low QSP counts in all the phases and mixed units (Figure 5.5): Msuluzi, 92; Ndondondwane, 86; Ntshekane, 11; Msuluzi/Ndondondwane, 12; Msuluzi/Ntshekane, 0; Ndondondwane/Ntshekane, 10; and the Unknown phase, 2. Although the samples are very small, it is clear that scapula fragments are well represented. Skeletal elements also well represented are: the horncore and astragalus in the Ndondondwane phase, the mandible ramus/condyle and scapula blade in the Msuluzi phase, and the mandible diastema, ramus/condyle, tibia and radius in the Ntshekane phase.

- **Bov II**

  Figure 5.6 combines the Bov II and Bov II (non-domestic) samples. The QSP counts for the phases and mixed units are as follows: Msuluzi, 72; Ndondondwane, 395; Ntshekane, 39; Msuluzi/Ndondondwane, 22; Msuluzi/Ntshekane, 3; Ndondondwane/Ntshekane, 22; and the Unknown phase, 2. Although a variety of skeletal parts are present from the various phases, no element can be singled out as being particularly common. In general, the mandible ramus/condyle was somewhat better represented in the Msuluzi and Ntshekane phases, and the proximal metapodial in the Ndondondwane phase.

- **Bov III**

  The QSP counts for Bov III in the different phases and mixed units are as follows: Msuluzi, 18; Ndondondwane, 105; Ntshekane, 39; Msuluzi/Ndondondwane, 11; Msuluzi/Ntshekane, 0; Ndondondwane/ Ntshekane, 10; and the Unknown phase, 2. In general, the preservation of the mandible ramus/condyle is best, but in the Ndondondwane phase this is exceeded by the distal and proximal metapodial and the scapula blade. In the Msuluzi phase the os petrosum, mandible ramus/condyle, hyoid and astragalus are equally well represented, and in the brief Ntshekane phase the mandible ramus/condyle, distal metapodial and os petrosum (Figure 5.7).

- **Bov IV**

  The Bov IV sample is very small with a total QSP count of only 42 (Figure 5.8). As a result no particular trends in skeletal part representation could be determined.

5.5. Measurements

All the complete teeth and bones (of domestic animals) that were measured are listed in Tables 5.25-5.28. Most of these bones are carpals, tarsals or phalanges, while the measured teeth are mainly premolars and molars. Compared to the total sample size of all the bones excavated on KwaGandaganda, disappointingly few bones were complete enough for measurements.

The specimens were measured according to the established standard international measurements set for each individual skeletal part. Standard deviations were calculated where three or more measurements exist. The skeletal elements listed were combined for the site as there are too few complete bones to allow for separation into the different phases. A tendency observed regarding the measurements, was that most of the domestic animals seemed to be relatively large and robust in relation to the modern comparative material used in the Archaeozoology Department of the Transvaal Museum. The measurements will be discussed and compared to those of other EIA sites in Chapter 6 (6.4.2.2.1).

Although established standard international measurements were used, it is possible that, should another researcher choose to try and duplicate the results of this specific project, the measurements may differ slightly. This is mainly because of the factor of human error, since it is not uncommon that different people will interpret a technique in their own way. However, should there be any differences, these are bound to be small and not significant enough to influence the general outcome of the research.

5.6. Age composition of animals at the time of death

The Tables depicting the age composition at the time of death of the animals in the three major phases were divided into two categories, e.g. domestic animals and wild animals (Tables 5.29-5.31). Figures 5.9 and 5.10 present a general overview of the age classes of *Bos taurus* and *Ovis/Capra* in the different phases. MNI counts were used as basis for the Figures and Tables.

Examining the age distribution data in the Tables it became clear that most of the animals, wild and domestic, were adult at the time of death. Relatively little evidence for neonate, juvenile and aged animals was found.

- **Domestic animals**

  In the Msuluzi phase most of the *Bos taurus* animals were classified as age class VI and VII, while in the Ndondondwane and Ntshekane phases it was age class VII. In all the other mixed units, adult animals also dominated the sample but no single age class is dominant.

  Ovis/Capra specimens from age class V dominated the samples in each phase. Relatively few *Ovis aries* and *Capra hircus* specimens could be used to determine age. However, specimens from age class V dominated these samples as well.

- **Non-domestic animals**

  Most of the non-domestic species that were represented on the site were mature. The numbers of adult individuals from each phase are as follows: Msuluzi, 19; Ndondondwane, 26; and Ntshekane, 18. Of the adult individuals identified, Bov II were more commonly represented in the Msuluzi phase, while in the Ndondondwane phase it was *Potamochoerus porcus*, *Philantomba monticola* and Bov II. In the Ntshekane phase, Bov III specimens were most abundant.

  The only neonate animals identified, were *Sylvicapra grimmia*, Bov I and Bov II. These specimens occurred only in the Msuluzi and Ndondondwane phases. Juvenile specimens occurred in all the phases, and included the following: *Equus burchelli*, *Potamochoerus porcus*, *Philantomba monticola*, *Sylvicapra grimmia*, Bov I, Bov II and Bov III. The only aged animals identified, occurred in the following phases: Msuluzi, *Aepyceros melampus*; Ndondondwane, *Potamochoerus porcus*; and Ntshekane, Bov II.

5.7. Sexing

Due to the fragmentation of the samples, few elements were sufficiently well preserved to allow sex determination. Only two horncores, three skull fragments and 34 pelvis fragments of domestic animals were complete enough to be used to determine sex. For a detailed list of male and female animals in each phase, see Table 5.32. Only 8% of the total number of *Bos taurus* pelvis fragments and 17% of the *Ovis/Capra* pelvis fragments from the deposits could be used for sex determination.

Seven *Bos taurus* animals were identified as male and five as female. From the *Ovis/Capra*, *Ovis aries* and *Capra hircus* sample, 15 animals were identified as males and 12 were females. For a graph depicting the proportion of male and female *Bos taurus* and *Ovis/Capra* specimens in the total sample, refer to Figure 5.11.

5.8. Contributors and non-contributors

In any excavation where faunal samples are present, it is almost certain that not all species identified relate to the human occupation or human activities on the site. It is the task of the archaeozoologist to ascertain what species do and do not relate to the archaeological sample. The former are usually referred to as contributors and the latter as non-contributors.

In Table 5.33, the most likely uses of the species identified on KwaGandaganda are listed. The species are tabulated according to the assumed primary use. Under non-contributors all those are listed that presumably had no relation with the archaeological deposit. These animals are either self-introduced through burrowing, or are accidental inclusions. The human remains are included in this category. Although they relate to the archaeological deposit, their bones did not contribute to either diet or cultural use of bone.

Many of the food animals listed under "diet" would presumably also have been utilised for other purposes such as the skins for clothing, bones in tool manufacturing and possibly also as flux for iron/metal ore smelting.

5.9. Food-procuring activities

In archaeozoological studies, species are usually grouped into five major food-getting activities, namely herding, hunting, snaring, gathering and fishing. For this project the hunting and snaring activities were combined, since most of the animals in this group could have been captured either way. The relative importance of each activity is presented in Figure 5.12 and Table 5.34 and the possible activity whereby each species could have been obtained, and the percentage contribution of each species to these activities, appear in Table 5.35.

The relative importance of fishing (Figure 5.12) is an estimate only and is almost certainly under-represented. Actual numbers of the fish skeletal parts are not available except for the preliminary analysis on Square 25, done for the Natal Museum by Poggenpoel (see also Appendix 1). He identified only 21 individuals (MNI) from approximately 517 fragments (NISP/QSP) in Square 25. Taking Square 25 into account, the percentage contribution of fishing seems to vary from 0.6% to 7.5%. These small numbers have little effect on the contributions of herding, hunting and gathering and lower their percentages only marginally. It therefore seems unlikely from the available evidence that fishing would have surpassed herding or hunting in providing meat to the community. This will be discussed further in Chapter 6 (6.4.2.2.4).

Gathering activities (mainly the responsibility of the women) represented only 4.16% of all the food procuring activities. It is therefore necessary to review the exploitation of shellfish by the people of KwaGandaganda. In Appendix 2 the number of identifiable shells and shell fragments of marine and freshwater molluscs in each phase is supplied. According to Whitelaw (1994b:45) the sample suggests regular exploitation of marine resources by EIA people. However, for a site the size of KwaGandaganda, the sample seems relatively small. The impact of this will be discussed further in Chapter 6 (6.4.2.2.4).

From the information in Table 5.36, it becomes clear that, taken as a whole, the largest contribution was made by the sheep and sheep/goat group, followed by cattle.

5.10. Dietary contributions

In Table 5.36 the domestic as well as non-domestic species that contributed to the inhabitants' diet are listed for each phase, with 50% of their live weight and their respective QSP counts. Tables 5.37a-5.37g list the meat contributed per species in kilograms as well as the percentage of meat contribution per species for each phase separately. (For a quick reference to the percentage of meat contribution per species over all the phases, see Table 5.38.) Overall, in the Ndondondwane phase the QSP counts for domestic as well as non-domestic animals were much higher than that in any of the other phases.

Considering the meat or dietary contribution in the phases at KwaGandaganda it is obvious that cattle contributed most in all phases, varying from 65.4% in Msuluzi to nearly 88% in the Msuluzi/Ntshekane mixed units; see Tables 5.37a-5.37g. The contribution made by the sheep/goat group is considerably lower in all phases although it still surpasses the contribution made by wild animal species. The exception here is in the Msuluzi/Ndondondwane mixed units where buffalo contributed slightly more.

There is some fluctuation in the contribution of the *Ovis/Capra* group, as indicated by the following range of variation in the major phases: Msuluzi, 20%; Ndondondwane, 7%; and Ntshekane, 4%. As is to be expected, this fluctuation is reflected in the reduced percentage of meat contribution by cattle. The relatively high representation of sheep/goat in the Msuluzi phase resulted in a lower percentage of meat contribution by cattle when compared to the other phases, e.g. Msuluzi, 65%; Ndondondwane, 84%; and Ntshekane, 77%. However, cattle meat contribution still exceeded the sheep/goat group in all the phases. The results compared as follows: Msuluzi, cattle contributed ± three times more than sheep/goat; Ndondondwane, cattle contributed ±12 times more than sheep/goat; and Ntshekane, cattle contributed ±20 times more than sheep/goat.

Wild animals did not contribute significantly to the diet although they occur in small quantities in all the phases.

5.11. Taphonomy

For the purpose of this project, it was decided to divide taphonomy into human-induced damage such as cut marks, chop marks and shearing, and damage caused by non-human agents including carnivore and rodent gnawing, burning and weathering (Plate 2).

- **Human-induced damage**

  This section excludes the formal and informal bone tools and worked bone. These will be dealt with below (see 5.12).

  According to Plug (1988:20), anthropologists have found that the way in which carcases were dismembered was much the same among different cultures in different parts of the world. Furthermore, in African societies the preferred method of preparing meat was to cook it in a pot as opposed to roasting.

  Bone flakes are usually chopped open or crushed to get to the marrow, causing depressed flake scars. Individual chop marks are usually present as the result of dismemberment of the carcase or to reduce the size of pieces to fit into the cooking pot. The dismemberment of carcases were probably necessary for distribution of the meat among the community or for easier transportation of the meat. Cut marks may occur as a result of the defleshing of bones. One can assume that most animals were probably skinned, thereby also causing small cut marks on the bones.

  Considering the total identifiable and non-identifiable samples from KwaGandaganda, only 7.8% had human damage. Most of the damage was observed on bovid material. The data regarding the human damage were not tabulated to be included in this dissertation, but are available on request.

  A total of 452 identifiable skeletal parts, all phases combined, show visible damage. Of these, 279 are from *Bos taurus*, 149 from *Ovis/Capra* and the remaining 24 are distributed mainly among the Bov II and Bov III categories. Most of the damage on *Bos taurus* and *Ovis/Capra* remains is found on mandibular fragments and pelvis fragments respectively. Other *Bos taurus* fragments where damage is present include carpal bones and the scapula glenoid, while *Ovis/Capra* remains include, in order of frequency: scapula, humerus, radius and tibia.

  The high incidence of *Ovis/Capra* pelvis fragments with chop marks can possibly be attributed to their abundance in the sample. However, when regarding the other skeletal parts with high numbers of chop marks it could probably also be attributed to the dismembering of the carcase. Although the skull remnants of *Bos taurus* were too fragmented to show any clear pattern of damage, the high number of mandibles with chopping and cutting damage might be significant in indicating a possible preferential method of mandible detachment from the skull, such as those identified by Plug (1988:330) on the EIA sites of the Kruger National Park. However, it can possibly also be attributed to their abundance in the sample.

In all the phases, damage to the non-identifiable bones was mainly concentrated on the bone flakes and ribs, with damage to the miscellaneous and vertebra fragments being slightly less. The chopping damage on the bone flakes could have been caused when the bones were chopped up further to fit into the cooking vessels, while cut marks probably resulted from cutting the meat off the bone. Most of the ribs had chop marks in the middle of the blade, suggesting that they too were chopped into smaller pieces. The high incidence of bone flakes can also be attributed to the possibility that the bones were shattered to get to the marrow.

- **Carnivore and rodent damage, burnt bone and weathering**

Although carnivore and rodent damage is present in most archaeozoological samples, it is often difficult to conclude what species were responsible for the damage. Domestic and non-domestic species that were contemporaneous with the occupation phases as well as animals active during the post-depositional period, must be considered. Fire damage to bones is also common on sites, again presenting difficulty in specifying the cause. Bones that were tossed into a fire, or remnants of a fire, during or after eating can display the entire spectrum of burning damage, from scorching to being completely calcined. The latter are usually very brittle and do not preserve well. Unburnt bones discarded on a midden could have been only partially burnt or scorched by the discarding of hot ashes in the same area. Post-depositional veld fires can also be hot enough to cause brittle, calcined bones.

The tables regarding burnt and weathered bone and animal damage are not included here, but are available on request. In examining the total identifiable and non-identifiable samples, it was found that only 5.4% had carnivore/rodent damage and 13.8% of the fragments were burnt. While only 0.01% of the identifiable fragments had weathering damage, no non-identifiable bones with weathering damage were recorded.

Carnivore damage was most common and occurred on 251 identifiable fragments. Of these, 126 were present on *Bos taurus* fragments, 104 on *Ovis/Capra* fragments and 21 on bovid bones. Relatively few bones with rodent damage were found: *Bos taurus*, 45; *Ovis/Capra*, 46; and bovidae, only two. Weathering damage is rare with only three *Bos taurus* fragments and one fragment each of *Ovis/Capra* and a bovid.

A total of 72 identifiable *Bos taurus* fragments, 85 *Ovis/Capra* fragments and 28 bovidae fragments were burnt. The burning occurred randomly on the different skeletal parts, and no skeletal part with burning damage could be singled out as occurring more than the rest.

Regarding the non-identifiable bones, more carnivore than rodent damage was recorded. This trend is observed in all the phases and was probably caused by domestic dogs during habitation of the site. The number of bones with carnivore damage proved to be too high to have been caused by wild carnivores such as jackals that could occasionally have scavenged on the middens. With regard to the fragments with rodent damage, one can probably attribute it to rodents such as *Rattus rattus* and some of the omnivorous *Aethomys* species.

The burning of non-identifiable bones is more or less randomly distributed over the skeleton, i.e. no specific skeletal part with markedly more burning damage could be singled out. Few of the fragments were calcined, and the bones were mostly scorched or black. This suggests that most of the bones were burnt through contact with hot ash rather than in active fires.

5.12. Worked bone

According to Plug and Voigt (1985:222), bone tools can be divided into two broad categories, namely formal and informal types. Informal types consist of bone splinters or fragments which have been utilised, often without modification, to the extent that a polished or worn surface has developed. Formal types are less common and are produced by careful shaping and polishing. There is a variety of forms, e.g. points and/or linkshafts, needles, bone tubes and others. For the purpose of this study, beads, worked ivory, divining bones and worked shell are defined as formal bone tools.

5.12.1. Formal bone tools

- **Bone points and/or linkshafts**

  A total of 14 complete and 58 broken bone points and/or linkshafts were identified (Plate 3). These are described in some detail in Table 5.39. The most common shapes are slender shafts with parallel sides and circular diameters. Most of these shafts have a smooth polished finish and flat butt ends.

  In Square 25 a complete, polished bone point with a flat butt end was excavated. The tip of this specimen has a dark stain, possibly due to traces of poison. The shaft form is convergent and the diameter of the specimen's widest part is 6.75 mm, while the diameter of the thinnest part is 1.75 mm. The total length is 78.7 mm. Unfortunately no photograph of this specimen is available at present. However, it will be incorporated in a study on the bone points/linkshafts that will be done in the near future.

- **Divining bones**

Five bovid astragali from the KwaGandaganda sample could have been objects from divining sets. They occurred, one each, in the following phases: Msuluzi, Ndondondwane, Ntshekane; and also in the Msuluzi/Ntshekane mixed units and Unknown phase. In some of the specimens, the dorsal or ventral sides were polished flat while one had both the dorsal and ventral sides polished away. Abrasions occurred on both the medial and lateral sides in three specimens, and only on the medial side in one specimen. Two of the specimens had holes drilled through one of the sides. The surface of another specimen has been worn extensively due to carnivore stomach etching and therefore it could not be classified. For a complete description of these bones, refer to Table 5.41 and Plate 4.

Two of the specimens were identified as *Ovis aries*, while the other three could only be identified as *Ovis/Capra*. One flat piece of bone (from an indeterminate species) has decorative dot in circle motifs on the one surface but is smooth and undecorated on the other. This has also been identified as a possible divining bone. It was found in the Msuluzi phase.

- **Beads**

A total of 4549 mollusc shell beads and 440 ostrich eggshell beads have been identified (Plates 5 and 6). Of these, 10% shell and 19% ostrich egg shell beads were burnt. No detailed analysis of the beads was done here but this will form the basis of another study. For a general list of beads excavated on KwaGandaganda, refer to Table 5.42.

- **Ivory**

An almost complete elephant tusk, 80 cm in length, was excavated in the Ndondondwane phase of Square 22 (Plate 7). The tusk is stored at the Natal Museum's Archaeology Department. From the information available and a photograph sent to me, there appears to be no obvious signs of chop marks or cut marks on the specimen. Whitelaw (1994b:39) also described an ivory bracelet found in Grid 4 of the Ndondondwane phase. Numerous other ivory pieces found amount to a mass of 4 262.5 g. Most of these chips, 4 204 g, occurred in Square 25 in the Msuluzi phase (see Table 5.43; Plate 8).

- **Worked shell**

The *Patella* shell identified by me in the Ndondondwane phase was polished around the edges while the *Polinices mamilla* shell from the same phase had a human-made hole drilled on the ventral side. For a general list of worked marine and freshwater shells as identified by Whitelaw, see Appendix 2.

5.12.2. Informal bone tools

Table 5.40 describes the 13 informal bone tools identified. These were mainly made of the bones of domestic animals but include bones from a few other species. Most of these tools are irregular fragments with some polish on one or both of the edges. Some of them also have cut and chop marks.

5.13. Pathology

A great variety of pathological specimens were identified, mostly from domestic species (Table 5.44). Of the 29 specimens identified, 21 are from *Bos taurus*, four from *Ovis/Capra*, two from *Ovis aries*, one from Bov II and one from an unidentified species. Most of the pathology occurred on bones in the feet, e.g. phalanges and metapodials.

The pathological damage on the KwaGandaganda sample can be divided into three broad categories, e.g. exostosis and arthritis, abscessing, and pathology specifically related to teeth.

Baker and Brothwell (1980:225) defines exostosis as the formation of new, abnormal osseous tissue on the outside of a bone. According to Bartosiewicz et al (1997:33), this abnormality may, in part, be caused by the ossification of ligaments, especially in phalanges. Almost all the fragments with exostosis found on KwaGandaganda are from the lower limb-bones of cattle and sheep/goat (Plates 9 and 10). However, one fragment each of hyoid, ulna and scapula with severe exostosis have also been documented. Arthritis was identified on two specimens, i.e. a rib of an indeterminate species and a first phalanx of *Ovis aries*.

The five specimens with abscesses are all from *Bos taurus* and include three phalanges, a molar and a mandible fragment.

Eleven teeth with pathological damage were noted. In three of these specimens the bodies of the teeth were markedly constricted, which was probably the result of a period of interrupted growth (Plate 11). This will be discussed in Chapter 6 (6.5). Several specimens with wear grooves where the root meets the enamel were also identified. This type of wear can be associated with a combination of abrasive food and old age.

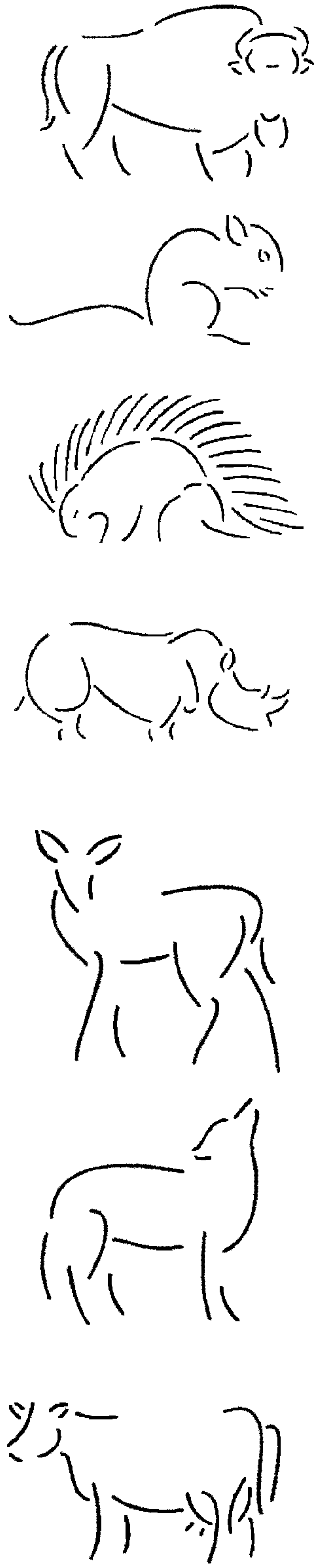
5.14. Summary

In this chapter the results of the faunal analysis were discussed in detail. The KwaGandaganda sample consisted of approximately 41 006 fragments (with a mass of 160 864 g) of which 9374 (22.9 %) were identifiable. In total 68 species were identified and the sample was dominated by fragments originating from domestic animals that appeared to have been large and robust. The majority of all the identified animals were adult at the time of death.

Several aspects of faunal analysis were addressed in this chapter, and include detail regarding total faunal samples; animal species present; representation of skeletal parts; measurements of complete skeletal parts; the sex-ratio of male and female animals; the age composition of animals at the time of death; animals that were utilised by the inhabitants of KwaGandaganda (contributors versus non-contributors); relative occurrence of different food-procuring activities (namely herding, hunting, snaring, gathering and fishing); percentage meat contribution to the diet; human and other damage on the bones; formal and informal bone tools (including beads, ivory and divining bones) and pathological bone.

In order to derive information concerning certain aspects of the way of life of the EIA people that inhabited KwaGandaganda, the main results of the faunal analysis are discussed in the next chapter.

CHAPTER 6



CHAPTER 6

DISCUSSIONS

6.1. Introduction

Interpreting the results of an archaeozoological study such as this is multi-faceted and complex. A single result could involve more than one aspect of human behaviour, as well as animal behaviour and past ecological and climatic conditions. Through previous research (for example Maggs 1980a, 1984a; Mazel 1989; Plug 1993a; Plug & Voigt 1985; Whitelaw 1993, 1995), much has already been learnt about the EIA of KwaZulu-Natal. This study sets out to broaden this knowledge, particularly in relation to the use of animals during that period.

In this chapter, all the results obtained through the faunal analysis (as summarised in the previous chapter) will be interpreted and discussed in detail. The exploitation of domestic and non-domestic animals during the EIA in KwaZulu-Natal (and on KwaGandaganda in particular) will be discussed. The herd management and hunting strategies used during the EIA will receive attention, while the possibility of trade relations with other communities will also be considered.

6.2. Integrity of the samples

In Chapter 4 the problems and limitations experienced during the research were discussed. Problems pertaining directly to the interpretation of the faunal analysis were the following:

- **Excavation method and quantification techniques**

  The initial excavation of the site with bulldozers definitely had a negative effect on the sample. Several times I had to include fragments in the non-identifiable sample since these fragments displayed fresh damage, without matching fragments which could have made the bone identifiable not only to size class, but also to species level. A total of approximately 7% of the identifiable bones displayed fresh damage. This excavation technique could have had a major influence on the species list of KwaGandaganda, since species that were only identified on the basis of a few fragments could possibly have been represented far more commonly.

  The influence of the retrieval techniques cannot only be seen on the samples, but also in the results. It is a fact that the unconventional excavation techniques produced a higher NISP count than what it would have been with conventional excavation methods. This again presents problems with the interpretation of the results, since it makes it difficult for the researcher to decide whether the archaeozoological sample gives a true picture of the proportional constitution of various species in an environment or in a domestic herd.

For example, if sheep bones were more easily destroyed than those of cattle because of their lower structural density, the use of bulldozers for the excavation could have resulted in a higher NISP count for sheep bones and therefore in a proportionally lower MNI count for sheep than for cattle. The higher MNI count for cattle does not necessarily mean that cattle were slaughtered more frequently than sheep, but if one just deals with the numbers, it does imply that. Therefore, the faunal samples obtained by means of unconventional methods, such as using bulldozers, may not give a true picture of the constitution of the herd populations from which they are drawn.

Another example of how this fragmentation influenced the results is the species variation between the units. In the units where the fragmentation is greater (thereby causing fewer identifiable fragments), the number of species identified is reduced proportionally.

Although most of the species occurred in all the phases of KwaGandaganda, some species occurred in one phase only, and had only limited representation (refer to 5.3). This could also have been caused by the effect of fragmentation, limiting the possibility of identification of these species in other phases and/or units.

– **Possible disturbance of the deposit**

The only possible disturbances noted by Whitelaw (1994b:22; 23) are round holes present in Trench 3 and an oval hole in Grid 4, both from the Ndondondwane phase. Whitelaw suggests that these might be of zoogenic origin. No further reference about possible disturbances was made in the documentation received, but the possibility of snails, frogs and other small animals burrowing in the site cannot be excluded. During analysis of the faunal sample, no remains of animals that could be specifically referred to as recent intrusions have been identified. However, 3 mm mesh is large enough to let small rodents, small frogs and small snails through. Therefore this result is not conclusive.

– **Ethnographic information and archaeozoological requirements**

Without ethnography, there would be no archaeological interpretation as we know it. However, since the objectives of ethnographers are often quite different from the objectives of the archaeozoologist and the information he/she requires, it is often difficult for the archaeozoologist to obtain relevant information regarding a variety of subjects important to the interpretation of faunal material. For example, detailed information on the methods of bone disposal and carcase dispersal of an animal, whether it is wild or domestic, is virtually non-existent in the ethnographic sources. This lack of information in the ethnographic material sometimes results in the using of information that can only be found in one or two ethnographic sources, albeit reliable or not. This information is then applied to the past without considering possible alternatives or other parallels that might have existed, since there are no other ethnographic sources to verify it.

6.3. The EIA, the CCP and KwaGandaganda

The spread of the EIA into KwaZulu-Natal occurred as early as the early fourth century AD. Considerable evidence for EIA communities exists in KwaZulu-Natal and the southern limit of the EIA appears to be at the Chalumna River in the former Ciskei. Other EIA sites in relatively close proximity of the KwaGandaganda area are Nanda, Msuluzi Confluence, Ntshekane, Ndondondwane and Magogo.

Archaeologists (for example Mazel 1989) argued that at the beginning of the first millennium, hunter-gatherers moved from the higher grassland areas of the Thukela Basin into the wooded valleys, perhaps drawn by the presence of agriculturalists (Maggs & Whitelaw 1991:18). According to Plug and Voigt (1985:200), Iron Age occupation in KwaZulu-Natal expanded from the river valleys and coastal lowlands into the grasslands around AD 900. The period between AD 900 and AD 1400 seems to be sparsely populated, but from AD 1400 there is an increase in the number of sites in the grassland areas.

According to Whitelaw (1994b:18), the finds on KwaGandaganda indicate that the site was occupied continuously between the Msuluzi and Ntshekane phases, i.e. from approximately AD 644 - AD 1029 if the calibrated dates are considered. Although a few small shifts occurred during the phases (see 2.2.4), the use of space was mostly fixed throughout the occupation. Whitelaw (1994a:107) suggests that this fixed use of space could be one of the reasons to account for the interpretation of KwaGandaganda as a political capital. Whitelaw (1994a:111) states that although it is not possible to estimate the size of the area controlled from KwaGandaganda's political centre, it is probable that Nanda (another EIA site situated on the northern bank of the Mngeni River) fell within its influence.

According to Whitelaw (1994a:119) the settlement pattern on KwaGandaganda conformed to the CCP as discussed in Chapter 1 (1.2.3). This in turn confirms that the people that occupied KwaGandaganda were patrilineal and that the men paid bridewealth in the form of cattle for wives. The finds on KwaGandaganda included several byres, and several ashy middens were found close to the byres. These middens were associated with the men's assembly area and included characteristic artefacts such as broken pots, ceramic sculpture, ivory artefacts and faunal material. The presence of furnace daga, slag and ore suggests that ironworking also took place in the vicinity of the cattle byres. The byres were furthermore surrounded by the residential areas which included pits, raised daga granaries, daga floors, midden deposits and scatters of artefacts (Whitelaw 1994a:104).

Byre-burials are an important characteristic of the CCP. On KwaGandaganda, the human burials were that of an old male and a premature baby. Both were buried in the Square 25 men's assembly-area midden, close to the byre. Whitelaw (1994a:104) interprets the fact that they were not buried inside the byre as a possibility that assembly-area middens were considered as suitable burial places.

The evidence for the CCP on EIA sites such as KwaGandaganda and Nanda in turn proves that one can use the recent ethnography of Bantu speakers in southern Africa to interpret the finds from these sites in more detail. In the next part of this chapter I will attempt to do so.

6.4. KwaGandaganda: animals in context

In any excavation where faunal samples are present, it is almost certain that not all species identified relate to the human occupation or human activities on the site. It is the task of the archaeozoologist to ascertain what species do and do not relate to the archaeological sample. The former is usually referred to as contributors and the latter as non-contributors (refer to the discussion under 5.8 and Table 5.33). The classification of fauna into contributors and non-contributors is more problematic in shelter deposits than in open-air village sites, as many animals make use of shelters. Nevertheless, even in these mostly human-accumulated deposits, problems still arise.

6.4.1. Non-contributors

Listed under non-contributors are all those animals that presumably had no relation with the archaeological deposit and include the human remains, since these bones did not contribute to either diet or cultural use of bone.

The following possible non-contributors were identified in the sample:

- ***Homo sapiens sapiens***
  Whitelaw (1994a:73-74) interpreted Square 25 as a men's assembly-area midden, and excavated human remains there. These remains were identified by Morris (1993:92) as the skeletons of a male (±60 years old) and a premature baby. Referring to the mature male skeleton, he noted that all the elements above the shoulder are missing, including parts of the scapulae, clavicles, humeri, cervical

vertebrae, and the skull and mandible. The absence of these skeletal elements cannot be ascribed to the excavation methods used but rather to earlier ploughing done by an unsuspecting farmer.

My identification of *Homo sapiens sapiens* in Square 25 (layer 2, Msuluzi phase) included fragments of a scapula, humerus, rib and clavicle as well as a premolar tooth fragment. I assume that these human remains are part of the skeleton of the mature male identified by Morris (1993:92). The premolar fragment also showed heavy wear, indicating that it belonged to an aged individual.

On Nanda, an EIA site near KwaGandaganda, Whitelaw (1994a:28) excavated several adult burials. The skulls in these burials showed a distinctive pattern of dental alteration where all four lower incisors and the central upper incisors had been removed long before death. The canines had also been chipped on their labial edges to reduce the crowns to blunt points. It is generally agreed (refer to 3.3.3) that dental mutilation could have been associated with the rites of passage concerning initiation rituals, or as part of an identity-creating process (Mitchell & Plug 1997:158).

On KwaGandaganda, an isolated incisor of *Homo sapiens sapiens* was identified in Grid 3 (part of a midden, Msuluzi phase). This find may be related to the abovementioned dental alteration rituals, but since no further evidence is available, it cannot be accepted as irrefutable proof.

- ***Otomys* species**

  According to Skinner and Smithers (1990:242) these animals seldom if ever burrow, but they may use the burrows of other species. It is a possibility that some of these animals died in the burrows, only to be included in the archaeological deposit. *Otomys* sp. is normally seen as a non-contributor but, if it was not a late intrusion, it could have been a source of food. Because of the ambiguity of the inclusion of *Otomys* sp. in the deposit, this will also be discussed under contributors.

- ***Rattus rattus***

  Since rats are not endemic to the southern African region, Voigt and Von den Driesch (1984:100) suggested that coastal contact involving trade with the outside world would be the most logical explanation for the presence of these animals. According to Plug et al. (1979) and Voigt and Von den Driesch (1984) these rodents were present in southern Africa before the period of European contact and their presence in the pre-European archaeological deposits can only be explained by possible Arabian trade links with people from the east coast of Africa. Rats have never been identified on a southern African archaeological site predating AD 700, and the earliest date known at present is that of the finds at Ndondondwane, dated to the eighth century. *Rattus rattus* has also been identified at Pont Drift in the Limpopo Valley between AD 850 - 1110 (Plug et al. 1979), indicating that the species was already widespread in southern Africa during the EIA. Plug (1988) noted that the presence of *Rattus rattus* on archaeological sites could have opened the way for the transmission of virulent epidemics.

According to Skinner and Smithers (1990:282) *Rattus rattus* is usually found in association with human habitation, although they occasionally settle in the veld where local conditions are suitable. Female rats are able to breed continuously, and may produce five or six litters with about ten pups each per year. It is therefore understandable that only a few of these animals were initially necessary to reproduce the large quantities of rats that we know in southern Africa today.

The presence of this species on KwaGandaganda (in the Msuluzi and Ntshekane phases) was identified by Chris Chimimba (formerly of the Transvaal Museum) on the basis of a few complete longbones and a mandible with cheekteeth fragments.

- **Reptiles**

  The reptile species listed as non-contributors were probably all self-introduced, since some are burrowers and others make use of abandoned burrows. The lizards, frogs and snakes could therefore be intrusions from a later period, possibly even recent. However, since traditional diviners utilised certain reptile skeletal parts for their medicinal values, they will also be discussed under contributors.

- **Snails**

  Some of the snail species that were identified as possible non-contributors could have been recent intrusions. *Achatina* species tend to burrow into soft soils where they aestivate during dry periods. The soft, ashy deposits of an archaeological site would have been ideal for this activity. Dating of such intrusions is at present not possible, but as these shells occasionally die during aestivation, their remains become incorporated in the archaeological fauna (Plug 1988:328). The KwaGandaganda sample does not seem to have intrusive *Achatina*, but the possibility that some of them do not relate to the archaeological deposit cannot be ruled out.

  Semi-aquatic snail species could have been unknowingly transported to the site in the reeds used to construct huts or to make sleeping mats. These snails are usually small, and no evidence for their nutritional contribution could be found in the ethnographic sources.

6.4.2. Contributors

Contributors are generally accepted to have been associated with the people that occupied the site. There is a possibility that occasionally a specimen in that category could have been introduced into a deposit after the site was abandoned, examples being natural deaths and predator kills. However, the chances that these factors impact significantly on the deposits of an open-air village site are negligible. Should it have happened, one would expect to find complete carcases, bones with evidence of extensive carnivore damage or remains that are relatively fresh. The KwaGandaganda sample did not provide any evidence that such activities took place after the site was abandoned. Nevertheless, it is possible that some of this evidence may have been destroyed by the unorthodox method of excavation.

The animals regarded as contributors on KwaGandaganda will be discussed under separate headings, e.g. herd management strategies, hunting, gathering and marine resource utilisation. Before any discussion regarding the animals considered to be contributors to the KwaGandaganda people's diet and culture can be undertaken, it is necessary to take a look at the climate and the environment in which these animals existed.

6.4.2.1. The climate and environment

To fully understand human and animal relationships in the past, more attention has to be given to the past climate and environment. However, when studying past environments, one is dependent on the study of the veld as it is today. It has to be compared to those aspects that can be reconstructed from the study of faunal and botanical remains, soil samples and other environmental indicators obtained from archaeological and other deposits.

When interpreting faunal material from an archaeological site it is always necessary to consider the role played by environmental factors such as topography, drainage, flooding, erosion, climate, altitude and distance from the sea which influence the appearance, distribution and availability of vegetation. For a veld type to be sufficient to have the carrying capacity of such a large herd as the one from KwaGandaganda as well as those from the neighbouring communities such as Nanda and Magogo, it needed to have sufficient sweetveld vegetation. Sweetveld vegetation contains grasses which remain palatable for most of the year and usually occurs on the richer, more alkaline soils (Low & Rebelo 1996:81).

As mentioned earlier (in 2.3.1.2), KwaGandaganda presently falls in an area where the climate of the valley is generally hot and moist in summer and cool in winter with cold nights. KwaGandaganda lies on deep, fertile colluvial soil and at the time of occupation, the soil on the site would have been suitable for sorghum and millet cultivation. The savanna woodland would have provided edible plants, sweetveld grazing for domestic herds, and wood for domestic and industrial fuel. Considering the size of the KwaGandaganda settlement and the quantity of its faunal remains versus the long period of occupation, one has to accept that the environment surrounding KwaGandaganda would have fulfilled the needs of the people and their herds at that time.

The present climate and environment of the area surrounding KwaGandaganda have been discussed in detail in Chapter 2 (2.3). However, Tyson and Lindesay (1992) suggested sufficient changes in the temperature and rainfall during the last 2000 years in southern Africa to influence farming activities in this area (refer to 1.3). By applying their changes in the climate to the period that KwaGandaganda was occupied, it is possible to state that the Msuluzi phase (AD 620 - AD 780) and the greater part of the Ndondondwane phase (AD 780 - AD 970) would have been part of the cooler, drier period between AD 600 and AD 900. A short period of the Ndondondwane phase and the whole Ntshekane phase (AD 970 - AD 1030) were therefore part of the so-called warmer and wetter period between AD 900 and AD 1300. The dates regarding the phases were based on Whitelaw's chronological division of the cultural phases (see 2.2.3).

The warmer and wetter period distinguished by Tyson and Lindesay (1992) between AD 900 and AD 1300 would have been the perfect climate for people herding domestic animals. As stated earlier (see 1.3), a sufficiently warm and wet climate is essential for the herding of domestic animals since unreliable rainfall leads to great fluctuations in the availability of water and grazing, and ample grazing is needed to maintain herds.

The next period beginning AD 1300 and termed the "Little Ice Age" resulted in very cold and dry conditions, thereby possibly making the area surrounding KwaGandaganda very harsh to live in and insufficient to accommodate large herds such as those from a sizeable settlement such as KwaGandaganda. As stated earlier (in 1.3), research has indicated that the total number of animals maintained in any area depends on the total nutritional level of that environment, and four years of drought are enough to destroy the basic structure of indigenous herds.

Not only do the abovementioned changes in the climate sometimes result in insufficient grazing and water for domestic herds, but they also cause minor changes in the species distribution of wild animals, thereby affecting the availability of animals for hunting by the people occupying the area. Several of the non-domestic species identified on KwaGandaganda were non-endemics to the region. Animals such as the giraffe, grysbok, impala and waterbuck did not occur in the KwaGandaganda region in historic times, while (according to Mentis 1974) the elephant, white rhino, zebra, warthog, hippopotamus, giraffe, impala, buffalo, kudu, eland and waterbuck are all animals exotic to the region in recent times. There are several possible reasons for this:

- the animals did occur in the KwaGandaganda region while the site was occupied, but were eliminated due to excessive hunting in historic times
- the hunters of KwaGandaganda roamed far afield to find products of these

exotic animals

- the animal products were traded from other contemporary EIA communities in the area or from hunter-gatherers
- climatic fluctuations influenced the distribution of game.

I now turn to the discussion of the herding and hunting strategies used by the people that occupied KwaGandaganda. This will be done by means of an interpretation of the findings in Chapter 5.

6.4.2.2. Herding and hunting strategies on KwaGandaganda

Although it is not possible to determine the precise herding and hunting strategies employed by the people that occupied an archaeological site, the faunal material from KwaGandaganda was preserved sufficiently well to allow for authoritative research on the subject. However, severe fragmentation (mainly caused by the unorthodox excavation methods) has hampered the research and was in many cases the cause of limited interpretation. During the following discussion this problem should also become clear to the reader, although it is not mentioned everywhere.

6.4.2.2.1. Herd management strategies

An aspect regarding the interpretation of the results in Chapter 5 that should be explained first and foremost is the relationship between the fragments of identified bovid species and the fragments that could only be classified into bovid group size. A short explanation follows.

Since not all the identifiable bones in the sample could be identified up to species level, it is important to consider the relationship between Bov II and *Ovis/Capra*; and Bov III and *Bos taurus*. This relationship plays an important role and should be taken into account during the interpretation of the faunal material.

According to During (1986:56), when in a bone sample the fragments identified as *Bos taurus* have the relative frequency of 80%, and the other fragments identified as several Bov III antelope species combined have a relative frequency of 20%, it is reasonable to assume that 80% of the bones identified as Bov III only would also have been *Bos taurus*.

In other words, if the *Bos taurus* remains comprised 30% of all the identified species' remains that fall into the Bov III category, it is safe to accept that 30% of those remains classified as Bov III would have been *Bos taurus* remains. The same is true for *Ovis/Capra* versus Bov II.

Also, if *Bos taurus* remains comprised 50% of all the identifiable remains, it would be safe to accept that 50% of all the unidentifiable remains (e.g. ribs/vertebrae/bone flakes) would have been *Bos taurus*.

I now return to the interpretation of the faunal material regarding the herd management strategies of the people that occupied KwaGandaganda.

The abundant cattle remains from KwaGandaganda indicate that tsetse flies were not a problem in the area at the time that the site was occupied. Bryant (1967:336) noted that earlier, in historical times, tsetse flies were less prevalent in KwaZulu-Natal and the surrounding areas than in recent times, while Fuller (1923:32-33) could find no earlier evidence than 1870 for tsetse fly distribution in KwaZulu-Natal.

Bos taurus was very well represented during all the phases of KwaGandaganda's occupation. It is therefore possible that the information regarding the abundance of cattle as depicted in the more recent ethnographic studies describing the CCP, could also have been true for KwaGandaganda. Indeed, it conforms to the assumption made by Whitelaw (1994a:119; 1994b:49) that the CCP was present on KwaGandaganda.

Whitelaw (1994a:58) recorded six cattle byres in the Ndondondwane phase, only one in the Msuluzi phase and none in the Ntshekane phase. There is, however, a probability that the excavation sample could be largely responsible for this variation, since there is always a possibility that the lateral occupation of the site has shifted, and that the full extent for each phase has not been determined. This assumption could be true for KwaGandaganda as a large area of the site has not been excavated due to time constraints. The detail regarding the excavation of KwaGandaganda has been outlined in Chapter 2 (2.2).

The existence of the six Ndondondwane byres (all in close proximity of each other) was interpreted as a possible measure of preventing diseases in the herd since cattle that are penned in excessively deep dung are more prone to disease (Whitelaw 1994a:89). Whitelaw also gave an alternative explanation for the separate byres, i.e. that the byres belonged to different family groups within the settlement.

As noted on other EIA sites, the herds on KwaGandaganda did not only consist of cattle. It also included sheep and goats, and remains of these animals were very common in the sample, even more so than the cattle remains. The possibility that some of the byres could have housed small stock should be considered. Examination of the dung could shed some light on this.

It has been noted (Voigt 1987:149) that *Ovis/Capra* remains were more common than those of cattle in the EIA up to the eighth century, when cattle gradually replaced them. The same trend is noticed on KwaGandaganda where, during the Ntshekane phase (10th-11th century), cattle remains are somewhat better represented than those of *Ovis/Capra*. However, during the earlier Msuluzi and Ndondondwane phases *Ovis/Capra* remains were dominant. Most of the sheep and goat remains from EIA sites, including KwaGandaganda, are heavily fragmented and can only be classified as *Ovis/Capra*. In the following discussion, the data for *Ovis aries* and *Capra hircus* were included in the *Ovis/Capra* sample, except where I refer to one species in particular.

- **Animal breeds**

Since most faunal samples are heavily fragmented and few bones are found whole, knowledge of the size and physical characteristics of EIA cattle is limited. The cattle remains found on KwaGandaganda indicate that some of the cattle were medium-sized, e.g. as big as the "Pedi Blue" specimen that is used for comparison in the Archaeozoology Department of the Transvaal Museum. However, fragments of longbone articulations, and the size of some of the phalanges and carpals, suggest that some of the animals were large and robust (Plate 12).

Very little work has been done on cattle size variation in the southern African Iron Age. Apart from inconclusive results from Voigt (1983) and work on the LIA done by De Wet-Bronner (1997), measurements of complete bones could only be found in unpublished measurement lists and card catalogues of the Transvaal Museum's Archaeozoology Department. The complete bones from KwaGandaganda that were measured were compared to those of a few other EIA sites, namely Schroda (Limpopo Valley), Bosutswe (Botswana) and Nanda (KwaZulu-Natal). It was noticed that the relatively large and robust size of the cattle from KwaGandaganda more or less corresponded to the size of those originating from Bosutswe and Nanda. The specimens from Schroda were significantly smaller. De Wet-Bronner (1997:681) suggests that environmental factors such as the quality of the veld may influence the size of cattle. Certain factors of the climate are also important, since temperature and humidity can also keep cattle small, i.e. a size suitable to the climate.

In an earlier report on KwaGandaganda, Plug (1996:515) distinguished two distinct facial profiles from sufficiently large skull fragments, namely strongly convex such as seen in modern Afrikaner cattle, and flat, slightly convex as seen in Sanga cattle (Plate 13).

As noted in an earlier chapter (1.2.6), recent genetic research has indicated that virtually all southern African indigenous cattle is of taurine origin. Previously, Sanga cattle were believed to have originated as a result of a crossing between Zebu (*Bos indicus*) and long-horned humpless cattle, *Bos taurus*. However, this theory does not fit in with the latest research proving that all southern African indigenous cattle is of taurine origin. The findings regarding Sanga cattle on KwaGandaganda proves that no evidence of the Zebu was present in KwaZulu-Natal at least until the eleventh century AD when KwaGandaganda was presumably deserted, and that the African taurine strain of *Bos primigenius* is also the main ancestor of KwaGandaganda's cattle.

The size and physical characteristics of *Ovis aries* and *Capra hircus* are difficult to detect from skeletal remains only. The various measurements taken (see Table 5.25 and 5.27) indicate that the breeds kept on KwaGandaganda were larger and more robust than the Pedi sheep used for comparison in the Transvaal Museum's Archaeozoology Department. It is difficult to determine the reason for this difference in size, but as in the case of the large cattle it can possibly be attributed to a larger breed type or to better and more favourable environmental conditions. Again it can be noted that very few of the bones in the KwaGandaganda sample were complete, reducing the reliability of the observations regarding the size of the animals, since it is possible that mainly the bones from the larger animals were completely preserved because of the greater structural density thereof. Regarding the large size of the KwaGandaganda sample and the relatively few complete bones that were excavated, it is difficult to say whether the tendency of large/robust animals is true for the whole site. When compared to the measurements taken from other EIA faunal assemblages, it seems that the evidence of large and robust sheep corresponds with the finds on Nanda but that the animals are slightly smaller than those present on Schroda. Notably, the presence of a dwarf goat variety has been recorded on Nanda (see Voigt & Von den Driesch 1984:98) and also on a LIA site near Winburg (see Brink & Holt 1992:88-91), but no such small animals were identified from the KwaGandaganda samples.

From the KwaGandaganda faunal sample, no definite conclusions could be made concerning the presence of fat- or thin-tailed sheep, or whether they had hair rather than wool. Due to the presence of hairy rather than woolly sheep in Africa, one could assume that the KwaGandaganda sheep were hairy.

Sex-ratio and age composition

With reference to the utilisation of livestock and herd management strategies in general, the death profile and sex of the animals are significant means to acquire more information on the methods employed. However, in the KwaGandaganda sample, very few skeletal elements in the total sample of both wild and domestic animals were sufficiently well preserved to allow sex determination. The sex-ratio samples of both *Bos taurus* and *Ovis/Capra* indicate that more male animals were represented in the faunal sample than female animals in all the phases. Only seven *Bos taurus* animals were identified as male and five as female, while only 15 *Ovis/Capra* animals were identified as male and 12 as female. Although the preferential slaughtering of male animals may have been the case, it can also possibly be attributed to the fact that the pubis of a male pelvis is stronger, with a higher structural density than a female pubis, and that it therefore preserves better in an archaeological deposit. It is therefore possible that the apparent dominance of male animals could be the result of taphonomic processes/natural attrition in the deposit, and does not necessarily indicate slaughter trends. A larger sample would be needed for such a comparison.

The age composition of the animals found at KwaGandaganda refers to the ages of the animals at the time of death, and therefore one can infer that this would have been related to herding practices. The following tendencies were observed in the KwaGandaganda sample.

By examining the results of the age composition of *Bos taurus* at the time of death, the MNI counts for the adult to aged animals (classes V-IX) were found to be more numerous than the neonate to sub-adult animals (classes I-IV). However, the different age categories do not represent equal periods of time in the life of an animal, and are therefore not comparable to each other. The duration of age classes I-IV combined is only ±24 months, while the duration of age classes V-IX combined can be up to ±156 months (Plug pers. comm.). The perceived over-representation of older cattle can therefore be counterbalanced by a proportional calculation of younger and older animals. In other words, there should be about six and a half times more older animals than younger ones in order for the representation to be proportionally equal.

Most of the *Ovis/Capra* specimens on KwaGandaganda were adult at the time of death. In all the phases, the totals in age class V (30-60 months) were the highest. Again, as with cattle, the different age categories do not represent equal periods of time in the life of an animal. The duration of age classes I-III combined is only ±16 months, while the duration of age classes IV-V combined can be in excess of 92 months. The apparent over-representation of older sheep/goats can therefore be counterbalanced by a proportional calculation of younger and older animals. When these results are taken into account, it seems that there have to be at least six times more older animals than younger ones in order for the representation to be proportionally equal.

Although the abovementioned calculations were based on teeth eruption sequences only, De Wet (1993:26) noted that the post-cranial bones from juvenile animals are usually less dense than adult bone and are more subject to post-depositional destruction, again leading to the over-representation of the adults.

When I recalculated both the *Bos taurus* and *Ovis/Capra* samples to include the proportionally correct representation of the age classes (based on teeth eruption sequences), I found that the older animals were, in fact, under-represented, reflecting a much higher proportion of younger animals than a superficial examination of the figures would suggest.

In several of the phases *Bos taurus* remains from age classes I-II (newborn to 15 months) were identified. The slaughtering of cattle while still so young seems improbable and these inclusions may well have been the results of natural deaths. Plug (1988:316) also reported a high incidence of juvenile mortality on an EIA site in the Kruger National Park (Le6), and attributed it to a disease particularly lethal to calves. This does not exclude their consumption, as Voigt (1983:54) noted that the Venda of today eat the animals that die of natural causes.

According to Dahl and Hjort (1976:29), most pastoralists try to keep as many female cattle as possible in order to safeguard milk production and to secure reproduction of the herd. One mature bull can usually serve 50-60 cows, but pastoralists keep more bulls than the necessary minimum as a security against losses. The remaining bull calves are usually castrated or slaughtered. When this information is compared to the results of the KwaGandaganda sample, one can infer that the inclusion of numerous cattle from age class III-IV (15-24 months) in the samples of all the phases, provides preliminary evidence for the slaughtering of young bulls on KwaGandaganda. The deaths of the older cattle that were identified can probably be ascribed to natural attrition of cattle that were included in the breeding stock.

The relatively high number of younger sheep/goats could have been natural deaths, but they could also have been slaughtered for other purposes, such as the use of lamb skins in the making of men's clothing.

– **Skeletal parts representation**

The results of the skeletal parts representation of *Bos taurus* show some interesting trends (refer to Chapter 5 [5.4]; Table 5.17). In almost all the phases, the mandible ramus/condyles were best represented. The high proportion of excavated mandible remains occurred randomly and was not concentrated in certain areas. A possible explanation for the exceptional representation of cattle mandibles is their high structural density, which, according to Lyman (1992:7-20) allows them to be better preserved in archaeological deposits. A comparison on bone density in archaeological faunal material from the Soutpansberg region done by De Wet (1993:216-217), also indicates that those elements which are over-represented are, in general, also more dense.

It is accepted that the high structural density of certain skeletal elements allows for better preservation. Nevertheless, in the Ndondondwane and Msuluzi phases of KwaGandaganda, the cattle skeletal elements (other than mandibles) that were over-represented, are those with relatively low bone density values. In the Ntshekane phase, the roles are reversed again since high density bones such as astragali and calcanei were over-represented. One can therefore expect that high bone density does not necessarily determine the state of preservation of skeletal elements.

In all the phases, the *Ovis/Capra* skeletal part best represented is the pelvis acetabulum but since the slaughtering of *Ovis/Capra* usually involves no specific procedure among the Bantu speakers (see Quin 1959:102), it is difficult to explain this exceptional representation in terms of modern behaviour. Information on the traditional tribes during historical times as described by people such as Quin, Grivetti, and Bryant, cannot always be successfully extrapolated to the distant past.

As stated earlier in this section, the percentage of bones that could have been identified as *Bos taurus* or *Ovis/Capra* in the identifiable sample would probably have constituted the same percentage of the non-identifiable sample. With reference to the skeletal parts representation of the non-identifiable sample, it can be noted that the bones that occurred most abundantly in all the phases were bone flakes followed by ribs and vertebrae (refer to Figure 5.2b).

– **Taphonomy**

In Chapter 5 (5.11), it was noted that 12.2% of the total *Bos taurus* sample are mandible ramus/condyles with cut and chop marks. Other *Bos taurus* bones with a large percentage of human damage were carpals and scapulae. The human damage noted on fragments identified as Bov III shows a similar trend, namely a high proportion of mandibles with cut and chop marks. As stated earlier in this chapter (at the beginning of 6.4.2.2.1), one can therefore assume that, were the KwaGandaganda sample not as fragmented, a high percentage of the bones identified as Bov III would have been classified as *Bos taurus*.

When interpreting these results, one has to keep in mind that the large quantity of mandibles with damage could be an effect of the high number of mandibles that occurred in the total sample. However, Voigt (1983:81) noted that at Mapungubwe very few complete cattle mandible ascending rami were found, indicating that the mandibles were removed from the skulls by chopping across the ramus. She also noted that cut and chop marks on the mandibles were common.

Taking into account the abovementioned evidence, one could reason that the people from KwaGandaganda may have used the same methods of butchering cattle than the people that inhabited Mapungubwe.

Only 149 *Ovis/Capra* bone fragments have human damage. Of these cut and chop marks, 38 were inflicted on the pelvis. Other skeletal parts with relatively high damage counts are: scapula, 17; humerus, 14; radius, 14; and tibia, 13. The fact that more pelvis fragments were cut and chopped may be significant. A bigger sample is necessary for wider-based interpretation, since the over-representation of pelvis fragments may have had an effect on the total damage count. Referring to the Bov II taphonomy sample, the fragments with the most damage are mandibles and metapodials. Considering that a large part of the fragments only identified as Bov II can possibly be *Ovis/Capra*, the number of *Ovis/Capra* pelvis fragments with damage may be proportionally smaller and insignificant when the Bov II sample is included.

In all the phases, damage to the non-identifiable bones were mainly concentrated on the bone flakes and ribs, with damage to the miscellaneous and vertebra fragments being slightly less. The chopping damage on the bone flakes could have been caused when the bones were chopped up further to fit into the cooking vessels, while cut marks probably resulted from cutting the meat off the bone. Most of the ribs had chop marks in the middle of the blade, suggesting that they too were chopped into smaller pieces. The high incidence of bone flakes can also be attributed to the possibility that the bones were shattered to get to the marrow.

Another aspect of taphonomic damage to the bones that has to be considered is burning. Whitelaw (1994b:29) identified only one circular hearth-like structure which occurred in Square 3, but it is uncertain whether it relates to the Msuluzi phase or to the Ndondondwane phase. No specific cooking areas on KwaGandaganda could be identified based on the presence of burnt bones. By correlating the presence of burnt bones with the finds identified by Whitelaw (1994a; 1994b), it seems that most of the burnt bones were recovered from areas that were occupied by middens.

A factor that could possibly indicate trends regarding cooking methods, is the distribution of burning traces on different skeletal parts. However, in the KwaGandaganda sample, the burning occurred randomly on the different skeletal parts of both the identifiable and unidentifiable material. When meat is cooked in a pot there is little chance of the bone burning. However, should the meat be roasted over an open fire the protruding bones would most definitely show traces of scorching. Very few of the bones identified from KwaGandaganda had severe burning damage or were completely calcined, such as they would have been when discarded into a glowing hearth. It is however possible that such bones, being very brittle, simply did not preserve. It does however seem that most of the bones were perceived as refuse and were disposed of on the middens. They could therefore have been partially burnt or scorched by the discarding of hot ashes in the midden.

- **Contribution to the diet**

When looking at the domestic animals' substantial contribution to the people's diet, one can conclude that hunting was of little importance in supplying food. In all the phases, *Bos taurus* made the highest contribution to the total diet, ranging from between 65% to 88% (refer to Chapter 5 (5.10); Table 5.36). In the Ndondondwane phase, where the highest diversity of wild and domestic species occurs, 84% of the meat in the diet was contributed by cattle, while *Ovis/Capra* contributed 7%, and all the other species combined, contributed 9%.

The percentages of meat contributed to the diet by *Ovis/Capra* as reflected in the faunal sample provided interesting results. In the Msuluzi phase, *Ovis/Capra* contributed 20% of the total diet, while it only contributed 7% in the Ndondondwane phase and 4% in the Ntshekane phase. This cannot be explained in terms of proportional representation since the Ntshekane phase has the smallest species diversity of all the phases. It is probably due to the fact that, in the later phases the importance of sheep and goats declined to be gradually replaced by the cattle.

Taking into account that, with the exception of the Ntshekane phase, the *Ovis/Capra* QSP counts outnumbered the *Bos taurus* QSP counts in every phase on KwaGandaganda, (see Chapter 5 (5.10); Tables 5.37a-5.37g), it can be assumed that sheep and goats were slaughtered more frequently. Cattle outweighs sheep/goats by ±234 kilograms per animal, and for each head of cattle slaughtered, a total of 16 sheep/goats must be killed to get an equal amount of meat. This would mean that there should proportionally be a much higher ratio of sheep/goat to cattle in a slaughtered population to fulfil the communities' needs. Since sheep/goat outnumber cattle by far in the KwaGandaganda slaughtered population, the above argument could be valid for KwaGandaganda, at least.

- **Pathology**

Pathological damage is present on an unusually large number of specimens in the KwaGandaganda faunal sample. The nature and possible causes of the lesions will be discussed later in this chapter (in 6.5).

6.4.2.2.2. Other domestic animals

The other two domestic animals that were identified in the KwaGandaganda sample are dogs and chickens. Although these animals probably did not play a significant role in the lives of the people that occupied the site, they should be included in the discussions.

- ***Canis familiaris***

  Like some of the dogs found in rural areas nowadays, the dogs on KwaGandaganda were probably not fed regularly, and had to scavenge around the inhabitants' living areas for food. They were therefore probably also responsible for most of the carnivore damage noted on the other faunal remains since the number of bones with carnivore damage proved to be too high to have been caused by wild carnivores such as jackals that could occasionally have scavenged on the middens.

  A total of nine adult domestic dogs were identified on KwaGandaganda. As far as the abundance of dogs and their activities are concerned, one can only speculate since dogs tend to be under-represented in an archaeological sample in communities where they were not used for food (as was the case on KwaGandaganda where they were probably regarded as hunting animals). When compared to the faunal sample from Ndondondwane that yielded a large number of dog remains (Voigt & Von den Driesch 1984:98), the small sample from KwaGandaganda seems insignificant.

  Dogs, especially the ones in EIA communities, were not really seen as part of the family and they roamed around freely (refer to 3.3.1.3; Mönnig 1967:164). Therefore one can assume that they died alone, probably in the veld, away from the settlement. The few specimens found on KwaGandaganda may indicate that some of the animals died in the settlement area and became incorporated into the deposit.

- ***Gallus domesticus***

  At KwaGandaganda, chickens occurred in small numbers in the Msuluzi as well as the Ndondondwane phases. Lack of proof for the presence of chickens during the Ntshekane phase does not necessarily imply that they did not occur. The faunal sample from the Ntshekane phase is probably not a representative sample if the site extended beyond the area investigated (refer to the details regarding the excavation of KwaGandaganda in Chapter 2).

  As in other traditional Bantu-speaking communities, the chickens on KwaGandaganda were probably rarely fed and roamed around freely. They were probably kept for food, while their eggs may not have been utilised, but left to secure future breeding. The absence of eggshell could possibly be a result of the non-utilisation of eggs, but it can also be attributed to preservational factors.

As mentioned in Chapter 3 (3.3.1.4), the faunal samples from EIA sites identified before 1990 indicate that chickens were not common and often not present in the faunal assemblages. It was also stated that this may be due to the fact that in the early years of archaeozoological study, it was often not possible to distinguish between chicken and guinea fowl bones. Techniques have improved since then and it is now possible to distinguish between the two species. To know more about the spread and utilisation of chickens during the EIA, it will be necessary to re-analyse the faunal remains from those sites.

6.4.2.2.3. Hunting

KwaGandaganda occupied an area of approximately 140 000 m^2 (Whitelaw pers. comm.). It is difficult to estimate the size of the population that lived there, but by taking into account the size of the site, the long-term occupation, the fact that KwaGandaganda was identified by Whitelaw (1994a:107-108) as a political capital and the size of the herds, one will be safe to assume that it probably consisted of a few hundred people. Because of the large component of domestic animals on the site and the existence of other contemporary EIA sites in the area (e.g. Nanda on the opposite bank of the Mngeni River), the areas surrounding KwaGandaganda probably did not have such an abundant wildlife as one would expect. Large numbers of domestic animals need ample grazing, thereby causing reduced grazing potential for the wildlife, thus effectively forcing them out towards areas with more favourable conditions. Although a variety of wild species could be expected, their numbers were probably insignificant. This could have forced the hunters to travel to other areas to obtain the meat, skins and other products of the wild animals that they utilised.

Although there is always a possibility, it is difficult to say whether the social system on KwaGandaganda recognised totem animals since it is not possible to deduct this from the faunal sample alone. Also, possible changes of totem animals could have influenced the utilisation of animals, since totem animals were usually not killed and/or eaten, and would therefore not be included in the faunal sample. However, if a tribe's totem animal changed, say for example from a hyaena to a crocodile, this would also result in changes in the general utilisation of those animals.

Where only a few fragments of a certain type of animal appeared in the deposits, it suggests that they were incidental or stray visitors. According to Plug (1997:751), animals such as hyaenas, crocodiles, anteaters and leopards are at present associated with rituals, traditional healers and diviners in Bantu-speaking societies. Their presence in this faunal sample supports the other evidence (i.e. the divining bones discussed in 5.12.1 and later in 6.6), that these people played an integral part in the KwaGandaganda community.

From the previous discussion on the extensive utilisation of livestock on KwaGandaganda, one can conclude that hunting was of little importance in supplying food, and was probably recreational or for ritual purposes. Shaw (1974:97; 98) states that hunting was the most important sport and occupation of the men and boys. She states that "....several villages might join together under the organization of one of the men who was reckoned the master of the hunt........either for sport of for some special reason; for example, the Mpondo had an organized hunt as part of the treatment of the army". The small yield of wild species on KwaGandaganda suggests that hunting only had importance in the light of social activities, or possibly because some of the animals could only be obtained seasonally. However, the fact that species exotic to the region were identified also suggests trading between the KwaGandaganda people and others, possibly hunter-gatherers or other contemporary EIA settlements. The possibilities of trade will be discussed later in this chapter (see 6.7).

In the following discussion, the hunting practices of the people that occupied KwaGandaganda will be compared with other EIA sites in KwaZulu-Natal, and occasionally with ones in other regions of southern Africa. What better KwaZulu-Natal EIA sites to compare with than those on which the cultural sequence of KwaGandaganda is based (i.e. Msuluzi Confluence, Ndondondwane and Ntshekane [as discussed in 2.3.2.2.1])? The faunal sample from KwaGandaganda was markedly larger than any one of the others. To allow for comparison, a brief recap of the wild species that were identified on these sites follows.

- **Msuluzi Confluence**
  Only 138 identifiable bones were retrieved from Msuluzi Confluence. These yielded an unusually high MNI, i.e. 21. The non-domestic animals represented in the faunal collection were a hare, tortoise, fish, shellfish (representing snaring, fishing and collecting activities), and also wild bovids such as impala and a Bov I specimen (representing hunting). A baboon tooth (for divining?) and a cowrie specimen (possibly representing trade contacts with the coast) were also found.

- **Ndondondwane**
  The non-domestic sample from Ndondondwane yielded remains from animals such as jackals, hippopotami, common duikers, oribi, grey rhebok, nyala, reedbuck, cane rats, house rats, hares, ostriches, birds, tortoises, lizards, a crocodile, frogs, fish, snails, freshwater mussels and a marine shell. Evidence of elephants has also been found, but only in the form of ivory fragments that were used in ivory production (particularly bangles).

- **Ntshekane**
  Several wild animals were identified on Ntshekane, including a hunting dog, wildcat, hyrax, warthog, bushpig, blue wildebeest, blue duikers, common duikers, an oribi, steenbok, nyala, hares and tortoises.

A variety of wild animals occurred on KwaGandaganda, most of which could have been hunted or snared, regularly contributing to the meat supply. From all the ethnographic sources consulted, no definite evidence for skinning and butchering patterns for wild animals among traditional societies could be traced. The skeletal part representation and taphonomy of the fauna identified on KwaGandaganda did not show any specific trend either, since too few complete wild animal remains were found in the sample to allow for authoritative research on the people's preferences regarding sex, age and skeletal parts of wild animals. The following information regarding hunting practices utilised on KwaGandaganda could be extracted from the faunal material.

- **Primates**
  The few bones of primates identified on KwaGandaganda may indicate that they were not a regular source of food, but could have been used by the diviners for their medicinal and ritual purposes. The only evidence for primates on the other sites was found on Msuluzi Confluence, where a baboon tooth was identified. This also indicates that primates were not usually hunted for food purposes.

- **Carnivores**
  Although carnivore species occurred in the KwaGandaganda samples, such evidence was limited to a few specimens only, as was the case on the other EIA sites in the area. Therefore it seems possible that these animals were not regular food items but were probably used for other purposes and perhaps selectively utilised by the diviners. The single lion first phalanx identified may therefore have been part of a divining set.

- **Large mammals**
  Methods by which these large animals could have been obtained have been discussed in Chapter 3 (3.3.2.3), and include pitfall traps, scavenging and more risky methods such as hunting hippopotami from boats and the hamstringing of elephants. All these methods imply communal involvement rather than the activities of single hunters.

  Hippopotamus fragments identified on KwaGandaganda occurred in all three the major cultural phases, indicating that the animal was commonly utilised. Voigt and Von den Driesch (1984) also documented large quantities of hippopotamus remains on Ndondondwane, and identified it as a potential consistent food source, especially as few other wild animals appear to have been hunted.

  Due to the size of the hippopotami, elephants, giraffes and rhinos, they were probably too large to transport back to the village and were therefore slaughtered in the veld. It can be assumed that only parts of the carcase were taken back to the village. This would explain why so few fragments of these animals were identified.

Nevertheless, it seems that the people from KwaGandaganda had reasons, as well as the means for hunting these large animals. From the above information, one can safely assume that the meat from the large mammals was probably eaten while the elephant's heart, eyes and fat could have been used for medicinal purposes.

As KwaGandaganda was situated on the river, hippopotami may have been more readily available close to home than may have been the case on other sites situated on smaller streams, for example.

– **Ungulates**

It may be assumed that the ungulate remains that were incorporated into the sample were utilised for a multitude of purposes. This would include the use of meat, skin and bones for food, clothing and other ritual and social accoutrements.

The mortality profiles of the ungulates indicate that most of the animals were adults (refer to Chapter 5 [5.6] and Tables 5.29b, 5.30b and 5.31b). Very young and very old animals are not well represented. Although age profiles sometimes provide evidence of seasonal hunting, it could not be clearly established from the relatively small sample of wild animals on KwaGandaganda, since most of these animals were adult at the time of death.

Several of the species identified in the KwaGandaganda sample are currently exotic to the region, such as the impala, kudu and waterbuck. According to Tyson's climatic studies (1986), several changes occurred in the climate of the eastern parts of southern Africa over the last 2000 years (refer to 1.3). As a result of these changes the environment would have changed, thereby again resulting in minor changes in the distribution of wild species (refer to 6.4.2.1). It is also possible that the animals that are currently exotic to the region were eliminated by means of excessive hunting in the last 200 years with the introduction of fire-arms.

– **Small mammals**

The animals classified as small mammals include various rodents, hares, the pangolin and the hyrax, *Procavia capensis*. The pangolin (scaly anteater) was identified from the Msuluzi and Ntshekane phases. Although the hyrax was only identified in the Ndondondwane phase, it is possible that this animal could have occurred in the other phases although no positive evidence has been found.

Regardless of the fact that *Otomys* sp. and *Rattus rattus* are normally seen as non-contributors, they did occur on KwaGandaganda and if the *Otomys* sp. was not a late intrusion, it could have been a source of food. With regard to *Rattus rattus*, it is undetermined whether the people of KwaGandaganda utilised it as food.

Rattus rattus is not indigenous to southern Africa but was also identified on Ndondondwane and EIA sites in the Limpopo Valley and Botswana (see Plug & Voigt 1985).

Although most of the smaller rodents seem to have been utilised as food, only a few species were identified on KwaGandaganda. This is possibly due to the fact that not all the microfauna was analysed, but only the few fragments that were mistakenly included in the boxes with the larger fauna. The sieving and retrieval methods used during excavation (as discussed in Chapter 4 [4.2.1]), as well as the possibility that the smaller rodents were caught and eaten by the herdsmen and young boys while tending the cattle, could have excluded most of the microfaunal remains from the sample.

- **Birds**

The birds identified were mostly classified as small, medium or large, but one bird of prey was identified, as well as *Struthio camelus*.

The bird of prey phalanx identified was probably from a vulture and came from the Ndondondwane phase next to one of the byres. There is a midden close by and it is possible that it could have scavenged off the unused animal remains that were discarded. It is also possible that the diviners killed the bird for medicinal purposes.

Ostriches are represented only by eggshell fragments and beads. KwaGandaganda falls well out of the nearest natural occurrence of this large bird, which was in the Free State region. It is an indication that the people from KwaGandaganda possibly obtained the ostrich eggs by trading it from other peoples, or that their own hunters travelled great distances to collect certain animal products. The trading of animals goods will be discussed later in this chapter (6.7).

Very few bird remains were identified on the other EIA sites mentioned earlier. This may be an indication that the people did not actively hunt for birds, but that their inclusion in the diet was rather opportunistic. Another reason may be the fact that small birds were usually caught by boys when they were looking after the herds. These birds would then have been eaten in the field and therefore not many bird bones would reach the village deposits. Also, it is possible that bird bones, being very fragile, would have been consumed by dogs, leaving no trace in a deposit.

- **Reptiles**

The few reptiles identified in the KwaGandaganda sample possibly did not play a significant role in the diet or in the cultural life of the community. However, the few fragments that were identified could have been utilised by the diviners for their medicinal values. The small amount of tortoise remains indicates that they were either rarely eaten, or that they were consumed in the veld where they were collected. If tortoises were regularly eaten, one would expect a large number of shell remains in the archaeological deposit, and since Plug (1988:327) states that the gathering of tortoises was rather opportunistic, this could have been the case on KwaGandaganda.

According to Branch (1988), the current distribution of tortoises in southern Africa excludes the immediate area of KwaZulu-Natal where KwaGandaganda is situated. Although it is possible that the occurrence of *Kinixys natalenis* in the lowlands of KwaZulu-Natal could well include the region close to KwaGandaganda, their presence in the deposit can possibly also be explained by the possible trading of animal goods with other people.

6.4.2.2.4. Gathering activities, marine and riverine resource utilisation

Under this heading the animals that were possibly obtained by means of gathering and fishing will be discussed. These include both marine and freshwater fish; and the gathering of snails and shellfish.

- **Fishing**

  In a preliminary survey of the fish remains from KwaGandaganda's Square 25, several species were identified by Poggenpoel (Appendix 1). The small variety of marine species indicates only occasional marine fishing, while the even smaller freshwater variety indicates a definite under-exploitation of the nearby riverine resources.

  The total number of fish remains from Square 25, Msuluzi phase, is far higher than on any other area of the site. The total fish remains from this Square had a mass of 809 g, while the fish component from all the other excavated areas had a total mass of only 107 g. Since Square 25 was interpreted as a men's assembly area, this may indicate that fish possibly had special significance for the men on KwaGandaganda. This may also indicate a major difference between the Msuluzi and Ndondondwane and Ntshekane phases.

  According to several ethnographic sources, fish were generally rejected as a food source among Bantu-speaking peoples such as the Nguni and the Sotho because of the belief that, should fish be removed from the water, the river would dry up. Fish were also classified as water snakes and therefore not killed because of the connotation between snakes and ancestor spirits (Grivetti 1976; Krige 1936; Quin 1959). However, if there was an aversion taboo, one would not expect to find such abundant fish remains as the sample that was identified on KwaGandaganda.

In other ethnographic sources (see 3.3.2.8), fishing was described as a very important activity to Bantu-speaking peoples such as the Shona, Venda, Tsonga and Mpondo in terms of adding to the food supply. The methods that were used are a matter of conjecture since no evidence of fishing equipment was excavated on KwaGandaganda. Whitelaw (pers. comm.) speculates that these EIA people caught the fish by means of lines or traps.

– **Snails and shellfish**

Gathering activities in traditional Bantu-speaking societies were generally the responsibility of the women. In this section, gathering activities will be discussed in terms of snails and shellfish and the utilisation thereof as food source and for other applications.

According to Horwitz et al. (1991:24), several researchers have indicated variability in patterns of shellfish exploitation related to the distance of the site from the coast. According to this research, people that lived up to 5 km from the sea regularly exploited shellfish, while people that lived up to 10 km inland limited their visits to the coast to once or twice a month, usually during low spring tides.

The remains of these protein foods occurred in all the phases of the KwaGandaganda occupation, although in relatively small numbers (refer to Appendix 2). The presence of these shells on the site may indicate that the people gathered them regularly and regarded them as valuable food sources. However, from the small numbers of marine molluscs excavated, it seems that the collecting of marine molluscs as a food source was not very important to the people of KwaGandaganda. Another explanation is that they collected the molluscs from the coast and only transported a few whole shells inland. It seems likely that the extraction of the edible portion took place at the coast, with only that portion being transported back to the site. According to Horwitz et al. (1991:25), this would have created extensive shell middens at the coast immediately adjacent to the shell beds, while few remains would be found at inland sites. It is also possible that the few marine shells that were transported back to the site were utilised for decorative or exchange purposes.

Since shellfish spoils quickly once dead, they would either have been eaten where they were caught or, as in the case of KwaGandaganda where the seashore is not that far away, they could have been transported back to the site. Although the shellfish meat contribution was small compared to those of the hunted and herded animals, it was probably of some dietary importance as a source of protein.

Not only were the contents of the shells important to the people, but the shells themselves were also utilised (refer to 3.3.2.9). Among the KwaGandagnada people, the shells were possibly used as clay rubbers, to work skins and to manufacture beads. Although shells such as *Cypraea* sp. are used as a form of currency among some traditional Bantu-speaking societies, they could also have been attached to clothing or to objects such as baskets. Most of these shells have had their dorsal surfaces removed (Whitelaw 1994b:45). This indicates that they were probably rather used for clothing than for money, since complete shells were used for the latter (Plug pers. comm.).

Shells such as *Nassarius kraussianus*, *Nassarius articularis*, *Polinices tumidus*, *Polinices didyma* and *Oliva caroliniana* could have been used as beads, while *Polynices mamilla*, *Pinctada capensis* and *Perna perna* could have been used as ornaments or in the manufacturing of beads (see also Whitelaw 1994b:45). The shells could also have been powdered and used by diviners to cure a variety of ailments.

When comparing the finds of the different cultural phases, it is clear that the Msuluzi sample yielded far more specimens than the specimens from the other two phases combined (refer to Appendix 2a). This great difference in the occurrence of marine molluscs between the phases can probably be ascribed to the fact that Square 25, a midden dating to the Msuluzi phase, was excavated far more extensively than any other area on the site.

A comparison between the small sample of Unionidae fragments and the larger marine sample once again leads to the question of why the riverine resources were under-utilised, particularly since the river was so close. However, without more extensive data from this site, as well as from others to compare these with, this question will remain unanswered.

Although *Achatina* are frequently recent intrusions in archaeological deposits, none of the samples identified from KwaGandaganda seemed to have been introduced recently. It appears as if all *Achatina* are contemporaneous with the occupation of the site. (However, they can then still be intrusive as this can happen at any time during occupation or immediately afterwards, as long as there is some soft deposit available.) The *Achatina* specimens were most likely used by the people for food as well as a variety of other uses such as bead-making, as rubbers for claypots, as scoops and when powdered, also as divining medicine. Although it is possible that they were utilised as such, very few fragments with polish were documented; much less than one would expect if they were used predominantly for the purpose of scoops or clay rubbers.

Another factor that needs attention is the relative abundance of animals between the phases, for example the Ndondondwane phase with its proportionally large mammal sample but small mollusc sample. This trend is true for all three the phases, since in the total KwaGandaganda faunal sample, gathering activities represent only 4.16% of all the food procuring activities. According to Whitelaw (1994b:45) the sample suggests regular exploitation of marine resources by the people that occupied the site. However, for a site the size of KwaGandaganda, the sample seems relatively small. This can be ascribed to three possible factors, i.e. that shellfish exploitation was not regarded as an important means for protein procurement and that the people from KwaGandaganda were merely opportunistic users; or that the bulk of the shells were discarded at the shell-harvesting site on the coast and that only the meat and a few necessary shells were transported back to the site; or that the area of the site where the shells could have been discarded was not excavated.

Many possible gathered animals would have left no trace in the deposits, e.g. insects, small rodents, small reptiles and others. Another reason for their near absence in the sample is that the smallest mesh size of the sieves that were used for retrieval (3 mm), was still too large to retain many such elements.

6.5. Pathology

The main reason why I chose to discuss the pathological specimens separately, is the fact that pathological damage is rarely found in faunal remains from southern African archaeological sites and therefore the finds on KwaGandaganda may be of major importance. It is not unusual to find none or less than four examples in assemblages numbering 100 000 fragments or more, for example the EIA sites from the Limpopo valley (Voigt 1983; Voigt & Plug 1981) and Sehonghong, a Stone Age site in Lesotho (Plug pers. comm: not published yet). One reason for the low incidence of pathological specimens is fragmentation of the bones that have obliterated the traces of pathology. Therefore, an unusual feature of the KwaGandaganda sample is the relatively large number of the bones showing pathological damage.

A total of 21 *Bos taurus* pathological specimens were identified while evidence for pathological conditions among the *Ovis/Capra* bones was limited (refer to 5.13 and Table 5.50). The cattle pathology is mainly confined to the lower limb-bones, usually phalanges (11 specimens) and to the teeth (10 specimens). The phalanges display exostosis and/or abscesses. Exostosis is often caused by the extensive use of animals, e.g. as trek animals or general work animals and is also associated with old age. Often, as a direct result of repeated stress on the bone and tendons, exostosis forms at the end of a joint. This is particularly common in draught-animals, where the damage occurs mainly in the lower limb and phalanges (Bartosiewicz et al. 1997).

Abscessing is more often the result of trauma and usually occurs when an open wound becomes infected. The abscesses on the lower limb-bones could also have been the result of trampling, as often happens when herd animals are closely huddled together in a confined space such as a cattle byre that is too small for the size of the herd.

Whitelaw (1994a:58) identified the existence of at least seven cattle byres on KwaGandaganda with a diameter range of 17-21 metres. The faunal evidence of large herds supports the possibility that the byres were too confined for the numbers of cattle kept in them, therefore causing trampling resulting in injuries to the feet.

Other post-cranial material with pathological damage was limited to an ulna fragment with exostosis. The cause of this damage could not be determined with certainty but it is possibly due to a trauma-related infection.

According to Voigt (1983) the growth of cattle is inhibited during dry years. Baker and Brothwell (1980:136) noted that poor grazing and insufficient nutrients during growth would influence the state of the teeth. Fertility and milk yield also decrease during dry periods. Large numbers of cattle on the veld during droughts could have disastrous effects, resulting in serious degradation of the environment. This situation could have been harmful to the cattle and could even have resulted in stock losses.

The pathology on the cattle cranial material occurred mainly on teeth. In some of the specimens the body of the tooth is markedly constricted, suggesting interrupted growth, possibly due to a period of poor nutrition (Plug pers. comm.). The *Ovis/Capra* material with pathological damage also included a tooth with an interrupted enamel column. The latter specimen occurred in the Ndondondwane phase, similar to one of the affected cattle teeth. The other affected cattle tooth occurred in the Ntshekane phase. It is therefore justifiable to identify a specific period of environmental stress, possibly relating to the overlap from the Ndondondwane phase to the Ntshekane phase. To explain this negative change in the environmental conditions would be difficult.

Several specimens from cattle and sheep/goats with "wear grooves" (where the root meets the enamel) were noted although not all of them were described. These specimens were not all confined to one specific phase but were equally well represented in all the phases. Wear grooves usually occur in older animals and are formed when the animal uses its teeth to pull the grass out of the ground. In areas where the grass is of poor quality there is an increased likelihood that soil or grit will be ingested with the grass, causing friction which in turn causes a notch in the tooth, even in younger animals (Grant 1978:104; Müller 1997:149-152). According to McKenzie (1990:117-128) another possible explanation for the occurrence of these wear grooves is the fact that teeth are not just used for eating. Observations on some browsing antelope species have revealed the extensive use of the incisor teeth for grooming purposes. Using a distinctive upward sweeping of the head, these animals make use of their teeth to maintain "....their skin and associated pelage through the removal of parasites, debris or water, alignment of the hairs of the coat and sometimes the dispersion of odours or secretions through the pelage".

Another cattle cranial specimen with pathological damage is a hyoid. Some exostosis and an irregular lesion are visible on the bone. According to Plug (pers. comm.) a broken hyoid can be caused by animals fighting.

The *Ovis/Capra* pathological sample is too small for wider-based interpretation. Since the bone sample of *Bos taurus* is considerably smaller than that of *Ovis/Capra*, the large number of cattle bones with pathological damage may be a significant discovery in terms of the utilisation of work animals, and one may conclude that the community did not keep their cattle for social and ritual purposes only, but also to use as riding or pack animals. It is probable that mainly oxen were utilised in such a way.

6.6. Worked bone

Several complete specimens and fragments of worked bone were excavated on KwaGandaganda. Beads that were manufactured from ostrich eggshell (OES) and molluscs were also abundant. The following discussion will concentrate on these finds and will suggest possible uses for these artefacts. Discussions on ivory carving and divining bones will also be incorporated here.

- **Bone points/linkshafts, informal bone tools and beads**

  Among the Zulu, certain articles of use are always manufactured from bone, for example awls for making baskets, face scrapers for wiping off perspiration and snuff-spoons (Krige 1936:209). It is seldom possible to determine species on worked bone. The few species whose bone were used for informal bone tools were *Canis familiaris*, *Bos taurus*, *Ovis/Capra*, a carnivore and a Bov II specimen.

  Complete as well as broken bone points or linkshafts occurred in all the phases. Most of the points/linkshafts were polished. A few objects are covered with a thick layer of encrustation and could not be classified to type. A few show traces of burning. Apart from the somewhat faceted shapes, most of the points are circular or oval-shaped in cross-section. Only a few of the complete specimens had points at both ends.

Some of the bone points may have been used as awls. One sharply pointed, thin bone point closely resembles a modern needle and could have been utilised to sew clothing or bags from animal skins. In Square 25 a complete, polished bone point with a flat butt end was excavated. The tip of this specimen has a dark stain, possibly due to traces of poison (refer to 5.12.1). From this find one may conclude a possible association between the KwaGandaganda people and hunter-gatherers.

Table 5.49, listing the other bone tools excavated on KwaGandaganda, excluded the tools described by Whitelaw (1994b:38-45). I would, however, like to mention a possible face scraper, several pierced canine teeth, bone and ivory replicas of a canine tooth, and a possible divination tablet.

The worked bone fragment identified by Whitelaw (1994b) as a possible sweat scraper could also have been utilised as a tool to push and lift *Patella* sp. from the rocks. This specimen was made from the rib of a medium-sized mammal, possibly Bov III (Plate 15).

Although the pierced canines could have come from *Canis mesomelas*, there is also the possibility that it could have come from a domestic dog. Although traditionally southern African people did not pay much attention to their dogs and seldom fed them, they were usually very proud of their animals, especially after a successful hunt. It is possible that these teeth were used as ornaments and pendants after the dog died.

A distal tibia fragment of *Canis familiaris* was identified in the Msuluzi phase. The shaft of the tibia has been cut and snapped neatly. It is possible that the rest of the shaft might have been used to make a whistle (refer to Chapter 3, 3.5) or an ornament or bead of some kind (Plate 14). Since hunting dogs were highly prized assets in hunting communities (see 3.3.1.3), I speculate that this dog could have been highly valued by its owner and he therefore used some of its remains to manufacture a hunting whistle or another prized object.

The ivory and bone replicas of a canine tooth are both about as large as that of a lion. Since lions would have been difficult to capture, it is a possibility that these bone pendants had to suffice as substitutes (Plate 16).

The large sample of ostrich eggshell and mollusc shell beads shows that these ornaments were commonly used, possibly for necklaces and other decorative articles. As stated earlier, a detailed examination of the KwaGandaganda bead sample will form the subject of a later study.

- **Ivory carving**

Thousands of ivory chips were excavated on KwaGandaganda, as well as worked ivory such as an almost complete armband and the abovementioned canine tooth replica. The ivory chips were probably waste material, and therefore indicate that ivory was worked on the site, at least during the Msuluzi and Ndondondwane phases.

Traditionally, ivory carving was a craft practised by the men only. Most of the ivory chips excavated on KwaGandaganda came from Square 25, i.e. the Msuluzi phase. This may be due to the fact the area has been identified as a men's assembly-area midden, and thus a high status area. However, Whitelaw (pers. comm.) is of the opinion that, since the excavation of Square 25 was more extensive than in other areas of the site (refer to 2.2.4), it could also have contributed to the over-representation of the ivory in the sample.

Most of the ivory consists of very small flakes, making it difficult to tell whether they came from elephant or hippopotamus. Judging from the diameter of the armband described by Whitelaw (1994b:39) and from the texture of other large fragments, it was definitely elephant ivory. An almost complete elephant tusk was excavated in the Square 22 midden, Ndondondwane phase (Plate 7). It is a matter of conjecture why such a presumably valuable item that was usually the property of the chief (see 3.3.2.3) was left behind when the site was abandoned.

There is no evidence to suggest how the KwaGandaganda people might have obtained the ivory. The small number of elephant bones excavated provides no clues to the hunting of elephants. Unless killed close to the village, it may be assumed that only parts of the carcase were taken back home. Ivory could also have been obtained by scavenging the tusks from dead animals or by trading with other people.

According to Voigt and Von den Driesch (1984:102), ivory is usually only present on southern African EIA sites in the form of armband fragments. Only three sites have thus far been identified on which this was not the case, i.e. K2 (part of the Mapungubwe complex), Ndondondwane and KwaGandaganda.

The amount of ivory that was excavated on KwaGandaganda was compared with that of K2 and Ndondondwane. With reference to K2, Voigt (1983:111-119) describes the ivory that was excavated as "a large quantity", although it consisted of only 143 specimens of ivory chips or fragments. She suggests that these sites were probably part of a large ivory trading network and concludes that the Mapungubwe complex "....is unique in that there is evidence for the working of ivory...", since the ivory does not only occur in the form of finished objects.

The ivory from Ndondondwane consisted of a large amount of small chips and cut fragments weighing 1150 g which far outweighs the sample from K2 (see Voigt & Von den Driesch 1984:100). However, when the quantity of ivory that was excavated from K2 (143 pieces) and Ndondondwane (1960 fragments) is compared to that of KwaGandaganda, it is clear that the latter outweighs the other samples by far. The sample from KwaGandaganda consists of thousands of pieces weighing 4 262.5 g, and this excludes the complete tusk and worked ivory. The collection of ivory fragments from KwaGandaganda is therefore the largest sample that has ever been identified on a southern African EIA site.

Since not many complete objects that were carved from ivory were found on KwaGandaganda, it may suggest trade in these finished ivory products. This will be discussed later in 6.7.

- **Divining bones**

Divining sets have been identified in archaeology as far back as the Late Stone Age. On KwaThwaleyakhe Shelter in the Thukela Basin, Plug (1993b:43) identified eight astragali which had been polished and were very similar to traditional divining bones used by African diviners. Plug (1988:67) wrote that bones are difficult to identify as divining bones when excavated on an archaeological site, and gave some pointers by which to recognise them:

> "Astragali were often deliberately abraded in such a manner that both the medial and lateral facets of the bone are ground completely flat.........occasionally small holes were made in the ventral bulge of an astragalus."

A total of six possible modified divining bones were identified from KwaGandaganda in all the major phases (Plate 4). Five astragali specimens were identified as divining bones on the basis of Plug's abovementioned description. Some of the specimens have some or all the sides polished flat. One astragalus even shows traces of copper wire stains across the surface on the ventral side (see Plug 1987b:58). Two of the specimens have holes drilled through them from the sides. According to Plug (pers. comm.) these drilled specimens could have originated from hunter-gatherers, since they used to wear their divining sets on a string which made it easier to carry during their constant travelling.

An interesting factor regarding the astragali, is that all the astragali could be identified as originating from *Ovis/Capra*. According to Plug (1987b:51; pers.

comm.), in divining sets used among the Sotho-Tswana, all the astragali had to be from different species in order to represent different totem animals. Today, however, *Ovis/Capra* specimens are used as substitutes because game is unobtainable. The *Ovis/Capra* astragali are then "redefined" as a particular species representing a specific totem animal. Since one can assume that game was perhaps easier to obtain during the time that KwaGandaganda was occupied than in modern times, the evidence for the *Ovis/Capra* astragali in divining sets cannot be explained easily. It can possibly indicate that wild animals were not readily obtained and were therefore not regularly part of the peoples' diet. In fact, the small sample of wild animals that were identified may suggest that this could have been the case on KwaGandaganda.

One bone flake (from an indeterminate species) with decorative motifs on one of its flat surfaces has also been identified as a possible divining bone. This bone flake has been polished smooth on the inside, causing the marrow cavity to disappear. The bone has also been fashioned into a V-shape. The surfaces are polished. The decorative motif on the outer layer of the bone consists of numerous small circles with dots in them. Plug (1988:63), Van Warmelo (1945:200-201) and Hammond-Tooke (1989:114) demonstrated and/or described similar so-called "male and female" tablets such as those found among the Shona, Venda and Sotho. Unfortunately, the base of the tablet excavated from KwaGandaganda has been broken, and it is impossible to determine whether it was "male" or "female" (see Plate 4). Plug (1988:63) noted that Tsonga and Nguni sets did not originally contain these dice, and that they were only recently introduced, which leads me to speculate that the people that inhabited KwaGandaganda were possibly not ancestral Nguni, but rather ancestral to a Sotho, Venda or Shona group. This possibility will be discussed later in this chapter (refer to 6.8).

Divining dice such as the one described above are reported to be the main elements in a diviner's pouch as they set the tone of a prediction, i.e. the way they fall is interpreted as a good or bad omen (Plug 1987b:50). One can therefore assume that divining bones were generally taken care of and were not lost easily. The possible reasons why no less that six possible divining objects were found in the KwaGandaganda sample is difficult to explain. A possibility is that a diviner had to evacuate the area in a hurry, such as would have been the case when a fire broke out in his hut. However, one would then expect that the divining objects would show traces of burning as well, which they do not. Therefore one cannot be entirely convinced by mere speculation that this was indeed the case.

6.7. Trade

Trading of products between different groups of people has been part of the ethnographic history of southern Africa for a long time and occurred mostly in the form of exchange. In other words, commodities that were scarce in a certain group (such as ivory, gold, copper and animal products) would be obtained from another (Shaw 1974:127).

Before an archaeologist or archaeozoologist can proceed with the analysis of cultural or faunal material from an archaeological site, it should be remembered that archaeological culture is not necessarily similar to ethnological culture, e.g. pottery and iron could have been traded from another group with a different culture, and might therefore not have been manufactured locally (Plug 1988:8). Shaw (1974:126) notes that people such as the Tsonga obtained most of their metal goods from the Venda; the Tswana exchanged spears, dogs and knives for skins from the San; the Mpondo traded copper rings from tribes further east in exchange for corn; and the South Sotho traded animal products such as otter skins and ostrich feathers with the Zulu in exchange for products such as hoes and spearheads. This relationship between local and imported goods is also reflected in the archaeological sample from KwaGandaganda.

According to Whitelaw (1994a:108) several of the items excavated on KwaGandaganda could indicate trade relations with settlements in other regions. Foreign articles such as the OES beads, the *Haliotis midae* shell, the glass and copper beads and the Sassanian-Islamic sherd originated at considerable distances from KwaGandaganda. He also states that their inclusion in the deposit does not only indicate trade relations, but also indicates the attraction that KwaGandaganda had for foreign travellers, other contemporary EIA peoples and/or hunter-gatherers and therefore probably proves that KwaGandaganda was a high-status site.

The fact that contact existed between the KwaGandaganda people and foreign groups was also evident from the faunal material. The following examples exist:

- ***Rattus rattus***
  Since rats are not endemic to the southern African region, Voigt and Von den Driesch (1984:100) suggested that coastal contact involving trade with the outside world would be the most logical explanation for the presence of these animals.

- **Evidence of animals exotic to the KwaGandaganda region**
  Although other factors (such as changes in the climate and environment; and the fact that the hunters could have travelled considerable distances) could also be responsible for the occurrence of these animals in the KwaGandaganda deposit, these animal products could have been traded from other contemporary EIA communities in the area or from hunter-gatherers.

- **Marine shells**
  According to Whitelaw (1994a:108) the *Haliotis midae* shell is foreign to the KwaGandaganda coastal region and was probably imported. With regard to the other marine shells that were identified, the distance from KwaGandaganda to the coast is only a few kilometres and can probably not prove trade in marine shells.

However, there is a possibility that these shells were obtained from the coast by the KwaGandaganda people to be used as trade objects with people from sites that were situated further inland.

- **Tortoises**

According to Branch (1988) the current distribution of tortoises in southern Africa excludes the area of KwaZulu-Natal where KwaGandaganda is situated. Although it is possible that the occurrence of *Kinixys natalenis* in the lowlands of KwaZulu-Natal, and the occurrence of *Kinixys belliana* along the Mozambique coast as far south as Zululand could well include the region close to KwaGandaganda, their presence in the deposit can also be explained by the possible trading of animal goods with other people.

- **Ivory**

There is no evidence to suggest how the KwaGandaganda people might have obtained the ivory. Only a few fragments of elephant bones were excavated which indicate that the people either took only parts of a carcase back home, or scavenged the ivory from dead animals, or traded the ivory from other people.

The complete ivory tusk that was excavated as well as the amount of ivory chips on KwaGandaganda indicate that ivory came to the site in its raw form and was carved on the site. The large amount of ivory chips also suggests that completed ivory products were not traded from other people but were rather manufactured by the KwaGandaganda people themselves.

On Pont Drift (an EIA site in the Northern Province) Voigt and Plug (1981) interpreted the absence of unworked ivory fragments as a possibility that finished ivory items were traded. The fact that mainly ivory fragments and very little completed objects were found on KwaGandaganda, may in turn suggest that KwaGandaganda could have been part of an ivory trading network where they not only supplied the raw material, but also completed carved objects such as armbands.

Considering hunter-gatherer/agriculturalist interactions in KwaZulu-Natal, Mazel (1992:759) suggests that before AD 1000 these two communities enjoyed close relations and may even have intermarried. However, shortly after AD 1000 the hunter-gatherers moved to the Drakensberg which in turn led to reduced contact between the two communities. Mazel also suggests that the hunter-gatherers entered into some kind of client-relationship with the agriculturalists.

With regard to trading relationships between the agriculturalists and hunter-gatherers, three finds in the archaeological deposit of KwaGandaganda illustrate that such a relationship could possibly have existed.

- **Divining bones with holes drilled through one side**
  In the section dealing with divining bones (see 6.6), two astragali with holes drilled through one of the sides were described as possibly originating from hunter-gatherers. It is a mystery why the hunter-gatherers would part with such valuable objects, but their occurrence in an archaeological deposit relating to Bantu-speaking peoples allows for intriguing speculation regarding these societies' relationship with each other.

- **Bone points/linkshafts**
  Whitelaw (1994a:108) suggests that the large numbers of bone points/linkshafts (refer to 5.12.1) may also indicate a relationship between the people from KwaGandaganda and hunter-gatherers, "....perhaps representing attempts by hunter-gatherers to establish *hxaro*-like relationships with the agriculturalists through the exchange of gifts". However, he also states that it may simply reflect hunting by agriculturalists. The existence of a bone point with possible poison trace in the KwaGandaganda sample (see 5.12.1 and 6.6) may also demonstrate trade links between these groups.

- **OES beads**
  Ostriches are represented on KwaGandaganda only by eggshell fragments and beads (see Table 5.42). With regard to trade relations between hunter-gatherers and agriculturalists during the first millennium AD, Whitelaw (1994a:108) states that some researchers have indicated that the relationship between these two groups was more amicable in the first than in the second millennium AD (see for example Maggs 1980a; Mazel 1989). He further states that, in KwaZulu-Natal, OES beads are regarded as indicators of this relationship because ostriches are not endemic to the region. Therefore, ".....the ratio of OES beads to other shell disc-beads may be an indication of the degree of contact between the two groups. More intensive contact probably took place around political centres resulting in the deposition of a greater number of OES beads".

  Although this statement could have merit, it should however be corroborated with evidence regarding the form and manufacturing procedure of the beads. As stated earlier, a detailed examination of the KwaGandaganda bead sample will form the subject of a later study.

6.8. The people of KwaGandaganda

Unless definite ethnographic evidence is available to corroborate the findings, it is extremely difficult for archaeologists to specify which cultural group occupied an area or a specific site a few hundred years ago. Although it was not originally included as a primary objective of this study, I decided to attempt to determine the origins of the people that occupied KwaGandaganda, simply by looking at their faunal remains and by comparing it to the available ethnographic evidence regarding southeast Bantu-speaking peoples and their utilisation of wild and domestic animals.

Whitelaw (1998:6) states that the Msuluzi-Ndondondwane-Ntshekane continuum most probably represents the cultural heritage of Shona speakers. By comparing the ethnographic evidence regarding the Shona and the Nguni (particularly the Zulu since they are the current occupants of the area), it became evident that these peoples share many cultural features and practices characteristic of patrilineal Bantu-speaking agriculturalists. However, during the project it became evident that much more of the ethnographic evidence directly relating to the Shona people could be used to explain the inclusion of certain animals and features in the deposit.

The following examples should illustrate the point:

- The inclusion of a substantial amount of fish remains in the KwaGandaganda faunal sample suggests that the people that inhabited the site regarded fishing as a means to contribute to their diet. The ethnographic evidence illustrated that the Shona were very fond of eating fish, while traditionally the Nguni showed an aversion towards the eating of fish (refer to 6.4.2.2.4).

- Also in the KwaGandaganda sample, a bone flake that was fashioned into a V-shape with decorative motifs has been identified as possibly being a so-called "male or female" divining bone. Several ethnographic sources cited these bones as found among the Shona, while others noted that Nguni sets did not originally contain these dice, and that they were only recently introduced (refer to 6.6).

- Only three southern African archaeological sites have thus far been identified on which ivory is not only found in the form of armband fragments, but also ivory chips, indicating the working of ivory. These sites include the Mapungubwe complex, Ndondondwane and KwaGandaganda (see 6.6). It is nowadays generally accepted that Mapungubwe was inhabited by Shona speakers (Huffman 1996b).

Establishing the cultural and/or linguistic affinity of the inhabitants of an archaeological site such as KwaGandaganda is, however, a complex issue that falls outside the scope of this study.

6.9. Summary

In this chapter all the results obtained through the faunal analysis - as summarised in the previous chapter - have been interpreted and discussed. The ethnographic background relating to the

Bantu-speaking peoples of southern Africa and specifically the evidence for the exploitation of animals in these societies (outlined in Chapter 3) were incorporated into the discussion.

Before the discussion, however, I cast some light on the integrity of the samples by highlighting a few factors that could have influenced the outcome of the research. Factors such as the excavation methods, quantification techniques, disturbances of the deposit and problems relating to ethnographic information versus archaeozoological needs were discussed briefly. A short discussion on the relation between the EIA, the CCP and KwaGandaganda followed.

The results obtained through the faunal analysis were divided and discussed as several topics. Since not all species identified relate to the human occupation or human activities on the site, the main results were divided as those relating to contributors and non-contributors. Under the non-contributors elements such as *Homo sapiens sapiens*, *Rattus rattus*, *Otomys* sp., reptiles and snails were addressed.

The discussion considering the species that were regarded as contributors was divided into animals that related to herding, hunting, gathering and marine resource utilisation. A short discussion on the climate and environmental factors that could influence the distribution and condition of these species was also incorporated.

Herd management strategies of EIA people were discussed with specific reference to the people that occupied KwaGandaganda. Findings regarding cattle and sheep/goats were discussed in terms of breed, sex, age at the time of death, skeletal part preservation and taphonomy. The presence of other domestic animals such as dogs and chickens was also addressed.

The discussion of hunting strategies incorporated a comparison of species that were identified on the sites relating to the cultural phases associated with KwaGandaganda, i.e. Msuluzi Confluence, Ndondondwane and Ntshekane. The possible different uses of the non-domestic animals that were identified on KwaGandaganda were also discussed in terms of the ethnographic information presented in Chapter 3.

Gathering activities and marine resource utilisation were discussed with reference to fishing as an activity, as well as the gathering of snails and shellfish. The possible uses of these raw materials were also considered.

The occurrence of pathological specimens in the KwaGandaganda sample was discussed separately, since an unusual high number of bones with pathological damage were identified. Worked bone was discussed in terms of bone points/linkshafts, informal bone tools, beads, ivory carving and divining bones.

The possibility that KwaGandaganda could have been part of a large inland trading network was also considered. Reference was made to trade with other contemporary EIA communities as well as the possibility of trade relations with hunter-gatherers.

Although it cannot be accepted as irrefutable proof, I speculated that a comparison between Shona and Nguni ethnographic evidence regarding their utilisation of animals, and the use of animals by the people that occupied KwaGandaganda has shown that the inhabitants of KwaGandaganda have greater affinities with the Shona.

In the next chapter I will offer my conclusions while recommendations for further research will also be discussed.

CHAPTER 7

CHAPTER 7

CONCLUSIONS AND RECOMMENDATIONS FOR FURTHER STUDY

7.1. Introduction

The science of Archaeozoology helps to increase our knowledge of certain aspects of the human past that cannot be inferred from archaeological material other than faunal remains. However, in order to achieve this, the archaeozoologist needs to study subjects such as bone measurements, sexual dimorphism, animal mortality profiles and taphonomy. In addition to these, the archaeozoologist also needs to study detailed ethnographic material, since the use of ethnographic information may help to reconstruct elements of human behaviour in the past.

The EIA of KwaZulu-Natal has been included in studies of a number of subjects, none of which included a detailed examination of the exploitation of animals during that period and in that area. This study, however, concentrates in particular on the use of animals, wild and domestic, by the people that inhabited KwaZulu-Natal during the EIA. Specific reference is made to the people that occupied KwaGandaganda, since it is one of few EIA sites from this area that yielded such a substantial sample of sufficiently well-preserved faunal material.

In Chapter 1 (1.1) it was stated that the primary objective of this project is to establish the exploitation of wild and domestic animals during the Early Iron Age (EIA) in KwaZulu-Natal by analysing the faunal material from KwaGandaganda. The use of domestic stock during the EIA in KwaZulu-Natal, and the role that it played in social, ritual and economic patterns, would be discussed, while the use of non-domestic animals would also be addressed. The results of the faunal analysis (as presented in Chapter 5) were discussed in detail in Chapter 6. Several conclusions regarding the abovementioned topics could be made, and these will be addressed below.

Throughout this study, I compared the results with the trends found in the different cultures and traditions of the southern African Bantu-speaking communities as described in the ethnographic sources and summarised in Chapter 3. I also endeavoured to determine the importance of various domestic and non-domestic animals, slaughtering patterns, preferences for certain animals, preferences for certain skeletal parts, possible ritual uses of animals and the general value of animals in the social life of the inhabitants. Not only did herd management and hunting strategies during the EIA receive attention, but the possibility of trade in animal products was also considered (see 6.7).

During the study I also encountered many aspects that would need further attention, not only from archaeologists and anthropologists, but also from people specialising in subjects such as archaeozoology, genetics, zoology and animal anatomy. These aspects and the recommendations for further research will be discussed in the final section of this chapter.

7.2. Humans and animals during the EIA of KwaZulu-Natal

The spread of the EIA into KwaZulu-Natal occurred as early as the early fourth century AD. EIA sites in relatively close proximity of KwaGandaganda are Nanda, Msuluzi Confluence, Ntshekane, Ndondondwane and Magogo. According to Whitelaw (1994b:18), the finds on KwaGandaganda indicate that the site was occupied continuously during the Msuluzi, Ndondondwane and Ntshekane cultural phases, i.e. from approximately AD 644 - AD 1029 (if the calibrated dates are considered) and the use of space was mostly fixed throughout the occupation. Whitelaw (1994a:107) interprets KwaGandaganda as a political capital and speculates that sites such as Nanda (another EIA site situated on the northern bank of the Mngeni River) could have fallen within its sphere of influence.

The finds on KwaGandaganda included several byres, with several ashy middens close to the byres. These middens were apparently associated with the men's assembly area and included characteristic artefacts such as broken pots, ceramic sculpture, ivory artefacts and faunal material. The presence of furnace daga, slag and ore suggests that ironworking also took place in the vicinity of the cattle byres. The byres were furthermore surrounded by the residential areas which included pits, raised daga granaries, daga floors, midden deposits and scatters of artefacts (Whitelaw 1994a:104). According to Whitelaw (1994a:119) the settlement pattern on KwaGandaganda conformed to the CCP, which means that the people were patrilineal and that the men paid bridewealth for their wives in the form of cattle.

- **Animals not related to the human occupation of KwaGandaganda**
  Several animal species that were identified in the KwaGandaganda deposit did not relate to the human occupation or human activities on the site. These included animals that are either self-introduced through burrowing, or are accidental inclusions. The human remains are included in this category since their bones did not contribute to either diet or cultural use of bone. In Chapter 6 (6.4.1) I speculated that the human remains are part of the skeleton of a mature male that was excavated in Square 25 (Msuluzi phase) and identified by Morris (1993:92). However, an isolated human incisor was also identified. According to Plug (1993a) there is increasing evidence that isolated human remains can be associated with ritual practices and it is possible that this incisor refers to such practices. On Nanda, an EIA site near KwaGandaganda, the skulls from the adult burials showed a distinctive pattern of dental alteration consisting of the removal of incisors. I stated that the isolated human incisor that was found on KwaGandaganda may

have been related to the abovementioned dental alteration rituals, but since no further evidence is available it cannot be accepted as confirmation.

Other animals that were regarded as not relating to the human occupation of KwaGandaganda included *Otomys* sp., reptiles, snails and *Rattus rattus* (see 6.4.1). Although these animals are probably all self-introduced, the presence of the house rat, *Rattus rattus*, is of great interest. Rats are not endemic to the southern African region, but according to Plug et al. (1979) and Voigt and Von den Driesch (1984) these rodents were present in southern Africa before the period of European contact. Since these rodents are usually only found in association with human habitation, their presence in the pre-European archaeological deposits can only be explained by possible trade links with people from the east coast of Africa. Plug (1994) states that, considering the dates of *Rattus rattus* remains found on Bosutswe in Botswana, it is possible that rats were introduced into southern Africa via the east coast of Africa when Arabian traders opened trade links with African people. How the rats came to be included into archaeological deposits as far south as Ndondondwane and KwaGandaganda is not yet clear.

– **Past climates and environments**

Regarding the discussion of both wild and domestic animals identified in KwaGandaganda's archaeological deposit, it was necessary to refer to the past environment since environmental factors such as topography, drainage, flooding, erosion, climate, altitude and distance from the sea influence the appearance, distribution and availability of vegetation. A main element that was considered were changes in the climate of southern Africa that occurred in the last 2000 years (refer to 1.3 and 6.4.2.1). This included the identification of a cooler, drier period in the Msuluzi phase and a greater part of the Ndondondwane phase, while the lesser part of the Ndondondwane phase and the whole Ntshekane phase were part of a warmer and wetter period between AD 900 and AD 1300.

These differential periods that could be defined in the climate over the last 2000 years probably had a major influence on the distribution and availability of vegetation and therefore on the distribution of wild animals and their obtainability for hunting practices. However, not only the wild animals were affected since suitable vegetation is also important for the implementation of successful herding practices concerning domestic animals. During the occupation of KwaGandaganda, the veld in the areas surrounding the site ought to have had sufficient sweetveld vegetation to cater for the needs of the large herds from KwaGandaganda as well as those from the neighbouring communities such as Nanda and Magogo.

- **Hunting strategies**

The faunal analysis of KwaGandaganda has shown that there were great differences in resource utilisation of the wild and domestic animals available to the people. The basic subsistence strategies were very similar throughout the Msuluzi, Ndondondwane and Ntshekane cultural phases, with minor shifts in the herding strategies regarding the importance of cattle over sheep/goats.

With reference to the hunting strategies, it seems that although the area surrounding KwaGandaganda probably had great exploitation potential, the people made relatively limited use of the resources available. A variety of wild animals are represented in the samples. Most of these could have been hunted or snared, and contributed regularly to the diet. Nevertheless, in all the phases hunting as an activity was greatly overshadowed by the importance of herding.

The extensive utilisation of livestock on KwaGandaganda indicates that hunting was of little importance in supplying food. It was probably of recreational, ritual or social value involving the men and the boys. The identification of species exotic to the region can possibly be attributed to changes in the climate and environment over time, but it also suggests trading between the KwaGandaganda people and others, possibly other contemporary EIA settlements or hunter-gatherers. (It was also speculated that recent exterminations due to excessive hunting in historic times could also account for the current absence of certain wild animals in the KwaGandaganda region.)

Wild animals such as hyaenas, crocodiles, pangolins and leopards are at present associated with rituals, traditional healers and diviners in Bantu-speaking societies (refer to 3.3.2). Their presence in this faunal sample suggests that these people played an integral part in the lives of people from KwaGandaganda. The ethnographic sources that were consulted indicated that most of the primates and carnivores that were identified on KwaGandaganda were probably used by diviners for their medicinal and ritual purposes.

The remains of large mammals such as hippopotami, elephants, giraffes and rhinos were probably acquired by means of pitfall traps, scavenging, hunting hippopotami from boats and the hamstringing of elephants. The relatively few fragments of these animals in the archaeological deposit can be explained by the fact that, due to the size of these animals they were probably slaughtered in the veld and only parts of the carcase transported back to the village. It is almost certain, judged by the few skeletal elements, that the meat was eaten. The teeth could have been used, although no positive evidence for hippopotamus ivory was found.

Remains of ungulates such as the grysbok, impala, waterbuck, zebra, warthog, bushpig, buffalo, kudu and eland were also identified in the sample. These were probably primarily food animals although it may be safely assumed that their skins and bones were also utilised. Most of these animals were adult at their time of death.

A few small mammals such as various rodents, hares and the hyrax were included in the sample. Although these animals were probably used as food, the scarcity of small animals (such as rodents that can be regarded as famine foods) suggests that there was no shortage of animal protein. It is, however, also possible that the sieve mesh used during excavation (3 mm) was too large and that most of the small rodent material was lost. It also depends on the keen eyes, reliability and experience of the sorters whether the small elements are retrieved (Plug 1988:359; pers. comm.).

The birds that were identified in the sample were mostly classified as small, medium or large, but one bird of prey was identified, as well as *Struthio camelus* (albeit on the basis of eggshell fragments only). The bird of prey remains possibly relate to the diviners who may have used them for medicinal purposes. The fact that very few bird remains were identified probably indicates that the KwaGandaganda people did not actively hunt for birds, or that birds were caught and eaten by boys when they were looking after the herds, suggesting that not many bird bones would reach the village deposits. It is also a fact that dogs could have disposed of the bird bones, leaving no trace thereof in the deposit.

The few reptiles identified in the KwaGandaganda sample could possibly have been utilised by the diviners for their medicinal values. Very few tortoise remains were identified, indicating that they were either rarely eaten, or that they were consumed in the veld where they were collected. Since the current distribution of tortoises in southern Africa excludes the area of KwaZulu-Natal where KwaGandaganda is situated, their presence in the sample can possibly be explained by the trading of animal goods with other people, or by the fact that changes in the climate and environment could have resulted in the extension of their range to the KwaGandaganda area a thousand years ago. This does not seem impossible, since *Kinixys natalenis* currently occurs in the lowlands of KwaZulu-Natal and could well have included the region close to KwaGandaganda when the site was inhabited.

– **Gathering activities and the utilisation of marine and riverine resources**

The small variety of marine fish species indicates only occasional fishing. However, the large amount of fish remains that was identified in the Msuluzi phase

(Square 25) possibly indicates that fish had special significance for the men on KwaGandaganda, since the area was identified as a men's assembly-area midden. In some ethnographic sources (see 3.3.2.8) fishing was described as a very important activity to Bantu-speaking peoples such as the Shona, Venda, Tsonga and Mpondo in terms of adding to the food supply. The fish found on KwaGandaganda were probably caught by means of lines or traps.

With reference to gathering activities, it has been established that in traditional Bantu-speaking societies these activities were generally the responsibility of the women. On KwaGandaganda, it possibly included the gathering of snails and shellfish. However, in the total KwaGandaganda faunal sample, gathering activities represent only 4.16% of all the food-procuring activities. Considering the distance from KwaGandaganda to the sea, it is probable that these people limited their visits to the coast to once or twice a month, probably during low spring tides. Since gathering and fishing are gender-related activities (gathering is generally the work of the women while fishing is the men's activity), they probably did not do both at the same time. From the small numbers of marine molluscs excavated, it seems that either the collecting of marine molluscs as a food source was not very important, or that they collected the molluscs from the coast and only transported a few whole shells inland, extracting the edible portion at the coast. The few marine shells that were transported back to the site were probably utilised for purposes such as decorating and exchange, but they could also have been used to work skins and to manufacture beads.

The abundant remains of *Achatina* snails on KwaGandaganda may indicate that the people regarded them as valuable sources of protein. The specific uses of certain shells have been discussed in Chapter 6 (6.4.2.2.4).

With regard to gathering and fishing in general, it is clear that the people of KwaGandaganda under-utilised the riverine resources, even though the river was in close proximity to the site.

– **Herd management strategies**

Domestic animals played a significant role in the food-procuring activities of the people of KwaGandaganda. The abundant cattle remains on the site indicate that tsetse flies were not a problem in the area at the time that the site was occupied.

The community was heavily dependent upon their domestic stock for food, particularly their small stock. These were probably used on a day-to-day basis rather than their cattle. However, the faunal analysis has shown that there were differences in the exploitation of domestic animal remains during the three cultural phases on KwaGandaganda. The importance of cattle over small stock increased from the earlier to the latest phase. By the final, i.e. Ntshekane phase, cattle numbers had increased dramatically to outnumber small stock. This suggests that cattle became progressively more important to the economy, and presumably also to the social and ritual life of the people.

Whitelaw (1994a:58) recorded six cattle byres in the Ndondondwane phase, only one in the Msuluzi phase and none in the Ntshekane phase. Since it was evident from the Ntshekane sample that cattle were more abundant than sheep/goats, the absence of byres in this phase is not easily explained. However, it is possible that there were spatial shifts in the occupation of the site, and that the full lateral extent of each occupation phase has not been determined. Since a large area of the site has not been excavated due to time constraints, this would be a feasible explanation.

The cattle remains found on KwaGandaganda indicate that some of the cattle were medium-sized and also that some of the animals were large and robust, approaching the size of buffalo. When compared to cattle sizes from other archaeological sites, the size of the cattle seems to correspond to the size of those identified from Bosutswe and Nanda, while the compared specimens from Schroda were smaller. However, as Iron Age cattle size would be the subject of a large study on its own, it is not addressed here, but would be a suitable independent research project.

With reference to the breed of cattle that was herded on KwaGandaganda, two distinct facial profiles could be recognised, namely strongly convex such as seen in modern Afrikaner cattle, and flat, slightly convex as seen in Sanga cattle. These findings confirm new research that no evidence of the Zebu was present in KwaZulu-Natal at least until the eleventh century AD when KwaGandaganda was presumably deserted.

The remains of *Bos taurus* were very well represented during all the phases of KwaGandaganda's occupation. By comparing the information regarding the abundance of cattle on KwaGandaganda and the general layout of the site with the recent ethnographic studies describing the CCP, it is possible to state that Whitelaw's (1994a; 1994b) identification of the CCP on KwaGandaganda is justified.

The herds on KwaGandaganda also included sheep and goats. These were large and robust in relation to the comparative material used for analysis. In relation to other EIA material, it seems that the small stock of KwaGandaganda compare well with those identified from Nanda but seem to have been slightly smaller than those from Schroda. No evidence of the dwarf goat variety that has been recorded on Nanda (see Voigt & Von den Driesch 1984:98) or from the LIA in the Free State (see Brink & Holt 1992) was found on KwaGandaganda.

The analysis of the faunal material from KwaGandaganda also yielded evidence for slaughtering practices of herded animals. It seems that males were slaughtered more frequently than female animals, for both *Bos taurus* and *Ovis/Capra.* Slaughter trends as reflected in the age composition of *Bos taurus* and *Ovis/Capra* indicated that the older animals were under-represented in both groups, and that, relative to the length of the age categories, younger animals were preferred for slaughtering. However, the slaughtering of *Bos taurus* from age classes I-II (newborn to 15 months) seems improbable and these inclusions may well have been the results of natural deaths. Based on ethnographic information regarding slaughtering patterns, the inclusion of numerous cattle aged between 15-24 months provides preliminary evidence for the slaughtering of young bulls.

Regarding the number of very young sheep/goats in the sample, it is possible that they could have been natural deaths, but they could also have been slaughtered for purposes such as the use of lamb or kid skins in the making of men's clothing.

The skeletal parts representation of the domestic animals show clearly that the cattle mandible ramus/condyles were best represented, while in the case of the sheep/goats the pelvis fragments were more abundant. Considering the skeletal parts representation of the non-identifiable sample, the specimens that occurred most abundantly in all the phases were bone flakes derived from limb-bones followed by ribs and vertebrae.

Many specimens show evidence of butchering damage: 12.2% of the total *Bos taurus* sample with damage are mandible ramus/condyles with cut and chop marks, while many of the carpal and scapula fragments also have a high incidence of human damage. Only 149 fragments of the total *Ovis/Capra* sample of 4021 fragments have human damage, most of which occurred on pelvis fragments.

The cattle slaughtering patterns at KwaGandaganda appear to be rather similar to those used by the people of Mapungubwe. Since the slaughtering of *Ovis/Capra* usually involves no specific procedure among the Bantu speakers (see Quin 1959:102), the exceptional preservation of pelvis fragments and the high incidence of human damage on these remains are difficult to explain.

The bone assemblages provided little evidence of the cooking procedures used at

KwaGandaganda. Only one circular hearth-like structure was found. Most of the burnt bones were recovered from the middens. Scorch and burn patterns usually associated with roasting could not be demonstrated from the sample. Burning occurred randomly on the different skeletal parts of both the identifiable and unidentifiable material.

Calculations on meat weights and dietary contributions of animal protein indicated that *Bos taurus* was most important, contributing between 65% and 88% of meat to the diet (refer to Chapter 5 [5.10] and Table 5.36). Meat contributions of *Ovis/Capra* vary between 4% and 20%, the lowest contribution being in the Ntshekane phase. I speculate that this is probably due to the fact that, in this later phase the importance of sheep and goats declined to be gradually replaced by the cattle.

An interesting feature of the KwaGandaganda faunal sample is the unusually high number of pathological specimens. As noted in Chapter 6 (6.5), evidence for pathological damage is rare in faunal remains from southern African archaeological sites. On KwaGandaganda, however, several specimens with pathological damage were identified, mostly occurring on bones of *Bos taurus*, with only a few *Ovis/Capra* specimens. The cattle pathology is mainly confined to the lower limb-bones and to the teeth and consists primarily of exostosis and/or abscesses in the former and wear grooves in the latter. The presence of exostosis may indicate that the cattle of KwaGandaganda were, in addition to their many uses, also utilised as work animals, perhaps as riding and/or pack animals. It is probable that mainly oxen were utilised in such a way.

The abscessing can be explained as the result of trauma with subsequent infection of an open wound. The abscesses on the lower limb-bones of the cattle could therefore have been the result of trampling, as often happens when herd animals are closely huddled together in a confined space such as a too small cattle byre. Since the cattle byres that were identified on KwaGandaganda only had a diameter range of between 17-21 metres, this may well have been the cause of these injuries.

The pathology on the cattle and sheep/goats teeth included specimens where the body of the tooth is markedly constricted. Since Baker and Brothwell (1980:136) noted that poor grazing and insufficient nutrients during growth would influence the state of the teeth, it is possible to suggest a period of interrupted growth related to a period of poor nutrition. These specimens occurred in both the Ndondondwane and Ntshekane phases, suggesting a long period of environmental stress during these phases. Whether this was caused by overgrazing and overexploitation cannot be ascertained. A long period of drought could also have contributed, leading to decreased vegetation with poor nutritional value.

Other domestic animals that were identified in the KwaGandaganda sample are dogs and chickens. The dogs were probably part of the KwaGandaganda people's everyday lives and they were probably not eaten but mainly used during hunting. Although relatively little evidence of chickens was found, they were probably kept for food.

– **The utilisation of animal products**

Several specimens of worked bone and shell were excavated on KwaGandaganda. These included bone points/linkshafts, informal bone tools, beads, worked ivory and divining bones. Some of the bone points may have been used as awls, while a sharply pointed, thin bone point could have been utilised to sew clothing or bags from animal skins. Another specimen's tip has a dark stain, possibly due to traces of poison (refer to 5.12.1). The informal bone tools included a specimen that could have been a sweat scraper, but it could also have been utilised as a tool to push and lift *Patella* sp. from the rocks. Several pierced canines and ivory and bone replicas of canine teeth were possibly used as ornaments and pendants, while the large sample of ostrich eggshell and mollusc shell beads shows that they were commonly used, possibly for necklaces and other decorative articles.

The collection of ivory fragments from KwaGandaganda is the largest sample that has ever been identified on a southern African EIA site up to date. Thousands of ivory chips, manufacture residue, as well as worked ivory fragments were identified. Although it cannot be proven, it is possible that ivory was worked by the men from KwaGandaganda. The ivory could have been obtained by scavenging the tusks from dead animals; by catching elephants in pitfalls traps and/or by hunting. By whatever means obtained, it is clear that only a few remains were transported back to the site. Whether the meat was important is difficult to determine; the ivory certainly was.

Since the component of worked ivory is small in relation to the large amount of chips, it may well be that finished ivory products were traded.

– **Ritual activities**

Possible evidence of ritual activities was found on KwaGandaganda in the form of several modified divining bones and an isolated human incisor. The human incisor could have been related to the ritual practice of dental alteration, but this could not be proven.

The other evidence for ritual activities includes several modified *Ovis/Capra* astragali specimens. There is also a possibility that two of these specimens could have originated from hunter-gatherers. A bone flake with decorative motifs has also been identified as a possible divining bone. It has been fashioned into a V-shape and the surfaces are polished. The bone strongly resembles the so-called "male and female" tablets such as those found among the Shona, Venda and Sotho (as described by Hammond-Tooke 1989:114; Plug 1988:63; Van Warmelo 1945:200-201). Plug noted that the Tsonga and Nguni only recently introduced these dice into their sets.

Divining bones were the main elements in a diviner's pouch (Plug 1987b:50), and one can only speculate how these bones became incorporated into the archaeological deposit.

- **Trade relations**

The trading of necessary products that could not be obtained by a certain group of people occurred commonly in the history of the Bantu-speaking communities of southern Africa. Trading mainly took place in the form of exchange. The people from KwaGandaganda were probably therefore also part of a trading network.

Several of the items excavated on KwaGandaganda could indicate trade relations with settlements in other regions. Apart from the foreign articles such as the *Haliotis midae* shell, the glass and copper beads and the Sassanian-Islamic sherd that were identified by Whitelaw (1994a:108), the faunal remains also yielded possible evidence of trade relations. This evidence was discussed in detail in Chapter 6 (6.6) and includes the following:

- evidence of *Rattus rattus*, a species not endemic to southern Africa
- evidence of animals exotic to the KwaGandaganda region
- evidence of marine shells which can probably not prove trade between the KwaGandaganda people and other people closer to the coast, but there is a possibility that the KwaGandaganda people obtained these shells from the coast to be used as trade objects with people from sites that were situated further inland
- evidence of tortoises, a species not endemic to KwaZulu-Natal
- large quantities of ivory
- divining bones with holes drilled through one side, possibly originating from hunter-gatherers
- large numbers of bone points/linkshafts
- evidence of OES beads

7.3. Recommendations for further study

During the course of this study, it was noted that information regarding the following points was either insufficient or absent. Some of them cannot be rectified, but others may still be addressed.

- Ethnographic studies seldom deal with aspects of human behaviour that directly or indirectly address the needs of archaeozoology. Although some information exists on traditional stock-breeding practices of southern African people, there are few references to those topics relevant to archaeozoological research. There is insufficient documentation on the reasons for slaughtering, slaughter ages, male to female ratios in herds and for slaughter, if and when bulls are castrated, how cattle or oxen are utilised and for what purposes. Since these practices are likely to differ between different ethnic groups, it would be easier to establish relationships between past and present populations, and to trace the origins of the inhabitants of an archaeological site, should such information be available.

- Butchering procedures and the methods of cooking and its effect on the bones are seldom mentioned in ethnographic literature. For the archaeozoologist such information is crucial. Carcase treatment such as butchering, dismembering, cooking and waste disposal procedures all impact on the preservation of bone in a deposit, and influence subsequent taphonomic processes. Since cooking may have a damaging effect on the bone, knowledge of food processing methods is useful in the interpretation of skeletal part preservation. Skeletal parts with a low structural density, may also be more easily destroyed when cooked. This may lead to an under-representation of such parts in the sample.

- Methods of refuse disposal are hardly ever mentioned in the ethnographic material. There is also no information on the rate of midden accumulation and the size of the contributing community. It is therefore difficult to interpret remains excavated in middens. Since middens usually yield most of the faunal material, this matter needs urgent attention.

- Knowledge about the differential preservation of skeletal elements of African mammals, wild and domestic, is also scant. Since the faunal analysis of KwaGandaganda yielded relatively little evidence of the remains of non-domestic animals in the middens and elsewhere, it may be possible that the rest of these animals' skeletal remains either were not present on the site, or were fully utilised, or were subject to poor preservation conditions, rendering them only identifiable up to group/size level. Nevertheless, if one has information regarding the preservation of these skeletal elements for specific species and under specific conditions, one would have a much better indication regarding the utilisation of these animals on the site.

- Information regarding comparative cattle sizes is absent in the literature. Very few archaeozoologists bother to include the range of measurements taken from the cattle bones identified in the archaeological sample. Measurements of current indigenous cattle breeds distributed over various geographical regions and the influences of nutrition is also not available to be compared with Iron Age cattle measurements.

- The use of standardised research and reporting methods by researchers is lacking in most of the written sources used. From some of the sources, it was not clear which quantification methods the researcher used, how these were applied or how the results of the quantification methods were interpreted. As a result it is at best difficult or at worst not possible to duplicate the results should it be necessary to do a follow-up study, or a comparison with the results from other sites.

- In view of improved archaeozoological techniques, it may be worthwhile to re-analyse the fauna identified from sites before *ca* 1980, particularly to distinguish between cattle and Bov III; sheep and goat; domestic dogs and jackals; and guinea fowl and chicken. Such re-examination may well alter or increase and strengthen previous findings.

- There is an urgent need for more studies in comparative osteomorphology. The skeletal elements of animals from the same size class (e.g. Bov II) are often difficult to allocate to species, as the species-determining criteria for many taxa have not been established. Such studies will increase the scope of faunal analysis and will provide greater resolution on past human behaviour.

- More research is needed on the causes of disease and pathology with reference to overcrowded byres, malnutrition and the use of animals as ride, pack, work, and draught animals. Although it is sometimes possible from pathological samples to establish the cause of the damage, it is hardly ever possible to say with certainty whether an arthritic lesion was the result of trauma, natural disease or overwork.

- In view of future excavations, a last and very important point that needs to be addressed is that of the excavation techniques used by archaeologists. The growing trend of archaeologists using large landscaping equipment to clear areas for excavation is unacceptable. I realise and accept that on KwaGandaganda this method of excavation seemed appropriate due to time constraints. However, while implementation of other more traditional techniques may be more time-consuming, less fragmentation of the samples would occur which would in turn result in a more accurate picture of the past. Considering the amount of funding that is currently spent on archaeological projects conducted as part of cultural resource management programmes, it is unforgivable that such destructive techniques are still used, especially if the site is as uniquely rich in faunal remains as KwaGandaganda. It is even more unacceptable if the site is to be destroyed (such as KwaGandaganda which has been destroyed by the flooding of the Inanda dam), with no prospect to re-excavate the site.

Only when attention is turned to all the abovementioned matters will archaeozoologists be able to provide a less distorted view of the EIA people's diet and their utilisation of wild and domestic animals.

FIGURES

Figure 1.1. KwaZulu-Natal and the position of KwaGandaganda in relation to associated Early Iron Age sites

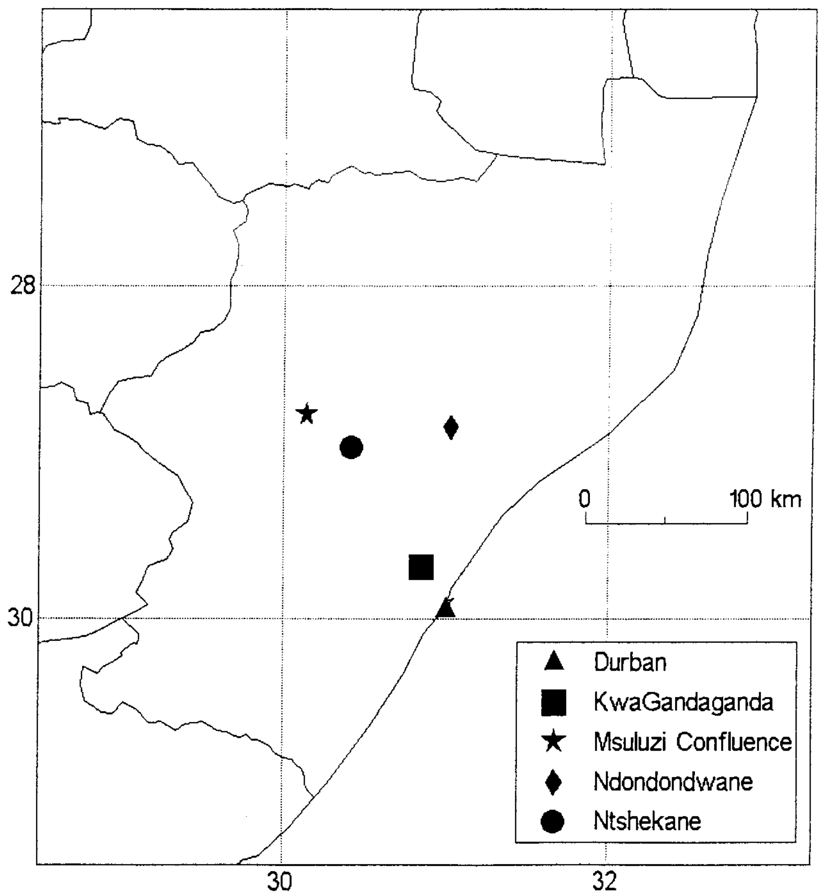


Figure 2.1a. KwaGandaganda: plan of the excavations and artefact occurrences. G: grid; S: square; TS: test square; plain numbers indicate survey point (SVP) features; black triangles denote unexcavated SVP features. The border marks the edge of the excavated area (After Whitelaw 1994b:5)

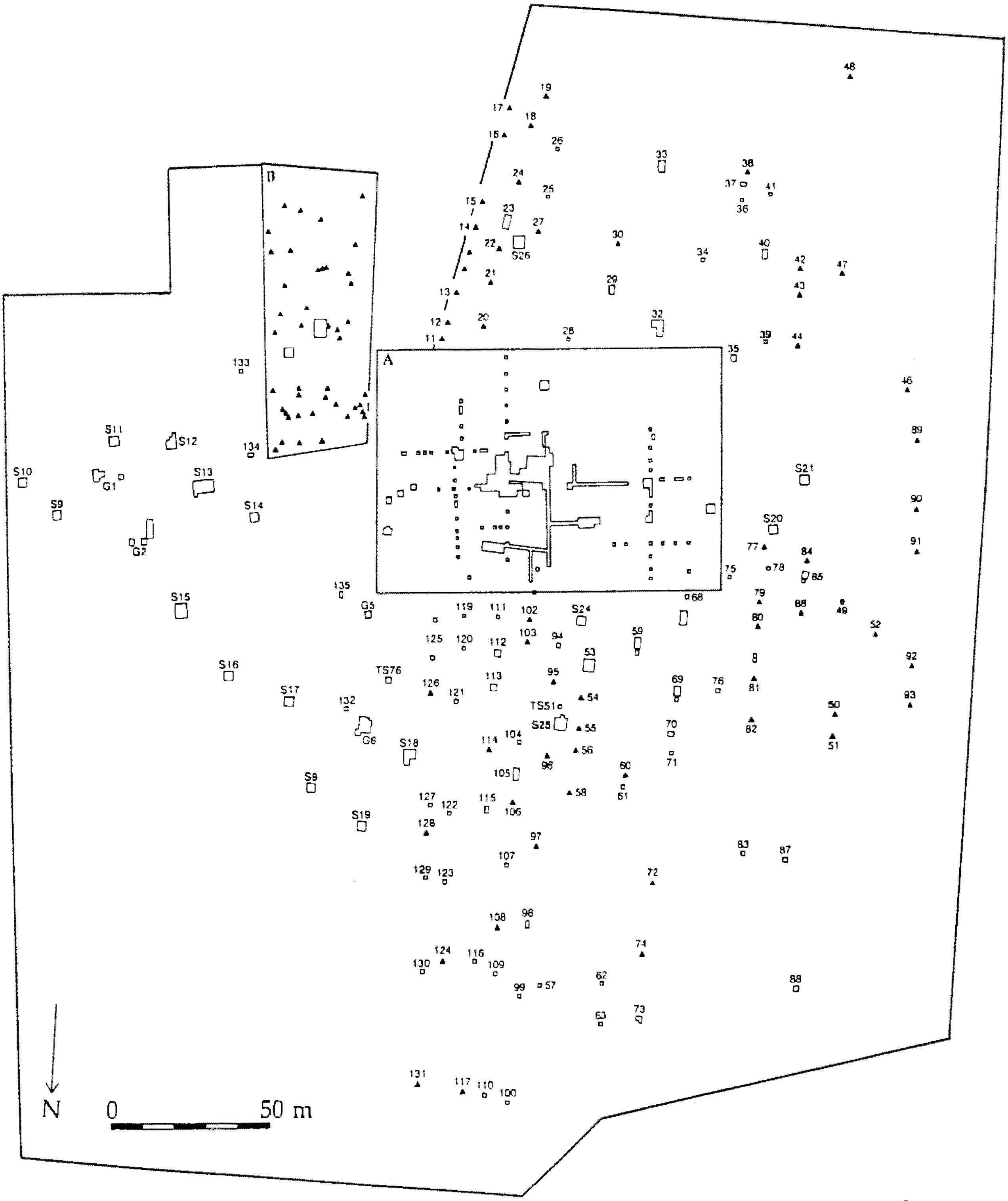


Figure 2.1b. KwaGandaganda: detail of the excavations in area A of Figure 2.1a (After Whitelaw 1994b:6)

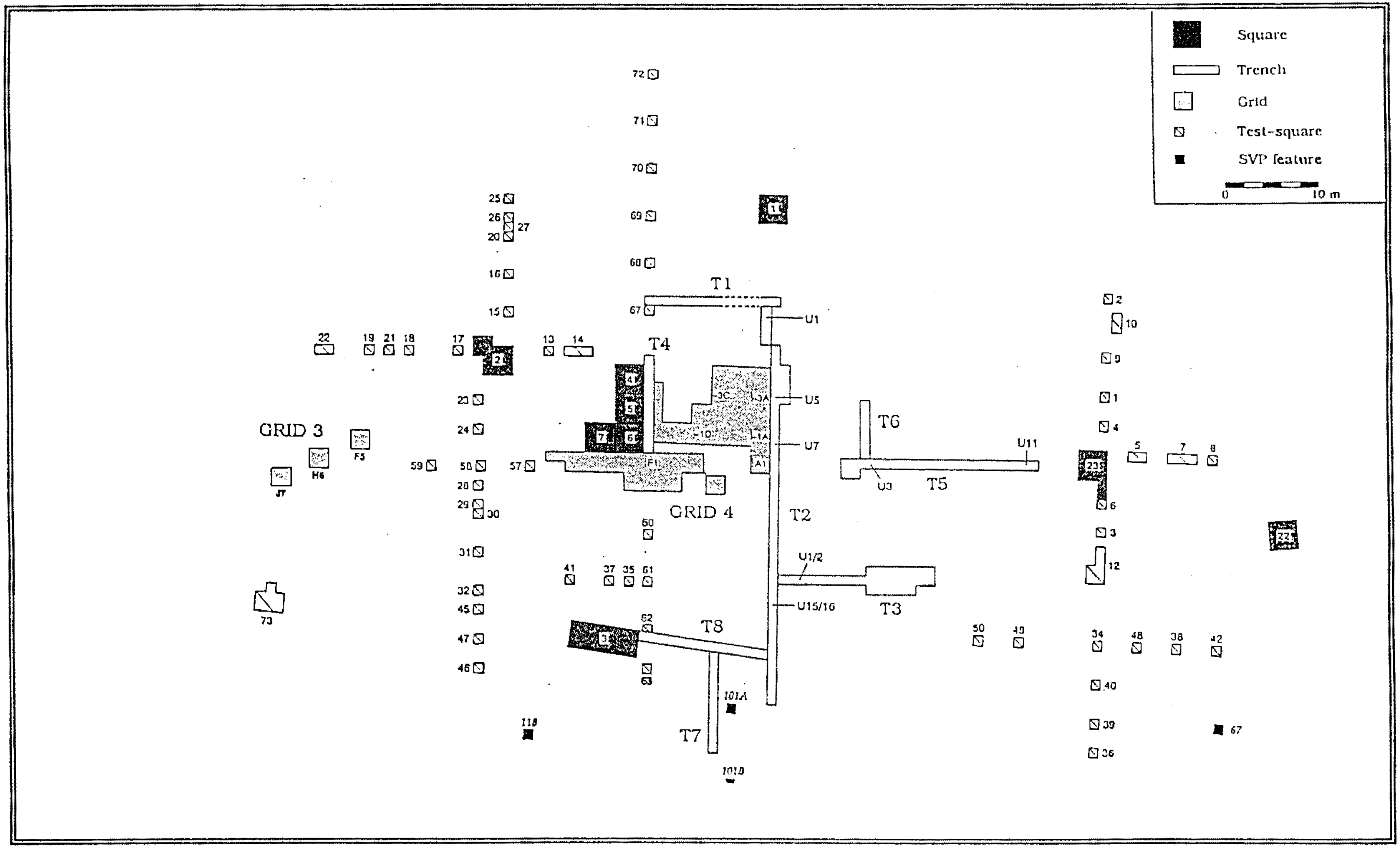


Figure 4.1. Example of the form used to list non-identifiable faunal material (Transvaal Museum)

SITE: 86/2 KwaGandaganda			**PROVENANCE**: Trench 2			**LEVEL**: U5 Hearth	
	Damaged	**Burnt**	**Gnawed**	**Weathered**	**Unmodified**	**Total**	**Mass (g)**
Enamel					1	1	10
Skull	1		1		19	21	678
Vertebrae	3		2		19	24	1238
Ribs	4		2		58	64	1657
Misc. skel. parts		3	1		26	29	254
Bone flakes			9		70	79	1697
000-009mm							
010-019mm						12	
020-029mm						20	
030-039mm						21	
040-049mm						12	
050-059mm						5	
060-069mm						3	
070-079mm						3	
080-089mm						1	
090-099mm							
100-109mm						2	

Figure 4.2. Example of a card used to describe identifiable remains (Transvaal Museum)

SPECIES: *Bos taurus*	**NUMBER:** 5413
SIZE RANGE:	**SITE:** 86/2 KwaGandaganda
MNI: 1	**PROVENANCE:** G4 -4A
AGE: Juvenile	**LEVEL:** Loose soil from JCB
SKELETAL PART: Fragment of unfused (L) femur shaft. (Proximal end.)	
DIMENSION: 140 mm 13,7 g	**PREPARATION:** None
DAMAGE: Carnivore gnaw-marks	
CONDITION: Burnt	**PERM. HOUSING:** Natal Museum

Figure 5.1a. KwaGandaganda: Msuluzi phase - combined units (➔ indicates relative position of features not indicated on the map. Adapted from Whitelaw 1994b:6)

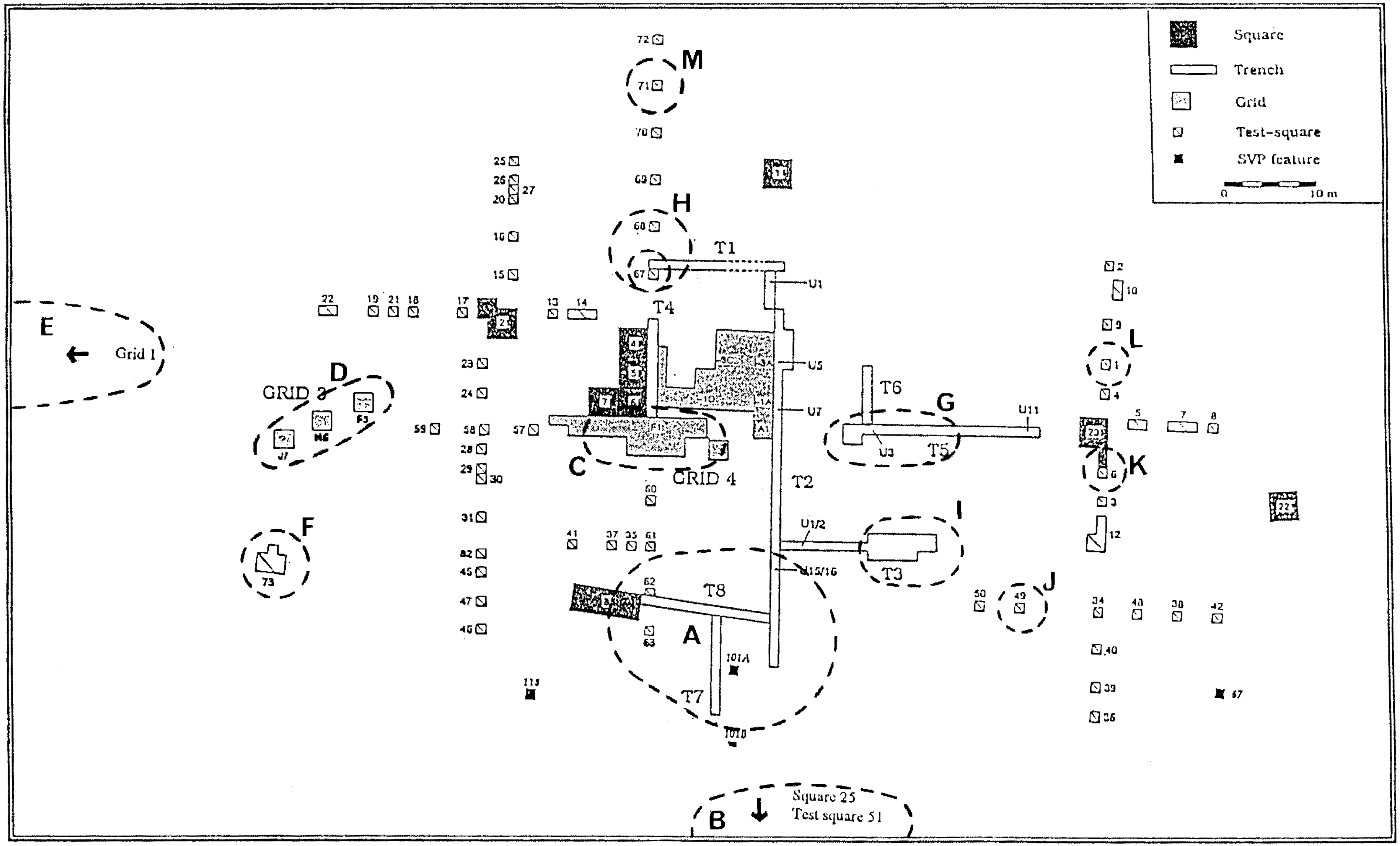


Figure 5.1b. KwaGandaganda: Ndondondwane phase - combined units (➜ indicates relative position of features not indicated on the map. Adapted from Whitelaw 1994b:6)

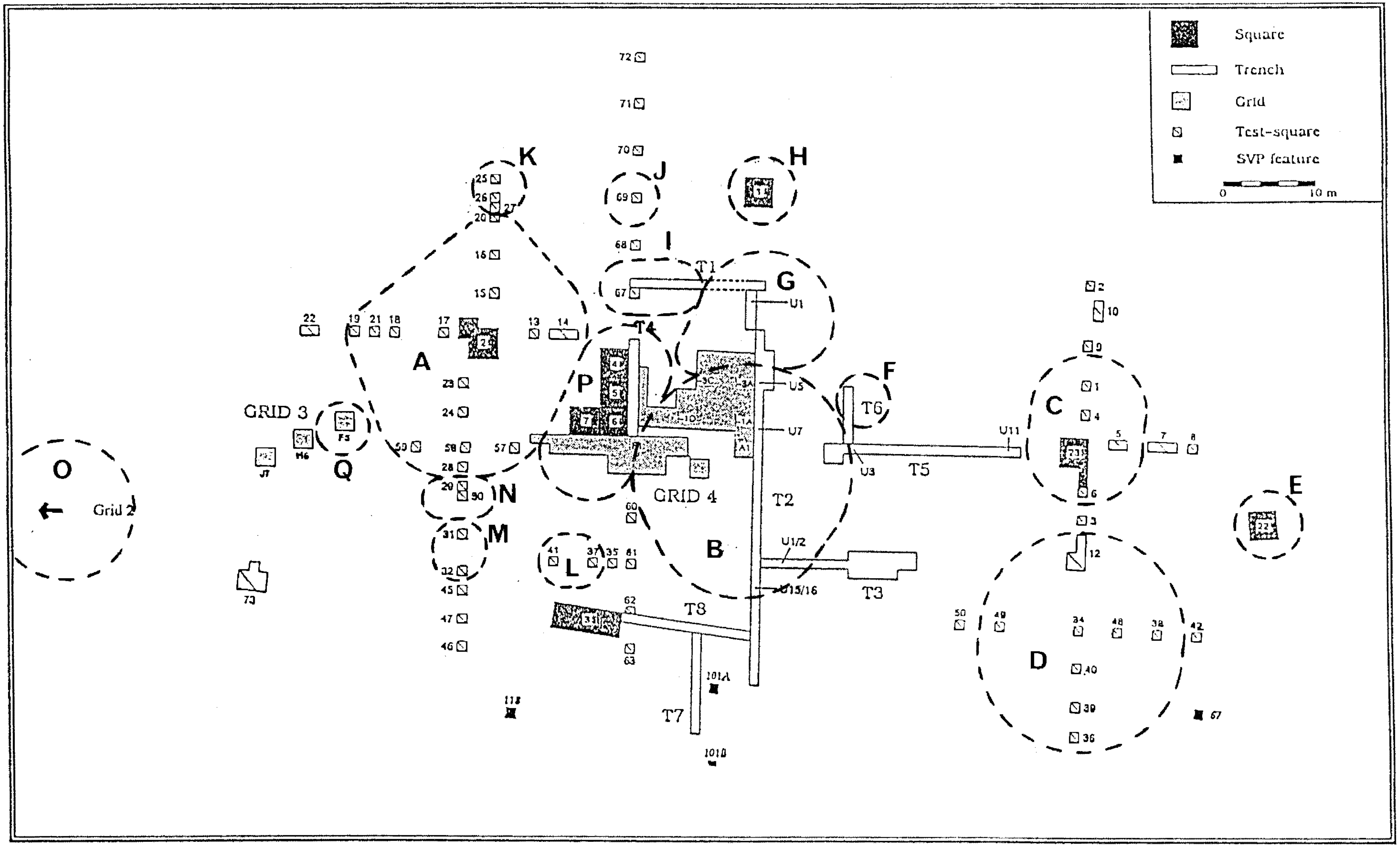


Figure 5.1c. KwaGandaganda: Ntshekane phase - combined units (➜ indicates relative position of features not indicated on the map. Adapted from Whitelaw 1994b:6)

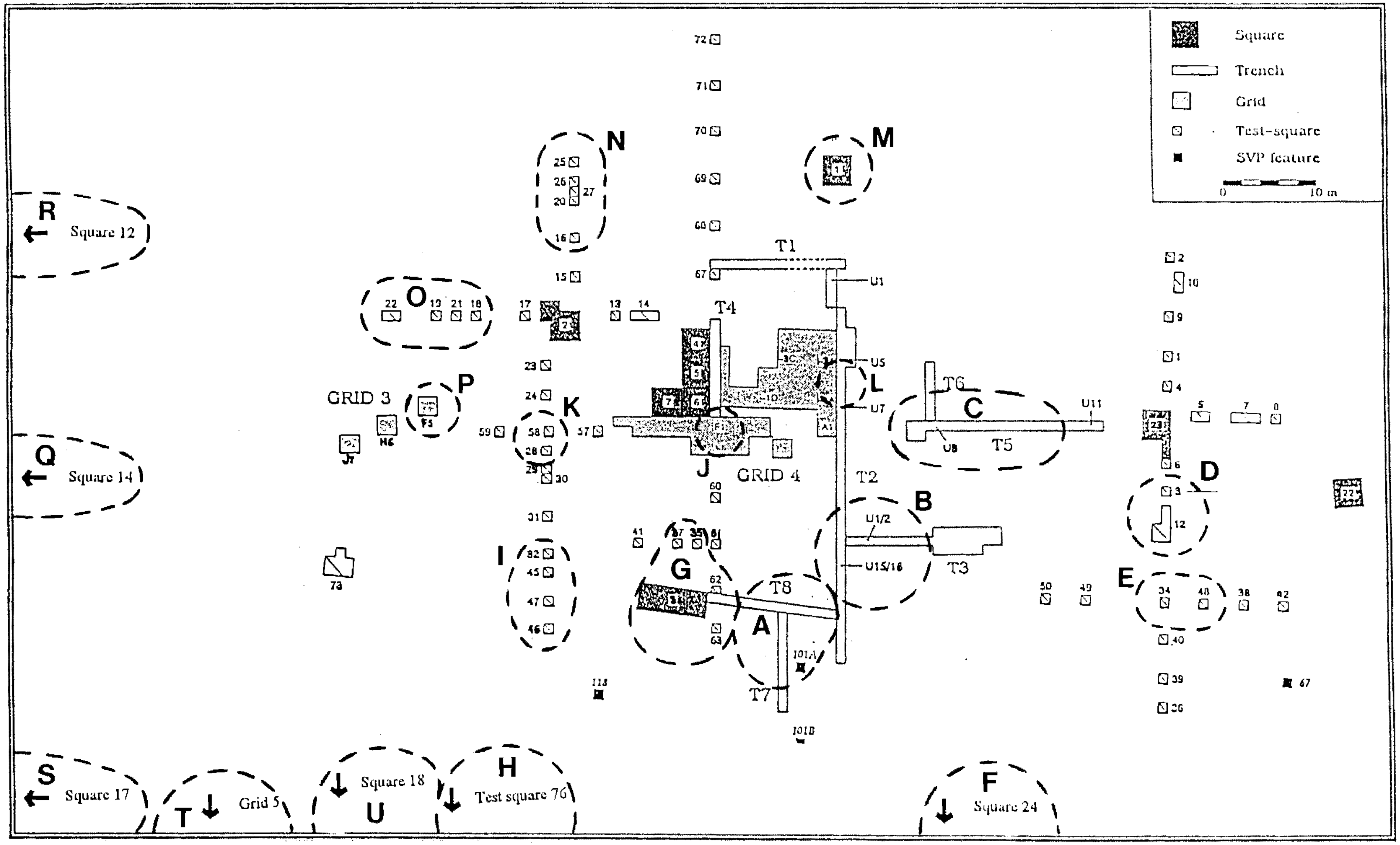


Figure 5.1d. KwaGandaganda: Msuluzi/Ndondondwane mixed units - combined units (➜ indicates relative position of features not indicated on the map. Adapted from Whitelaw 1994b:6)

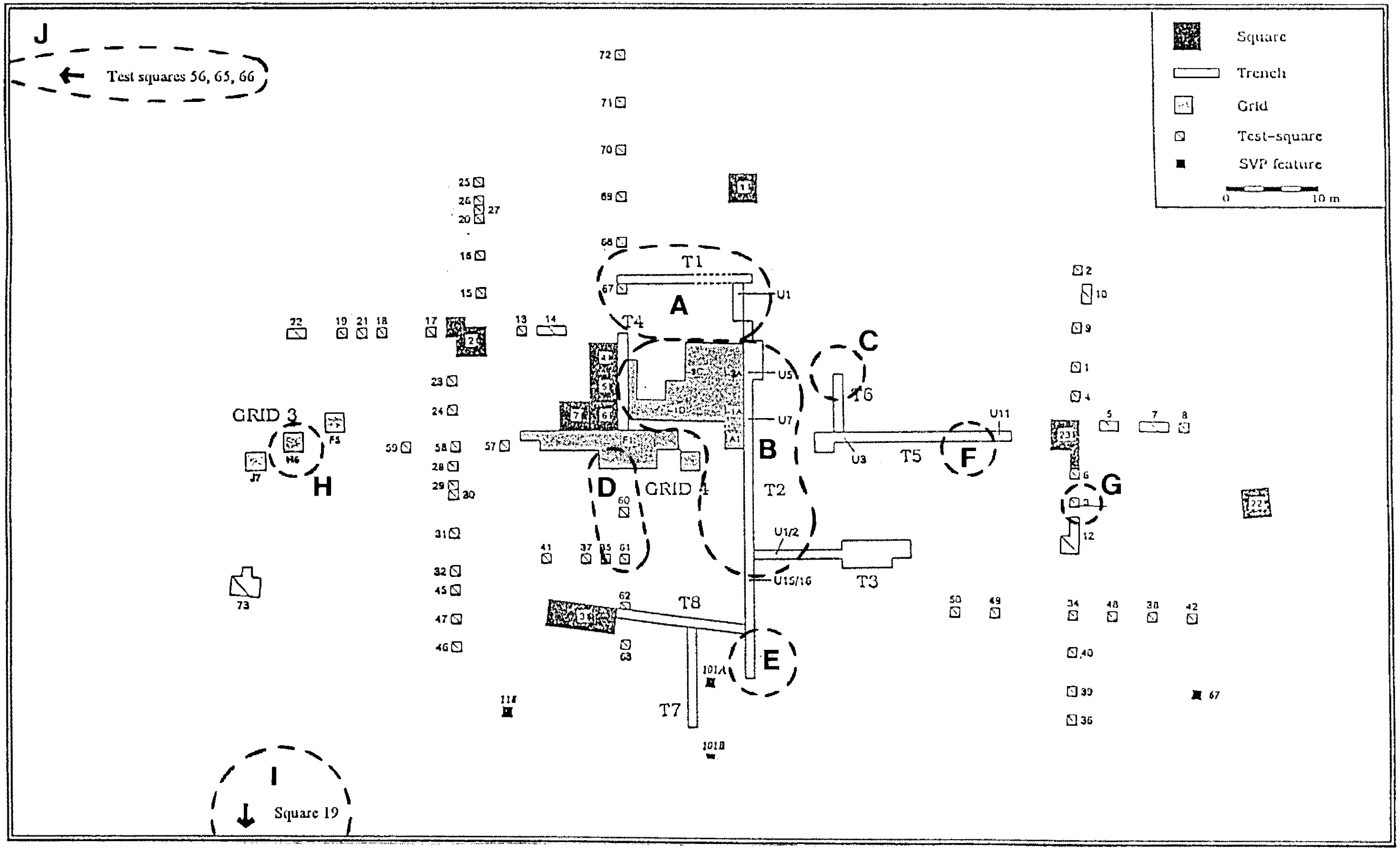


Figure 5.1e. KwaGandaganda: Msuluzi/Ntshekane mixed units - combined units (➔ indicates relative position of features not indicated on the map. Adapted from Whitelaw 1994b:6)

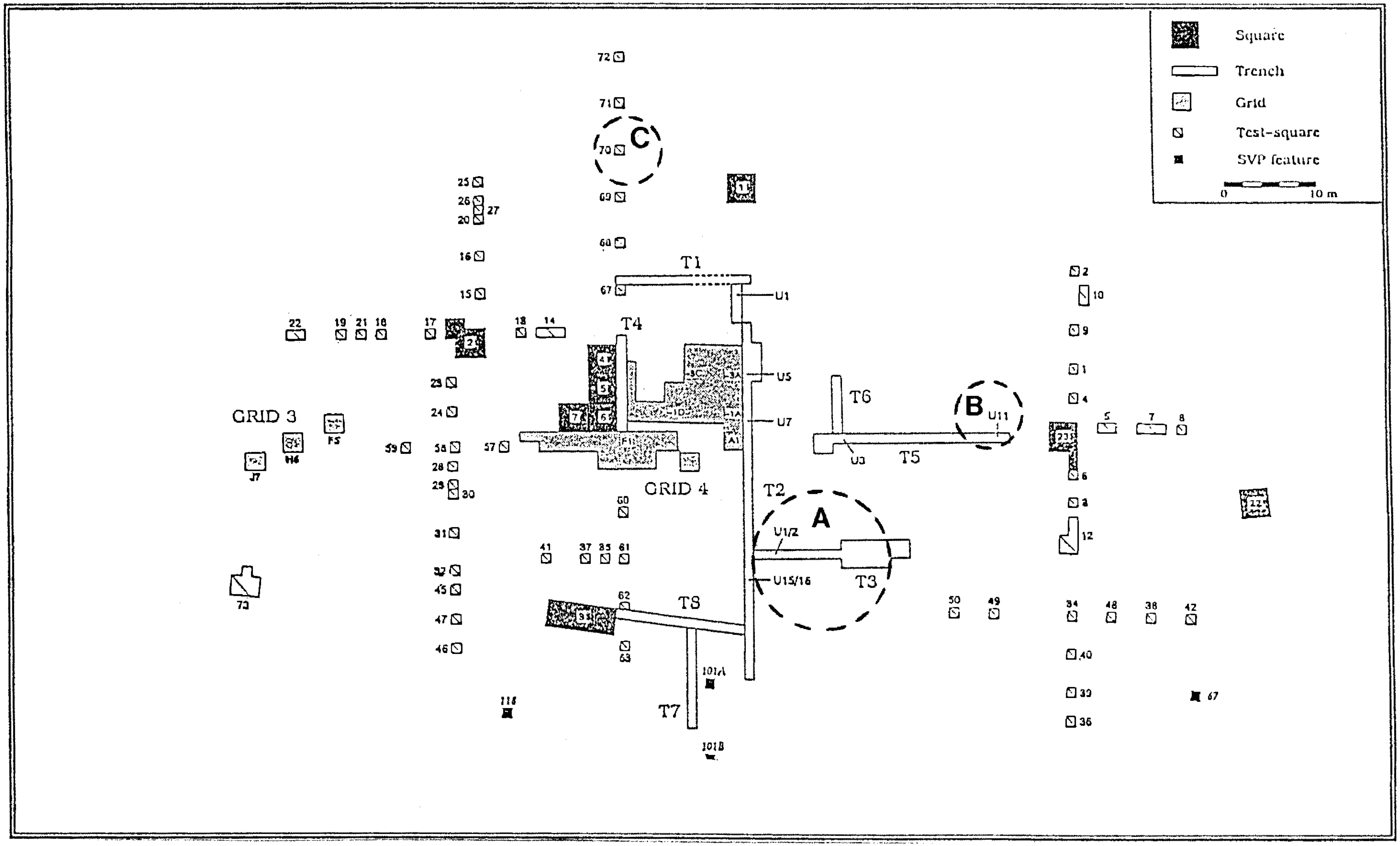


Figure 5.1f. KwaGandaganda: Ndondondwane/Ntshekane mixed units - combined units (➔ indicates relative position of features not indicated on the map. Adapted from Whitelaw 1994b:6)

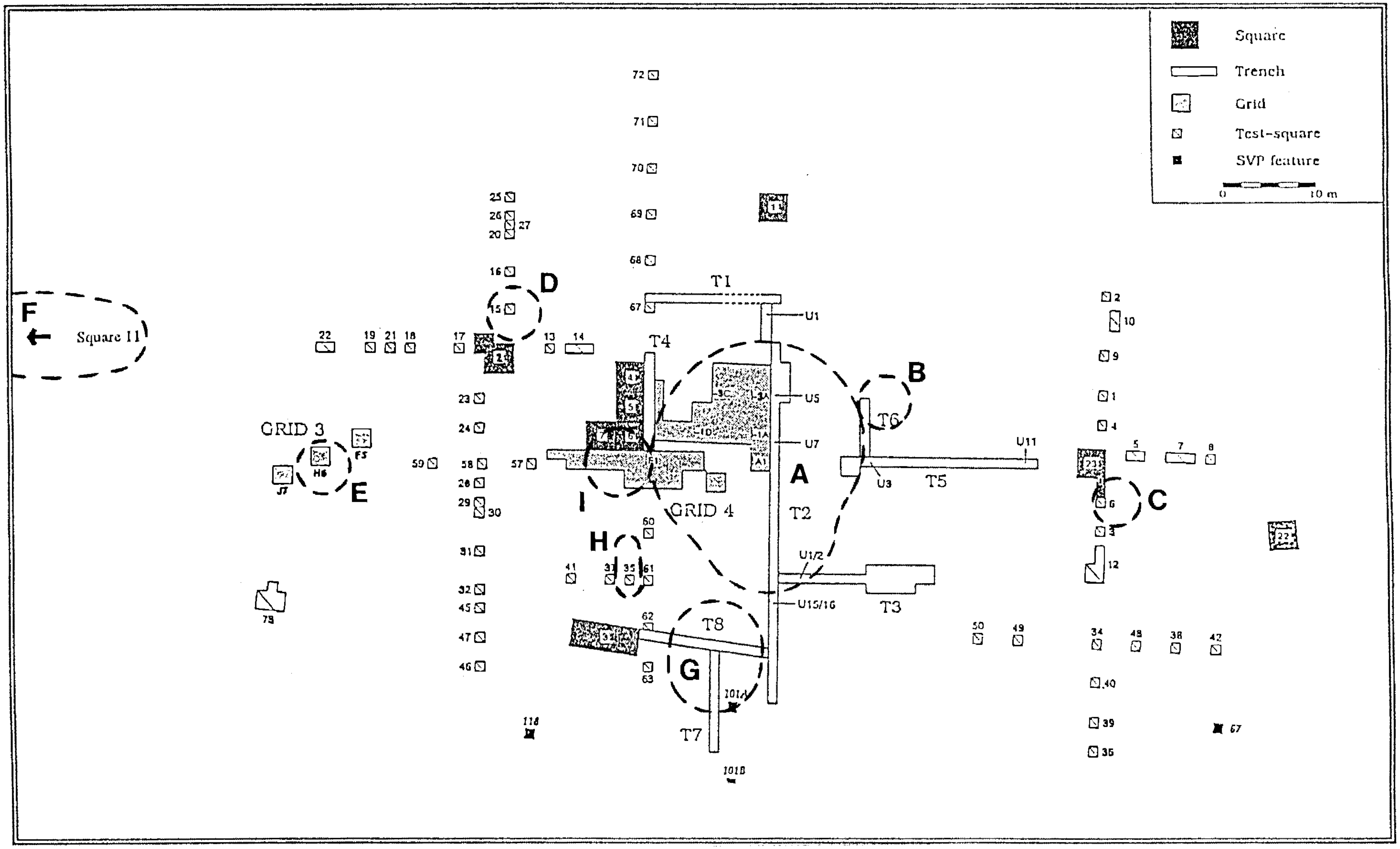


Figure 5.1g. KwaGandaganda: Unknown phase - combined units (➜ indicates relative position of features not indicated on the map. Adapted from Whitelaw 1994b:6)

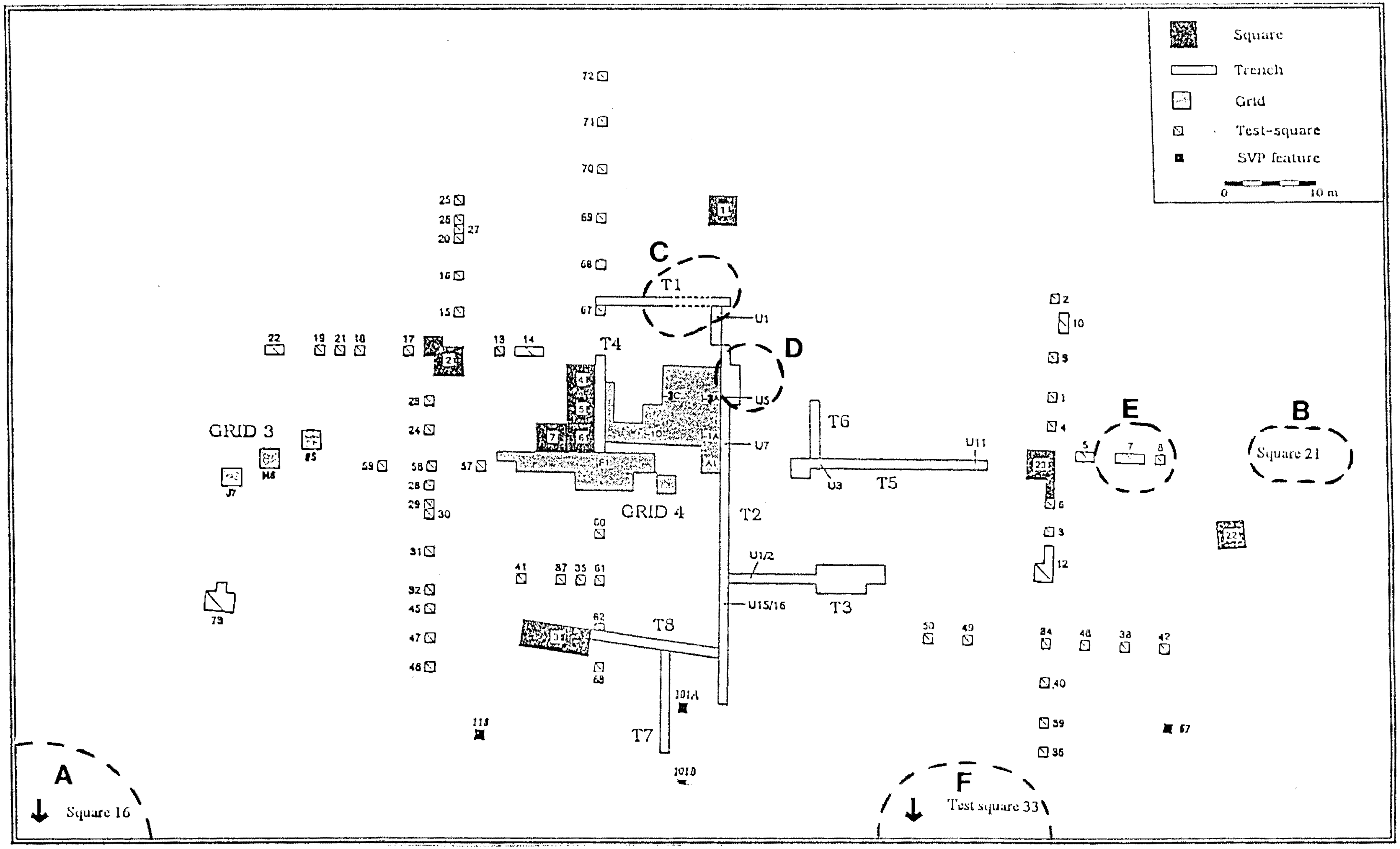


Figure 5.2a. KwaGandaganda: total sample identifiable vs. non-identifiable bones in each phase and mixed units (Total ID based on NISP; Total Non-ID based on number of fragments) (ID: Identifiable; Non-ID: Non-identifiable; Ms: Msuluzi; Nd: Ndondondwane; Nt: Ntshekane; Ms/Nd: Msuluzi/ Ndondondwane; Ms/Nt: Msuluzi/Ntshekane; Nd/Nt: Ndondondwane/Ntshekane)

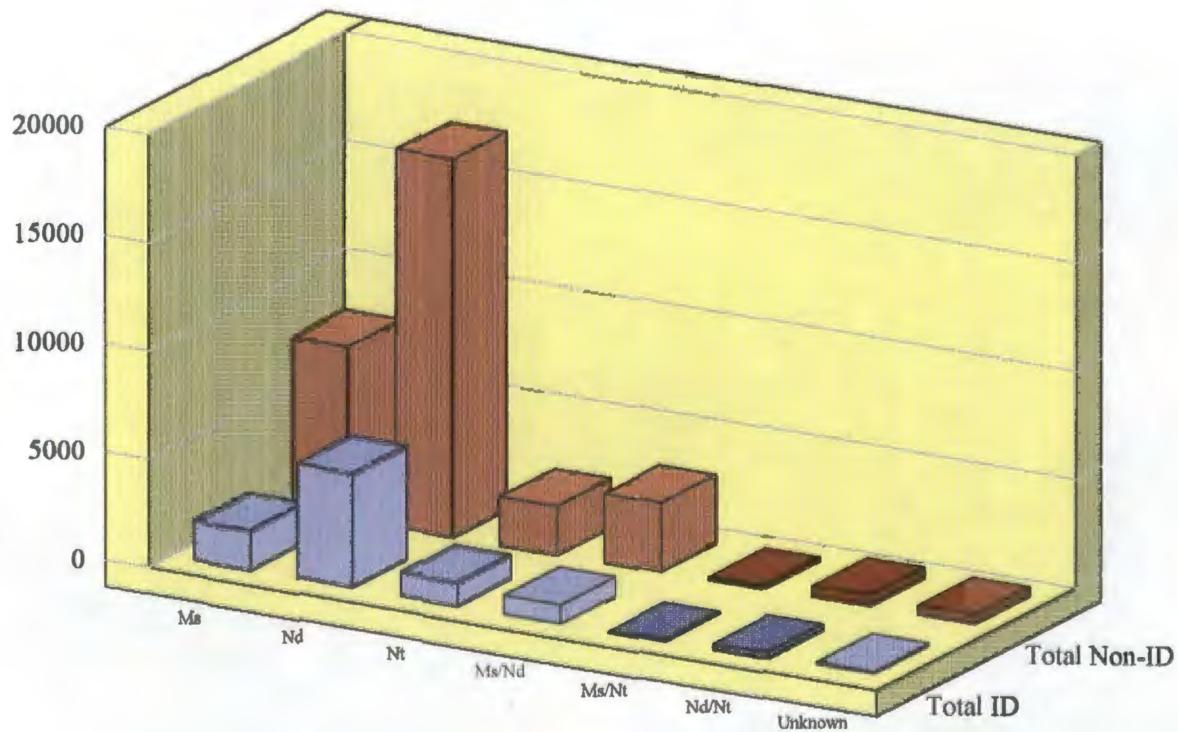


Figure 5.2b. KwaGandaganda: percentages representation of identifiable and non-identifiable elements (ID: Identifiable remains; all others are not identifiable to species or animal size class. Ms: Msuluzi; Nd: Ndondondwane; Nt: Ntshekane; Ms/Nd: Msuluzi/Ndondondwane; Ms/Nt: Msuluzi/Ntshekane; Nd/Nt: Ndondondwane/Ntshekane)

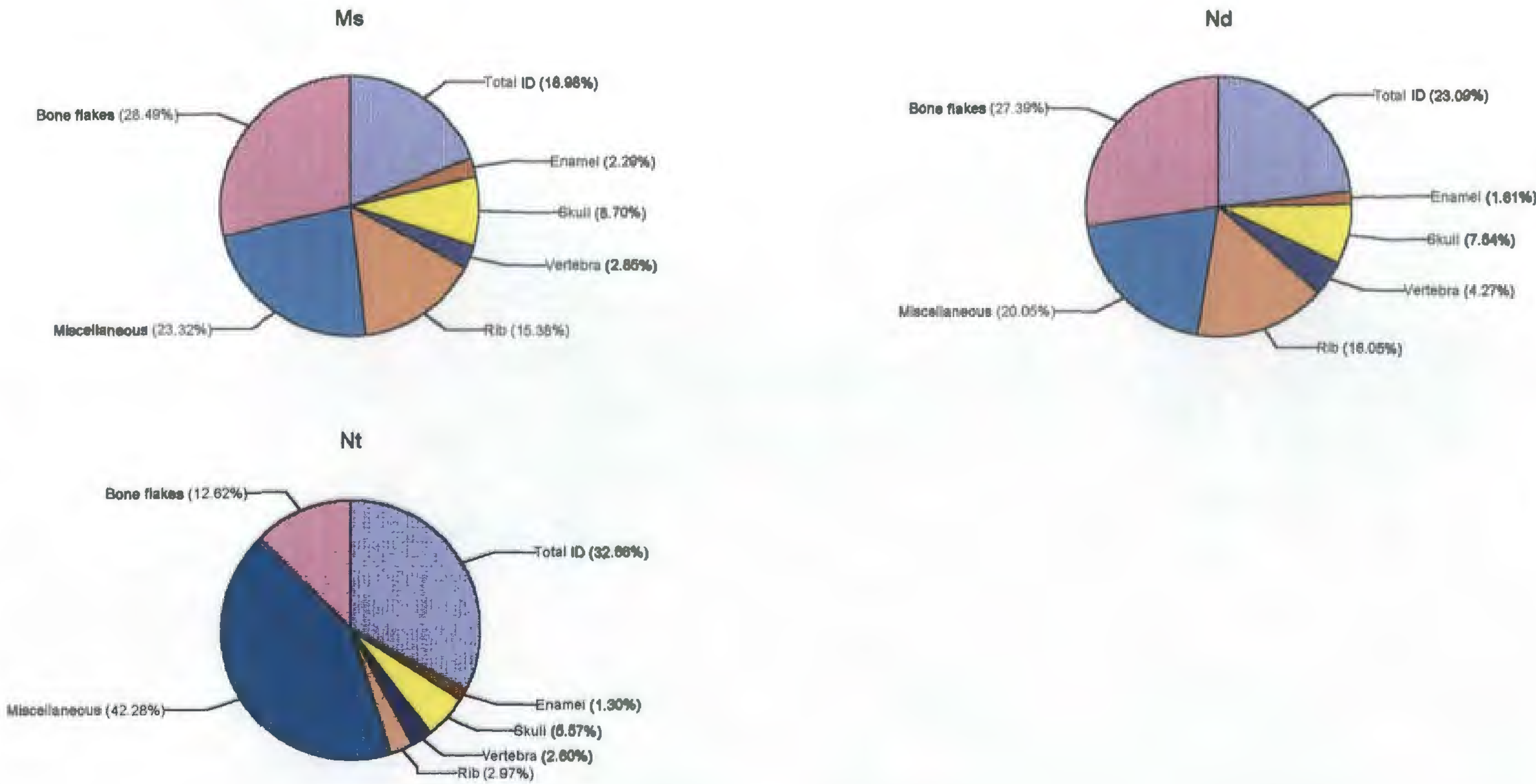


Figure 5.2b. Continued

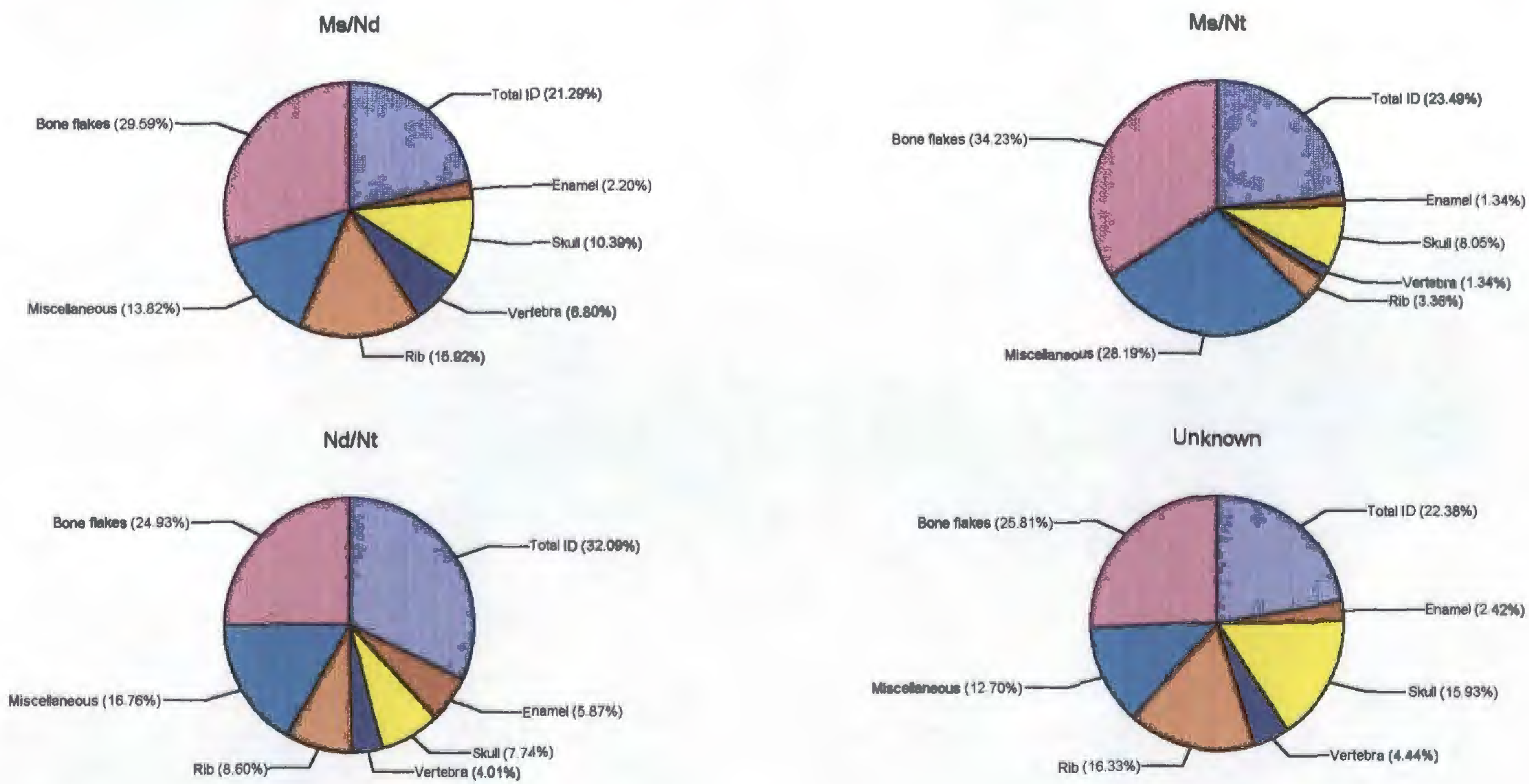


Figure 5.3. KwaGandaganda: *Bos taurus* remains represented in each phase and mixed units after correction for skeletal complexity (➔ indicates skeletal component of one individual. Ms: Msuluzi; Nd: Ndondondwane; Nt: Ntshekane; Ms/Nd: Msuluzi/Ndondondwane; Ms/Nt: Msuluzi/Ntshekane; Nd/Nt: Ndondondwane/Ntshekane)

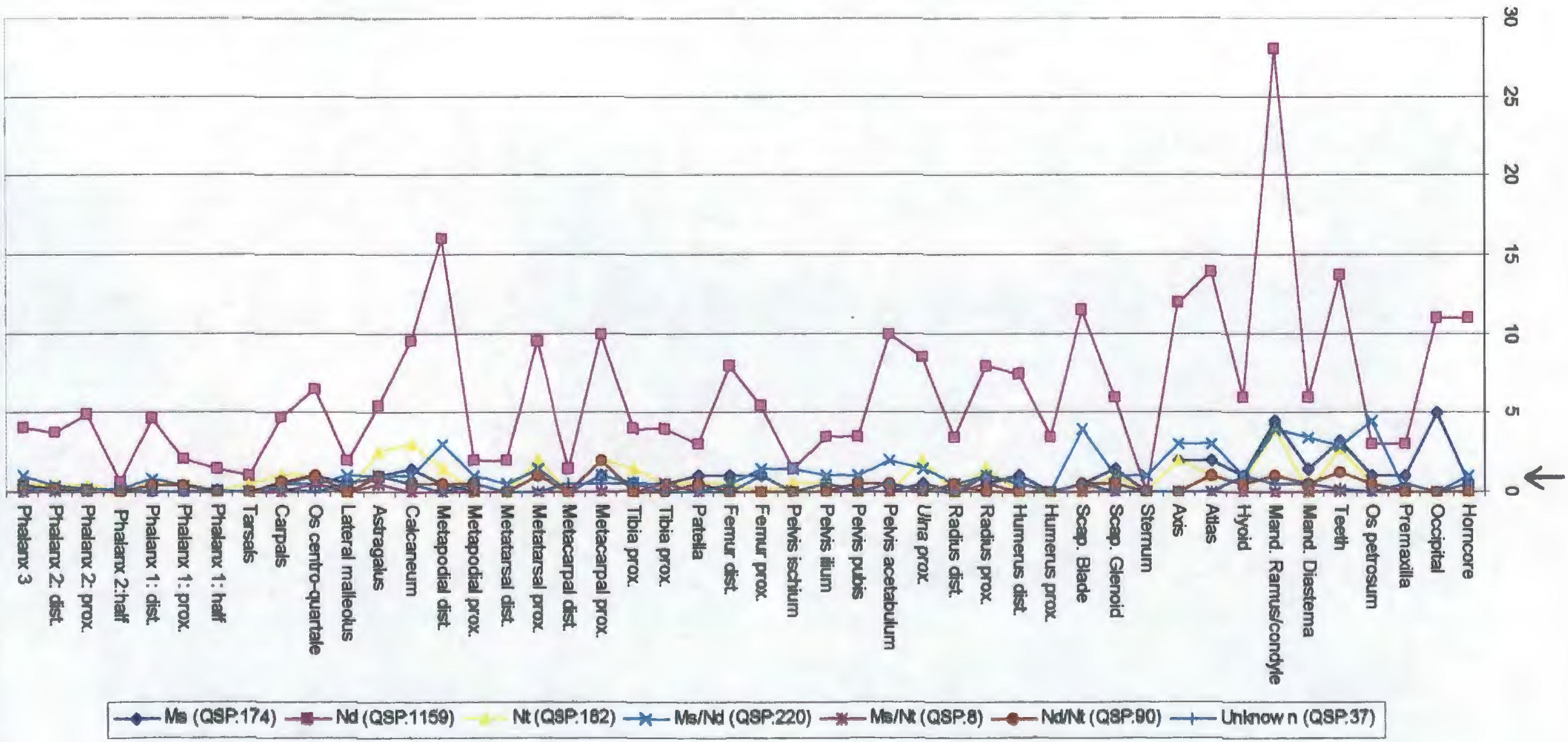


Figure 5.4. KwaGandaganda: *Ovis/Capra* remains represented in each phase and mixed units after correction for skeletal complexity (➔ indicates skeletal component of one individual. Ms: Msuluzi; Nd: Ndondondwane; Nt: Ntshekane; Ms/Nd: Msuluzi/ Ndondondwane; Ms/Nt: Msuluzi/Ntshekane; Nd/Nt: Ndondondwane/Ntshekane)

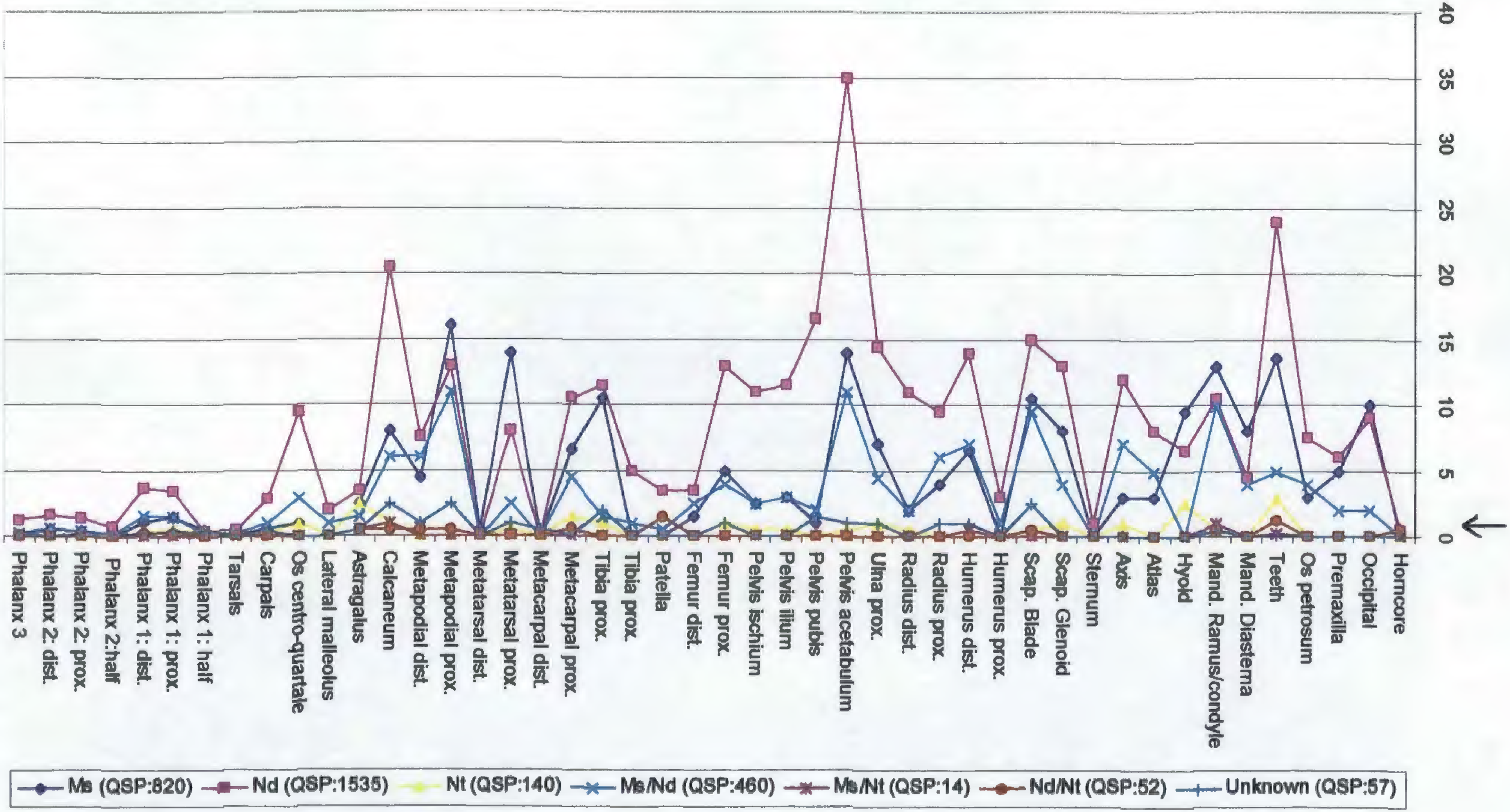


Figure 5.5. KwaGandaganda: Bov I remains represented in each phase and mixed units after correction for skeletal complexity (➔ indicates skeletal component of one individual. Ms: Msuluzi; Nd: Ndondondwane; Nt: Ntshekane; Ms/Nd: Msuluzi/Ndondondwane; Ms/Nt: Msuluzi/Ntshekane; Nd/Nt: Ndondondwane/Ntshekane)

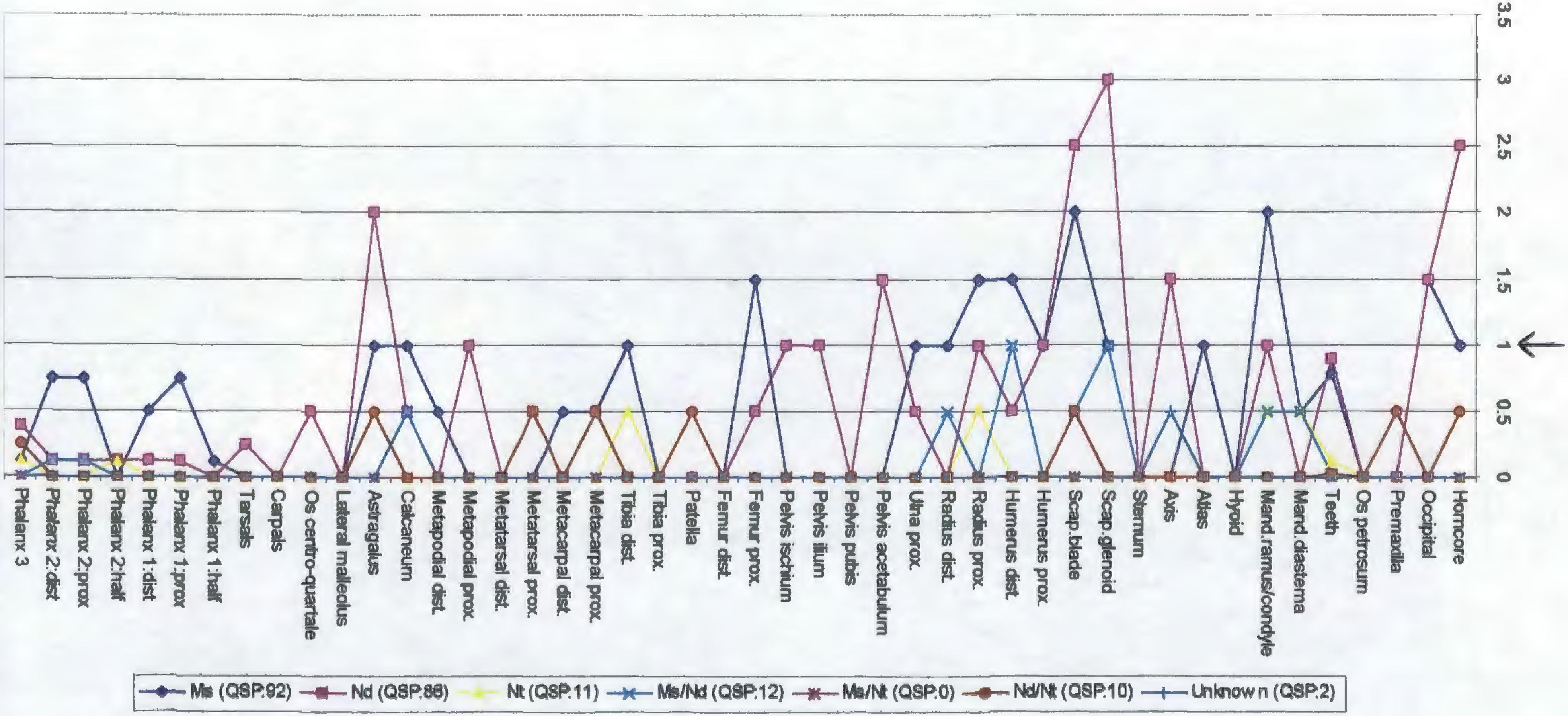


Figure 5.6. KwaGandaganda: Bov II remains represented in each phase and mixed units after correction for skeletal complexity (➜ indicates skeletal component of one individual. Ms: Msuluzi; Nd: Ndondondwane; Nt: Ntshekane; Ms/Nd: Msuluzi/Ndondondwane; Ms/Nt: Msuluzi/Ntshekane; Nd/Nt: Ndondondwane/Ntshekane)

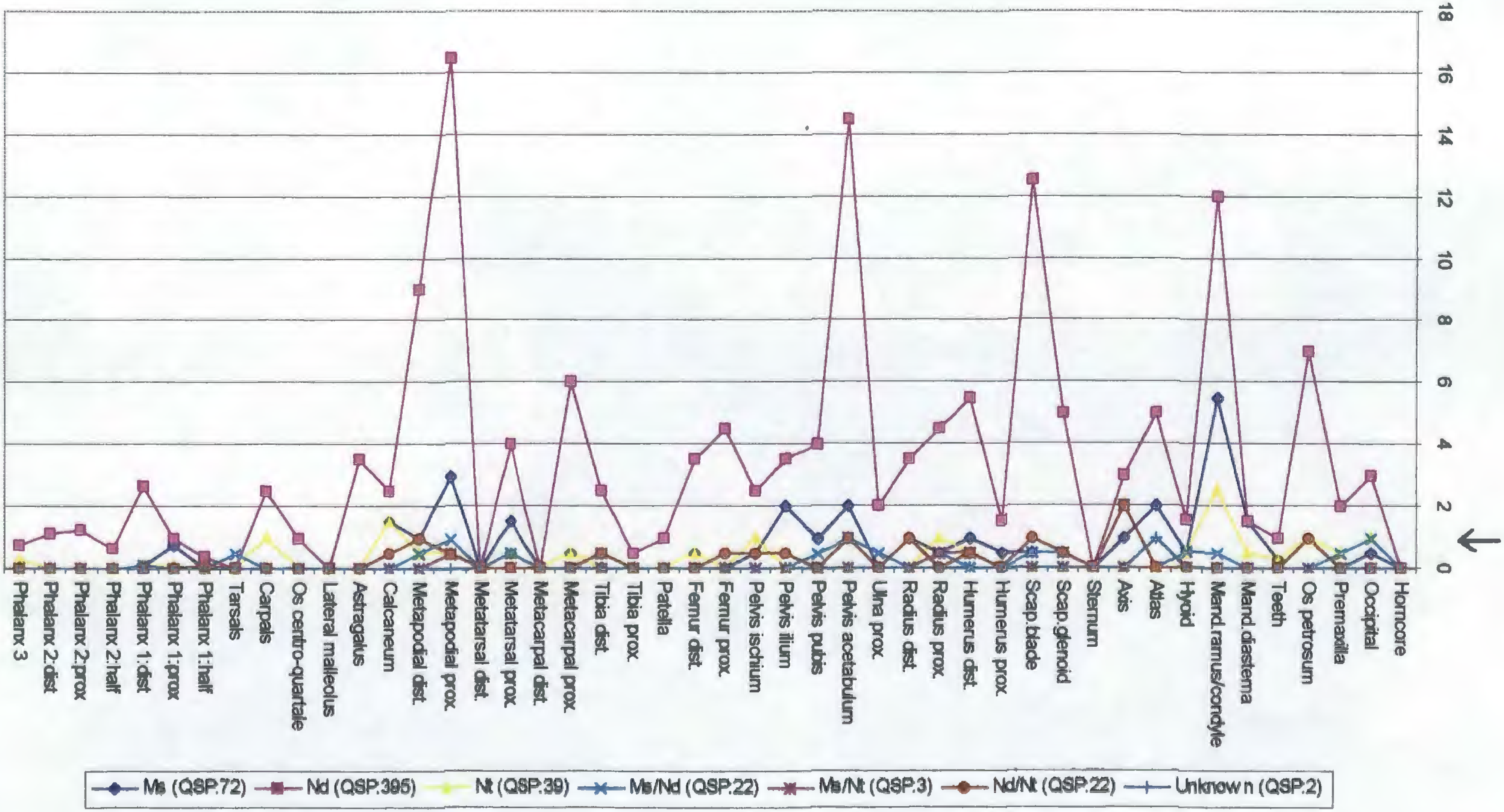


Figure 5.7. KwaGandaganda: Bov III remains represented in each phase and mixed units after correction for skeletal complexity (➔ indicates skeletal component of one individual. Ms: Msuluzi; Nd: Ndondondwane; Nt: Ntshekane; Ms/Nd: Msuluzi/Ndondondwane; Ms/Nt: Msuluzi/Ntshekane; Nd/Nt: Ndondondwane/Ntshekane)

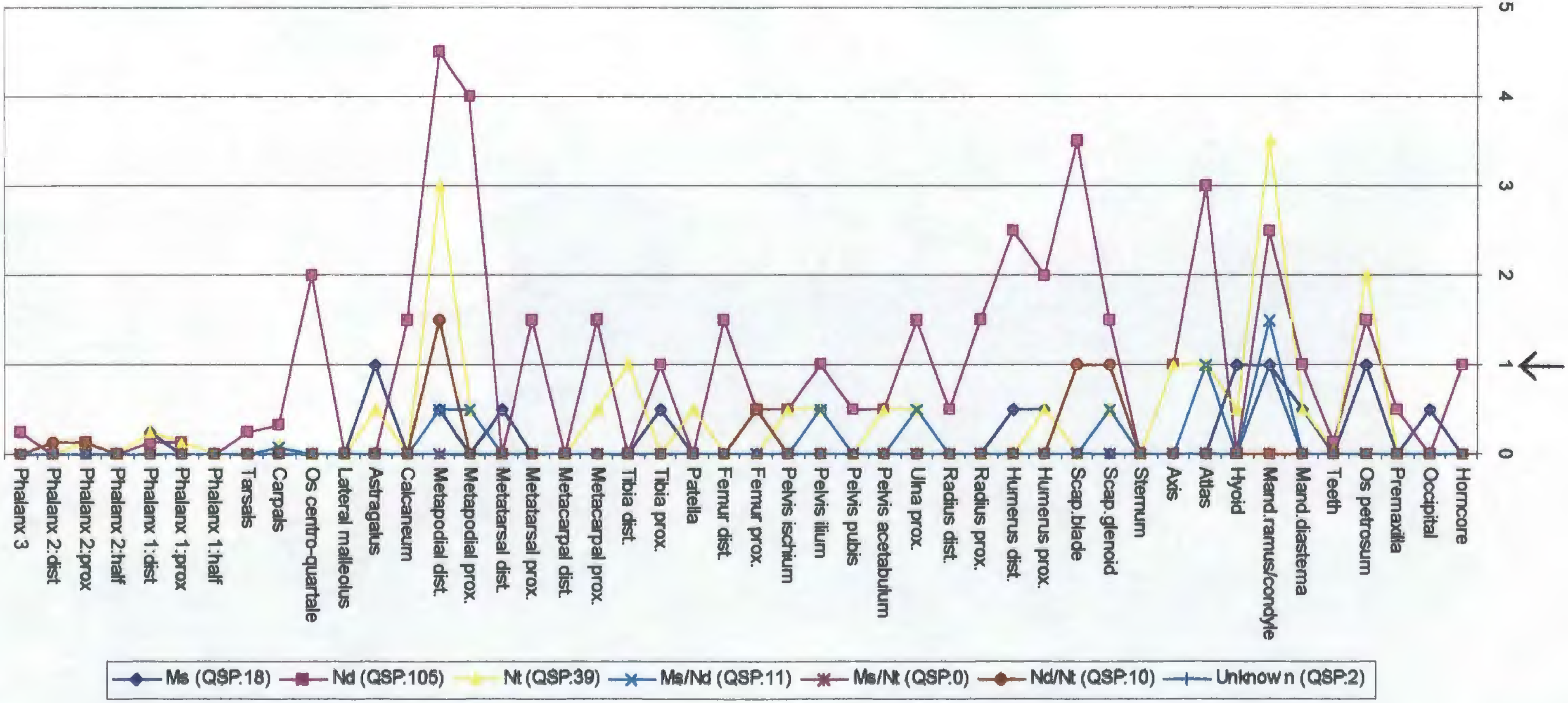


Figure 5.8. KwaGandaganda: Bov IV remains represented in each phase and mixed units after correction for skeletal complexity (➔ indicates skeletal component of one individual. Ms: Msuluzi; Nd: Ndondondwane; Nt: Ntshekane; Ms/Nd: Msuluzi/Ndondondwane; Ms/Nt: Msuluzi/Ntshekane; Nd/Nt: Ndondondwane/Ntshekane)

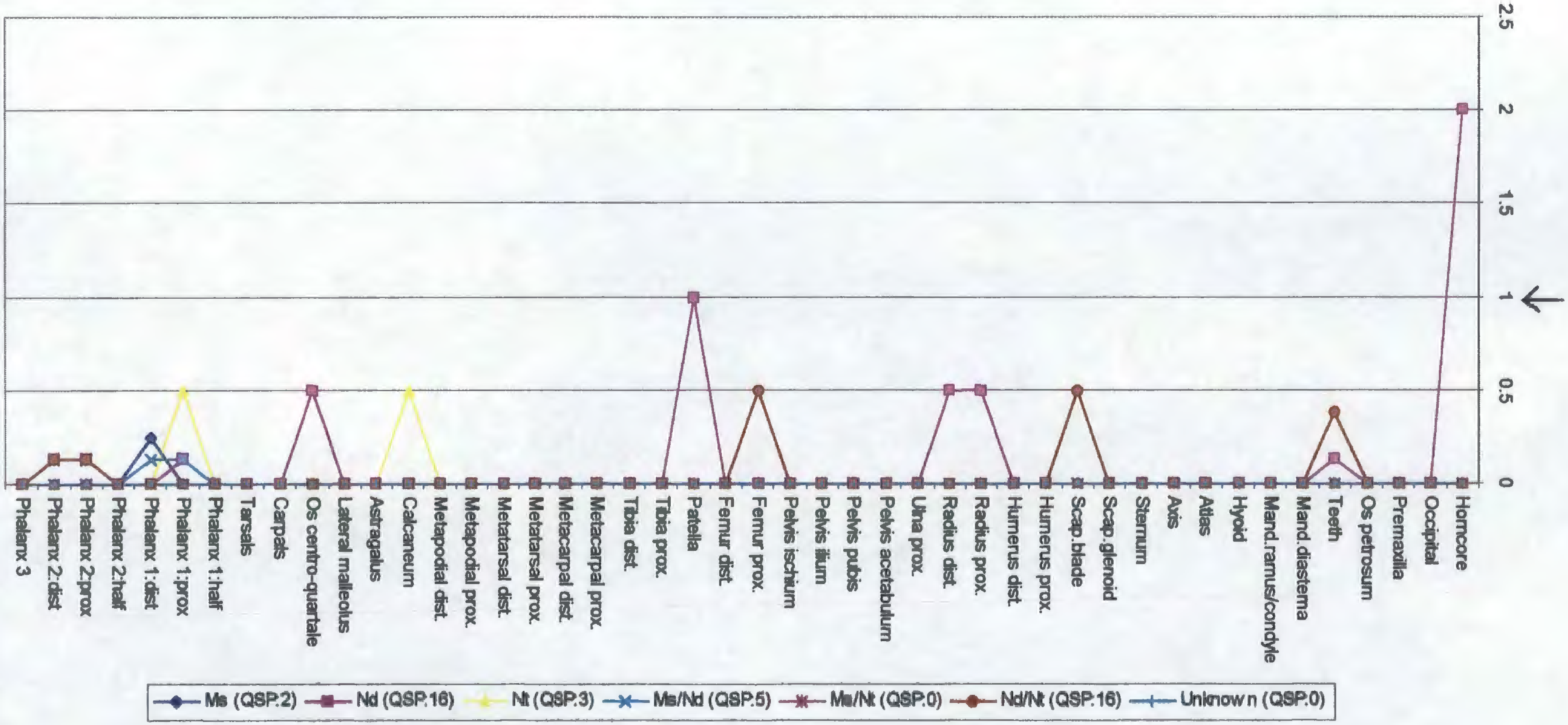


Figure 5.9. KwaGandaganda: *Bos taurus* age classes per phase and mixed units, based on MNI counts and tooth wear patterns (Ms: Msuluzi; Nd: Ndondondwane; Nt: Ntshekane; Ms/Nd: Msuluzi/Ndondondwane; Ms/Nt: Msuluzi/Ntshekane; Nd/Nt: Ndondondwane/ Ntshekane)

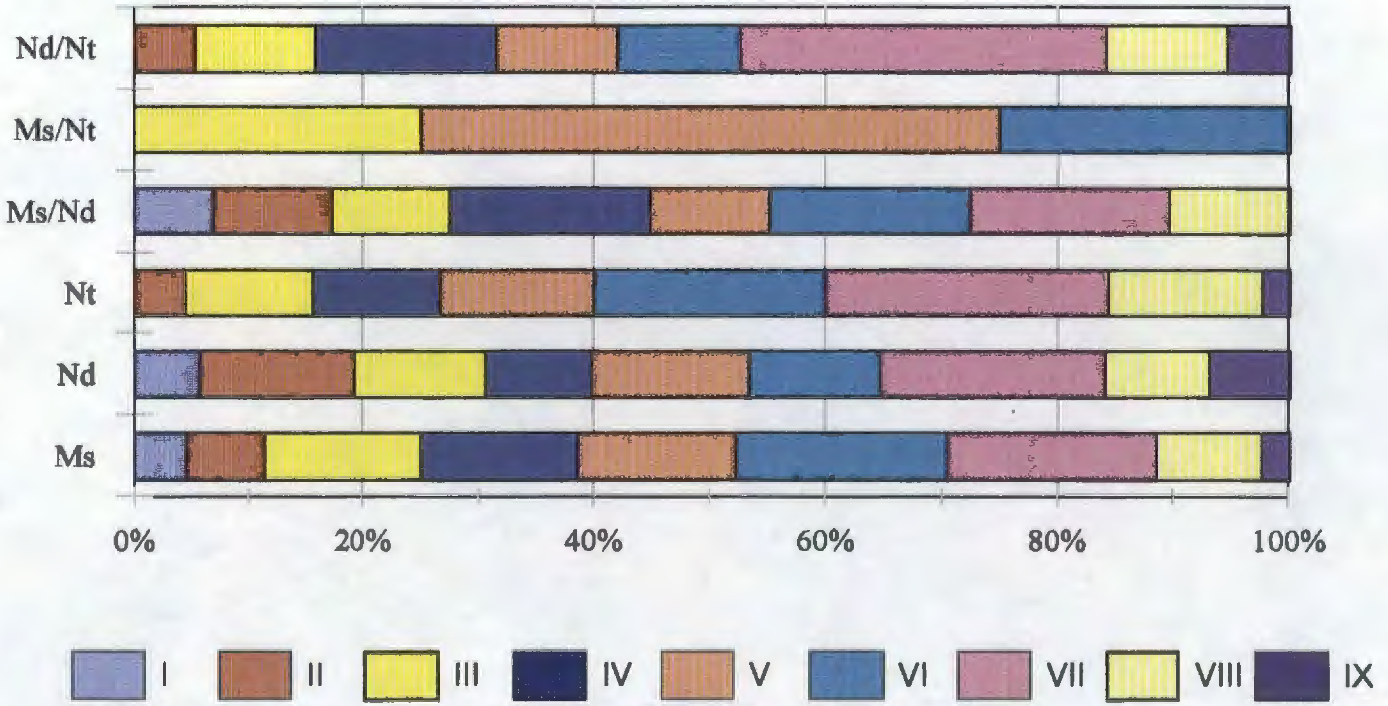


Figure 5.10. KwaGandaganda: *Ovis/Capra* age classes per phase and mixed units, based on MNI counts and tooth wear patterns (Ms: Msuluzi; Nd: Ndondondwane; Nt: Ntshekane; Ms/Nd: Msuluzi/Ndondondwane; Ms/Nt: Msuluzi/Ntshekane; Nd/Nt: Ndondondwane/Ntshekane)

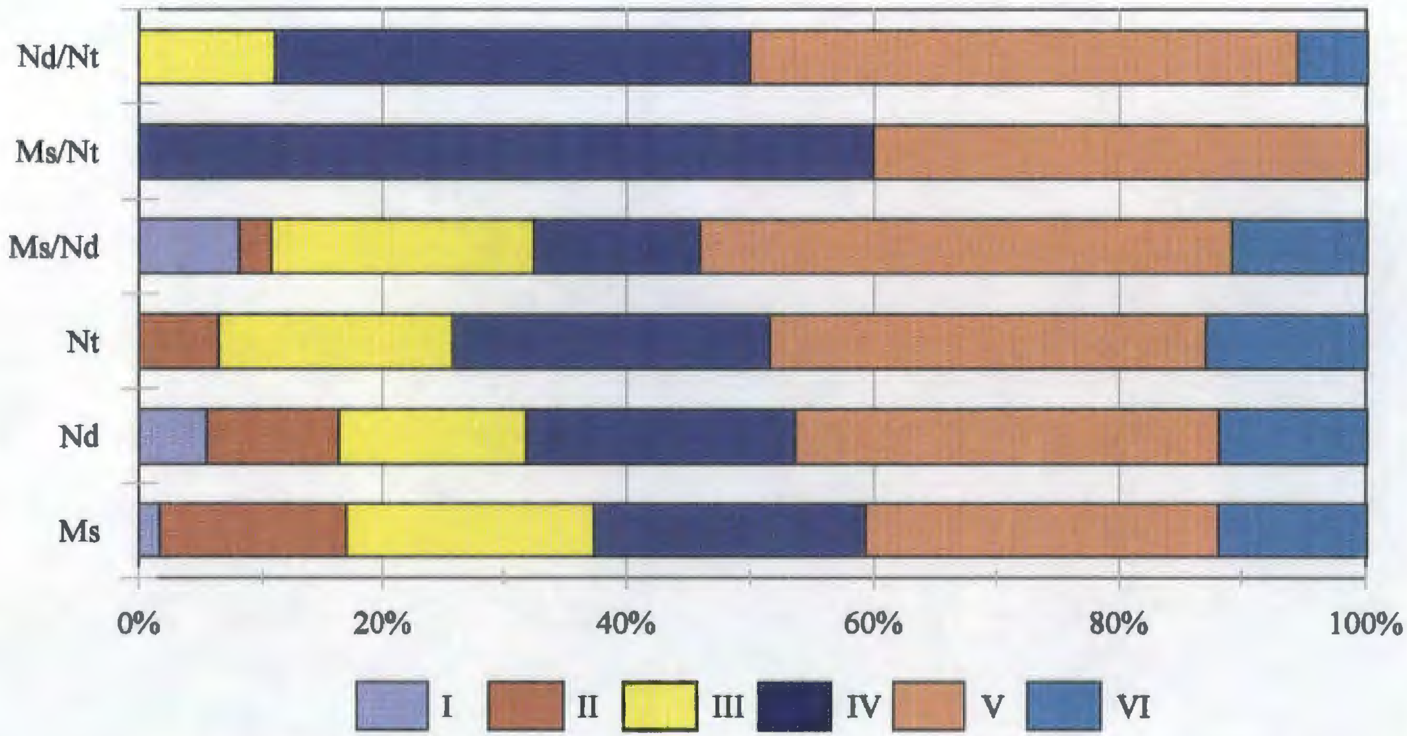


Figure 5.11. KwaGandaganda: proportion of male and female domestic animals for all phases combined, based on MNI counts and expressed in percentage

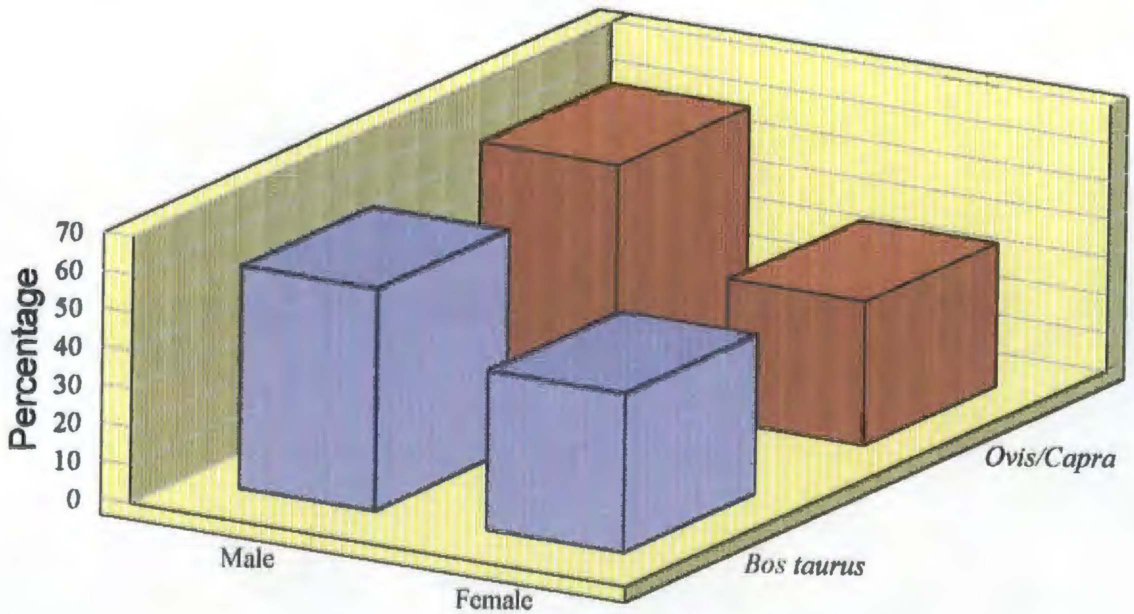
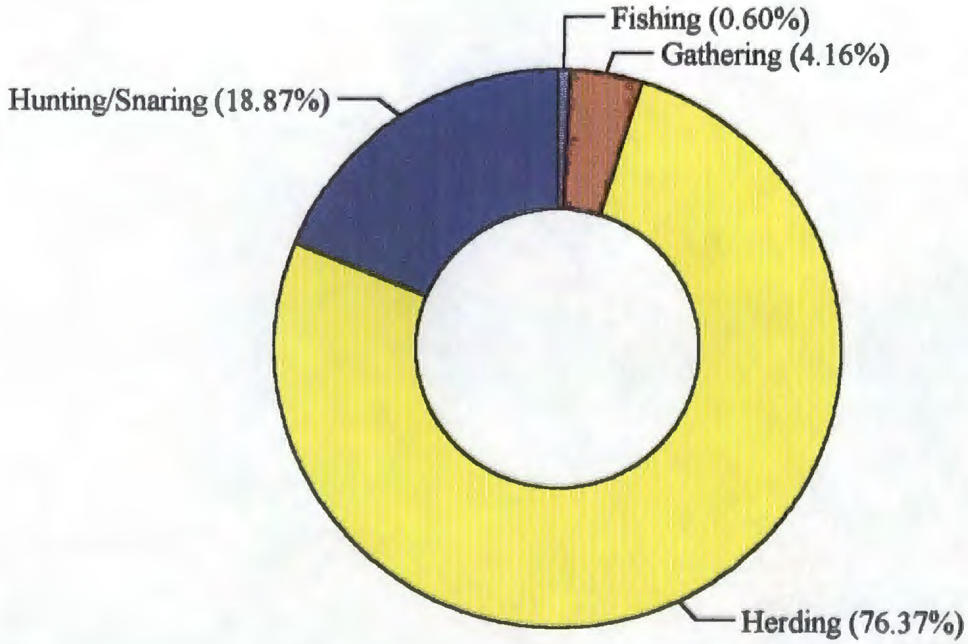


Figure 5.12. KwaGandaganda: percentage herding, hunting/snaring, gathering and fishing for all phases combined, based on QSP counts



TABLES

Table 2.1. General features of the Coastal Lowlands Bioclimatic Group (adapted from The Development Bank of Southern Africa 1988:2.33)

Veld type	Evergreen forest, medium/tall thicket and woodland
Elevation range	0-457 m
Humidity range	Humid to humid/subhumid
Temperature range	Hot/warm to warm/mild
Mean annual temperature	20-23.5 °C
Mean annual rainfall	850-1400 mm
Rainfall distribution	Wet months (≥ 101.6 mm): 5-6 Medium wet months (Intermediate): 7-5 Ecologically dry months (≤ 25.4 mm):0-1-(2)
Occurrence of hail	Rare
Occurrence of frost and snow	Nil to rare to very occasional

Table 2.2. Ungulates present in KwaZulu-Natal during historical times (as described by Du Plessis 1969)

Common name	**Species name**
Black rhinoceros	*Diceros bicornis*
Square-lipped rhinoceros	*Ceratotherium simum*
Burchell's zebra	*Equus burchellii*
Bushpig	*Potamochoerus porcus*
Warthog	*Phacochoerus aethiopicus*
Hippopotamus	*Hippopotamus amphibius*
Giraffe	*Giraffa camelopardalis*
Red duiker	*Cephalophus natalensis*
Blue duiker	*Philantomba monticola*
Grey duiker	*Sylvicapra grimmia*
Steenbok	*Raphicerus campestris*
Grysbok	*Raphicerus melanotis*
Oribi	*Ourebia ourebi*
Suni	*Neotragus moschatus*
Klipspringer	*Oreotragus oreotragus*
Grey rhebok	*Pelea capreolus*
Mountain reedbuck	*Redunca fulvorufula*
Reedbuck	*Redunca arundinum*
Waterbuck	*Kobus ellipsiprymnus*
Impala	*Aepyceros melampus*
Springbok	*Antidorcas marsupialis*
Blesbok	*Damaliscus dorcas*
Red hartebeest	*Alcelaphus buselaphus*
Black wildebeest	*Connochaetes gnou*
Blue wildebeest	*Connochaetes taurinus*

Table 2.2. Continued

Common name	Species name
Bushbuck	*Tragelaphus scriptus*
Nyala	*Tragelaphus angasii*
Kudu	*Tragelaphus strepsiceros*
Eland	*Taurotragus oryx*
Buffalo	*Syncerus caffer*

Table 2.3. Larger mammal species of KwaZulu-Natal (adapted from Skinner & Smithers 1990)

Common name	Species name
Aardwolf	*Proteles cristatus*
Brown hyaena	*Hyaena brunnea*
Spotted hyaena	*Crocuta crocuta*
Leopard	*Panthera pardus*
Lion	*Panthera leo*
Caracal	*Felis caracal*
African wild cat	*Felis lybica*
Serval	*Felis serval*
Cape fox	*Vulpes chama*
Side-striped jackal	*Canis adustus*
Black-backed jackal	*Canis mesomelas*
Cape clawless otter	*Aonyx capensis*
Honey badger	*Mellivora capensis*
African weasel	*Poecilogale albinucha*
Striped polecat	*Ictonyx striatus*
Aardvark	*Orycteropus afer*
African elephant	*Loxodonta africana*
White rhinoceros	*Ceratotherium simum*
Black rhinoceros	*Diceros bicornis*
Burchell's zebra	*Equus burchellii*
Bushpig	*Potamochoerus porcus*
Warthog	*Phacochoerus aethiopicus*
Hippopotamus	*Hippopotamus amphibius*
Blue wildebeest	*Connochaetes taurinus*
Blesbok	*Damaliscus dorcas phillipsi*
Blue duiker	*Philantomba monticola*
Red duiker	*Cephalophus natalensis*

Table 2.3. Continued

Common name	Species name
Common duiker	*Sylvicapra grimmia*
Klipspringer	*Oreotragus oreotragus*
Oribi	*Ourebia ourebi*
Steenbok	*Raphicerus campestris*
Grysbok	*Raphicerus melanotis*
Suni	*Neotragus moschatus*
Impala	*Aepyceros melampus*
Grey rhebok	*Pelea capreolus*
African buffalo	*Syncerus caffer*
Kudu	*Tragelaphus strepsiceros*
Nyala	*Tragelaphus angasii*
Bushbuck	*Tragelaphus scriptus*
Eland	*Taurotragus oryx*
Reedbuck	*Redunca arundinum*
Mountain reedbuck	*Redunca fulvorufula*
Waterbuck	*Kobus ellipsiprymnus*

Table 2.4. Species identified from the sites associated with the different phases on KwaGandaganda (Ms: Msuluzi Confluence, Minimum Number of Individuals; Nd: Ndondondwane, Number of Identifiable Skeletal Parts; Nt: Ntshekane, Minimum Number of Individuals [adapted from Maggs 1980a:144; Maggs & Michael 1976:731; Voigt & Von den Driesch 1984:97])

Species	Ms (MNI)	Nd (NISP)	Nt (MNI)
Papio ursinus (baboon)	1		
Canis familiaris (domestic dog)		102	2
Lycaon pictus (hunting dog)			1
Canis mesomelas (black-backed jackal)		7	
Felis lybica (wild cat)			1
Loxodonta africana (elephant) Ivory fragments only		1960	
Procavia capensis (hyrax)			1
Phacochoerus aethiopicus (warthog)			1
Potamochoerus porcus (bushpig)			3
Suid (non-domestic) (pig)		9	
Hippopotamus amphibius (hippopotamus)		173	
Bos taurus (cattle)	2	960	14-15
Ovis aries (sheep)	4	459	
Capra hircus (goat)		47	
Ovis/Capra (sheep/goat)	4	1458	20-22
Connochaetes taurinus (blue wildebeest)			5
Philantomba monticola (blue duiker)			2
Sylvicapra grimmia (common duiker)		12	4
Ourebia ourebi (oribi)		1	1
Raphicerus campestris (steenbok)			4
Aepyceros melampus (impala)	1		
Pelea capreolus (grey rhebok)		3	
Tragelaphus angasi (nyala)		3	1
Redunca arundinum (reedbuck)		1	
Bovidae indet. (unidentified bovid)			2

Table 2.4. Continued

Species	Ms (MNI)	Nd (NISP)	Nt (MNI)
Bov I	1		
Thryonomys swinderianus (cane rat)		4	
Rattus rattus (house rat)		9	
Murid-sized rodent	1		
Other rodents		207	
Lepus sp. (hare)			3
Lagomorph (hare)	1	2	
Gallus domesticus (chicken)		18	
Struthio camelus (ostrich)		2	
Anas undulata (yellow-billed duck)		2	
Other birds		8	
Chelonia (tortoise)	1	4	3
Varanus sp. (monitor lizard)		7	
Crocodylus niloticus (crocodile)		1	
Other reptiles		31	
Amphibians (frogs)	1	36	
Synodontis (fish)	1		
Other fish		47	
Achatina sp. (land-snail)	1	36	
Unio/Aspatharia (large freshwater mussel)		13	
Unionidae (large freshwater bivalve)	1		
Cypraea sp. (marine shell)	1		
Nerita sp. (marine shell)		1	
Patellidae (limpet)		1	
TOTAL	**21**	**5624**	**68-71**

Table 4.1a. Definition of small/medium/large animal size classes (Plug pers. comm.)

Size	Carnivores
Small	Mustelidae/Viverridae and smaller carnivores
Small-medium	Wild cats, otters, badgers, etc
Medium	Caracals, jackals, etc
Large	Lions, leopards, cheetahs, wild dogs, hyaenas, etc.

Size	Birds
Small	Pigeons and smaller
Medium	Chickens, francolins and guinea fowls
Large	Birds of prey, e.g. eagles, secretary birds, cranes
Very large	Ostriches

Size	Rodents
Small	*Otomys* sp. and smaller
Medium	*Cryptomys* sp., ground squirrels, etc
Large	Cane rats, porcupines, springhares, etc.

Table 4.1b. Bovidae (Bov) size classes (adapted from Brain 1974:2)

Categories	Live-weight range	Upper limit
BOV I (small)	0-23 kg	Large ♀ common duiker
BOV II (medium)	23-84 kg	Large ♂ blesbok (Including sheep and goats)
BOV III (large)	84-296 kg	Large wildebeest or roan antelope (Including cattle)
BOV IV (very large)	More than 296 kg	Buffalo and eland

Table 4.2. Numbers of identifiable bones in the skeletons of Bovids (B), Equids (E), Suids (S), Tortoises (T), Lions (L) and Baboons (Ba) as applied to this study (adapted from De Wet (1993:33) and Plug (1988:87)

Skeletal part	B	E	S	T	L	Ba
Premaxilla	2	0	0	0	0	0
Occipital	1	1	1	0	1	1
Os petrosum	2	2	2	0	2	2
Hyoid	2	2	2	0	0	0
Mandible ramus/condyle	2	2	2	0	2	2
Mandible diastema	2	0	0	0	2	0
I1/I1 upper and lower	2	4	4	0	4	4
I2/I2 upper and lower	2	4	4	0	4	4
I3/I3 upper and lower	2	4	4	0	4	0
I4 or canine/I4 or canine upper and lower	2	4	4	0	4	4
P1/dP1 upper and lower	0	0	4	0	0	0
P2/dP2 upper and lower	4	4	4	0	2	0
P3/dP3 upper and lower	4	4	4	0	4	4
P4/dP4 upper and lower	4	4	4	0	4	4
M1 upper and lower	4	4	4	0	4	4
M2 upper and lower (not in juvenile)	4	4	4	0	0	4
M3 upper and lower (not in juvenile)	4	4	4	0	0	4
Atlas	1	1	1	0	1	1
Axis	1	1	1	0	1	1
Cervical vertebrae	0	0	0	8	0	0
Scapula glenoid	2	2	2	0	2	2
Scapula blade	2	2	2	0	2	2
Shoulder girdle	0	0	0	4	0	0
Humerus proximal	2	2	2	2	2	2
Humerus distal	2	2	2	2	2	2
Radius proximal	2	2	2	2	2	2

Table 4.2. Continued

Skeletal part	B	E	S	T	L	Ba
Radius distal	2	2	2	2	2	2
Ulna proximal	2	2	2	2	2	2
Radial carpal (scaphoid)	2	2	2	0	0	2
Intermediate carpal (lunate)	2	2	2	0	0	2
Ulnar carpal (cuneiform)	2	2	2	0	2	2
Accessory carpal (pisiform)	2	2	2	0	2	2
1st carpal	0	2	2	0	2	2
2nd carpal	0	2	2	0	2	2
3rd carpal	0	2	2	0	2	2
2nd and 3rd carpal (magnum)	2	0	0	0	0	0
4th carpal (unciform)	2	2	2	0	2	2
Metacarpal proximal	2	0	0	0	0	0
Metacarpal distal	2	2	8	0	8	10
Metacarpal 2 proximal	0	2	2	0	2	2
Metacarpal 3 proximal	0	2	2	0	2	2
Metacarpal 4 proximal	0	2	2	0	2	2
Metacarpal 5 proximal	0	0	2	0	2	2
Pelvis acetabulum	2	2	2	0	2	2
Pelvis ischium	2	2	2	0	2	2
Pelvis ilium	2	2	2	0	2	2
Pelvis pubis	2	2	2	0	2	2
Pelvic girdle	0	0	0	6	0	0
Femur proximal	2	2	2	2	2	2
Femur distal	2	2	2	2	2	2
Patella	2	2	2	0	2	2
Tibia proximal	2	2	2	2	2	2
Tibia distal	2	2	2	2	2	2

Table 4.2. Continued

Skeletal part	B	E	S	T	L	Ba
Lateral malleolus	2	0	0	0	0	0
Calcaneum	2	2	2	0	2	2
Astragalus	2	2	2	0	2	2
1st tarsal	0	0	2	0	0	2
1st and 2nd tarsal	0	2	0	0	0	0
2nd tarsal	0	0	2	0	2	2
3rd tarsal	0	2	2	0	2	2
2nd and 3rd tarsal	2	0	0	0	0	0
4th tarsal	0	2	2	0	2	2
Central tarsal	0	2	2	0	2	2
Central and 4th tarsal (Os centroquartale)	2	0	0	0	0	0
Metatarsal proximal	2	0	0	0	0	0
Metatarsal distal	2	2	8	0	8	10
Metatarsal 2 proximal	0	2	2	0	2	2
Metatarsal 3 proximal	0	2	2	0	2	2
Metatarsal 4 proximal	0	2	2	0	2	2
Metatarsal 5 proximal	0	0	2	0	2	2
Phalanx 1	8	4	16	0	16	20
Phalanx 2	8	4	16	0	16	20
Phalanx 3	8	4	16	0	16	20
Carapace	0	0	0	49	0	0
Plastron	0	0	0	9	0	0
TOTAL	**131**	**24**	**68**	**58**	**68**	**82**

Table 4.3. Number of identifiable bones in the skeletons of animals not mentioned in Table 4.2. (De Wet 1993:34)

Other animals	Number of id bones
Juvenile *Bos taurus*	159
Juvenile *Ovis/Capra*	159
Elephant/Rhino	Approx. 245
Hare, rodent	136
Bird	50
Varanus sp., reptile	94
Frog	27
Fish	31
Achatina sp. or any gastropod	2
Bivalves	4

Table 4.4. Relative age classes for *Ovis/Capra* using teeth eruption sequences (Voigt 1983:47)

Age class	Relative age	Eruption sequence
Class I	0-3 months	Deciduous teeth erupted and in wear
Class II	3-10 months	M1 and I1 erupted
Class III	10-16 months	M2 erupted and in wear
Class IV	16-30 months	M3 and I2 erupted, deciduous premolars lost and replaced by permanent premolars
Class V	30-60 months	Full permanent dentition present and in wear
Class VI	Over 60 months	Heavy wear on all teeth, central islands disappearing

Table 4.5. Relative age classes for *Bos taurus* using teeth eruption sequences (Voigt 1983:53)

Age class	Relative age	Eruption sequence
Class I	0-6 months	Deciduous teeth erupted and in wear
Class II	6-15 months	M1 erupted
Class III	15-18 months	M2 erupted
Class IV	18-24 months	M3 and I1 erupting; loss of deciduous premolars
Class V	24-30 months	P2, P3 and I2 erupting
Class VI	30-42 months	P4 and I3 erupting
Class VII	Over 42 months	I4/Canine erupting
Class VIII		Full adult dentition, heavy wear on M1 and M2
Class IX		Heavy wear on all teeth, central islands disappearing

Table 4.6. Relative age categories used when reliable information on age determination was not available (Plug 1988:55-56)

Age class	Relative age	Description of teeth
Class I	Neonate	Deciduous teeth not in wear
Class II	Juvenile	M1 in wear, M2 erupting
Class III	Sub-adult	Loss of deciduous incisors and premolars, M3 erupting
Class IV	Adult	Full permanent dentition present and in wear
Class V	Mature	Central islands disappearing on M1 and M2
Class VI	Aged	Central islands disappearing on all teeth, M1and M2 worn to gumline

Table 5.1. KwaGandaganda: Msuluzi phase - NISP of total sample; fish and marine molluscs excluded (ID: Identifiable; Non-ID: Non-identifiable; #: No non-identifiable lists available)

SKELETAL PART	Sq 25 GAL	Sq 25 Slag dump	Sq 25 1 B	Sq 25 2 (20-30)	Sq 25 3	Sq 25 (a+d) 2 (30-54)	Sq 25 (a+d) 2 (54-80)	Sq 25 (b) 2 (30-56)	Sq 25 (b) 2 (56-80)	Sq 25 (c)
Total ID remains	14	16	62	244	81	140	253	41	42	131
Enamel fragments	3	0	16	11	13	22	43	7	#	19
Skull fragments	15	17	6	228	56	105	126	10	#	78
Vertebra fragments	4	2	4	67	16	23	45	6	#	22
Rib fragments	54	35	3	395	104	172	321	16	#	227
Miscellaneous fragments	68	42	5	424	186	300	318	39	#	366
Bone flakes	83	69	11	410	143	286	511	47	#	315
Total NON-ID	227	165	45	1535	518	908	1364	125	#	1027
TOTAL SAMPLE	241	181	107	1779	599	1048	1617	166	42	1158
Mass: ID (g)	88.0	109.9	446.1	1336.7	670.7	598.6	1186.7	527.4	224.0	568.9
Mass: NON-ID (g)	177.1	255.6	45.7	1545.5	517.0	841.2	1669.1	141.6	#	932.5
Number of burnt bones	46	23	5	251	60	170	220	25	1	152
% Burnt bones	19.08	12.7	4.7	14.10	10.01	16.22	13.6	15.06	2.38	13.12

Table 5.1. Continued

SKELETAL PART	Grid 1 A 4 1 Brown	Grid 1 E 4 1 Brown	Grid 1 D 3 1 Brown	Grid 1 E 2/3 1 Brown	Grid 1 A 4 2 LB	Grid 1 E 2 2 LB	Grid 1 E 2/3 2 LB	Grid 1 E 4 2 LB	Grid 1 E 3 2 LB	Grid 1 D 3 2 LB
Total ID remains	2	10	26	11	42	16	29	11	34	0
Enamel fragments	0	3	2	21	0	8	0	3	4	1
Skull fragments	0	2	13	1	8	14	14	14	20	3
Vertebra fragments	1	2	5	1	3	3	7	7	6	0
Rib fragments	2	9	19	0	11	4	6	0	12	1
Miscellaneous fragments	5	48	65	0	8	57	50	18	76	19
Bone flakes	9	13	69	3	27	19	39	8	59	17
Total NON-ID	17	77	173	26	57	105	116	50	177	41
TOTAL SAMPLE	19	87	199	37	99	121	145	61	211	41
Mass: ID (g)	17.8	15.2	52.9	43.2	85.4	43.3	76.2	61.7	115.6	0
Mass: NON-ID (g)	40.6	50.0	171.3	13.9	55.1	63.6	124.2	42.4	132.0	31.3
Number of burnt bones	0	5	24	2	7	4	11	0	19	11
% Burnt bones	0	5.74	12.06	5.40	7.14	3.30	7.58	0	9.00	26.82

Table 5.1. Continued

SKELETAL PART	Trench 3 U 8 2	Trench 3 U 5/6 3 PB	Trench 3 U 9/10 2/4 IF	Trench 5 U 4/5 3 PB	Trench 5 U 6 3 PB	Trench 5 U 1/2 4 RC	Trench 7 U 1 3 PB	Trench 7 U 2 3 PB	Trench 7 U 3 3 PB	Trench 7 U 1/2 3 PB
Total ID remains	4	7	14	46	8	61	22	41	35	2
Enamel fragments	#	0	0	0	#	#	14	#	4	#
Skull fragments	#	3	2	0	#	#	10	#	5	#
Vertebra fragments	#	2	4	3	#	#	1	#	2	#
Rib fragments	#	6	9	1	#	#	0	#	0	#
Miscellaneous fragments	#	1	13	3	#	#	0	#	0	#
Bone flakes	#	17	11	7	#	#	0	#	0	#
Total NON-ID	#	29	39	14	#	#	25	#	11	#
TOTAL SAMPLE	4	36	53	60	8	61	47	41	46	2
Mass: ID (g)	27.3	52.8	72.8	648.1	54.3	542.8	264.1	358.3	385.1	11.3
Mass: NON-ID (g)	#	85.5	103.6	38.9	#	#	54.0	#	56.7	#
Number of burnt bones	0	5	0	0	0	0	0	0	0	0
% Burnt bones	0	13.89	0	0	0	0	0	0	0	0

Table 5.1. Continued

SKELETAL PART	Trench 8 U 1 3 PB	Trench 8 U 2 3 PB	Trench 8 U 3 3 PB	Trench 2 U 15/16 3 PB	Trench 2 U 17/18 3 PB	Trench 2 U 20 3 PB	Grid 4 E 1 4 RC	Grid 4 F 1 4 RC	Grid 4 H 1 4 RC	Grid 4 I 1 4 RC
Total ID remains	35	17	42	13	16	9	13	10	18	26
Enamel fragments	#	#	#	2	2	0	0	0	0	0
Skull fragments	#	#	#	27	5	13	1	5	8	12
Vertebra fragments	#	#	#	3	1	3	3	3	0	4
Rib fragments	#	#	#	13	9	9	7	2	6	5
Miscellaneous fragments	#	#	#	25	7	6	26	26	15	35
Bone flakes	#	#	#	81	30	9	19	11	8	35
Total NON-ID	#	#	#	151	54	40	56	47	37	91
TOTAL SAMPLE	35	17	42	164	70	49	69	57	55	117
Mass: ID (g)	642.3	110.9	395.3	100.6	130.4	101.3	119.1	129.4	174.9	353.9
Mass: NON-ID (g)	#	#	#	252.5	192.8	118.1	229.2	154.6	143.3	298.5
Number of burnt bones	0	0	0	4	0	0	56	39	0	0
% Burnt bones	0	0	0	2.43	0	0	81.15	68.42	0	0

Table 5.1. Continued

SKELETAL PART	Grid 4 - 2 F East Dung	Grid 4 - 3 F East Dung	TS 1 3/4 IF	TS 6 4	TS 49 4 RC	TS 51 1	TS 51 3 R: 2	TS 51 2 : 1	TS 51 2 : 2	TS 51 2 : 3
Total ID remains	10	9	9	4	2	10	11	19	3	3
Enamel fragments	0	2	0	#	0	0	3	1	#	0
Skull fragments	0	2	6	#	0	1	2	5	#	5
Vertebra fragments	4	5	0	#	0	0	0	11	#	4
Rib fragments	0	6	0	#	0	4	11	7	#	6
Miscellaneous fragments	1	0	2	#	0	1	0	0	#	0
Bone flakes	68	50	0	#	4	22	18	131	#	75
Total NON-ID	73	65	8	#	4	28	34	155	#	90
TOTAL SAMPLE	83	74	17	4	6	38	45	174	3	93
Mass: ID (g)	75.2	82.5	331.6	9.1	12.9	89.9	73.6	50.91	0.3	4.3
Mass: NON-ID (g)	38.2	243.5	20.7	#	19.8	95.0	161.5	118.8	#	125.2
Number of burnt bones	4	0	0	0	0	0	0	0	0	0
% Burnt bones	0.05	0	0	0	0	0	0	0	0	0

Table 5.1. Continued

SKELETAL PART	TS 62 3 PB	TS 67 2/3 IF	TS 68 2/3 IF	TS 71 Level -	TS 73 1	TS 73 2	TS 73 Brown	Total Msuluzi sample
Total ID remains	7	18	13	6	43	17	15	**1843**
Enamel fragments	#	#	1	#	7	10	#	**222**
Skull fragments	#	#	2	#	0	1	#	**845**
Vertebra fragments	#	#	0	#	0	0	#	**277**
Rib fragments	#	#	1	#	0	0	#	**1493**
Miscellaneous fragments	#	#	3	#	3	3	#	**2264**
Bone flakes	#	#	29	#	3	0	#	**2766**
Total NON-ID	#	#	36	#	13	14	#	**7867**
TOTAL SAMPLE	7	18	49	6	56	31	15	**9710**
Mass: ID (g)	345.4	288.4	258.1	177.7	397.9	42.1	100.7	**13170.81**
Mass: NON-ID (g)	#	#	83.6	#	9.3	6.3	#	**9499.3**
Number of burnt bones	0	0	0	0	0	0	0	**1143**
% Burnt bones	0	0	0	0	0	0	0	**11.83**

Table 5.2. KwaGandaganda: Ndondondwane phase - NISP of total sample; fish and marine molluscs excluded (ID: Identifiable; Non-ID: Non-identifiable; #: No non-identifiable lists available)

SKELETAL PART	Grid 2 complete	Trench 4 U 1/2 3 PB	Trench 4 U 3/4 2 CDB	Trench 5 U 1/2 3 D	Trench 5 U 3 3 D	Trench 6 U 2 3 GA	Trench 6 U 3 3 GA	Trench 2 U 3 2 CDB	Trench 2 U 1 3 V	Trench 2 U 1 3 GA
Total ID remains	1008	61	13	22	7	67	42	28	25	28
Enamel fragments	86	0	0	0	0	5	#	0	5	4
Skull fragments	493	2	1	15	3	2	#	10	5	24
Vertebra fragments	282	2	3	8	0	7	#	4	4	6
Rib fragments	828	7	2	12	5	2	#	27	18	110
Miscellaneous fragments	2024	85	9	55	16	3	#	13	3	59
Bone flakes	1672	34	23	64	26	0	#	34	9	129
Total NON-ID	5385	130	38	154	50	19	#	88	44	332
TOTAL SAMPLE	6393	191	51	176	57	86	42	116	69	360
Mass: ID (g)	13691.7	565.8	239.6	370.9	41.8	975.0	295.4	120.7	74.3	223.8
Mass: NON-ID (g)	14849.1	336.7	136.3	477.7	144.4	141.1	#	211.6	56.1	558.9
Number of burnt bones	897	130	9	154	50	0	0	10	5	57
% Burnt bones	14.03	68.06	17.64	87.5	87.71	0	0	8.62	7.24	16.37

Table 5.2. Continued

SKELETAL PART	Trench 2 U 3 3 GA	Trench 2 U 4 3 GA	Trench 2 U 6 3 D	Trench 2 U 7 3 D	Trench 2 U 9 3 D	Trench 2 U 10 3 D	Trench 2 U 11 3 D	Trench 2 U 12 3	Trench 2 U 13 3 D	Trench 2 U 3 3 D
Total ID remains	257	363	32	122	32	12	17	36	18	30
Enamel fragments	2	34	14	16	3	1	0	13	15	#
Skull fragments	85	201	28	59	14	9	17	33	21	#
Vertebra fragments	35	177	27	33	1	3	5	5	1	#
Rib fragments	196	298	93	101	6	2	6	13	6	#
Miscellaneous fragments	91	190	44	66	3	6	7	15	25	#
Bone flakes	161	524	151	204	31	21	20	46	28	#
Total NON-ID	570	1424	357	479	58	42	55	125	96	#
TOTAL SAMPLE	827	1787	389	601	90	54	72	161	114	30
Mass: ID (g)	1827.2	2023.4	225.4	818.4	309.8	96.9	121.5	231.2	191.2	161.3
Mass: NON-ID (g)	1143.1	3231.7	637.9	969.5	190.3	172.2	156.5	217.6	240.0	#
Number of burnt bones	63	153	1	11	0	0	2	0	1	0
% Burnt bones	7.61	8.56	0.25	1.83	0	0	2.70	0	0.87	0

Table 5.2. Continued

SKELETAL PART	Trench 2 U 2 3 GA	Trench 2 U 5 H	Trench 2 U 7 DA	Trench 2 U 7 4	Grid 4 - 1 A Dung	Grid 4 - 1 B Dung	Grid 4 - 1 C Dung	Grid 4 - 1 D Dung	Grid 4 - 1 E Dung	Grid 4 - 1 F Dung
Total ID remains	38	76	3	398	26	32	51	42	16	28
Enamel fragments	12	11	#	8	#	41	#	#	0	0
Skull fragments	68	23	#	111	#	42	#	#	2	4
Vertebra fragments	81	29	#	53	#	5	#	#	3	4
Rib fragments	86	64	#	156	#	8	#	#	3	2
Miscellaneous fragments	96	30	#	101	#	236	#	#	2	0
Bone flakes	181	80	#	249	#	126	#	#	102	71
Total NON-ID	524	237	#	678	#	458	#	#	112	81
TOTAL SAMPLE	562	313	3	1076	26	490	51	42	128	109
Mass: ID (g)	144.2	565.9	241.9	6805.0	318.8	110.0	368.7	258.6	84.2	309.1
Mass: NON-ID (g)	1291.9	589.8	#	4059.4	#	592.6	#	#	240.7	377.1
Number of burnt bones	40	9	0	73	0	404	0	0	0	0
% Burnt bones	7.11	3.79	0	6.78	0	82.4	0	0	0	0

Table 5.2. Continued

SKELETAL PART	Grid 4 - 2 A Dung	Grid 4 - 2 A Loose soil from JCB	Grid 4 - 2 B Loose dung /Brown	Grid 4 - 2 C Dung	Grid 4 - 2 D Dung	Grid 4 - 3 A Pit Dark ash /Dung	Grid 4 - 3 B Dung	Grid 4 - 3 B Loose soil from JCB	Grid 4 - 3 C Dung	Grid 4 - 4 A Dung\ Ash Loose soil from JCB
Total ID remains	28	18	78	37	35	134	7	24	51	160
Enamel fragments	#	#	#	#	#	4	#	#	#	7
Skull fragments	#	#	#	#	#	83	#	#	#	3
Vertebra fragments	#	#	#	#	#	11	#	#	#	2
Rib fragments	#	#	#	#	#	19	#	#	#	83
Miscellaneous fragments	#	#	#	#	#	410	#	#	#	17
Bone flakes	#	#	#	#	#	70	#	#	#	109
Total NON-ID	#	#	#	#	#	597	#	#	#	221
TOTAL SAMPLE	28	18	78	37	35	731	7	24	51	381
Mass: ID (g)	193.9	49.2	355.0	175.9	191.3	634.3	19.2	168.1	173.5	1127.1
Mass: NON-ID (g)	#	#	#	#	#	437.8	#	#	#	144.1
Number of burnt bones	0	0	0	0	0	593	0	0	0	109
% Burnt bones	0	0	0	0	0	81.56	0	0	0	35.85

Table 5.2. Continued

SKELETAL PART	Grid 4 - 4 C : 1	TS 5 3	TS 12 Ext 3	TS 17 3	Trench 2 U 11 3 PB	Trench 2 U 14 3 PB	Trench 2 U 2 2 CDB	Square 2 3 D	Square 4-7 3 D\PB	Square 6 FE 1-3
Total ID remains	139	14	16	2	1	23	0	49	38	29
Enamel fragments	#	#	1	0	#	2	6	0	#	#
Skull fragments	#	#	1	0	#	19	34	2	#	#
Vertebra fragments	#	#	1	0	#	2	19	0	#	#
Rib fragments	#	#	1	0	#	2	113	0	#	#
Miscellaneous fragments	#	#	0	1	#	20	84	0	#	#
Bone flakes	#	#	0	2	#	28	86	0	#	#
Total NON-ID	#	#	4	3	#	73	342	2	38	29
TOTAL SAMPLE	139	14	20	5	1	96	342	51	38	29
Mass: ID (g)	1150.4	150.4	348.8	42.7	0.1	90.0	0	1131.3	1217.9	222.2
Mass: NON-ID (g)	#	#	32.0	7.4	#	174.2	595.6	75.0	#	#
Number of burnt bones	0	0	0	3	0	2	25	0	0	0
% Burnt bones	0	0	0	60.0	0	2.08	7.31	0	0	0

Table 5.2. Continued

SKELETAL PART	Square 22 1-3	Sq 23 Ext 3 D	Grid 4 A 1 3 D	Grid 4 A 1 H	Grid 4 A 1 2	Grid 4 A 1; C 2 2 CDB	Grid 4 C 2 2 CGB	Grid 4 C 2 3 D	Grid 4 D 1 2 CDB	Grid 4 D 1 3 : 2
Total ID remains	442	11	40	6	6	4	7	34	16	23
Enamel fragments	0	#	#	0	#	#	3	#	#	#
Skull fragments	25	#	#	3	#	#	0	#	#	#
Vertebra fragments	21	#	#	0	#	#	1	#	#	#
Rib fragments	1045	#	#	3	#	#	0	#	#	#
Miscellaneous fragments	0	#	#	31	#	#	2	#	#	#
Bone flakes	967	#	#	12	#	#	2	#	#	#
Total NON-ID	2058	#	#	49	#	#	8	#	#	#
TOTAL SAMPLE	2500	11	40	55	6	4	15	34	16	23
Mass: ID (g)	5600.4	93.7	280.1	165.9	53.7	87.4	34.9	292.0	132.5	225.1
Mass: NON-ID (g)	5799.4	#	#	97.4	#	#	20.7	#	#	#
Number of burnt bones	109	0	0	28	0	0	1	0	0	0
% Burnt bones	5.29	0	0	50.9	0	0	6.6	0	0	0

Table 5.2. Continued

SKELETAL PART	Grid 4 D 1 3 Dung:1	Grid 4 E 1 3 Dung:1	Grid 4 F 1 3 Dung	Grid 4 G 1 3 Dung	Grid 4 H 1 3 D\PB	Grid 4 J 1 3 PB	TS 18 3 D	TS 19 4 (43-58) Dung	TS 19 3	TS 21 3
Total ID remains	14	54	49	67	21	14	67	11	62	23
Enamel fragments	0	2	0	0	2	0	1	10	4	1
Skull fragments	10	16	3	14	6	0	4	3	73	5
Vertebra fragments	7	3	3	6	0	0	1	5	9	7
Rib fragments	3	7	5	13	4	3	0	1	9	19
Miscellaneous fragments	74	117	117	51	19	21	0	4	65	80
Bone flakes	54	71	50	51	24	24	0	75	35	21
Total NON-ID	148	216	178	135	55	38	6	98	195	133
TOTAL SAMPLE	162	270	227	202	76	52	73	109	257	156
Mass: ID (g)	105.7	429.8	380.9	749.9	259.6	139.4	1133.5	48.7	1262.5	188.9
Mass: NON-ID (g)	264.0	322.1	314.8	453.5	172.4	111.4	23.2	66.6	764.1	468.3
Number of burnt bones	148	216	178	134	55	48	0	1	1	22
% Burnt bones	91.35	80.0	78.4	66.33	72.36	92.30	0	0.92	0.38	14.10

Table 5.2. Continued

SKELETAL PART	TS 22 3	TS 23 3	TS 24 3	TS 26 3	TS 27 3	TS 28 3	TS 29 3 D	TS 30 3	TS 31 3	TS 32 3
Total ID remains	41	6	5	7	17	1	4	2	15	9
Enamel fragments	1	#	#	0	0	0	0	0	0	0
Skull fragments	1	#	#	1	0	0	3	0	0	4
Vertebra fragments	0	#	#	0	0	2	2	0	0	2
Rib fragments	0	#	#	3	0	1	1	2	0	1
Miscellaneous fragments	69	#	#	3	0	0	0	0	0	0
Bone flakes	0	#	#	1	7	9	4	0	1	5
Total NON-ID	71	#	#	8	7	12	10	2	1	12
TOTAL SAMPLE	112	6	5	15	24	13	14	4	16	21
Mass: ID (g)	409.6	249.8	3.5	38.8	240.1	4.9	24.6	59.5	237.3	135.1
Mass: NON-ID (g)	20.5	#	#	37.4	27.0	85.1	72.1	9.8	11.6	38.8
Number of burnt bones	0	0	0	0	0	0	0	0	0	0
% Burnt bones	0	0	0	0	0	0	0	0	0	0

Table 5.2. Continued

SKELETAL PART	Trench 1 U 1 2 CDB	Trench 1 U 2 2 CDB	Trench 1 U 3 2 CDB	Trench 1 U 4 2 CDB	Trench 1 U 7 2 CDB	Trench 2 U 1 2 CDB	Trench 2 U 2/3 GA	TS 5 Ext 2	TS 23Ext 2	TS 58 3
Total ID remains	4	22	20	82	33	33	71	8	4	5
Enamel fragments	0	25	8	9	4	0	#	#	0	#
Skull fragments	0	34	2	47	18	17	#	#	0	#
Vertebra fragments	0	18	4	22	32	8	#	#	0	#
Rib fragments	0	36	0	70	77	37	#	#	1	#
Miscellaneous fragments	3	43	13	28	49	34	#	#	3	#
Bone flakes	4	124	0	132	168	53	#	#	11	#
Total NON-ID	7	280	27	308	348	149	#	#	15	#
TOTAL SAMPLE	11	302	47	390	381	182	71	8	19	5
Mass: ID (g)	91.2	236.2	353.7	911.1	408.1	313.7	657.4	55.5	57.4	95.8
Mass: NON-ID (g)	13.3	464.2	92.7	432.1	400.0	272.7	#	#	80.2	#
Number of burnt bones	0	13	0	11	15	8	0	0	7	0
% Burnt bones	0	4.30	0	2.82	3.93	4.39	0	0	36.84	0

Table 5.2. Continued

SKELETAL PART	TS 34 3	TS 36 3	TS 37 3	TS 39 3	TS 41 3	TS 49 3 D	TS 57 3	TS 59 Level -	TS 69 3	Total Ndondon. sample
Total ID remains	3	17	2	2	1	7	1	20	4	**5230**
Enamel fragments	#	0	#	#	2	0	#	#	2	**364**
Skull fragments	#	1	#	#	3	1	#	#	0	**1708**
Vertebra fragments	#	1	#	#	0	0	#	#	0	**967**
Rib fragments	#	21	#	#	4	0	#	#	0	**3635**
Miscellaneous fragments	#	3	#	#	0	1	#	#	0	**4541**
Bone flakes	#	8	#	#	7	1	#	#	0	**6202**
Total NON-ID	#	34	#	#	16	3	#	#	2	**17417**
TOTAL SAMPLE	3	51	2	2	17	10	1	20	6	**22647**
Mass: ID (g)	47.9	329.1	23.1	55.0	3.5	87.0	2.8	216.9	126.4	**56392.6**
Mass: NON-ID (g)	#	108.7	#	#	137.9	16.3	#	#	11.6	**43705.4**
Number of burnt bones	0	0	0	0	0	0	0	0	0	**3796**
% Burnt bones	0	0	0	0	0	0	0	0	0	**16.76**

Table 5.3. KwaGandaganda: Ntshekane phase - NISP of total sample; fish and marine molluscs excluded (ID: Identifiable; Non-ID: Non-identifiable; #: No non-identifiable lists available)

SKELETAL PART	**Trench 3 U 3/4 2 CGB**	**Trench 3 U 1/2 2**	**Trench 3 U 2 2/4 IF**	**Trench 5 U 1/2 2 CDB**	**Trench 5 U 3 2 CDB**	**Trench 5 U 6 2 CDB**	**Trench 7 U 2 2 CDB**	**Trench 7 U 3 2 CDB**	**Trench 7 U 1,2,3 2 CDB**	**Trench 8 U 1 2 CDB**
Total ID remains	18	7	1	10	7	1	13	23	1	24
Enamel fragments	2	0	#	0	#	#	0	1	#	#
Skull fragments	6	2	#	14	#	#	10	4	#	#
Vertebra fragments	0	0	#	5	#	#	2	1	#	#
Rib fragments	1	1	#	11	#	#	0	0	#	#
Miscellaneous fragments	14	2	#	46	#	#	0	0	#	#
Bone flakes	30	4	#	62	#	#	0	0	#	#
Total NON-ID	53	9	#	138	#	#	12	6	#	#
TOTAL SAMPLE	71	16	1	148	7	1	25	29	1	24
Mass: ID (g)	29.3	89.9	7.3	75.4	31.4	36.3	382.1	291.7	13.7	255.9
Mass: NON-ID (g)	64.4	29.6	#	231.8	#	#	48.5	48.6	#	#
Number of burnt bones	1	0	0	138	0	0	0	0	0	0
% Burnt bones	1.40	0	0	93.24	0	0	0	0	0	0

Table 5.3. Continued

SKELETAL PART	Trench 8 U 2 2 CDB	Trench 8 U 3 2	Grid 5 C 3 1 Brown	Grid 5 C 3 2	Trench 2 U 15/16 2 CDB	Trench 2 U 6 2 CDB	Sq. 3Ext 2 CDB	Square 3 HE	Sq. 12 2 CDB :2	Sq. 12Ext 2 DB
Total ID remains	20	9	19	13	7	2	140	40	46	9
Enamel fragments	#	#	0	0	4	0	0	0	#	#
Skull fragments	#	#	5	0	5	12	0	3	#	#
Vertebra fragments	#	#	1	4	3	0	0	0	#	#
Rib fragments	#	#	1	2	8	6	0	0	#	#
Miscellaneous fragments	#	#	100	121	12	8	0	0	#	#
Bone flakes	#	#	24	8	12	16	3	1	#	#
Total NON-ID	#	#	131	135	44	42	3	4	#	#
TOTAL SAMPLE	20	9	150	148	51	44	143	44	46	9
Mass: ID (g)	255.1	78.6	417.4	47.6	74.6	74.3	1247.0	302.6	680.0	242.5
Mass: NON-ID (g)	#	#	231.5	168.4	168.3	76.2	10.8	16.8	#	#
Number of burnt bones	0	0	3	13	0	2	1	0	0	0
% Burnt bones	0	0	2.0	9.62	0	4.54	0.69	0	0	0

Table 5.3. Continued

SKELETAL PART	Sq. 12Ext 3 R	Square 14 2 and 3 R	Square 17 2 DB	Square 18 2	Square 24 2 DB	Grid 4 F 1 2 CGB	TS 3 2 CDB	TS 12Ext 2 CDB	TS 16 2	TS 18 2
Total ID remains	36	21	18	2	26	15	6	7	6	30
Enamel fragments	#	#	0	#	0	#	#	#	#	11
Skull fragments	#	#	1	#	0	#	#	#	#	5
Vertebra fragments	#	#	1	#	1	#	#	#	#	2
Rib fragments	#	#	0	#	0	#	#	#	#	0
Miscellaneous fragments	#	#	1	#	0	#	#	#	#	0
Bone flakes	#	#	2	#	11	#	#	#	#	0
Total NON-ID	#	#	5	#	12	#	#	#	#	18
TOTAL SAMPLE	36	21	23	2	38	15	6	7	6	48
Mass: ID (g)	399.0	261.0	449.0	10.4	523.1	126.9	37.6	135.8	37.1	352.1
Mass: NON-ID (g)	#	#	47.9	#	153.7	#	#	#	#	78.2
Number of burnt bones	0	0	0	0	1	0	0	0	0	0
% Burnt bones	0	0	0	0	2.63	0	0	0	0	0

Table 5.3. Continued

SKELETAL PART	TS 19 2	TS 20 2 CGB	TS 21 2 CDB	TS 22 2 CDB	TS 22Ext 2 CDB	TS 22 Slag	TS 22 1 Brown	TS 25 2	TS 26 2	TS 34 2
Total ID remains	28	18	102	117	94	15	23	5	8	2
Enamel fragments	2	0	0	1	3	0	0	#	0	0
Skull fragments	6	0	12	28	22	0	0	#	4	0
Vertebra fragments	4	0	5	40	6	0	3	#	0	0
Rib fragments	4	3	8	29	10	0	9	#	0	0
Miscellaneous fragments	12	1	80	110	350	1	13	#	0	0
Bone flakes	18	11	28	89	36	0	12	#	3	4
Total NON-ID	46	15	133	297	427	1	37	#	7	4
TOTAL SAMPLE	74	33	235	414	521	16	60	5	15	6
Mass: ID (g)	361.7	221.7	1452.8	1713.8	772.7	76.9	322.4	60.4	73.2	74.4
Mass: NON-ID (g)	387.2	65.6	578.4	1605.0	668.5	1.6	231.5	#	44.7	48.8
Number of burnt bones	0	0	2	6	6	0	0	0	0	0
% Burnt bones	0	0	0.85	1.44	1.15	0	0	0	0	0

Table 5.3. Continued

SKELETAL PART	TS 37 2	TS 45 2	TS 46 2	TS 48 2	TS 58 2	TS 63 Level -	TS 76 Level -	TS 76Ext 1	TS 76 Brown	TS 3 2
Total ID remains	3	2	4	5	6	9	7	24	8	12
Enamel fragments	0	0	0	#	#	#	#	1	#	#
Skull fragments	0	0	3	#	#	#	#	0	#	#
Vertebra fragments	0	0	2	#	#	#	#	2	#	#
Rib fragments	1	0	0	#	#	#	#	0	#	#
Miscellaneous fragments	0	0	6	#	#	#	#	0	#	#
Bone flakes	1	5	8	#	#	#	#	0	#	#
Total NON-ID	2	5	19	#	#	#	#	3	#	#
TOTAL SAMPLE	5	7	23	5	6	9	7	27	8	12
Mass: ID (g)	52.4	16.1	81.3	45.7	36.1	66.2	101.3	205.2	62.4	77.2
Mass: NON-ID (g)	8.3	41.1	175.8	#	#	#	#	8.9	#	#
Number of burnt bones	0	0	0	0	0	0	0	0	0	0
% Burnt bones	0	0	0	0	0	0	0	0	0	0

Table 5.3. Continued

SKELETAL PART	TS 22 Level -	TS 46 1	Total Ntshekane sample
Total ID remains	6	4	**1079**
Enamel fragments	18	#	**43**
Skull fragments	42	#	**184**
Vertebra fragments	4	#	**86**
Rib fragments	4	#	**98**
Miscellaneous fragments	520	#	**1397**
Bone flakes	29	#	**417**
Total NON-ID	617	#	**2225**
TOTAL SAMPLE	623	4	**3304**
Mass: ID (g)	99.1	81.7	**12982.8**
Mass: NON-ID (g)	362.1	#	**5602.2**
Number of burnt bones	209	0	**382**
% Burnt bones	33.54	0	**11.56**

Table 5.4. KwaGandaganda: Msuluzi/Ndondondwane mixed units - NISP of total sample; fish and marine molluscs excluded (ID: Identifiable; Non-ID: Non-identifiable; #: No non-identifiable lists available)

SKELETAL PART	**Trench 6 U 1 3 D/GA**	**Trench 1 U 1 3 R**	**Trench 1 U 2 3 R**	**Trench 1 U 3 3 R**	**Trench 1 U 4 3 R**	**Trench 1 U 7 4 R**	**Trench 1 U 7 3 GA**	**Trench 1 U 7 3 R**	**Trench 1 U 3 2**
Total ID remains	11	49	39	106	62	10	22	2	2
Enamel fragments	#	2	3	29	12	0	0	#	3
Skull fragments	#	32	17	110	48	2	6	#	0
Vertebra fragments	#	13	7	57	22	4	2	#	0
Rib fragments	#	10	18	112	81	3	10	#	0
Miscellaneous fragments	#	28	32	196	63	6	7	#	0
Bone flakes	#	56	81	236	125	18	22	#	0
Total NON-ID	#	141	158	740	351	33	47	#	3
TOTAL SAMPLE	11	190	197	846	413	43	69	2	5
Mass: ID (g)	131.1	739.7	291.4	716.2	422.0	25.0	83.1	1.5	6.8
Mass: NON-ID (g)	#	369.4	275.2	1188.0	637.0	67.8	60.5	#	4.4
Number of burnt bones	0	1	35	100	19	0	3	0	0
% Burnt bones	0	0.52	17.76	11.82	4.60	0	4.34	0	0

Table 5.4. Continued

SKELETAL PART	Trench 2 U 21 3	Trench 2 U 22 3 D/GA	Square 19 1 B	Grid 4 G 2 3 D	Grid 4 - 4 B	TS 3 3	TS 56 3	TS 60 3 D
Total ID remains	198	137	10	43	88	7	3	3
Enamel fragments	27	11	#	0	#	0	1	#
Skull fragments	107	79	#	4	#	4	4	#
Vertebra fragments	98	52	#	10	#	0	3	#
Rib fragments	283	116	#	2	#	0	0	#
Miscellaneous fragments	117	61	#	14	#	0	0	#
Bone flakes	325	260	#	30	#	5	16	#
Total NON-ID	957	579	#	60	#	9	24	#
TOTAL SAMPLE	1155	716	10	103	88	16	27	3
Mass: ID (g)	1362.7	718.7	119.1	557.6	425.2	40.2	40.2	175.4
Mass: NON-ID (g)	1933.3	1139.7	#	301.9	#	32.2	90.5	#
Number of burnt bones	21	0	0	60	0	0	0	0
% Burnt bones	1.81	0	0	58.25	0	0	0	0

Table 5.4. Continued

SKELETAL PART	TS 61 3/4 IF	TS 65 Level -	TS 66 Level -	TS 70 Ash and 3 A	Trench 3 U 1/2 3 D	Trench 5 U 8 2 CDB	Total Msuluzi/ Ndondondwane sample
Total ID remains	18	2	3	22	9	6	**852**
Enamel fragments	#	#	#	0	0	0	**88**
Skull fragments	#	#	#	0	3	0	**416**
Vertebra fragments	#	#	#	0	0	4	**272**
Rib fragments	#	#	#	0	0	2	**637**
Miscellaneous fragments	#	#	#	10	2	17	**553**
Bone flakes	#	#	#	1	6	3	**1184**
Total NON-ID	#	#	#	11	11	26	**3150**
TOTAL SAMPLE	18	2	3	33	20	32	**4002**
Mass: ID (g)	318.5	49.4	23.1	558.4	40.0	483.1	**7328.4**
Mass: NON-ID (g)	#	#	#	27.6	30.5	241.4	**6399.4**
Number of burnt bones	0	0	0	0	0	0	**239**
% Burnt bones	0	0	0	0	0	0	**5.97**

Table 5.5. KwaGandaganda: Msuluzi/Ntshekane mixed units - NISP of total sample; fish and marine molluscs excluded (ID: Identifiable; Non-ID: Non-identifiable)

SKELETAL PART	**Trench 5 U 11 2 CDB**	**Trench 3 U 7/8 3 PB**	**Total Ms/Nt sample**
Total ID remains	30	5	**35**
Enamel fragments	2	0	**2**
Skull fragments	12	0	**12**
Vertebra fragments	2	0	**2**
Rib fragments	2	3	**5**
Miscellaneous fragments	32	10	**42**
Bone flakes	48	3	**51**
Total NON-ID	98	16	**114**
TOTAL SAMPLE	128	21	**149**
Mass: ID (g)	251.1	21.9	**273.0**
Mass: NON-ID (g)	292.8	29.6	**322.4**
Number of burnt bones	74	0	**74**
% Burnt bones	57.81	0	**49.66**

Table 5.6. KwaGandaganda: Ndondondwane/Ntshekane mixed units - NISP of total sample; fish and marine molluscs excluded (ID: Identifiable; Non-ID: Non-identifiable; #: No non-identifiable lists available)

SKELETAL PART	Trench 6 U 1 2	Trench 7 U 1 2 CDB	Trench 2 U 4 2 CDB	Trench 2 U 5 2 CDB	Trench 2 U 10 2 CDB	Trench 2 U 11 2 CDB	Trench 2 U 12 2 CDB	Trench 2 U 13 2 CDB	Trench 2 U 14 2 CDB	Trench 2 U 11 H
Total ID remains	4	20	14	14	9	9	12	15	4	1
Enamel fragments	#	#	5	4	4	4	7	0	1	0
Skull fragments	#	#	9	17	5	6	3	3	5	3
Vertebra fragments	#	#	7	6	1	0	4	4	0	1
Rib fragments	#	#	16	26	3	2	1	4	1	6
Miscellaneous fragments	#	#	35	50	9	2	7	3	4	5
Bone flakes	#	#	31	66	9	16	7	18	1	13
Total NON-ID	#	#	103	169	31	30	29	32	12	28
TOTAL SAMPLE	4	20	117	183	40	39	41	47	16	29
Mass: ID (g)	10.4	229.9	99.7	152.1	72.4	84.2	147.5	98.4	55.1	5.3
Mass: NON-ID (g)	#	#	106.5	352.1	19.8	44.9	52.5	56.3	28.1	46.5
Number of burnt bones	0	0	3	2	1	0	1	0	0	0
% Burnt bones	0	0	2.56	1.09	2.5	0	2.2	0	0	0

Table 5.6. Continued

SKELETAL PART	Trench 2 U 8 2 CDB	Trench 2 U 9 2 CDB	Sq. 11+11(a) 2 DB	Sq. 23 Ext 2 CDB	Sq. 23(d) 2 CDB	Grid 4 E 1/2 2 CDB	Grid 4 F2,G1,G2 2 CB	TS 6 2	TS 15 2/3	Total Nd/Nt sample
Total ID remains	4	3	34	2	13	28	30	5	3	**224**
Enamel fragments	1	0	#	14	#	1	#	#	#	**41**
Skull fragments	3	0	#	0	#	0	#	#	#	**54**
Vertebra fragments	1	2	#	1	#	1	#	#	#	**28**
Rib fragments	1	0	#	0	#	0	#	#	#	**60**
Miscellaneous fragments	0	1	#	0	#	1	#	#	#	**117**
Bone flakes	7	6	#	0	#	0	#	#	#	**174**
Total NON-ID	13	9	#	15	#	3	#	#	#	**474**
TOTAL SAMPLE	17	12	34	17	13	31	30	5	3	**698**
Mass: ID (g)	19.6	10.7	350.3	43.7	138.9	475.4	464.0	96.4	114.3	**2668.3**
Mass: NON-ID (g)	19.9	23.1	#	28.3	#	25.2	#	#	#	**803.2**
Number of burnt bones	0	0	0	0	0	1	0	0	0	**8**
% Burnt bones	0	0	0	0	0	3.2	0	0	0	**1.15**

Table 5.7. KwaGandaganda: Unknown phase - NISP of total sample; fish and marine molluscs excluded (ID: Identifiable; Non-ID: Non-identifiable; #: No non-identifiable lists available)

SKELETAL PART	**TS 7 Level -**	**TS 33 1 + 2**	**Trench 1 U 7 4 R**	**Trench 2 U 4 4**	**Square 16 2 DB**	**Square 21 2 DB**	**Total sample of Unknown (?) phase**
Total ID remains	4	28	62	1	6	10	**111**
Enamel fragments	#	0	12	#	0	0	**12**
Skull fragments	#	29	48	#	0	2	**79**
Vertebra fragments	#	0	22	#	0	0	**22**
Rib fragments	#	0	81	#	0	0	**81**
Miscellaneous fragments	#	0	63	#	0	0	**63**
Bone flakes	#	0	125	#	3	0	**128**
Total NON-ID	#	29	351	#	3	2	**385**
TOTAL SAMPLE	4	57	413	1	9	12	**496**
Mass: ID (g)	35.8	179.2	422.0	5.9	267.0	57.3	**967.2**
Mass: NON-ID (g)	#	69.0	637.0	#	39.4	3.7	**749.1**
Number of burnt bones	0	0	19	0	0	0	**19**
% Burnt bones	0	0	4.60	0	0	0	

Table 5.8. KwaGandaganda: general species list, all phases and levels combined

Homo sapiens sapiens..human
cf. *Homo sapiens sapiens*
cf. *Galago crassicaudatus*.......................................thick-tailed bushbaby
Cercopithecus aethiops..vervet monkey
cf. *Cercopithecus aethiops*
Papio ursinus..chacma baboon
Canis familiaris...domestic dog
cf. *Canis familiaris*
cf. *Canis mesomelas*..black-backed jackal
Canis cf. *mesomelas*
Canis sp.
Canid
Mellivora capensis...honey badger
Genetta tigrina...large-spotted genet
Atilax paludinosus..water mongoose
Mongoose
Hyaena/Crocuta...brown/Spotted hyaena
cf. *Hyaena/Crocuta*
Panthera pardus...leopard
Panthera leo...lion
cf. *Panthera leo*
Felis serval...serval
Felis lybica...African wild cat
Felid
Felid (small)
Felid (large)
Carnivore
Carnivore (small)
Carnivore (small-medium)
Carnivore (medium)
Carnivore (medium-large)
Carnivore (large)
Loxodonta africana..elephant
cf. *Loxodonta africana*
cf. *Ceratotherium simum*...square-lipped rhinoceros
Equus burchellii...Burchell's zebra
Procavia capensis...rock dassie
Phocochoerus aethiopicus...warthog
cf. *Phocochoerus aethiopicus*
Potamochoerus porcus..bushpig
cf. *Potamochoerus porcus*

Table 5.8. Continued

Suid
Hippopotamus amphibius..hippopotamus
cf. *Hippopotamus amphibius*
Giraffa camelopardalis..giraffe
Bos taurus...cattle
cf. *Bos taurus*
Ovis aries..sheep
cf. *Ovis aries*
Capra hircus...goat
cf. *Capra hircus*
Ovis/Capra...sheep/goat
cf. *Ovis/Capra*
Philantomba monticola..blue duiker
cf. *Philantomba monticola*
Cephalophus natalensis...red duiker
cf. *Cephalophus natalensis*
Cephalophinae
Sylvicapra grimmia...common duiker
cf. *Sylvicapra grimmia*
Raphicerus campestris..steenbok
cf. *Raphicerus campestris*
Raphicerus melanotis...grysbok
cf. *Raphicerus* sp.
Aepyceros melampus...impala
cf. *Aepyceros melampus*
Syncerus caffer..buffalo
cf. *Syncerus caffer*
Tragelaphus strepsiceros..kudu
Tragelaphus scriptus..bushbuck
Taurotragus oryx..eland
cf. *Taurotragus oryx*
cf. *Redunca arundinum*..reedbuck
cf. *Redunca fulvorufula*..mountain reedbuck
Kobus ellipsiprymnus...waterbuck
cf. *Kobus ellipsiprymnus*
Bov I
Bov II
Bov II (non-domestic)
Bov III
Bov III (non-domestic)
Bov IV

Table 5.8. Continued

Manis temminckii..pangolin
Pedetes capensis..springhare
Thryonomys swinderianus..greater cane rat
cf. *Thryonomys swinderianus*
Cryptomys hottentotus...common molerat
Cryptomys sp.
Otomys sp. ....vlei rat
cf. *Otomys* sp.
cf. *Mus minotoides* ....pygmy mouse
Aethomys sp..mouse
cf. *Rattus rattus*..common house rat
Muridae
Lepus saxatilis..scrub hare
Lepus sp.
Lagomorph
Rodent
Rodent (small)
Rodent (medium)
Gallus domesticus...domestic chicken
cf. *Gallus domesticus*
Struthio camelus..ostrich
Bird of prey
Bird (small)
Bird (medium)
Bird (medium/large)
Tortoise
Terrapin
Snake (small)
Crocodilus niloticus...crocodile
Varanus niloticus..water monitor
Varanus sp.
Lizard
Reptile (small)
Reptile (medium)
Frog
Frog/Toad
Sparadon durbanensis...mussel cracker
Clarias gariepinus..barbel
Clarias sp.
Fish
Fish (medium)

Table 5.8. Continued

Achatina zebra..giant land snail
Achatina sp.
Bulinus sp...freshwater gastropod
Tropidophora sp..terrestrial gastropod
Freshwater snail
Snail (small)
Patella sp...true limpets
Polinices mamilla..marine gastropod
Naticidae
Unionidae
Unio/Aspatharia..freshwater mussel
Marine bivalve
Glycymeris queketti...bittersweet clam
Perna perna..perna mussel
Oyster
Cardium sp..cockle

Table 5.9. KwaGandaganda: species as represented in each phase and mixed units, all levels combined (Ms: Msuluzi; Nd: Ndondondwane; Nt: Ntshekane; Ms/Nd: Msuluzi/Ndondondwane; Ms/Nt: Msuluzi/Ntshekane; Nd/Nt: Ndondondwane/Ntshekane; ?: Unknown phase)

Species	Ms	Nd	Nt	Ms/Nd	Ms/Nt	Nd/Nt	?
Homo sapiens sapiens	✓	✓					✓
cf. *Homo sapiens sapiens*							✓
cf. *Galago crassicaudatus*	✓						
Cercopithecus aethiops	✓						
cf. *Cercopithecus aethiops*				✓			
Papio ursinus		✓	✓				
Canis familiaris	✓	✓	✓			✓	
cf. *Canis familiaris*		✓					
cf. *Canis mesomelas*		✓					
Canis cf. *mesomelas*	✓						
Canis sp.	✓	✓				✓	
Canid		✓					
Mellivora capensis		✓					
Genetta tigrina		✓					
Atilax paludinosus	✓	✓	✓				
cf. *Atilax paludinosus*			✓				
Mongoose		✓	✓				
Hyaena/Crocuta	✓	✓	✓				
cf. *Hyaena/Crocuta*	✓						
Panthera pardus	✓						
Panthera leo		✓					
cf. *Panthera leo*		✓					
Felis serval	✓						
Felis lybica	✓						
cf. *Felis lybica*				✓			
Felid		✓					
Felid (small)			✓		✓		

Table 5.9. Continued

Species	Ms	Nd	Nt	Ms/Nd	Ms/Nt	Nd/Nt	?
Felid (large)	✓						
Carnivore		✓					
Carnivore (small)		✓					
Carnivore (small-medium)		✓					
Carnivore (medium)		✓	✓				
Carnivore (medium-large)				✓			
Carnivore (large)		✓					
Loxodonta africana	✓		✓				
cf. *Loxodonta africana*		✓	✓				
cf. *Ceratotherium simum*				✓			
Equus burchellii	✓	✓					✓
Procavia capensis		✓					
Phacochoerus aethiopicus	✓	✓	✓				
cf. *Phacochoerus aethiopicus*			✓				
Potamochoerus porcus	✓	✓	✓	✓		✓	
cf. *Potamochoerus porcus*	✓	✓	✓	✓			
Suid	✓	✓	✓				
Suid (non-domestic)			✓				
Hippopotamus amphibius	✓	✓	✓				
cf. *Hippopotamus amphibius*		✓					
Giraffa camelopardalis		✓					
Bos taurus	✓	✓	✓	✓	✓	✓	✓
cf. *Bos taurus*	✓	✓	✓	✓	✓	✓	
Ovis aries	✓	✓	✓	✓		✓	✓
cf. *Ovis aries*	✓		✓				
Capra hircus	✓	✓	✓	✓			✓
cf. *Capra hircus*		✓					
Ovis/Capra	✓	✓	✓	✓	✓	✓	✓

Table 5.9. Continued

Species	Ms	Nd	Nt	Ms/Nd	Ms/Nt	Nd/Nt	?
cf. *Ovis/Capra*	✓	✓	✓	✓	✓	✓	✓
Philantomba monticola	✓	✓	✓	✓		✓	
cf. *Philantomba monticola*	✓	✓	✓			✓	
Cephalophus natalensis	✓	✓					
cf. *Cephalophus natalensis*		✓	✓				
Cephalophinae	✓						
Sylvicapra grimmia	✓	✓	✓	✓	✓	✓	
cf. *Sylvicapra grimmia*	✓	✓	✓				
Raphicerus campestris	✓	✓	✓				
cf. *Raphicerus campestris*	✓	✓					
Raphicerus melanotis			✓				
cf. *Raphicerus* sp.		✓				✓	
Aepyceros melampus	✓	✓	✓			✓	
cf. *Aepyceros melampus*	✓	✓		✓			
Syncerus caffer	✓	✓	✓	✓		✓	
cf. *Syncerus caffer*	✓	✓	✓			✓	
Tragelaphus strepsiceros		✓					
Tragelaphus scriptus			✓				
Taurotragus oryx	✓						
cf. *Taurotragus oryx*	✓		✓				
cf. *Redunca arundinum*		✓				✓	
cf. *Redunca fulvorufula*	✓						
Kobus ellipsiprymnus		✓					
cf. *Kobus ellipsiprymnus*		✓					
Bov I	✓	✓	✓	✓		✓	
Bov II	✓	✓	✓	✓	✓	✓	✓
Bov II (non-domestic)	✓	✓	✓	✓	✓	✓	
Bov III	✓	✓	✓	✓	✓	✓	✓

Table 5.9. Continued

Species	Ms	Nd	Nt	Ms/Nd	Ms/Nt	Nd/Nt	?
Bov III (non-domestic)	✓	✓	✓	✓		✓	
Bov IV	✓	✓	✓	✓			
Manis temminckii	✓		✓				
Pedetes capensis		✓					
Thryonomys swinderianus	✓	✓	✓				
cf. *Thryonomys swinderianus*							
Cryptomys hottentotus		✓	✓				
Cryptomys sp.		✓					
Otomys sp.	✓		✓				
cf. *Otomys* sp.	✓					✓	
cf. *Mus minotoides*			✓				
Aethomys sp.	✓		✓				
cf. *Rattus rattus*	✓		✓				
Muridae			✓				
Lepus saxatilis		✓					
Lepus sp.		✓	✓				
Lagomorph		✓					
Rodent	✓						
Rodent (small)		✓	✓				
Rodent (medium)	✓	✓	✓		✓		
Gallus domesticus	✓	✓					
cf. *Gallus domesticus*		✓					
Struthio camelus	✓						
Bird of prey		✓					
Bird (small)	✓	✓		✓			
Bird (medium)	✓	✓					
Bird (medium/large)		✓					
Tortoise	✓	✓	✓				

Table 5.9. Continued

Species	Ms	Nd	Nt	Ms/Nd	Ms/Nt	Nd/Nt	?
Terrapin					✓		
Snake (small)		✓					
Crocodilus niloticus	✓						
Varanus niloticus	✓	✓	✓				
Varanus sp.	✓	✓	✓	✓			
Lizard	✓						
Reptile (small)		✓					
Reptile (medium)		✓	✓				
Frog		✓					
Frog/Toad	✓						
Sparadon durbanensis		✓					
Clarias gariepinus	✓	✓		✓			
Clarias sp.		✓					
Fish	✓	✓		✓			
Fish (medium)		✓					
Achatina zebra		✓					
Achatina sp.	✓	✓	✓	✓		✓	✓
Bulinus sp.		✓					
Tropidophora sp.		✓					
Freshwater snail		✓					
Snail (small)		✓					
Patella sp.		✓					
Polinices mamilla		✓					
Naticidae		✓					
Unionidae	✓	✓					
Unio/Aspatharia	✓	✓		✓			
Marine bivalve	✓	✓					
Glycymeris queketti		✓					

Table 5.9. Continued

Species	Ms	Nd	Nt	Ms/Nd	Ms/Nt	Nd/Nt	?
Perna perna		✓					
Oyster		✓					
Cardium sp.		✓					

Table 5.10. KwaGandaganda: Msuluzi phase - Species list of combined units with the NISP/MNI (The numbers in the table were assigned to the following combined units: 1: Test square 1; 2: Test square 6; 3: Test square 49; 4: Trench 3; 5: Trench 5; 6: Square 25, Test square 51; 7: Test Square 71; 8: Test squares 68 and 67; 9: Grid 1; 10: Grid 3; 11: Test square 73; 12: Grid 4; 13: Trenches 2, 7, 8 and Test square 62)

SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13
Homo sapiens sapiens						12/1				1/1			
cf. *Galago crassicaudatus*						1/1							
Cercopithecus aethiops									3/1				
Canis familiaris						10/1				2/1			5/1
Canis cf. *mesomelas*						1/1							
Canis sp.									1/1				
Atilax paludinosus									1/1		2/1		
Hyaena/Crocuta										4/1			
cf. *Hyaena/Crocuta*										1/1			
Panthera pardus						4/1							
Felis serval										1/1			
Felis lybica						2/1							
Felid (large)										1/1			
Loxodonta africana						11/1							
Equus burchellii									1/1		1/1		
Phacochoerus aethiopicus						1/1							1/1
Potamochoerus porcus						21/1				2/1	1/1	5/1	5/1

Table 5.10. Continued

SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13
cf. *Potamochoerus porcus*													3/1
Suid						1/1							
Hippopotamus amphibius						1/1							
Bos taurus	2/2			13/2	23/4	37/5	2/1	10/3	3/1	19/2	11/3	13/1	81/5
cf. *Bos taurus*					6/1		2/1	4/1		1/1		4/1	6/1
Ovis aries						153/4		1/1	13/3	6/1	12/1		4/1
cf. *Ovis aries*									3/1				
Capra hircus						12/1							1/1
Ovis/Capra	6/1	1/1		5/1	28/2	722/10	1/1	7/3	86/7	235/6	17/2	18/2	94/6
cf. *Ovis/Capra*					1/1	11/1				1/1		3/1	1/1
Philantomba monticola						20/1			2/1	4/1	1/1		2/1
cf. *Philantomba monticola*										1/1			
Cephalophus natalensis										3/1			
Cephalophinae						4/1							
Sylvicapra grimmia				2/1	1/1	10/1		1/1	9/1	3/1	3/1		
cf. *Sylvicapra grimmia*						1/1			2/1	3/1			
Raphicerus campestris						1/1							
cf. *Raphicerus campestris*						3/1							
Aepyceros melampus				1/1				1/1	1/1		1/1		

Table 5.10. Continued

SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13
cf. *Aepyceros melampus*						2/1							
Syncerus caffer									1/1		1/1		
cf. *Syncerus caffer*									1/1			4/1	
Taurotragus oryx											1/1		
cf. *Taurotragus oryx*													2/1
cf. *Redunca fulvorufula*												2/1	
Bov I				1/1	6/1	13/1			10/1		3/1		1/1
Bov II			2/1		15/2	13/1		3/1	7/1	29/2	13/2	20/2	15/1
Bov II (non-domestic)						1/1		1/1		5/1	2/1		
Bov III					5/1	2/1	1/1	3/1	1/1	6/1	6/1	6/1	17/1
Bov III (non-domestic)						2/1			3/1	2/1			
Bov 1V	1/1												1/1
Manis temminckii				1/1									
cf. *Thryonomys swinderianus*						1/1							
Otomys sp.									1/1				
cf. *Otomys* sp.						1/1							
Aethomys sp.						1/1							
cf. *Rattus rattus*						2/1							

Table 5.10. Continued

SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13
Rodent						1/1							
Rodent (medium)						2/1			1/1				
Gallus domesticus						3/1						1/1	
Struthio camelus									1/1				
Bird (guinea fowl/chicken size)									1/1				
Bird (small)										1/1			
Crocodylus niloticus						2/1							
Varanus niloticus						7/1							
Varanus sp.						1/1							
Tortoise									1/1				
Lizard				1/1									
Frog/Toad						1/1							
Clarias gariepinus				1/1									
Fish		2/1								5/1			
Achatina sp.		1/1			24/3	23/1			7/1				
Unionidae					6/1	2/1			17/1				
Unio/Aspatharia						6/1							
Marine bivalve						1/1							

Table 5.10. Continued

SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13
Total	9/4	4/3	2/1	25/9	115/17	1126/ 59	6/4	31/13	177/33	159/30	75/19	76/12	239/25

Table 5.11a. KwaGandaganda: Ndondondwane phase - Species list of combined units with the NISP/MNI (The numbers in the table were assigned to the following combined units: 1: Test squares 17, 18, 19, 21, 23, 24, 28, 57, 58, 59 and Square 2; 2: Test square 31, 32; 3: Test square 29, 30; 4: Grid 2; 5: Grid 3; 6: Test square 22; 7: Test square 26, 27; 8: Test square 37, 41; 9: Test square 69)

Species	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Canis familiaris				1/1					
Canis sp.									1/1
Genetta tigrina	5/1								
Atilax paludinosus	2/1								
Mongoose				4/2					
Hyaena/Crocuta	2/1								
Panthera leo				1/1					
cf. *Panthera leo*	1/1								
Felid				1/1					
Carnivore (small)				1/1					
Carnivore (small-medium)				1/1					
Carnivore (large)				1/1					
cf. *Loxodonta africana*				2/1					
Equus burchellii				1/1					
Procavia capensis				5/2					
Phacochoerus aethiopicus	8/1								

Table 5.11a. Continued

Species	1	2	3	4	5	6	7	8	9
Potamochoerus porcus	9/1			111/8		2/1			
Suid				7/1					
Hippopotamus amphibius				1/1					
cf. *Hippopotamus amphibius*						1/1			
Giraffa camelopardalis				4/1					
Bos taurus	76/5	9/3	1/1	325/18	12/3	9/2	4/4	1/1	1/1
cf. *Bos taurus*	32/2	2/1	1/1				3/2		
Ovis aries	1/1			64/5		8/1	1/1		1/1
Capra hircus				4/1	1/1				
Ovis/Capra	44/4	3/1	2/1	163/8	37/6	5/3	4/2	1/1	
cf. *Ovis/Capra*	11/2	1/1			5/1				
Philantomba monticola	2/1			23/2	2/1		1/1		
Cephalophus natalensis				1/1					
Sylvicapra grimmia				5/1			1/1		
cf. *Sylvicapra grimmia*	2/1	1/1							
Raphicerus campestris				4/1					
cf. *Raphicerus* sp.	2/1								
Aepyceros melampus				40/3					

Table 5.11a. Continued

Species	1	2	3	4	5	6	7	8	9
cf. *Aepyceros melampus*						1/1			
Syncerus caffer	3/1			1/1	5/2				
Tragelaphus strepsiceros				3/2					
cf. *Kobus ellipsiprymnus*	2/1								
Bov I	2/1	1/1	2/1	11/1		1/1			
Bov II	32/2	2/1		27/1	10/1	7/1	6/1		
Bov II (non-domestic)	2/1			33/1					
Bov III	19/1	5/2		18/1	3/1	2/1	4/1		1/1
Bov III (non-domestic)				24/1				1/1	
Thryonomys swinderianus				12/1					
Cryptomys hottentotus				1/1					
Crypromys sp.				3/1					
Lepus saxatilis						4/1			
Lepus sp.				1/1					
Lagomorph				1/1					
Rodent (medium)				6/2	1/1				
Bird (small)					4/1				
Bird (medium)						1/1			

Table 5.11a. Continued

Species	1	2	3	4	5	6	7	8	9
Snake (small)				1/1					
Varanus sp.				8/1					
Reptile (medium)				1/1					
Clarias gariepinus				2/1					
Clarias sp.				1/1					
Fish (medium)				1/1					
Fish				29/5	1/1				
Achatina sp.				16/3					
Bulinus sp.				1/1					
Snail (small)				1/1					
Patella sp.				1/1					
Polynices mamilla				1/1					
Unionidae				7/3					
Marine bivalve				3/2					
Perna perna				23/17					
Oyster				1/1					
Total	**256/30**	**24/11**	**6/4**	**1008/119**	**81/19**	**41/14**	**24/13**	**3/3**	**4/4**

Table 5.11b. KwaGandaganda: Ndondondwane phase - Species list of combined units with the l.___.MNI (The numbers in the table were assigned to the following combined units: 10: Square 1; 11: Test squares 12, 34, 36, 39, 49; 12: Square 22; 13: Test square 5 and Square 23 Ext; 14: Trench 1 (Units1 - 4); 15: Trench 1 (Unit 7), Trench 2 (Units 1 - 4) and Grid 4 (Units -4A and -4C); 16: Grid 4 (Units G1, J1, H1), Trench 4 (Units 1/2, 3/4) and Squares 4 - 7; 17: Trench 6; 18: Trench 2 (Units 5-7 and 9-14), Trench 5 (Units 1/2, 3), Test square 5 Ext (layer 2), Grid 4 (Units A1, C2, D1, E1, F1, -1A, -1B, -1C, -1D, -1E, -1F, -2A, -2B, -2C, -2D, -3A, -3B, -3C)

Species	10	11	12	13	14	15	16	17	18
Homo sapiens sapiens									2/1
Papio ursinus	3/1								
Canis familiaris			7/1			9/1			10/1
cf. *Canis familiaris*									4/1
cf. *Canis mesomelas*									4/1
Canid			1/1						
Mellivora capensis									3/1
Genetta tigrina						3/1			17/1
Hyaena/Crocuta	1/1								
Panthera leo									1/1
Carnivore							1/1		
Carnivore (medium)									1/1
cf. *Loxodonta africana*			3/1						
Procavia capensis						8/1			
Phacochoerus aethiopicus	2/1		1/1			2/1			1/1

Table 5.11b. Continued

Species	10	11	12	13	14	15	16	17	18
Potamochoerus porcus	2/1								12/1
cf. *Potamochoerus porcus*	1/1					1/1			2/1
Suid									3/1
Hippopotamus amphibius						1/1			
Bos taurus	85/10	9/1	91/3	5/1	54/6	153/5	65/4	17/2	444/8
cf. *Bos taurus*	19/1	4/1	26/2	1/1		10/2	15/2	7/1	35/2
Ovis aries			14/2		3/2	39/2		1/1	41/2
Capra hircus			1/1		3/1	4/1		6/1	1/1
cf. *Capra hircus*						1/1			4/1
Ovis/Capra	40/13	14/1	89/7	11/5	61/4	449/7	101/7	42/2	615/7
cf. *Ovis/Capra*	1/1	7/1	21/2			17/2	7/1	12/2	47/2
Philantomba monticola	3/1			1/1	4/1	1/1	1/1		14/2
cf. *Philantomba monticola*									2/1
Cephalophus natalensis									3/1
cf. *Cephalophus natalensis*									1/1
Sylvicapra grimmia			3/1						14/1
cf. *Sylvicapra grimmia*			2/1				2/1		2/1
cf. *Raphicerus campestris*									1/1
Aepyceros melampus						1/1	1/1		1/1

Table 5.11b. Continued

Species	10	11	12	13	14	15	16	17	18
cf. *Aepyceros melampus*									4/1
Syncerus caffer						4/1	3/1		
cf. *Syncerus caffer*			6/1			1/1	4/1		
cf. *Redunca arundinum*									1/1
Kobus ellipsiprymnus							2/1		
Bov I			3/1		2/1	9/1	2/1	1/1	6/1
Bov II	12/2	6/2	79/2	1/1		50/2	22/1	8/2	180/3
Bov II (non-domestic)		3/1	4/2		1/1	2/1	1/1		6/1
Bov III	19/2	2/1	36/1	1/1			12/2	5/1	29/2
Bov III (non-domestic)	1/1								
Pedetis capensis									1/1
Rodent (small)			3/1						2/1
Rodent (medium)			3/1						9/2
Gallus domesticus									2/1
Bird of prey							1/1		
Bird (medium)			1/1						
Bird (medium/large)							1/1		
Varanus niloticus									1/1

Table 5.11b. Continued

Species	**10**	**11**	**12**	**13**	**14**	**15**		**17**	**18**
Varanus sp.						1/1			
Reptile (small)									2/1
Frog									2/1
Sparadon durbanensis				2/1					
Clarias gariepinus									1/1
Achatina zebra			5/1						
Achatina sp.			30/4			6/1		4/1	118/22
Tropidophora									1/1
Fresh water snail									2/2
Naticidae									1/1
Unionidae			13/1				1/1	6/1	
Unio/Aspatharia									18/1
Glycymeris queketti									1/1
Perna perna									4/1
Cardium sp.									2/1
Total	**189/36**	**45/8**	**442/39**	**29/11**	**128/16**	**762/36**	**243/29**	**109/15**	**1676/93**

Table 5.12a. KwaGandaganda: Ntshekane phase - Species list of combined units with the NISP/MNI (The numbers in the table were assigned to the following combined units: 1: Square 12; 2: Square 14; 3: Square 17; 4: Square 18; 5: Test square 76; 6: Square 24; 7: Grid 5; 8: Test square 22; 9: Test squares 18, 19, 21; 10: Test squares 16, 20, 25, 26; 11: Square 1)

Species	1	2	3	4	5	6	7	8	9	10	11
Canis familiaris								1/1			
Atilax paludinosus		2/1									
cf. *Atilax paludinosus*					1/1						
Hyaena/Crocuta								2/1			
Loxodonta africana								1/1	2/1		
Phacochoerus aethiopicus								4/1			
cf. *Phacochoerus aethiopicus*								2/1			
Potamochoerus porcus							6/1	10/2	7/1		
cf. *Potamochoerus porcus*								1/1			1/1
Suid (non-domestic)								4/1			1/1
Bos taurus	25/3	3/1	8/2		4/2	19/6	1/1	93/9	49/5	8/1	8/2
cf. *Bos taurus*	23/2	4/1			1/1	1/1		4/1	24/2	5/1	
Ovis aries					1/1						1/1
Capra hircus				1/1							
Ovis/Capra	5/1	1/1		1/1	8/1		4/1	29/4	38/3	19/2	3/1

Table 5.12a. Continued

Species	1	2	3	4	5	6	7	8	9	10	11
cf. *Ovis/Capra*	5/1	2/1			2/1		1/1	3/1	6/1	1/1	
Philantomba monticola								1/1	4/1		
cf. *Cephalophus natalensis*					2/1				3/1		
Sylvicapra grimmia					1/1			13/1			
Raphicerus melanotis							3/1				
Aepyceros melampus					1/1						
Syncerus caffer							3/1				1/1
cf. *Syncerus caffer*	2/1										1/1
cf. *Taurotragus oryx*								1/1			
Bov I		1/1			1/1		1/1	1/1	2/1		1/1
Bov II	7/1	1/1	3/1		7/2	2/1	5/1	29/2	9/1	3/1	
Bov II (non-domestic)	3/1				3/1				1/1		
Bov III	21/2	2/1	7/1		5/1	3/1	6/1	51/3	13/2	2/1	8/2
Bov III (non-domestic)						1/1					1/1
Bov IV							1/1	1/1			
Manis temminckii								2/1			
Cryptomys hottentotus							1/1				

Table 5.12a. Continued

Species	1	2	3	4	5	6		8	9	10	11
Bird (small)					1/1						
Bird (medium)					1/1			2/1			
Total	**91/12**	**21/8**	**18/4**	**2/2**	**39/17**	**26/10**	**32/11**	**255/36**	**158/20**	**37/7**	**26/12**

Table 5.12b. KwaGandaganda: Ntshekane phase - Species list of combined units with the NISP/MNI (The numbers in the table were assigned to the following combined units: 12: Grid 3(F5); 13: Test square 45, 46; 14: Test square 58; 15: Grid 4 (F1, E1/E2/F1); 16: Test squares 37, 63, Square 3 and Trench 8 (U1/2); 17: Trench 8 (U3) and Trench 7 (U1,U2,U3); 18: Trench 2 (U6); 19: Trench 2 (U15/16) and Trench 3; (U1/2, U3/4); 20: Trench 5 (U1/2, U3 , U6); 21: Test square 12 Ext and Test square 3; 22: Test squares 34 and 48)

Species	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**
Atilax paludinosus									1/1		
Carnivore (medium)					1/1						
Phacochoerus aethiopicus					8/1						
cf. *Phacochoerus aethiopicus*					5/1						
Potamochoerus porcus					2/1						
Suid					1/1	1/1		1/1			
Hippopotamus amphibius										1/1	
Bos taurus	5/1	3/2		7/1	44/4	21/3	2/1	16/2	6/1	5/1	
cf. *Bos taurus*		1/1			15/1				1/1	1/1	
Ovis aries			1/1		19/2	1/1				2/1	
cf. *Ovis aries*					1/1						
Capra hircus	1/1										
Ovis/Capra	4/1	3/1	1/1	2/2	73/5	14/3		12/2	2/1	5/2	4/1
cf. *Ovis/Capra*		2/1			8/1					1/1	1/1

Table 5.12b. Continued

Species	12	13	14	15	16	17	18	19	20	21	22
Philantomba monticola					2/1						
Sylvicapra grimmia				1/1	2/1	1/1				1/1	
cf. *Sylvicapra grimmia*			4/1								
Raphicerus campestris										1/1	
Syncerus caffer					2/1			1/1			
Tragelaphus scriptus					6/1						
Bov I					2/1						
Bov II		1/1		3/1	16/2	2/1			8/1	6/2	1/1
Bov II (non-domestic)					2/1			1/1			
Bov III					16/1	5/1			10/2	1/1	1/1
Bov III (non-domestic)					2/1						
Thryonomys swinderianus					3/1						
Otomys sp				2/1							
Lepus sp.				1/1	2/1						
Varanus niloticus					1/1						
Varanus sp.					3/1						
Tortoise								1/1			

Table 5.12b. Continued

Species	12	13	14	15	16	17	18	19	20	21	22
Reptile (medium)						1/1					
Achatina sp.										1/1	
Total	**10/3**	**10/6**	**6/3**	**16/7**	**236/33**	**46/12**	**2/1**	**32/8**	**28/7**	**25/13**	**7/4**

Table 5.13. KwaGandaganda: Msuluzi/Ndondondwane mixed units - Species list of combined units with the NISP/MNI (The numbers in the table were assigned to the following combined units: 1: Grid 3 (H 6); 2: Square 19; 3: Trench 1, Grid 4 (-4 B); 4: Grid 4 (G 2), Test squares 60, 61; 5: Trench 3 (U 1/2); Trench 2 (U 5, U 8), Grid 4 (-2 F East); 6: Trench 2 (U 21, U 22); 7: Trench 6 (U 1); 8: Trench 5 (U 8); 9: Test square 3)

Species	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
cf. *Cercopithecus aethiops*			1/1						
cf. *Felis lybica*	1/1								
Carnivore (medium/large)						1/1			
cf. *Ceratotherium simum*								1/1	
Potamochoerus porcus	7/2				1/1				
cf. *Potamochoerus porcus*	1/1								
Bos taurus	30/3	1/1	98/8	23/3	43/5	71/4	3/2	1/1	1/1
cf. *Bos taurus*	5/1	1/1	4/2	10/1			2/1	2/1	1/1
Ovis aries	3/1	2/1	8/1		6/1	3/1			
Capra hircus			9/2		2/1				
Ovis/Capra	26/4		205/6	20/2	91/5	249/7	2/1	2/1	4/1
cf. *Ovis/Capra*	2/1		10/1	1/1	1/1		4/1		
Philantomba monticola	4/1				2/1	1/1			1/1
Sylvicapra grimmia	2/1		4/1		1/1				
cf. *Aepyceros melampus*						1/1			
Syncerus caffer						2/1			

Table 5.13. Continued

Species	1	2	3	4	5	6	7	8	9
Bov I	1/1		1/1			2/1			
Bov II	4/1	3/1	16/2	10/1	3/1	3/1			
Bov II (non-domestic)	2/1		4/1						
Bov III	2/1	3/1	6/2	1/1		1/1			
Bov III (non-domestic)	1/1		1/1						
Bov IV	1/1								
Bird (small)			1/1						
Varanus sp.	1/1								
Clarias gariepinus			1/1						
Fish	3/1								
Achatina sp.						1/1			
Unio/Aspatharia			1/1						
Total	**96/24**	**10/5**	**370/32**	**64/9**	**150/17**	**335/20**	**11/5**	**6/4**	**7/4**

Table 5.14. KwaGandaganda: Msuluzi/Ntshekane mixed units - Species list of combined units with the NISP/MNI (The numbers in the table were assigned to the following combined units: 1: Test square 70; 2: Trench 5 (U 11); 3: Trench 3 (U 2, U 7/8)

Species	**1**	**2**	**3**
Felid (small)		1/1	
Bos taurus	7/1	6/2	3/2
cf. *Bos taurus*	7/1	2/1	
Ovis/Capra	3/1	12/4	1/1
cf. *Ovis/Capra*	1/1	3/1	
Sylvicapra grimmia	1/1		
Bov II		3/1	
Bov II (non-domestic)		1/1	
Bov III	3/1	1/1	
Rodent (medium)		1/1	
Terrapin			2/1
Total	**22/6**	**30/13**	**6/4**

Table 5.15. KwaGandaganda: Ndondondwane/Ntshekane mixed units - Species list of combined un h the NISP/MNI (The numbers in the table were assigned to the following combined units: 1: Square 11; 2: Grid 3 (H6); 3: Test square 15; 4: Square 23; 5: Trench 6 (U1); 6: Test square 6; 7: Trench 7 (U1); 8: Grid 4 (C2, A1), Trench 2 (U4, U5, U8 - U14); 9: Grid 4 (E1/2, F2/G1/G2); 10: Test square 35)

Species	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Canis familiaris								7/1		
Canis sp.	1/1	4/1								
Potamochoerus porcus		3/1							8/1	
Bos taurus	6/1	12/2	3/1	5/2		3/1	8/2	48/5	27/3	2/1
cf. *Bos taurus*	9/1	2/1				1/1	4/1	1/1		4/2
Ovis aries	7/1	1/1						3/1	1/1	
Ovis/Capra	6/2	9/1		1/1	1/1		3/2	41/3	8/2	3/1
cf. *Ovis/Capra*					1/1		1/1			1/1
Philantomba monticola								1/1		
cf. *Philantomba monticola*						1/1				
Sylvicapra grimmia								1/1	1/1	
Raphicerus sp.		1/1								
cf. *Aepyceros melampus*		4/1								
Syncerus caffer		13/2								
cf. *Syncerus caffer*		4/2							1/1	
cf. *Redunca arundinum*									1/1	
Bov I	1/1				1/1					

Table 5.15. Continued

Species	1	2	3	4	5	6	7	8	9	10
Bov II	1/1	3/1		5/1	1/1		3/1		7/1	
Bov II (non-domestic)									3/1	1/1
Bov III	2/1	4/1		4/1					1/1	1/1
Bov III (non-domestic)							1/1			
Otomys size rodent		2/1								
Achatina sp.	1/1									
Total	**34/10**	**62/16**	**3/1**	**15/5**	**4/4**	**5/3**	**20/8**	**102/13**	**58/13**	**12/7**

Table 5.16. KwaGandaganda: Unknown phase - Species list of combined units with the NISP/MNI (The numbers in the table were assigned to the following combined units: 1: Test square 7, Square 21; 2: Trench 1 (U7); 3: Square 16; 4: Test square 33; 5: Trench 2 (U4)

Species	**1**	**2**	**3**	**4**	**5**
Equus burchellii				1/1	
Bos taurus	3/1	6/1			
Ovis aries			1/1		
Capra hircus			3/1		
Ovis/Capra	1/1	1/1		9/2	1/1
cf. *Ovis/Capra*		1/1			
Bov II		1/1			
Bov III	2/1				
Achatina sp.		1/1			
Total	**6/3**	**10/5**	**4/2**	**10/3**	**1/1**

Table 5.17. KwaGandaganda: *Bos taurus* skeletal parts in each phase and mixed units, with QSP/Percentage. Where the total QSP is less than 100, percentages are not provided (Ms: Msuluzi; Nd: Ndondondwane; Nt: Ntshekane; Ms/Nd: Msuluzi/Ndondondwane; Ms/Nt: Msuluzi/Ntshekane; Nd/Nt: Ndondondwane/Ntshekane; ?: Unknown phase)

SKELETAL PART	Ms	Nd	Nt	Ms/Nd	Ms/Nt QSP only	Nd/Nt QSP only	? QSP only
Skull							
:horncore	1/0.6	22/1.9	-	2/0.9	-	-	1
:occipital	5/2.9	11/0.9	-	-	-	-	-
:pre-maxilla	2/1.1	6/0.5	-	-	-	-	1
:os petrosum	2/1.1	6/0.5	1/0.5	9/4.1	-	1	-
Teeth	104/59.8	439/37.9	86/47.2	95/43.2	3	42	7
Mandible							
:diastema	3/1.7	12/1.0	-	7/3.2	-	1	1
:ramus/ condyle	9/5.2	56/4.8	8/4.4	8/3.6	-	2	1
Hyoid	2/1.1	12/1.0	1/0.5	2/0.9	-	1	2
Atlas	2/1.1	14/1.2	1/0.5	3/1.4	-	1	-
Axis	2/1.1	12/1.0	2/1.1	3/1.4	-	-	-
Vertebra	-	-	-	2/0.9	-	-	-
Sternum	-	-	-	1/0.5	-	-	-
Scapula							
:glenoid	3/1.7	12/1.0	2/1.1	2/0.9	-	1	-
:blade	1/0.6	23/2.0	-	8/3.6	-	1	1
Humerus							
:proximal	-	7/0.6	-	-	-	-	-
:distal	2/1.1	15/1.3	-	1/0.5	-	-	1
Radius							
:proximal	1/0.6	16/1.4	3/1.6	2/0.9	1	-	2
:distal	-	7/0.6	-	1/0.5	-	1	-
Ulna							
: proximal	1/0.6	17/1.5	4/2.2	3/1.4	-	-	-

Table 5.17. Continued

SKELETAL PART	Ms	Nd	Nt	Ms/Nd	Ms/Nt QSP only	Nd/Nt QSP only	? QSP only
Pelvis							
:acetabulum	-	20/1.7	-	4/1.8	-	1	1
:pubis	-	7/0.6	-	2/0.9	-	1	-
:ilium	-	7/0.6	1/0.5	2/0.9	-	-	1
:ischium	-	3/0.3	1/0.5	3/1.4	-	-	-
Sacrum	-	1/0.1	-	-	-	-	-
Femur							
:proximal	2/1.1	11/0.9	-	3/1.4	-	-	2
:distal	2/1.1	16/1.3	1/0.5	1/0.5	-	-	-
Patella	2/1.1	6/0.5	1/0.5	-	-	1	-
Tibia							
:proximal	1/0.6	8/0.7	1/0.5	1/0.5	1	-	-
:distal	1/0.6	8/0.7	1/1.6	1/0.5	-	-	1
Metacarpal							
:proximal	2/1.1	20/1.7	4/2.2	2/0.9	-	4	1
:distal	-	3/0.3	-	-	-	-	1
Metatarsal							
:proximal	2/1.1	19/1.6	4/2.2	3/1.4	-	2	-
:distal	-	4/0.3	-	1/0.5	-	-	-
Metapodial							
:proximal	-	4/0.3	-	2/0.9	-	1	1
:distal	1/0.6	32/2.8	3/1.6	6/2.7	-	1	-
Calcaneum	3/1.7	19/1.6	6/3.3	2/0.9	-	1	1
Astragalus	2/1.1	11/0.9	5/2.7	2/0.9	1	2	2
Lateral malleolus	1/0.6	4/0.3	-	2/0.9	-	-	1
Os centro-quartale	2/1.1	13/1.1	2/1.1	1/0.5	1	2	-
Carpals	6/3.4	56/4.8	13/7.1	6/2.7	-	7	2
Tarsals	-	4/0.3	2/1.1	-	-	-	-

Table 5.17. Continued

SKELETAL PART	Ms	Nd	Nt	Ms/Nd	Ms/Nt QSP only	Nd/Nt QSP only	? QSP only
Sesamoids	2/1.1	23/2.0	9/4.9	1/0.5	-	4	1
Phalanx 1							
:half	1/0.6	12/1.0	-	1/0.5	-	-	-
:proximal	-	17/1.5	4/2.2	3/1.4	-	3	-
:distal	-	37/3.2	4/2.2	7/3.2	-	3	-
Phalanx 2							
:half	-	5/0.4	-	2/0.9	-	-	1
:proximal	1/0.6	39/3.4	3/1.6	2/0.9	-	1	1
:distal	2/1.1	30/2.6	3/1.6	3/1.4	1	2	-
Phalanx 3	1/0.6	33/2.8	4/2.2	8/3.6	-	3	3

Table 5.18. KwaGandaganda: *Ovis aries* skeletal parts in each phase and mixed units, with QSP/Percentage. Where the total QSP is less than 100, percentages are not provided (Ms: Msuluzi; Nd: Ndondondwane; Nt: Ntshekane; Ms/Nd: Msuluzi/Ndondondwane; Nd/Nt: Ndondondwane/Ntshekane)

SKELETAL PART	Ms	Nd	Nt QSP only	Ms/Nd QSP only	Nd/Nt QSP only
Skull					
:horncore	-	5/3.2	1	2	-
:occipital	-	2/1.3	-	-	-
:pre-maxilla	3/2.8	1/0.6	-	-	-
Teeth	22/20.8	40/25.3	14	-	6
Mandible					
:ramus/ condyle	7/6.6	12/7.6	-	2	-
Hyoid	2/1.9	1/0.6	-	-	-
Axis	-	3/1.9	-	1	-
Scapula					
:glenoid	6/5.7	15/9.5	-	1	-
:blade	3/2.8	8/5.1	-	1	-
Humerus					
:distal	3/2.8	6/3.8	1	2	-
Radius					
:proximal	7/6.6	2/1.3	-	-	-
:distal	1/0.9	1/0.6	-	-	1
Ulna					
:proximal	5/4.7	1/0.6	-	-	-
Pelvis					
:acetabulum	2/1.9	3/1.9	-	-	-
:pubis	2/1.9	1/0.6	-	-	-
:ischium	-	1/0.6	-	-	-
Sacrum	-	1/0.6	-	-	-

Table 5.18. Continued

SKELETAL PART	Ms	Nd	Nt QSP only	Ms/Nd QSP only	Nd/Nt QSP only
Femur					
:proximal	-	1/0.6	-	-	-
:distal	1/0.9	1/0.6	-	-	-
Patella	-	1/0.6	-	1	-
Tibia					
:proximal	-	2/1.3	-	-	-
:distal	-	4/2.5	-	1	-
Metacarpal					
:proximal	-	-	1	1	-
:distal	-	3/1.9	-	-	-
Metatarsal					
:proximal	1/0.9	3/1.9	-	-	-
:distal	1/0.9	-	-	-	-
Metapodial					
:distal	1/0.9	5/3.2	-	-	2
Calcaneum	4/3.8	8/5.1	-	2	-
Astragalus	7/6.6	2/1.3	1	-	-
Lateral malleolus	-	-	-	2	-
Os centro-quartale	-	1/0.6	-	-	-
Carpals	6/5.7	4/2.5	-	1	-
Tarsals	-	-	-	1	-
Sesamoids	-	4/2.5	-	-	-
Phalanx 1					
:proximal	4/3.8	3/1.9	-	-	-
:distal	3/2.8	4/2.5	-	-	-

Table 5.18. Continued

SKELETAL PART	Ms	Nd	Nt QSP only	Ms/Nd QSP only	Nd/Nt QSP only
Phalanx 2					
:half	-	1/0.6	-	-	-
:proximal	6/5.7	2/1.3	-	1	-
:distal	7/6.6	2/1.3	-	1	1
Phalanx 3	2/1.9	4/2.5	-	3	-

Table 5.19. KwaGandaganda: QSP of *Capra hircus* skeletal parts in each phase and mixed units (Ms: Msuluzi; Nd: Ndondondwane; Nt: Ntshekane; Ms/Nd: Msuluzi/Ndondondwane)

SKELETAL PART	Ms	Nd	Nt	Ms/Nd
Skull				
:horncore	-	8	1	-
Teeth	1	5	-	5
Mandible				
:diastema	-	-	1	-
ramus/condyle	-	1	-	-
Hyoid	1	-	-	-
Scapula				
:glenoid	-	2	-	-
:blade	-	2	-	-
Humerus				
:distal	-	-	-	1
Radius				
:proximal	1	1	-	-
Ulna				
:proximal	1	-	-	-
Pelvis				
:acetabulum	1	2	-	-
:pubis	-	1	-	-
:ilium	1	1	-	-
:ischium	-	1	-	-
Femur				
:proximal	1	-	-	-
Tibia				
:distal	-	1	-	-
Metapodial				
:distal	-	-	-	1
Calcaneum	1	1	-	-
Astragalus	2	-	-	2

Table 5.19. Continued

SKELETAL PART	Ms	Nd	Nt	Ms/Nd
Lateral malleolus	-	-	-	1
Phalanx 2				
:distal	-	1	-	-

Table 5.20. KwaGandaganda: *Ovis/Capra* skeletal parts in each phase and mixed units, with QSP/ Percentage. Where the total QSP is less than 100, percentages are not provided (Ms: Msuluzi; Nd: Ndondondwane; Nt: Ntshekane; Ms/Nd: Msuluzi/Ndondondwane; Ms/Nt: Msuluzi/Ntshekane; Nd/Nt: Ndondondwane/Ntshekane; ?: Unknown phase)

SKELETAL PART	Ms	Nd	Nt	Ms/Nd	Ms/Nt QSP only	Nd/Nt QSP only	? QSP only
Skull							
:horncore	-	1/0.06	-	-	-	1	-
:occipital	10/1.2	9/0.5	-	2/0.4	-	-	-
:pre-maxilla	10/1.2	12/0.7	-	4/0.9	-	-	-
:os petrosum	6/0.7	15/0.9	-	8/1.7	-	-	-
Teeth	436/53.1	765/49.8	92/65.7	158/34.3	6	39	5
Mandible							
:diastema	16/1.9	9/0.5	-	8/1.7	-	-	-
:ramus/ condyle	26/3.1	21/1.3	1/0.7	20/4.3	2	1	1
Hyoid	19/2.3	13/0.8	5/3.5	-	-	-	-
Atlas	3/0.3	8/0.5	-	5/1.1	-	-	-
Axis	3/0.3	12/0.7	1/0.7	7/1.5	-	-	-
Vertebra	2/0.2	1/0.06	-	-	-	-	-
Sternum	-	1/0.06	-	-	-	-	-
Scapula							
:glenoid	16/1.9	26/1.6	2/1.4	8/1.7	-	-	-
:blade	21/2.5	30/1.9	1/0.7	19/4.1	-	1	5
Humerus							
:proximal	-	6/0.3	-	2/0.4	-	-	-
:distal	13/1.5	28/1.8	1/0.7	14/3.0	1	-	2
Radius							
:proximal	8/0.9	19/1.2	-	12/2.6	-	-	2
:distal	4/0.4	22/1.4	1/0.7	4/0.8	-	-	-
Ulna							
:proximal	14/1.7	29/1.8	2/1.4	9/1.9	-	-	2

Table 5.20. Continued

SKELETAL PART	Ms	Nd	Nt	Ms/Nd	Ms/Nt QSP only	Nd/Nt QSP only	? QSP only
Pelvis							
:acetabulum	28/3.4	70/4.5	1/0.7	22/4.7	-	-	2
:pubis	2/0.2	33/2.1	-	4/0.8	-	-	3
:ilium	6/0.7	23/1.4	1/0.7	6/1.3	-	-	-
:ischium	5/0.6	22/1.4	1/0.7	5/1.1	-	-	-
Sacrum	1/0.1	-	-	-	-	-	-
Femur							
:proximal	10/1.2	26/1.6	2/1.4	8/1.7	-	-	2
:distal	3/0.3	7/0.4	-	5/1.1	-	-	-
Patella	-	7/0.4	-	1/0.2	-	1	-
Tibia							
:proximal	-	10/0.6	-	2/0.4	-	-	-
:distal	11/1.3	23/1.4	2/1.4	3/0.6	-	-	4
Metacarpal							
:proximal	13/1.5	21/1.3	3/2.1	9/1.9	-	1	-
:distal	-	-	-	-	-	-	1
Metatarsal							
:proximal	28/3.4	16/1.0	1/0.7	5/1.1	-	-	2
:distal	1/0.1	-	-	-	-	-	-
Metapodial							
:proximal	32/3.9	26/1.6	-	22/4.7	-	1	5
:distal	9/1.0	15/0.9	-	12/2.6	-	1	2
Calcaneum	16/1.9	41/2.6	2/1.4	12/2.6	2	1	5
Astragalus	5/0.6	7/0.4	5/3.5	3/0.7	1	1	1
Lateral malleolus	-	4/0.2	-	2/0.4	-	-	-
Os centro-quartale	2/0.2	19/1.2	2/1.4	6/1.3	-	-	-

Table 5.20. Continued

SKELETAL PART	Ms	Nd	Nt	Ms/Nd	Ms/Nt QSP only	Nd/Nt QSP only	? QSP only
Carpals	8/0.9	34/2.2	3/2.1	12/2.6	2	-	4
Tarsals	-	2/0.1	-	1/0.2	-	-	-
Sesamoids	-	1/0.06	-	2/0.4	-	-	-
Phalanx 1							
:half	4/0.4	3/0.2	3/2.1	2/0.4	-	-	2
:proximal	12/1.4	28/1.8	4/2.8	12/2.6	-	2	3
:distal	9/1.0	30/1.9	3/2.1	13/2.8	-	2	1
Phalanx 2							
:half	-	6/0.3	-	1/0.2	-	-	1
:proximal	3/0.3	11/0.7	-	3/0.6	-	-	1
:distal	4/0.4	13/0.7	-	5/1.1	-	-	-
Phalanx 3	1/0.1	10/0.6	1/0.7	2/0.4	-	-	1

Table 5.21. KwaGandaganda: QSP of Bov I skeletal parts in each phase and mixed units (Ms: Msuluzi; Nd: Ndondondwane; Nt: Ntshekane; Ms/Nd: Msuluzi/Ndondondwane; Nd/Nt: Ndondondwane/Ntshekane; ?: Unknown phase)

SKELETAL PART	Ms	Nd	Nt	Ms/Nd	Nd/Nt	?
Skull						
:horncore	2	5	-	-	1	-
:occipital	3	3	-	-	-	-
:pre-maxilla	-	-	-	-	1	-
Teeth	25	29	4	1	1	-
Mandible						
:incisive	1	-	-	-	-	-
:diastema	1	-	1	1	-	-
:ramus/ condyle	4	2	1	1	-	-
Atlas	2	-	-	-	-	-
Axis	-	3	-	-	-	1
Scapula						
:glenoid	2	6	-	2	-	-
:blade	4	5	-	1	1	-
Humerus						
:proximal	2	2	-	-	-	-
:distal	3	1	-	2	-	-
Radius						
:proximal	3	2	1	-	-	-
:distal	2	-	-	1	-	-
Ulna						
:proximal	2	1	-	-	-	-
Pelvis						
:acetabulum	-	3	-	-	-	-
:ilium	-	2	-	-	-	-
:ischium	-	2	-	-	-	-

Table 5.21. Continued

SKELETAL PART	Ms	Nd	Nt	Ms/Nd	Nd/Nt	?
Femur						
:proximal	3	1	-	-	-	-
Patella	-	-	-	-	1	-
Tibia						
:distal	2	-	1	-	-	-
Metacarpal						
:proximal	1	1	-	-	1	-
:distal	1	-	-	-	-	-
Metatarsal						
:proximal	-	1	-	-	1	-
Metapodial						
:proximal	-	2	-	-	-	-
:distal	1	-	-	-	-	-
Calcaneum	2	1	-	1	-	1
Astragalus	2	4	1	-	1	-
Os centro-quartale	-	1	-	-	-	-
Tarsals	-	1	-	-	-	-
Phalanx 1						
:half	1	-	-	-	-	-
:proximal	6	1	-	-	-	-
:distal	4	1	-	-	-	-
Phalanx 2						
:half	-	1	1	-	-	-
:proximal	6	1	-	1	-	-
:distal	6	1	-	1	-	-
Phalanx 3	1	3	1	-	2	-

Table 5.22. KwaGandaganda: Bov II skeletal parts in each phase and mixed units, with QSP/Percentage. Where the total QSP is less than 100, percentages are not provided (Ms: Msuluzi; Nd: Ndondondwane; Nt: Ntshekane; Ms/Nd: Msuluzi/Ndondondwane; Ms/Nt: Msuluzi/Ntshekane; Nd/Nt: Ndondondwane/Ntshekane; ?: Unknown phase)

SKELETAL PART	Ms QSP only	Nd	Nt QSP only	Ms/Nd QSP only	Ms/Nt QSP only	Nd/Nt QSP only	? QSP only
Skull							
:horncore	-	-	-	-	-	-	-
:occipital	1	6/1.52	1	1	-	-	-
:pre-maxilla	-	4/1.01	1	1	-	-	-
:os petrosum	2	14/3.54	2	-	-	2	-
Teeth	8	32/8.10	8	-	-	-	-
Mandible							
:incisive	-	-	-	1	-	-	-
:diastema	3	3/0.76	1	-	-	-	-
:ramus/ condyle	11	24/6.08	5	1	-	-	-
Hyoid	1	3/0.76	1	1	-	-	-
Atlas	2	5/1.27	1	-	-	-	1
Axis	1	3/0.76	-	2	-	2	-
Vertebra	1	2/0.51	-	-	-	-	-
Scapula							
:glenoid	1	10/2.53	-	1	-	1	-
:blade	1	25/6.33	-	1	-	2	-
Humerus							
:proximal	1	3/0.76	-	-	-	-	-
:distal	2	11/2.78	1	-	1	1	-
Radius							
:proximal	1	9/2.28	2	1	1	-	-
:distal	2	7/1.77	-	-	-	2	-
Ulna							
:proximal	-	4/1.01	-	1	-	-	-

Table 5.22. Continued

SKELETAL PART	Ms QSP only	Nd	Nt QSP only	Ms/Nd QSP only	Ms/Nt QSP only	Nd/Nt QSP only	? QSP only
Pelvis							
:acetabulum	4	29/7.34	-	2	-	2	-
:pubis	2	8/2.02	-	1	-	-	-
:ilium	4	7/1.77	-	-	-	1	-
:ischium	1	5/1.27	2	-	-	1	-
Femur							
:proximal	-	9/2.28	-	-	-	1	-
:distal	1	7/1.77	1	-	-	-	-
Patella	-	2/0.50	-	-	-	-	-
Tibia							
:proximal	-	1/0.25	-	-	-	-	-
:distal	-	5/1.27	-	1	-	1	-
Metacarpal							
:proximal	1	12/3.04	1	-	-	-	-
Metatarsal							
:proximal	3	8/2.03	1	1	-	-	1
Metapodial							
:proximal	6	33/8.35	1	2	1	1	-
:distal	2	18/4.56	1	1	-	2	-
Calcaneum	3	5/1.27	3	-	-	1	-
Astragalus	-	7/1.77	-	-	-	-	-
Os centro-quartale	-	2/0.50	-	-	-	-	-
Carpals	-	5/1.27	2	-	-	-	-
Tarsals	-	-	-	1	-	-	-
Sesamoids	-	3/0.76	-	1	-	1	-
Phalanx 1							
:half	-	3/0.76	-	-	-	1	-
:proximal	6	8/2.03	1	-	-	-	-
:distal	1	21/5.32	1	1	-	-	-

Table 5.22. Continued

SKELETAL PART	Ms QSP only	Nd	Nt QSP only	Ms/Nd QSP only	Ms/Nt QSP only	Nd/Nt QSP only	? QSP only
Phalanx 2							
:half	-	5/1.27	-	-	-	-	-
:proximal	-	10/2.53	-	-	-	-	-
:distal	-	11/2.78	-	-	-	-	-
Phalanx 3	-	6/1.52	2	-	-	-	-

Table 5.23. KwaGandaganda: Bov III skeletal parts in each phase and mixed units, with QSP/Percentage. Where the total QSP is less than 100, percentages are not provided (Ms: Msuluzi; Nd: Ndondondwane; Nt: Ntshekane; Ms/Nd: Msuluzi/Ndondondwane; Ms/Nt: Msuluzi/Ntshekane; Nd/Nt: Ndondondwane/Ntshekane; ?: Unknown phase)

SKELETAL PART	Ms QSP only	Nd	Nt QSP only	Ms/Nd QSP only	Nd/Nt QSP only	? QSP only
Skull						
:horncore	-	2/1.90	-	-	-	-
:occipital	1	-	-	-	-	-
:pre-maxilla	-	1/0.95	-	-	-	-
:os petrosum	2	3/2.86	4	-	-	-
Teeth	-	4/3.81	1	-	-	-
Mandible						
:diastema	1	2/1.90	1	-	-	-
:ramus/ condyle	2	5/4.76	7	3	-	2
Hyoid	2	-	1	-	-	-
Atlas	-	3/2.86	1	1	-	-
Axis	-	1/0.95	1	-	-	-
Scapula						
:glenoid	-	3/2.86	1	1	2	-
:blade	-	7/6.67	-	-	2	-
Humerus						
:proximal	1	4/3.81	1	-	-	-
:distal	1	5/4.76	-	-	-	-
Radius						
:proximal	-	3/2.86	-	-	-	-
:distal	-	1/0.95	-	-	-	-
Ulna						
:proximal	-	3/2.86	1	1	-	-
Pelvis						
:acetabulum	-	1/0.95	1	-	-	-

Table 5.23. Continued

SKELETAL PART	Ms QSP only	Nd	Nt QSP only	Ms/Nd QSP only	Nd/Nt QSP only	? QSP only
:pubis	-	1/0.95	-	-	-	-
:ilium	1	2/1.90	1	1	-	-
:ischium	-	1/0.95	1	-	-	-
Femur						
:proximal	-	1/0.95	-	-	1	-
:distal	-	3/2.86	-	-	-	-
Patella	-	-	1	-	-	-
Tibia						
:proximal	1	2/1.90	-	-	-	-
:distal	-	-	2	-	-	-
Metacarpal						
:proximal	-	3/2.86	1	-	-	-
Metatarsal						
:proximal	-	3/2.86	-	-	-	-
:distal	1	-	-	-	-	-
Metapodial						
:proximal	-	8/7.62	1	1	-	-
:distal	1	9/8.57	6	1	3	-
Calcaneum	-	3/2.86	-	-	-	-
Astragalus	2	-	1	-	-	-
Os centro-quartale	-	4/3.81	-	-	-	-
Carpals	-	4/3.81	1	1	-	-
Tarsals	-	1/0.95	-	-	-	-
Sesamoids	-	2/1.90	-	-	-	-
Phalanx 1						
:proximal	-	1/0.95	1	-	-	-
:distal	2	1/0.95	2	-	-	-
Phalanx 2						
:proximal	-	1/0.95	1	-	1	-

Table 5.23. Continued

SKELETAL PART	Ms QSP only	Nd	Nt QSP only	Ms/Nd QSP only	Nd/Nt QSP only	? QSP only
:distal	-	-	-	-	1	-
Phalanx 3	-	2/1.90	-	-	-	-

Table 5.24. KwaGandaganda: QSP of Bov IV skeletal parts in each phase and mixed units (Ms: Msuluzi; Nd: Ndondondwane; Nt: Ntshekane; Ms/Nd: Msuluzi/Ndondondwane; Nd/Nt: Ndondondwane/Ntshekane)

SKELETAL PART	Ms	Nd	Nt	Ms/Nd	Nd/Nt
Skull					
:horncore	-	4	-	-	-
Teeth	-	4	-	-	12
Radius					
:proximal	-	1	-	-	-
:distal	-	1	-	-	-
Femur					
:distal	-	-	-	-	1
Patella	-	2	-	-	-
Calcaneum	-	-	1	-	-
Os centro-quartale	-	1	-	-	-
Sesamoids	-	-	1	1	-
Phalanx 1					
:proximal	-	1	1	1	-
:distal	2	-	-	1	-
Phalanx 2					
:proximal	-	1	-	1	1
:distal	-	1	-	1	1

Table 5.25. KwaGandaganda: measurements in mm of *Ovis/Capra* skeletal elements (n: number; x: average; sd: standard deviation; min mm: minimum; max mm: maximum; e: estimate)

- Radial carpal:

Measurements	n	x	sd	min mm	max mm
Greatest depth	10	19.99	0.84	18.4	21.3
Greatest height	9	11.35	1.63	10.1	15.5
Breadth (distal)	10	13.85	0.66	14.8	13.1

- Intermediate carpal:

Measurements	n	x	sd	min mm	max mm
Greatest depth	3	22.2	0.53	21.6	22.6
Greatest height	3	14.33	0.58	14.0	15.0

- Astragalus:

Measurements	n	x	sd	min mm	max mm
Greatest length (lateral)	7	31.49	1.11	29.6	32.65
Greatest length (medial)	7	30.04	1.03	28.3	30.65
Depth (lateral)	7	16.91	1.22	14.6	18.1
Breadth (distal)	7	19.44	0.64	18.2	20.2

- Os centroquartale:

Measurements	n	x	sd	min mm	max mm
Greatest breadth	5	24.72	1.47	22.2	26.0
Greatest depth	5	22.22	2.16	18.9	24.5

Table 5.25. Continued

- 1st Phalanx:

Measurements	n	x	sd	min mm	max mm
Greatest length (peripheral)	3	38.13	1.64	36.4	39.65
Greatest length (axial)	2	36.3	1.70	35.1	37.5
Breadth (proximal)	3	12.5	0.49	12.1	13.05
Breadth (distal)	3	13.02	1.89	11.8	15.2
Smallest breadth of diaphysis	2	10.4	0.85	9.8	11.0

Table 5.26. KwaGandaganda: measurements in mm of *Bos taurus* skeletal elements (n: number; x: average; sd: standard deviation; min mm: minimum; max mm: maximum; e: estimate)

- Radial carpal:

Measurements	n	x	sd	min mm	max mm
Greatest depth	5	45.93	3.39	40.4	49.55
Greatest height	5	31.39	2.75	28.35	35.25
Breadth (distal)	3	29.63	1.00	28.5(e)	30.4(e)

- Intermediate carpal:

Measurements	n	x	sd	min mm	max mm
Greatest depth	5	47.34	4.26	42.2	51.8
Greatest height	5	29.27	2.35	27.0	33.25

- 2nd & 3rd Carpal:

Measurements	n	x	sd	min mm	max mm
Greatest breadth	6	39.23	3.65	33.8	44.0
Greatest depth	8	34.78	3.47	29.4	41.1

-4th Carpal:

Measurements	n	x	sd	min mm	max mm
Breadth (distal articular surface)	5	30.7	4.06	27.25	36.0
Greatest depth	5	23.34	2.13	20.10	26.1

Table 5.26. Continued

- 1st Phalanx:

Measurements	n	x	sd	min mm	max mm
Greatest length (peripheral)	5	62.53	3.36	57.1	65.75
Greatest length (axial)	5	61.44	4.27	55.7	66.3(e)
Breadth (proximal)	5	31.6	3.59	27.6	36.4
Breadth (distal)	5	29.71	3.44	26.8	35.0
Smallest breadth of diaphysis	4	28.13	3.73	24.2	32.3

- 2nd Phalanx:

Measurements	n	x	sd	min mm	max mm
Greatest length	12	44.99	7.54	37.0	66.3
Breadth (proximal)	12	31.64	2.81	27.7	36.4
Depth (proximal)	9	31.81	2.45	27.1	34.2
Breadth (distal)	13	27.08	2.85	23.0	32.5
Smallest breadth of diaphysis	12	25.23	2.15	22.2	28.9

- 3rd Phalanx:

Measurements	n	x	sd	min mm	max mm
Sole: Diagonal length	11	68.04	6.18	60.5	78.1
Length (dorsal)	11	53.77	6.83	41.2	68.15
Height (in region of extensor process)	11	39.12	2.46	35.2	43.1
Breadth of articular surface	10	24.31	2.62	21.30	28.65

Table 5.26. Continued

- Astragalus:

Measurements	n	x	sd	min mm	max mm
Greatest length (lateral)	9	68.73	4.79	62.5	78.3
Greatest length (medial)	9	61.76	5.34	55.2	72.9
Depth (lateral)	9	38.23	4.40	32.25	46.95
Breadth (distal)	9	44.15	5.02	37.1	52.65

Table 5.27. KwaGandaganda: measurements in mm of *Ovis/Capra* teeth (n: number; x: average; sd: standard deviation; min mm: minimum; max mm: maximum; e: estimate)

- Upper P2; Age class V:

Measurements	n	x	sd	min mm	max mm
Crown height	1	6.40	-	6.40	6.40
Length	2	7.60	-	7.00	8.20
Breadth	2	6.15	-	6.00	6.30

- Upper P2; Age class VI:

Measurements	n	x	sd	min mm	max mm
Crown height	3	5.90	4.20	2.50	10.60
Length	5	8.16	0.21	8.00	8.50
Breadth	5	7.08	0.61	6.50	8.00

- Upper P3; Age Class V:

Measurements	n	x	sd	min mm	max mm
Crown height	2	13.90	1.56	12.80	15.00
Length	3	8.43	0.81	7.50	8.90
Breadth	3	8.17	0.76	7.50	9.00

- Upper P3; Age Class VI:

Measurements	n	x	sd	min mm	max mm
Crown height	-	-	-	-	-
Length	2	9.05	-	8.10	10.00
Breadth	2	8.60	-	8.20	9.00

Table 5.27. Continued

- Upper P4; Age Class V:

Measurements	n	x	sd	min mm	max mm
Crown height	2	12.12	-	11.80	12.45
Length	2	7.48	-	7.40	7.55
Breadth	2	9.78	-	9.55	10.00

- Upper P4; Age Class VI:

Measurements	n	x	sd	min mm	max mm
Crown height	2	10.15	-	9.00	11.30
Length	3	7.47	1.27	6.10	8.60
Breadth	3	9.97	0.75	9.20	10.70

- Upper M1; Age Class III:

Measurements	n	x	sd	min mm	max mm
Crown height	1	29.50	-	29.50	29.50
Length	2	17.90	-	17.60	18.20
Breadth	2	9.40	-	8.00	10.80

- Upper M1; Age Class IV:

Measurements	n	x	sd	min mm	max mm
Crown height	15	19.02	6.38	7.40	27.50
Length	15	15.03	1.97	11.40	17.90
Breadth	15	12.13	1.91	8.70	16.50

- Upper M1; Age Class V:

Measurements	n	x	sd	min mm	max mm
Crown height	20	17.00	4.19	9.80	23.70
Length	24	14.66	1.36	11.50	17.40
Breadth	24	11.97	1.27	9.90	16.30

Table 5.27. Continued

- Upper M1; Age Class VI:

Measurements	n	x	sd	min mm	max mm
C	5	4.34	1.74	1.60	6.20
Length	6	12.28	1.57	10.40	14.10
Breadth	6	12.52	0.89	11.40	13.80

- Upper M2; Age Class IV:

Measurements	n	x	sd	min mm	max mm
Crown height	9	24.80	8.53	7.60	33.80
Length	11	17.19	1.16	14.30	18.70
Breadth	10	11.66	1.48	9.50	13.80

- Upper M2; Age Class V:

Measurements	n	x	sd	min mm	max mm
Crown height	11	27.87	3.10	20.80	32.30
Length	15	17.89	2.68	15.20	26.70
Breadth	14	12.47	1.65	10.70	17.60

- Upper M2; Age Class VI:

Measurements	n	x	sd	min mm	max mm
Crown height	2	21.90	-	21.50	22.30
Length	3	16.40	1.92	14.20	17.70
Breadth	3	13.47	0.84	12.50	14.00

- Upper M3; Age Class V:

Measurements	n	x	sd	min mm	max mm
Crown height	18	29.01	6.65	18.20	38.40
Length	20	18.92	2.34	12.50	21.60
Breadth	19	12.41	2.19	9.80	20.00

Table 5.27. Continued

- Upper M3; Age Class VI:

Measurements	n	x	sd	min mm	max mm
Crown height	2	24.45	-	16.80	32.10
Length	3	19.67	0.55	19.10	20.20
Breadth	3	13.17	0.15	13.00	13.30

- Lower P4; Age Class VI:

Measurements	n	x	sd	min mm	max mm
Crown height	2	5.60	-	4.00	7.20
Length	2	10.20	-	8.90	11.50
Breadth	2	7.75	-	6.50	9.00

- Lower P4; Age Class V:

Measurements	n	x	sd	min mm	max mm
Crown height	2	15.13	-	10.75	19.50
Length	2	9.63	-	9.25	10.00
Breadth	2	6.75	-	5.90	7.60

- Lower M1; Age Class III:

Measurements	n	x	sd	min mm	max mm
Crown height	3	23.57	5.62	19.60	30.00
Length	4	15.39	2.48	13.05	18.00
Breadth	4	7.55	0.30	7.30	7.90

- Lower M1; Age Class V:

Measurements	n	x	sd	min mm	max mm
Crown height	8	17.06	3.85	10.80	23.00
Length	10	13.57	1.24	11.80	15.40
Breadth	10	7.94	0.87	6.65	9.60

Table 5.27. Continued

- Lower M1; Age Class VI:

Measurements	n	x	sd	min mm	max mm
Crown height	13	9.24	3.60	3.50	14.80
Length	13	11.95	1.56	10.00	15.00
Breadth	13	8.18	0.94	7.10	10.60

- Lower M2; Age Class III:

Measurements	n	x	sd	min mm	max mm
Crown height	4	30.98	1.00	29.90	32.30
Length	4	19.60	6.23	14.60	28.70
Breadth	4	7.80	0.98	6.60	8.90

- Lower M2; Age Class IV:

Measurements	n	x	sd	min mm	max mm
Crown height	8	28.06	6.86	16.35	36.35e
Length	8	16.91	1.63	14.25	19.50
Breadth	8	9.83	3.55	7.50	18.20

- Lower M2; Age Class V:

Measurements	n	x	sd	min mm	max mm
Crown height	19	24.76	5.46	12.00	32.80
Length	21	16.10	1.10	14.35	19.00
Breadth	20	9.52	2.41	8.10	19.50

- Lower M3; Age Class IV:

Measurements	n	x	sd	min mm	max mm
Crown height	2	39.65	-	37.20	42.10
Length	3	22.37	1.62	20.50	23.40
Breadth	3	7.97	0.55	7.60	8.60

Table 5.27. Continued

- Lower M3; Age Class V:

Measurements	n	x	sd	min mm	max mm
Crown height	4	31.95	6.10	27.70	40.90
Length	6	23.13	2.16	19.10	25.10
Breadth	6	8.77	0.50	8.00	9.40

Table 5.28. KwaGandaganda: measurements in mm of *Bos taurus* teeth (n: number; x: average; sd: standard deviation; min mm: minimum; max mm: maximum; e: estimate)

- Upper P2; Age Class VII:

Measurements	n	x	sd	min mm	max mm
Crown height	2	16.75	-	11.90	21.60
Length	2	17.98	-	17.85	18.10
Breadth	2	14.40	-	13.90	14.90

- Upper M1; Age Class III:

Measurements	n	x	sd	min mm	max mm
Crown height	2	36.05	-	16.70	55.40
Length	3	27.78	5.17	22.10	32.20
Breadth	3	17.73	0.23	17.60	18.00

- Upper M1; Age Class IV:

Measurements	n	x	sd	min mm	max mm
Crown height	2	22.35	-	14.85	29.85
Length	3	24.53	1.45	22.95	25.80
Breadth	3	17.25	1.12	16.00	18.15

- Upper M1; Age Class V:

Measurements	n	x	sd	min mm	max mm
Crown height	2	37.45	-	32.00	42.90
Length	2	27.70	-	27.50	27.90
Breadth	2	15.05	-	14.70	15.40

Table 5.28. Continued

- Upper M1; Age Class VI:

Measurements	n	x	sd	min mm	max mm
Crown height	5	35.49	4.40	29.60	40.50
Length	5	27.94	1.42	25.80	29.60
Breadth	5	18.23	2.32	16.90	22.35

- Upper M1; Age Class VII:

Measurements	n	x	sd	min mm	max mm
Crown height	7	32.00	10.21	19.70	45.60
Length	7	26.51	5.59	15.25	30.70
Breadth	7	19.07	3.75	14.00	23.50

- Upper M1; Age Class VIII:

Measurements	n	x	sd	min mm	max mm
Crown height	4	21.70	5.41	15.70	27.30
Length	4	23.78	3.13	19.50	26.90
Breadth	4	19.20	2.12	16.10	20.90

- Upper M2; Age Class V:

Measurements	n	x	sd	min mm	max mm
Crown height	4	47.16	5.44	42.45	54.80
Length	5	27.87	6.30	16.80	31.95
Breadth	5	19.36	6.34	15.50	30.60

- Upper M2; Age Class VI:

Measurements	n	x	sd	min mm	max mm
Crown height	4	44.05	10.16	29.40	51.20e
Length	4	27.52	4.00	22.20	30.80
Breadth	4	21.83	7.20	17.60	32.60

Table 5.28. Continued

- Upper M2; Age Class VII:

Measurements	n	x	sd	min mm	max mm
Crown height	3	43.78	7.98	36.65	52.40e
Length	3	30.73	2.19	29.00	33.20
Breadth	3	19.33	4.84	13.80	22.80

- Upper M3; Age Class VI:

Measurements	n	x	sd	min mm	max mm
Crown height	3	45.15	6.90	40.05	53.00
Length	3	29.40	1.25	28.10	30.60
Breadth	3	18.27	1.89	16.10	19.60

- Lower P4; Age Class VII:

Measurements	n	x	sd	min mm	max mm
Crown height	2	14.43	-	8.95	19.90
Length	2	21.25	-	20.45	22.05
Breadth	2	11.63	-	11.60	11.65

- Lower M1; Age Class V:

Measurements	n	x	sd	min mm	max mm
Crown height	2	36.40	-	32.90e	39.90
Length	2	27.30	-	27.05	27.55
Breadth	2	12.60	-	11.30	13.90e

- Lower M1; Age Class VII:

Measurements	n	x	sd	min mm	max mm
Crown height	2	25.00	-	22.40	27.60
Length	3	25.97	2.21	24.10	28.40
Breadth	3	14.90	3.28	11.90	18.40

Table 5.28. Continued

- Lower M2; Age Class VI:

Measurements	n	x	sd	min mm	max mm
Crown height	2	41.95	0.92	41.30	42.60
Length	3	27.80	0.80	27.00	28.60
Breadth	3	12.03	0.90	11.00	12.60

- Lower M2; Age Class VII:

Measurements	n	x	sd	min mm	max mm
Crown height	1	33.00	-	33.00	33.00
Length	2	26.65	-	24.80	28.50
Breadth	2	13.35	-	12.80	13.90

- Lower M3; Age Class VI:

Measurements	n	x	sd	min mm	max mm
Crown height	2	53.30	-	52.60	54.00e
Length	2	36.50	-	36.50	36.50
Breadth	2	12.30	-	12.10	12.50

Table 5.29a. KwaGandaganda: age classes of domesticates in Msuluzi phase, based on NISP/MNI, tooth eruption and tooth wear

Age class	*Bos taurus*	*Ovis/Capra*	*Ovis aries*	*Capra hircus*
I	2/2	9/1	-	-
II	6/3	19/5	5/3	1/1
III	11/6	60/12	-	-
IV	8/6	78/12	9/1	-
V	13/6	132/13	9/4	-
VI	23/8	32/6	1/1	-
VII	20/8	n.a.	n.a.	n.a.
VIII	7/4	n.a.	n.a.	n.a.
IX	1/1	n.a.	n.a.	n.a.

Table 5.29b. KwaGandaganda: age classes of non-domesticates in Msuluzi phase, based on NISP/MNI, fused and unfused epiphysis

Species	Neonate	Juvenile	Sub-adult	Adult	Aged
Homo sapiens sapiens	-	-	-	2/1	-
Canis familiaris	-	7/1	-	5/1	-
Atilax paludinosus	-	-	1/1	-	-
cf. *Hyaena/Crocuta*	-	-	-	1/1	-
Felid (Large)	-	-	-	1/1	-
Equus burchellii	-	1/1	-	1/1	-
Phacochoerus aethiopicus	-	-	-	1/1	-
Potamochoerus porcus	-	1/1	9/1	3/1	-
Philantomba monticola	-	1/1	-	3/1	-
Cephalophus natalensis	-	-	-	3/1	-
Sylvicapra grimmia	1/1	1/1	1/1	9/1	-
Aepyceros melampus	-	-	1/1	-	1/1
cf. *Redunca fulvorufula*	-	-	-	2/1	-
Syncerus caffer	-	-	-	5/1	-
Taurotragus oryx	-	-	-	1/1	-
Bov I	3/1	1/1	-	3/1	-
Bov II	1/1	8/1	-	46/2	-
Bov II (non-domesticate)	-	1/1	-	6/1	-
Bov III	-	-	-	17/1	
Bov III (non-domesticate)	-	-	-	2/1	-

Table 5.30a. KwaGandaganda: age classes of domesticates in the Ndondondwane phase, based on NISP/MNI, tooth eruption and tooth wear

Age class	*Bos taurus*	*Ovis/Capra*	*Ovis aries*	*Capra hircus*
I	15/5	16/6	-	-
II	32/12	32/7	11/4	1/1
III	31/10	74/16	1/1	-
IV	33/8	143/21	10/3	-
V	34/12	317/25	49/11	5/2
VI	64/10	63/12	1/1	-
VII	98/17	n.a.	n.a.	n.a.
VIII	29/8	n.a.	n.a.	n.a.
IX	11/6	n.a.	n.a.	n.a.

Table 5.30b. KwaGandaganda: age classes of non-domesticates in the Ndondondwane phase, based on NISP/MNI, fused and unfused epiphysis

Species	Juvenile	Sub-Adult	Adult	Aged
Homo sapiens sapiens	-	1/1	-	-
Papio ursinus	1/1	-	-	-
Canis familiaris	-	-	22/1	-
Canis mesomelas	-	-	4/1	-
Genetta tigrina	-	-	3/1	-
Hyaena/Crocuta	-	-	2/1	-
Panthera leo	1/1	-	1/1	-
Felid (Large)	-	-	1/1	-
Equus burchellii	-	-	1/1	-
Procavia capensis	2/1	-	-	-
Phacochoerus aethiopicus	-	1/1	4/1	-
Potamochoerus porcus	2/2	-	18/2	3/2
Hippopotamus amphibius	-	-	2/1	-
Philantomba monticola	-	1/1	18/2	-
Cephalophus natalensis	-	-	1/1	-
Sylvicapra grimmia	-	-	11/1	-
Raphicerus campestris	-	-	3/1	-
Aepyceros melampus	-	1/1	9/1	-
Redunca arundinum	-	-	1/1	-
Kobus ellipsiprymnus	-	-	2/1	-
Syncerus caffer	1/1	-	11/1	-
Tragelaphus strepciceros	1/1	-	-	-
Bov I	1/1	-	22/1	-
Bov II	22/1	-	232/2	-
Bov II (non-domesticate)	-	-	18/2	-
Bov III	5/1	-	84/1	-

Table 5.31a. KwaGandaganda: age classes of domesticates in the Ntshekane phase, based on NISP/MNI, tooth eruption and tooth wear

Age class	*Bos taurus*	*Ovis/Capra*	*Ovis aries*	*Capra hircus*
I	-	-	-	-
II	6/2	2/2	-	-
III	14/5	8/6	-	-
IV	17/5	49/7	5/1	-
V	11/6	8/8	3/3	-
VI	29/9	3/3	5/1	-
VII	53/11	n.a.	n.a.	n.a.
VIII	20/6	n.a.	n.a.	n.a.
IX	1/1	n.a.	n.a.	n.a.

Table 5.31b. KwaGandaganda: age classes of non-domesticates in the Ntshekane phase, based on NISP/MNI, fused and unfused epiphysis

Species	Juvenile	Sub-adult	Adult
Canis familiaris	-	-	1/1
Atilax paludinosus	-	-	2/1
Hyaena/Crocuta	-	-	1/1
Phacochoerus aethiopicus	-	-	12/1
Potamochoerus porcus	1/1	-	21/2
Philantomba monticola	-	-	11/1
Cephalophus natalensis	-	-	4/1
Sylvicapra grimmia	-	-	12/1
Raphicerus melanotis	-	-	3/1
Aepyceros melampus	1/1	-	-
Syncerus caffer	-	-	6/1
Tragelaphus scriptus	-	-	6/1
Bov I	-	-	8/1
Bov II	2/1	1/1	60/1
Bov II (non-domesticate)	-	-	5/1
Bov III	2/1	2/1	49/2
Bov III (non-domesticate)	-	-	1/1

Table 5.32. KwaGandaganda: male and female animals (Ms: Msuluzi; Nd: Ndondondwane; Nd/Nt: Ndondondwane/Ntshekane; ?: Unknown)

Phase	*Bos taurus*		*Ovis/Capra*		*Ovis aries*
	♂	♀	♂	♀	♀
Ms	-	-	2	-	2
Nd	6	5	11	8	1
Nd/Nt	1	-	-	-	-
?	-	-	2	1	-
TOTAL	7	5	15	9	3

Table 5.33. KwaGandaganda: contributor and non-contributor species and their possible value to the society

Species	Contributor		Non-contributor	Uncertain	Comments/ Possible uses of animal
	Diet	Cultural			
Homo sapiens sapiens			✓		No comment
cf. *Homo sapiens sapiens*			✓		
cf. *Galago crassicaudatus*		✓			Used for skins and teeth
cf. *Cercopithecus aethiops*		✓			
Papio ursinus		✓			
Canis familiaris		✓			Lived on site in association with humans, probably used as hunting dogs
cf. *Canis familiaris*		✓			
cf. *Canis mesomelas*		✓			Used for skins and teeth
Canis cf. *mesomelas*		✓			
Canis sp.		✓			
Canid		✓			
Mellivora capensis		✓			Used for skins
Genetta tigrina		✓			
Atilax paludinosus		✓			
cf. *Atilax paludinosus*		✓			
Mongoose		✓			
Hyaena/Crocuta		✓			Used for skins, teeth and possibly for diviner bones
cf. *Hyaena/Crocuta*		✓			
Panthera pardus		✓			Used for skins and teeth
Panthera leo		✓			
cf. *Panthera leo*		✓			
Felis serval		✓			Used for skins
Felis lybica		✓			
cf. *Felis lybica*		✓			

Table 5.33. Continued

Species	Contributor		Non-contributor	Uncertain	Comments/ Possible uses of animal
	Diet	Cultural			
Felid		✓			Used for skins
Felid (small)		✓			
Felid (large)		✓			
Carnivore				✓	The uses were probably similar as those listed under species, but as the species here are unknown it was deemed more prudent to list as "Uncertain"
Carnivore (small)				✓	
Carnivore (small-medium)				✓	
Carnivore (medium)				✓	
Carnivore (medium-large)				✓	
Carnivore (large)				✓	
Loxodonta africana		✓			Used ivory to make bangles and other tools
cf. *Loxodonta africana*		✓			
cf. *Ceratotherium simum*	✓				Nothing is known about its cultural use, but it cannot be excluded
Equus burchellii	✓				Used as food, but the skin could also have been used
Procavia capensis	✓	✓	✓		Could have been eaten, used for skins or could have been self-introduced to the area
Phacochoerus aethiopicus	✓				Could have been eaten, but it does not exclude the possibility of usage of teeth for ornaments/tools
cf. *Phacochoerus aethiopicus*	✓				
Potamochoerus porcus	✓				
cf. *Potamochoerus porcus*	✓				
Suid	✓				
Suid (non-domestic)	✓				

Table 5.33. Continued

Species	Contributor		Non-contributor	Uncertain	Comments/ Possible uses of animal
	Diet	Cultural			
Hippopotamus amphibius	✓	✓			Used for food, but the ivory could have been used to make ornaments
cf. *Hippopotamus amphibius*	✓	✓			
Giraffa camelopardalis	✓				No comment
Bos taurus	✓	✓			Used as food, and also as cultural product in ritual ceremonies and as exchange for bride wealth. The skins could also have been used. Diviner bones from sheep have been identified on the site.
cf. *Bos taurus*	✓	✓			
Ovis aries	✓	✓			
cf. *Ovis aries*	✓	✓			
Capra hircus	✓	✓			
cf. *Capra hircus*	✓	✓			
Ovis/Capra	✓	✓			
cf. *Ovis/Capra*	✓	✓			
Philantomba monticola	✓				Although mainly used as food, it can be accepted with certainty that the skins were utilised to make clothing and furnishings. In certain Bantu-speaking societies bovid astragali and other bones were often used in diviner sets. Some of the astragalus divining bones that were found on KwaGandaganda were too abraded for species-identification, but they could have come from antelopes
cf. *Philantomba monticola*	✓				
Cephalophus natalensis	✓				
cf. *Cephalophus natalensis*	✓				
Cephalophinae	✓				
Sylvicapra grimmia	✓				
cf. *Sylvicapra grimmia*	✓				
Raphicerus campestris	✓				
cf. *Raphicerus campestris*	✓				
Raphicerus melanotis	✓				

Table 5.33. Continued

Species	Contributor		Non-contributor	Uncertain	Comments/ Possible uses of animal
	Diet	Cultural			
cf. *Raphicerus* sp.	✓				
Aepyceros melampus	✓				
cf. *Aepyceros melampus*	✓				
Syncerus caffer	✓				
cf. *Syncerus caffer*	✓				
Tragelaphus strepsiceros	✓				
Tragelaphus scriptus	✓				
Taurotragus oryx	✓				
cf. *Taurotragus oryx*	✓				
cf. *Redunca arundinum*	✓				
cf. *Redunca fulvorufula*	✓				
Kobus ellipsiprymnus	✓				
cf. *Kobus ellipsiprymnus*	✓				
Bov I	✓				
Bov II	✓				
Bov II (non-domestic)	✓				
Bov III	✓				
Bov III (non-domestic)	✓				
Bov IV	✓				
Manis temminckii		✓			Had ritual/divining importance
Pedetes capensis	✓				Could have been used for food, but could also have been self-introduced since it digs itself into soft deposits
Thryonomys swinderianus	✓				No comment
cf. Thryonomys swinderianus	✓				

Table 5.33. Continued

Species	Contributor		Non-contributor	Uncertain	Comments/ Possible uses of animal
	Diet	Cultural			
Otomys sp.	✓		✓		Mainly seen as a non-contributor, but it could have been used as food
cf. Otomys sp.	✓		✓		
cf. Mus minotoides			✓		No comment
Aethomys sp.			✓		No comment
cf. *Rattus rattus*		✓	✓		A non-contributor, always found in association with human habitation. Therefore it is a commensal of the KwaGandaganda population
Muridae			✓		No comment
Lepus saxatilis	✓				No comment
Lepus sp.	✓				
Lagomorph	✓				
Rodent			✓		No comment
Rodent (small)			✓		
Rodent (medium)			✓		
Gallus domesticus	✓				No comment
cf. *Gallus domesticus*	✓				
Struthio camelus		✓			Eggshells used to make beads
Bird of prey		✓			No comment
Bird (small)				✓	No comment
Bird (medium)	✓				
Bird (medium/large)	✓				
Tortoise	✓				Although shells were often used as containers, no modified fragments were present in this deposit
Terrapin	✓				

Table 5.33. Continued

Species	Contributor		Non-contributor	Uncertain	Comments/ Possible uses of animal
	Diet	Cultural			
Snake (small)			✓		No comment
Crocodilus niloticus		✓			Could have been used for food and medicine
Varanus niloticus	✓				No comment
Varanus sp.	✓				
Lizard			✓		No comment
Reptile (small)			✓		
Reptile (medium)			✓		
Frog			✓		No comment
Frog/Toad			✓		
Sparadon durbanensis	✓				No comment
Clarias gariepinus	✓				
Clarias sp.	✓				
Fish	✓				
Fish (medium)	✓				
Achatina zebra	✓	✓	✓		Shells were used as scoops, to make beads and smooth clay. The contents could have been eaten. It could also be recent intrusions
Achatina sp.	✓	✓	✓		
Bulinus sp.		✓	✓		These shells could have been transported to the site by the water during a flood, or could have been in the reeds used to construct the huts or to make sleeping mats, etc.
Tropidophora sp.		✓	✓		
Freshwater snail		✓	✓		
Snail (small)			✓		No comment

Table 5.33. Continued

Species	Contributor		Non-contributor	Uncertain	Comments/ Possible uses of animal
	Diet	Cultural			
Patella sp.	✓				No comment
Polinices mamilla		✓			Used as ornaments
Naticidae		✓			Used as ornaments
Unionidae	✓	✓			Used as food or to make ornaments
Unio/Aspatharia	✓	✓			Used as food or to make ornaments
Marine bivalve	✓				No comment
Glycymeris queketti	✓	✓			Used as food or to make ornaments
Perna perna	✓				Used as food. *Cardium* sp. possible also used as coinage
Oyster	✓				
Cardium sp.	✓				

Table 5.34. KwaGandaganda: contribution of the various methods whereby animals were obtained, based on QSP

	Herding	Hunting/ Snaring	Gathering	Fishing	Total
Total QSP	5318	1314	290	42	6964
% of total	76.36	18.87	4.16	0.60	100%

Table 5.35. KwaGandaganda: percentage contribution of each species to herding, hunting, snaring, gathering and fishing

Species	Herding	Hunting/ Snaring	Gathering	Fishing	QSP	% of total
cf. *Galago crassicaudatus*		✓			1	0.01
Cercopithecus aethiops		✓			4	0.06
Papio ursinus		✓			3	0.04
Canis mesomelas		✓			4	0.06
Canis cf. *mesomelas*		✓			7	0.10
Mellivora capensis		✓			3	0.04
Genetta tigrina		✓			17	0.24
Atilax paludinosus		✓			2	0.03
Mongoose		✓			1	0.01
Hyaena/Crocuta		✓			5	0.07
Panthera pardus		✓			4	0.06
Panthera leo		✓			4	0.06
Felis serval		✓			2	0.03
Felis lybica		✓			4	0.06
Loxodonta africana		✓			6	0.09
cf. *Ceratotherium simum*		✓			2	0.03
Equus burchellii		✓			2	0.03
Procavia capensis		✓			12	0.17
Phocochoerus aethiopicus		✓			19	0.27
Potamochoerus porcus		✓			182	2.61
Suid		✓			13	0.19
Hippopotamus amphibius		✓			2	0.03
Giraffa camelopardalis		✓			4	0.06
Bos taurus	✓				1870	26.85
Ovis aries	✓				315	4.52

Table 5.35. Continued

Species	Herding	Hunting/ Snaring	Gathering	Fishing	QSP	% of total
Capra hircus	✓				49	0.70
Ovis/Capra	✓				3078	44.20
Philantomba monticola		✓			73	1.05
Cephalophus natalensis		✓			8	0.11
Sylvicapra grimmia		✓			76	1.09
Raphicerus campestris		✓			9	0.13
Raphicerus melanotis		✓			2	0.03
Aepyceros melampus		✓			51	0.73
Syncerus caffer		✓			45	0.65
Tragelaphus strepsiceros		✓			3	0.04
Tragelaphus scriptus		✓			6	0.09
cf. *Redunca arundinum*		✓			2	0.03
cf. *Redunca fulvorufula*		✓			1	0.01
Kobus ellipsiprymnus		✓			1	0.01
Bov I		✓			45	0.65
Bov II		✓			377	5.41
Bov II (non-domestic)		✓			46	0.66
Bov III		✓			180	2.58
Bov III (non-domestic)		✓			29	0.42
Bov IV		✓			2	0.03
Manis temminckii		✓			1	0.01
Pedetes capensis		✓			1	0.01
Thryonomys swinderianus		✓			13	0.19
Otomys sp.		✓			4	0.06
Lepus saxatilis		✓			7	0.10

Table 5.35. Continued

Species	Herding	Hunting/ Snaring	Gathering	Fishing	QSP	% of total
Lepus sp.		✓			4	0.06
Lagomorph		✓			1	0.01
Gallus domesticus	✓				6	0.09
Struthio camelus			✓		1	0.01
Bird (small)		✓			3	0.04
Bird (medium)		✓			1	0.01
Bird (medium/large)		✓			1	0.01
Tortoise			✓		2	0.03
Terrapin			✓		2	0.03
Snake (small)			✓		1	0.01
Crocodilus niloticus		✓			1	0.01
Varanus niloticus		✓			7	0.10
Varanus sp.		✓			11	0.16
Sparadon durbanensis				✓	2	0.03
Clarias gariepinus				✓	4	0.06
Clarias sp.				✓	1	0.01
Fish				✓	35	0.50
Achatina zebra			✓		5	0.07
Achatina sp.			✓		198	2.84
Patella sp.			✓		1	0.01
Unionidae			✓		31	0.45
Unio/Aspatharia			✓		22	0.32
Marine bivalve			✓		3	0.04
Perna perna			✓		21	0.30
Oyster			✓		1	0.01
Cardium sp.			✓		2	0.03

Table 5.36. KwaGandaganda: dietary contribution of each species expressed in meat mass, based on 50% of live mass and calculated from QSP counts (Ms: Msuluzi; Nd: Ndondondwane; Nt: Ntshekane; Ms/Nd: Msuluzi/Ndondondwane; Ms/Nt: Msuluzi/Ntshekane; Nd/Nt: Ndondondwane/Ntshekane; ?: Unknown phase)

Species	50%: live mass	Ms	Nd	Nt	Ms/Nd	Ms/Nt	Nd/Nt	?	Total
cf. *Ceratotherium simum*	440.00	-	-	-	1	-	-	-	**1**
Equus burchellii	160.00	1	-	-	-	-	-	1	**2**
Procavia capensis	1.80	-	12	-	-	-	-	-	**12**
Phacochoerus aethiopicus	35.00	2	5	10	-	-	-	2	**19**
Potamochoerus porcus	31.00	30	125	8	9	-	10	-	**182**
Suid	33.00	-	9	4	-	-	-	-	**13**
Hippopotamus amphibius	700.00	1	1	-	-	-	-	-	**2**
Giraffa camelopardalis	500.00	-	4	-	-	-	-	-	**4**
Bos taurus	250.00	174	1159	182	220	8	90	37	**1870**
Ovis aries	16.00	106	158	18	23	-	10	-	**315**
Capra hircus	16.00	10	27	2	10	-	-	-	**49**
Ovis/Capra	16.00	820	1535	140	460	14	52	57	**3078**
Philantomba monticola	2.18	23	40	4	4	-	1	1	**73**
Cephalophus natalensis	7.00	3	5	-	-	-	-	-	**8**
Sylvicapra grimmia	10.00	31	29	8	5	-	2	1	**76**
Raphicerus campestris	5.50	4	4	-	-	-	1	-	**9**
Raphicerus melanotis	5.13	-	-	2	-	-	-	-	**2**
Aepyceros melampus	24.00	9	39	-	1	-	2	-	**51**
Syncerus caffer	390.00	5	14	7	2	-	17	-	**45**
Tragelaphus strepsiceros	97.00	-	3	-	-	-	-	-	**3**
Tragelaphus scriptus	27.00	-	-	6	-	-	-	-	**6**
cf. *Redunca arundinum*	22.00	-	1	-	-	-	1	-	**2**
cf. *Redunca fulvorufula*	29.00	1	-	-	-	-	-	-	**1**
Kobus ellipsiprymnus	125.00	-	1	-	-	-	-	-	**1**
Bov I	10.00	22	16	1	2	-	2	2	**45**

Table 5.36. Continued

Species	50%: live mass	Ms	Nd	Nt	Ms/Nd	Ms/Nt	Nd/Nt	?	Total
Bov II	16.00	62	254	32	8	3	16	2	**377**
Bov II (non-domestic)	24.00	8	31	2	1	-	4	-	**46**
Bov III	110.00	21	87	57	4	-	8	3	**180**
Bov III (non-domestic)	100.00	3	21	1	3	-	1	-	**29**
Bov IV	390.00	-	-	1	1	-	-	-	**2**
Pedetes capensis	1.50	-	1	-	-	-	-	-	**1**
Thryonomys swinderianus	2.50	-	10	3	-	-	-	-	**13**
Otomys sp.	0.05	2	-	2	-	-	-	-	**4**
Lepus saxatilis	1.20	-	5	2	-	-	-	-	**7**
Gallus domesticus	0.70	4	2	-	-	-	-	-	**6**
Bird (small)	0.10	1	2	-	-	-	-	-	**3**
Bird (medium)	0.20	-	1	-	-	-	-	-	**1**
Bird (medium/large)	1.00	1	-	-	-	-	-	-	**1**
Tortoise	0.80	1	-	1	-	-	-	-	**2**
Terrapin	0.80	-	-	-	-	2	-	-	**2**
Snake (small)	0.50	-	1	-	-	-	-	-	**1**
Crocodilus niloticus	250.00	1	-	-	-	-	-	-	**1**
Varanus niloticus	1.60	7	-	-	-	-	-	-	**7**
Varanus sp.	1.60	-	8	2	1	-	-	-	**11**
Sparadon durbanensis		2	-	-	-	-	-	-	**2**
Clarias gariepinus	1.50	1	3	-	-	-	-	-	**4**
Clarias sp.	1.50	-	1	-	-	-	-	-	**1**
Fish	0.50	-	30	-	-	-	-	-	**30**
Achatina zebra	0.02	-	5	-	-	-	-	-	**5**
Achatina sp.	0.02	34	155	-	1	-	1	7	**198**
Patella sp.	0.02	-	1	-	-	-	-	-	**1**
Unionidae	0.02	8	23	-	-	-	-	-	**31**

Table 5.36. Continued

Species	50%: live mass	Ms	Nd	Nt	Ms/Nd	Ms/Nt	Nd/Nt	?	Total
Unio/Aspatharia	0.02	2	19	-	1	-	-	-	**22**
Marine bivalve	0.02	1	2	-	-	-	-	-	**3**
Perna perna	0.02	-	21	-	-	-	-	-	**21**
Oyster	0.02	-	1	-	-	-	-	-	**1**
Cardium sp.	0.02	-	2	-	-	-	-	-	**2**

Table 5.37a. KwaGandaganda: Msuluzi phase, percentage meat contribution per species

Species	QSP	QSP value	Meat (kg)	% meat contribution
Equus burchellii	1	0.01	1.17	0.23
Phacochoerus aethiopicus	2	0.01	0.36	0.07
Potamochoerus porcus	30	0.15	4.77	0.93
Hippopotamus amphibius	1	0.01	2.86	0.56
Bos taurus	174	1.33	332.06	65.04
Ovis aries	106	0.81	12.95	2.54
Capra hircus	10	0.08	1.22	0.24
Ovis/Capra	820	6.26	100.15	19.62
Philantomba monticola	23	0.18	0.39	0.08
Cephalophus natalensis	3	0.02	0.16	0.03
Sylvicapra grimmia	31	0.24	2.37	0.46
Raphicerus campestris	4	0.03	0.17	0.03
Aepyceros melampus	9	0.07	1.65	0.32
Syncerus caffer	5	0.04	14.89	2.92
cf. *Redunca fulvorufula*	1	0.01	0.22	0.04
Bov I	22	0.17	1.68	0.33
Bov II	62	0.47	7.57	1.48
Bov II (non-domestic)	8	0.06	1.47	0.29
Bov III	21	0.16	17.63	3.45
Bov III (non-domestic)	3	0.02	2.29	0.45
Otomys sp.	2	0.01	0.01	0.01
Gallus domesticus	4	0.08	0.06	0.01
Bird (medium/large)	1	0.02	0.02	0.01
Tortoise	1	0.01	0.01	0.01
Crocodilus niloticus	1	0.01	2.66	0.52
Varanus niloticus	7	0.07	0.12	0.02
Sparadon durbanensis	2	0.06	1.10	0.22
Clarias gariepinus	1	0.03	0.05	0.01

Table 5.37a. Continued

Species	QSP	QSP value	Meat (kg)	% meat contribution
Achatina sp.	34	17.00	0.34	0.07
Unionidae	8	4.00	0.08	0.02
Unio/Aspatharia	2	1	0.02	0.01
Marine bivalve	1	0.25	0.01	0.01

Table 5.37b. KwaGandaganda: Ndondondwane phase, percentage meat contribution per species

Species	QSP	QSP value	Meat in kg	% meat contribution
Procavia capensis	12	0.09	0.16	0.01
Phacochoerus aethiopicus	5	0.03	0.90	0.03
Potamochoerus porcus	125	0.64	19.87	0.75
Suid	9	0.05	1.52	0.06
Hippopotamus amphibius	1	0.01	3.59	0.14
Giraffa camelopardalis	4	0.03	15.27	0.58
Bos taurus	1159	8.85	2211.83	83.50
Ovis aries	158	1.21	19.30	0.73
Capra hircus	27	0.21	3.30	0.12
Ovis/Capra	1535	11.72	187.48	7.08
Philantomba monticola	40	0.31	0.67	0.03
Cephalophus natalensis	5	0.04	0.27	0.01
Sylvicapra grimmia	29	0.22	2.21	0.08
Raphicerus campestris	4	0.03	0.17	0.01
Aepyceros melampus	39	0.30	7.15	0.27
Syncerus caffer	14	0.11	41.68	1.57
Tragelaphus strepsiceros	3	0.02	2.22	0.08
cf. *Redunca arundinum*	1	0.01	0.17	0.01
Kobus ellipsiprymnus	1	0.01	0.95	0.04
Bov I	16	0.12	1.22	0.05
Bov II	254	1.94	31.02	1.17
Bov II (non-domestic)	31	0.24	5.68	0.21
Bov III	87	0.66	73.05	2.76
Bov III (non-domestic)	21	0.16	16.03	0.61
Pedetes capensis	1	0.01	0.01	0.01
Thryonomys swinderianus	10	0.07	0.18	0.01
Lepus saxatilis	5	0.04	0.04	0.01

Table 5.37b. Continued

Species	QSP	QSP value	Meat in kg	% meat contribution
Gallus domesticus	2	0.04	0.03	0.01
Bird (small)	1	0.02	0.01	0.01
Snake (small)	1	0.11	0.06	0.01
Varanus sp.	8	0.09	0.14	0.01
Clarias gariepinus	3	0.10	0.15	0.01
Clarias sp.	1	0.03	0.05	0.01
Fish	30	0.97	0.48	0.02
Achatina zebra	5	2.5	0.05	0.01
Achatina sp.	155	77.5	1.55	0.06
Patella sp.	1	0.5	0.01	0.01
Unionidae	23	11.5	0.23	0.01
Unio/Aspatharia	19	9.5	0.19	0.01
Marine bivalve	2	0.5	0.01	0.01
Perna perna	21	5.25	0.11	0.01
Oyster	1	0.25	0.01	0.01
Cardium sp.	2	0.5	0.01	0.01

Table 5.37c. KwaGandaganda: Ntshekane phase, percentage meat contribution per species

Species	QSP	QSP value	Meat in kg	% meat contribution
Phacochoerus aethiopicus	10	0.05	1.79	0.40
Potamochoerus porcus	8	0.04	1.27	0.28
Suid	4	0.02	0.68	0.15
Bos taurus	182	1.39	347.33	77.26
Ovis aries	18	0.14	2.20	0.49
Capra hircus	2	0.02	0.24	0.05
Ovis/Capra	140	1.07	17.10	3.80
Philantomba monticola	4	0.03	0.07	0.02
Sylvicapra grimmia	8	0.06	0.61	0.14
Raphicerus melanotis	2	0.02	0.08	0.02
Syncerus caffer	7	0.05	20.84	4.64
Tragelaphus scriptus	6	0.05	1.24	0.28
Bov I	1	0.01	0.08	0.02
Bov II	32	0.24	3.91	0.87
Bov II (non-domestic)	2	0.02	0.37	0.08
Bov III	57	0.44	47.86	10.65
Bov III (non-domestic)	1	0.01	0.76	0.17
Bov IV	1	0.01	2.98	0.66
Thryonomys swinderianus	3	0.02	0.06	0.01
Otomys sp.	2	0.01	0.01	0.01
Lepus saxatilis	2	0.01	0.02	0.01
Tortoise	1	0.01	0.01	0.01
Varanus sp.	2	0.02	0.03	0.01

Table 5.37d. KwaGandaganda: Msuluzi/Ndondondwane mixed units, percentage meat contribution per species

Species	QSP	QSP value	Meat in kg	% meat contribution
cf. *Ceratotherium simum*	1	0.01	1.80	0.36
Potamochoerus porcus	9	0.05	1.43	0.29
Bos taurus	220	1.68	419.85	84.00
Ovis aries	23	0.18	2.81	0.56
Capra hircus	10	0.08	1.22	0.24
Ovis/Capra	460	3.51	56.18	11.24
Philantomba monticola	4	0.03	0.07	0.01
Sylvicapra grimmia	5	0.04	0.38	0.08
Aepyceros melampus	1	0.01	0.18	0.04
Syncerus caffer	2	0.02	5.95	1.19
Bov I	2	0.02	0.15	0.03
Bov II	8	0.06	0.98	0.20
Bov II (non-domestic)	1	0.01	0.18	0.04
Bov III	4	0.03	3.36	0.67
Bov III (non-domestic)	3	0.02	2.29	0.46
Bov IV	1	0.01	2.98	0.60
Varanus sp.	1	0.01	0.02	0.01
Achatina sp.	1	0.50	0.01	0.01
Unio/Aspatharia	1	0.50	0.01	0.01

Table 5.37e. KwaGandaganda: Msuluzi/Ntshekane mixed units, percentage meat contribution per species

Species	QSP	QSP value	Meat in kg	% meat contribution
Bos taurus	8	0.06	15.26	87.90
Ovis/Capra	14	0.11	1.71	9.85
Bov II	3	0.02	0.37	2.13
Terrapin	2	0.02	0.02	0.12

Table 5.37f. KwaGandaganda: Ndondondwane/Ntshekane mixed units, percentage meat contribution per species

Species	QSP	QSP value	Meat in kg	% meat contribution
Potamochoerus porcus	10	0.05	1.59	0.66
Bos taurus	90	0.69	171.76	70.80
Ovis aries	10	0.08	1.22	0.50
Ovis/Capra	52	0.40	6.35	2.62
Philantomba monticola	1	0.01	0.02	0.01
Sylvicapra grimmia	2	0.02	0.15	0.06
Raphicerus campestris	1	0.01	0.04	0.02
Aepyceros melampus	2	0.02	0.37	0.15
Syncerus caffer	17	0.13	50.61	20.86
cf. *Redunca arundinum*	1	0.01	0.17	0.07
Bov I	2	0.02	0.15	0.06
Bov II	16	0.12	1.95	0.80
Bov II (non-domestic)	4	0.03	0.73	0.30
Bov III	8	0.06	6.72	2.77
Bov III (non-domestic)	1	0.01	0.76	0.31
Achatina sp.	1	0.50	0.01	0.01

Table 5.37g. KwaGandaganda: Unknown phase, percentage meat contribution per species

Species	QSP	QSP value	Meat in kg	% meat contribution
Equus burchellii	1	0.01	1.17	1.42
Phacochoerus aethiopicus	2	0.01	0.36	0.44
Bos taurus	37	0.28	70.61	85.92
Ovis/Capra	57	0.44	6.96	8.47
Philantomba monticola	1	0.01	0.02	0.02
Sylvicapra grimmia	1	0.01	0,08	0.10
Bov I	2	0.02	0.15	0.18
Bov II	2	0.02	0.24	0.29
Bov III	3	0.02	2.52	3.07
Achatina sp.	7	3.5	0.07	0.09

Table 5.38. KwaGandaganda: summary of percentage meat contribution to the diet, per species for each phase and mixed units (Ms: Msuluzi; Nd: Ndondondwane; Nt: Ntshekane; Ms/Nd: Msuluzi/Ndondondwane; Ms/Nt: Msuluzi/Ntshekane; Nd/Nt: Ndondondwane/Ntshekane; ?: Unknown phase)

Species	Ms	Nd	Nt	Ms/Nd	Ms/Nt	Nd/Nt	?
cf. *Ceratotherium simum*	-	-	-	0.36	-	-	-
Equus burchellii	0.23	-	-	-	-	-	1.42
Procavia capensis	-	0.01	-	-	-	-	-
Phacochoerus aethiopicus	0.07	0.03	0.40	-	-	-	0.44
Potamochoerus porcus	0.93	0.75	0.28	0.29	-	0.66	-
Suid	-	0.06	0.15	-	-	-	-
Hippopotamus amphibius	0.56	0.14	-	-	-	-	-
Giraffa camelopardalis	-	0.58	-	-	-	-	-
Bos taurus	65.04	83.50	77.26	84.00	87.90	70.80	85.92
Ovis aries	2.54	0.73	0.49	0.56	-	0.50	-
Capra hircus	0.24	0.12	0.05	0.24	-	-	-
Ovis/Capra	19.62	7.08	3.80	11.24	9.85	2.62	8.47
Philantomba monticola	0.08	0.03	0.02	0.01	-	0.01	0.02
Cephalophus natalensis	0.03	0.01	-	-	-	-	-
Sylvicapra grimmia	0.46	0.08	0.14	0.08	-	0.06	0.10
Raphicerus campestris	0.03	0.01	-	-	-	0.02	-
Raphicerus melanotis	-	-	0.02	-	-	-	-
Aepyceros melampus	0.32	0.27	-	0.04	-	0.15	-
Syncerus caffer	2.92	1.57	4.64	1.19	-	20.86	-
Tragelaphus strepsiceros	-	0.08	-	-	-	-	-
Tragelaphus scriptus	-	-	0.28	-	-	-	-
cf. *Redunca arundinum*	-	0.01	-	-	-	0.07	-
cf. *Redunca fulvorufula*	0.04	-	-	-	-	-	-
Kobus ellipsiprymnus	-	0.04	-	-	-	-	-
Bov I	0.33	0.05	0.02	0.03	-	0.06	0.18
Bov II	1.48	1.17	0.87	0.20	2.13	0.80	0.29
Bov II (non-domestic)	0.29	0.21	0.08	0.04	-	0.30	-

Table 5.38. Continued

Species	Ms	Nd	Nt	Ms/Nd	Ms/Nt	Nd/Nt	?
Bov III	3.45	2.76	10.65	0.67	-	2.77	3.07
Bov III (non-domestic)	0.45	0.61	0.17	0.46	-	0.31	-
Bov IV	-	-	0.66	0.60	-	-	-
Pedetes capensis	-	0.01	-	-	-	-	-
Thryonomys swinderianus	-	0.01	0.01	-	-	-	-
Otomys sp.	0.01	-	0.01	-	-	-	-
Lepus saxatilis	-	0.01	0.01	-	-	-	-
Gallus domesticus	0.01	0.01	-	-	-	-	-
Bird (small)	-	0.01	-	-	-	-	-
Bird (medium)	-	-	-	-	-	-	-
Bird (medium/large)	0.01	-	-	-	-	-	-
Tortoise	0.01	-	0.01	-	-	-	-
Terrapin	-	-	-	-	0.12	-	-
Snake (small)	-	0.01	-	-	-	-	-
Crocodilus niloticus	0.52	-	-	-	-	-	-
Varanus niloticus	0.02	-	-	-	-	-	-
Varanus sp.	-	0.01	0.01	0.01	-	-	-
Sparadon durbanensis	0.22	-	-	-	-	-	-
Clarias gariepinus	0.01	0.01	-	-	-	-	-
Clarias sp.	-	0.01	-	-	-	-	-
Fish	-	0.02	-	-	-	-	-
Achatina zebra	-	0.01	-	-	-	-	-
Achatina sp.	0.07	0.06	-	0.01	-	0.01	0.09
Patella sp.	-	0.01	-	-	-	-	-
Unionidae	0.02	0.01	-	-	-	-	-
Unio/Aspatharia	0.01	0.01	-	0.01	-	-	-
Marine bivalve	0.01	0.01	-	-	-	-	-
Perna perna	-	0.01	-	-	-	-	-

Table 5.38. Continued

Species	Ms	Nd	Nt	Ms/Nd	Ms/Nt	Nd/Nt	?
Oyster	-	0.01	-	-	-	-	-
Cardium sp.	-	0.01	-	-	-	-	-

Table 5.39. KwaGandaganda: bone points or linkshafts (* Diameter: W: widest part of the shaft; T: thinnest part of the shaft/point; ✓: the bone has parallel sides)

Level	Complete /Broken	Polished	Drilled	* Diameter (mm)	Length (mm)	Butt end	Shaft form	Diameter form	Burnt	Rough/ Smooth	Comments
TS 51 1 B	Complete	✓	✗	W: 5.3 T: 0.8	140.55	Sharp	Convergent	Round	✗	Smooth	The shaft finish is not entirely polished round, but it has smooth edges
Tr 2 U 3 3	Broken	✗	✗	W: 5.85 T: 1.85	31.5	Broken	Convergent	Round	✗	Rough	The shaft is round, but the point is angular
Gr 2 D 4 2 G	Broken	✓	✗	✓: 4.75	32.05	Broken	Parallel sides	Round	✗	Smooth	No comments
Gr 3 D 5 2/3	Broken	✓	✗	✓: 5.2	21.8	Broken	Parallel sides	Round, flattened on one side	✗	Smooth	No comments
TS 73 2	Broken	✗	✗	✓: 5.65	10.7	Flat	Parallel sides	Round	✓	Rough	No comments
Gr 3 J 7 1	Broken	✓	✗	-	-	Broken	-	Round, flattened on one side	✓	Smooth	The shaft finish is not entirely polished round, but it has smooth edges
Sq 25(b) 2(30-56)	Broken	✓	✗	✓: 4.55	37.15	Flat	Parallel sides	Round	✗	Smooth	The surface is covered with ground (encrustation)
TS 22 2	Broken	✗	✗	W: 7.9 T: 6.1	41.8	Broken	Convergent	Oval	✗	Smooth	No comments

Table 5.39. Continued

Level	Complete /Broken	Polished	Drilled	* Diameter (mm)	Length (mm)	Butt end	Shaft form	Diameter form	Burnt	Rough/ Smooth	Comments
TS 22 2	Broken	✗	✗	✓: 4.9	32.05	Flat	Parallel sides	Round	✗	Rough	No comments
Gr 6 E 7 3	Broken	✗	✗	W: 5.8 T: 3.8	36.9	Transverse	Convergent	Round	✗	Rough	No comments
Gr 6 E 7 3	Broken	✗	✗	✓: 6.0	34.4	Broken	Parallel sides	Round	✗	Rough	No comments
Gr 6 E 7 3	Broken	✗	✗	W: 5.7 T: 5.2	26.8	Flat	Convergent	Oval	✗	Rough	No comments
Sq 25(b) 30-56	Broken	✗	✗	W: 4.5 T: 3.5	29.6	Flat	Convergent	Round	✓	Rough	No comments
Sq 25(b) 30-56	Broken	✗	✗	✓: 5.3	21.7	Broken	Parallel sides	See comment	✓	Rough	The shaft is rounded with the remnant of the marrow cavity showing
Sq 25(b) 30-56	Broken	✗	✗	✓: 3.85	11.75	Broken	Parallel sides	Round	✓	Rough	No comments
Gr 2 E 6 2	Broken	✗	✗	W: 5.95 T: 4.8	37.25	Broken	Convergent	Round	✗	Rough	No comments
T 2 U 5 3	Broken	✓	✗	✓: 5.05	37.15	Broken	Parallel sides	Round	✗	Smooth	No comments
Sq 25(d) 2: 3	Broken:2 fragments	✓	✗	✓: 5.95	48.5	Broken	Parallel sides	Broken	✗	Smooth	No comments

Table 5.39. Continued

Level	Complete /Broken	Polished	Drilled	* Diameter (mm)	Length (mm)	Butt end	Shaft form	Diameter form	Burnt	Rough/ Smooth	Comments
Gr 6 F 7/8 2	Broken	✓	✗	W: 5.6 T: 4.15	67.4	Broken	Convergent	Round	✗	Smooth	No comments
Sq 3 2	Broken	✓	✗	✓: 5.85	54.05	Broken	Parallel sides	Roundly angular	✗	Smooth	Smooth edges
Sq 23Ext 3	Complete	✗	✗	W: 6.3 T: 1.75	99.0	Sharp on one end, transverse on other	Convergent	Round with notch	✗	Rough	Made from bone shaft with marrow cavity still visible. Only the points are polished
Sq 12Ext 3	Broken	✓	✗	W: 3.95 T: 0.55	98.9	Broken	Convergent	Round	✗	Smooth	Very sharp (needle-like) point
Tr 2 U 5 H	Broken	✗	✗	W: 9.85 T: 0.8	67.9	Broken	Convergent	Semi-circular	✗	Rough	Metapodial mid-shaft sharpened to a point
Sq 25Ext 2(55-70)	Complete	✓	✗	W: 5.65 T: 0.8	148.25	Flat	Convergent	Round	✗	Smooth	No comments
Gr 2 D 3 1 Brown	Broken	✓	✗	W: 6.6 T: 4.45	27.5	Broken	Convergent	Oval	✗	Smooth	No comments
Sq 25Ext (55-70)	Broken	✓	✗	✓: 4.95	29.85	Broken	Parallel sides	Round	✗	Smooth	Possibly shaft fragment of next bone point
Sq 25Ext (55-70)	Broken	✓	✗	W: 3.15 T: 1.85	13.8	Broken	Convergent	Round	✗	Smooth	Possibly bone point of previous bone shaft
SVP 69 1 m^2: 1	Broken	✓	✗	✓: 4.5	48.0	Flat	Parallel sides	Round	✗	Smooth	No comments

Table 5.39. Continued

Level	Complete /Broken	Polished	Drilled	* Diameter (mm)	Length (mm)	Butt end	Shaft form	Diameter form	Burnt	Rough/ Smooth	Comments
Sq 25Ext (30-50)	Broken	✓	✗	W: 2.65 T: 0.95	15.85	Broken	Convergent	Round	✗	Rough	No comments
Sq 25 Slag heap	Broken	✗	✗	✓: 4.8	43.35	Flat	Parallel sides	Angular	✓	Slightly rough	Most of the bone is encrusted
Sq 25Ext (75-84) Excl. slag	Broken	✓	✗	W: 4.95 T: 0.5	34.25	Broken	Convergent	Semi-circular	✗	Smooth	Looks like an ulna shaft end polished to a point
Sq 25Ext (75-84) Excl. slag	Broken	✓	✗	✓: 3.25	18.9	Broken	Parallel sides	Round	✓	Smooth	No comments
Sq 25Ext (75-84) Excl. slag	Broken	✓	✗	✓: 4.8	11.35	Broken	Parallel sides	Oval	✓	Smooth	No comments
SVP 25	Complete	Unsure	✗	W: 6.05 T: 2.05	43.75	Flat	Convergent	Round	✗	Smooth	The outer layer of the bone is weathered away, but the part that still exists may have been polished
Sq 25(c) Whole square	Broken	✗	✗	W: 6.25 T: 1.8	70.65	Broken	Convergent	See comment	✗	Rough	Made from bone shaft with marrow cavity still visible. There are rodent gnaw-marks on the shaft of the bone point

Table 5.39. Continued

Level	Complete /Broken	Polished	Drilled	* Diameter (mm)	Length (mm)	Butt end	Shaft form	Diameter form	Burnt	Rough/ Smooth	Comments
Sq 25(c) Whole square	Broken	✓	✗	✓: 5.75	24.0	Broken	Parallel sides	Round	✓	Smooth	No comments
Sq 25(c) Whole square	Broken	✗	✗	W: 5.7 T: 4.35	20.45	Flat	Convergent		✓	Smooth	No comments
Sq 25(c) 3	Broken	✓	✗	W: 7.7 T: 3.5	78.3	Flat	Convergent	Oval	✗	Smooth	No comments
Sq 25(b) 2(56-80)	Broken	✓	✗	W: 5.9 T: 4.2	18.25	Flat	Convergent	Round	✓	Smooth	No comments
Sq 25(b) 2(56-80)	Broken	Unsure	✗	W: 6.9 T: 5.25	22.4	Flat	Convergent	Round	✓	Unsure	The shaft is encrusted
Sq 25(c) 2	Complete	✗	✗	W: 5.10 T: 2.95	96.9	Flat	Convergent	Round	✗	Rough	No comments
Sq 25(a)	Complete	Partly	✗	W: 7.05 T: 2.3	80.1	Flat	Convergent	Round	✗	Partly smooth	No comments
Sq 25(a) 2(54-80)	Complete	✓	✗	W: 6.0 T: 2.35	91.0	Rounded	Convergent	Flat oval	✗	Smooth	Smooth edges
Sq 25 D 11 3	Complete	✓	✗	W: 5.35 T: 1.15	76.2	Flat	Convergent	Oval	✗	Smooth	Smooth edges
SVP 49 Grey	Complete	✗	✗	W: 6.0 T: 2.4	98.6	Flat	Convergent	Round	✗	See comment	Rodent gnaw-marks on shaft near the butt end. The outer layer of the bone is absent in some places

Table 5.39. Continued

Level	Complete /Broken	Polished	Drilled	* Diameter (mm)	Length (mm)	Butt end	Shaft form	Diameter form	Burnt	Rough/ Smooth	Comments
SVP 49 Grey	Broken	✓	✗	W: 7.85 T: 0.9	52.15	Broken	Convergent	See comment	✗	Smooth	Made from bone shaft with marrow cavity still visible.
Sq 25 9	Broken	✗	✗	✓: 4.45	24.2	Broken	Parallel sides	Oval	✓	Rough	The shaft is slightly angular, possibly due to weathering
Gr 4 - 3 A Dung	Broken	✓	✗	W: 4.2 T: 1.45	38.55	Broken	Convergent	Round	✗	Smooth	No comments
SVP 37 :2	Broken	✓	✗	W: 6.35 T: 3.9	53.85	Flat	Convergent	Round	✗	Smooth	Part of the outer layer of the bone is weathered
Sq 25Ext E 10 1	Broken	✓	✗	✓: 4.75	18.45	Broken	Parallel sides	Round	✓	Smooth	No comments
Sq 25 E 11 4	Broken	✓	✗	✓: 6.5	14.35	Broken	Parallel sides	Round	✓	Smooth	No comments
Sq 25 7C 4	Complete	✓	✗	W: 5.0 T: 2.0	126.75	Sharp	Convergent	Round	✗	Smooth	No comments
Gr 2 Pit 1 55-80	Complete	✓	✗	W: 5.3 T: 1.5	61.45	Flat	Convergent	Round	✗	Smooth	No comments
Gr 2 Pit 1 55-80	Complete	✓	✗	W: 5.9 T: 2.55	61.4	Flat	Convergent	Round	✓	Smooth	Shaft is encrusted

Table 5.39. Continued

Level	Complete /Broken	Polished	Drilled	* Diameter (mm)	Length (mm)	Butt end	Shaft form	Diameter form	Burnt	Rough/ Smooth	Comments
Gr 2 Pit 1 55-80	Broken	✓	✗	✓: 5.45	26.5	Broken	Parallel sides	Round	✗	Smooth	No comments
Sq 25 D 11 1	Broken	✓	✗	✓: 3.95	18.8	Broken	Parallel sides	Angular	✗	Smooth	No comments
Sq 25 1m^2 6	Complete	✓	✗	W: 6.75 T: 1.75	78.7	Flat	Convergent	Round	✗	Smooth	Tip of the point is coloured dark
Sq 25 3: 2	Complete	✗	✗	W: 6.0 T: 3.4	99.25	Flat	Convergent	See comment	✗	Rough	Made from bone shaft with marrow cavity still visible; has smooth edges
Sq 25 : 1	Broken	✓	✗	✓: 3.95	31.65	Broken	Parallel sides	Round	✗	Smooth	No comments
Sq 25 : 1	Broken	✓	✗	W: 2.9 T: 1.25	20.45	Broken	Convergent	Round	✗	Smooth	No comments
Sq 25 E 11 3	Broken	✗	✗	✓: 5.1	20.0	Broken	Parallel sides	Round	✗	Rough	No comments
Sq 25 E 11 3	Broken	✗	✗	✓: 5.0	6.3	Broken	Parallel sides	Round	✗	Rough	No comments
Sq 25 E 11 3	Broken	✗	✗	✓: 3.6	5.9	Broken	Parallel sides	Round	✓	Rough	No comments

Table 5.39. Continued

Level	Complete /Broken	Polished	Drilled	* Diameter (mm)	Length (mm)	Butt end	Shaft form	Diameter form	Burnt	Rough/ Smooth	Comments
Sq 25 B 11 + C 11	Broken	✓	✗	W: 6.6 T: 5.1	38.3	Flat	Convergent	Oval	✓	Smooth	No comments
Sq 25 B 11 + C 11	Broken	✓	✗	✓: 6.2	35.3	Broken	Parallel sides	Round	✗	Smooth	No comments
Sq 25 B 11 + C 11	Broken	✓	✗	✓: 5.25	32.4	Broken	Parallel sides	Oval	✗	Smooth	No comments
Sq 25 B 11 + C 11	Broken	✓	✗	✓: 4.7	29.5	Broken	Parallel sides	See comment	✗	Smooth	Made from bone shaft with marrow cavity still visible
Sq 25 B 11 + C 11	Broken	✗	✗	W: 5.6 T: 4.15	18.65	Broken	Convergent	Angular	✗	Rough	No comments

Table 5.40. KwaGandaganda: description of miscellaneous worked bone and shell fragments (Ms: Msuluzi; Nd: Ndondondwane; Nt: Ntshekane; Ms/Nd: Msuluzi/Ndondondwane)

Phase	Provenance	Species	Skeletal part and description
Ms	Tr 7 U 1 3 PB	*Canis familiaris*	Distal tibia articulation fragment including part of the distal shaft. The shaft has been neatly cut and snapped, possibly to use the rest of the shaft to make a whistle or an elongated bead or an ornament.
Ms	Gr 3 J7 2 RA	Non-identifiable	Fragment of a long bone shaft with one of the edges smoothed away. The specimen also has cut marks.
Ms	Gr 3 F 5 4 A	cf. *Bos taurus*	Fragment of a proximal radius shaft. The proximal end of the shaft is formed into a rounded edge.
Ms/Nd	Tr 2 U 5 3 D/GA	*Bos taurus*	Fragment of a proximal femur shaft with parallel cut marks, oblique to the length of the bone. The side of the bone is also polished.
Nd	Tr 2 U 13 3 D	*Cardium* sp.	Valve fragment with a polished edge.
Nd	Tr 2 U 2/3	Non-identifiable	Bone flake with both sides sharpened to a point.
Nd	Tr 2 U 2/3 GA	Non-identifiable	Rib fragment with polished sides. The one side is curved inward, and also has a shallow cut mark.
Ms/Nd	Tr 2 U 22 3 D	Carnivore (medium/large)	Fragment of a canine with a hole drilled through the root.
Nd	Gr 4 E 1 3 D:2	*Ovis/Capra*	Left radius, proximal articulation and shaft fragment. The end of the shaft is sharpened to a point. There are also cut and chop marks on the shaft.
Ms/Nd	Gr 4 G 2 3 D	Bov II	Fragment of a long bone shaft with the end worked into a sharp point.
Nd	Gr 4 - 2 C Dung	Non-identifiable	Possibly a fragment of a small metapodial proximal shaft. The bone has been worked into the form of an arrow-head.
Nd	Sq 22 1-3	Non-identifiable	The long bone shaft has been modified and polished into a point on the one side.
Nd	Sq 22 Level -	Bov II	Fragment of a proximal tibia shaft with one end polished into a rounded point.
Nt	TS 12Ext 2 CDB	cf. *Bos taurus*	Fragment of a bone shaft with one end polished round.

Table 5.41. KwaGandaganda: modified bone objects from divining sets (Ms: Msuluzi; Nd: Ndondondwane; Nt: Ntshekane; Ms/Nt: Msuluzi/Ntshekane; ?: Unknown phase)

Phase	Provenance	Species	Skeletal part	Description
Nt	Trench 8 U 1 2 CDB	*Ovis aries*	Astragalus (Right)	The bone has been partially polished flat on the dorsal side
Ms	Grid 3 J 7 2 Red ash	*Ovis aries*	Astragalus (Left)	Shows traces of copper wire across the surface on the ventral side. It is also polished smooth on the ventral side.
Nd	Grid 4 -3 C Dung	*Ovis/Capra*	Astragalus (Left)	This specimen has been polished flat on both the dorsal and ventral sides.
(?)	Grid 6	cf. *Ovis/Capra*	Astragalus (?)	This bone is heavily abraded and has a small hole drilled into the proximal/distal side (it is difficult to distinguish the sides). These abraded surfaces have possibly been caused by wear due to extensive use of the object.
Ms/Nt	Trench 5 U 11 2 CDB	*Ovis/Capra*	Astragalus (Right)	The specimen has a hole drilled into the proximal side. The surface has been worn extensively due to carnivore digestion.
Ms	Grid 1	Indeterminate	Bone flake	This bone flake has been polished smooth on the inside, causing the marrow-cavity to disappear. The bone has also been polished in a V-shape. The decorative motif on the outer layer of the bone consist of numerous small circles with dots in them.

Table 5.42. KwaGandaganda: summary of the mollusc shell and ostrich eggshell beads (Ms: Msuluzi; Nd: Ndondondwane; Nt: Ntshekane)

Provenance	Shell				Ostrich eggshell				Total beads	Total mass (g)
	Not burnt	Burnt	Total	Mass (g)	Not burnt	Burnt	Total	Mass (g)		
Ms	1942	309	2251	209.2	291	69	360	43.5	2611	239
Nd	1521	108	1629	140.3	50	13	63	6.3	1692	147
Nt	625	58	683	63.9	15	2	17	2.5	700	66.4
Total	**4088**	**475**	**4563**	**413.4**	**356**	**84**	**440**	**52.3**	**5003**	**452**

Table 5.43. KwaGandaganda: mass of elephant ivory chips (Ms: Msuluzi; Nd: Ndondondwane; Nt: Ntshekane)

Phase	Provenance	Mass (g)
Nd	Square 22(b), 2	7.0
Nt	Test square 22, 2 DB	11.0
Nd	Grid 4, 3 A, Pit	7.5
Ms/Nd/ Nt	Grid 3	33.0
Ms	Square 25 Ext	376.0
Ms	Square 25, Level -	645.5
Ms	Square 25, E 10, 4(48-63)	517.0
Ms	Square 25, E 11, 4	339.0
Ms	Square 25, E 11, 3+2	316.0
Ms	Square 25, E 10, 3(35-48)	593.0
Ms	Square 25, E 10, 2 (20-35) and levels 1,5,6,7,8	392.0
Ms	Square 25, 2(20-30)	393.0
Ms	Square 25(b), 2(56-80)	101.0
Ms	Square 25(d), 2(30-54)	3.5
Ms	Square 25(a), 2 (30-54)	13.0
Ms	Square 25(d), 2(54-80)	13.5
Ms	Square 25, 1 Brown	51.5
Ms	Square 25(c), 40-65	91.0
Ms	Square 25(b), 2 (30-56)	92.0
Ms	Square 25(b), 2 (56-80)	86.0
Ms	Square 25(a), 2 (54-80)	11.0
Ms	Square 25, 3	160.0
Ms	Square 25, Slag dump	10.0
Total		**4262.5**

Table 5.44. KwaGandaganda: pathological bones (Ms: Msuluzi; Nd: Ndondondwane; Nt: Ntshekane; Ms/Nd: Msuluzi/Ndondondwane; Nd/Nt: Ndondondwane/Ntshekane)

Phase	Provenance	Species	Skeletal part	Description of pathology
Ms	Sq 25(b) 2 (56-80)	*Ovis aries*	Proximal 1st phalanx fragment	Exostosis on the shaft, below the proximal articulation.
Nd	Tr 1 U 4 2 CDB	*Ovis/Capra*	2nd phalanx	Exostosis on shaft.
Ms/Nd	Tr 1 U 4 3 R	*Bos taurus*	2nd phalanx	Abscess on the side of the phalanx, near the distal end.
Nd	Sq 1 3 LBA:2	*Ovis aries*	1st phalanx	Severe exostosis and arthritic damage to both proximal and distal surfaces, and on the sides around the distal shaft in particular. Possibly a result of previous trauma.
Nt	Tr 8 U 2 2 CDB	*Bos taurus*	Hyoid	Some exostosis and an irregular lesion are visible on the bone, probably as a result of a disease involving bone forming. The hyoid has a few cutmarks on its surface.
Nd/Nt	Gr 4 E 1/2 2 CDB	*Bos taurus*	Ulna fragment with part of processus anconaeus	The specimen has severe exostosis on the lateral side of the articulation. It is possibly due to trauma.
Ms	Gr 4 - 3F(East) Dung	Non-identifiable	Rib fragment	Arthritis.
Nd	Gr 4 - 4 C	*Bos taurus*	Metacarpal (Right side)	Natural indentation in proximal shaft (possibly residue of abscess); also exostosis on the medial shaft.
Nd	Sq 4-7 3 PB	Bov II	Scapula fragment	The tuberculum glenoid is attached to the neck and spine of the vertebrae, with excessive bone growth, forming an inter-osseous space. This is caused by the excessive bone growth. On the left side of the neck where the extra bone from the tuberculum meets the spine, the bone growth is in excess of 22mm thick. The cause of this could be severe trauma to the upper limb, but tumor forming can not be excluded.
Nd	Sq 4-7 3 PB	*Ovis/Capra*	Upper (left) M1	Interrupted enamel column.

Table 5.44. Continued

Phase	Provenance	Species	Skeletal part	Description of pathology
Nt	TS 12Ext 2	*Bos taurus*	Half 1st phalanx	The muscle scar of the bone is extremely thick with some damage (probably an abscess) just below the proximal articulation. The shaft is slightly deformed and curved in the direction of the muscle scar. Probably an old animal that has been used as a working animal.
Nt	TS 12Ext 2	*Bos taurus*	Right radial carpal	Exostosis on the outer medial side, probably from old age combined with work stress. Cut marks visible.
Nt	Sq 24 2 DB	*Bos taurus*	Right lower M3	The posterior lobe is reduced to a very sharp, narrow edge.
Nd	TS 69	*Bos taurus*	Molar fragment	The interior of the tooth has a granulated surface. The tooth was probably abscessed.
Nd	TS 18 3	*Bos taurus*	1st phalanx proximal articulation and body fragment	Ligament lesions are very strong, some stress on the bone. It is a very large individual, most likely a male animal (oxen).
?	Sq 21 2 DB	*Bos taurus*	Half 2nd phalanx	Some thickening of the ligament scars, probably due to stress and old age.
Nt	Sq 24 2 DB	*Bos taurus*	M1 and M2 in part of the right mandible	The M1 is worn to the roots well below the occlusion surfaces of the M2. This indicates that the M1 of the upper jaw was relatively long in relation to its neighbour M2, placing more wear stress on the lower M1. Aged animal.
Nt	TS 22Ext 2 CDB	*Ovis/Capra*	Incisor	The tooth has a wear groove, and comes from an aged animal.
Nd	TS 22 3	*Bos taurus*	Half 1st phalanx	The shaft is slightly deformed and curved in the direction of the muscle scar.
Nd	TS 22 3	*Bos taurus*	Left os centroquartale	Extra bone forming on the plantar side of the bone and also on the small facets at its distal face. This could be indicative of old age combined with hard work, as some exostosis is also visible on the medial side. Carnivore damage is also visible.

Table 5.44. Continued

Phase	Provenance	Species	Skeletal part	Description of pathology
Nd	Gr 4 C 2 3	*Bos taurus*	Left proximal radius fragment	The tendon scars at the ulnar articulation on the shaft are extremely rugged and prominent, suggesting old age. Where the shaft is broken there is very clear polish on the lateral side, the purpose of which is unknown. It is as if that particular small section of the bone has been used in a rubbing action.
Nt	TS 21 2	*Bos taurus*	Right upper M1	The tooth has light wear. The body of the tooth is markedly constricted, at which point there seems to have been a line in the enamel suggesting interrupted growth. Possibly due to poor nutrition.
Nd	TS 19 4(43-58)	*Bos taurus*	Distal articulation and shaft fragment of 1st phalanx	The shaft below the distal articulation shows evidence of an abscess with new bone forming on the lesion. Probably encountered the damage whilst in a kraal with many other cattle.
Nd	TS 18 3	*Bos taurus*	Left upper M2 fragment, posterior lobe	The lobe has light wear, but there is a deep wear groove where the root meets the enamel. This usually occurs in old animals.
Nd	TS 18 3	*Bos taurus*	Left lower M1	The body of the tooth is markedly constricted. There seem to have been a line in the enamel suggesting interrupted growth. Possibly due to a period of poor nutrition.
Nd	Sq 22 1-3	*Ovis/Capra*	Left mandible fragment with P3 and P4	The alveolus for the P2 is partially closed. The tooth was probably lost earlier in the animal's life.
Nd	TS 59	*Bos taurus*	Mandible tooth row fragment	Severe abscessing is visible on the lingual side of the mandible. The root cavities on the buccal side are partially closed up, whilst the root cavities on the lingual side have disappeared.
Nd	Gr 4 - 2 A Dung	*Bos taurus*	Left lower I1	The specimen has a clearly visible wear groove. One of many in the sample.
Nd	TS 18 3	*Bos taurus*	Proximal metacarpal fragment including part of proximal shaft.	The remnant of the 4th metacarpal is fused to the proximal shaft. There are also stress marks and ossified cartilage visible. The animal was aged, possibly a castrated male, that was probably used as a trek animal.

Plate 1. KwaGandaganda: relative position of the site in relation to the Mngeni River (Photo: Gavin Whitelaw)

Plate 2. KwaGandaganda: examples of bone fragments with different types of damage. From the top, left to right: carnivore damage, digestive damage, possible insect damage, rodent gnawmarks and cutting and chopping damage (Scale in centimetres) (Photo: Wulf Haacke)

Plate 3. KwaGandaganda: examples of complete bone points and/or linkshafts (Scale in centimetres) (Photo: Wulf Haacke)

Plate 4. KwaGandaganda: possible diviner bones. Top row, left to right: heavily abraded, polished astragalus; flat decorated bone fragment, sides polished. Bottom: four polished astragali, right hand specimen also with digestive damage (Scale in centimetres) (Photo: Wulf Haacke)

Plate 5. KwaGandaganda: ostrich eggshell beads (Scale in centimetres) (Photo: Wulf Haacke)

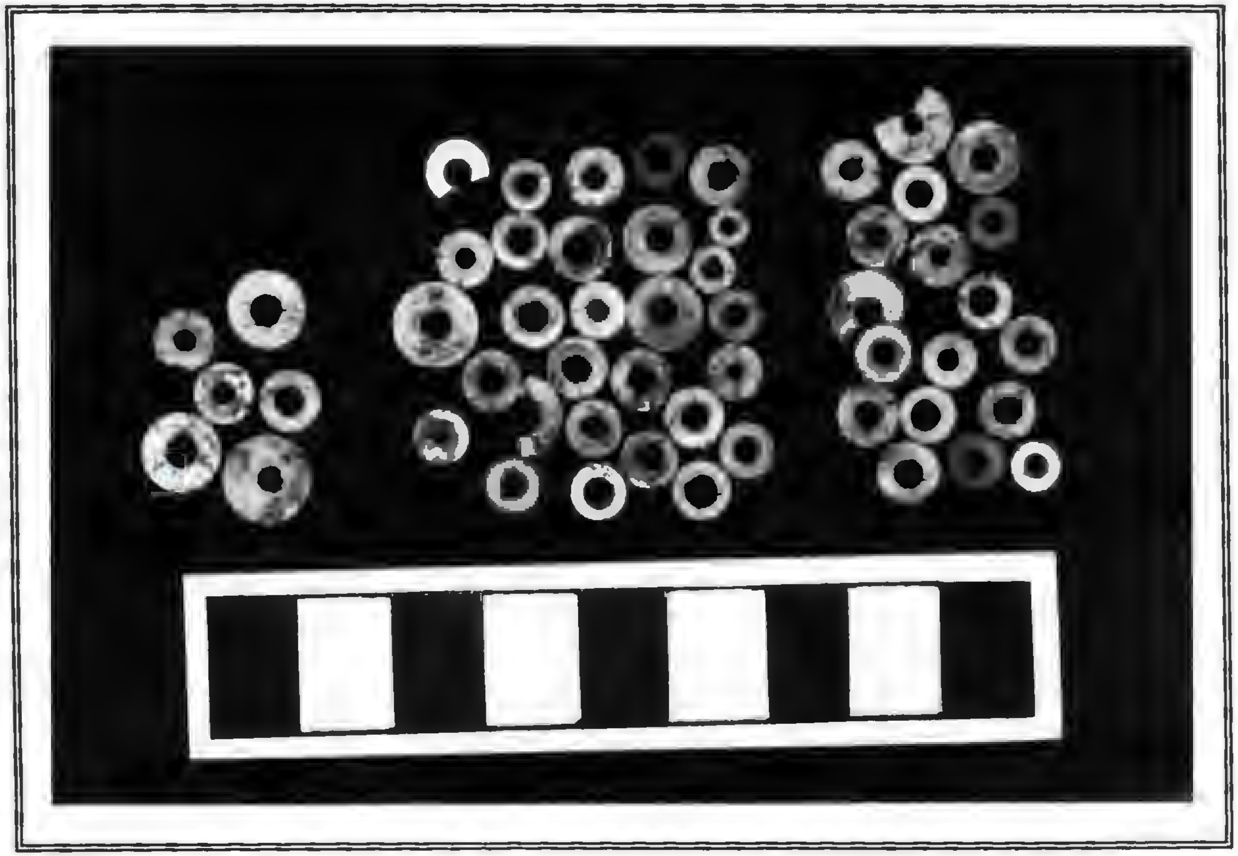


Plate 6. KwaGandaganda: mollusc shell beads (Scale in centimetres) (Photo: Wulf Haacke)

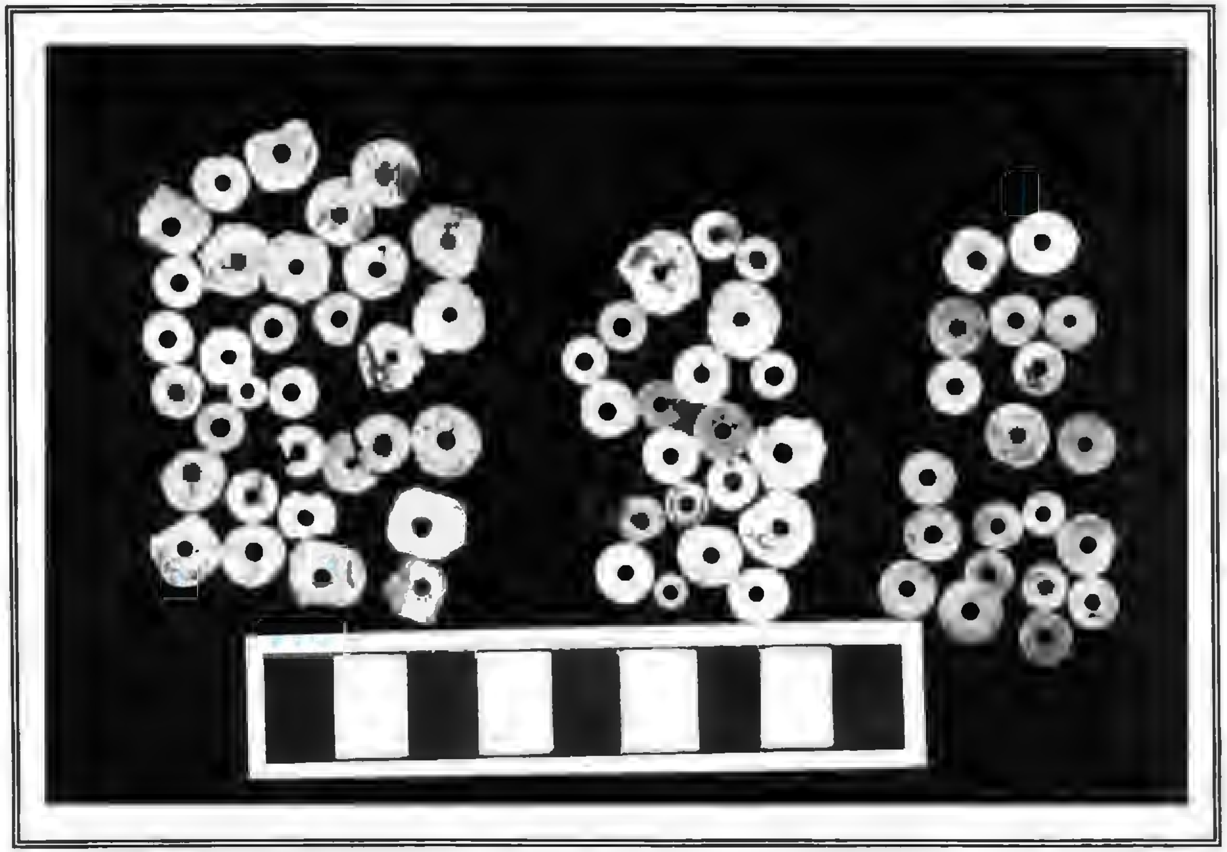


Plate 7. KwaGandaganda: complete ivory tusk *in situ*, Square 22, Ndondondwane phase (Scale in centimetres) (photo: Gavin Whitelaw)

Plate 8. KwaGandaganda: ivory fragments from Square 25, Msuluzi phase (Scale in centimetres) (Photo: Wulf Haacke)

Plate 9. KwaGandaganda: ***Bos taurus*** **right proximal metacarpal fragment with exostosis and fusion with MC V (top), compared to normal** ***Bos taurus*** **metacarpal from the Transvaal Museum, Archaeozoology Department, comparative specimen number AZ/1 (bottom)** (Scale in centimetres) (Photo: Wulf Haacke)

Plate 10. KwaGandaganda: examples of phalanges with exostosis compared to modern specimens. Top row, from left to right: *Bos taurus*, half 1st phalanx; *Bos taurus*, proximal 1st phalanx. Bottom row, from left to right: *Ovis aries*, 1st phalanx; *Bos taurus*, half 2nd phalanx; *Bos taurus*, half 1st phalanx. Specimens on the left are comparative specimens from the Transvaal Museum, Archaeozoology Department, comparative collection (Scale in centimetres) (Photo: Wulf Haacke)

Plate 11. KwaGandaganda: examples of *Bos taurus* teeth with constricted bodies and interrupted enamel patterns suggesting interrupted growth. The object on the right is a *Bos taurus* mandible tooth row fragment with severe abscessing on the lingual side (Scale in centimetres) (Photo: Wulf Haacke)

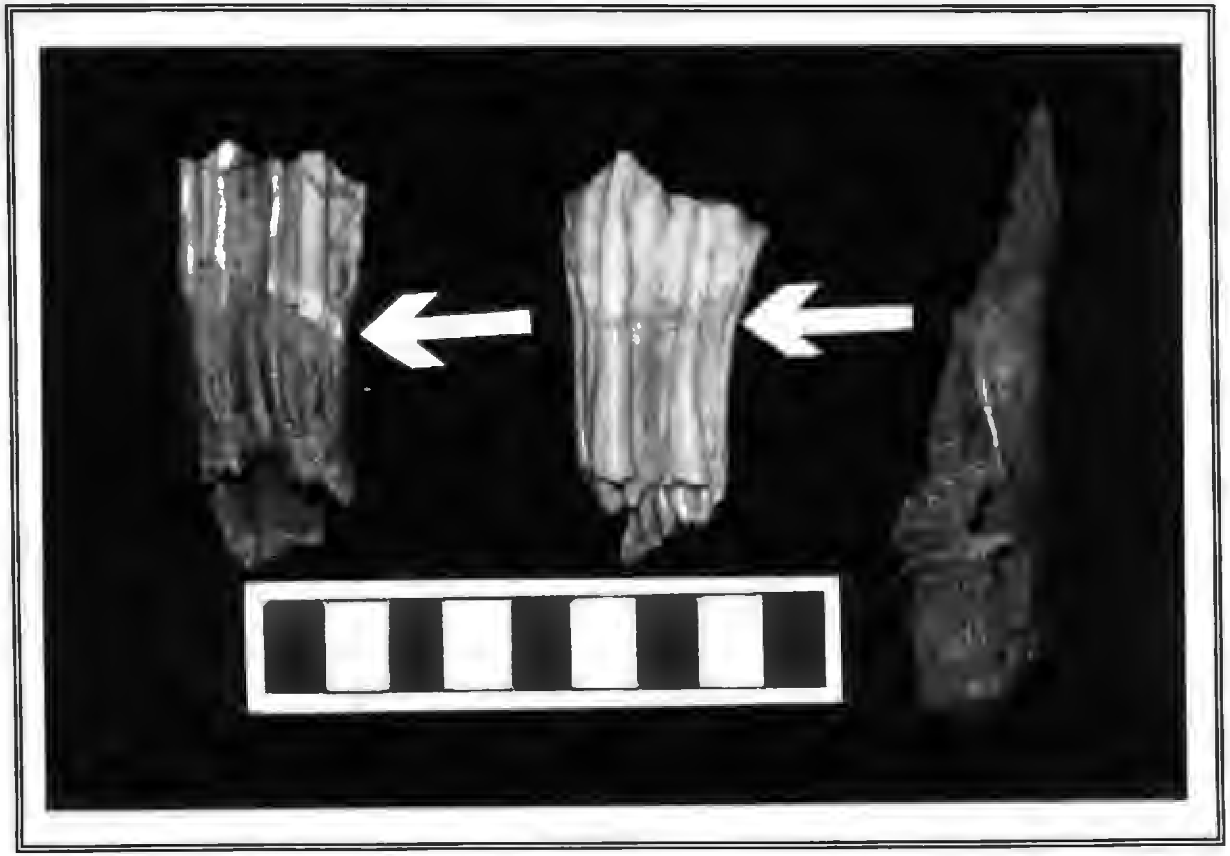


Plate 12. KwaGandaganda: size comparison between various bones from *Bos taurus* and a modern *Bos taurus* specimen. Top **row, from left to right: radial carpal; 2nd and 3rd carpal. Middle row, from left to right: 1st phalanx; 3rd phalanx. Bottom row, from left to right: ulnar carpal; astragalus. Specimens on the left are comparative specimens from the Transvaal Museum, Archaeozoology Department, comparative collection**(Scale in centimetres) (Photo: Wulf Haacke)

Plate 13. KwaGandaganda: comparison between *Bos taurus* skull fragment from KwaGandaganda (top) and the Transvaal Museum, Archaeozoology Department, comparative specimen number AZ/1 (bottom) (Scale in centimetres) (Photo: Wulf Haacke)

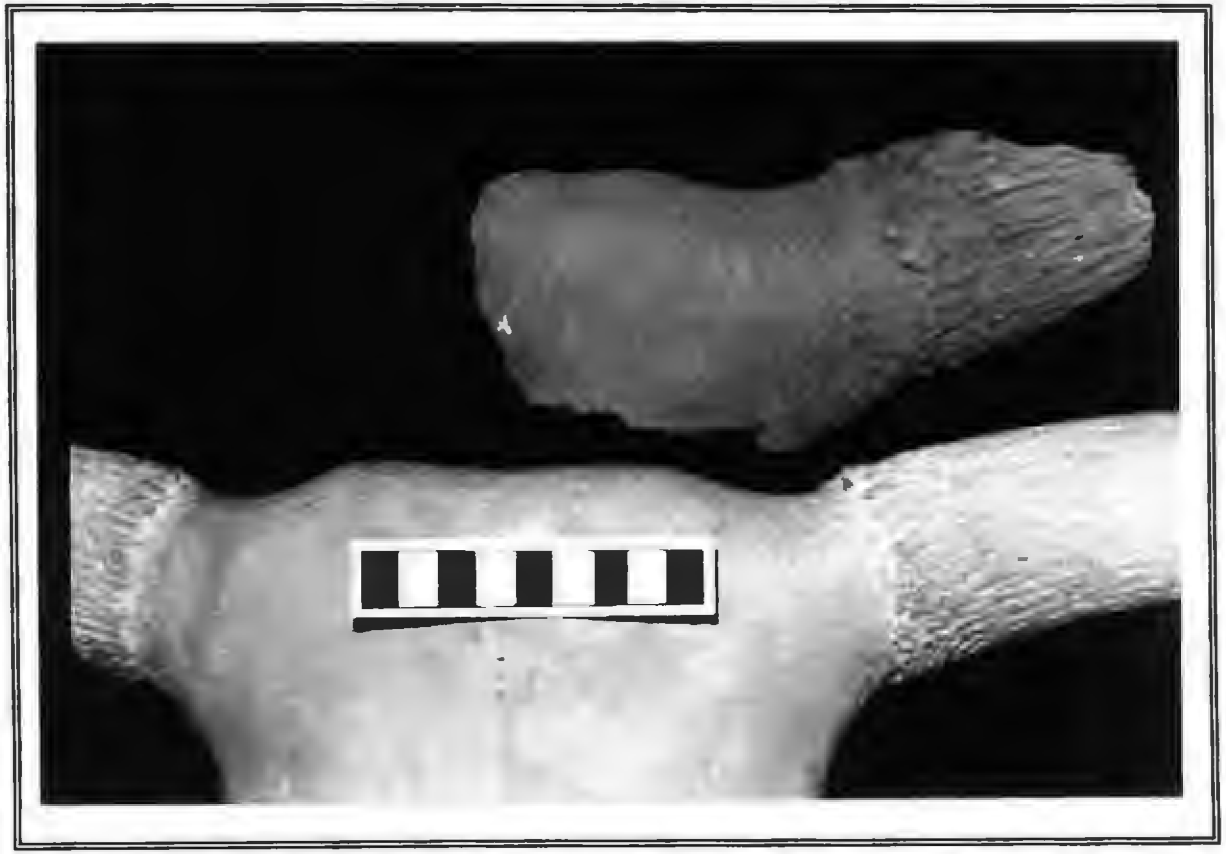


Plate 14. KwaGandaganda: worked bones fragments. Top: example of modern bone whistle. Bottom, from left to right: bone bead fragment with decorative motifs; longbone shaft fragment with decorative motifs; *Canis familiaris* distal tibia, remnant of groove and snap method; longbone shaft fragment, example of groove and snap method (Scale in centimetres) (Photo: Wulf Haacke)

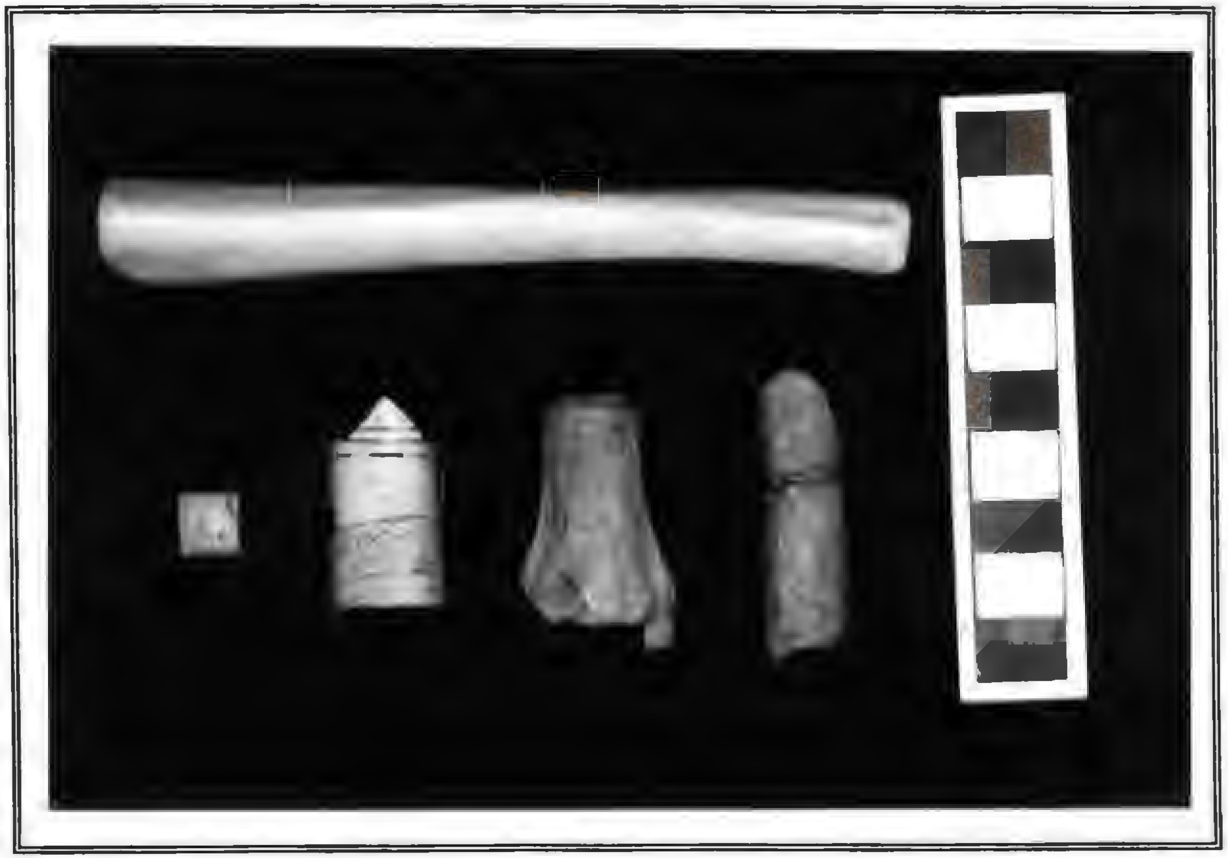


Plate 15. KwaGandaganda: possible sweat scraper identified by Whitelaw (1994b). Could also have been used to lift *Patella* sp. from the rocks (Scale in centimetres) (Photo: Wulf Haacke)

Plate 16. KwaGandaganda: canine teeth pendants. Top row and left specimen of bottom row: pierced canine teeth of several carnivore species. Bottom, middle: bone replica of canine tooth. Bottom, right: ivory replica of canine tooth (Scale in centimetres) (Photo: Wulf Haacke)

PLATES

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APPENDICES

APPENDICES

Appendix 1a. KwaGandaganda: number of identifiable skeletal parts of fish species in Square 25, identified by C. Poggenpoel for the Natal Museum (copied from Whitelaw 1994b:44)

Tachysurus feliceps	catfish	2
Barbus natalensis	scaly	2
Cymatoceps nasutus	black mussel cracker	1
Mugil cephalus	flathead mullet	3
Pomadasys commersonii	spotted grunter	9
Coracinus capensis	galjoen	1
Rhabdosargus sp.	Natal stumpnose?	1
Sparadon durbanensis	white mussel cracker	1
Diplodus trifasciatus	zebra fish	2
Diplodus sargus	dassie	1

Appendix 1b. KwaGandaganda: mass of fish remains per unit excavated

Provenance	**Weight (g)**
Square 25	808.9
Test square 6	0.4
Test square 51	9.3
Test square 73	6.4
Grid 3	2.2
Grid 4	15.3
Grid 6	5.2
Trench 2	2.4
SVP 32	2.3
SVP 28	2.4
SVP 36	8.2
SVP 37	4.0
SVP 41	1.8
SVP 49	3.3
SVP 80/81	10.1
SVP 87	3.3
SVP 104	3.2
SVP 111	6.1
SVP 129	6.4
SVP 132	1.6
SVP 134	4.3
SVP 135	8.4
Total	**915.5**

Appendix 2a. KwaGandaganda: species and number of shells and shell fragments of marine and freshwater molluscs per phase. The numbers of worked shells are indicated in brackets (Whitelaw 1994b:44) (Ms: Msuluzi; Nd: Ndondondwane; Nt: Ntshekane)

Species	**Ms**	**Nd**	**Nt**
MARINE			
Amalda contusa	1	0	0
Bufonaria crumenoides	0	1 (1)	0
Bullia natalensis	1	0	0
Cypraea sp.	8 (1)	1	0
Cypraea annulus	66 (60)	3 (3)	1 (1)
Cypraea arabica	3 (3)	0	0
Fissurella natalensis	2	1	0
Glycymeris queketti	4 (1)	1	0
Haliotis spadicea	2	0	0
Haliotis midae	1	0	0
Loripes clausus	1	0	0
Monodonta australis	1	0	0
Nassarius arcularius plicatus	3 (1)	0	0
Nassarius kraussianus	32 (25)	1	0
Nerita textilis	1	0	0
Oliva caroliniana	1 (1)	1 (1)	0
Ostrea sp.	5	0	0
Oxystele tabularis	2	0	0
Patella miniata sanguinans	0	2	0
Perna perna	168	20	9 (2)
Pinctada capensis	1 (1)	0	0
Polinices didyma	4 (4)	0	0
Polinices tumidus	13 (10)	7 (3)	0
Strombus decorus	1	0	0
Thais capensis	0	1	0
Tivela sp.	4	0	0

Appendix 2a. Continued

Species	**Ms**	**Nd**	**Nt**
Tivela natalensis	4	0	1
Turbo cidaris natalensis	0	1	0
Turbo sp.	3	1	0
FRESHWATER			
Unio caffer	5	0	0
Total	**337 (107)**	**41 (8)**	**11 (3)**

Appendix 2b. KwaGandaganda: mass of shells and shell fragments of marine and freshwater molluscs per unit excavated

Provenance	Mass (g)
Square 3 Ext	1.6
Square 14	1.3
Square 17	46.6
Square 22b	59.8
Square 25	2357.2
Test Square 3	18.4
Test Square 6	37.5
Test Square 19	0.5
Test Square 21	2.1
Test Square 22	3.3
Test Square 51	140.6
Test Square 73	3.0
Trench 1	12.1
Trench 2	160.1
Trench 3	1.9
Trench 5	65.0
Grid 1	65.9
Grid 2	394.2
Grid 3	56.6
Grid 4	217.1
Grid 6	12.0
SVP 25	41.6
SVP 28	39.4
SVP 32	6.9
SVP 36	13.2
SVP 37	61.9
SVP 39	15.6
SVP 40	3.7

Appendix 2b. Continued

Provenance	Mass (g)
SVP 41	40.9
SVP 49	11.0
SVP 57	3.2
SVP 62	4.5
SVP 80/81	107.2
SVP 83	7.7
SVP 85	7.2
SVP 87	130.7
SVP 104	42.9
SVP 111	9.3
SVP 115	5.4
SVP 118	20.5
SVP 119	1.7
SVP 129	39.4
SVP 132	61.9
SVP 134	47.2
SVP 135	4.7
Total	**4384.5**

Appendix 3. KwaGandaganda: mass of microfauna per unit excavated

Provenance	**Mass (g)**
Square 25	91.8
Grid 2	9.5
Grid 3	0.4
Grid 4	2.0
Trench 1	0.3
Trench 2	1.2
Trench 5	0.5
Test square 6	2.5
Test square 19	0.6
Test square 51	1.8
Total	**110.6**

Appendix 4. List of abbreviations used in the text, plates, figures and tables

B	-	brown
CDB	-	coarse dung brown
CGB	-	coarse greybrown soil
D	-	dung
DA	-	dark ash
Ext	-	extension
GA	-	grey ash
GAL	-	grey ash lens
Gr	-	grid
IF	-	interface between one layer and the next
JCB	-	refers to loose soil on the exposed surface after a JCB mechanical excavator was used to remove overlying archaeologically sterile topsoil
LB	-	light brown
PB	-	pale brown
R	-	red
RA	-	red ash
RC	-	red crust
SD	-	slag dump
Sq	-	square
SVP	-	survey point
Tr	-	trench
TS	-	test square
: followed by a number	-	spit number