Mapungubwe

AN ARCHAEOZOOLOGICAL INTERPRETATION OF AN IRON AGE COMMUNITY

E. A. VOIGT

TRANSVAAL MUSEUM, PRETORIA

7 Evidence for Crafts and Trade

In many areas stone-using prehistoric and modern men have achieved a high level of artistic expression. With the advent of agriculture it was possible for a craftsman to develop his abilities to the full, for the production of an assured supply of food allowed the development of specialised craftsmen within a community. The people of Mapungubwe utilised refined techniques in the manufacture and decoration of their pottery. They showed a similar mastery of two other basic media: bone and ivory.

THE WORKING OF BONE

The large quantity of worked bone present in the Mapungubwe assemblage is described in Chapter 10. The majority of the specimens are tools which conform to a set pattern and have been polished and carefully finished over their entire surface.

Cooke and Robinson (1954) described how they believed the Amadzimba bone tools to have been made. The most likely method of manufacture was to split a long-bone, to shape the piece roughly by filing and also chipping (with a metal instrument), and then to grind and polish the piece until it is smoothed over its entire surface. As at Amadzimba, those Mapungubwe tools on which the striations could be seen carried oblique striations, suggesting that they were smoothed by rotating them in a grooved stone rather than by rubbing them back and forth. However, such striations are much less common at Mapungubwe than at Amadzimba, and it seems that the smooth finish must have been obtained by further polishing, possibly by using a piece of wet leather. At Mapungubwe the stages of splinter, 'chiselling' into shape and polishing are all in evidence, especially in the hoard of tools from K2. When completed, the majority of the formal tools retained none of the external or internal characteristics of the bone used. The specimens found on K2 (in the 'hoard') showed that the required length was obtained by chopping and snapping the bone.

There is thus evidence for a highly developed level of craftsmanship in bone working at Mapungubwe. However, this 'craft' is very limited in spatial distribution. Approximately two-thirds of the formal tools were found on the Hill, and most of them came from the top metre of deposit, i.e. A. Meyer's Phase 4 (Tables 10.1 and 10.2). However, similar tool types came from the top metre of K2, i.e. the very upper portion of Phase 2. Although the pottery suggests that these upper levels of Phase 2 are distinct from those of Phase 4, the bone tools suggest very strongly that the people responsible for the upper levels at K2 were the same people present in the upper levels of Mapungubwe Hill. The other interesting aspect of bone working at Mapungubwe is the sheer quantity of finely finished products produced. It is difficult to visualise a group being able to utilise the amount of bone produced in what was probably a relatively short period of occupation. The evidence suggests that the bone tools were being made in sufficient quantities to produce a surplus, and that at Mapungubwe we have a group of skilled bone-working craftsmen who were manufacturing well-finished tools for trade.

IVORY

Just as the bone tools at Mapungubwe indicate a high level of craftsmanship in bone, the finished ivory products suggest a similar level of competence in ivory.

There is excellent evidence that ivory was brought to K2 as a raw material. The major part of a tusk was found during the excavation of 'Ruitnet 2' (Grid 2) on K2. The tusk was extensively damaged by fire; crumbling fragments of burnt earth in immediate proximity to the tusk suggest that it was buried in the rubble of a burnt hut. It is difficult to understand why no attempt was made to rescue such a large piece of a valuable commodity. One can only assume that the settlement was deserted at the time of the destruction of the hut, or that the owner was in no position to return for the tusk, e.g. a dead man's hut being burnt down and the contents left untouched.

The solid tip of a tusk was found by Gardner (1963) (W/293) at the 'four foot' level at K2, and a 12–13 cm portion of a tusk was found in K2/TS3/Level 4 (T3/1561) by the University of Pretoria. This latter specimen has the remains of the nerve cavity, the size of which suggests that it may have come from a juvenile. The tusk is cut cleanly through at both ends, and the entire outer surface is covered with shallow chisel marks. In addition, a portion of the same tusk was also found which consisted of a thin sliver of ivory, cut cleanly through both faces.

These specimens provide good evidence of how the ivory was worked at K2. The tusk was apparently sawn through with a metal instrument. Multiple striations are visible on the ends of TS3/1561 and several of the slivers of ivory; they run in from the edge at various angles, and do not pass right across the edge. These slivers and the tusk have such a flat, clean surface that it seems likely that they were removed with a sawing action. If they were cut or chopped through, then the ends have subsequently been filed down with a flat, fine file. This method would also produce the type of striations visible on the tusk fragments. However, it is unlikely that chopping or cutting could produce the regular surfaces seen on these specimens (Plate 7.1). An alternative system would be to use a piece of wire with an abrasive.

T3/1561 is covered with shallow chisel marks, suggesting that the ivory was initially trimmed to the required thickness and shape (Plate 7.2). This process would result in the type of ivory chip or flake which is so common on K2 (see Chapter 10, Table 10.3). The edges of the ivory were regularised by cutting slivers off the ends of the piece being worked; several such slivers have been found. The ivory was then polished smooth, and the edges ground smooth to form a flat or bevelled edge. The polish on the ivory objects is so fine and smooth that a very fine material, such as leather (possibly wet) must have been used to obtain the final surface.

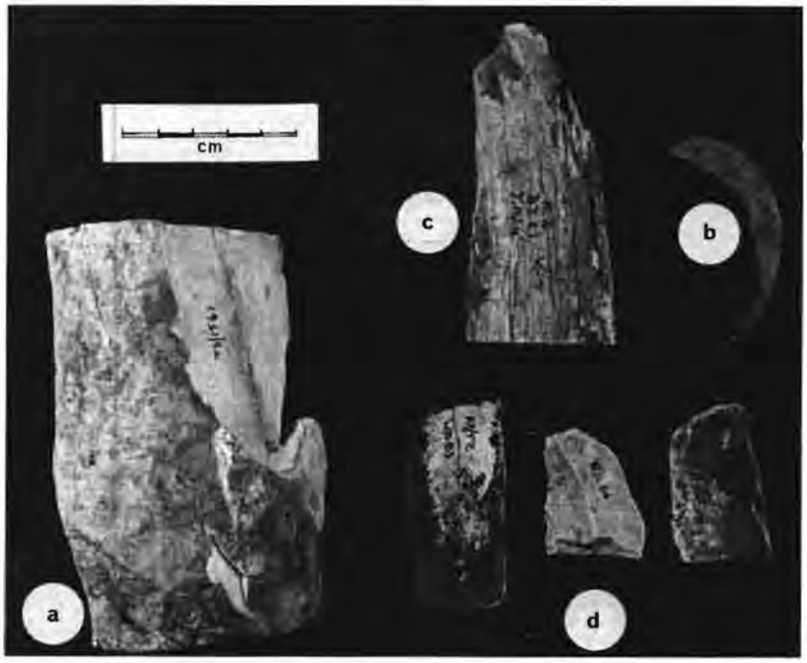

PLATE 7.1. Stages in manufacture of ivory objects at K2. (a) Worked piece of tusk T3/1561, (b) sliver of sawn off tusk, (c) solid tip of tusk, (d) ivory chips or fragments. Photograph: C. K. Brain.

PLATE 7.2. Manufacture of ivory objects. Detail of T3/1561 (Plate 7.1) showing striations from sawing and chisel/chop marks. Photograph: C. K. Brain.

I do not know whether it is possible to split fresh ivory along the line of the tusk; certainly the Mapungubwe specimens today are splitting into laminae. If it were possible to split fresh ivory, this would greatly facilitate the making of ivory armbands, since the ivory could be split into 'plates' of the desired thickness before being smoothed off. This would also facilitate producing the correct size central bore.

The ivory was therefore treated in a similar way to the bone; of particular interest is the method of chipping off flakes to reduce the outer surface. The inner surfaces of the armbands are completely smooth, so that all working scars have been polished away, probably from wear. When the edge of the armband is a flat surface, the polish on the edges is so fine that it is almost as smooth as glass. Bigalke (1966: 7) describes how the Cape Nguni manufacture armbands by hollowing out and smoothing off the tusk.

The form of the ivory armbands is remarkably consistent. This does suggest that the working of ivory to produce armbands might have been a highly specialised craft which was limited to a small group of craftsmen.

The perforations drilled into several of the armbands to effect repairs or strengthening were made with a very fine instrument. It seems likely that a fine 'drill' or awl of metal was used to make these perforations, and could have been part of the tool kit of an ivory worker. Other elements of such a kit would include a tool suitable for sawing through the tusk, fine files for filing down, small bladed adzes for chipping the initial shape of the object, and leather or some other suitable polishing material. All the ivory armbands and the ivory waste were found on K2, suggesting that this specific class of craftsmen lived, worked and distributed his fine finished products only at K2.

The most reliable form of evidence for trade would be the discovery of exotic articles in an archaeological context. At Mapungubwe the presence of cowries *(Cypraea annulus), Polynices tumidus* and the two small marine shells *Nassarius kraussianus* and *Natica* sp. indicate some form of contact with the coast. We know from the combined evidence of Arab documents and glass beads that Arab trade existed on the East Coast by 1000 A.D. (Huffman, 1972). The marine mollusc species present are all found on the East Coast from Durban to Mozambique. Although neither Arabs nor direct trade with the coast need necessarily be involved in the movement of objects from the coast inland, the possibility of this type of contact cannot be ruled out. It would be possible for items such as shells to be handed from group to group in a chain of bartering activities, so that coastal items could move far from the coast without any formalised trading system being in existence.

Large quantities of ivory were being handled at K2. We know that, apart from gold, ivory was one of the strongest motives for the development of Arab trade with the interior. The people at K2 were bringing in raw ivory and were utilising it as a raw material. They were also in possession of a large number of marine shells originating on the coast. The dating of K2 coincides with early Arab dates on the coast. Although it would be very difficult to prove, I suggest that, since the K2 people were involved in obtaining and working ivory in large quantities, there is a strong possibility that they were also involved in an outgoing trade in ivory. K2 might have been a centre for the collection of ivory which eventually found its way to the East Coast, with cowries, glass beads and possibly other trade items travelling in the reverse direction. The history of the ivory trade has been pushed back a further hundred years to 850 A.D. by the identification of worked ivory and ivory objects associated with glass beads and cowries on the Zhizo site of Schroda (Voigt and Plug, 1981).

The presence of gold on Mapungubwe Hill, as well as the pottery traditions, has linked the Mapungubwe and Great Zimbabwe complexes. It is very likely that the size and social status of K2 could have developed as a result of involvement in the ivory trade. Later trade contacts through Zimbabwe could have resulted in gold reaching Mapungubwe during the last phase of occupation. The basis for this contact could still have been ivory, since it occurs throughout the K2 sequence, including the uppermost levels with the high yield of bone tools.

The bone tools themselves raise another possibility of trade from Mapungubwe. Finely finished bone tools were produced, and the quantities involved suggest a regular manufacturing pattern in excess of the local needs (as at Amadzimba and the 'Main Cave' on the Robberg Peninsula, Cape Province). The evidence suggests the possibility of a trade in formalised bone tools which were being produced at Mapungubwe. The sizes of some of the 'hoards' of bone tools found suggest individual ownership far in excess of individual requirements, strengthening the idea that specialists were producing a commodity for bartering within, and outside, the Mapungubwe community. It remains an open question as to who was responsible for making so many bone tools—were they Bantu-speaking or Khoisan craftsmen? The evidence from Mapungubwe indicates that the people of Mapungubwe (or K2 in particular) were able to support specialised craftsmen, and that the high density and apparent wealth of the settlement may well have depended on trade in that most precious commodity, ivory.

8 Damage to Bone by Man and Animals

Damage to the assemblage by Man embraces butchering, burning and damage from hunting weapons, while damage by animals includes damage by rodents and dogs.

PATTERN OF BUTCHERING

Throughout the foregoing chapters it has been stated that the bone accumulation at Mapungubwe resulted from the butchering of animals by the inhabitants for food. Apart from the direct association of bones and habitation areas, proof of this origin lies in the consistent occurrence of butchering marks on bones.

Four types of butchering marks were identified during the analysis:

1. *Cut marks*. Cut marks are V-shaped gashes occurring on the bone. They may be merely superficial or relatively deep. These marks indicate the use of a sharp metal instrument, and are probably mainly the result of cutting meat off the bone. Characteristic cut marks appear, for instance, in sets of parallel, oblique lines across ribs.

2. *Clean cuts*. In many cases bones preserved flat, clean-cut faces. These were the result of portions of the bones being cut away. In fact, such damage is almost certainly the result of a clean, chopping action which has neatly removed a piece of bone. It is most noticeable on epiphyses, but also appears on limb-bones and phalanx shafts.

3. *Chopping damage*. Chopping damage differs from cut marks in that a piece of bone has literally been 'chipped out' with a chopping action. The result is a relatively deep, asymmetrical, V-shaped gash.

4. *'Chisel' marks*. These marks cannot be satisfactorily explained. They are shallow depressions, often occurring in clusters. Examined closely, the depressions have a series of fine lines running parallel to the direction of the 'stroke'. Initially, it was thought that this kind of damage could have been caused by porcupines, but it does not show any of the characteristics of porcupine gnawing, e.g. matched pairs of marks such as you would expect from porcupine teeth. This kind of damage therefore appears to be the result of a chiselling action and is possibly the result of scraping meat off so close to the bone that the bone itself was slightly scraped.

All of the above types of damage were probably the result of using metal tools in the butchering process (Plate 8.1).

PLATE 8.1. Butchering damage. Top left: two specimens with deep cut marks. Top right: three specimens with cut marks. Centre top: scapula with deep chop and chisel marks. Bottom left: chopping damage. Bottom centre and right: two specimens cut cleanly through. Photograph: C. K. Brain.

There is a sufficiently consistent pattern of damage to the bones to be able to reconstruct some of the stages of butchering. It is likely that sheep and goats were dismembered in the same way as cattle. The most detailed evidence for butchering is found on the cattle bones.

It is likely that in most cases the animal was first stunned and then killed by cutting its throat. However, some *B. taurus* frontals carry evidence of violent disposal in the form of deep chop marks. The nature of these long chop marks suggests the use of a metal axe for stunning or killing the animal. The well-preserved Sanga-type frontal G/4873 (Plate 6.22) is criss-crossed with a series of 17 chop marks, suggesting repeated blows of an axe.

It is very likely that the blood of the dead animal would have been utilised. The head was severed, probably with the atlas and axis vertebrae attached, and the animal eviscerated and skinned.

In processing the head, the horns were chopped off the skull close to the pedicle, the premaxilla was chopped off at or close to the nasion, and the back of the skull chopped away to extract the brain. This pattern of destruction has been interpreted as preparation of the skull for boiling up in a vessel (L. Binford, personal communication). Very few complete ascending rami were found; it seems likely that the mandibles were removed by being chopped free across the ramus. This would make the tongue accessible. However, cut and chop marks on the buccal surface of the mandible are common, so that it is not impossible that the tongue was reached by skinning the mandibles and approaching the tongue from below. Many of the cattle mandibles are split longitudinally. Yellen (1977*a:* 8) notes that the !Kung split the mandibles of large animals to reach the highly nutritious marrow. This would explain the splitting seen at Mapungubwe. Fagan *et al.* (1969: 89) noted the same phenomenon at Ingombe Ilede, Zambia. This pattern of breakage of the skull is similar to that cited by Welbourne (1975: 12).

The skin would probably have acted as a 'blanket' under the body during the butchering process. It is likely that the phalanges were sometimes severed just above the proximal end of the first phalanx and left in the skin, since articulating phalanges have been found, e.g. the *Ovis/Capra* specimens from MST/F4/2(iii) (Chapter 4). In addition, complete distal metapodials are very rare. The viscera were probably removed first, distributed, cleaned and eaten.

The carcass would probably then have been jointed, before the thorax was dismembered. Pelvic fragments are invariably broken into several pieces; the pelvis was probably severed along the symphysis, and possibly also across the acetabulum. Those proximal femur articulations which have survived are fragmentary, suggesting that the head of the femur might have been smashed during dismemberment. The glenoid fossa of scapulae are frequently complete, separation of the shoulder is relatively easy and would cause no damage to the articulation at this point. Most of the long-bone shafts were fragmented to obtain the marrow. Bov.II radius and tibia shafts with the epiphyses broken away occurred quite frequently suggesting that the shafts were not shattered for the marrow but that the marrow was extracted via the broken ends. Metapodials were, however, subjected to considerable fragmentation.

Many of the phalanges were split longitudinally to extract their marrow. Longitudinal splitting of first phalanges was common while second phalanges appear to have seldom been exposed to this kind of treatment. A similar pattern was recorded by Welbourne (1971: 122).

The frequent shallow cut marks on rib fragments suggest that the skin layer was stripped from the ribs during butchering or after cooking; occasionally, a series of rib fragments with cut marks was found (e.g. T3/4828 and 4829) which suggested that this was done while the rib cage was still intact. The ribs were cut off along the vertebral column as complete rib articulations are rare. The horizontal processes of the thoracic vertebrae and, in many cases, of the lumbar vertebrae, were cut away. It seems likely that the vertebral column was frequently stripped and discarded with sinew still holding the bones together. This is suggested by the discovery of articulating vertebrae, and articulating series of vertebrae found on the Southern Terrace (Plate 4.8). The vertebrae were, however, often broken up completely; one specimen was found which had a deep cut mark within the neural canal.

One curious feature of the assemblage was the low incidence of caudal vertebrae. One specimen was found (T3/4809, Bov.II) which had been cut cleanly in half, suggesting that the tails of the animals were sometimes cooked. However, the low incidence of this body part might suggest that the tail was left intact, and the bones discarded in areas where the skin itself was worked, or that the tail was cooked as a unit and then discarded. Cooked caudal vertebrae are friable and would easily disintegrate.

Butchering damage occurs on three bones from wild animals. An extremely large, broad rib, which probably belonged to a hippopotamus or elephant, was chopped through, then utilised in such a way as to produce a polished concave edge. T3/4826 is a portion of a hyaena sagittal crest with chopping damage along the break indicating that the cranium was broken open. MK/1277 is a fragment of a left-hand mandible of a hyaena with a single tooth still in place. The mandible was chopped through the P_4 alveolus; in addition chop marks can be clearly seen on the inner and outer surfaces of the mandible. This kind of damage could have occurred while the animal was being skinned, but it is unlikely that the animal would have been eaten. No postcranial hyaenid material was identified, so that it is very likely that only the skull and skin were brought back to the home site.

Quin (1959: 96–97) gives a detailed account of the pattern of butchering followed by the Pedi. The animal is killed early in the morning in the cattle kraal, using an assegai. It is bled, and the rest of the herd driven out of the kraal. The butchering pattern in brief is as follows:

1. The animal is flayed, including the tail. During this process the meat from the cheeks, which is regarded as a delicacy, is removed and thrown onto a

fire to be charred for eating. The tail is cut into various pieces, most of which are eaten during the butchering process.

2. The right leg is removed and taken to the traditional recipient. A piece of flesh is stripped from the right-hand ribs and 'awarded to the herds'.
3. The right shoulder is removed and distributed.
4. The animal is eviscerated and its entrails divided in various ways. No part is wasted, and little care is taken in cleaning intestines, etc. before grilling and eating.
5. After splitting the abdominal cavity and before emptying it, the right side is split vertically and the ribs behind the right shoulder dissected but not removed. After the animal has been eviscerated, this cut, which is known as the Chief's cut, is delivered to the chief via his representative.
6. The left leg is removed, then the left side split and the same cut as the Chief's cut is removed and given to the host.
7. The left shoulder is removed, the ribs are distributed among the women who made the beer for the feast.
8. The butcher is given a piece of groin; the brisket, kidneys and other viscera go to the women.
9. The vertebral column is split in two forward of the pelvis. The two portions are given to the women.
10. The neck goes to the host, the head is carried home by the guests. The hoofs are prepared for the men, and the hide spread in the sun.

Quin states that the butchering procedure follows a set pattern. The entire operation takes three hours, and is done at great speed, since no beer may be drunk during the procedure! He further comments on the fact that nothing of the carcass is wasted, and that even the dung is utilised in various ways (including as a source of food in years of famine). Sheep and goats are killed by having their throats cut, and there is no ceremony connected with their butchering.

Brain (1976*a*: 100) gives an account of the butchering of a goat among the Topnaar Hottentots. Most of the animal is utilised, and the skin is cured. The animal is eviscerated after killing and skinning; the fore- and hind-limbs are removed (with the pelvis being split along the pubic symphysis and sacro-iliac joints). The feet are severed above the first phalanx, and cooked by the children. Ribs are removed at the vertebral articulation, and the skull removed with the atlas and axis. The skull is always treated in the same way, i.e. the horns are broken off at their bases using an axe, then the skull is cooked, stripped of meat and broken open for the brain. All marrow-bearing bones are smashed to extract the marrow.

It is unlikely that a uniform system of butchering would exist over large areas or long periods of time. Quin's (1959) description is, however, useful as an indication of how a present-day group butchers cattle for food. It is noticeable that he makes no mention of damage to bones during the process; thus the fragmentation observed in the Mapungubwe assemblage could possibly be the result of cooking rather than butchering methods.

The evidence for butchering techniques lies with the bones themselves, and the distribution of this kind of damage is summarised in Figs 8.1–8.4.

Fig. 8.1 shows the percentage of the total sample of bones from twelve excavation units which showed butchering damage. The graph indicates a fairly constant incidence of damage in the total samples throughout the Mapungubwe sequence, from 10,7% to 4,5% of the sample with a mean of 7,4%. The distribution of butchering damage within the group of bovid postcranial remains presents a somewhat different picture (Fig. 8.2). The range is wider (12,9% to 39,5%). The values recorded for TS1 are very similar, except for Level 1. K8 Levels 2 and 13 are very similar, while TS2 Level 1 is most similar to MK1/2 and MK1/6. MK1/2, 6 and 9 are close, but MK1/11 is closer to the TS1 values than the other MK1 values. Fig. 8.2 therefore shows that, whereas the incidence of butchering damage is similar throughout the twelve units, the actual proportions within the bovid skeletal parts group vary markedly.

The analysis of the pattern of butchering marks on bovid skeletal parts provided the basis for the reconstruction of the butchering pattern. In all cases, the largest number of specimens showing butchering marks were vertebral and rib fragments. In both TS1 and TS2, skull and metapodial fragments were the next most numerous groups, with the limb bones represented by far smaller numbers (Fig. 8.3). The MK1 pattern is different. The results from the three phases at MK1 were examined separately, but were found to follow the same broad pattern as that of the combined levels (Fig. 8.4). There is a similar proportion of the same limb bones showing damage, and there is less of a difference between the proportions of the vertebrae, rib and meta-

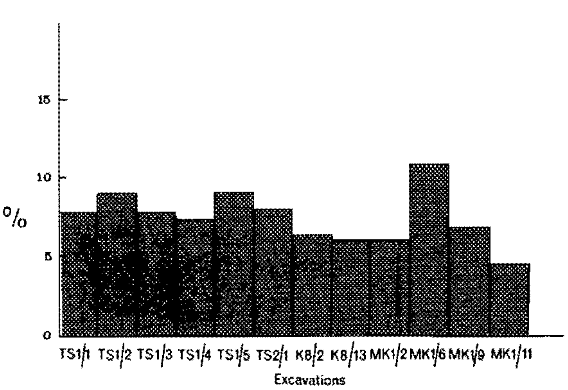

FIG. 8.1. Percentage of total sample of bone from twelve excavation units which show butchering damage.

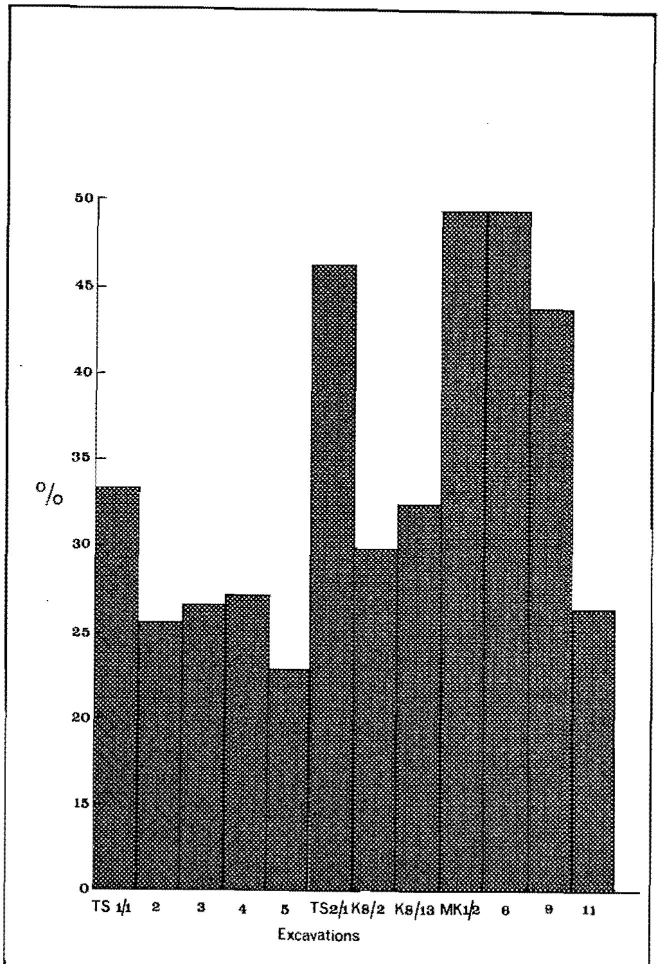

FIG. 8.2. Percentage of bovid skeletal parts from twelve excavation units which show butchering damage.

podial groups than there is in the TS1 and TS2 samples.

Therefore, although the overall distribution pattern of butchering marks is fairly consistent throughout Mapungubwe, the separate units of the excavation show varying proportions of damage between different parts of the bovid skeletons.

Limited evidence of butchering patterns is available in the literature. Fagan (1967: 62) records distinct butchering damage at Isamu Pati, Zambia, where many bones carry cut marks from iron knives and indications of splitting with iron axes. He suggests that some of the animals may have been slaughtered away from the area excavated, since it appears that there is a discrepancy in body part preservation. This is discussed in more detail in Chapter 9. Unfortunately, he does not distinguish between wild and domestic bovids in his analysis of butchering techniques. However, the butchering pattern suggested is virtually identical to that observed at Mapungubwe.

Evidence for butchering patterns among hunter-gatherers is available from Yellen (1977*a*), who provides some information on !Kung butchering practices. The occupants of one camp, 'Camp 2', killed a steenbok and a young adult male gemsbok. The steenbok was carried back whole to the camp and eaten. The gemsbok was skinned and butchered in the field. The liver, some ribs, the metacarpals and the head were eaten by the hunters at the kill site; the meat was carried back to the camp in two trips. The skin was roasted at the kill site, and collected on a third trip when it was carried back to the camp and eaten (this was an early winter camp, when water was limited). At 'Camp 3', a young duiker and a steenbok were brought back intact to camp. An adult duiker was skinned at the kill site and the marrow extracted from the bones before the rest of the animal was carried back for sharing. The gemsbok killed by the occupants of 'Camp 6' was skinned at the kill site, where the liver and some ribs were eaten by the hunters, who also cracked one tibia and all four metapodials for marrow. The rest of the animal, except for one horn, part of the backbone and the cracked bones, was carried back to camp. A similar pattern was observed at another camp when two gemsbok were killed.

The above information suggests that little of a large kill is eaten at a kill site, and much of the skeleton is carried back to the home site. In the case of small antelope the entire skeleton is carried back. A comment on the resulting body part preservation is given in Chapter 9.

Yellen (1977*a*) also mentions two cases of groups obtaining meat by scavenging from carnivore kills. This method of obtaining meat could well have been indulged in by the occupants of Mapungubwe.

An interesting contrast in butchering technique is available from the mass hunting activities of American Plains Indians. A number of communal kill sites have been excavated which show the pattern of meat usage followed, for instance the Olsen-Chubbuck site in Colorado described by Wheat (1967). Such sites allow the reconstruction of the entire hunting event, from the drive of the animals to the sequence of butchering. Wheat calculated a meat yield of about 550–400 pounds (approximately 250–200 kg) of meat from an adult bison; from this premise he was able to calculate the total meat yield from the hunt and the load of meat which would have to be carried back to the permanent camp.

Such detailed evidence is not easy to acquire but, when found, yields invaluable information on prehistoric butchering techniques. Hill (1979) notes that disarticulation patterns resulting from butchering vary very little from the natural pattern of disarticulation of a dead specimen in the wild. Butchering techniques therefore tend to utilise natural weaknesses in the skeleton, the only exception being the tendency to separate the atlas and axis in association with the skull.

BURNT BONE

During an excavation it is common to find that some of the bones retrieved are either dark brown, black, grey or white. This characteristic is generally assumed to be the result of burning. Bone which has had a relatively

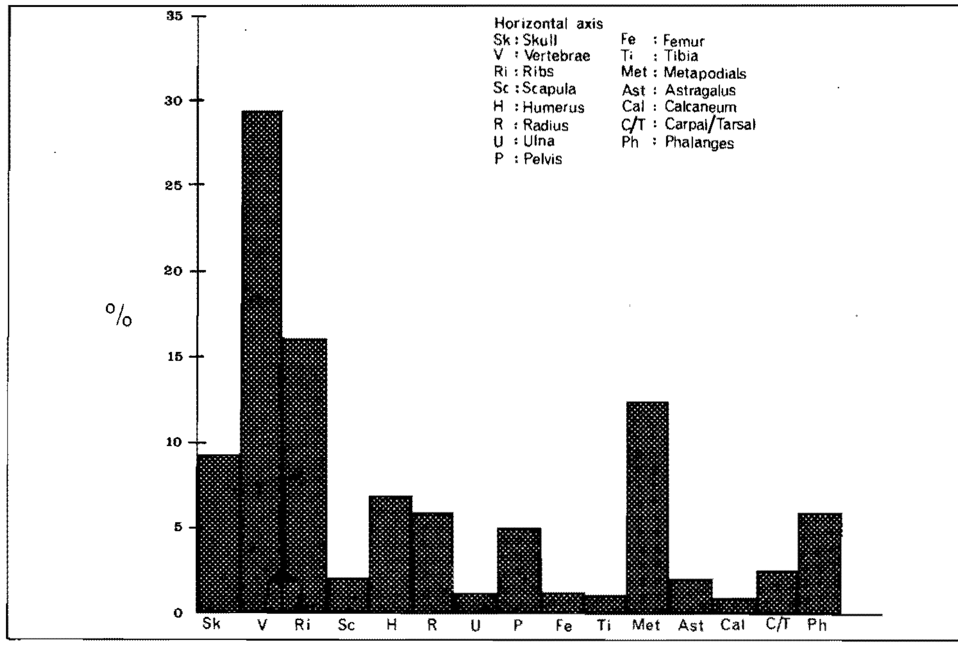

FIG. 8.3. Distribution of butchering damage on bovid skeletal parts from K2/TS2/1.

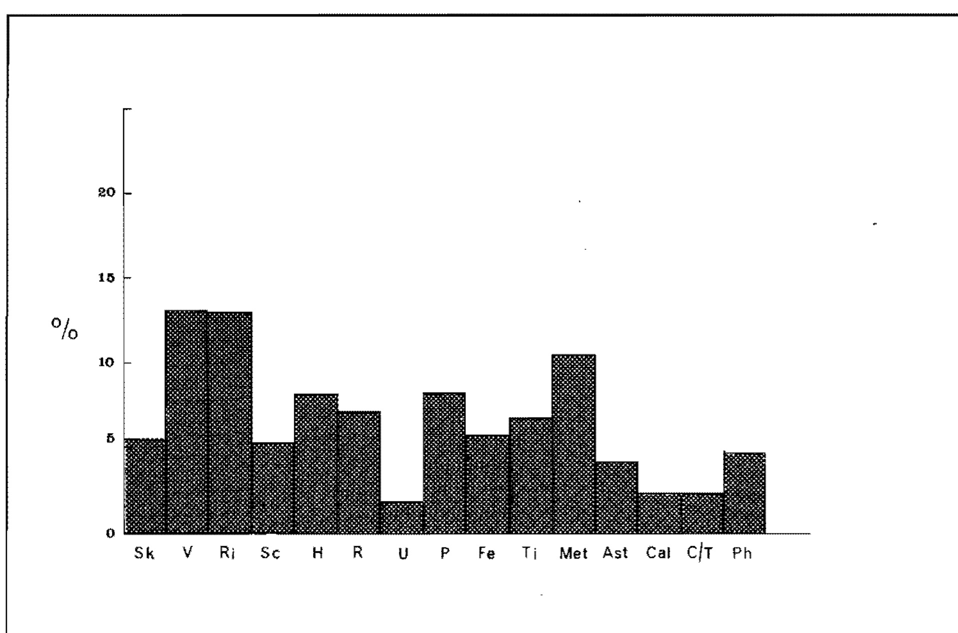

FIG. 8.4. Distribution of butchering damage on bovid skeletal parts from MK1. See Fig. 8.3 for explanation of horizontal axis.

short contact with fire develops varying shades of brown; with increasing heat intensity the bone blackens, then eventually goes grey and, finally, white. At this point the bone starts to disintegrate. Grey and white bones are extremely brittle, although in the final stages of calcining the bone becomes 'chalky' to the touch.

How does this burning occur? No controlled experiments have been done on this aspect of bone preservation. Brothwell (1965: 18) suggests that bones which have a deep black surface may have been burnt with the meat still adhering. Coy (1975: 427–428), on the other hand, suggests that bones which have a hard, non-porous surface and are slightly translucent and whitish, have come from body parts which have been roasted in the fire. She also makes the interesting suggestion that cut marks on bone suggest that the bone was cleaned of meat and then discarded, with the result that the bone did not come into contact with the fire. Certainly bones which are both burnt and damaged by butchering marks are rare at Mapungubwe. The colour changes are most likely to be the result of direct contact with a fire. Bone will burn or char slowly, so that one would expect that a bone tossed into a fire would be affected by the heat and change colour, the changes depending on the availability of oxygen. Long-term exposure to intense heat could be expected to result in grey or white bone fragments.

Contact with the fire would arise in the cooking and eating areas, where stripped bone might have been thrown into the fire as a system of waste disposal. However, some very large burnt bones were recovered from the deposits at Mapungubwe, for instance a left humerus and distal femur with unfused epiphyses of *B. taurus* from TS3/Level 21. These bones were burnt right through and were a deep brown and black; although the epiphyses were loose, they could be reunited with the shafts. It seems unlikely that two such large bones would be tossed casually into the cooking fire, and much more likely that they would be discarded on the midden outside the hut. If hot ash were regularly being thrown onto this midden one would suspect that a slow charring process would continue on the midden itself. Bones covered by hot ash would therefore gradually change colour and become brown or black. This is a field which could fruitfully be tested by experimentation.

What is the pattern of burning at the Mapungubwe sites?

Burnt bone occurred at least in small quantities in all the excavated samples. In many cases, concentrations of burnt bone were excavated as units. These concentrations may have been the remains of single 'dumps' of bone from a hut fire, i.e. the result of cleaning out a hearth. It was found that the pattern of burning in relation to bovid postcranial parts differed between units. The pattern of burning in the bone flake class broadly followed that of burning in the total sample. However, it is not advisable to use this category as an example of the frequency of burning, as the observable difference between units was much smaller than was the case when dealing with either the total sample or the proportion of burnt bovid postcranial remains.

Fig. 8.5 shows the percentage of burnt bone out of the total sample of bone from each of twelve excavation units. The proportion of burnt bone increases steadily from TS1/3 to MST/K8/2. In MK1, Levels 2, 6 and 9 contained very similar proportions, with Level 11 having a much higher incidence of burning. During excavation, MST/K8/5 appeared to contain a great deal of burnt bone, but examination of the bovid skeletal part sample showed the initial impression to be incorrect. This emphasises the need for quantifying such data.

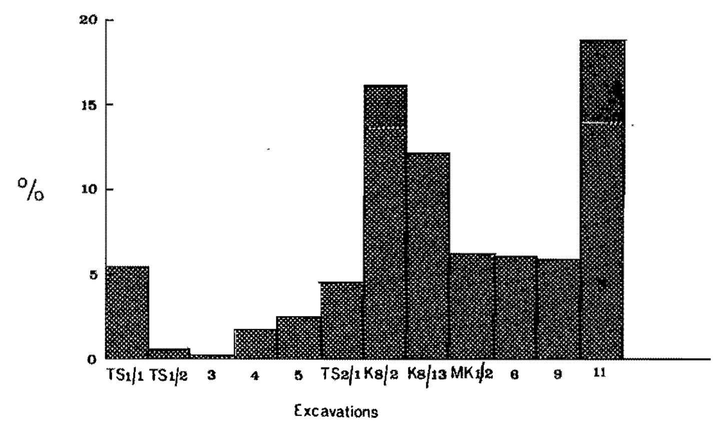

Fig. 8.5. Percentage of total sample of bone from twelve excavation units which show burning damage.

Fig. 8.6 illustrates the proportion of identifiable bovid skeletal parts which showed burning. The general pattern of burning is the same as in Fig. 8.5, although the actual values are higher. Therefore the recording of burning in bovid postcranial remains results in an unrealistically high figure compared to the incidence of burning in the total sample. For this reason, statements on the incidence of burning should preferably be based on the incidence of burning found within the total sample rather than within individual components of a sample such as bone flakes or bovid skeletal parts.

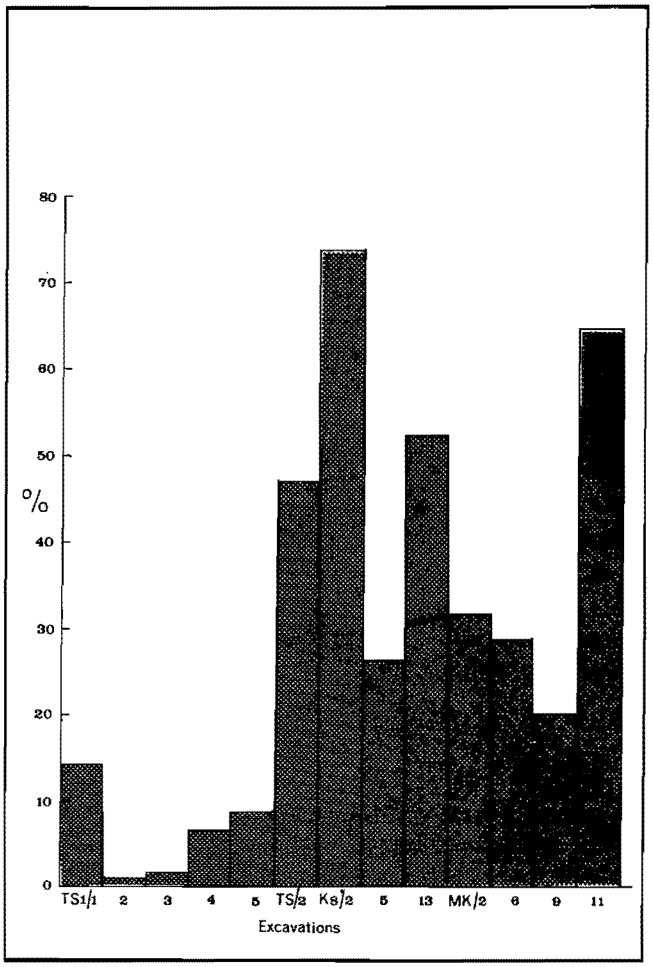

FIG. 8.6. Percentage of bovid skeletal parts from thirteen excavation units which show burning damage.

Very few archaeological reports contain information on burning of faunal material. At Great Zimbabwe Brain (1974*b*: 308) found an extremely low proportion of burnt bone in the sample, i.e. less than 1% of the total sample. This constitutes the only available quantitative data from Iron Age sites. On Stone Age sites the picture may be radically different. Thus Plug (1978) reports that approximately 74% of the faunal sample from the Late Pleistocene/Holocene levels of Bushman Rock Shelter were burnt. This was probably at least partly due to the concentrated accumulation of ash in the shelter; superpositioning of hearths would result in continual exposure of the bones to heat.

Yellen (1977*a*) includes descriptions of 13 !Kung camp sites and plots the positions of hearths and scatters of charcoal. Although he frequently quotes bones, mongongo nuts and other debris as being associated with the hearths, he unfortunately does not mention whether the bones were in any way affected by the fire. He also comments (p. 184) on the fact that the hearth at Camp 6, like all the hearths examined, contains a very fine wood ash which is attributed to the type of wood used by the !Kung. Yellen unfortunately does not relate this phenomenon to a particular tree species or to the condition of the wood itself, e.g. being very dry. The explanation for very fine wood ash is a continuing archaeological problem. He also mentions that hearth debris is scooped up and discarded outside the occupation area, where it forms isolated mounds of ash and debris.

Detailed studies of present-day patterns of debris disposal among Bantu-speaking peoples are needed to throw some light on the relationship between bone debris disposal and ash disposal, as well as the effects of burning in a hut hearth.

EVIDENCE FOR DAMAGE BY HUNTING WEAPONS

There are no records in South Africa of damage to bone caused by hunting weapons. Noe-Nygaard (1972*a*, 1974) has described in detail such evidence in Mesolithic and bog remains from Denmark. She found that both healed and unhealed injuries occur, and that unhealed fractures in red deer *(Cervus elaphus)* scapulae are often limited to the centre of the scapula. The ratio of healed to unhealed fractures changes through time. The fractures indicate that a bow and arrow was used to wound or kill the animal and a spear to despatch it. Wild boar skulls indicate the use of a spear, knife and axe.

Healing is indicated by callousing around and closing of the wound. Where bones with healed fractures have been found on sites, it is assumed that the animal was hunted twice, succumbing on the second hunt. A period of two to three months is suggested as the necessary period to allow healing. Complete or near complete carcasses of animals (in bogs) with partially healed wounds could either indicate natural death of an animal which escaped a hunter, or death of an animal from secondary infection resulting from the wound.

Two small specimens in the Mapungubwe collection showed possible healed damage of the bone. TS2/3296 (Level 1) is an unidentifiable bone fragment with a shallow cut mark on one edge. A raised ridge of bone occurs along both sides of the cut, suggesting a healed bone injury. TS2/3643 (Level 2) is also an unidentifiable fragment bearing two parallel cut marks on the edge, both of which have slightly raised healing ridges on both sides.

Neither of these marks are particularly deep, nor do they correspond to Noe-Nygaard's category. However, the raised ridges strongly suggest healing. These fragments thus possibly preserve the evidence of a spear thrust or arrow which has touched the bone deeply enough to scar it, whereafter the animals survived long enough for callousing to occur.

CARNIVORE DAMAGE ON BONE

Intermittently during the analysis of the Mapungubwe assemblage, bones were recorded which carried either one or more circular perforations, circular depressions of crushed bone, or 'pitting' of the hard outer surface of the bone as if from sharp contact with a pointed object. Such marks have been termed carnivore or canid damage and only 109 (i.e. 0,2%) such specimens were found in the entire assemblage.

Miller (1969) illustrates perforations made in bones by wolf canines, and striations resulting from wolf and coyote damage. He claims that this kind of grooving could possibly be confused with rodent gnawing; in fact, the pattern of grooving is too irregular for rodent gnawing, which invariably consists of paired grooves formed by the incisors.

Sutcliffe (1970) illustrates similar gnawing striations on bones made by the milk teeth of young spotted hyaenas. He also describes the 'scooping out' of the cancellous bone forming epiphyses by carnivores. This characteristic was noticed but was not recorded during the Mapungubwe analysis. He also describes the appearance of regurgitated bone fragments. Since the digestive fluids of the hyaena are undoubtedly stronger than those of a domestic dog, less marked modification of the bone could be expected when dogs are involved.

Brown, spotted and striped hyaenas have all been shown to be collectors of animal bones with varying degrees of dedication to the task. Spotted hyaenas collect few bones, and tend to select from the larger bovid size classes, whereas brown and striped hyaenas accumulate larger collections consisting of a wide range of smaller mammals (Mills and Mills, 1977: 152). Damage to such bones would be extensive. There is no evidence for hyaena damage on the Mapungubwe material although these animals may have slipped into the confines of the settlement and stolen isolated bones from the midden.

Until domestic dogs were identified at Mapungubwe, the identity of the carnivore responsible for this damage remained very uncertain. The circular perforations and depressions are small, so that the damage is unlikely to have been inflicted by any animal larger than the dogs identified in the collection. Such damage is indiscriminately distributed through the skeletal parts. Of interest is carnivore crushing on a pelvis of a hare from K2/TS3 (T3/3494). Another specimen (a carpal/tarsal from MK1 Level 9, MK/1402), has had the entire outer surface of the bone destroyed. It seems possible that this kind of damage would occur in the digestive tract of a carnivore.

Carnivore damage has been recorded from a number of sites, e.g. Tautswe (Welbourne, 1975: 13). Domestic dogs were undoubtedly responsible for much of the damage but it is also likely that jackals, and possibly small members of the cat family, would periodically scavenge on the middens, thus also contributing to this kind of damage.

The action of domestic dogs has been shown to influence the preservation of certain bones (Brain, 1967). This aspect is discussed in Chapter 9.

EFFECT OF RODENTS ON BONE

Another form of animal modification of the bone which was noted throughout the analysis was the effect of rodent gnawing. Two forms of rodent gnawing could be expected, i.e. that of porcupines and of small rodents such as murids. Porcupine gnawing is recognisable as pairs of scrape marks on the surface of the bone, each of which may carry fine, parallel striations within the mark. The scrape marks are about 0,4 cm wide, and relatively easy to identify. The gnawing of small rodents is also evidenced by pairs of marks, the marks being very fine and slender. Extensive gnawing by small rodents can remove the entire outer surface of the bone, resulting in a fine, almost fluted appearance.

Only four bovid postcranial specimens were found with porcupine gnawing. It can therefore safely be assumed that the actions of porcupines had almost no effect on the history of the Mapungubwe bones after they were discarded by the inhabitants.

Bone assemblages accumulated by porcupines have been shown to be characterised by a high percentage of gnawed bone, and a reasonably low percentage of unidentifiable fragments. Hendey and Singer (1965) found such a situation in the analysis of bone from Andrieskraal I and II rock shelters in the Cape Province. The bone accumulations from the Andrieskraal I rock shelter were the result of human activities. Gnawing occurred on only 0,3% of the bones and 80% of the assemblage was unidentifiable. The assemblage from the porcupine lair, however, showed 60% gnawing and 42% of the assemblage was unidentifiable. Man tends to fragment the bones of his kill very thoroughly in order to obtain the marrow, whereas assemblages from porcupine lairs contain numerous nearly complete bones with a consequently overall larger size composition (see Chapter 9, Figs 9.9–9.15). These characteristics can be used in distinguishing between human and animal bone accumulations.

Gnawing by small rodents, however, occurred sporadically throughout the Mapungubwe sample, although it is not numerically significant on any of the sites. Fig. 8.7 shows the incidence of rodent gnawing in the total sample from 12 excavation units. Rodent gnawing is more common on K2 than on MST or MK1; the range of values for K2 are 2,7% to 9,6%. On MST and MK1 the range is 0,6% to 3,0%. The amount of rodent gnawing varies from unit to unit, but in no case does it constitute more than 9,6% of the total sample and is therefore not a significant factor in the bone assemblage.

Gnawing by small rodents is probably the result of their being attracted to the middens by food refuse; in some cases the bones might have been associated with burrows within the midden itself. Since rodents adapt rapidly to the possibility of gleaning food inside human habitations, there is no reason to assume that this kind of rodent gnawing occurred during temporary periods of non-occupation of the settlements.

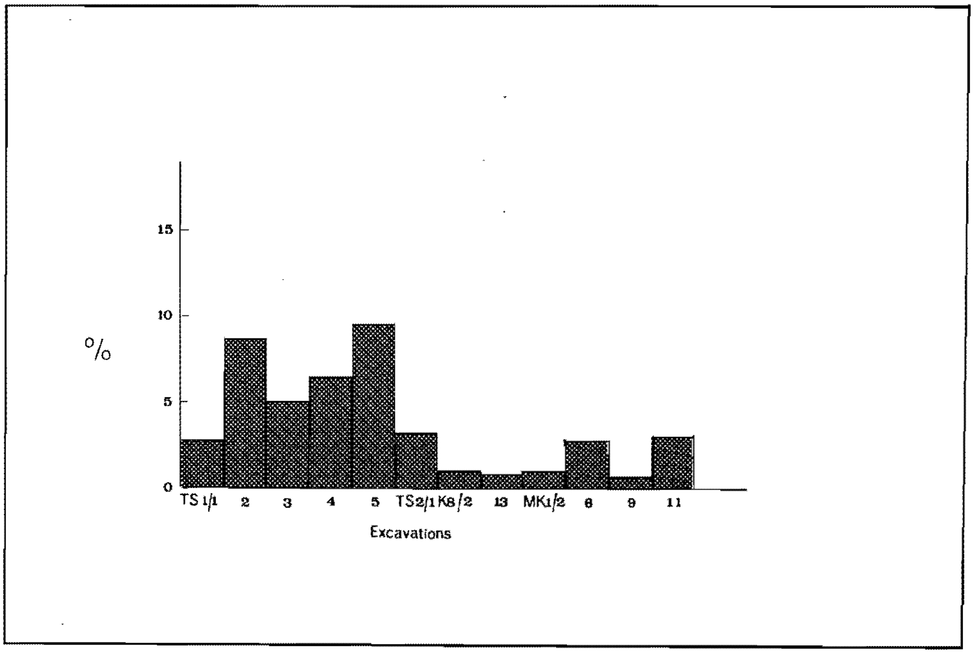

FIG. 8.7. Percentage of total sample of bone from twelve excavation units which show rodent gnawing.

9 Bone Preservation at Mapungubwe

When an animal dies its physical remains are at the mercy of the environment in which they lie. Recent research has led to a greater understanding of the natural forces acting upon the remains of an animal, and the pattern of disintegration to be expected; this field of research is now known as taphonomy. If, however, the animal is an element in the diet of a human group, the pattern of preservation will be affected by human activities such as butchering, sharing, cooking and food waste disposal. The elements of the skeleton may be exposed to the activities of domestic dogs before finally being affected by the natural elements. This chapter describes some of the factors acting upon bone remains discarded in the Mapungubwe settlements.

BONE DISTRIBUTION

Although bone was retrieved in each excavation on the Mapungubwe archaeological sites, variations in the density of bone occurred. An ideal situation would be to study the horizontal and vertical distribution of bone in a deposit. Such distributions should wherever possible be related to specific features (such as hut floors) or to large areas (such as kraals). Two areas were analysed with reference to horizontal distribution of bone with the following results.

The horizontal distribution of bone flakes in K2/TS2 Levels 1 and 2 is represented graphically in Fig. 9.1. Within each level, horizontal density varied between squares. Unfortunately this could not be related to specific features, so cannot be satisfactorily explained in terms of structural features. In Level 2, most of the squares yielded between 6% and 10% of the total of Level 2 bone flakes, except for B5 which yielded 24% of the bone flakes. In contrast, the highest percentage of bone flakes in Level 1 came from B4; in Level 1 itself the percentages of bone flakes in each square fluctuated a great deal. The example from MK1 which follows, and the example from Commando Kop (Voigt and Plug, 1981), suggest that these variations may reflect the presence of structures which are invisible in the stratigraphy.

During the excavation of Level 10 on MK1, the well-preserved floor of a hut was uncovered. Burnt stumps of the hut poles were found *in situ*, as well as burnt wood outside the hut. The hut lay within squares A4 and A5. A5 and B5 consisted mainly of a deep pit which yielded a large quantity of bone. Since the bone in this pit came from Level 9 (B5.9ii.1) these values were omitted. In A3, the dissected remains of a hut floor were found, which were separated from the hut in A4/A5 by an irregularly shaped trench. The horizontal distribution of bone from Level 10 is represented diagrammatically in Fig. 9.2 in relation to the positions of the features mentioned above. The percentages refer to the percentage of the sample from Level 10 which occur in each square. The least material (0,9%) came from the floor of the hut in A5. The largest amount of material came from

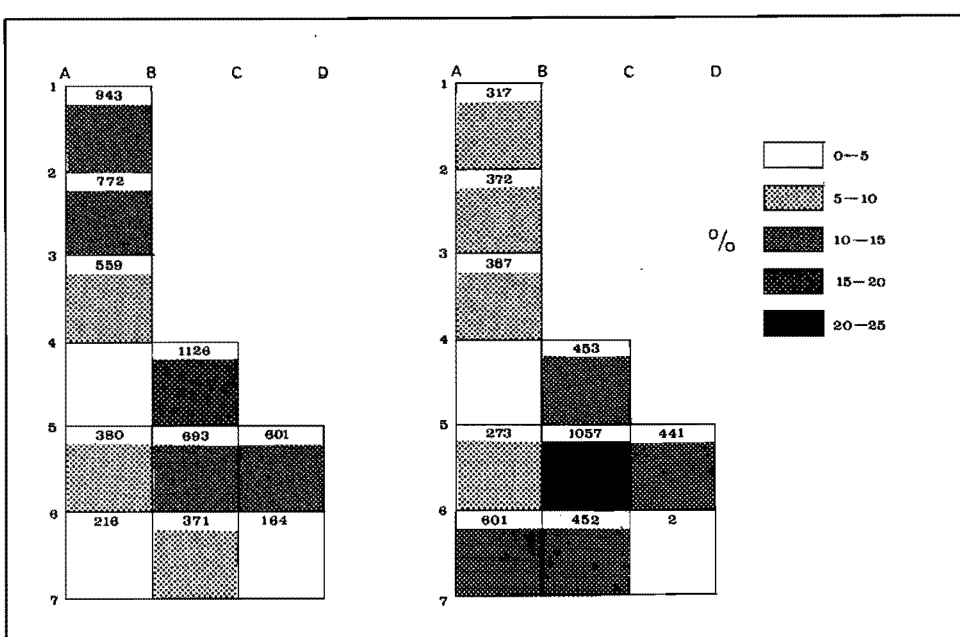

FIG. 9.1. K2/TS2/Levels 1 and 2. Horizontal variation in distribution of bone flakes. Square B4 not included. Numbers in squares are numbers of bone flakes.

B3, which included the trench between the huts. A large quantity of bone related to this trench was noted during excavation. The area outside the hut in B4 also yielded a large quantity of bone, as did the eroded hut remains in A3. The maximum amount of bone therefore came from outside the main hut floor, and from what appeared to be a shallow erosion gully between two huts. The concentration of bone on the A3 hut could either indicate a cooking or food preparation area, or the disposal of food waste on top of the remains of a collapsed hut, i.e. a hut which was disused at the time of occupation of the A4 hut. It is possible that the eroded area between the huts was the remains of a footpath.

In excavations in which a relatively large area has been opened up which shows some definition of activity areas, a study of the horizontal distribution of bone can therefore be linked to the evidence from the excavation. A similar study has been done on the Commando Kop site in Botswana by Plug (Voigt and Plug, 1981). However, many more examples such as these are necessary before a meaningful pattern is likely to emerge. If enough examples are studied it may eventually be possible to define activity areas on the basis of bone density, even on sites where no other physical evidence of activities has survived.

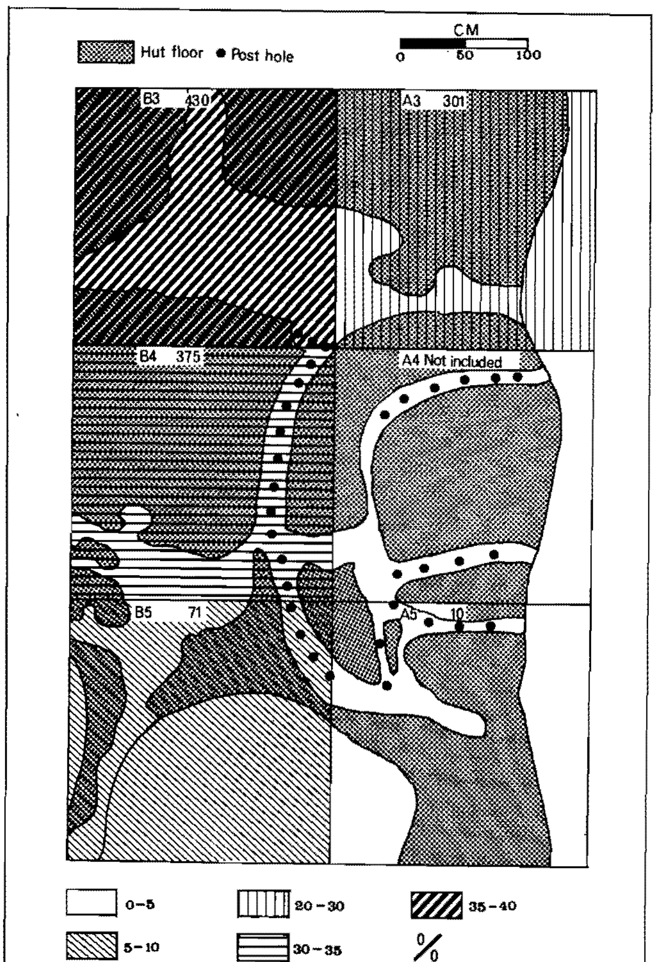

Fig. 9.2. Variation in horizontal distribution of all bone in MK1/Level 10 in terms of percentage of total sample from Level 10.

One interesting aspect of the Mapungubwe accumulation, which has only been briefly touched on in Chapter 8, is the occurrence of articulated bones. Articulated phalanges occurred in a number of levels (e.g. MK1/2300, 1578 and 2001, MST/5) and, more rarely, articulating limb bones. Articulated vertebral columns were found on MST, e.g. Plate 4.5 and Plate 4.9. MST also yielded an articulating Bov.III astragalus and calcaneum (MST/129). In some cases, the articulated remains appear to be portions of a virtually complete (but partly disarticulated) animal such as the subadult *B. taurus* from K2/TS3/Level 6. A similar situation pertained on Schroda (Hanisch, 1980; Voigt and Plug, 1981) in which the major part of the skeleton of a sheep/goat was associated with a pot burial. Such portions of disarticulated skeletons can be interpreted as the disposal of bones which are still held together by cartilage and the ritual use of an animal before burial.

There is no evidence at Mapungubwe for the deliberate burial of entire animals for any purpose, since only portions of skeletons have been found interred or disposed of at Mapungubwe, and in all cases they have been thoroughly disarticulated. Thus at Mapungubwe, whatever the reason for the disposal of a single animal on one spot, the carcass of the animal was first used as a meat source before the bones were disposed of.

Bone Density

The quantity of bone occurring at Mapungubwe varied from one excavation to another. An attempt was made to quantify the density of bone occurring in K2/TS2, MST/K8 and MK1 (Fig. 9.3). The cubic capacity of each of these excavations was calculated as closely as possible using the excavation sections provided. Variations in the thickness of individual levels could not be taken into account. The number of bones included in the analysis was then divided by the cubic capacity of the excavation. The resultant figure indicates the number of bones per cubic metre in each excavation. The values obtained are lower than they should be for K8 and MK1 Phases 3 and 4 because, when analysing the bones from these units, not all the bone was dealt with.

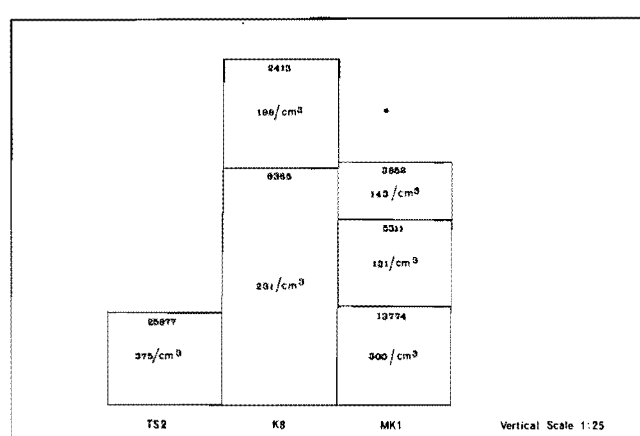

Fig. 9.3. Variation in density of bone as expressed by number of bones per cubic metre in TS2, K8 and MK1. Horizontal lines represent boundaries between cultural Phases.

TS2, although it was a shallow excavation, covered the largest horizontal area. It yielded the largest sample of bones and the highest density of bone, i.e. 735 bones per cubic metre. MK1/Phase 2 (Levels 10 and 11) was completely analysed. It was almost the same depth as TS2, and 10 square metres larger in area. Nevertheless the density of bone is less than half that of TS2.

MST/K8/Phase 3 was almost the same cubic capacity as MK1/Phase 4, yet yielded almost twice the number of bones per cubic metre. The lowest yield of bones came from the second largest excavation unit, i.e. MK1/Phase 3. The explanation for this low yield may lie in the fact that this unit was dissected by numerous hut floors, which would affect waste disposal. The same argument could be applied to MST/K8/3.

Whenever possible, calculations of bone density need to be linked to data such as pottery density and soil content of an excavation. This will add a new dimension to the interpretation of archaeological material. To explain the variations in density, some information on activity areas is essential. The variations are not easy to explain; why, for instance, did TS2, one of the shallowest excavations, provide so good a degree of preservation? Does the density of the bone represent a 'dump' area rather than a living area? Problems such as these should be examined in the future by keeping accurate records of the volume of excavations, and coupling these with full bone and pottery analyses.

PATTERN OF BONE PRESERVATION

The study of the pattern of bone preservation on a site is concerned with the factors affecting the survival of bone. Several factors are operating on the sample: the size and fusion pattern of the bones may influence the pattern of preservation, activities may decide which bones survive on the site itself, and the activities of dogs may also influence the survival pattern.

The first factor to be examined was whether there was differential preservation of body parts within a bovid size class in an excavation.

If the percentage distribution of the skeletal parts is examined it can be seen that a difference exists between the preservation of Bov.II and Bov.III postcranial remains (only the upper two levels in TS1 and K8, which yielded the largest samples, are plotted). The actual proportions of each Bov.II skeletal part vary but all parts are present, with metapodials and phalanges being the most common. In contrast, Bov.III is represented very largely by the extremities, with the carpals/tarsals and phalanges being most common. The fore-limb is not well-represented (Figs 9.4 and 9.5).

The above results were tested against the data from MK1 Levels 2, 8, 10 and 11 (Figs 9.6 and 9.7).

Each of the graphs exhibits individual variations. However, in broad terms, in the Bov.II size class, the peak of the graph is in most cases represented by pelvic fragments, the exceptions being MK1/8, 10 and 11, in which the peaks are radius, femur and metapodial respectively. Ulnae and carpals/tarsals are a small group in all except TS1/1 and 2; the extremities are not well-represented. In the Bov.III size group, metapodials and the extremities form the peak except for TS1/1 and MK1/2 where pelvic fragments form the peak of the body parts other than the extremities. In three cases (K8/7, MK1/2 and MK1/11), the most common body parts found are the phalanges. In all cases, all the elements of the extremities (astragalus, calcaneum, carpals, tarsals and phalanges) are represented in very

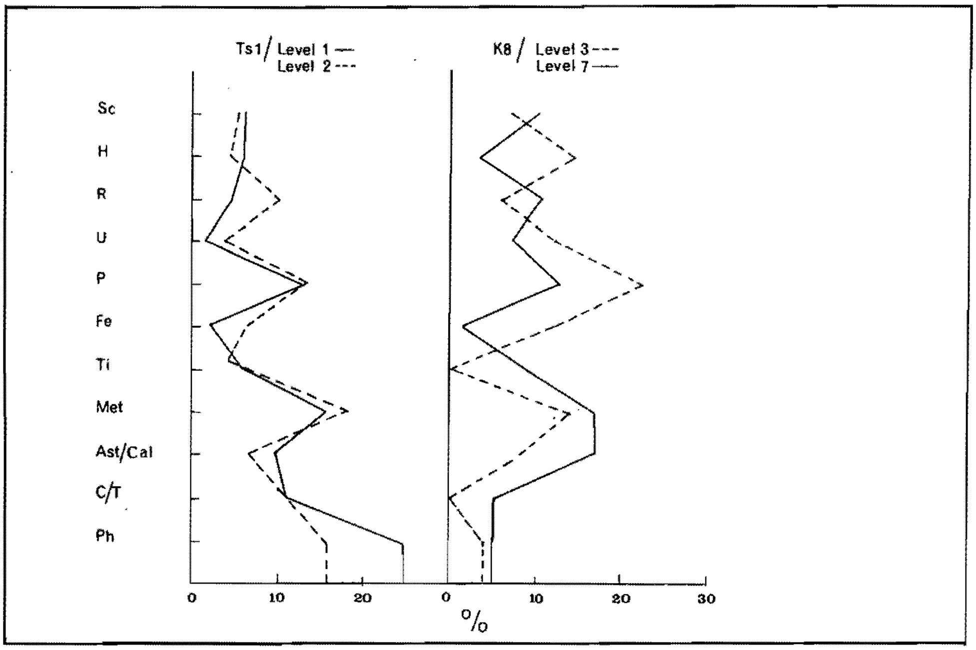

FIG. 9.4. Percentage survival of Bov.II postcranial skeletal parts in TS1/Levels 1 and 2 and K8/Levels 3 and 7. See Fig. 8.3 for explanation of vertical axis.

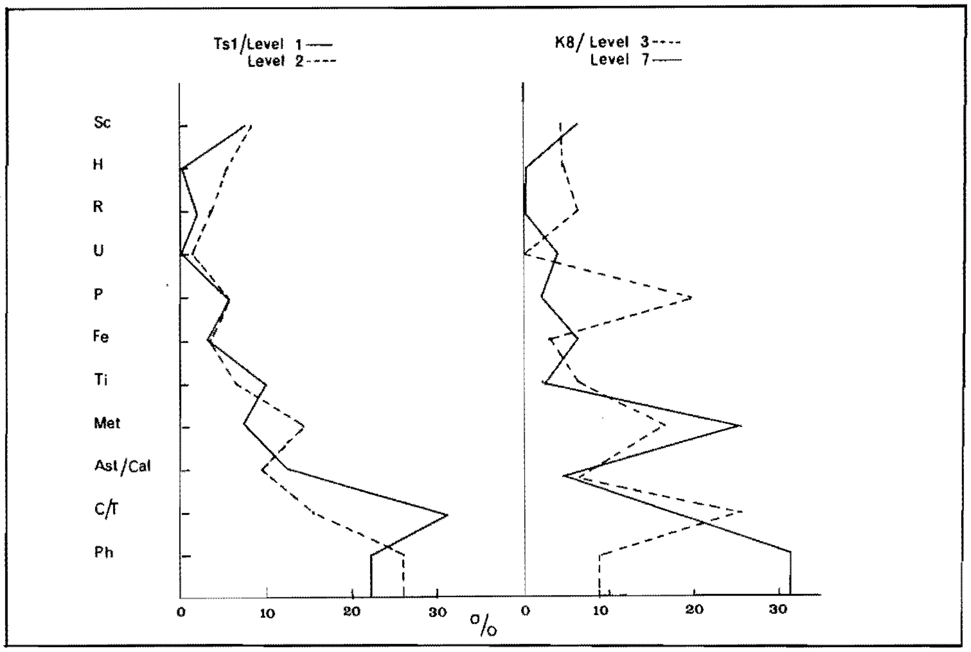

FIG. 9.5. Percentage survival of Bov.III postcranial skeletal parts in TS1/Levels 1 and 2 and K8/Levels 3 and 7. See Fig. 8.3 for explanation of vertical axis.

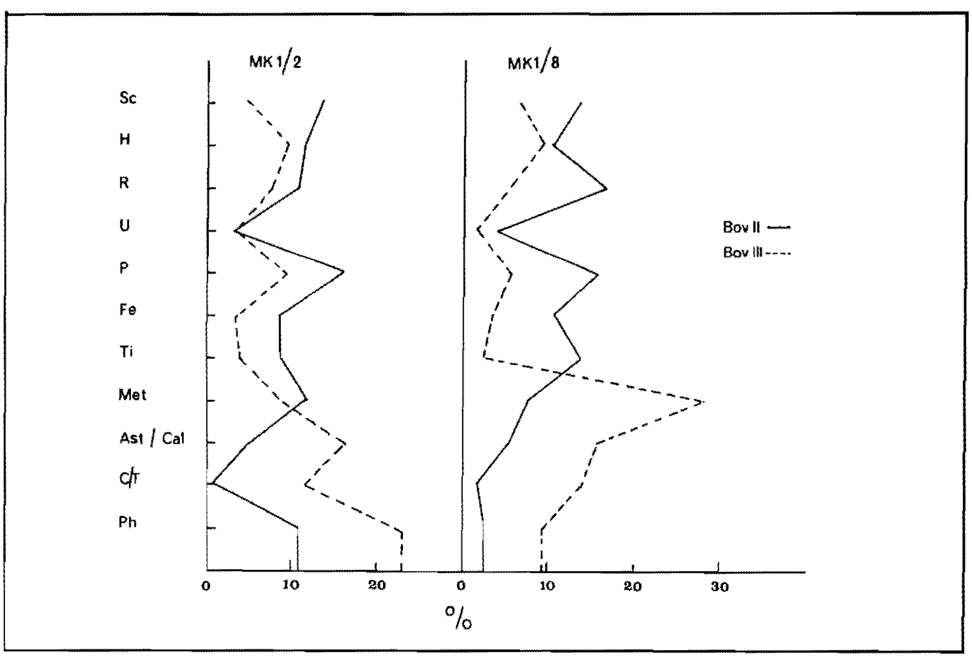

FIG. 9.6. Percentage survival of Bov.II and Bov.III postcranial skeletal parts in MK1/Levels 2 and 8. See Fig. 8.3 for explanation of vertical axis.

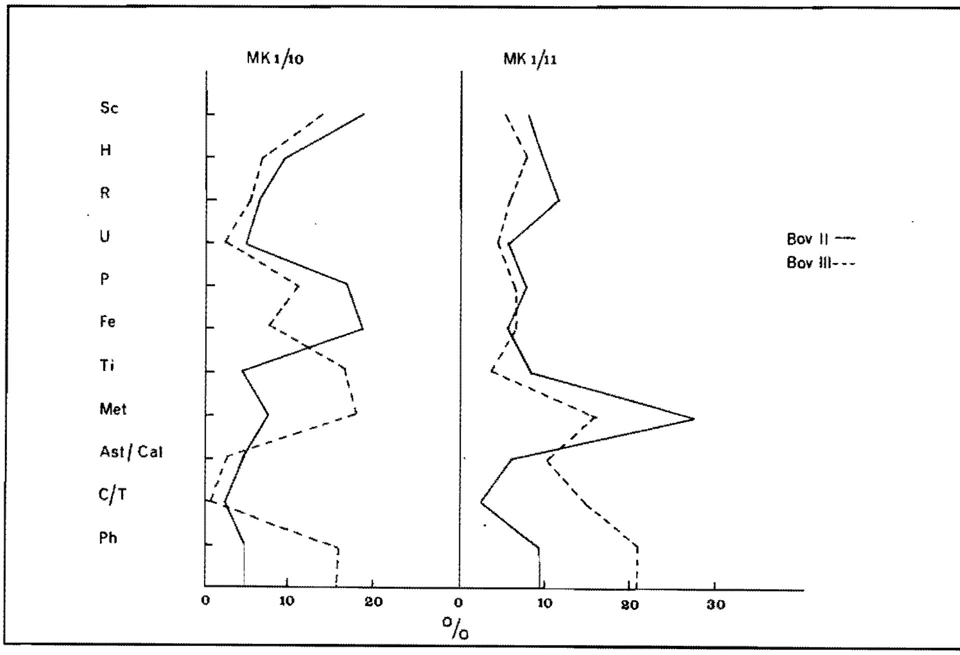

FIG. 9.7. Percentage survival of Bov.II and Bov.III postcranial skeletal parts in MK1/Levels 10 and 11. See Fig. 8.3 for explanation of vertical axis.

much greater numbers in the Bov.III group than in the Bov.II group; other skeletal parts are very much under-represented compared to the Bov.II group (Fig. 9.8).

It seems that, with respect to actual skeletal part preservation, there is much variation across the site. Bov.II body parts are more evenly represented than Bov.III in all cases, in that reasonable proportions of all body parts are present. The Bov.III body part lists are largely dominated by metapodials and extremities. This may be partly due to the fact that the *Ovis/Capra* sample is the larger of the two. However, this preservational pattern is also related to butchering practices, in that most Bov.III bones were thoroughly smashed in order to obtain the marrow, thus being reduced largely to bone flakes rather than being preserved as identifiable postcranial material. The representation of skeletal parts in the faunal sample is also undoubtedly linked with the vagaries of horizontal distributions as exposed during excavation. Larger bones (Bov.III) might therefore not be expected to be as common in living areas as in midden areas, and certain body parts might be over-represented in areas where ritual activities or interments had taken place.

Klein (1976: 93–97) discusses the proportions of axial/appendicular skeletal parts at kill and home sites. He demonstrates that vertebrae tend to be under-represented at home sites, presumably as a result of butchering practices, and discrepancies exist between fore- and hind-limb, cranial and postcranial, and limb-bone/foot-bone ratios. When the proportions of axial/appendicular bovid bones in TS1 are listed (Table 9.1), it is found that in most cases axial material outnumbers appendicular material. Two sets of figures are given; in the first, axial material includes all skull, vertebral and rib fragments, whereas in the second set, axial material includes identifiable bovid skull material and vertebral material only. These figures suggest that, in most cases, appendicular remains constituted 50% or less of all the bone in samples from TS1. This is not unexpected, since the animals were slaughtered on the site and bones such as ribs and vertebrae are subject to heavy fragmentation and therefore produce a larger part of the sample. In calculating such figures fragmentation patterns must therefore be taken into account.

When the proportions of axial to appendicular remains on MST and MK1 are compared in the same way as the TS1 material, some differences emerge (Table 9.2). The proportion of axial material is lower on MK1 than on TS1 or MST/K8 when all the axial material is considered. When the more limited range of axial material is considered, the proportions fluctuate so that in some levels the appendicular fragments are more common than the axial fragments. It is very likely that this variation is due to horizontal variation in activities uncovered during excavation, as K8/7, MK1/8, MK1/10 and MK1/11 all contained hut floors which influenced the distributional pattern of the bone. At Tautswe (Botswana), Welbourne (1975: 10) found axial/appendicular proportions of 69,5% to 30,5%. These figures suggest a high proportion of axial bone fragments on Iron Age settlement sites.

The possibility was considered of examining the numerical representation of body parts compared to the expected representation based on frequencies in the skeleton. Fragmentation at the site was such that it was not possible to relate fragments from the same specimen. In the same way, proximal and distal ends were too fragmented to be able to relate parts of the same bone. Cer-

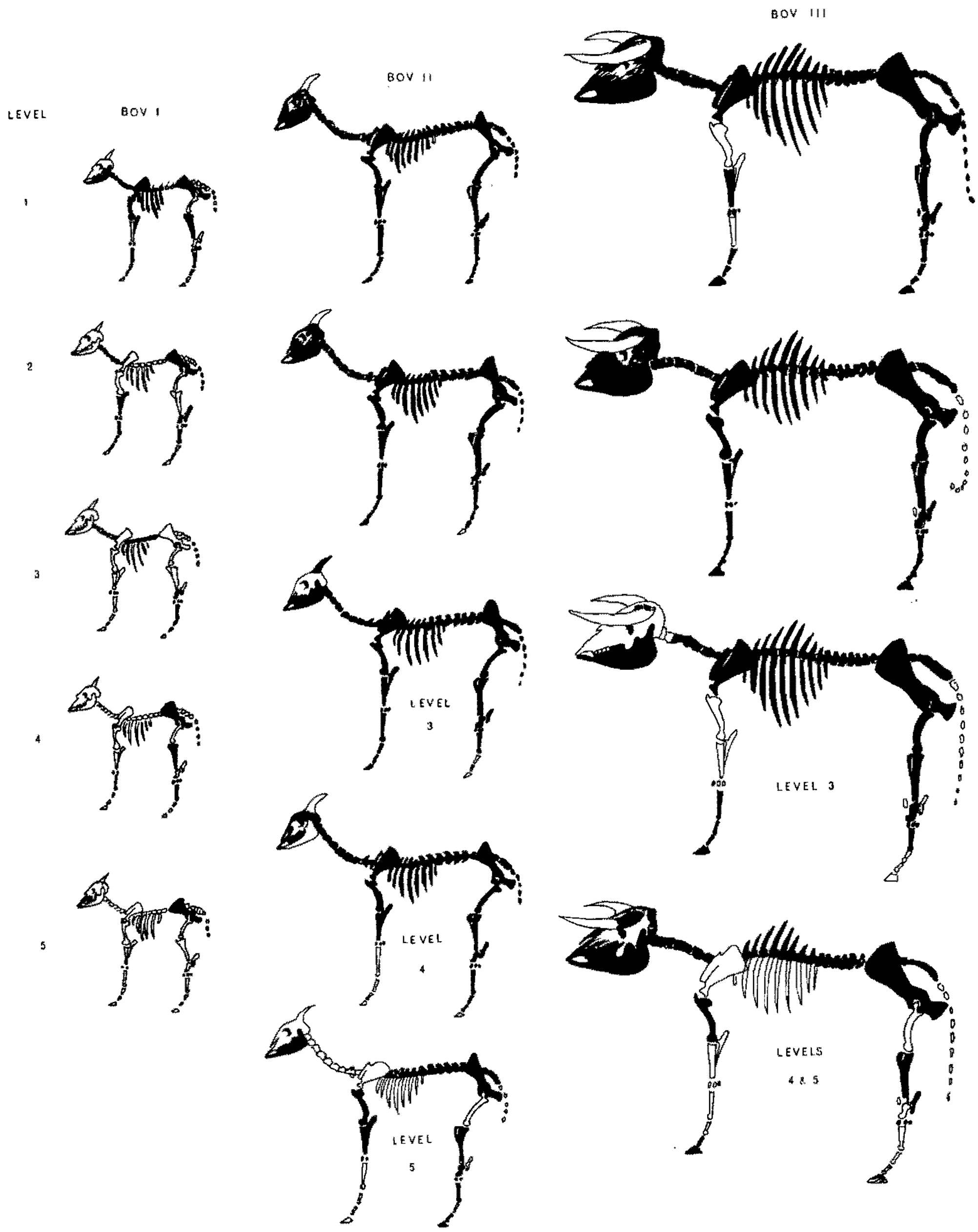

FIG. 9.8. Diagrammatic representation of Bov.I, Bov.II and Bov.III postcranial skeletal parts in K2/TS1.

tain fragments did occur with a higher frequency than others, e.g. distal humerus, proximal radius and distal tibia. Brain (1967, 1976*c*) has clearly shown that patterns of preservation of epiphyses are directly related to fusion times and bone density. In view of the preservational conditions and the fact that the same factors of bone density and fusion would operate on the Mapungubwe material, further investigation of this aspect would add nothing to the present study. Some details of the preservation of proximal and distal epiphyses are given in Tables 4.5 and 4.7.

Perkins and Daly (1968) discussed the unequal preservation of limb- and foot-bones of cattle in a faunal sample from an early village site in Turkey. They also noted that this discrepancy did not exist in the sheep bones, and postulated that the inhabitants butchered wild oxen at the kill site, and then dragged the meat back in the hides, which still contained the foot-bones. Sheep and goat carcasses were brought back to the village intact. The resultant preservational discrepancy has been referred to as the 'schlepp effect'.

This hypothesis does not stand up to close examination and comparison with other results in Africa. The pattern of preservation of Bov.II and Bov.III body parts at Mapungubwe showed a discrepancy in the frequency of phalanges. Bov.III phalanges were in most cases the most common element in the Bov.III sample and contributed a larger frequency than in the Bov.II sample. This inequality is due to the absolute size of the bones, not the location of the butchering site. It is also obvious that the high number of phalanges is not the result of killing the animal away from the home site and bringing only the foot-bones back, nor is it a reflection of domestic as opposed to wild species. Yellen (1977*b*: 324) has also clearly shown that comparisons of bone preservation patterns between species must be treated with considerable caution.

In Figs 9.9 and 9.10 the proportions of leg- and foot-bones are plotted for *Ovis/Capra* and *Bos taurus*, and for cattle only, for a number of sites, including Suberde and Can Hassan, Turkey. I believe that these results indicate that the 'schlepp effect' is part of a preservational pattern which occurs on Iron Age as well as Stone Age sites, and that it cannot be utilised as a means of defining hunting/domestic animal patterns or kill site/home site butchering.

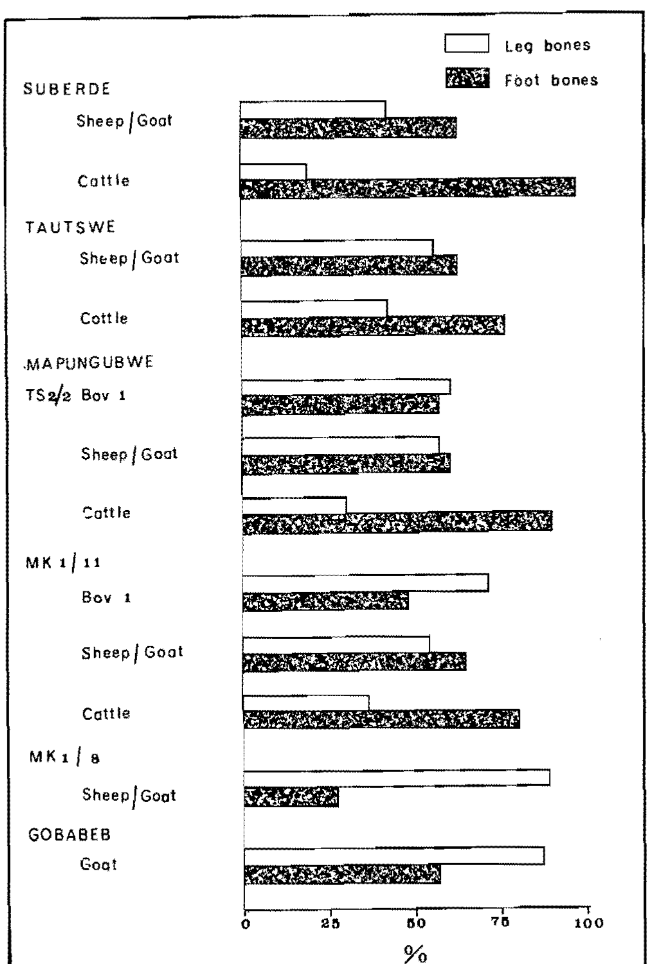

FIG. 9.9. The *'Schlepp effect'*. Preservation of cattle and sheep/goat leg and foot bones at three sites for comparison with Mapungubwe.

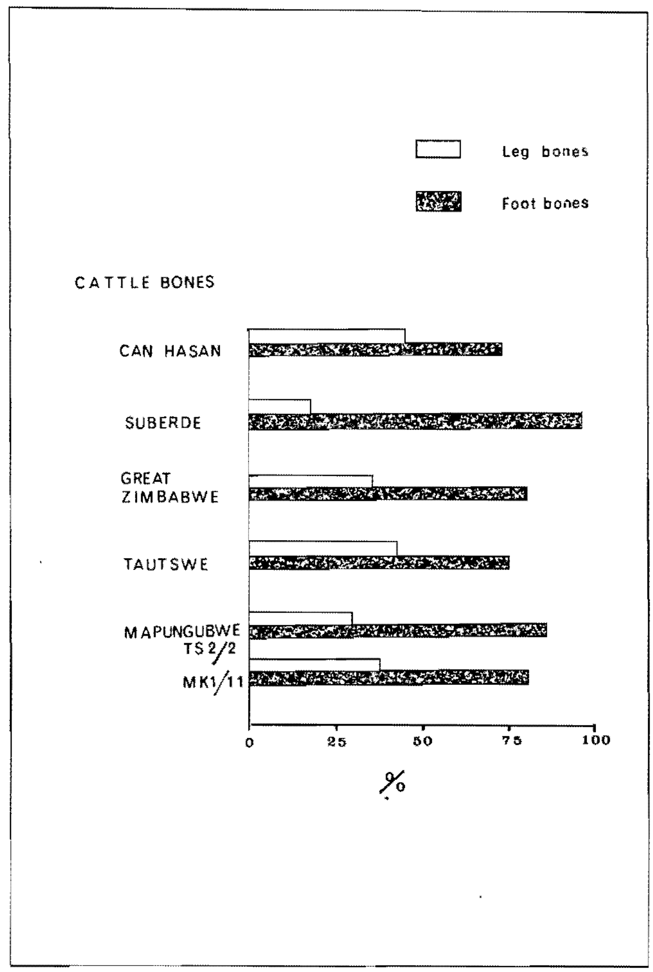

FIG. 9.10. The *'Schlepp effect'*. Preservation of cattle leg and foot bones at four sites for comparison with Mapungubwe.

A final minor criticism of the 'schlepp' concept is that a skin could be used for carrying meat, but certainly not for dragging meat home—no skin would stand up to that sort of treatment!

Ethnological Information on Patterns of Bone Preservation

Reference has already been made to the work done by Yellen (1977*a*) on Bushman camps in the Dobe area (Chapter 8). It is illuminating to now examine his evidence in the light of bone preservation. Table 9.3 lists the faunal material collected at each camp at which a carcass was brought back and eaten at the home site.

The data from the Bushman camp sites highlight several useful points for interpreting the preservation of skeletal parts. Skulls of the large bovids are frequently discarded at the kill site, but skull remains from small bovids occur on the home site. Metapodials are destroyed for marrow at the kill; thus metapodials and most of the bones of the extremities do not occur on the home site. The presence of hoofs and 'other bones of the extremities' (which are presumably sesamoids, etc.) do support the idea that these bones came back to the site as part of the hide. One of the most important factors to emerge is that fragmentation results in remarkably high numbers of fragments of individual bones, e.g. femora and scapulae. Thus the quantity of fragments of a bone may vary considerably in relation to the actual number of individuals present. It would be illuminating to collect similar detailed information from around African homesteads for comparison. I suspect that individual elements of a cow skeleton would become very scattered and would occur in small numbers only. Yellen (1977*b*) is convinced that there is 'cultural patterning' in faunal samples which needs to be recognised and identified; detailed faunal studies must bear this possibility in mind.

A final factor acting upon the preservation of skeletal parts is the effect of dogs on an assemblage. Since we know that domestic dogs occurred at Mapungubwe, it can be assumed that they would have had access to discarded bones and therefore would influence the survival pattern. Brain (1967) initiated discussion of this subject in South Africa, and has been able to show convincingly that the gnawing activity of dogs affects skeletal part preservation. In particular, smaller bones such as Bov. II carpals/tarsals, sesamoids and phalanges are liable to total or near total destruction, and the spongy epiphyses of bones of all sizes are equally vulnerable. A recent study by Binford and Bertram (in Binford, 1977: 77–106) discusses the destructive effect of Eskimo dogs on caribou bones, and that of Navajo dogs on sheep bones. Their results show that pelves and proximal metacarpals of caribou had a good survival record, while phalanges, sterna, distal femora, tarsals, calcanea and distal metatarsals had a poor survival rate. The actual presence of body parts was dependant on the dog maintenance programme of the Eskimoes themselves, and showed seasonal shifts. The Navajo data show the disappearance of small body parts, and seasonal variation. Such variation is unlikely to occur in South Africa. However, the published evidence clearly indicates that certain discrepancies in skeletal part preservation may not be the result of human activities, but the result of the gnawing proclivities of Man's best friend, his dog.

BONE FRAGMENTATION

Habitation residues discarded by Man are characterised by extensive fragmentation of the bone which they contain. The habit of breaking up limb-bones which contain marrow is a very old one, and has been documented on a number of sites. This activity results in the production of large numbers of bone flakes—fragments of limb-bone shafts with no traces of articular ends. During the sorting of bone material from the Schroda Zhizo site, bone flakes were found on which the actual point of percussion caused by the breaking process could be clearly seen. The point occurs as a V-shaped or U-shaped notch on the broken edge of the flake, with shallow flaking on the internal surface of the bone. Other bones, such as phalanges, mandibles and vertebrae are also fragmented, but it is the bone flakes which have been used in this study to define the degree of fragmentation of the bone.

The bone flake tables for K2/TS1 (e.g. Table 4.6) show that although the range of sizes is wide, a definite peak occurs in the same size classes in all levels except Level 1. This peak occurs in the 2–3 cm and 3–4 cm size classes. In Level 1, the peak extends to the 1–2 cm class, while in Level 5 it extends to the 4–5 cm class. Size classes greater than 11 cm are represented in all the levels by small numbers of flakes, i.e. eight flakes or less. Figure 9.11 illustrates the distribution of bone flakes between the first eleven size classes when all the flakes from TS1 are grouped together.

A similar extension of the peak into the 1–2 cm size class is apparent in TS2/Level 1; it is likely that this is a function of the upper level in a deposit which is more susceptible to trampling and weathering than are the lower levels. In TS2/Level 2, size classes 3–4 cm and 4–5 cm each include 20% of the sample as in TS1/Level 5. MST/K8 Levels 2 and 13 both show maximum numbers of bone flakes in the 3–4 cm size class, with the same number in the 4–5 cm class in Level 2, but a reduced number in this class in Level 13. The peaks are all very close, i.e. 24,2% (TS1), 27,5% (K8/2), and 29,9% (K8/13). MK1/Levels 2 and 11 both show a peak in the 4–5 cm size class; the distribution of bone flakes in this level is shown in Fig. 9.12 for comparison with the figure for TS1.

Two different patterns of fragmentation therefore occur at the Mapungubwe sites. The majority of bone flakes either fall into the 2–4 cm size classes, or into the larger size class, i.e. 4–5 cm. In the uppermost levels of TS1 and TS2 there are a large number of flakes in the smaller size class of 1–2 cm. Variation in bone flake sizes is probably the result of three conditions, i.e. low levels of activity in the area involved (i.e. less trampling effect), the texture of the deposit (e.g. soft ash), and the rate of accumulation. It seems reasonable to suppose

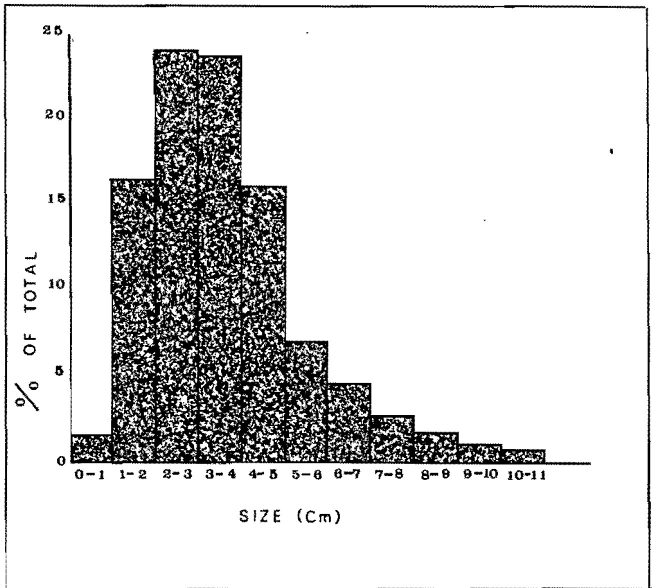

FIG. 9.11. K2/TS1. Size distribution of bone flakes in total sample.

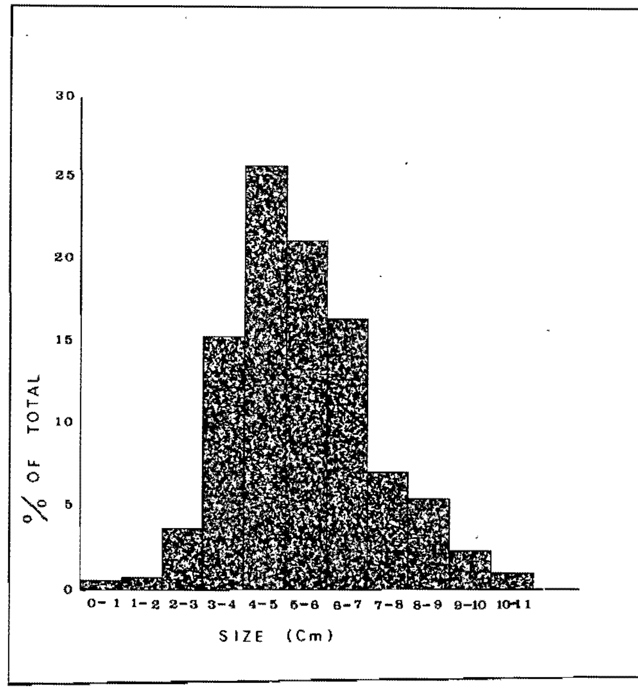

FIG. 9.12. MK1/Level 11. Size distribution of bone flakes.

that rapid deposition would result in less fragmentation of the bone.

All the identifiable material analysed was also measured. To compare the size of the bovid skeletal parts to that of the bone flakes, postcranial material from MK1/Level 11 was grouped according to size classes (Table 9.4). The range of sizes involved was much greater than in the case of bone flakes, i.e. up to 23 cm. There were no specimens in the 0–1 cm size class. The tail of the resulting graph is longer, and shows better representation in the larger classes than is the case with the bone flakes. In spite of this wider range of sizes the peak of the size classes in the postcranial material also occurs in the 3–4 cm size class (Fig. 9.13). The pattern, with respect to size, between bone flake size classes and identifiable bovid postcranial size classes, is not identical. As the bone flake class is invariably larger, it was decided to continue to utilise this class as an indicator of the degree of fragmentation of bone in a deposit.

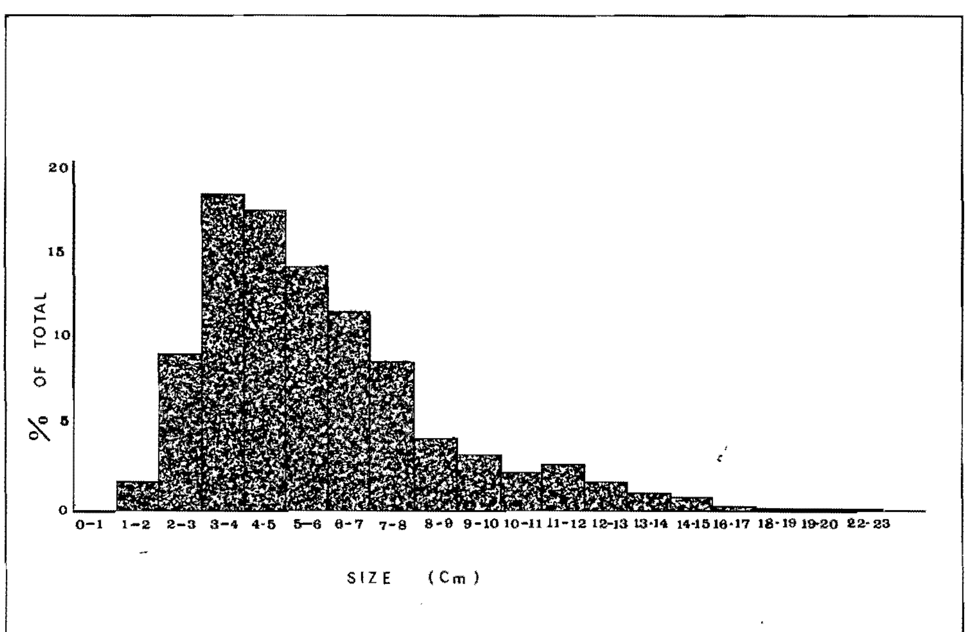

FIG. 9.13. Size distribution of bovid postcranial skeletal parts in MK1/Level 11.

Patterns of Bone Fragmentation on Other Sites

Some data are available in the literature for comparison with Mapungubwe. Bone flakes from two Early Iron Age Malaŵian sites, Nkope and Matope Court, were measured to define the degree of fragmentation of these sites (Speed, 1970; Voigt, 1973). At Nkope, the peak in the bone flake graph occurs in the 0–2,5 cm size class (58,2% of the bone flakes measured). The whole Nkope assemblage was very heavily fragmented, since it came from a shallow, hard deposit. It is therefore not unexpected that the majority of bones in the assemblage were also very small. At Matope Court the larger group of bone flakes was the 2–4 cm size group, as at Mapungubwe (Figs 9.14 and 9.15). On the Icon site (Voigt, 1979), the peak lay at 2–3 cm, with a slightly smaller quantity in the 3–4 cm size class.

Welbourne (1975: 11) published size ranges for a mixed sample of 6985 bones from Tautswe (Fig. 9.16); the largest sample fell into the 2–4 cm size class. By way of comparison, Brain (1976*b*: 236–237) gives details of bone flake and total sample fragmentation on the Kromdraai Australopithecine site. In this case the peak occurs in the 2–3 cm size class, with a further large percentage of flakes falling into the 1–2 cm size class. The tails of these histograms are shorter than those of Mapungubwe, reflecting a more limited size range. In his paper on Bushman Rock Shelter, the bone flakes from each cultural unit were measured and listed (Brain, 1969: 55); this showed peaks for Stone Age levels in the 2–4 cm class. Plug (1978) also found that the peak for bone flakes at Bushman Rock Shelter fell between 2–4 cm, with the main peak in the 2–3 cm size class.

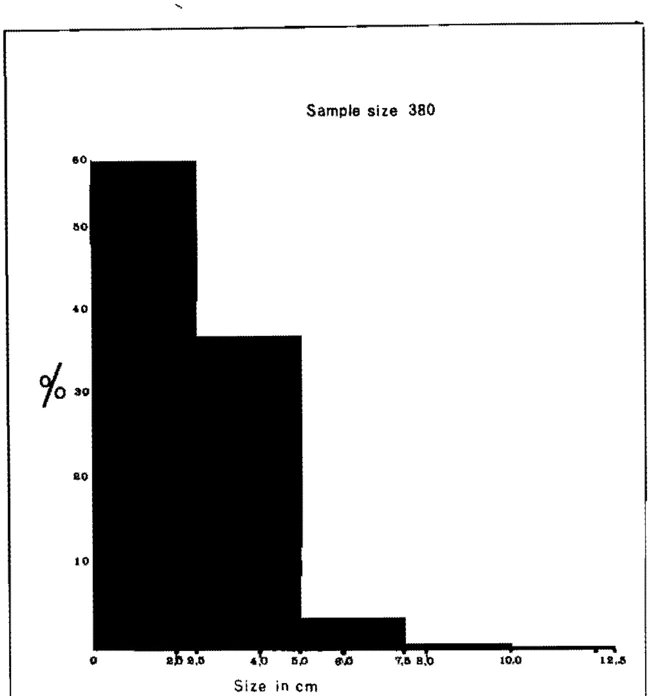

FIG. 9.14. Bone flake size distribution: Nkope, Malaŵi.

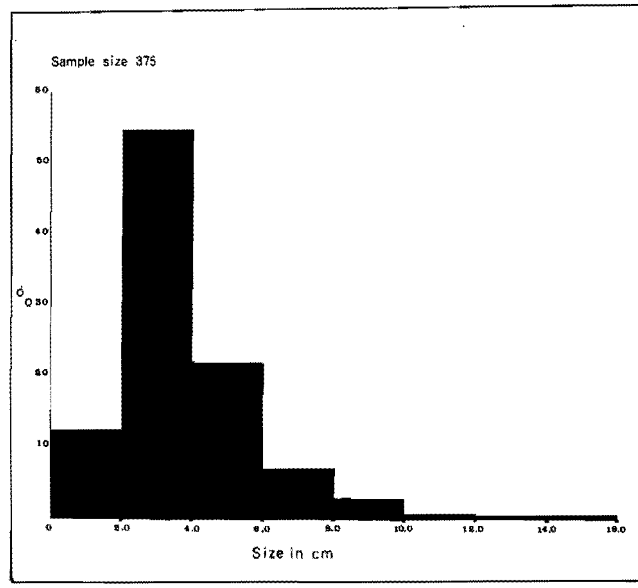

FIG. 9.15. Bone flake size distribution: Matope Court, Malaŵi.

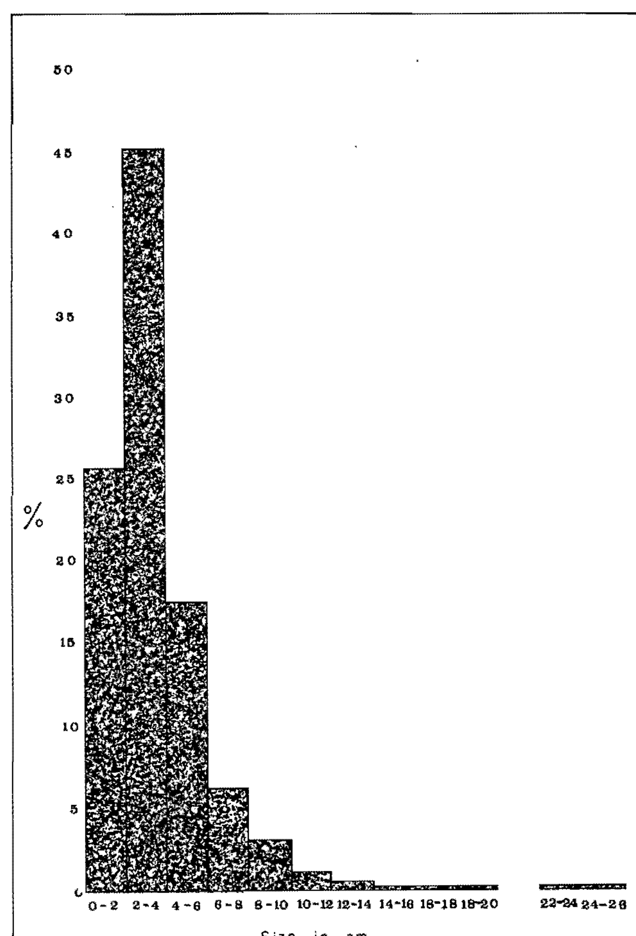

FIG. 9.16. Bone flake size distribution: Tautswe, Botswana.

Brain (1976*c*) published comparable data on the bone accumulation from a porcupine lair. The range of sizes is large (up to 58 cm) with a peak at 2–4 cm. The peak is thus similar to that of the Iron Age examples quoted above. However, the other size classes are also well-represented, resulting in a more gradual curve than in the case of the Iron Age or Stone Age samples (Fig. 9.17).

These sites do therefore, display an overall pattern of fragmentation in which the majority of the bone pieces fall between 2 cm and 4 cm in size. It was initially thought that the degree of fragmentation would differ on Stone Age and Iron Age sites, but it appears that fragmentation is independent of the period of the archaeological site, i.e. it may cut across the Iron Age/Stone Age boundary.

The question of whether there is any deliberate pattern of breakage in a bone accumulation has been discussed by a number of authors. Much of the speculation arose as a result of Dart's 1957 hypothesis of an osteodontokeratic culture practised by the Australopithecines. One of the more recent studies related to this problem is that of Kooros (1972), who examined a sample of over 40 000 bone fragments in an attempt to isolate patterns of deliberate or non-random breakage. Her paper contains the results of very useful experimental work in this field, and also showed that the Jaguar Cave assemblage from Idaho, United States of America, contained very little evidence of a set pattern of breakage. The bones showed random breakage, with the exception of between 10–15% which exhibited a systematic fracturing technique and therefore the possibility of the bones having been used as tools. These results are interesting in that a very large sample was involved in the search for deliberate fracturing. One would anticipate, however, that a group of people would develop a 'standard' way of breaking bones for marrow, but that only those which show actual evidence of utilisation could be reasonably classified as 'tools'; this hypothesis is carefully examined by Yellen (1977*a*) with valuable results. I believe that the 'non-formal' bone tools described in Chapter 10 fulfill this requirement, and represent the end product of deliberate *utilisation* rather than deliberate fracturing at Mapungubwe.

Noe-Nygaard (1973) re-examined a collection of Mesolithic scapula 'scrapers' (originally described by Rust) with similar questions in mind to those asked by Kooros. She describes the natural processes which can result in 'notching' and flaking of the posterior edge of a bovid scapula. This kind of breakage was never interpreted as being man-made in the Mapungubwe analysis; good examples of such breakage definitely occurred in the assemblage. Such breakage can therefore safely be ascribed to natural fracturing, possibly as a result of moisture and temperature changes in the deposit.

WEATHERING OF BONE

Five stages of weathering were noted during the analysis of the Mapungubwe assemblage.

Stage O. Fresh bone. The majority of the bone fell into this category; the surfaces of these bones are hard and unweathered, the bone is strong and breaks cleanly. Many fresh specimens were also burnt.

Stage 1. Slightly weathered. The surface of the bone shows some shallow cracks, and has been 'roughened' by natural agents.

Stage 2. Medium weathering. The cracking process has penetrated deeper into the bone surface and the bone is becoming friable. External features of

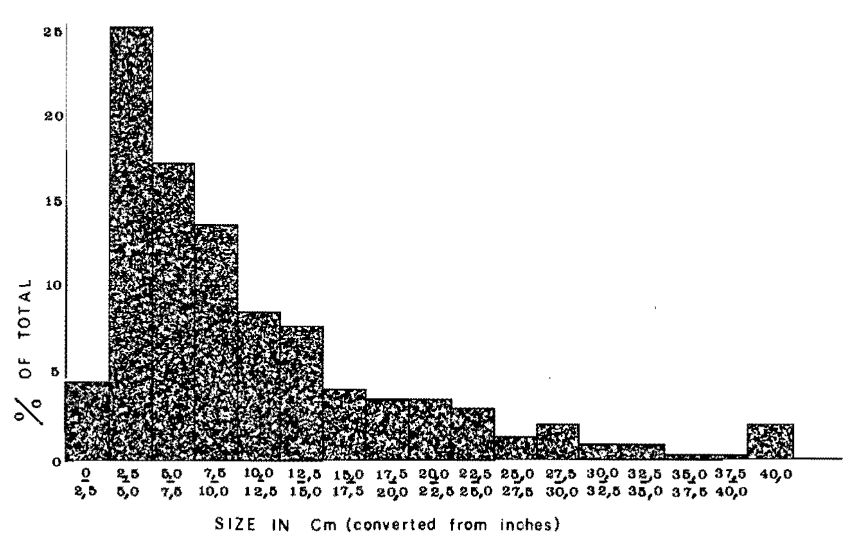

FIG. 9.17. Total bone sample size distribution: porcupine lair, Nossob (From Brain, 1976*c*: 29–30).

the bone may be partially obliterated by the weathering process.

Stage 3. Heavy weathering. The surface of the bone is soft and disintegrating. Cracking may be so extensive as to result in a bark-like texture. Most external features have been destroyed.

Stage P. This stage was not very frequently encountered. By this stage of deterioration, the texture of the bone has become powdery or chalk-like; the bone is so soft that it can be abraded with the fingers. Usually it is also completely without recognisable external characteristics.

The condition of a bone from archaeologicol deposits depends on two main factors. One of these is the chemical composition of the soil. A very acid soil will lead to extensive and deep weathering of the bone, even once the bone has been buried. The other important factor is the speed of deposition. The more rapidly a bone is buried, the less weathered it will be; in other words the degree of weathering of a bone lying on the surface depends on the period of exposure. On this basis, a bone which is weathered has been exposed to the elements; a bone which is covered immediately will retain its fresh appearance. An interesting situation existed at Mapungubwe in which some bones show two different degrees of weathering, e.g. fresh on one side or one portion and Stage 1 weathering on the other. This situation would arise where a bone is dumped in a rapidly accumulating deposit which covers all or part of it. Either the exposed part is then weathered for some time, or the bone is later exposed as a result of erosion of a disused midden, and weathering of the exposed portion begins. Such weathering could be expected to occur within the span of a few years, especially with the African variations in temperature and humidity. Brain (1980) found that defatting and cracking of bone takes place very rapidly under desert conditions, defatting being completed within a year. After seven years, bone left exposed under such conditions was completely defatted and cracked. Gifford (1980) found that bone could survive under dry, tropical conditions for more than 15 years in the Lake Turkana region of Kenya. During this time the surface of the bone was extensively damaged and the bone became friable. She utilised a five-point weathering scale evolved by Behrensmeyer, and was able to show that weathering of similarly aged bones varied according to their position in the deposit. She also quoted a good example of the influence of location on weathering when water is involved as a depositional factor.

At Mapungubwe weathering did not have a very great influence on the bone assemblage. Weathering was most common in the upper levels of an excavation; material from these levels were frequently also the most fragmented. The maximum amount of weathering (51,7%) recorded in a sample of reasonable size was for TS2/4C. All other levels showed 20% or less weathering, with a mean of 11,9%. Fig. 9.18 shows the amount of weathering in 13 levels. In K2/TS1, TS2 and MST/K8, the largest number of weathered specimens occur in the lowest levels. No consistent pattern of weathering therefore occurs with increasing depth, and variations in weathering were probably the result of the vagaries of depositional rates operating on each of the three areas of the vast accumulation at Mapungubwe.

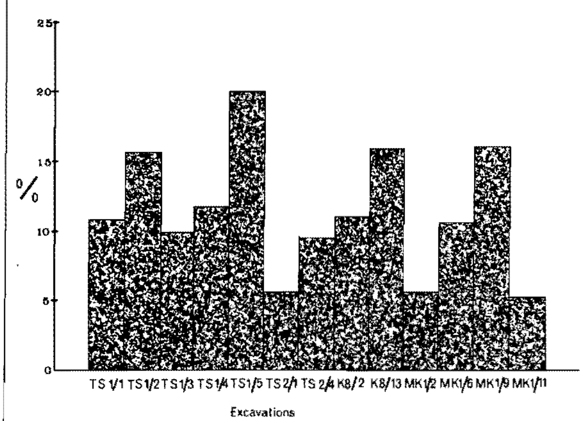

FIG. 9.18. Incidence of weathering in Mapungubwe assemblage: percentage of weathered bone in 13 excavation units.

10 Bone, Ivory and Shell as Raw Material at Mapungubwe

Man has utilised the bones of animals which he killed as a source of raw material since at least the Middle Pleistocene Period. During the Upper Pleistocene Period in Europe bone became an art medium for the prehistoric hunter. Apart from its use in the manufacture of tools, bone was decorated with representations of animals and abstract designs, and tools made of this material were finely finished and occasionally decorated. In southern Africa, Late Pleistocene and Holocene hunter-gatherers utilised bone as a raw material for points, link-shafts, awls, needles and other basic tools; in rare cases these tools were decorated. Finds of bone tools have been relatively sparse on most sites. Exceptions are sites such as Amadzimba Cave in Zimbabwe (Cooke and Robinson 1950, 1954) and the Robberg caves excavated in the 1930s (a large unpublished assemblage is housed in the South African Museum, Cape Town). These caves yielded dozens of finely worked bone tools which indicated a high degree of craftsmanship. The quantity of completed bone tools on these sites suggests strongly that they might have been the home base of craftsmen specialising in the production of a surplus of bone tools.

Bone tools occur in Iron Age sites, but are relatively rare. The Mapungubwe sites proved to be an exception. Numerous formalised bone tools have been excavated on the site throughout the period of investigation, and numerous 'non-formal' bone tools were identified during the analysis of the faunal remains. The Mapungubwe people utilised bone, ivory, and terrestrial, marine and freshwater shells; their craftsmanship with the first two materials attained an exceptionally high standard. Gardner (1963) described bone and ivory finds and illustrated some of the link-shafts and points. In the following pages the culturally modified faunal material from the Mapungubwe sites is described in some detail according to the raw material used.

Gardner (1963) suggests that the arrow-heads from Mapungubwe were made from ostrich leg-bones and of ivory. Sparrman (in Rudner and Rudner, 1957) suggests that ivory was used by Bushman hunters in the manufacturing of arrowheads, while Stow (1905) claims that ostrich leg-bones were used. Ivory was not identified as a raw material in the collection of formal tools. Some tools were made of very dense white bone, but this could not be attributed to ostrich bones. Enough raw material would have been available in the form of cattle, sheep and goat limb-bones, for the manufacture of bone tools. These were the main source of raw material at Mapungubwe.

BONE TOOLS

Formalised Tools

During the analysis of Zimbabwean Late Pleistocene and Holocene lithic collections, I undertook a typological study which was extended to bone tools. The modified bone from Amadzimba Cave formed the basis for this study; 38 'types' were recognised in the collection. The Mapungubwe material was examined within the framework of these typological classes. Twenty of the Amadzimba types appeared in the assemblage, and three additional type classes (514, 529 and 534) were identified. These classes have therefore been utilised in the descriptions which follow; the prefix '5' merely denotes bone rather than stone.

Since the re-examination of the Amadzimba material has not been published, the full description of each type is given. The distribution of bone tool types at Mapungubwe is given in Table 10.1.

Type 501 (Plate 10.17)

Bone fragment, with a circular cross-section, which has been polished overall. Both ends are sharp points.

The two specimens belonging to this type were found on K2 in the cache of bone tools found by Gardner in 1937.

Type 502 (Plates 10.1 and 10.17)

Bone fragment which has been completely polished. The tool has a circular or oval cross-section, with a very sharp, pointed and circular-sectioned tip. The base is broken.

Twenty specimens conforming to the above description were found (Table 10.1). All except one specimen (K2/TS3, Level 15) occurred in the upper metre or so of the deposit.

Type 503 (Plates 10.1 and 10.17)

Completely polished bone with circular or oval section, in which one end forms a sharp point, the other is flat or slightly rounded.

These tools are probably the completed versions of Type 502, and were probably arrow-points. The Mapungubwe specimens vary in their length/breadth ratio. Nine of the 30 specimens have a shallow cut mark encircling the base, probably to facilitate binding or to increase the purchase of the bone point. In addition, seven specimens are decorated with chevrons or fine diagonal lines. This decoration is at the base of all except one of the tools, which has a lightly engraved double chevron just below the point. Such a decoration may indicate individual ownership.

Type 504 (Plate 10.2)

Polished piece of bone with a circular section. One end is rounded or roughly conical, and the base is broken. The end may be asymmetrically rounded.

These broken pieces probably relate to Types such as 510 and 514, and were probably used as link-shafts. Eighteen specimens have one or more cut marks encircling them just above the intact end. One specimen also

PLATE 10.1. Bone tools. From left to right: Type 502: UP/4, 2 and 121 from the Hill and Southern Terrace. Type 503: W/122, UP/12, UP/11, W/23 and W/25. UP/12 and 11 are decorated with a chevron pattern. The University of the Witwatersrand specimens are from Gardner's excavations on the Hill and K2; UP/12 is from the Hill. Photograph: C. K. Brain.

PLATE 10.2. Bone tools. Type 504: all from Gardner's excavations, University of the Witwatersrand collection, except for the first and third specimens from the left which are from the University of Pretoria collection. Note iron staining on UP/78 (third specimen from left). Photograph: J. Oosthuizen.

carries a chevron pattern, while another has a neat band of cross-hatching on its body. Of particular interest is UP/78. This specimen has a 0,5 cm wide iron stain forming a band around it which is all that remains of a thin iron band decorating the tool.

Type 505 (Plate 10,3)

A partially or completely polished bone splinter with an oval or a rectangular section. One end forms a sharp point, the other is straight.

These tools may have been used as some form of needle. One specimen was made from the fragment of a rib.

Type 507 (Plates 10.3 and 10.18)

Polished bone with a circular, rectangular or oval section. One end is spatulate or rounded while the opposite end may be constricted and blunt. (This type may include polished pieces which conform to the shape, but in which one or other extremity is broken.) This type also includes pieces which have a swelling low in the shaft (e.g. the K2 hoard specimens, see p. 113).

The constricted end of such tools is in most cases highly polished, suggesting that they may have been used as awls.

Type 509 (Plate 10.3)

Polished bone with a circular section. The point is relatively blunt and asymmetrical. The base is flat or slightly rounded.

These tools appear to have been used as awls of some sort, the asymmetry being produced by heavier wear on one face of the point.

Two specimens are decorated with sets of short, parallel lines cut horizontally into the bone. One specimen is covered over half its length by a single line of chevrons engraved on the bone.

Type 510 (Plates 10.4 and 10.18)

Polished piece of bone with a circular section. One end is pointed, rounded or conical (like a blunt pencil point). The other is flat.

These were probably used as link-shafts. They are very uniform in shape and size, with an average length of 6–7 cm. The majority of specimens have a shallow cut mark encircling one or both ends; few specimens have any other design on them. A single, badly executed chevron has been engraved on one specimen while another has two cut marks forming a spiral rising up the tool from the base.

Published descriptions of Bushman arrows either ignore the shape of the link-shaft, or describe it as 'pointed at both ends'. However, Schapera (1963: 129–130) describes a link-shaft used by the Naron, Auen and !Kung as being 'blunted at the tip'. He specifically associates this kind of link-shaft with poisoned arrows. Cooke and Robinson (1950: 111; 1954: 707) illustrate similar tools from Amadzimba.

Type 512 (Plates 10.5, 10.6 and 10.18)

Polished piece of bone with a circular, oval or rectangular section. One end is straight and polished smooth; the other end is broken. In sorting this category from

PLATE 10.3. Bone tools. Top: Type 509: UP/274 (Gardner, K2). Centre: Type 507: UP/15 (K2) and UP/16 (University of Pretoria). Bottom: Type 505: fourth and fifth specimen from the left from Southern Terrace, rest from K2. University of Pretoria collection except for third and last specimens from the left. Photograph: J. Oosthuizen.

PLATE 10.4. Bone tools. Type 510: compare with unfinished specimens on Plate 10.18. Universities of the Witwatersrand and Pretoria collections from K2 and the Hill. Photograph: J. Oosthuizen.

PLATE 10.5. Bone tools. Type 512: broken ends are flattened. University of Pretoria collection. From the Hill. Photograph: D. C. Panagos.

Mapungubwe, it became obvious that many of the specimens of this type were probably originally from Types 510, 513 and the iron-tipped arrow-point group, Type 514.

Shallow cut marks encircling the base of specimens are common. One specimen had irregular lines forming a band of decoration; two others had carefully executed decorations. One of these had a pattern of diamonds, the other a complex series of diagonal and horizontal lines with small, fine chevrons.

Type 513 (Plates 10.7 and 10.19)

Completely polished bone with a circular section. Both ends are flat or one end may be very slightly rounded. The piece may be straight-sided or may be slightly wider at the base; it may also have slightly convex sides. This type overlaps with Type 510 if one end becomes a blunt dome.

This is the form of tool generally described as a 'link-shaft'. In view of the specialised type of arrow (Type 514) at Mapungubwe, it seems likely that arrows with iron tips were connected to the arrow-shafts by means of link-shafts. Vinnicombe (1971) and Rudner and Rudner (1957) describe similar arrow-points, which are used in conjunction with a link-shaft.

Again, shallow cut marks are common around the base of the tools. Three specimens have very simple decorations in the form of horizontal lines or chevrons.

Type 514 (Plates 10.8 and 10.9)

Completely polished bone with a circular cross-section. The base of the piece is flat, slightly rounded or conical. The opposite end has been polished to form a thin, straight edge which is frequently split so as to form a shallow 'V' at right angles to the long axis of the piece. This type of bone tool has so far only been found on the Greefswald sites.

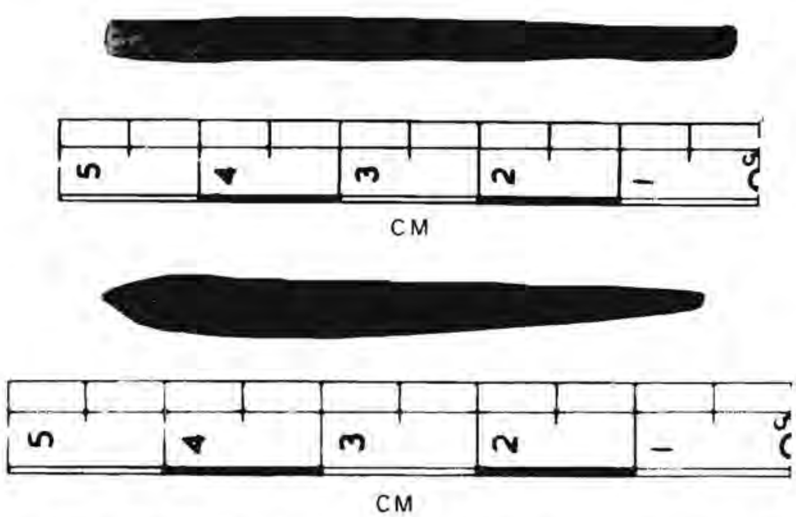

PLATE 10.6. Bone tools. Top: Type 512: specimen with fine engraved decoration from K2. Bottom: Type 527 from K2. Both from University of Pretoria collection. Photograph: D. C. Panagos.

PLATE 10.7. Bone tools. Type 513: all from the Hill. Last specimen in top row from the University of the Witwatersrand collection, also all except first and fourth specimens from the left in bottom row. Others from University of Pretoria. Photograph: D. C. Panagos.

Traces of iron remaining in the split bone indicate that the bone was used as a mounting for an iron tip, which was probably triangular. In some cases the split bone has broken away and the remaining portion has been polished to form a thin, smooth end. The iron point was then attached to this thin end, as proved by iron stains on such specimens. These tools are interesting in that they represent a blending of pre-metal-using and metal-using hunting technology. The use of bone for the fore-shaft may indicate that iron was a rare and vaulable commodity.

Stow (1905), Rudner and Rudner (1957) and Vinnicombe (1971) describe arrows which have bone fore-shafts armed with metal tips. Vinnicombe records that the metal-tipped arrows from the Drakensberg all carry a small additional barb bound onto the fore-shaft. A Bushman informant told Miss Lloyd that such spurs were made from the 'wing feather root' of an ostrich (Goodwin, 1945: 439). He added that such barbed arrows were used for gemsbok and ostrich, but never for springbok. The few extant examples of this type of arrow show that they were poisoned, with the poison extending below the barb.

Most of the Mapungubwe specimens have a thin cut mark encircling the base. Three specimens are decorated with multiple cut marks around the base or close to the tip.

Three particularly interesting specimens (UP/146–148) show the remains of decoration with black paint and ochre. Two of the specimens have a band of black paint 2,4 cm and 2,6 cm from the tip respectively. The third specimen has thin painted black bands at 0,6 cm and 2,4 cm from the tip. Between these two lines, the tool was covered with red ochre, which was rubbed into the bone (Plate 10.9).

Painted (or pigmented) bone tools are rare in the South African archaeological record. Deacon (1976: 49) describes a caracal-sized atlas vertebra found at Melkhoutboom, Cape Province, which had been used as an ornament and was stained with red ochre. Plug (1978: 242) noted that red ochre had been rubbed into cut marks on two polished bone tools from Bushman Rock Shelter in eastern Transvaal.

PLATE 10.8. Bone tools. Type 514: iron stains clearly visible on several specimens. Broken split ends have been polished smooth. Piece of iron still fixed in split end of fourth specimen from top. All from Gardner's excavations on the Hill. University of the Witwatersrand collection. Photograph: D. C. Panagos.

PLATE 10.9. Bone tools. Type 514: iron stains clearly visible on first and third specimens from left. Position of painted bands of red and black also visible. Fragment of iron still visible in right-hand specimen. All from the Hill. Third and fifth specimens from left are from the University of the Witwatersrand collection. Photograph: J. Oosthuizen.

Type 522 (Plate 10.10)

Polished bone with a rectangular section. One end is a blunt point or spatulate. The other end is perforated and may be finished off in various ways or may be a partially preserved articular end. The tools falling into this type have previously been referred to in the literature as 'eyed needles'.

The Mapungubwe assemblage yielded three complete specimens and one broken one (which has been classified as Type 523). The largest specimen (9,2 cm; W/129 from K2) is a piece of bone with a rectangular cross-section and is polished over its entire surface. A shallow depression is all that remains of the marrow cavity. One side is convex, the other side slightly convex, then straight. The base is U-shaped and has been perforated by a roughly circular hole, drilled from both sides. The point is slightly constricted, highly polished, and sharp. A straight cut mark decorates the piece just above the 'eye'.

UP/130 is 4,4 cm long, rectangular in section and carefully polished although some of the cellular structure of the bone still shows. The base has a U-shaped notch in it, just below a small perforation drilled from one side. The bottom of the perforation is smoothed from use. A shallow depression extends from the eye to the base on the underside. This was probably worn away by the thread used by the owner. The sides of the specimen converge to form a relatively sharp point which is slightly polished.

UP/131 (from MK1) is a small piece of bone with an oval section, fairly well polished. The tip is broken; the base is U-shaped, with a figure-of-eight-shaped perforation made from both sides. The lower part of the perforation is well-worn, and there is a slight groove below the eye caused by the thread which was used.

The wear visible on these specimens clearly indicates that they were used in the same way as modern needles.

Gardner (1963) records finding more eyed and notched needles than exist at present in the collection.

Type 523 (Plate 10.10)

This is most likely a type which is a waste class arising from Type 522. It includes polished pieces of bone with one broken end, the other end being either shaped in various ways, or a partially preserved articular end. The complete end is perforated. It is very likely that such pieces are broken 'eyed needles'.

Two specimens occurred in the Mapungubwe collection, both probably made from a piece of rib, as one side preserves a cellular rib-like structure. The perforation on one specimen had been made from both sides, while on the other it had been made only from one side. Below the perforation and on the edge of UP/132 remains of a second perforation or notch is present. Although the base is damaged, the needle was obviously used, as the hook-like projection formed on the edge of the needle is smoothed from use.

Type 525 (Plate 10.11)

A completely or partially polished piece of bone with a circular, oval or rectangular section. The base may be flat or conical, and is frequently encircled by a shallow cut mark, the opposite end being polished to form a thin U-shaped or straight end with a flat section.

These pieces may form part of the manufacturing chain for Type 514.

Type 529 (Plates 10.12 and 10.13)

Piece of bone in which the shaft is smoothly polished. A raised band, or series of bands, have been formed on the shaft as a result of cutting and polishing.

PLATE 10.10. Bone tools. Types 523 (left- and extreme right-hand specimen) and 522: W/129 from K2, rest from the Hill. All except second specimen from left are from the University of Pretoria collection.

PLATE 10.11. Bone tools. Type 525: all from the Hill. All except specimen on left from University of the Witwatersrand collection. Photograph: D. C. Panagos.

Some of these specimens may be blanks for Types 510 and 513. Two of the specimens were cut just below the band, and then snapped off. Two smoothly polished specimens (UP/196 and UP/195) had polished, raised bands on the shafts. UP/195 might have been used as a hair ornament.

Type 534 (Plate 10.14)

A bone tube, made from the shaft of a mammal or bird bone. The ends may be lightly or completely polished, and the tube may be decorated.

Bone tubes have been recorded from a number of sites. They could have been used as pipes, receptacles or ornaments. Clark (1959: 236) suggests that such objects could have been used as handles or whistles. Lichtenstein (in Bigalke, 1966: 2) mentions that herdsmen sometimes used a small pipe to call to their cattle, and Daniell (1804: Plate 4) mentions the use of a bone whistle for controlling cattle.

Two such specimens were found in the Mapungubwe assemblage. UP/191 is a very smooth tube, made from a bird bone, with both ends cut and smoothed. The tube is decorated with an irregular pattern of cut marks. W/190 may have been made from a Bov.I tibia shaft. One end is broken, the other is smoothed off, but has a V-shaped notch which is polished smooth, possibly from a thong. The tube is elaborately decorated with a carefully executed pattern of diamonds above two sets of nine short lines.

Neither tube shows any sign of burning so it is unlikely that they were used as smoking pipes.

In addition to the identifiable formal bone tool types, the Mapungubwe collection also contained 34 completely polished midsections of bone. One of these was decorated with two vertical double lines of chevrons. These tools are formalised in that they conform to a consistent pattern. In addition, the majority are completely polished, i.e. there is little or no indication of the type of bone used in manufacturing the tool.

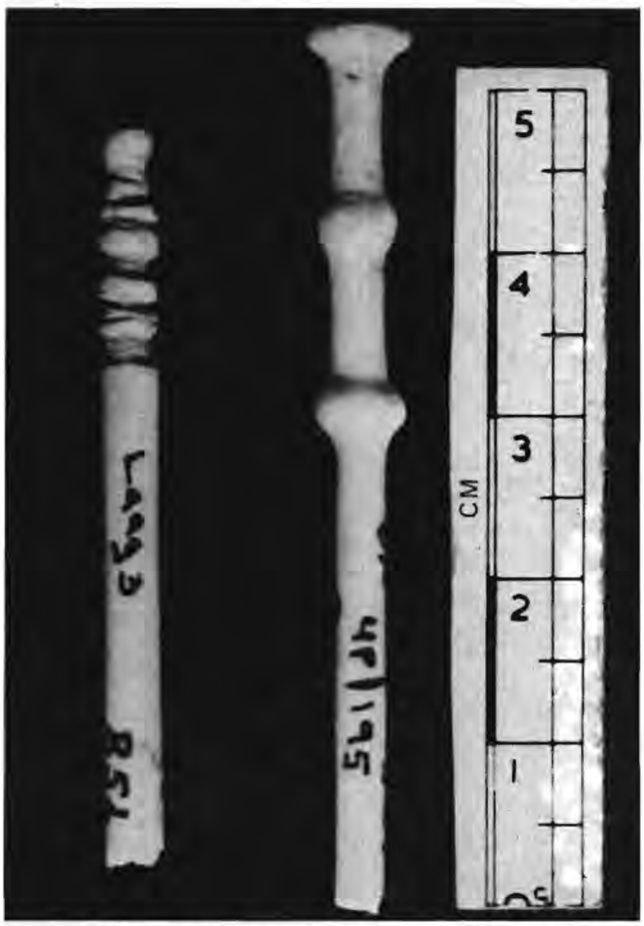

PLATE 10.12. Bone tools. Type 529: both from the Hill. University of Pretoria collection. Photograph: D. C. Panagos.

PLATE 10.13. Bone tools. Type 529: Gardner's excavation, centre and bottom specimen from the Hill. University of the Witwatersrand collection. Photograph: D. C. Panagos.

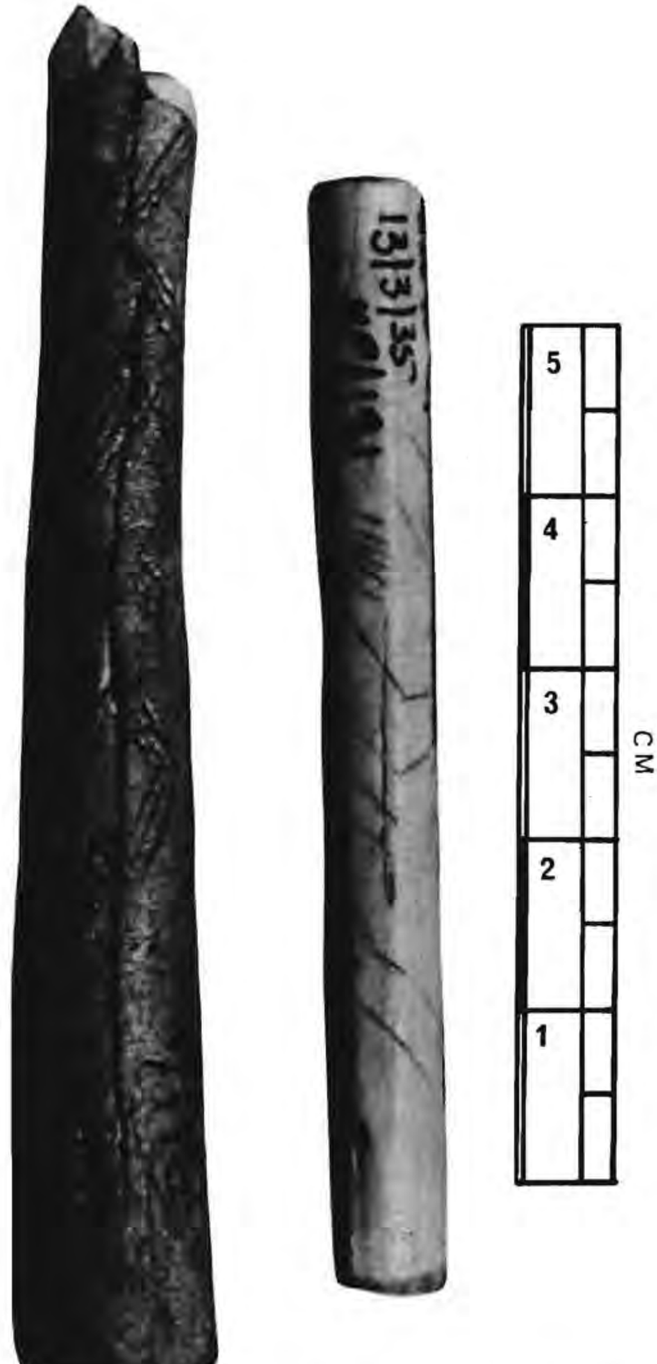

PLATE 10.14. Bone tools. Type 534: Left: The Hill, University of the Witwatersrand collection. Right: University of Pretoria. Both from Gardner's excavation. Photograph: D. C. Panagos.

A second less formalised type of bone tool was utilised at Mapungubwe. These tools are 'formalised' in so far as the working edge is concerned, i.e. they conform to a set pattern and can be classified into 'types'. However, this group of tools is made on splinters or flakes of bone which have not been modified except for the working edge. It is therefore sometimes possible to identify the actual bone used in the manufacture of the tool.

Type 517

Bone flake or splinter in which the articular end has been completely removed, and one end polished to form a blunt, usually asymmetrical point. The base of the piece may be partially polished. It is usually made from a relatively heavy piece of bone which may still be identifiable.

In the Mapungubwe assemblage, most of the tools falling into this class were made from bone flakes. One bone flake was from a metapodial, while one was from a very large long-bone which appeared to be a Bov.III tibia. Two specimens were made from fragments of ribs. Two specimens were polished on the end opposite to the blunt tip, and one was lightly flaked on that end. The polishing extended onto the under-surface in another specimen. The type of polish on the tips of these tools suggests contact with relatively soft surfaces.

Type 518

Bone splinter or flake in which the articular end has been removed and one end has been polished to form a sharp or relatively sharp point. The base may also be partially polished.

The points of these tools tend to be relatively rough or slightly blunted. One specimen from Mapungubwe was apparently made from a rib fragment, one from an ulna fragment, and another appears to be part of a hyoid bone. These tools were probably crudely finished awls.

Type 519 (Plate 10.15)

Bone splinter in which the articular end is wholly or partially preserved and the other end has been polished to form a blunt or spatulate end. The base may be partially polished.

Two of the Mapungubwe specimens were made from splinters of proximal metatarsals (Bov.II and Bov.III), and one from a Bov.II left proximal radius. The shaft of this last specimen was polished from handling.

PLATE 10.15. Bone tools. Type 519: both specimens from K2. University of Pretoria collection. Photograph: D. C. Panagos.

Type 527 (Plates 10.6 and 10.19)

A bone splinter with a circular, polished section in which one end is a sharp point, and the other is roughly shaped.

All fourteen specimens were found on K2; this type may be a stage in the manufacturing of Types 501 and 502, as the ends are in many cases cut off or cut and snapped off.

Type 531

A relatively heavy piece of bone or bone flake in which one end has been utilised as a scraper or a rubber.

The bone flake from Mapungubwe falling into this category has a straight end which has been sharpened to form a strong, sharp edge. There is flaking along the right side of the flake, suggesting utilisation.

Type 537

Bone splinter in which one end is a roughly polished articular end, the other is broken.

The Mapungubwe specimen is made from a splinter of a metapodial. The articulation and shaft have been whittled down, then lightly polished.

Type 538

Bone splinter in which the articular end is wholly or partially preserved and may be lightly polished. The opposite end is polished to form a blunt or U-shaped end with a convex lower surface.

Two of the Mapungubwe specimens are made from Bov.III metatarsal splinters. The worked extremities are U-shaped and the under-surface convex.

Non-formal Bone Tools

During the sorting of the faunal material it was noticed that a large number of bones showed evidence of utilisation. These were not bone tools in the sense that they had been shaped for a specific purpose, but rather pieces of bone (often bone flakes or ribs) which had been picked up and used for a short time for a specific job before being discarded. The most common type of utilisation was polishing and in these cases sharp or natural edges had been smoothed by abrasion. Occasionally, abrasion would form a very rough point but more usually it merely smoothed the edge of the piece into a convex line.

Bone flakes with limited polish on one edge, or with a convex edge, or with polish on one or both sides in addition to the edge or edges were common in the assemblage. One such bone flake came from a distal tibia. The type or bone used for the other specimens could not be ascertained.

It was of interest to find a large number of rib fragments which had one end smoothed by utilisation into a convex or, more rarely, a straight edge. Two specimens had been cut straight first, then smoothed from use. A few specimens had concave smooth ends; one of these also had flaking resulting from utilisation on the end. Two specimens had both ends convex and smoothed from use while another had two polished sides which converged to form an asymmetrical point. Four specimens had a convex, smoothed end, with the rest of the rib smoothed from handling, suggesting that some of these tools were utilised for a considerable period of time. Polished edges associated with a smoothed end were rare; in two specimens, however, one edge had been utilised until it was noticeably concave. A single specimen had an end which was ground on both faces to form a strong, sharp edge. The most unusual specimen had one convex end polished, the other cut into a V-shaped notch which showed polish within the notch. Such a specimen could have been used as a handle, or possibly in the preparation of thongs.

Six bone pieces recognisable as particular types of bones had been utilised. Two of these were radius shafts, both of which had convex, polished ends. In one specimen, the opposite end had been ground to a point. A portion of a Bov.I humerus shaft had light polish on the proximal end of the shaft, while a Bov.II long-bone shaft fragment had one convex polished end. A Bov.II tibia shaft had been cut through and roughly polished, while a large fragment of the proximal end of a Bov.III femur was slightly smoothed, resulting in a sharp but rather wavy end.

Three first phalanges had ground edges, as if they had been utilised; one of these was from a juvenile Bov. III. The condyle of a Bov.II mandible was found with light polishing on the anterior edge, while a fragment of a very large rib showed flaking along one edge as if the rib had been used for chopping. Two large slabs of bone, one of which probably came from a Bov.III scapula, showed extensive polishing and utilisation. One specimen was rounded off and polished to form a rectangular slab. The scapula was polished overall, although chisel-like shaping marks were visible on the articulation; this shaping was designed to produce a rounded, knob-like end. The straight edge of the piece was sharp, and showed utilisation damage. Clark illustrates a similar specimen from Matjies River Cave, Cape Province, and quoted Le Vaillant's account (Clark, 1959: 236–238) of the use of ribs in the preparation of skins (suggesting a use for the ribs described above), and also suggests that large spatulate tools could have been used as meat mattocks or in the preparation of skin (Plate 10.16). Meiring (1952: 30) illustrates additional examples of this kind of tool which suggest that it is a relatively common tool form in the Stone Age cultures.

An unusual specimen (MK/1902) is the distal end of a Bov.II right tibia. Five small holes were drilled into the epiphysis, suggesting that the bone may have been suspended from a thong. The broken end is smooth from usage, and the shaft appears to have been reamed so that the walls were very thin. It is difficult to suggest any use for this piece except as an ornament or as an incomplete specimen of Type 534.

Another very unusual non-formal 'tool' was found in TS2/Level 1 (Plate 10.16). This was a portion of a *B. taurus* scapula with one surface criss-crossed by a maze of shallow cut marks, much like the surface of a kitchen chopping board. It seems very likely that this was the purpose served by this specimen. Also of interest is the proximal end of a left *B. taurus* metacarpal, also from TS2/Level 1. Just below the articulation are a large number of parallel lines which appear to have been designed to improve the purchase of sinews on the bone, and may therefore have been part of a composite tool.

PLATE 10.16. Left: *Bos taurus* scapula with 'chopping board' damage. From K2/TS2. Right: bone 'mattock' made from a scapula. University of the Witwatersrand collection. Photograph: C. K. Brain.

Finally, with respect to 'worked' bone, three Bov.II incisors were found all of which had very heavy wear, and a V-shaped notch cut into both sides of the tooth just below the enamel. Initially, it was thought that the grooving was artificial and was designed to allow the teeth to be suspended on a thong or string, and act as ornaments. Welbourne (1971: 124) records a *B. taurus* incisor from Matluassi which was treated in the same way. Gramley (in Odner, 1972: 90–91) also records similar incisors from Narosura in Kenya, and maintains that the grooving is natural. Inspection of the Nguni comparative material revealed such grooving in one specimen. Similar grooving has now also been found on the teeth of a wild bovid which confirms that such grooving is a natural feature, although it may have been utilised by Man at some stage.

The assemblage thus yielded a total of 605 formal bone tools (whole or broken) and 93 non-formal tools—a total yield of 698 specimens. Gardner (1963) mentions a minimum of 630 specimens. The excavations undertaken by the University of Pretoria from 1968 to 1977 yielded 236 specimens, all of which were examined and appear in Tables 10.1 and 10.2. It is therefore clear that a large part of the 1935–1939 collection of bone tools has either been lost or was never kept.

Approximately two-thirds of the formal bone tools were found on Mapungubwe Hill; the majority of these came from the uppermost 0,6 metre (2 feet) of deposit. Table 10.2 shows the vertical distribution of bone tools at all three sites. Gardner (1963: 70) maintained that the vertical distribution of bone tools was very limited. Although the University of Pretoria excavations yielded a large quantity of bone tools from below 1 metre at K2, it seems that the major period of manufacture and use of bone tools was during the deposition of the uppermost 0,6 metre of deposit.

It has been suggested that the formalised bone tools are characteristic of Mapungubwe Hill. Table 10.1 shows that most of the bone tool types occur at all three sites. Type 517, which is the commonest form on K2, is not a formalised tool but is more formalised than those which fall into the 'non-formal' tool types. Link-shafts of Type 510 occur on all three sites, and 'arrow-points' are most common on K2 (excluding Type 514). However, 'link-shaft' Type 513 occurs largely on MK1; it has been suggested that these link-shafts may be related to the specialised arrows (Type 514) which do not occur on K2. From this point of view it is perhaps justifiable to refer to MK1 Phase 4 as the 'link-shaft phase', but it should be borne in mind that formal bone tools are not exclusive to Mapungubwe Hill, and also that virtually one third of the worked bone from the early excavations has disappeared, so that the original distribution of worked bone will never be known.

Gardner (1963: 31, 112) recorded the finding on K2 of a hoard of 'over one hundred rough bone arrow-points' at a depth of 3 feet (± 1 metre) in 1937/1938. A small box bearing his original label with the correct stratigraphic data was found among the assemblage in the Archaeological Research Unit. The box contained the 'hoard' referred to above. Examination of the collection revealed that virtually all the specimens were incomplete in that they had not been polished down to the fine finish found on virtually all the other Mapungubwe bone tools. In many cases the extremities were only 'roughed out', although many were also broken. I believe that Gardner was correct in suggesting that the collection represented the unfinished stock of a bone-tool maker. The specimens belonged to a very limited number of Types; the 97 specimens were distributed as follows:

Type 501	2
Type 502	12
Type 503	19
Type 507	4
Type 510	21
Type 512	24
Type 513	2
Type 527	13

This find suggests strongly that bone tools were being manufactured at K2 for use by the inhabitants of the Hill. The complete hoard as it exists today is illustrated in Plates 10.17–10.19.

'Formal' bone tools have been recorded by Maggs (1976) in the Orange Free State, Welbourne in Botswana (1975, Tautswe) and Fagan in Zambia (1967, Isamu Pati). Robinson (1959: 88, 156) records whistles made from bone tubes at Khami. 'Non-formal' bone tools (= blunt points made from flakes, 'rubbers' made from flakes, etc.) were present in relatively large numbers in the Orange Free State (Maggs, 1976) and at Olifantspoort, Klipriviersberg and Melville in the Transvaal (Welbourne, 1971); sparse examples occurred at Tautswe, Matope Court (Malaŵi: Voigt, 1973) and on the Kalomo sites in Zambia. The use of bone tools on Iron Age sites is therefore fairly well documented and it is remarkable how uniform the less formalised and 'non-formal' tool types are. It is interesting to note that Welbourne (1971: 123) mentions that ribs were particularly favoured as 'rubber' or skin preparers on all the sites analysed by him. This type of tool thus enjoys a long tradition of usage.

USE OF IVORY

A large quantity of ivory was recovered during all the excavations on K2. No difference was noted between the ivory of the fragments and of the finished articles present, so that it was assumed that all the ivory encountered in the assemblage was elephant ivory. It is not impossible that some warthog and hippopotamus ivory may have been used, e.g. WK2/4881 is a fragment of warthog ivory which had been cut through and ground smooth.

Three fragments of elephant tusk were found during the excavations, proving that the ivory came on to the site in its raw form (Chapter 7). Ivory chips or fragments are numerous (143 specimens) and finds of ivory were made at all depths, even the lowest level of TS3 (Table 10.3).

Fragments of completed 'armbands' or bracelets constitute 25% of the total sample. These can be divided into two major types i.e. narrow and deep 'armbands' (Plates 10.20–10.23). It seems very likely that these specimens were in fact decorations to be worn on the arm, although the diameter of most of the specimens is relatively small. Bigalke (1966: 8) mentions that the Cape Nguni men wore their highly-prized ivory armbands above their left elbows and that in some cases these were so tight as to cause considerable pain. (See also Daniell, 1804: Plate 4.) Gardner (1963) suggested that the deep specimens might be archers' wrist guards, but as there is no evidence of the use of this type of protection in southern Africa, it is more likely that they were used for personal adornment.

The remains of 23 possible armbands with a depth of less than 5,0 cm were found in the assemblage. These pieces either had two flat or two bevelled edges, or a combination of flat and bevelled edges. The minimum diameter (which could not be measured properly in most cases because the specimens were too incomplete) is usually greater than 6,0 cm.

PLATE 10.17. Bone tools. The K2 bone 'hoard'. Top row: Type 502. Centre right and bottom right: Type 501. Bottom left: Type 503. Scale in cm. Photograph: D. C. Panagos.

PLATE 10.18. Bone tools. The K2 bone 'hoard'. Top two rows: Type 512. Bottom left: Type 507. Bottom two rows, right-hand side: Type 510. Scale in cm. Photograph: D. C. Panagos.

PLATE 10.19. Bone tools. The K2 bone 'hoard'. Left: two specimens of Type 513. Right: Type 527. Scale in cm. Photograph: D. C. Panagos.

A few of these specimens displayed interesting characteristics. UP/294 is an almost complete ring of ivory, with a depth of 4,6 cm and a diameter of 6,5–7,0 cm (Plates 10.22 and 10.23). Both edges are ground flat. The circle is incomplete because a portion has been broken away. However, the opposite end of the ring is *not* a break, but is a carefully smoothed, flat edge. W/297 also displays one polished flat 'end' to the circle (depth 4,3 cm; diameter + 6,0 cm; Plates 10.22 and 10.23). These two specimens suggest a solution to the small size of these armbands—it appears that they were not complete circles, but had a gap in the ring (like some modern bracelets) which would greatly facilitate putting the armband on to the arm. (This feature was originally noticed by A. Brown during cataloging of the material.)

W/297 is also interesting in that the edges of the band are smoothed down and rounded from being worn. W/323 (depth 2,9 cm; diameter + 6,0 cm) displays the same pattern of internal wear, as well as a smoothed end, suggesting frequent donning and removal of the armband (Plate 10.20).

A different type of damage is apparent on UP/321 (depth 3,1–3,3 cm). Both edges of this specimen are polished flat, but a series of seven flakes has been knocked off one edge (Plate 10.24). This is the kind of damage which might result from repeated dropping or banging, both of which would suggest continuous usage (and possibly careless handling when not being worn!).

Two specimens, K2/3092 and W/312 (depth 3,7 cm and 3,3 cm respectively) each have two holes drilled close to one edge. These holes are drilled from one or from both sides, and one is asymmetrical as if from the constant friction of a thong. The significance of these perforations is discussed below.

Three fragments which may have been parts of narrow armbands are decorated with grooves and cut marks which probably relate to the manufacturing process (T2/4009, T2/3489 and T2/3490).

The assemblage yielded 16 fragments which appear to have come from deep armbands. The edges of these are similar to those of the narrow armbands, i.e. flat, bevelled or a combination of the two.

UP/303 (from K1) is unusual in that the piece carries a band of decoration in the form of a wavy-line pattern. The edges of the specimen were worn to a V-shape by usage. It is 9,2 cm deep (Plate 10.25).

Eleven of the fragments have perforations drilled into one or more edges, and from one or both sides. The depth of these armbands varied from 7,0 cm to 15,2 cm (Plates 10.26 and 10.27).

Two specimens (UP/300 and UP/302) had one unbroken end which was polished flat, as did W/299 (see below). These specimens give additional support to the idea that armbands were not in the form of a complete circle.

PLATE 10.20. Worked ivory. Examples of narrow armbands from K2. University of the Witwatersrand collection except for top and bottom right-hand specimens. Photograph: D. C. Panagos.

PLATE 10.21. Worked ivory. Fragments of narrow and deep armbands. University of the Witwatersrand collection except for top right-hand specimen. Photograph: D. C. Panagos.

PLATE 10.22. Worked ivory. The three best preserved armbands. Left: W/297. Right UP/294, which never was a complete circle. The centre specimen (UP/320) shows repair work before the ivory separated. Centre and right-hand specimens from University of Pretoria. Photograph: D. C. Panagos.

PLATE 10.23. Worked ivory. Details of circumference of UP/294 (left) and W/297. Photograph: D. C. Panagos.

PLATE 10.24. Worked ivory. Armband UP/321 from K2 showing flaking damage on edge. Photograph: J. Oosthuizen.

PLATE 10.25. Worked ivory. UP/303. Detail of wavy-line decoration. Photograph: D. C. Panagos.

Two specimens (W/299 and W/308; depth 15,2 cm and 8,1 cm respectively) each had three perforations drilled close to one edge. In W/299 the top and bottom perforations were oval as a result of abrasion by a thong; in W/308 the lowest perforation showed the same type of abrasion.

What was the purpose of these perforations? Perforations in pottery fragments are well known from coastal sites and have also been found in Iron Age pottery. This type of perforation enabled the owner to bind the pot across a crack, thus prolonging the life of the vessel. The question which arises with the armbands is whether such perforations were used to hold together separate pieces which had broken apart, or to join together separate pieces to form a jointed armband.

UP/320 suggests that these perforations may have been part of a 'stitch in time' philosophy. UP/320 (from K2) has V-shaped polished edges and is 8,8–9,2 cm deep (Plates 10.22 and 10.27). It was found broken into nine pieces, five of which had perforations close to the edges. These perforations were mostly drilled from both sides, and showed signs of abrasion. The pieces could be joined together to form two large pieces, the ends of which abutted neatly. Only two of the breaks showed weathering on one side of the break, whereas all the others were clean, showing no signs of abrasion, and could be fitted neatly together and glued. This suggests that when a crack appeared in an ivory armband, holes were drilled on either side of the crack and the armband was bound across the crack before it opened completely, thus avoiding abrasion. The cracks only opened subsequently in the soil or during excavation. In such a case, the perforations were part of preventive measures aimed at stopping cracks from opening. UP/320 is also interesting in that it is the only specimen found which was definitely a complete, closed circle; it is also extremely narrow in diameter and is most likely to have been worn by a child or a very small-boned adult.

Bigalke (1966: 7) confirms the idea of repairing ivory armbands in his observations on the Cape Nguni habit of repairing such armbands with metal pegs.

In addition to the above specimens, the assemblage contained two large pieces of worked ivory. W/295 is a slab of ivory from a large tusk with one end cut cleanly through. Below the cut are two deep and several shallow cut marks. W/309 is a large fragment with one cut and polished end; the other is unfortunately broken. On the inner surface, two highly polished depressions extend inwards from the edge, much like a pair of finger or thumb marks. The purpose of this piece is obscure.

The above data show that ivory is an integral part of the K2 phase of the Mapungubwe sequence. Ivory is not unknown on Iron Age sites, but is fairly rare and has certainly not been found in such quantities on any site, although Fagan *et al.* (1969: 138) mention 'many ivory fragments' at Ingombe Ilede in Zambia. Gardner (1963: 31) mentions that 'armlets, bracelets and rings of bone and ivory were discovered in all blocks'. Apart from this, he mentions only an engraved portion of a tusk (possibly UP/303 from K1) and two sections of ivory with holes drilled in them, one of which is the specimen described above as W/299. His statement on the distribution and quantity of ivory confirms that the extant collection is no longer complete.

Ivory occurs on a number of sites in South Africa, Zimbabwe, Botswana, Zambia and Malaŵi. From South Africa, Maggs (1976: 210) records a carefully polished broken rectangle of ivory, which had been perforated at one end, from OND3, in the Orange Free State. He mentions fine striations on the underside which suggest shaping by sawing, much like the Mapungubwe material. Three ivory 'lozenges', two of which are stained red, a polished and perforated rectangle and a fragment of a bracelet which appeared to be of ivory have been recorded by Inskeep and Maggs (1975) from the site of the Lydenburg Heads, and constitute the earliest find of ivory from southern Africa. Welbourne (1971: 124 and H57) records eight fragments of ivory bracelet from Klipriviersberg. One of the pieces had two holes drilled into it. From Zimbabwe no ivory is recorded in Huffman's (1974*b*) monograph on the Leopard's Kopje tradition, nor in the excavations at

PLATE 10.26. Worked ivory. Fragments of deep armbands with holes drilled for repairs. University of the Witwatersrand collection except for extreme top left- and top right-hand specimens. Photograph: D. C. Panagos.

Great Zimbabwe. Robinson (1959: 155–156) describes finely carved ivory figures and 'divining dice' from the Khami ruins, and mentions that fragments of plain ivory bracelets have been found at other sites and decorated ivory rings from Dhlo Dhlo. Welbourne (1975: 8) records three fragments of ivory bracelets from Tautswe in Botswana. Ivory is recorded at Ingombe Ilede (fragments only), and Isamu Pati (Fagan, 1967: 87, 92, 122), both in Zambia. Phillipson (1970: 107) describes two bracelet fragments (from Twickenham Road in Zambia) which are roughly rectangular in section, and are therefore narrow bands of ivory. Voigt (1973: 138) describes a fragment of ivory from Matope Court in Malaŵi which displays the same kind of 'sawing' striations observed at Mapungubwe.

In all the above cases (except Ingombe Ilede), ivory occurs only in the form of finished objects and strongly supports the suggestion in Chapter 7 that Mapungubwe is unique in that there is evidence for the working of ivory, as well as the use of finished objects made from this attractive and valuable material.

MOLLUSCS IN THE MAPUNGUBWE CULTURE COMPLEX

Three groups of molluscs contributed to the cultural traits of Mapungubwe. These are terrestrial, freshwater and marine species.

Terrestrial Species

Numerous very small terrestrial molluscs which played no part in the cultural life of the community, were found at Mapungubwe. However, the large land snail, *Achatina immaculata,* appears to have been of considerable importance. The majority of specimens occurred on K2, and only this site yielded specimens which showed signs of cultural modification. Ten specimens from K2 had the edge, or part of the edge, of the aperture ground flat with oblique striations or striations at 90° to the edge. Two of these specimens (T2/3276 and a specimen from T1/Level 3) are complete. If they had first been used as food they were possibly cooked before

PLATE 10.27. Worked ivory. UP/320 showing details of perforations drilled for repairs. Photograph: D. C. Panagos.

PLATE 10.28. *Achatina immaculata.* Left: specimen from Eiland in which the aperture is ground down in the same way as T2/3476. Right: complete, unmodified shell from Pont Drift site. Photograph: C. K. Brain.

the animal was removed from the shell. A complete shell with the entire edge ground flat was picked up by the author on the surface at the Eiland Early Iron Age site in 1976; T. M. Evers (personal communication) postulated that the shells had been used as scoops for the salt-rich soil during the salt manufacturing process which was carried out there. Van der Waal (personal communication) provided the information that *Achatina* shells are commonly used as scoops or receptacles or, with the apex cut away, as a funnel when medication is being poured into a patient's ear! Fagan *et al.* (1969: 90) record the use of *Achatina* shells in the manufacture of pottery (Plate 10.28).

Achatina immaculata had some spiritual value to the people of K2 as evidenced by the frequent occurrence of complete specimens in the 'Beast Burials' and graves. In addition, the species was utilised as a food animal, as raw material for beads and, as mentioned above, as a source of tools. It was a useful shell in many ways.

Freshwater Species

Two large freshwater species are represented by fragments: *Aspatharia wahlbergi* and *Unio* sp. One specimen of each in which one edge was ground flat from utilisation was found on K2. Three specimens with ground edges were found in MST/K8, and five in MK1. River mussel shells with edges ground flat have been recorded from a number of sites, e.g. Maggs (1976: 191; one specimen); Welbourne (1971: 122–123; Klipriviersberg) and Woodward (in Huffman, 1974*b*: 135–137; Leopard's Kopje sites).

Gardner (1963: 16) suggested that such wear could be a result of the use of the shell for burnishing a pot. There is good ethnological evidence for the use of a large river mussel shell in burnishing and finishing off of pots, so that, while they could perhaps also have been used in the working of skins, it seems most likely that the main use for these shells was indeed as pot burnishers.

Marine Species

Four species of marine shell were identified in the old and new collections during the present analysis.

Nassarius kraussianus is an extremely small (under 1,0 cm) gastropod, commonly found in marine estuaries. It is a scavenger which frequents mud-flats and lagoons from the western Cape to Mozambique. The single specimen found has a small hole in it, and shows overall signs of polishing. It was undoubtedly used as a bead, although how such a minute specimen could have found its way from the coast to Mapungubwe is an enigma.

Natica sp. also has a very small shell (1–2 cm); there is no indication that the specimen found was used as an ornament.

Eight specimens of *Polynices mamilla* were found, six of them being from the earlier excavations. These are almost certainly the specimens described by Gardner (1963) as *Nerita.* All except one of the specimens have a perforation on one side and in six of the specimens the perforations are worn smooth from friction with the thong or string on which they were originally suspended. These shells were thus specifically used as ornaments.

Cypraea annulus is a very common marine species at K2. Only three specimens were found on the Southern Terrace, and the Hill. Six specimens from K2 were either not obviously modified or too fragmentary to detect any modification. The remaining 41 specimens have had their dorsal surface cut away. In most cases the resulting edges are smoothed, and flat facets have been worn away on the dorsal surfaces or edges of the shells (Plate 10.29).

It is highly likely that these shells were attached to clothing, or to objects such as baskets. Cowrie shells are well known as a means of ornamenting clothing, and ethnological specimens decorated with cowries exist from within South Africa and from as far inland as the Okavango.

One specimen (TS1/1093) was coated with a hard, red-brown layer, suggesting that the shells might have occasionally been smeared with red ochre. A group of eight specimens (WK2/4878), found by Gardner and associated with Beast Burial no. 6, was covered with a dark brown to black crust. This might again have been colouring matter, or the remains of mastic used to attach them to some object. This cluster suggests that cowries were common enough to allow groups of the shells to be used as ornamentation (Plate 10.29).

Maggs (1976: 126, 190, 263) records a specimen of *Cypraea helvola* and of *Nerita* sp. from sites in the Orange Free State; *Corbicula africana* and *Unio* sp. from OU2, and *Cypraea annulus* from OXF1; all the specimens have ground dorsal surfaces, umbones or edges. Welbourne (1971: 122) records only abraded mussel shells from Klipriviersberg. Robinson (1959) records *Cypraea* sp., cf. *Murex brevispina* and cf. *Polynices* sp. from Khami; the cowrie had been treated in the same way as the rest of the Mapungubwe material. Woodward (in Huffman 1974*b*: 135–137) records *Achatina* sp., *Burtoa nilotica, Limicolaria* sp., *Cafferia caffer, Mutela dubia* and *Aspatharia rubens*. The *Cafferia* specimens show polished edges as at Mapungubwe, and one specimen was apparently perforated for suspension. Welbourne (1975: 9) records *Achatina* sp., *Cypraea moneta* and *Unio* sp. from Tautswe; five specimens of the two species had abraded edges, and the cowries were reduced dorsally.

In Zambia, Fagan (1967) records *C. annulus, Polynices mamilla* and *Conus* sp. shells from Ingombe Ilede, in addition to *Achatina* sp. and other smaller terrestrial species. The cowries had been modified for use as orna-

PLATE 10.29. *Cypraea annulus*. Top: dorsal and ventral views of specimens showing how dorsal surface is cut away and ground. Remaining eight specimens from Burial No. 6 on K2; brown mastic-like substance adhering to specimens. All from the University of the Witwatersrand collection. Photograph: D. C. Panagos.

ments. He also mentions *C. annulus* from Isamu Pati and Kulundu and *Conus* sp. shells and *Aspatharia wahlbergi* (Isamu Pati). Also in Zambia, Phillipson (1970) found two cowries and fragments of *Achatina* at the Twickenham Road site. Only freshwater and terrestrial species (*Aspatharia* spp., *Lanistes* spp. and *Achatina* sp.) were recorded by Voigt (1973) from Matope Court in Malaŵi, but a fragment of a cowrie has subsequently been found on the site.

The above evidence shows that *Achatina* sp. and river mussels occur on many of the published Iron Age sites, and were frequently utilised. Cowrie specimens are much more rare, but were nevertheless reaching inland localities with remarkable regularity. The quantity of cowries present at K2 is unusual; it is one facet of a complex pattern of utilisation of faunal material within the culture of the Mapungubwe people.

11 Mapungubwe Animal Figurines

CLAY FIGURINES

The excavations at Mapungubwe yielded a vast amount of pottery. However, the people at Mapungubwe did not limit their artistic abilities to the manufacture of fine pots and bowls. Clay human and animal figurines have been recovered from all parts of the site by all the excavators. The human figurines display a high degree of stylisation and will be dealt with in a report on the pottery by Meyer. The animal figurines yielded some information on the types of animals kept by the people at Mapungubwe and were studied in relation to the following distinguishing characteristics.

Horn shape
Body configuration
Number of teats

Forty-six fragments of animal figurines retained none of the above characteristics and were not examined further. However, 35 specimens were detailed enough to be identifiable to species level. All except three of these appear to represent domestic animals (Table 11.1).

It may be argued that clay animal figurines should be classified as children's toys. I believe that the Mapungubwe material represents a form of plastic art which portrays sufficient detail to suggest that many of the figurines were modelled after animals with which the makers were very familiar. I think that it is also possible that many of the animal figurines were the work of adults, and may have had some significance in the social structure beyond that of a mere 'toy'.

Cattle Figurines

I. Horn Shape

Five clay objects are isolated horns broken off cattle figurines.

(a) *Provenance:* K2/B4/12 5′13′ 2′ (Fig. 11.1a)
Excavator: Gardner, 1938
Maximum dimension: 3,14 cm
Max. and min. diameter of base: 1,89 × 1,78 cm
A thick, short horn with a simple curve

(b) *Provenance:* K2/TS1/A6/Level 1 (Fig. 11.1b)
Excavator: Eloff and Meyer
Maximum dimension: 1,83 cm
Max. and min. diameter of base: 1,44 × 1,0 cm
Tip of horn broken away. Horn forms a simple curve similar to (a).

(c) *Provenance:* K2/2a(i) ?JS3/2(a) (Fouché 1937: 13) (Fig. 11.1c)
Excavator: J. F. Schofield excavated JS3 (Mahobe's) in 1934
Maximum dimension: 1,85 cm
Max. and min. diameter of base: 1,3 × 0,9 cm
Horn almost complete. Rather straight curve very similar to specimen (f).

(d) *Provenance:* K2/TS3/A2/Level 1.1.1 (Fig. 11.1d)
Excavator: Eloff and Meyer
Maximum dimension: 2,59 cm
Max. and min. diameter of base: 0,8 × 0,8 cm
Complete specimen. Very finely made, forms an S-curve and is very similar to that of a Nguni type.

(e) *Provenance:* K2/TS3/02/Level 8 (Fig. 11.1f)
Excavator: Eloff and Meyer
Maximum dimension: 4,25 cm
Max. and min. diameter of base: 1,45 × 1,33 cm
Complete specimen. Short, straight horn. Uneven finish, not smoothed off as with (a)–(d).

(f) *Provenance:* K2/TS3/A2/Level 6 (Fig. 11.1e)
Excavator: Eloff and Meyer
Maximum dimension: (Nose to poll) 3,58 cm
Max. and min. diameter horn: 1,20 × 1,03 cm
Since the horn is still attached to the head, it can be seen that the horn is short, and curves forward at 90° to the plane of the face. In the two most complete figurines, (Figs. 11.1g and 11.4a) the horns are similarly shaped but are tilted slightly up and slightly down respectively. Thus the loose horns could have been orientated in any of these ways; there is, however, no evidence for horns rising vertically from the head as in the Nguni type. The face is narrow, with a long, convex profile and the beginning of a dewlap. It is tempting to see an Afrikaner type in the profile of the face, but the profile is probably the result of the method of manufacture.
Five other specimens described below also have horns preserved.

II. Body Configuration

Humps. The so-called Sanga cattle of Africa are characterised by the presence of a more or less pronounced cervico-thoracic hump and a dewlap. The hump may be associated with bifid thoracic vertebrae. These characteristics also occur in the Afrikaner which, however, is also characterised by a convex facial profile, a high, convex poll between the horns, and short, forward-curving horns.

Six of the cattle figurines from Mapungubwe carry humps.

(a) *Provenance:* K2/TS3/A2/Level 4 (Fig. 11.1g)
Excavator: Eloff and Meyer
Maximum dimension: Nose to tail: 7,35 cm
Maximum height (at hump): 4,4 cm
This is a carefully modelled, almost complete specimen. The entire body has been smoothed over with a narrow instrument, resulting in slight 'fluting' over the surface of the body. The legs are short, cleanly cut stumps. The right horn is broken away at the base. The left horn is

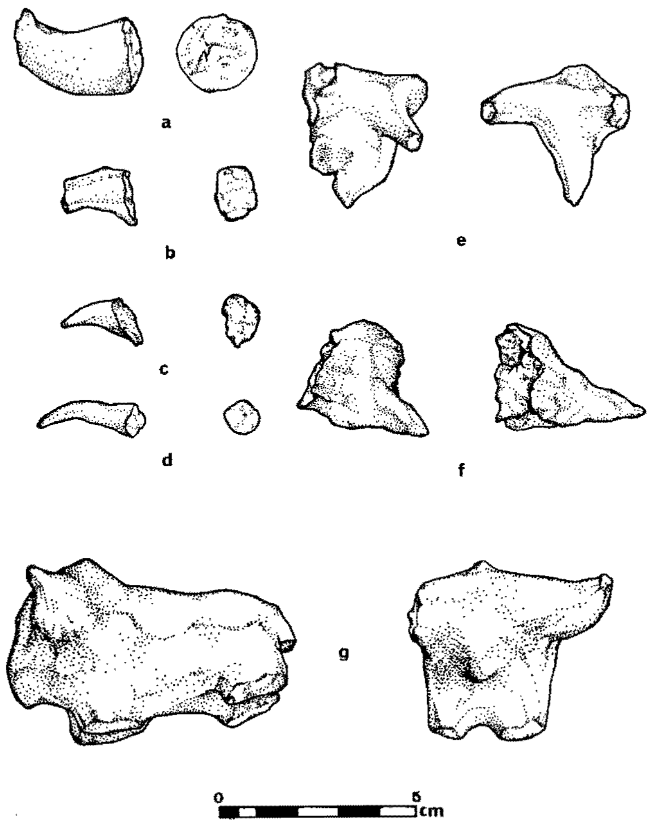

FIG. 11.1. Clay cattle figurines showing horn configuration (a–f), and body configuration. All specimens from K2.

short, and curves forwards and slightly up. The dimensions at the base of the complete horn are 1,69 × 1,63 cm. The face is convex and stylised; a small hump has been modelled just behind the horns. The tail is broken off.

(b) *Provenance:* ?JS4, Mapungubwe Hill (Fouché 1937: 14 and Plate XV, 5) (Fig. 11.2a)
Excavator: ? Schofield, 1934
Maximum dimension: 4,83 cm
Maximum height: 3,16 cm
A black clay figurine, poorly baked. It is roughly made, the clay showing signs of repeated remodelling. Left horn broken off; right side appears to have an ear rather than a horn. There is a distinct hump behind the head. The hump is relatively long, with a sharp ridge. The face is again slightly convex; the right side appears to have been smoothed off with a flat object, while the face itself has two slightly concave surfaces as if it were formed by pinching.

(c) *Provenance:* Nil. Numbered '143' (Fig. 11.2b)
Excavator: ?
Maximum dimension: 5,3 cm
Maximum height: 3,54 cm
This is a well-baked pinched clay figurine, the horns and tail are broken away. There is a very low hump directly behind the head. Two depressions on the face suggest that the figurine originally had bead eyes. The only other animal figurine with bead eyes was the 'hippopotamus' found by Gardner. The figurine has a neat, circular hole under the tail which goes deep into the body. A modelled line of clay suggests the penis of the animal.

(d) *Provenance:* K2/S6/No. 8 Probably K2, Trench 1/S6/24″. (Fig. 11.2c)
Excavator: Gardner, 1935. See Gardner 1963: 94
Maximum dimension: 6,55 cm
Maximum height: 3,69 cm
Well-fired figurine. The horns are broken, but curve slightly downwards after leaving skull at 90° to plane of face. The face is convex in profile and narrow, with a thin dewlap modelled in. The legs are fused to form two stump 'feet' with flattened bases. A number of shallow, V-shaped cuts across these bases appear to be an attempt to indicate separate feet. The tail is broken. There is a slight but distinct hump behind the head. The unusual feature of this specimen is the decoration across the body, which has been made with a small, oval-sectioned implement. The result is a line of impressions running from the nose of the figurine to the base of its tail. The right side is divided into four by two intersecting rows of impressions, while the left side has a curving line of impressions running across the left cheek, along the line of the back and down the left rump. Another line of impressions runs down the front leg, and a third line down the flank of the figurine. This decoration is very carefully done. While the decoration could conceivably represent traces for draught, the fact that the pattern of decoration is different on each side suggests that it is more likely to be an attempt to represent colouring on the animal.

(e) *Provenance:* 34.2F Probably K2, Trench 1, S34, 2′. (Fig. 11.2d)
Excavator: Gardner, 1935. See Gardner, 1963: 97
Maximum dimension: 5,32 cm
Maximum height: 3,1 cm
Well-fired clay figurine. The hind-legs and head have been broken off. A well-developed hump has been modelled in just behind the head. The stump of a thin tail has survived.

(f) *Provenance*: K2/TS3/01/Level 9 (Fig. 11.2e)
Excavator: Eloff and Meyer
Maximum dimension: height from hump to feet: 3,01 cm
This specimen consists of only the forequarters and head of a well-fired black figurine. The horns are broken off. The face is small, and a prominent hump is situated just behind the head. As with specimen (d), this figurine is decorated with two lines of fine punctate marks. One line runs up the face (slightly off-centre) and along its back; a second line comes to meet the first on the back at a slight angle, then runs down the left horn. This decoration again suggests representation of markings on the figurine.

Apart from the above six specimens, only one other (Fig. 11.3f) also carries a hump. The rest of those which are well enough preserved to be identified as cattle are not humped. This may indicate that not all the cattle at Mapungubwe were humped, or that prominent humps were unusual. The size of the hump in Sanga cattle varies markedly, so that even virtually straight-backed animals are encountered. Only one of the above specimens has a combination of both hump and dewlap.

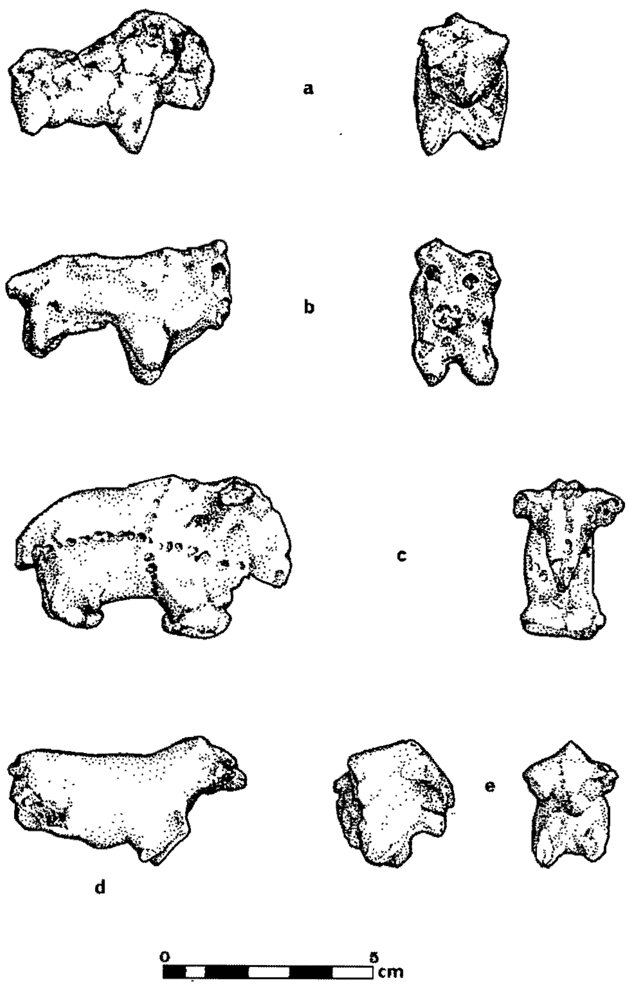

FIG. 11.2. Clay cattle figurines showing body configuration. Representation of humps: (a) and (e) from K2, the rest from old excavations. (c) and (e) are decorated, possibly to represent coloration. (b) probably originally had beads for eyes.

Dewlaps. The dewlap is well-developed in the Sanga and the Afrikaner breed of cattle. Eleven of the cattle figurines have dewlaps modelled in. Of these, six specimens are distinctive only for the presence of a dewlap.

(a) *Provenance:* K2/TS1/A6/Level 1 (Fig. 11.3a)
Excavator: Eloff and Meyer
Maximum dimension: Nose to broken edge: 3,35 cm.
This specimen consists of the head, neck and shoulders only. The face is narrow and has a relatively straight profile and poll, the horns and front legs are broken away. However, a dewlap is modelled on which ends at the break; the dewlap has nine V-shaped 'nicks' cut into it to give the impression of hair.

(b) *Provenance:* K2/S16/No. 2 This should probably read S14/No. 2, as no S/16 was excavated; see Gardner, 1963: 111 (Fig. 11.3b)
Excavator: Gardner, 1935–1940
Maximum dimension: Nose to broken edge: 5,14 cm.
This specimen, which is of poorly fired clay, consists of the forequarters and head only. The legs are broken away. The face has a slightly convex profile, but the poll between the horns is very convex, suggesting that the horns pointed downwards as with specimen (d) below. The dewlap is represented by a pinched line of clay running down towards the legs.

(c) *Provenance:* K2/S15/No. 3 (B1/S15/3') (Gardner, 1963: 103) (Fig. 11.3c)
Excavator: Gardner, probably 1936
Maximum dimension: Poll to feet: approximately 5,9 cm
The head portion has the remains of a red provenance number written on the break on the neck, of which only 'K2' is still visible. However, the head does appear to go well with the fore-feet, matching it in colour and texture. The face is almost identical to specimen (b), although the poll is not as strongly convex and the stub of horn is relatively straight. The dewlap is a well-defined, pinched line of clay which runs in a pleasing curve from the chin of the animal to just between the front legs.

(d) *Provenance:* K2/TS3/A2/Level 5.1 (Fig. 11.3d)
Excavator: Eloff and Meyer
Maximum dimension: Poll to feet: 4,19 cm
Well-modelled and well-fired fore-portion of a figurine. The face has a straight profile, with a convex poll and the stump of a downward curving left horn. The right horn is broken away. A pinched line of clay forms a distinct dewlap, running from the chin to between the forelegs. Of interest in this specimen is the neat perforation through the muzzle. The perforation is slightly oval on one side; both sides show a slight widening of the perforation towards the neck. This suggests that the figurine could conceivably have been worn, strung on a thong, as an amulet. The alternative explanation for the perforation is that it indicates the use of cattle by the Mapungubwe people as draught or as riding animals.

(e) *Provenance:* K2/S15/No. 3 (Fig. 11.3e)
Excavator: Gardner, probably 1936. See Gardner, 1963: 103
Maximum dimension: Poll to feet: 5,59 cm
Forequarters of animal with left leg and right horn broken away. The profile of the face is

straight, with a convex poll. The left horn is curved downwards, laid flat against the face. The tip of the horn is unfortunately broken off. A well-defined dewlap forms an S-curve from the animal's chin to between its forelegs; this end of the dewlap broke away with the left leg. The figurine is carefully finished, being smoothed off over the entire surface.

(f) *Provenance:* Nil. Labelled 'No. 42' (Fig. 11.3f)
Excavator: ?Gardner
Maximum dimension: Neck to tail: 3,84 cm
Well-fired black clay figurine with head broken away. The stump of the tail and of one horn is present. There is a small hump just behind the head, and a small dewlap runs down the chest. The penis is modelled in.

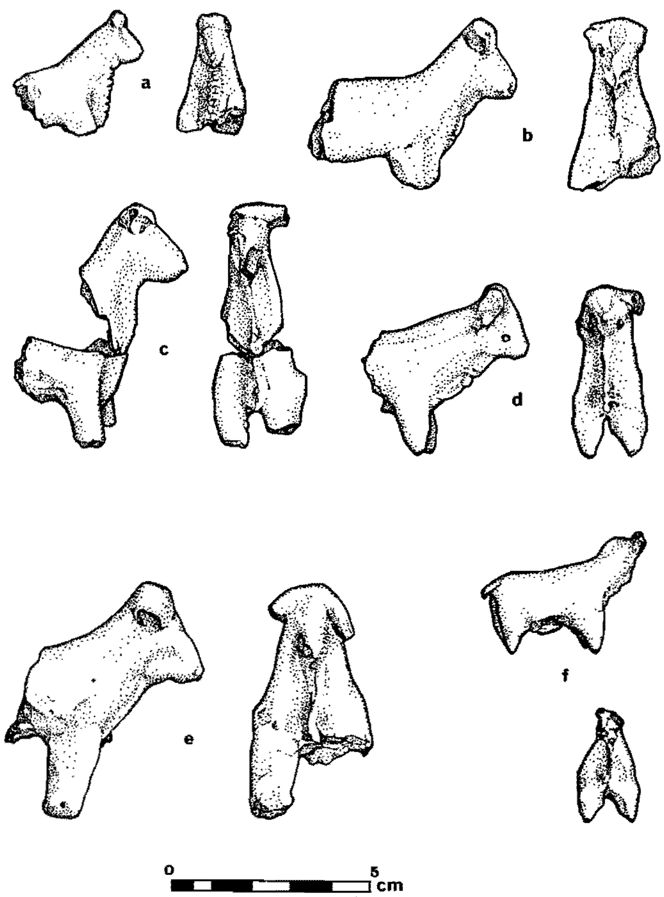

FIG. 11.3. Clay cattle figurines showing various aspects of body configuration, including dewlaps. All from K2 except for (f) which has no provenance. (d) has hole drilled through muzzle.

III. Teats

The udders of cows and she-goats have four teats, whereas those of ewes have only two. Nine of the cattle figurines from Mapungubwe are very explicit in the representation of udders. This feature is often combined with one or more of the other characteristics described above, leaving no doubt as to the generic or sexual identity of the animals portrayed.

(a) *Provenance:* M/6–1/55–11–3. B6/S1/2, Mapungubwe Hill (Fig. 11.4a)
Excavator: Gardner, 1940. See Gardner, 1963: 155
Maximum dimension: Nose to tail: 6,34 cm
Maximum height: Poll to feet: 3,32 cm
This figurine is complete except for the tips of the horns and tail. It represents a cow with a convex face profile and horns which curve forwards and downwards. The body is sturdy, with short legs, a dewlap which ends just above the front legs and a tail which hangs straight down. An udder with four teats is modelled in under the figurine. The clay of which the animal is made is not very homogeneous.

(b) *Provenance:* K2/TS3/A2/Level 5.1 (Fig. 11.4b)
Excavator: Eloff and Meyer
Maximum dimension: Poll to feet: 3,68 cm
The hindquarters of this figurine are missing. The face profile is flat, as is the poll; the surviving horn curves downwards. A neatly made dewlap hangs down between the forelegs. Three (damaged) teats are arranged in a line across the belly of the figurine.

(c) *Provenance:* K2/TS3/A2/Level 5.1 (Fig. 11.4c)
Excavator: Eloff and Meyer
Maximum dimension: Nose to tail: 6,73 cm
Maximum height: Poll to feet: 4,22 cm
This specimen is complete except for the horns and right hind-leg. It is carefully finished, with the same 'fluting' on the surface as the specimen shown in Fig. 11.1g. The profile of the face is slightly convex, with a concave poll. The stump of the right horn curves upwards then begins to turn downwards. A dewlap extends to between the forelegs. A line of three teats is modelled across the belly of the figurine.

(d) *Provenance:* M/6–1/55–11–3. Mapungubwe Hill (Fig. 11.4d)
Excavator: Gardner, 1940: B6/S1/2'. See Gardner, 1963: 155
Maximum dimension: Nose to tail: 6,04 cm
Maximum height: Poll to feet: 3,46 cm
The head and legs of this figurine are damaged. It is very similar to specimen (a) in style, conformation and size, but the back has been more carefully finished off and shows 'fluting'. A well-defined dewlap runs down to the forelegs. A cluster of four teats is modelled under the belly of the figurine, with an additional one in front of this cluster.

(e) *Provenance:* Nil (Fig. 11.5a)
Excavator: ?
Maximum dimension: Nose to tail: 5,69 cm
Maximum height: Poll to feet: 2,98 cm
This figurine is well-fired, but badly damaged on the head and legs. It shows signs of abrasion on the legs and udder. It has very rounded hindquarters and a small dewlap. An udder which

appears to have had four teats is modelled onto the belly.

(f) *Provenance:* K2/TS3/A2/Level 5.2 (Fig. 11.5b)
Excavator: Eloff and Meyer
Maximum dimension: Foreleg to hind-leg: 4,08 cm
Maximum height: Broken neck to feet: 3,4 cm
The presence of five teats suggests strongly that this damaged specimen represents a cow.

(g) *Provenance:* K2/B5/S3/9'20'3' (Fig. 11.5c)
Excavator: Gardner, 1939. See Gardner, 1963: 125.
Maximum height: Top of rump to feet: 2,73 cm
The little which remains of this animal shows a tail hanging straight down, and a damaged line of multiple teats.

(h) *Provenance:* Labelled JS.4. Small trench 3' No. 79, i.e. Mapungubwe Hill (Fig. 11.5d)
Excavator: Schofield, 1934. See Fouché, 1937: 14
Maximum dimension: Neck to tail: 6,17 cm
Maximum height: Top of rump to feet: 3,18 cm
The head and tail of this figurine are missing, and three of the legs are damaged. A circular hole is sunk into the body under the tail. A cluster of three teats is modelled onto the belly.

(i) *Provenance:* K2/2a(i) ?JS3/2(a) (Fouché 1937: 15) (Fig. 11.5e)
Excavator: J. F. Schofield excavated JS3 (Mahobe's) in 1934
Maximum dimension: Nose to tail: 6,34 cm
Maximum height: Tip of broken horn to tip of broken leg: 4,0 cm
The face and legs have been damaged by a spade or trowel. However, the remains of the face show a slightly convex profile. The horns rise straight up from the head and are curved. There is a slight hump behind the head, but no dewlap. The tail hangs straight down. Four teats are modelled onto the belly.

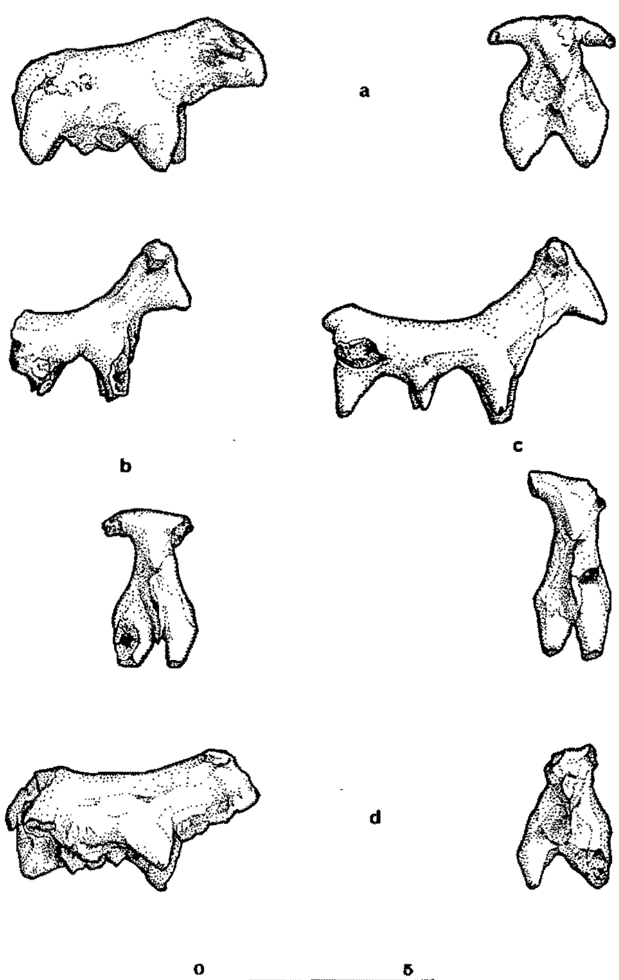

FIG. 11.4. Clay cattle figurines showing body configuration. Representations of udders. (a) and (d) from old excavations. (b) and (c) from Meyer's excavations on K2.

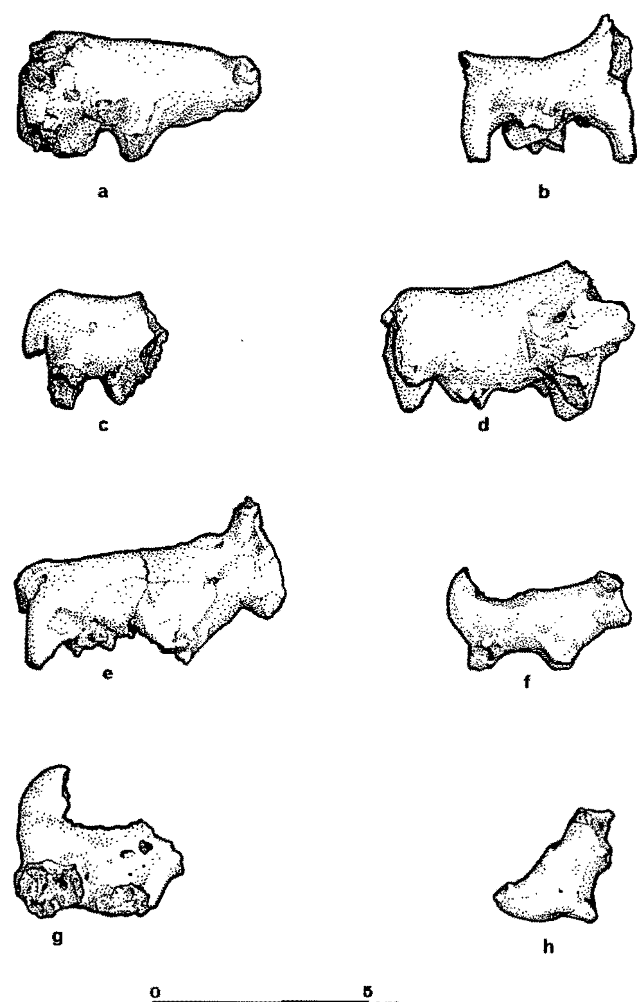

FIG. 11.5. a–e: clay cattle figurines with representations of udders. (b) from Meyer's K2 excavations, (c–e) from old excavations. (a) has no provenance. (f) and (g) may possibly be goat figurines. (f) from Meyer's K2 excavations. (g) from Gardner's K2 excavations. (h) Possible springhare. Meyer, K2.

Goat Figurines

Goats can be readily distinguished visually from sheep by the shape of their horns and tails. Goat horns usually curve straight back and away from the skull, and goats carry their tails high like 'flags'.

(a) *Provenance:* K2/TS3/A2/Level 10 (Test trench) (Fig. 11.5f)
Excavator: Eloff and Meyer
Maximum dimension: Nose to tail: 4,37 cm
Maximum height: Top of head to feet: 2,37 cm
This figurine is well-modelled, but with very short legs. The top of the head and the hind-quarters are damaged. However, the specimen has a broad, upright tail which curls up over its back, suggesting strongly that the figurine may represent a goat.

(b) *Provenance:* K2/B5/S14/1'3 '1' (Fig. 11.5g)
Excavator: Gardner, 1938. See Gardner, 1963: 123
Maximum dimension: 3,96 cm
Although badly damaged, the orientation of this figurine as shown on the figure appears to be correct, i.e. it is a figurine of an animal with the head and legs missing. What remains is a broad, upward curling tail which is suggestive of a goat.

(c) *Provenance:* M. 1940/5–5/74–10–4 (i.e. Mapungubwe Hill B5/S5) (Fig. 11.6c)
Excavator: Gardner, 1940. Not listed in Gardner, 1963
Maximum dimension: Nose to tail: 3,1 cm
Maximum height: Top of head to feet: 2,08 cm
This is a small, well-made figurine. It looks somewhat dog-like. However, on the back of the head are the broken stumps of backward facing horns, and the upright tail is missing only the very tip. Although it is possible that the Mapungubwe dogs had upright ears and tails, this figurine almost certainly represents a goat rather than a dog.

Sheep Figurines

The identification of two sheep figurines was perhaps the most exciting result of the study of the Mapungubwe animal figurines. The rear end of a ewe has a very distinctive shape. The two figurines were made in such a way as to emphasise this.

(a) *Provenance:* MST/K8/Level 7 (Fig. 11.6a)
Excavator: Eloff and Meyer
Maximum dimension: Nose to tail: 4,98 cm
Maximum height: Top of head to feet: 2,98 cm
The leg and head of the figurine are damaged. It appears to have ears (or horns) which rose straight from the skull and then turned backwards. The line of the back is high at the shoulders and the tail is broken off. Two small perforations have been made under the tail, the lower one having a lip. Two teats are modelled onto the belly.

(b) *Provenance:* MST/K8/Level 7 (Fig. 11.6b)
Excavator: Eloff and Meyer
Maximum dimension: Nose to tail: 5,69 cm
Maximum height: Head to feet: 2,97 cm
Apart from damage to the head and right leg, this specimen is complete. It is neatly modelled, although the clay is not smoothed. The surviving ear (on the right side) turns downwards alongside the head. The line of the back and hindquarters is gently rounded. The two orifices at the back of the animal are carefully made, the lower one being very prominently lipped. The figurine has two swollen teats.

Wild Animal Figurines

Springhare

(a) *Provenance:* K2/TS3/01/Level 9 (Fig. 11.5h)
Excavator: Eloff and Meyer
Maximum dimension: Nose to tail: 3,49 cm
Maximum height: Rump to feet: 1,89 cm
The forelegs and tail of this figurine are damaged. The head is small, with two projections which could be ears. The tail is wide and upright as in the goat specimens. Although initially this specimen was classified as a goat figurine, more detailed comparisons suggested that it did not closely resemble any of the domestic animal figurines. The specimen also balances very well on its tail and hind-legs. I therefore suggest very tentatively that it represents a springhare. There is a small circular hole under its chin. When examined by a mammalogist, he also identified the specimen as a springhare.

Giraffe

(b) *Provenance:* Mahobe's, JS3 (Fig. 11.6d)
Excavator: J. Schofield, 1934. See Fouché, 1937: 18, Plate XV, 5
Maximum dimension: Chest to tail: 6,8 cm
Maximum height: Head to feet: 15,8 cm; shoulder to feet: 6,97 cm
This specimen is a finely modelled giraffe, undamaged except for the top of the head. The tail is held curled above the rump, a position in which it is held while a giraffe is running. The head is small and stylised. A number of shallow 'nicks' in the clay suggest the use of a sharp instrument in the finishing process.

'Hippopotamus'

(c) *Provenance:* K2/B1/S13/1' (Fig. 11.6e)
Excavator: Gardner, 1936. See Gardner, 1963: 100
Gardner describes this specimen as being well-made, with green beads for eyes. In the collection of figurines housed at the University of Pretoria is a conical clay object, broken at the base, with two small blue-green beads set into one side. The apex of the cone has one convex and one concave facet with a reasonably preserved

finger-print on the convex facet and above the beads. Fine grooves on the surface of the piece indicate refined finishing work. This specimen is probably the one described by Gardner as a hippopotamus. Meyer feels that the figurine is a broken portion of a stylised human figurine (personal communication). The protuberances on the 'side' are much like the stylised arms of human figurines. The top of the specimen is, however, sculptured in such a way as to suggest a snout rather than the top of a head. Although it is possible that this figurine is a portion of a stylised human figurine, it could equally well be described as an animal head, possibly being an elongated head of a suid or of a hippopotamus.

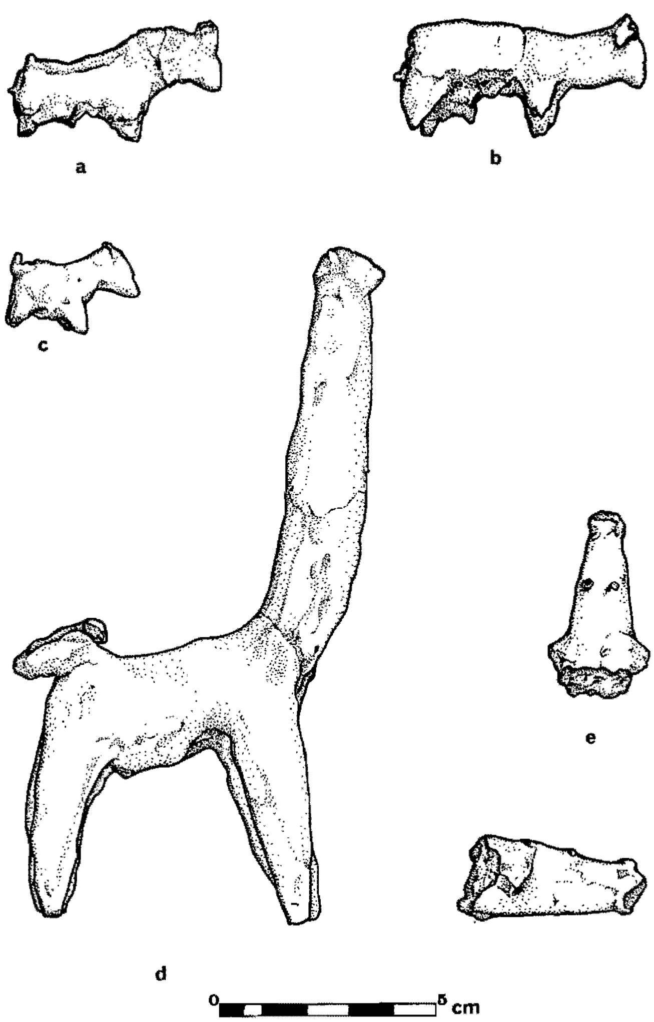

FIG. 11.6. (a) and (b): sheep figurines, both MST/K8. (c) goat figurine, Gardner (1940). (d) giraffe, Mahobe's, Schofield. (e) 'Hippopotamus', Gardner, K2.

GOLD FIGURINES

It is unlikely that the discoveries on Greefswald would have attracted so much attention if it had not been for the gold objects recovered by the Van Graan party. Apart from finds of isolated gold beads, most of the extant gold was found by the discovering party and in the 1934 excavations. The majority of the finds are illustrated in Fouché (1937).

The gold objects were badly damaged when found, and the reconstructions are not very satisfactory. Enough remains, however, to ascertain the existence of at least two rhinoceros figurines and two other animal heads. The figurines are formed of remarkably thin, beaten sheets of gold which were tacked onto cores by means of tiny gold tacks. The cores were most likely made of wood or of mastic. The gold is of exceptional purity (91,2–93,8% assay for the plate, and virtually 100% for the beads). The gold plate of the reconstructed rhinoceros shows some evidence of filing in the form of multiple fine abrasions.

The Rhinoceros

One rhinoceros figurine was reconstructed from the fragments recovered (Plate 11.1). A pair of identical, delicately modelled ears indicates that at least one more rhinoceros existed.

The rhinoceros figurine is a unique piece of craftsmanship. The plate body has been finely modelled to give an impression of short-legged solidity. The tail is a solid, thin cylinder; the slightly thickened end has several engraved marks to give the impression of a switch. The ears are made of thicker plate and are finely curved to give a tubular effect; they are held in position by a small tack deep inside the ear. The surviving eye is a gold tack with a roughly rounded head. The single horn is a cone of gold plate; it is fixed to the head forward of the eye. Below the horn the plates which constitute the 'cheeks' begin to curve inwards.

The position of the horn appears to be accurate. If the proportions of the head are taken into consideration, including the fact that the cheek section is relatively complete, then there appears to be no place for a second horn. This interesting feature was brought to my attention by Dr Terry Robinson of the University of Pretoria; it is hoped that we may be able to further pursue this aspect of the figurine. On the present evidence, the rhinoceros figurine appears to represent a single-horned Indian (or Sumatran) rhinoceros rather than a member of one of the double-horned African genera.

The possibility that the gold objects were not manufactured in southern Africa was raised by Fouché (1937: 25). The method of construction—that of attaching plating to a core by means of tacks—has a single southern African analogy in two specimens found in the Gubatsaa Hills in north-eastern Botswana, and now on display in the National Museum and Art Gallery in Gaborone (Botswana). One of these specimens is a wooden carving of a buffalo; the remains of copper plating which has been tacked into position have survived on the forehead and poll of the figurine. R. H. Summers (1969) has put forward strong arguments for Indian involvement in the early gold mining in Zimbabwe. Indian trade beads have been found at Mapungubwe; it may be that the little gold rhinoceros had come a very long way before it was interred at Mapungubwe.

The Animal Heads (Fig. 11.7)

One gold specimen is recognisable only as the neck and head of an animal, with holes for eyes or ears. The second specimen is better preserved, and appears to represent an equid head. The ears are moulded against the side of the head, the nostrils and eyes are less clearly modelled. Running along the base of the head is an engraved line of herring-bone motif. The question of whether the artist was representing a wild or domestic equid is an open one; the gold fragments hold their secret close.

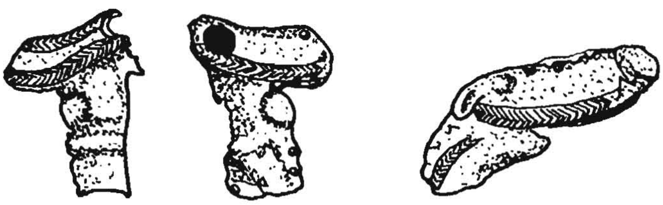

FIG. 11.7. Gold figurines. Left specimen is about 4–5 cm.

CONCLUSIONS

The animal figurines from Mapungubwe can be said to reflect the physical characteristics of animals familiar to the inhabitants of the site. It appears that not all the cattle had humps and dewlaps. The combination of these two characteristics with erect or up-turned horns corresponds well with the general morphology of Sanga cattle. However, several specimens (Figs 11.2c, 11.3b, d and e, 11.4a and b) do show down-turned horns which lend support to the suggestion that Afrikaner cattle were also kept by the people at Mapungubwe. The presence of convex face profiles in some of the figurines is also highly suggestive of Afrikaner characteristics, although so small a feature would be very dependant on the skill of the maker of the figurines.

The accent on the representation of multiple teats on the cow figurines suggests strongly that the Mapungubwe herds included good milk cows, and that their milk had considerable dietary importance to the herders.

The perforated muzzle of the specimen shown on Fig. 11.3a may suggest the use of cattle as draught or riding animals. This use of cattle is documented among the Hottentots by early writers (Plate 6.24) and in rock art (Plate 6.25).

The figurines indicate the presence of all three major domestic animals, i.e. cattle, goats and sheep, thus adding supportive evidence to the bone remains. In the case of the sheep figurines, an interesting point is the absence of tails. The practise of tail-docking has already been commented on (Chapter 6). The two sheep figurines tentatively suggest that the Mapungubwe people might have followed the same practice, although evidence for this among present-day negroid pastoralists is limited. Sheep figurines are rare in Iron Age assemblages.

The gold figurines of animals need to be adequately restored and studied in relation to exotic and indigenous art forms.

The presence of at least two clay figurines of wild animals in the Mapungubwe collection is interesting. Clay figurines of other wild animals have since been found at Ndondondwane in Natal (Maggs and Davison, 1981) and at Schroda (Hanisch, 1980). These figurines and the sheep and goat figurines indicate that a careful study of this aspect of Iron Age cultures can reveal a far wider range of representational art than we had previously suspected.

PLATE 11.1. The golden rhinoceros from the Hill. Specimen is 14,2 cm long. Photograph: Dotman Pretorius, courtesy of University of Pretoria.

The concept of an 'Iron Age' in southern Africa implies the existence of semi-sedentary groups practising mixed farming, and who manufactured pottery and possessed a knowledge of metal working. These groups are generally accepted to consist of negroid peoples speaking dialects belonging to the large group of Bantu languages.

Evidence of the cultivation of cereal crops (such as millet and sorghum) by these people is often only inferred, but may exist in the form of carbonised grain. The preservation of faunal remains on the sites holds out excellent possibilities for a greater understanding of the animal aspect of mixed agriculture than we can hope for in the reconstruction of the botanical aspect of their economy. Before we examine in detail the results of the study of the faunal assemblage from Mapungubwe, let us look at our present state of knowledge of the relationship between Man and animals in Early Iron Age communities through east and southern Africa.

At present, detailed information on the composition of domestic stock on early Iron Age sites is limited. Only two broad-based pieces of evidence are available, namely comments on the presence of bones and of clay figurines of animals. Table 12.1 lists the evidence available in the literature; the locations of the sites referred to are given in Fig. 12.1.

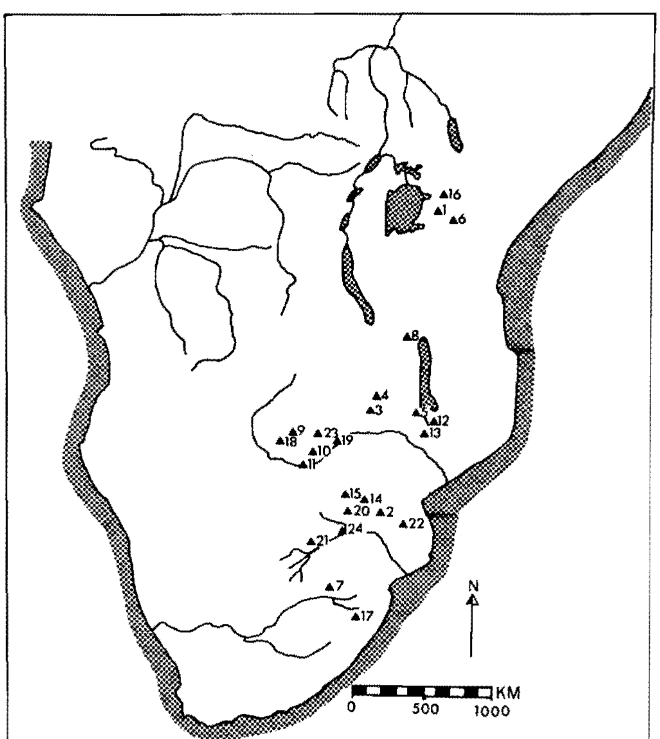

FIG. 12.1. Map of sub-Saharan Africa showing location of Iron Age sites which have yielded faunal material (see Table 12.1 for details).

The earliest evidence for domestic stock comes from East Africa, where bones of domestic animals were found in association with pottery and stone bowls. The earliest date comes from Bower and Nelson (1978) of 4800–5599 B.P.; cattle and sheep/goat bones were associated with Narosura Ware. The validity of this date has been questioned. Other early dates in the fifth to third millennia B.P. have since been commented on by Mgomezulu (1981). If the Narosura Ware date is valid it gives us a much longer time-span with which to work in studying the origins of cattle types.

Mary Leakey (1945) found bifid cattle vertebrae in her excavations in the north-eastern village at Hyrax Hill, Kenya. Originally tentatively dated to 850 B.C. and associated with Gumban B pottery, this would have been the earliest record for humped cattle south of the Sahara. The pottery from this site has more recently been reclassified as Lanet Ware, and dated to the middle of the second millennium A.D. (Posnansky, 1962, 1967). This leaves us with the earliest firm date for domestic animals south of the Sahara at Narosura in Kenya (Odner, 1972), where cattle and sheep/goats were identified, as well as a small number of wild animals. The site is dated to 410–810 B.C.

There is no dated evidence for domestic animals from this time until the beginning of the first millennium A. D. At Mabveni in Zimbabwe, cattle and sheep/goats were identified; there is no mention of other animal bones. In Zambia, cattle and sheep/goats were identified at Makwe Shelter; the earliest levels at this site were dominated by hunted animals. Thandwe Shelter in Zambia revealed the other side of the coin—an Iron Age occupation associated only with hunted fauna (Phillipson, 1976). Nanga and Namakala again showed these two different types of economy (Plug, 1980), while Kumadzulo showed a balance between wild animals and domestic animals (Vogel, 1971). Kumadzulo yielded the earliest evidence of humped cattle in southern Africa in the form of humped cattle figurines. It is at this point in time—the 4th to 6th centuries A.D.—that we must recognise two different types of Iron Age economies. In the one situation, domestic animals and hunting/gathering form the basis of the economy (Makwe, Nanga and Kumadzulo), while in the other situation the economy is based almost exclusively on hunting and gathering (Thandwe, Namakala, Nkope). In Malaŵi, evidence for domestic animals in the Early Iron Age is limited, consisting of the find of a possible sheep/goat at Tambala Village and, even less certain, at Banda Hill (Robinson, 1975: 18, 4; Voigt, 1977). However, cattle remains dating to the third or fourth century A.D. have now been found in Mtuzi rock shelter (Mgomezulu, 1981).

Malaŵi is a very interesting example of the kind of economic pattern which one might expect to find during the early first millennium. Present evidence indicates a heavy dependance on the lake and on hunting throughout this period, and oral traditions suggest that cattle arrived relatively late in the area (Agnew, 1972: 43–45). Even today, the rural economy is more dependant on the cultivation of grain crops and trading of fish from the lake than on domestic stock.

Evidence for iron working at many of the early sites is meagre or non-existent; at Lukenya Hill in Kenya, the inhabitants were making pottery and microliths and keeping stock, but apparently were not working iron (Maggs, 1977). On the other hand, the Broederstroom site, which is contemporary with Lukenya Hill, has yielded evidence of extensive iron working, and domestic animals have been identified from the site (Welbourne, 1973).

Well-preserved faunal samples from South Africa which predate 800 A.D. are rare. However, samples from sites such as Ntshekane in Natal (Maggs and Michael, 1976) already show reasonable quantities of domestic animals. From the ninth century A.D. domestic animals are regularly recorded from Iron Age sites. Unfortunately, quantitative information is sadly lacking in most cases, largely due to the poor preservation of material. Evidence from Malaŵi peters out at this point. Kulundu, Kangila and Ingombe Ilede in Zambia all yielded evidence of domestic animals in conjunction with hunting (Fagan, 1967). In Zimbabwe, sites belonging to the Leopard's Kopje tradition yielded enough bones of domestic stock to suggest a fair dependance on these animals, although the lack of other material does not justify the description of these people as 'keeping large herds of cattle'. Of particular interest in this context is the presence of beast burials on Leopard's Kopje sites (Huffman, 1974*b*; Robinson, 1966). Evidence from the Zambian and Zimbabwean sites is of both humped and humpless cattle. Huffman (1970) has suggested that cattle became important only in the second phase of the Leopard's Kopje culture; the results of the Northern Transvaal Iron Age Faunal Project indicate that cattle keeping was not a dominant activity on Leopard's Kopje A sites except for K2 (Voigt, 1980; Voigt and Plug, 1981).

Tautswe is broadly contemporaneous with the Mapungubwe sequence. Welbourne (1975) shows that domestic animals formed only a part of the Tautswe economy; there is evidence for extensive hunting of zebra (19 specimens) and impala (36 specimens). Thus, at the time of Mapungubwe, we have evidence for the continuation of the mixed dependance on domestic animals and hunting which can be seen in the earlier cultures.

Garlake (1978) proposed transhumance grazing at Manakweni in Mozambique; he stated that the economy of Manakweni was dominated by domestic animals. The figures published by Barker (1978) do not support this conclusion. The species list is as varied in its composition as those from Leopard's Kopje sites in the northern Transvaal; of interest is the consistent presence of fish. The economy as reflected in the M.Ind. counts does not correspond with that of Mapungubwe; the closest similarity lies in the 'dung layer' at Pont Drift (Voigt and Plug, 1981). At Pont Drift, Commando Kop and Icon, hunting played a significant part in the economic activities of the people, but domestic stock provided the major portion of meat in the diet. If the Manakweni sample is interpreted using the same methodology it is found that herding of domestic stock accounted for 40–60% of the economic activities, which is close to the values for the northern Transvaal sites. In terms of meat mass, domestic stock contributed less to the Manakweni diet than it did at nearly all the northern Transvaal sites. Only one unit at Manakweni (Phase 3: 80,4%) came close to the lowest percentage of meat found on a northern Transvaal site (Pont Drift 1/2: Levels 5–8: 81,9%). Barker's figures do not therefore indicate a diet dominated by domestic stock at Manakweni. A far more interesting aspect of Manakweni is the lateral variations in diet; these internal variations need to be examined in terms of intrasite social differentiation.

The faunal evidence from the Mapungubwe archaeological complex indicates that this community depended on their herds and flocks for most of the meat in their diet and that hunting, snaring and gathering supplemented this meat to a relatively small degree. In any faunal analysis the investigator is dealing with a sample of bones. However, the patterns which were obtained from the series of excavations at Mapungubwe were so similar, and the excavations themselves were so extensive, that it is highly unlikely that abnormal situations, such as accumulations resulting from short-term ritual activities, are being described. If the limitations of sampling are borne in mind, it can still be stated with justification that the Mapungubwe Iron Age economy was dependant on herding rather than hunting, gathering or fishing, the latter having made virtually no contribution to the diet whatsoever.

The analysis of the faunal remains from Mapungubwe clearly showed that two separate approaches are possible in the interpretation of material, i.e. on the basis of activities and on the basis of meat weight contributions. A clear distinction must be made between the results obtained. The 'economic basis' embraces the economic or food-getting activities of a group; relatively small variations in this pattern of activities may lead to quite large variations in dietary patterns. On the basis of economic activities, all the archaeological occurrences at Mapungubwe except TS1 showed a 60% or more dependance on domestic animals; TS1 showed 23% snaring and 17% gathering, with only 50% herding. Thus the TS1 people were less dependant on their herds in terms of economic activities than were the other Mapungubwe groups. The actual proportions of cattle to sheep/goats differ on different parts of the site. In the sample from MK1 Phases 2 and 3, the contribution made by hunting and snaring is almost identical, and the proportions of cattle to sheep/goat are fairly similar. MK1 Phase 4 has a high incidence of hunting and a relatively low incidence of herding (57%).

If the activities are translated into dietary contributions, a very different picture emerges—a picture in which all the occurrences, except that of MK1, yielded a figure of 96,0% to 98,7% meat from domestic animals. In all cases, the meat contribution to the diet of other economic activities was negligible. The exception to this pattern was MK1 Phase 4, in which the meat contribution of domestic animals dropped to 85,3% because of the presence of four zebra in the sample (which contributed 12,0% of the meat in the diet). This is the Phase of the sequence which is associated with the large quantity of bone arrow-heads and suggests very strongly that hunting was indeed an important activity in this last Phase of occupation on the Hill.

There is, therefore, a clear difference between the pattern of economic activity and the dietary pattern; in defining the overall economy of any site it is essential to consider the results in terms of various activities as well as meat contributions.

Gardner (1963: 27) originally suggested that the K2 people subsisted on meat and milk, although they were averse to killing their cattle. The evidence of the present study indicates utilisation of large and small stock, with more small stock being slaughtered than large. However, the quantity of stock represented suggests that the Mapungubwe people regarded their herds and flocks as a prime source of food; animals belonging to the entire age range were slaughtered in both groups. We do not know what proportion of the diet was contributed by plant foods. This is in marked contrast to the dietary pattern among present-day Bantu-speaking peoples, who slaughter their stock sparingly. This suggests that either the social significance of cattle has changed drastically, or that the Mapungubwe community enjoyed a high social status which provided it with access to sufficient stock to allow them to slaughter freely.

Among the present-day Bantu-speaking peoples, cattle form the basis of the social structure; social activities involve the use of cattle as a 'currency', and cattle constitute the cement which holds each society together. Several generations ago, iron hoes were in certain instances used as a medium of exchange in place of cattle. Iron and cattle have been and remain high value commodities; their social value is a reflection of rarity. Oral traditions exist which imply that some groups possessed a great many cattle 'a long time ago'. This tradition, as well as the shift from iron to cattle, suggests very strongly that the present high value enjoyed by cattle is an historically recent development. I would suggest that, in so far as the Transvaal is concerned, cattle and other domestic stock were swept out of the social structure firstly by the raiding and destruction caused by the Matabele movements in the 1830s, then again by the rinderpest epidemic of 1896 and the destruction of stock during the Second War of Independence of 1899–1902. It seems possible that the drop in the stock population in the middle of last century might have resulted in bush encroachment in certain regions, which in turn resulted in the spread of tsetse-fly, thus rendering previous cattle-keeping areas unsuitable for ranching. Archaeological evidence for such fluctuations in the tsetse-fly belt has been found in Zambia (Plug, personal communication). Such a pattern would lay the way open for cattle to gain a very high social value once herds began to be re-established, thus giving rise to their present high status.

The above is suggested as an hypothesis which requires investigation by ethnologists and social anthropologists. It is obvious that stock—including small stock—had a certain degree of religious significance at Mapungubwe, but this would be a natural development among a group of people for whom stock were a major part of their pattern of survival. It can be safely assumed that cattle represented wealth at all times, but that this was, so to speak, permissibly consumable wealth. Cattle could therefore be expected to be attracted to centres with a high social status within a culture phase in the form of tribute or in fulfilment of social obligations.

The above hypothesis applies to the enormous number of cattle concentrated at Great Zimbabwe. Unfortunately, we have as yet no comparable data from sites contemporary with Mapungubwe. However, as already noted, domestic animals constituted more than half the animals represented at all the occurrences at the Mapungubwe sites; this is not the situation at earlier sites such as Pont Drift or Commando Kop (Voigt and Plug, 1981). A notable difference from the situation at Great Zimbabwe is the fact that small stock was more numerous at Mapungubwe than cattle. The question which must be examined is whether the pattern at Mapungubwe is in any way abnormal compared to that of other Iron Age sites, thus indicating a special social position for the community.

The analysis of the faunal material showed that the Mapungubwe people kept sheep, goats, cattle and dogs. Goats were clearly identified on the basis of horn-cores, and sheep on the basis of horn-cores, hornless skulls and clay figurines. Two clay figurines of sheep were identified; Cooke (1957: 38) identified a sheep figurine from Khami Waterworks, but this specimen had a tail preserved. The tailless Mapungubwe sheep figurine suggested the possible practice of tail-docking to improve fertility; this husbandry practice is known today only among indigenous people in East Africa.

Although very young and very old individuals were identified, the majority of the domestic stock were slaughtered when mature. The graph showing the age at death of sheep/goats has a strong peak at the 30–60 month age class; the animals were therefore kept until they had bred several times. The cattle age classes show a much more even distribution, but again the peak occurs in a mature adult age class of older than 42 months. The age range represented is that which one would expect as a normal slaughtering pattern from a herd and has been found to occur on many Iron Age sites. There is no evidence of heavy dependance on young animals as found at Great Zimbabwe (Brain, 1974*b*).

Garlake (1978) has proposed a transhumant form of pastoralism in the Zimbabwe phase of the Late Iron Age on the basis of his work at the Manakweni site in Mozambique. The cattle sample from Manakweni showed an age range concentration of around 18–24 months. On the basis of this he postulates a beef-producing economy in which herds were kept elsewhere (in view of the absence of old animals) and that young animals only were utilised by the inhabitants of Manakweni, in the same way as at Great Zimbabwe. The slaughter of cattle at 24 months does not suggest 'beef-raising' in that the animals would not yet have reached their maximum mass; it rather suggests selective slaughtering for an elite group.

When the data as published by Barker (1978) are examined more closely, it can be seen that a very small dental sample (33 specimens) was utilised to establish this age range. In fact the range extends to 40 months; 62% of the Mapungubwe sample of 263 teeth fall within this same age range. The Manakweni sample does cluster around a limited group of young-mature animals; nevertheless the information provided by so small a sample should be treated with caution.

A problem of particular interest at Iron Age sites is that of cattle breeds. Gardner (1967) states that both Sanga and Afrikaner breeds were present. Skull remains indicated the presence of a Sanga type, and horn-core remains indicated the possible presence of the Afrikaner type. The presence of bifid thoracic vertebrae provided clear evidence of humped cattle; since both Sanga and Afrikaner may have bifid vertebrae, these cannot be interpreted as certain evidence for Afrikaner cattle. Sanga types can be humped or humpless, and indeed the clay cattle figurines suggest the presence of both forms of animals; the size of the hump is variable, and is related to the sex of the animal, bulls having larger humps than cows.

The importance of the difference between Sanga and Afrikaner in terms of breeds is perhaps over-emphasised in the literature. Osterhoff (1975) has shown that the Afrikaner is a purely local breed which owes none of its external characters to imported cattle, and that it is closely related to Sanga types. The blood groups of both the Sanga and Afrikaner types indicate a relationship with the Zebu type, *Bos indicus*. We do not know when this admixture occurred, but it must have been at least early in the first millennium A.D. and possibly occurred in East Africa. The Afrikaner is thus classifiable as a Sanga type, a proposition put forward by Mason and Maule (1960: 43–48). Its importance as a distinct 'breed' is mainly dependant on its historical relationship with the Hottentots or Khoikhoin. The Afrikaner can be regarded as a 'pure' breed of local cattle with a very long history. It is not impossible that it came to South Africa with the Khoikhoin peoples and may have predated the arrival of the Bantu-speaking peoples, but there is at present no convincing archaeological evidence for this. It is therefore possible that the Bantu-speaking Iron Age peoples could have obtained Afrikaner cattle as a result of contact with Khoikhoin peoples. The most important fact in relation to the history of domestic animals in southern Africa to emerge from the present study is that both Afrikaner and Sanga types were certainly present at Mapungubwe. The critical question is the relationship between cattle breeds and cultural groups. Horn-cores similar to those identified as Afrikaner type have been found in the faunal sample from the Zhizo site of Schroda, which pushes the date for this breed back to 800 A.D. (Voigt and Plug, 1981).

The examination of the cattle remains also showed quite clearly that the cattle from Mapungubwe fall within the size range of present-day Sanga types and cannot be described as 'dwarf' cattle. The 'dwarf' cattle described from Zambia fall themselves within the size range of the Mapungubwe material, and cannot therefore be regarded as being a small breed. Barker (1978) stated that the Manakweni cattle also fell within the size ranges given for the Zambian material.

Evidence for the presence of Man's best friend, the dog, has been accumulating from a number of Iron Age sites. All available previously undescribed material was utilised for comparison with the well-preserved skull from Mapungubwe. Three major results were obtained from this part of the study. First, it was found that the major European criterion of dog domestication (length $P^4 \leqslant$ length $M^1 + M^2$) cannot be applied in the South African context. In African dogs the length of P^4 has been found to be equal to or greater than that of $M^1 + M^2$. Secondly, two types of Iron Age dogs were identified in the sample—a lightly built, relatively small breed, and a more robust and larger breed. At present the first type is known from the Cape and South West Africa/Namibia, while the second is found on sites in the Transvaal and Natal. Thirdly, there is at present no evidence for domestic dogs in South Africa prior to 800 A.D.

The Mapungubwe complex represents an unusually large settlement with intensive occupation over a limited period of time. This in itself suggests a large concentration of people. The faunal sample provides some evidence for the social importance of the Mapungubwe sites by virtue of the large numbers of domestic animals which were utilised. It is likely that some form of involvement in trade with the East Coast contributed to the status of Mapungubwe.

Evidence for the working of ivory is only found on K2, where it occurs as waste material and as finished articles. As suggested in Chapter 7, the working of ivory and of bone could have been the basis for specialisation which raised K2 above its contemporaries. Evidence for contact with the East Coast exists on all three components of the site in the form of trade beads; the Limpopo Valley would have provided a reasonable trade route to which both the Mapungubwe sites and the Zhizo site of Schroda had ready access. Evidence for the working of ivory now exists at Schroda, pushing the date of this East Coast contact back to 800 A.D. (Voigt and Plug, 1981). The large quantity of ivory retrieved from the Mapungubwe excavations suggests an available surplus of this valuable commodity. We know that ivory drew the Arabs and the Portuguese inland, and that the gold trade routes frequently followed those established by the earlier trade in ivory. K2 may well have been a reservoir for this ivory trade; even if it did not lie directly on the trade route it may have been a collecting point for ivory. It is, however, possible that, by the time of the occupation of the Hill, Mapungubwe was no longer directly involved in the ivory trade but was acting as a 'clearing house' for another centre. By this time the trade commodity may have been gold. This 'other centre' could conceivably have been Great Zimbabwe, which began to develop as a large settlement by the end of the 12th and beginning of the 13th Centuries A.D. (Huffman 1974*a*). As Great Zimbabwe became involved in the gold trade, gold may have filtered back down the trade route to Mapungubwe, to appear only in the superficial levels on Mapungubwe Hill, thus marking the apex and the demise of a trading complex with a very long history.

The possibility that some of the worked gold might be exotic is discussed in Chapter 11. Mapungubwe could be expected to have enjoyed a high social status within its own cultural complex on the strength of such an involvement. Such social standing would attract people to Mapungubwe and would also result in a large population of domestic animals as a result of the concentration of people and the use of this domestic stock within the social structure.

It is therefore very likely that the uppermost levels of Mapungubwe Hill which are associated with the large number of bone tools and an increased contribution to the diet by hunting may indicate a decrease in the availability of domestic animals to the inhabitants. This could be a direct result of a decline in the importance of Mapungubwe with the rise to prominence of Great Zimbabwe. The finely worked bone tools which occur in varying quantities in the upper levels of all three components of the site suggest a cultural contemporaneity throughout these uppermost levels. Thus the uppermost levels of K2, which yielded identical bone tools to those found on the Hill, appear to be contemporary with the top of the Hill. The discovery of the 'hoard' of unfinished bone tools on K2 which conform to the type of bone tools found in the uppermost levels on the Hill strengthens the supposition. It also gives support to the hypothesis of K2 as a settlement which supported specialised craftsmen in ivory and bone, thus providing a viable trade basis for the entire sequence.

A curious aspect of the Mapungubwe archaeological story is that the last phase on the Hill apparently represents the end of the Early Iron Age in the Limpopo Valley. No sites have yet been identified which fall within the period 1200 A.D. to about 1400 A.D. (except for Icon, which does not fall within the Valley—see Hanisch, 1979). This 'Dark Age' has now been recognised in other areas. The possible causes for such a hiatus in the cultural record are discussed more fully in Voigt and Plug (1981). Suffice to say that the presence of *Rattus rattus* in the area, the obvious concentration of the population with its attendant destruction of the natural environment, and proven contact with the East Coast suggest that the cause may be destruction of the population as a result of Plague. It may be more than a coincidence that the hiatus corresponds with a period in Europe and the Near East which was characterised by a particularly virulent outbreak of what has been identified as Bubonic Plague. Recent suggestions that the 'Black Death' of this period might have been anthrax increase the possibility that disease may have been the cause of the hiatus. Such a catastrophe would explain the apparent depopulation of a previously much favoured area. It would also open the way for bush encroachment on the old village sites and fields and a consequent extension of the tsetse-fly belt into the Limpopo Valley, thus rendering it unsuitable for re-settlement by Herders.

The study of the Mapungubwe faunal assemblage produced a wealth of detail on bone accumulations, and also opened up a number of avenues of research into specific problems. The study showed that the community utilised domestic stock extensively; this, combined with the size of the settlement, suggests a site of high social prestige at the turn of the first millennium A.D.

Examining the evidence of Table 12.1, a general hypothesis can be formulated which suggests that the relationship between Man and domestic animals has a long history in Africa, a history which extends back to groups of sedentary farmers who did not work iron. During the first millennium A.D. two kinds of Iron Age economies emerged. Both included the cultivation of cereal crops; but one group of people, so far identified in Malaŵi and Zambia, remained heavily dependant on hunting as a source of food. The other group, identified in East Africa, Zambia, Zimbabwe and South Africa, kept herds and flocks which appear to have increased in importance with the passage of time. It is possible that this was a period of peaceful sedentarism during which a group could build up its reserves of domestic animals in such a way that they became a stabilising factor within their economic and social structure. Within this group, larger centres such as Schroda and Mapungubwe developed which were the forerunners of the Great Zimbabwe complex; these centres probably owed their importance to external trade and were able to utilise to a far greater extent the resources available in the form of cattle, sheep and goats, thus developing economies based very largely on herding. Mapungubwe can thus be regarded as a cultural 'capital' which blossomed and reached its peak in the northern Transvaal during the last phase of the Early Iron Age.

REFERENCES

ACOCKS, J. P. H., 1975. *Veld types of South Africa*, 2nd ed. Botanical Research Institute, Department of Agricultural Technical Services, Pretoria.

AGNEW, S., 1972. Environment and history: the Malaŵian setting. *In:* PACHAI, B., ed., *The Early History of Malaŵi*, pp. 28–48. Longmans, London.

ARMITAGE, P. L. and CLUTTON-BROCK, J., 1976. A system for classification and description of the horncores of cattle from archaeological sites. *Journal of Archaeological Science* **3**: 329–348.

ARMSTRONG, C. W. B. and MASEMOLA, J. P., 1975. The Pedi cattle of Lebowa. Unpublished manuscript.

BARKER, G., 1978. Economic models for the Manakweni Zimbabwe, Mozambique. *Azania* **13**: 71–100.

BIGALKE, E., 1966. Notes on the place of domestic and indigenous animals in Cape Nguni life. *Annals of the Cape Provincial Museums* **6**(1): 1–16.

BINFORD, L. R., ed., 1977. *For theory building in archaeology.* Academic Press, New York.

BISSCHOP, J. H. R., 1937. Parent stock and derived types of African cattle, with particular reference to the importance of conformational characteristics in the study of their origin. *South African Journal of Science* **33**: 852–870.

BOESSNECK, J., 1969. Osteological differences between sheep (*Ovis aries* LINNÉ) and goats (*Capra hircus* LINNÉ). *In:* BROTHWELL, D. and HIGGS, E., eds., *Science in Archaeology,* 2nd ed., pp. 331–358. Thames and Hudson, London.

BOESSNECK, J., MÜLLER, H. H. and TEICKERT, M., 1964. Osteologische Unterscheidungs merkmale zwischen Schaf (*Ovis aries* LINNÉ) und Ziege (*Capra hircus* LINNÉ). *Kühn-Archiv* **78**: 1–129.

BONSMA, F. N., BISSCHOP, J. H., CURSON, H. H., VAN RENSBURG, P., VAN RENSBURG, J. A., VAN WYK, H. P. D., BARNARD, W. G. and WATERMEYER, F., 1950. *Nguni Cattle.* Agricultural Research Institute series No. 22. Department of Agriculture, Pretoria.

BOUQUET, Y., OSTERHOFF, D. R. and VAN DE WEGHE, A., 1970. The origin of Afrikaner cattle—the relationship of the Afrikaner with the Portuguese Alentejo breed. *Proceedings of the South African Society of Animal Science* **9**: 203–208.

BOWER, J. R. F. and NELSON, C. M., 1978. Early pottery and pastoral cultures of the Central Rift Valley, Kenya. *Man* n.s. **13**(4): 554–566.

BRAIN, C. K., 1967. Hottentot food remains and their bearing on the interpretation of fossil bone assemblages. *Scientific Papers of the Namib Research Station* **32**: 1–11.

BRAIN, C. K., 1969. Faunal remains from the Bushman Rock Shelter, eastern Transvaal. *South African Archaeological Bulletin* **24**: 52–55.

BRAIN, C. K., 1974*a*. Some suggested procedures in the analysis of bone accumulations from southern African Quaternary sites. *Annals of the Transvaal Museum* **29**(1): 1–8.

BRAIN, C. K., 1974*b*. Human food remains from the Iron Age at Zimbabwe. *South African Journal of Science* **70**: 303–309.

BRAIN, C. K., 1976*a*. Some principles in the interpretation of bone accumulations associated with Man. *In:* ISAAC, G. L. and MCCOWAN, E. R., eds, *Human Origins. Perspectives on Human Evolution,* Vol. 3: pp. 97–116. W. A. Benjamin Inc., Menlo Park, California.

BRAIN, C. K., 1976*b*. An interpretation of the bone assemblages from the Kromdraai Australopithecine site, South Africa. *In:* TUTTLE, R. H., ed., *Paleoanthropology, Morphology and Paleoecology,* pp. 225–243. Mouton, The Hague.

BRAIN, C. K., 1980. Some criteria for the recognition of bone-collecting agencies in African Caves. *In:* BEHRENSMEYER, A. K. and HILL, A. P., eds., *Fossils in the Making: Vertebrate Taphonomy and Palaeoecology,* pp. 108–130. University of Chicago Press, Chicago.

BRAIN, C. K., 1981., *The Hunters or the Hunted? An introduction to cave taphonomy.* University of Chicago Press, Chicago.

BROTHWELL, D. R., 1965. *Digging up bones.* British Museum (Natural History), London.

BROWN, L. J., 1971. The biology of pastoral man as a factor in conservation. *Biological Conservation* **3**(2): 93–100.

BRUGGEN, A. C. VAN., 1978. A new land snail *Curvella transvaalensis,* from Southern Africa. (GASTROPODA, PULMONATA: SUBULINIDAE). *Annals of the Transvaal Museum* **31**(2): 17–20.

CARR, M. J., CARR, A. C., JACOBSON, L. and VOGEL, J. C., 1976. Radiocarbon dates from the Zerrissene Mountain open station settlement complex. *South African Journal of Science* **72**: 251–252.

CARTER, P. L. and CLARK, J. D., 1976. Adrar Bous and African cattle. *Proceedings of the 7th Pan African Congress of Prehistory and Quaternary Studies, Addis Ababa,* **1971**: 487–493.

CHAPLIN, R. E., 1971. *The study of animal bones from archaeological sites.* Seminar Press, London.

CHAPPEL, C. A., 1968/69. A strandloper skeleton found at Cape St. Francis. *Diastema* **2**(3): 37–39.

CHILD, G., SOWLS, L. and MITCHELL, B. L., 1965. Variations in the dentition, ageing criteria and growth patterns in warthog. *Arnoldia* **1**(38): 1–23.

CLARK, J. D., 1959. *The prehistory of southern Africa.* Penguin, Harmondsworth.

CLARK, J. D., WILLIAMS, M. A. J. and SMITH, A. B., 1973. The geomorphology and archaeology of Adrar Bous, Central Sahara: a preliminary report. *Quarternaria* **17**: 245–297.

CLARK, J. G. D., 1952. *Prehistoric Europe: the Economic Basis.* Methuen & Co. Ltd., London.

CLASON, A. T., 1967. *Animal and Man in Holland's Past,* 2 Vols. Wolters, Groningen.

CLASON, A. T., 1972. Some remarks on the use and presentation of archaeozoological data. *Helinium* **12**(2): 139–153.

CLASON, A. T., 1977. Bouqras, Gomolava en Molenaarsgraaf, drie stadia in de ontwikkeling van de veeteelts. *Museologia* **7**(1): 54–64.

CLUTTON-BROCK, J., 1971. The origins of the dog. *In:* BROTHWELL, D. and HIGGS E., eds., *Science in Archaeology,* 2nd ed., pp. 303–309. Thames and Hudson, London.

CLUTTON-BROCK, J., CORBET, G. B. and HILLS, M., 1976. A review of the family Canidae, with a classification by numerical methods. *Bulletin of the British Museum (Natural History) (Zoology)* **29**(3): 119–199.

COLLIER, S. and WHITE, J. P., 1976. Get them young? Age and sex inference on animal domestication in archaeology. *Antiquity* **41**: 96–102.

COOKE, C. K., 1957. The Waterworks Site at Khami, Southern Rhodesia: Stone age and proto-historic. *Occasional Papers of the National Museums of Southern Rhodesia* **3**(21A): 1–43.

COOKE, C. K. and ROBINSON, K. R., 1954. Excavations at Amadzimba Cave, Matopo Hills. *Occasional Papers of the National Museums of Southern Rhodesia* **2**(19): 699–728.

COOKE, C. K. and ROBINSON, K. R., 1950. Some unusual elements in the Wilton Industry in the Matopo Hills of Southern Rhodesia. *South African Archaeological Bulletin* **5**: 108–114.

COY, J. P., 1975. Iron Age cookery. *In:* CLASON, A. T., ed., *Archaeozoological Studies,* pp. 426–430. North Holland Publishing Co., Amsterdam.

DANIELL, S., 1804. *African Scenery and Animals.* Samuel Daniell, London.

DART, R. A., 1957. The Osteodontokeratic culture of Australopithecus prometheus. *Memoir of the Transvaal Museum* No. 10: 1–105.

DART, R. A. and KITCHING, J. W., 1958. Bone tools at the Kalkbank Middle Stone Age site and the Makapansgat Australopithecine locality central Transvaal. Part II. The Osteodontokeratic contribution. *South African Archaeological Bulletin* **13**: 94–116.

DAVIS, S., 1976. Mammal bones from the Early Bronze Age city of Arad, northern Negev, Israel: some implications concerning human exploitation. *Journal of Archaeological Science* **3**: 153–164.

DEACON, H. J., 1976. Where hunters gathered. *South African Archaeological Society, Monograph Series* **1**: 1–232.

DEACON, H. J., DEACON, J., BROOKER, M. and WILSON, M. L., 1978. The evidence for herding at Boomplaas Cave in the southern Cape, South Africa. *South African Archaeological Bulletin* **33**: 39–65.
DESHLER, W. W., 1965. Native Cattle keeping in Eastern Africa. *In*: LEEDS, A. and VAYDA, A. P., eds., *Man, Culture and Animals. The role of animals in human ecological adjustments*, pp. 153–168. American Association for the Advancement of Science, Publication No. 78. Washington, U.S.A.
DREISCH, A. VON DEN, 1976. A guide to the measurement of animal bones from archaeological sites. *Peabody Museum Bulletin* No. 1: 1–136.
EPSTEIN, H., 1956. The origin of the Afrikaner cattle with comments on the classification of Zebu cattle in general. *Zeitschrift für Tierzuchtung und Zuchtungsbiologie* **66**(2): 97–148.
EPSTEIN, H., 1957. The Sanga cattle of East Africa. *The East African Agricultural Journal* **22**(3): 149–164.
EPSTEIN, H., 1971. *The origin of the domestic animals of Africa*, 2 Vols. Africana Publishing Co., New York.
FAGAN, B. M., 1967. *Iron Age cultures in Zambia Vol. 1: Kalomo and Kangila*. Robins Series No. 5. Chatto and Windus, London.
FAGAN, B. M. and YELLEN, J. E., 1968. Ivuna: Ancient salt-working in southern Tanzania. *Azania* **3**: 1–43.
FAGAN, B. M., PHILLIPSON, D. W. and DANIELS, S. G. H., 1969. *Iron Age cultures in Zambia Vol. 2: Dambwa, Ingombe Ilede and the Tonga*. Robins Series No. 6. Chatto and Windus, London.
FOUCHÉ, L., ed., 1937. *Mapungubwe: Ancient Bantu civilization on the Limpopo*. University Press, Cambridge.
GARDNER, G. A., 1955. Mapungubwe 1935–1940. *South African Archaeological Bulletin* **10**: 73–77.
GARDNER, G. A., 1958. Mapungubwe and the second volume. *South African Archaeological Bulletin* **13**: 123–132.
GARDNER, G. A., 1963. *Mapungubwe Vol. II*. J. L. van Schaik, Pretoria.
GARLAKE, P. S., 1978. Pastoralism and Zimbabwe. *Journal of African History* **19**: 479–493.
GIFFORD, D. P., 1980. Ethnoarchaeological contributions to the Taphonomy of Human Sites. *In*: BEHRENSMEYER, A. K. and HILL, A. P., eds, *Fossils in the Making: Vertebrate Taphonomy and Palaeocology*, pp. 94–107. University Press, Chicago.
GOODWIN, A. J. H., 1945. Some historical Bushman arrows. *South African Journal of Science* **61**: 429–443.
GRIGSON, C., 1974. The craniology and relationships of four species of *Bos*. 1. Basic craniology: *B. taurus* L. and its absolute size. *Journal of Archaeological Science* **1**: 353–379.
GRIGSON, C., 1975. The craniology and relationships of four species of *Bos*. 2. Basic craniology: *B. taurus* L. proportions and angles. *Journal of Archaeological Science* **2**: 109–128.
GRIGSON, C., 1976. The craniology and relationships of four species of *Bos*. 3. Basic craniology: *B. taurus* L. sagittal profiles and other non-measurable characters. *Journal of Archaeological Science* **3**: 115–136.
HANISCH, E., 1979. Excavations at Icon, northern Transvaal. *South African Archaeological Society Goodwin Series* **3**: 72–79.
HANISCH, E., 1980. An Archaeological interpretation of certain Iron Age sites in the Limpopo/Shashi Valley. M.A. Thesis, University of Pretoria.
HATTINGH, T., 1975. The influence of castration on sheep horns. *In*: CLASON, A. T., ed., *Archaeozoological Studies*, pp. 345–351. North Holland Publishing Co., Amsterdam.
HENDEY, Q. B. and SINGER, R., 1965. The faunal assemblages from the Gamtoos Valley Shelters. *South African Archaeological Bulletin* **20**: 206–216.
HIGGS, E. S. and WHITE, J. P., 1963. Autumn killing. *Antiquity* **37**: 282–289.
HIGHAM, C. and MESSAGE, M., 1971. An assessment of a prehistoric technique of bovine husbandry. *In*: BROTHWELL, D. and HIGGS, E., eds., *Science in Archaeology*, 2nd ed., pp. 313–330. Thames and Hudson, London.
HILL, A. 1979. Butchery and natural articulation: an investigatory technique. *American Antiquity* **44**(4): 739–744.
HORTON, D. R., 1976. Lancefield: the problem of proof in bone analysis. *The Artefact* **1**: 129–142.
HOWELLS, W. W. and HANKS, J., 1975. Body growth of the Impala *Aepyceros melampus* in Wankie National Park, Rhodesia. *Journal of the Southern African Wild Life Management Association* **5**(2): 95–98.
HUFFMAN, T. N., 1970. The Early Iron Age and the spread of the Bantu. *South African Archaeological Bulletin* **25**: 3–21.
HUFFMAN, T. N., 1972. An Arab coin from Zimbabwe. *Arnoldia* **5**(32): 1–7.
HUFFMAN, T. N., 1973. Test excavations at Makuru, Rhodesia. *Arnoldia* **5**(39): 1–21.
HUFFMAN, T. N., 1974*a*. The linguistic affinities of the Iron Age in Rhodesia. *Arnoldia* **7**(7): 1–12.
HUFFMAN, T. N., 1974*b*. The Leopard's Kopje tradition. *National Museums and Monuments of Rhodesia, Memoir* No. 6: 1–150.
HUFFMAN, T. N., 1975. Cattle from Mabveni. *South African Archaeological Bulletin* **30**: 23–24.
INSKEEP, R. R. and MAGGS, T. M. O'C., 1975. Unique art objects in the Iron Age of the Transvaal, South Africa. *South African Archaeological Bulletin* **30**: 114–138.
JOUBERT, D. M. and BONSMA, J. C., 1959. Gestation of cattle in the subtropics, with special reference to the birth weight of calves. *South African Journal of Agricultural Science* **2**(2): 215–230.
JOUBERT, D. M. and DREYER, J. H., 1965. Bull *versus* steer on a moderate plane of nutrition in a group feeding trial. *Proceedings of the South African Society of Animal Production* **4**: 151–154.
KLEIN, R. G., 1976. The mammalian fauna of the Klasies River Mouth sites, southern Cape Province, South Africa. *South African Archaeological Bulletin* **31**: 75–98.
KLEIN, R. G. and SCOTT, K., 1974. The fauna of Scott's Cave, Gamtoos Valley, south-eastern Cape Province, South Africa. *South African Journal of Science* **70**: 186–187.
KOOROS, H. SADEK, 1972. Primitive bone fracturing: a method of research. *American Antiquity* **37**(3): 369–382.
LEAKEY, M. D., 1945. Report on the excavations at Hyrax Hill, Nakuru, Kenya Colony, 1937–1938. *Transactions of the Royal Society of South Africa* **30**: 274–409.
LEE, D. N. and WOODHOUSE, H. C., 1970. *Art on the Rocks of Southern Africa*. Purnell, Cape Town.
LEPIONKA, L., 1971. A preliminary account of archaeological investigation at Tautswe. *Botswana Notes and Records* **3**: 22–26.
MAGGS, T. M. O'C., 1975. Faunal remains and hunting patterns from the Iron Age of the southern Highveld. *Annals of the Natal Museum* **22**(2): 449–454.
MAGGS, T. M. O'C., 1976. Iron Age communities of the southern Highveld. *Occasional Papers of the Natal Museum* No. 2: 1–326.
MAGGS, T. M. O'C., 1977. Some recent radiocarbon dates from eastern and southern Africa. *Journal of African History* **18**: 161–191.
MAGGS, T. M. O'C. and SPEED, E., 1967. Bonteberg Shelter. *South African Archaeological Bulletin* **22**: 80–93.
MAGGS, T. M. O'C. and MICHAEL, M. A., 1976. Ntshekane: an Early Iron Age site in the Tugela Basin, Natal. *Annals of the Natal Museum* **22**(3): 705–740.
MAGGS, T. M. O'C. and DAVISON, P., 1981. The Lydenburg Heads. *African Arts* **14**(2): 28–33.
MANSVELDT, P. R. and SKINNER, J. D., 1962. The cattle of the BaVenda. *Department of Agricultural Technical Services Technical Communication* No. 6: 1–21.
MASON, I. L., and MAULE, J. P., 1960. The indigenous livestock of Eastern and southern Africa. *Commonwealth Agricultural Bureau of Breeding and Genetics. Technical Communication* No. 14: 17–83.
MASON, R. J., 1958. Bone tools at the Kalkbank Middle Stone Age site and the Makapansgat Australopithecine locality, central Transvaal, Part I. The Kalkbank site. *South African Archaeological Bulletin* **13**: 85–89.
MASON, R. J., 1962. *The prehistory of the Transvaal*. Witwatersrand University Press, Johannesburg.
MASON, R. J., 1964. Iron Age bone artefacts. *South African Archaeological Bulletin* **19**: 38.
MASON, R. J., 1973. First Early Iron Age settlement in South Africa: Broederstroom 24/73, Brits District, Transvaal. *South African Journal of Science* **69**: 324–325.
MEIRING, A. J. D., 1952. Polished-edge bone implements. *Navorsinge van die Nasionale Museum Bloemfontein* **1**(2): 30–34.

MEYER, A., 1980. 'n Interpretasie van die Greefswald potwerk. M.A. thesis, University of Pretoria.
MGOMEZULU, G. G. Y., 1981. Recent archaeological research and radiocarbon dates from Eastern Africa. *Journal of African History* **22**: 435–456.
MILLER, G. J., 1969. A study of cuts, grooves and other marks on recent and fossil bone. 1. Animal tooth marks. *Tebiwa* **12**(1): 20–26.
MILLS, M. G. L. and MILLS, M. E. J., 1977. An analysis of bones collected at hyaena breeding dens in the Gemsbok National Park. (Mammalia: Carnivora). *Annals of the Transvaal Museum* **30**(14): 145–155.
MONOD, J., 1975. *Pastoralism in Tropical Africa.* International African Institute, Oxford University Press, London.
NODDLE, B., 1974. Ages of epiphysial closure in feral and domestic goats and ages of dental eruption. *Journal of Archaeological Science* **1**: 195–204.
NOE-NYGAARD, N., 1972. Bone injuries caused by human weapons in Mesolithic Denmark. *In:* CLASON, A. T., ed., *Archaeozoological Studies,* pp. 151–159. North Holland Publishing Co., Amsterdam.
NOE-NYGAARD, N., 1973. New interpretation of shoulder-blade-scrapers. *Bulletin of the Geological Society of Denmark* **22**: 249–255.
NOE-NYGAARD, N., 1974. Mesolithic hunting in Denmark illustrated by bone injuries caused by human weapons. *Journal of Archaeological Science* **1**: 217–248.
ODNER, K., 1972. Excavations at Narosura, a Stone Bowl site in the southern Kenya Highlands. *Azania* **7**: 25–92.
OSTERHOFF, D. R., 1975. Haemoglobin types in African cattle. *Journal of the South African Veterinary Association* **46**(2): 185–189.
PARKINGTON, J. and POGGENPOEL, C., 1971. Excavations at de Hangen, 1968. *South African Archaeological Bulletin* **26**: 3–36.
PAYNE, S., 1973. Kill-off patterns in sheep and goats: the mandibles from Asvan Kale. *Anatolian Studies* **23**: 281–303.
PERKINS, D. and DALY, P., 1968. A hunter's village in Neolithic Turkey. *Scientific American* **219**(5): 96–106.
PERKINS, D., 1973. A critique on the methods of quantifying faunal remains from archaeological sites. *In:* MATOLCSI, J., ed., *Domestikations-forschung und geschichte der Haustiere,* pp. 367–369. Akadémiai Kiadó, Budapest.
PHILLIPSON, D. W., 1970. Excavations at Twickenham Road, Lusaka. *Azania* **5**: 77–118.
PHILLIPSON, D. W., 1976. The prehistory of Eastern Zambia. *British Institute in Eastern Africa, Memoir* No. 6: 1–229.
PLUG, I., 1978. Die latere Steentydperk van die Boesmanrotsskuiling in die Oos-Transvaal. M.A. thesis, University of Pretoria.
PLUG, I., 1980. Namakala and Nanga: faunal reports on two early Iron Age sites, Zambia. *South African Archaeological Bulletin* **35**: 123–126.
PLUG, I., HANISCH, E. O. M. and DIPPENAAR, N. J., 1979. *Rattus rattus* (house rat) from Pont Drift, an Iron Age site in the Northern Transvaal. *South African Journal of Science* **75**(2): 82.
POSNANSKY, M., 1962. The Neolithic cultures of East Africa. *Proceedings of the IVth Pan-African Congress on Pre- and Proto-history* **3**: 213–281.
POSNANSKY, M., 1967. The Iron Age in East Africa. *In*: BISHOP, W. W. and CLARK, J. D., eds., *Background to Evolution in Africa,* pp. 629–650. Chicago University Press, Chicago.
QUIN, P. J., 1959. *Foods and feeding habits of the Pedi.* Witwatersrand University Press, Johannesburg.
RAUTENBACH, I. L., 1971. Ageing criteria in the springbok *Antidorcas marsupialis* (Zimmerman, 1780) (ARTIODACTYLA: BOVIDAE). *Annals of the Transvaal Museum* **27**(6): 83–133.
RAVENHART, R., 1967. *Before van Riebeeck.* Struik, Cape Town.
ROBERTSON, T. C., 1946. The Hill of Jackals. *Libertas* **6**(4): 20–32.
ROBINSON, K. R., 1959. *Khami Ruins.* Cambridge University Press, London and New York.
ROBINSON, K. R., 1966. The Leopard's Kopje culture, its position in the Iron Age in Southern Rhodesia. *South African Archaeological Bulletin* **21**: 5–51.
ROBINSON, K. R., 1972. The Iron Age in Malaŵi: a brief account of recent work. *In*: PACHAI, B., ed., *The Early History of Malaŵi,* pp. 49–69. Longmans, London.
ROBINSON, K. R., 1975. Iron Age sites in the Dedza District of Malaŵi. *Department of Antiquities Publication* No. 16: 1–47. Malaŵi.
ROBINSON, K. R., 1977. Iron Age occupation north and east of the Mulanje Plateau, Malaŵi. *Department of Antiquities Publication* No. 17: 1–91. Malaŵi.
RUDNER, I. and RUDNER, J., 1957. A. Sparrman's ethnographical collections from South Africa. *Statens Etnografiska Museum, Stockholm Smärre Medelanden* **25**: 1–28.
SCHAFFER, W. M. and REED, C. A., 1972. The co-evolution of social behaviour and cranial morphology in sheep and goats (Bovidae, Caprini), *Fieldiana Zoology* **61**(1): 1–88.
SCHAPERA, I., 1963. *The Khoisan peoples of South Africa,* 4th ed. Routledge and Kegan Paul, London.
SCHOONRAAD, M., 1968. The discovery of Mapungubwe. *South African Archaeological Bulletin* **23**: 52–53.
SCHULZE, B. R., 1965. *Climate of South Africa. Part 8: General Survey.* Department of Transport, Weather Bureau, Pretoria.
SCHWEITZER, F. R., 1973. Early occurrence of domestic sheep in sub-Saharan Africa. *Nature* **241** (5391): 547.
SCHWEITZER, F. R., 1974. Archaeological evidence for sheep at the Cape. *South African Archaeological Bulletin* **29**: 75–82.
SILVER, I. A., 1969. The ageing of domestic animals. *In*: BROTHWELL, D. R. and HIGGS, E., eds., *Science in Archaeology,* 2nd ed., pp. 283–302. Thames and Hudson, London.
SISSON, J. and GROSSMAN, J. D., 1953. *The Anatomy of domestic animals,* 4th ed. W. B. Saunders & Co., Philadelphia and London.
SMITHERS, R. H. N., 1971. The mammals of Botswana. *National Museums of Rhodesia, Memoir* No. 4: 1–340.
SPEED, E. A., 1970. Specialists' report on the Nkope faunal remains. *In*: ROBINSON, K. R., The Iron Age of the Southern Lake area of Malaŵi, pp. 104–115. *Department of Antiquities Publication* No. 8. Malaŵi.
STEENKAMP, J. D. G., 1970*a*. The effect of breed and nutritional plane on the chronology of teeth eruption in cattle. *Rhodesian Journal of Agricultural Research* **8**: 3–13.
STEENKAMP, J. D. G., 1970*b*. Differences in manner of occlusion of representative indigenous and exotic breeds of cattle and effect on wear of deciduous incisor teeth. *Agroanimalia* **2**: 85–92.
STOW, G., 1905. *The Native Races of South Africa.* Struik, Cape Town. (reprint: 1964.)
SUTCLIFFE, A. J., 1970. Spotted hyaena: crusher, gnawer, digestor and collector of bones. *Nature* **227**: 1110–3.
SUMMERS, R., 1969. Ancient mining in Rhodesia and adjacent areas. *National Museums of Rhodesia, Memoir* No. 3: 1–236.
SUTTON, J. E. G., 1964. A review of pottery from the Kenya Highlands. *South African Archaeological Bulletin* **19**: 27–35.
SUTTON, J. E. G., 1972. New radiocarbon dates for eastern and southern Africa. *Journal of African History* **13**(1): 1–24.
SWANEPOEL, P., SMITHERS, R. H. N. and RAUTENBACH, I. L., 1980. A checklist and numbering system of the extant mammals of the southern African subregion. *Annals of the Transvaal Museum* **32** (7): 155–196.
VINNICOMBE, P., 1971. A Bushman hunting kit from the Natal Drakensberg. *Annals of the Natal Museum* **20**(3): 611–625.
VINNICOMBE, P., 1976. *People of the Eland.* University of Natal Press, Pietermaritzburg.
VOGEL, J., 1971. *Kumadzulo.* Zambia Museum Papers *3,* Oxford University Press, London. 1–119.
VOGEL, J. C., 1979. Radiokoolstofdatering van nedersettings uit die Ystertydperk op Greefswald. Council for Scientific and Industrial Research, Pretoria. Manuscript.
VOIGT, E. A., 1973. Faunal remains from the Iron Age sites of Matope Court, Namichimba and Chikumba, southern Malaŵi. *In*: ROBINSON, K. R., The Iron Age of the Upper and Lower Shire, Malaŵi, pp. 135–167. *Department of Antiquities Publication* No. 13: 1–167.
VOIGT, E. A., 1975. Studies of marine mollusca from archaeological sites; dietary preferences, environmental reconstructions and ethnological parallels. *In*: CLASON, A. T., ed., *Archaeozoological Studies,* pp. 87–98. North Holland Publishing Co., Amsterdam.
VOIGT, E. A., 1977. Faunal remains from pottery-filled pit, Banda Hill, Mulanje North. *In:* ROBINSON, K. R., Iron Age occupation north and east of the Mulanje Plateau, Malaŵi, pp. 32–33. *Department of Antiquities Publication* No. 17: 1–91.
VOIGT, E. A., 1979. The Faunal remains from Icon. *South African Archaeological Society. Goodwin Series* **3**: 80–84.

Voigt, E. A., 1980. Reconstructing Iron Age economies of the northern Transvaal: a preliminary report. *South African Archaeological Bulletin* **35:** 39–45.

Voigt, E. A., 1981*a*. The planning and purpose of a museum department of archaeozoology. *SAMAB* **14**(8): 357–368.

Voigt, E. A., 1981*b*. The faunal remains from Schroda. *In:* Voigt, E. A., ed., *Guide to archaeological sites in the northern and eastern Transvaal*, pp. 54–62. Transvaal Museum, Pretoria.

Voigt, E. A. and Plug, I., 1981. *Early Iron Age herders of the Limpopo Valley.* (Report to Human Science Research Council.) Transvaal Museum, Pretoria.

Von Petters, V., 1934. Beitrag zur kenntnis der Südafrikanischen hauskunde. *Zeitschrift für Säugetierkunde* **9:** 142–163.

Vrba, E. S., 1973. Two species of *Antidorcas* Sundevall at Swartkrans (Mammalia: Bovidae). *Annals of the Transvaal Museum* **28**(15): 287–352.

Welbourne, R. G., 1969. Report on Cenozoic ecology work 1968–1969. Relationships of prehistoric animals, Man and environment in Vaal-Limpopo Basins. *Archaeological Research Unit Occasional Papers* **4:** 1–3.

Welbourne, R. G., 1971. Prehistoric Environment, animals and man in the Vaal-Limpopo basins. M.A. thesis, University of the Witwatersrand.

Welbourne, R. G., 1973. Identification of Animal remains from the Broederstroom 24/73 Early Iron Age sites. *South African Journal of Science* **69:** 325.

Welbourne, R. G., 1975. Tautswe Iron Age site: its yield of bones. *Botswana Notes and Records* **7:** 1–16.

Wheat, J. B., 1967. A Palaeo-Indian bison kill. *Scientific American* **216**(1): 44–52.

White, T. E., 1953*a*. Observations on the butchering technique of some aboriginal peoples. No. 2. *American Antiquity* **19:** 160–164.

White, T. E., 1953*b*. A method of calculating the dietary percentage of various food animals utilized by aboriginal peoples. *American Antiquity* **18:** 396–398.

Winter, B. de and Vahrmeijer, J., 1972. *The National list of trees.* J. L. van Schaik, Pretoria.

Yellen, J. E., 1977*a*. *Archaeological approaches to the present.* Academic Press, New York.

Yellen, J. E., 1977*b*. Cultural patterning in faunal remains: Evidence from the !Kung Bushmen. *In:* Ingersoll, D., Yellen, J. E. and MacDonald, W., eds, *Experimental Archaeology*, pp. 270–331. Columbia University Press, Columbia.

Appendix I

FAUNAL REPORTS BY MALAN (1934) AND CURSON (1939)

1. COPY OF REPORT OF FAUNAL MATERIAL FROM GREEFSWALD BY PROF. D. E. MALAN, APPROXIMATELY 1934. UNIVERSITY OF PRETORIA GREEFSWALD FILE No. 1.

Systematic collections of bone fragments were made at several of the excavation sites and subsequently examined. As is evident from the subjoined list, the vast majority of these belong to the Ox and to the Sheep or Goat. It is impossible in the case of fragments and even of entire bones in most cases, to distinguish between sheep or goat. This is a matter for regret since it would have been of considerable interest to determine whether the inhabitants of Mapungubwe kept sheep or goats or both. That most of the bones, the remains of food, should belong to domesticated animals, shows that we have to do here with a pastoral people.

The list is as follows:

(a) Bones collected from the Original Grave Site.

Bos:
- Scapula
- Right Maleolus
- Second Phalanx
- Distal sesamoid bone
- Portion of lower jaw
- Second Phalanx
- Left radius
- Carpal (6 fragments)
- 2nd upper premolar
- Several fragments of Vertebrae
- Portion thoracic vertebra
- Right radial carpal
- Portion of scapula
- Tarsal
- First phalanx
- Right radius
- 3rd lower molar
- 2nd lower premolar

Ovis or *Capra:*
- Vertebrae, 7
- Portion lower jaw
- Scapula, 7 pieces
- Radius, 1
- Tibia, 1
- Astragalus, 1
- Carpals, 3
- Teeth, 6 upper molars
  2 lower molars
- Humerus, 2 pieces
- Femur, 1
- Ribs, several
- Calcaneum, 8
- Metacarpals, 4

Unidentifiable:
- Portions of vertebrae: 7
- Portions of Scapulae: 5
- Os petrosum: 1

(b) Bones collected from Site IV.
Bos: 11 fragments

(c) Bones collected from Site I.

Bos:
- Vertebrae: 3 fragments
- Lower jaw: 2 fragments
- Upper molars: 3 fragments
- Scapula: 3 fragments
- Humerus: 2 fragments
- Radius: 1 fragment
- Femur: 1 fragment
- Tibia: 1 fragment
- Carpals: 2 fragments
- Tarsals: 4 fragments

Ovis or *Capra:*
- Upper Molars: 7
- Lower Molars: 2
- Cervical vertebra: 1
- Fragment of orbital region of skull.
- Portion of tibia.
- Caudal vertebra.

Phacochoerus aethiopicus: Molar tooth
Papio porcarius: Lower jaw
Mus: Femur
Canis mesomelas: Premolar. Portion of upper jaw with teeth
Ruminant: Lower incisor

(d) Bones collected from Site II.

Bos:
- Teeth: 2 incisors, 1 upper premolar. 1 lower premolar.
- 8 upper molars. 7 lower molars
- 2 fragments of humerus. 1 carpal. 1 scapula.
- 2 tarsals. 3 metatarsals.

Signed: D. E. Malan

2. COPY OF REPORT ON FAUNAL MATERIAL FROM GREEFSWALD BY DR H. H. CURSON, 9 OCTOBER 1939. UNIVERSITY OF PRETORIA GREEFSWALD FILE No. 12.

A NOTE ON SOME OSSEOUS MATERIAL FROM THE MAPUNGUBWE EXCAVATIONS

BY H. H. CURSON, C. JACKSON AND J. H. L. CLOETE

Introduction

Thanks to Professor Leo Fouché of the University of the Witwatersrand, two small boxes of 'animal bones (mostly bos)' were received from the Director, Bureau of Archaeology, Department of Interior, Johannesburg, at the end of July last.

Professor Fouché reports 'in the course of excavations at Mapungubwe on the Limpopo' . . . the discovery of 'numerous so-called "beast burials"—human skeletons surrounded by animal bones'—(Private letter dated 20th June, 1939).

This material has been the subject of investigation by Professor D. Malan of the University of Pretoria whose report (Fouché 1937) states that the vast majority of the bones belong to the ox and to the sheep or goat, thus indicating that the inhabitants of Mapungubwe were a pastoral people.

Professor Fouché was anxious that some of the bones be further investigated in order to ascertain (a) type or race of cattle, (b) age of deposit and (c) religious significance.

Since there is a definite association between the species of domestic animal, especially cattle, and the early inhabitants of South Africa, it is indeed of importance to ascertain in such cases whether or not the osseous material includes bovine fragments, especially for the reason that, while the general native cattle types in Africa are well known, Hall and Neal (1902) report that 'in the more ancient debris heaps and under ancient cemented floors (of Rhodesia) are horns of very small oxen—short-horned—smaller than Guernsey cattle and probably the breed from which the present Zambesi cattle originated.[1] They were preserved by the cement work by which they were hermetically sealed from the action of the weather. Longhorned cattle were not introduced into South Africa until late in the 17th Century' (page 153). Without access to Hall and Neal's material it is impossible to pass an opinion, but assuming that the horns belonged to cattle, is it certain they were not of *calves* of the Sanga type or even of adults of the Short-horned Zebu?

Further it should be stressed that Long-horned cattle were introduced south of the Zambesi, first by the Hottentots and later by the Bantu who, according to Sir Harry Johnston, first crossed the Zambesi about 700 A.D. (quoted by Maingard, L.F. *S.A. Jl. Sc.* 1929, page 845).

Before considering the present material it will be well to review the cattle types of Africa.

Native Cattle Types

From the mass of data available on African cattle, it is possible from a practical point of view, to classify cattle as follows:

1. Along the Zambesi Valley one of the writers (H. H. C.) has encountered large Sanga cattle (of the Bechuana sub-type) (west of Victoria Falls) and small cattle of Short-horned Zebu type (Zambesi mouth):

A. Parent Stocks

(a) Humpless

1. *Hamitic Long-horn*, e.g. in the Gold Coast Colony (Stewart 1937);
2. *Short-horn*, e.g. along the littoral of the Gulf of Guinea—Gold Coast Colony, Dahomey, Nigeria—(Epstein 1934).

(b) Humped (True Zebus)

3. *Lateral-horned Zebu or Afrikander*, e.g. in South Africa, the hump being cervico-thoracic and muscular, and
4. *Short-horned Zebu*, essentially of Asia, but well represented in East Africa. In this case the hump is thoracic and musculo fatty.

B. Derived Types

Of the many types that have arisen from crossing over a period of centuries, the two most important are:

5. *Sanga*, best represented in South Africa (Curson 1936) and usually possessing a cervico-thoracic and muscular hump. It is derived by the mating of Hamitic Long-horn and Lateral-horned Zebu, and
6. *Lyre-horned Zebu*, e.g. in Nigeria (Henderson) and also having a hump which however is thoracic and musculo fatty. It is derived by the crossing of Hamitic Long-horn and Short-horned Zebu.

The Sanga and Lyre-horned Zebu types may conveniently be referred to as Pseudo-Zebus, for while they possess a hump, the type of skull, through Hamitic Long-horn admixture, is as a rule very different to that of the True Zebus whose origin is Asiatic.

The skull of True Zebus is generally long and coffin shaped and the orbital arches are not prominent. The profile too is, as a rule, convex. On the other hand the skull of Pseudo-Zebus is not so uniform, being wide in the forehead and having the orbital arches well developed. The profile is generally flat.

The shape and direction of the horn cores is also a matter of importance. Of the two South African types of native cattle, the Lateral-horned Zebu has horn cores which are oval on cross-section, whereas the Sanga has horn cores which are circular in circumference.

Another feature is the presence or absence of bifid superior spines of the thoracic vertebrae (from 6th vertebra backwards). In the True Zebus the superior spines are bifid, whereas in the Sanga, they may, as can be expected from a cross, be either, but nothing definite is known regarding the Lyre-horned Zebu.

The conformational and osteological differences of the above types have received consideration from Bisschop (1937) and from Curson and Epstein (1934) and Curson (1936).

The above is a general description of typical material, but as can be understood a multitude of varieties has evolved over a period of many centuries. The Short-horned Zebu is not found south of the Zambesi, while the Hamitic Long-horn, Short-horn and Lyre-horned Zebu occur chiefly in West Africa.

According to species the following material was identified:[1]

Bovine: Seven portions of the skull including more or less intact horn cores. Of these four portions (a = G/4869, b = G/4859, c = K2/4864, d = G/4872(a)) owing to their appearance (eg. convex forehead and oval horn cores directed in a lateral manner) were classed as Lateral-horned Zebu or Afrikander. The remaining three portions (e = K2/4858, f = G/4872(b), g = G/4870) were classed as Sanga on account of the flatness of the forehead and the circular appearance of the horn cores in cross section.

There were also four fragments of the skull including the nuchal crest, but without measurable horn cores. Of these one piece (k = G/4874) was classified as Afrikander and three pieces (h = K2/4862, i = MST/1000; j = G/4873) as Sanga.

In addition there were two portions (p, q) of the left humerus, but there was no feature to indicate the type of bovine.

A number of other fragments (eg. teeth, maxillae, vertebrae, etc.) of bovine origin were studied but proved of little or no value for type distinction.

The size of the horn cores generally indicated that they were from young animals.

Sheep: One piece (s) of the occipital region of the skull. Other material examined was not considered to be from domesticated animals and accordingly need not be described.

1. Catalogue numbers allocated to the specimens during the present study are given where possible, eg. G/4869.

Conclusion

In regard to the first of the points upon which Professor Fouché desired information, it is clear, as was to be expected, that the Mapungubwe folk possessed cattle of the Afrikander and Sanga types.

As to the age of the deposit it is impossible to give any estimate.

Finally as to the religious significance of the beast burials, it is a well known fact that even today Natives prefer to sacrifice animals without blemish. In other words, apart from their lower economic value, young animals would be preferred on account of the fact that they are less likely to have been injured.

Literature

Bisschop, J. H. R. (1937) Parent Stocks and Derived Types of Afrikander Cattle, with particular reference to the importance of conformational characteristics in the study of their origin. *S. A. Jl. Sc.* XXXIII.

Curson, H. H. and Epstein, H. (1934) a Comparison of Hamitic Long-horn, West African Short-horn and Afrikander Cattle, particularly with regard to the Skull. *Onderstepoort Jl. of Vet. Sc. and Animal Industry* III(2).

Curson, H. H. (1936) The Native Cattle Types of Africa, with particular reference to South Africa. *Jl. S.A.V.M.A.* VII(1).

Epstein, H. (1934) The West African Short-horn. *Jl. S.A.V.M.A.* V(3).

Fouché, L. (1937) *Mapungubwe.* Cambridge Univ. Press. p. 126.

Hall, R. N. and Neal, W. G. (1902) *The Ancient Ruins of Rhodesia.* Methuen and Co., London.

Henderson, W. W. ( ) *Annual Reports of Veterinary Department, Nigeria.*

Stewart, J. L. (1937) *The Cattle of the Gold Coast.* Government Printer, Accra.

IDENTIFICATION OF TERRESTRIAL AND FRESHWATER MOLLUSCA FROM MAPUNGUBWE

The following species of terrestrial and freshwater molluscs have been identified in the Mapungubwe collection. The information given here is quoted direct from correspondence with specialists, to whom the author is very grateful for their willing help.

The data is divided according to species, with details on provenance and identifier. 'AVB' is A. C. van Bruggen of the Rijks University, Leiden; and 'CA' is C. Appleton of the Research Institute for Diseases in a Tropical Environment, Congella, Natal.

TERRESTRIAL MOLLUSCA (All identified by AVB)

K2/TS1/1:	*Succinea badia* *Pupoides calaharicus* *Xerocerastus burchelli* *Curvella transvaalensis* *Archachatina* *Achatina immaculata*
K2/TS2/1:	*Pupoides calaharicus* *Xerocerastus burchelli* *Curvella transvaalensis*
K2/TS3/1:	*Succinea badia* *Pupoides calaharicus*
K2 All trenches:	*Succinea badia* *Pupoides calaharicus* *Xerocerastus burchelli* *Curvella transvaalensis* *Opeas lineare*
MST/K8:	*Pupoides calaharicus* *Xerocerastus burchelli* *Curvella transvaalensis*

Dr Van Bruggen's comments on the above include the following: 'As far as I can judge all the above species still occur in the same area. The terrestrial snails reflect an arid climate and vegetation (i.e. mopane savannah) such as are found today on the same spot. These snails are not interesting from the point of view of human food.'

Concerning *Achatina immaculata*, he comments: 'It is unlikely that achatinid species other than *Achatina immaculata* are found in the arid savannah environment (of Greefswald). In my opinion *A. immaculata* in this part of Southern Africa is best adapted to local climatic conditions. In any case no other species reaches such a size locally. Shells of large *Achatina* are known to have been used by the population as hippo scares in cultivated fields (pierced for suspension on lines) and as containers for all sorts of goods (e.g. snuff) (when) stoppered with wads of moss or other material.'

FRESHWATER MOLLUSCA

Identified by AVB:

K2/TS/1:	*Melanoides tuberculata* *Unio caffer*
K2/TS3/1/1134, TS3/3/1437, TS3/1563:	*Corbicula africana*
TS3/2190, TS3/13, TS3/8/1872:	*Unio caffer*
TS3/1,TS3/3/1438, TS3/14/2265:	*Aspatharia (Spathopsis) wahlbergi*
K2/A11 trenches:	*Melanoides tuberculata* *Pyrgophysa forskallii*
MST/K8:	*Melanoides tuberculata* *Bulinus* sp.

Identified by CA:

MST/K8/2(ii)/436, MST/K8/4/500, MST/K8/513, MST/K8/6/533, MST/K8/7/591:	*Aspatharia (Spathopsis) wahlbergi*
MST/K8/4/169:	*Unio caffer*

Dr Van Bruggen comments on the above material: '*Pyrgophysa forskalii* is a widely distributed freshwater snail. *Bulinus* sp. is a species of a widely distributed group of freshwater snails, most of which are bilharzia vectors.'

In reply to a question from the author as to how small freshwater mollusca succeed in arriving at a point some way from the nearest water, Dr van Bruggen made the following suggestions:

'Freshwater snail shells are very light and may have washed in from some distance away after a strong rain storm; they are even sufficiently light to be blown in by strong winds. Freshwater snails are sometimes dispersed by birds so that temporary bodies of fresh water may have been populated by eggs or juveniles brought in by birds. Small shells are transported by man in a variety of ways in fishing nets, on hippo meat and skin, on riverine vegetation etc.'

This last comment is a reminder of the excavations in a French Upper Palaeolithic deposit, when the density of small marine mollusca indicated to the excavator where the occupants of the cave had piled up a dried seaweed, host to the molluscs, as a bedding material. The fact that these small shells were retained at Mapungubwe has meant that additional information has been obtained on the distribution of certain species, quite apart from the new species described. This small example of the usefulness of such tiny organisms underlines again the necessity for retaining all material from an archaeological excavation, and the necessity of an interdisciplinary approach in archaeology.