DIE KULTURE VAN GREEFSWALD

'N ARGEOLOGIESE STUDIE VAN DIE YSTER=
TYDPERKKULTURE OP DIE PLAAS GREEFSWALD

DEEL III

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HOOFSTUK 7

DIE FAUNA VAN DIE GREEFSWALDTERREINE

deur E A Voigt
Transvaal Museum

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VOORWOORD

Die volgende verslag oor die fauna van die Greefswald= terreine is geskryf deur mev. E.A. Voigt van die Transvaal Museum. Dit vorm deel van 'n verhandeling wat sy by die Universiteit van Pretoria ingedien het vir die verkryging van 'n magistergraad in Argeologie. Die leiers vir die verhandeling was prof. J. F. Eloff en dr. C. K Brain. Die materiaal wat hierin beskryf word, is dié wat tydens die opgrawings van 1971 tot 1973 gevind is, maar in 'n paar ge= valle is daar gebruik gemaak van vroeëre vondste.

Sekere gedeeltes van mev. Voigt se verhandeling het nie regstreeks betrekking op die hoofverslag wat by die RGN ingedien word nie. Daardie gedeeltes is gevolglik wegge= laat en dit het sekere redaksionele wysigings vereis waarvan die volgende die belangrikste is.

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2. Die hoofstukke van mev. Voigt se verhandeling vorm nou onderafdelings van HOOFSTUK 7 van die hoof= verslag aan die RGN. Gevolglik moes daar 'n byvoeging by mev. Voigt se hoofstuknommers gemaak word om by die numerering van die verslag in te pas. Daardie nommers lees nou soos volg:
   "Chapter 7/3; 7/4", ens.

3. Tabelle, plate en sketsfigure wat nie ter sake is nie, word weggelaat en gevolglik sal daar sekere gapings in die numerering voorkom.

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CHAPTER 3

RETRIEVAL AND METHOD OF ANALYSIS OF THE FAUNAL SAMPLE

A. RETRIEVAL AND CHOICE OF SAMPLES

The faunal material which forms the basis for the present study was collected during the excavations undertaken at Greefswald since 1968. All material was meticulously annotated; thus the stratigraphical context of the faunal remains is clearly defined. The stratigraphy and the pottery are being described in full by Meyer.

With the exception of the topmost levels of K2/TS3, MST/K8 and MK1, all material was removed according to stratigraphic levels, i.e. by following observable features or changes in the deposit. The top three levels of these excavations were removed as artificial spits as there was no obvious stratigraphy. All material was dry sieved through 1/8" (3 mm) mesh, then sorted by students and unskilled labour. All faunal material was kept, the majority of the material being taken from the sieves. Bones which were almost complete or which occurred in concentrations or as "features" were lifted directly from the excavation and immediately packed for transport. Where it was felt to be necessary, complete or diagnostic specimens were coated in situ with Glyptal diluted with acetone.

Some of the bone was washed in the field; however the bulk of the collection was packed immediately. Bone material was packed separately from other finds; the marked paper packets were then packed into cardboard cartons before being transported to Pretoria University and then to the Transvaal Museum.

The method of excavation and sorting has, I believe, resulted in a maximum recovery rate of material. Rodent bones are represented in the collection, as well as large numbers of terrestrial molluscs, many of which are only five millimetres long. I am therefore confident that when students were responsible for sorting, no potentially useful material was lost in the excavation process. When unskilled labourers were used, very small material (such as rodent bones) was not picked from the sieves, although small isolated teeth were retained, as well as all larger material. My only criticism of the overall method

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of retrieval is that some of the bone suffered considerably during the sieving process; however this problem could not be solved without having a larger team in the field or without having a trained person in charge of this part of the excavation.

One of the aims of the faunal analysis was to define the degree of horizontal and vertical variation within the archaeological complex. It was therefore decided to examine the material from the three deepest sequences, and, since the K2 site is the most extensive, to also examine two excavations on the edge of the accumulation where the main concentration of living areas are thought to occur. In addition, the teeth and non-bovid material from a fourth area on K2, TS4, and from four features on the Southern Terrace were also examined. The choice of these samples lay with Eloff and Meyer.

The choice of samples for analysis was thus governed by a number of factors, namely: depth of deposit, (K2/TS3, MST/K8 and MK1), horizontal extent of excavation (K2/TS2), position of excavation (K2/TS1) and, lastly, the quantity of bone retrieved in each excavation. Those excavation areas which were not selected for analysis were those which did not yield large samples of bone.

The extent of each sample analysed is as follows:

EXCAVATION NUMBER AND NOTATION	NUMBER & SIZE OF SQUARES	NO. OF STRATIGRAPHIC LEVELS EXCAVATED	NO. OF LEVELS ANALYSED IN FULL	MAXIMUM DEPTH	QUANTITY OF BONE ANALYSED
K2					
Test trench (Toetssloot)1 TS1	3x2m	5	5	70cm	15088
Test trench (Toetssloot)2 TS2	11x2m	4	4	80cm	25877

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Test trench (Toetssloot)3					
TS3	2x2,3m	24	10	5,3m	8116
Test trench (Toetssloot)4					
TS4	5+4 half squares	5	Teeth only	?	60
Southern Terrace					
(MST)					
K8	1x3,6m	17	8	3,4 m	8779
F4	1	?	3 features	?	637
H5	1	?	1 feature	?	55
Mapungubwe Hill (Mapungubwe Kop)					
MK					
MK1	6x3 m	11	6	2,5 m	22967
TOTAL					81579

In many cases, strata were sub-divided during excavation. These sub-divisions were retained during the faunal analysis, but in cases where there was no faunal difference between sub-divisions, they have been combined to form single units as far as possible after consultation with Meyer.

Meyer has been able to further combine stratigraphic levels, on the basis of pottery and hut floor types, to form cultural phases. Phase 2 is regarded as a "pure" K2 phase, in which only M2 pottery occurs; Phase 3 is characterised by the presence of both M2 and M1 pottery, while Phase 4 is identified by the presence of bone linkshafts. These broader phases were not used in the faunal analysis except in the final stages of comparison; thus the entire faunal analysis has been done on the basis of excavated stratigraphic levels.

Necessary details of stratigraphy are given as an introduction to the analysis of each sample in Chapter 4.

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It was originally hoped that some statement could be made on the relative proportion of the deposit which was analysed. However, as details concerning the total area, volume and other components of the deposit, are not available, and would be impossible to calculate due to the natural contours of the site, it was not possible to calculate the percentage recovery of material involved. The types of deposit encountered can be very broadly described as follows:

K2/TS1	Relatively hard, coarse deposit with some ash
K2/TS2	Same as TS1
K2/TS3	Initially an ashy deposit. From level 16 downwards, high proportion of ash mixed with sandy soil. Levels 22 and 23 may represent the kraal floor.
MST/K8	Deposit consists of layers of collapsed hut rubble, hut floors and ash, with sand in-fill.
MK1	Similar to MST/K8

The hardness of the deposit thus varied considerably. This factor, and the rate of accumulation of the deposit, affected the state of preservation of the bone. The samples which were physically best preserved came from K2/TS3, and from certain levels of MST/K8 and MK1.

B. GENERAL METHODS OF ANALYSIS

Faunal studies have been a part of the Transvaal Museum research programme for many years, beginning with the pioneering work of C.K. Brain. During this time basic methods of analysis have been developed; these methods formed the basis for the current research project.

The original intention was to analyse all the faunal material from every level. However, the huge quantity of material available precluded doing this within a prescribed period and, in addition, it soon became clear that closely similar results in terms of the species present were being obtained for all the levels. All the bone (over 15 000 pieces) was analysed from the first excavation dealt with (K2/TS1); it was then decided to apply some sort of selection to the rest of the

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collection. All the teeth and all non-bovid material was examined from each level of each excavation. This material was adequate to produce a species list and a minimum number count for each level. Meyer then indicated which stratigraphic levels suggested that changes had taken place, and each of these levels was analysed in full. In addition, where an excavation was divided into cultural phases eg. MST/K8, the largest sample (i.e. the richest level) from each phase was also analysed. Out of a total of sixty-six levels, thirty-three levels were analysed completely, resulting in a sample of bones of 81,579 pieces.

The first step in the analysis was to sort through the material from each level and to divide it into two main groups, i.e. identifiable bone and waste bone. The first group is made up of three categories viz. bovid teeth, bovid post-cranial material and non-bovid material. The bovid teeth were identified and listed. The non-bovid material was identified with the help of a number of specialists and the comparative collection housed at the Transvaal Museum; this included molluscan and rodent material.

If the material from the level was to be analysed in its entirety, the bovid post-cranial remains other than ribs and vertebrae were first divided according to body part, then listed according to size ranges and sides (i.e. left or right); unfused epiphyses were noted. Damage such as human butchering damage, burning, rodent gnawing and natural weathering were noted for every specimen, and the majority of specimens was measured according to one centimetre intervals, i.e. 0-1, 1-2 cm etc.

In dividing the bovid remains according to size classes, the categories set up by Brain (1974a) were used, although the terms Bov.I, Bov.II, Bov.III and Bov.IV were used in preference to Ant.I etc. An additional class, Bov.IIb, has been utilised to include bovids which are impala sized or larger than impala size and therefore larger than sheep or goat; this is a refinement suggested by Welbourne (1971:7).

The waste bone was divided into five main categories viz.

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skull, vertebral and rib fragments, miscellaneous skeletal parts and bone flakes. Initially, an attempt was made to divide the skull, rib and vertebral fragments into bovid size classes; however it soon became obvious that the degree of fragmentation was such that reliable identification of the fragments was not possible and would not provide any additional information. Most of the vertebrae are broken into at least half a dozen pieces, many of which are too small to be identified as cervical, thoracic or lumbar. For this reason they could not be used for calculating minimum numbers; minimum numbers could be more reliably obtained by using other very much better preserved post-cranial material. The first four of these categories were not measured, but human damage was noted throughout and, in many cases, the presence of burning, rodent gnawing and weathering was also noted. Bone flakes from certain levels were measured in the same way as the other material; all damage was noted in these levels.

In many samples a large number of enamel fragments from teeth were left over after repairing teeth as far as possible. These fragments were usually counted separately, but in the final lists have been combined with "skull fragments." In some cases this has increased the size of this category considerably.

The category "miscellaneous skeletal parts" includes all the bone material which is unidentifiable, i.e. has been fragmented beyond recognition. The size of this class is proportional to the degree of weathering and fragmentation of the sample.

The bone flake category consists of bone fragments which originated from the shafts of the major limbs and which do not retain articular facets (Brain, op.cit.:3). Occasionally this class did absorb long bone flakes with very small portions of articular ends, but in these cases the articular facet was so small that it was not possible to identify the bone from which the flake came.

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If more than half of the circumference of the shaft of a bovid long bone was preserved, the specimen was listed as a shaft piece rather than a bone flake, and was included in the lists of identifiable bovid post-cranial material.

Sizing of specimens

In all cases the teeth were identified first. A small collection of domestic cattle, sheep and goat skulls was available for comparison. By comparing bovid teeth with this material, and by referring any doubtful material to Dr Vrba for checking, it was soon found that almost all the bovid teeth occurring in the Greefswald sample came from these three species. While handling the material a growing conviction developed that it was possible to separate sheep from goats on the basis of teeth. In listing the material, I was as specific as possible. However, since no adequate identified sample is currently available to check my assumptions, all the material identified on the basis of teeth as *Capra hircus*, *Ovis aries* or *Ovis/Capra* has been presented in the thesis as *Ovis/Capra* sp. That both species are present has been confirmed, and is discussed in Chapter 6.

In the same way, almost all the Bov.III size teeth conformed very closely with those of *Bos taurus;* it may therefore be assumed that, unless otherwise stated. all the Bov.III teeth handled were from *B. taurus* and have been listed as such. Those which could not be satisfactorily matched with the comparative material have been listed as Bov.III. Again, apart from using the comparative *B. taurus* material at all times, Dr Vrba was asked to check on problematical specimens. The same principles were applied to the Bov.II and Bov.III post-cranial material; this was assumed to have come from the *Ovis/Capra* and *Bos taurus* group.

In the case of non-bovid material, teeth and post-cranial material were identified as closely as possible to species, generic or family level. Specimens which could not be identified more closely than family level have been listed as belonging to a specific size class. In the case of carnivores, for instance, material has been listed according to

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which species matched the specimen most closely in size, e.g. jackal or Cape hunting dog size etc. If it was not possible to place it in such a category, a specimen was listed as indeterminate small, medium or large carnivore, or small, medium or large mammal.

Some bird bones were originally identified as "medium sized bird." Guinea fowl was subsequently identified; it was then decided to refer to "guinea fowl sized bird" instead of "medium sized bird". Possible alternatives to the guinea-fowl would be korhaan (*Lophotis rufricrista*) or domestic fowl (*Gallus gallus*). Neither of these species has been identified, suggesting that guineafowl is most likely to have been the species concerned.

Fragments of freshwater bivalves occurred in many levels. Three species were identified by C. Appleton viz. *Aspatheria (Spathopsis) walhbergi*, *Unio caffer* and *Corbicula africana*. Isolated fragments of valves have been listed as indeterminate small, medium or large bivalves. Marine mollusca were identified by R.N. Kilburn.

Small terrestrial mollusca were sent to A.C. van Bruggen for identification. His examination of these small specimens resulted in the description of a new species, *Curvella transvaalensis* (van Bruggen, 1978). The identification of mollusc specimens is given in Appendix 1. van Bruggen was also kind enough to identify the complete shells of *Achatina* species present as *A. immaculata*, an Achatinid with a preference for dry country. He expressed the opinion that no other species of *Achatina* would be likely to occur in the same area; for this reason, all material identified as Achatinid has been listed as *A. immaculata*.

Several layers produced very large bones which were so heavily weathered or damaged that it was not possible to identify the actual bone. These bones probably came from elephant, hippopotamus or rhinoceros, and are listed accordingly, or as "very large mammal". In such cases the species identification is less important than the fact that some remains of very large animals were brought back to the living site.

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Calculating minimum numbers of individuals

Minimum numbers of individuals were calculated on teeth and on post-cranial material when the latter material was included in the analysis. It was found that the numbers calculated on postcranial material were in some cases higher than those calculated on the basis of teeth. This was particularly true for non-bovids, which were often represented only by post-cranial material, and for the Bov.I group, the teeth of which fragment very readily.

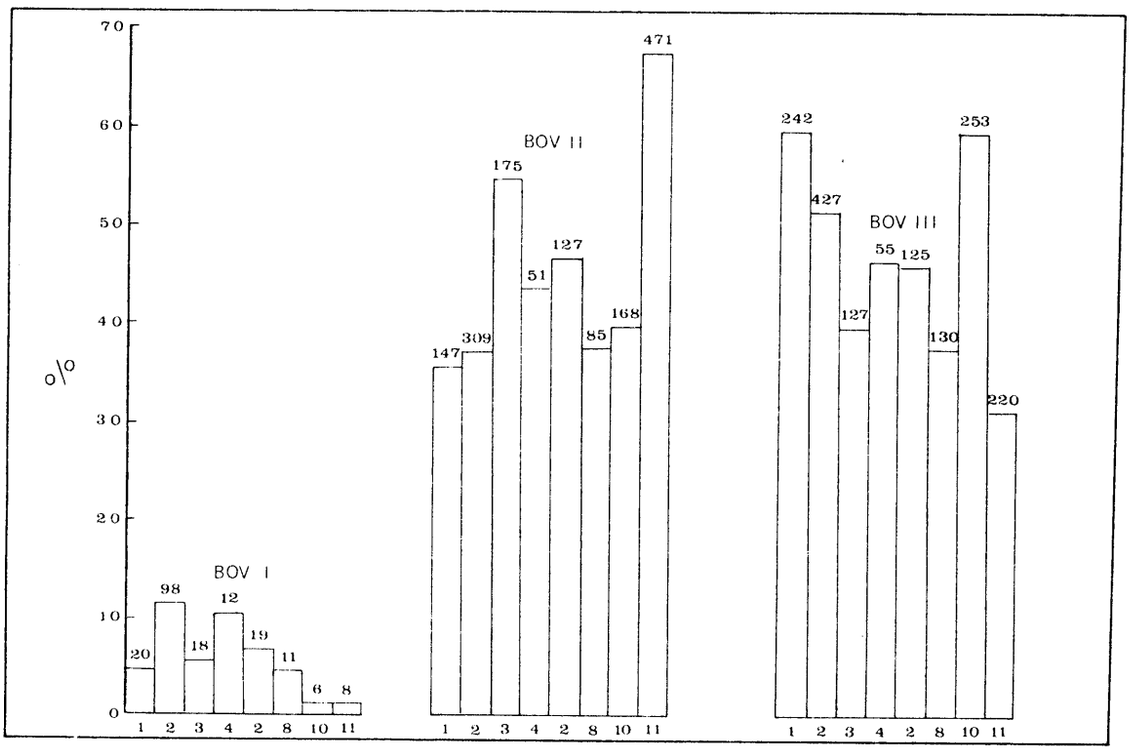

Fig. 3.1(a). Calculation of minimum numbers of individuals: percentage of each bovid size class on basis of actual number of post cranial body parts.

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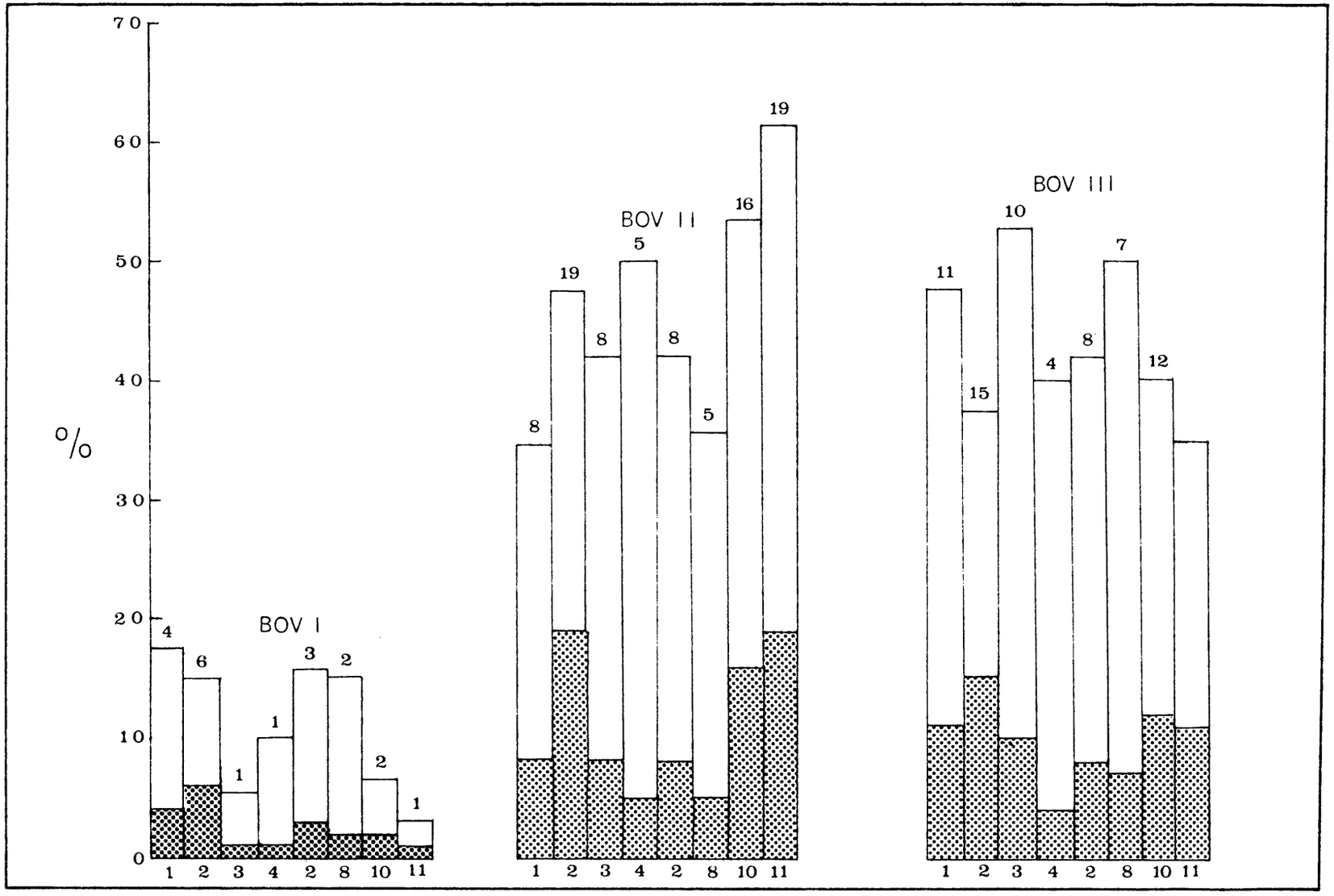
Fig. 3.1b. Calculation of Minimum numbers of individuals as used in thesis. Percentages of post-cranial remains of each size class. Minimum number of specimens involved is given at the head of each bar and shown as shaded portion at base of each bar. Figures at the base of each bar equate with excavation units TS1/1, TS2/2,/3 & /4, MK1/2, MK1/8, MK1/10(i) and MK1/11



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In all cases in which post cranial material was listed, the numbers were calculated on the basis of right and left sides, proximals and distals and unfused epiphyses. The highest number was taken as the minimum number count (termed M.Ind.), and unfused epiphyses were assumed to belong to juvenile or sub-adult animals other than these represented by fused epiphyses. All conclusions relating to economy were based on this minimum number count. An alternative (with the bovids) would have been to calculate frequencies of each group on the basis of actual numbers of post cranial parts present. An experiment with this system showed that a different pattern emerged using this method (Fig. 3.1a and 1b). This method could however only be applied to bovids; it was also felt that the M.IND. count is less dependant upon vagaries of preservation. Thus we have adhered to the concept of using minimum numbers of individuals as a basis for interpretation.

Clason (1972) states that four methods of calculating M.IND. are in use:

a) The number of specimens of the most numerous skeletal part is equated with the M.IND. If this number is divided according to right or left, proximal or distal, fused or unfused, and the highest taken as equivalent to M.IND., then this is the same method used in this study. If, however, a straightforward number is utilised eg. 34 scapulas = 34 individuals, then this method produces doubtful results.

b) Chaplin (1971) advocates that each group of skeletal parts should be inspected to ascertain which could have belonged to the same specimen. This method produces, in his mind, the most accurate result in calculating minimum numbers of individuals. In the course of this research project, measurements of the bones were not used to determine whether several bones belonging to the same individual were present or not. In other ways the method used in this analysis is the same as that advocated by Chaplin. When measurements were included in the examination, Chaplin increased his M.IND. count from 15 to 17, suggesting that the gain from the extra work involved may be expected to be relatively small (Chaplin, 1971;71-75).

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c) Some workers base minimum number counts on the numbers of mandibulae. In the course of the Greefswald project, mandibulae were examined as a potential source of minimum counts, but were always found to give a lower M.IND. than other body parts. They were however useful in indicating or confirming the presence of very young animals.

d) Perkins (1973) has evolved a method of calculating the frequency of species which he feels gives a more accurate impression of the relative proportion of species than does a minimum number count. The procedure has two major flaws. In the first place, it is dependant on a subjective decision as to which body parts are "least affected by cultural or preservational factors." The investigator must therefore decide what level of preservation is meaningful; in a situation like Greefswald where non-bovids are usually only represented by one or two bones each, this becomesalittle difficult. Secondly, the results provide frequencies, not calculated numbers, ruling out the possibility of taking interpretation beyond the level of proportional representation. As an exercise, I applied Perkins' method to the four levels of TS2, taking as my starting point the assumption that "under-represented" equalled less than 5 specimens, and "over-represented" more than 30. The results appear in Table 3.1, alongside frequencies calculated on M.IND. values and on total bovid skeletal parts.

There is a greater correspondence between the relative frequency (rf) calculated on M.IND and total bovid skeletal parts than there is between either of these methods and that recommended by Perkins. The M.IND. value is a value arrived at by inspection; the evidence indicates that there could not have been fewer animals present than indicated by the M.IND. value. However, the rf. calculated on Perkins method indicates only the trend in relationships, and not the degree of difference or similarity. This trend is accurately indicated in two levels only, indicating that this method cannot be satisfactorily applied at Greefswald.

Damage to bone material

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Five types of damage were recorded during the analysis, i.e. human damage, carnivore damage, burning, gnawing and weathering.

Human damage consisted mainly of "chop" or "cut" marks; it is clearly modification of the bone by human agencies before the bone became incorporated in the deposit. Bone which showed signs of modification from utilisation or for making into tools has been described in detail as "cultural" material.

Carnivore damage consisted of perforations or crushing caused by carnivore teeth. This can be regarded as the result of scavenging on the midden by carnivores. This damage could be the result of attentions of either wild carnivores, such as jackals, or of the domestic dogs present on the site.

When bone was dark brown, black or calcined white, it was assumed that the specimens had been subjected to burning. Some of the less severely burnt material was not always easy to identify, since the only modification was a slight darkening of the bone. The normal colour of bone from Greefswald was a dark yellow or tan colour. The relative proportions of burnt bone varied greatly from level to level.

Almost all of the gnawing identified on the Greefswald bones was the work of small rodents. Very little evidence was found for porcupine activity on the site. This damage was the result of rodents being attracted to the midden. It is not possible to separate damage which was contemporary with the formation of the midden, and that which was the result of activities of more recent rodents burrowing in the midden.

The degree of weathering involved was not always easy to judge objectively. Four levels of weathering were defined. Bone which showed no weathering was classed as "fresh", a term which applied to much of the bone from Greefswald.

Each type of damage is described in detail in the chapter in which such modifications are discussed, as well as the method of analysis utilised and the results obtained.

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Ageing of specimens

Bovid specimens were assigned to age groups on the basis of tooth eruption sequences. Published data on European material was used, as well as comparative material and the evidence inherent in the material itself. The methods of analysis and results obtained are described in the relevant chapter, as well as the detailed analysis undertaken into various aspects of the four domestic species, i.e. sheep, goat, cattle and dogs (Chap. 6).

Curating of the bone collection

The preservation of bone material requires specialist attention. The Greefswald collection was handled with intermittent aid from volunteers and students, which limited the time available for conservation work.

If it proved necessary, material was washed and dried or brushed clean before handling. Teeth and broken post-cranial material were repaired using clear Bostik; initially all identifiable material was also hardened using Glyptal diluted with acetone. This is a time-consuming activity, so that this part of the curating eventually had to be abandoned.

Material which was hardened in the field was cleaned with pure acetone, then treated as necessary.

A numerical catalogue system was set up for the material. All data were recorded on printed cards, each card containing all the information about individual bones or groups of bones. Identifiable material was numbered with Indian ink, using the site prefix and a consecutive number sequence for each site. This number appears on the card relating to the specimen.

The basic data on the cards (i.e. species and body part identification, M.IND, provenance and damage) were written into numerical book catalogues. These catalogues (4 volumes in all) were handed over to the excavator when the collection was returned. Although time-consuming, this double system ensures that the Department of Archaeozoology has a complete

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record of each identifiable piece, and the excavator has a complete record which will enable him to identify and locate individual specimens. This system is being used with other collections, with an additional refinement in the form of coloured cards for different types of sites.

Waste bone was packed in labelled paper bags then in large cardboard boxes; box lists were kept for this material. Material identified to species level was packed in sealed polythene tubing or in "Polytop" containers and then into labelled boxes. Post-cranial material was packed in the same way in a third set of boxes. The material is to be housed in the Department of Archaeology at the University of Pretoria; only the cards remain at the Transvaal Museum. Together with the detailed tables, they form a detailed record of the faunal remains from Greefswald.

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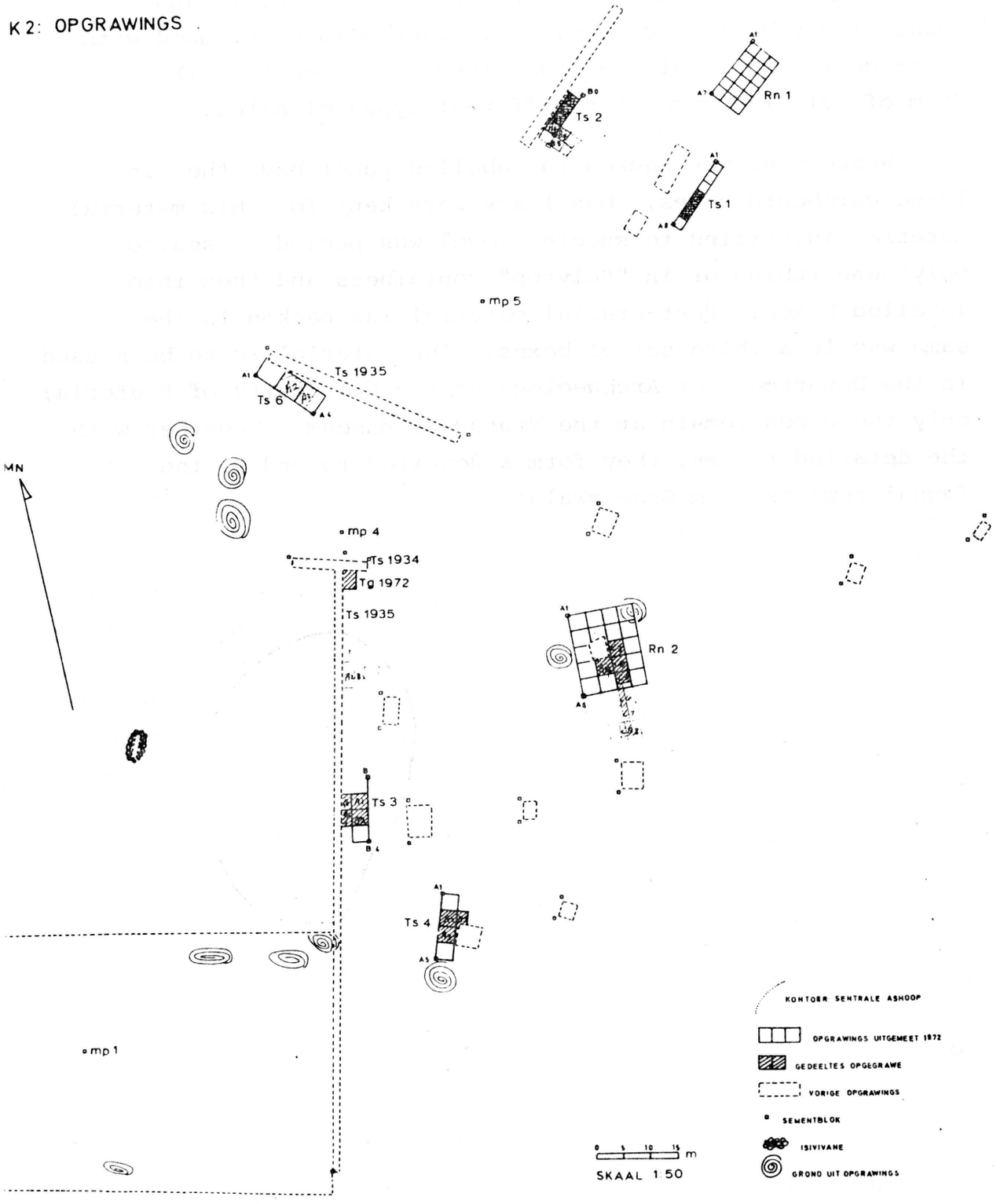

Figure 4.1. Location of excavations on K2. Shaded areas excavated by University of Pretoria by 1976.

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CHAPTER 4.

THE FAUNAL REMAINS FROM GREEFSWALD: GENERAL DESCRIPTION.

I. K2

TEST TRENCH 1 (TS1)

Test Trench 1 consisted of three squares of two metres each, situated on the north-eastern edge of K2 (Fig.4.1). During excavation, the deposit was divided into five levels on the basis of changes of soil colour. Level 3 extended only through squares A4 and A5, and was more ashy than levels 1 and 2. Level 1 was "faded brown" sandy soil, while levels 2, 4 and 5 were light brown sandy soil (Fig.4.2). Three concentrations of bone were excavated as separate features and have been described as such (5.1.2, 5.1.3 and 6.1.3). Many of the bones were ash encrusted, and extensive weathering had occurred. Levels 2 and 5 yielded the largest quantity of weathered bone.

Levels 2/3 have been dated to 970 $\pm$ 40 AD.

The total bone sample from TS1 was 15088 pieces of bone. A minimum of 148 individuals, belonging to 36 species, was identified on the basis of 1668 bone fragments (Table 4.1). The remainder of the bone sample was made up of skull, vertebral and rib fragments, bone flakes and waste bone (Table 4.2). Most of the bone identifiable to generic or specific level came from bovid skeletons. Level 5 had the maximum amount of identifiable non-bovid material (3,8% of the sample from the level). In the waste categories, the miscellaneous skeletal parts group was the largest; an interesting feature of TS1 is the fact that the bone flake group is also extremely large, making up as much as 41,8% of the Level 1 sample.

The fauna from Level 1.

The details of the faunal sample from this level are given in Tables 4,3-4.6. Twenty species were identified with a total of 39 individuals (Table 4.3). *Bos taurus* and *Ovis/Capra* sp. dominate the Bovidae. It is possible that the two Bov.I individuals are also *Sylvicapra grimmia* specimens. This is the only level in TS1 in which grey duiker and impala occur. The presence

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of bushpig suggests that hunting was pursued, while the rodents and small bird suggest snaring. The hare species present in the faunal sample could be either *L. capensis* or *L. saxtilis*, as both occur on the farm at present (Rautenbach, pers. comm). The springhare may have been caught by the occupants of the site, but could have died naturally and become incorporated in the deposit. Springhare activity is very common over much of K2 and MST.

The two small reptiles are likely to have become incorporated in the deposit as a result of natural deaths; however the *Achatina* shells and the bivalve would have been brought in by the occupants.

The fragment of ostrich eggshell probably occurred on the site as raw material, while the cowrie is a trade item with cultural affinities.

The total Level 1 bone sample is listed in Table 4.4. The very large number of skull fragments is due to the large number of tooth enamel fragments (434); the high proportion of bone flakes is unusual.

Table 4.5 lists the bovid skeletal parts present. Although cattle and the sheep/goat group are evenly represented (seven individuals each), there are more than twice the number of Bov.II/*Ovis/Capra* post cranial remains than there are of Bov.III. There is a high degree of weathering of the bovid post-cranial material.

Bone flake sizes are listed in Table 4.6. There is considerable weathering in this large sample (15%); the 2-3 cm size category is the most numerous sample.

Feature A5.1.2. was a concentration of bones, stones and potsherds. The assemblage of 152 bones included a minimum of two individuals of *B. taurus*, (one of which was a juvenile) two *Ovis/Capra* sp. and one juvenile Bov.I. (Table 4.7 and 4.8). No lower limbs of Bov.II size were preserved in the post-cranial sample while the Bov.III post-cranial sample consists largely of the smaller bones of the skeleton (Table 4.9).

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Feature A5.1.3. was also a concentration of stones, bones and potsherds. The count of individuals included two *B. taurus*, one *Ovis/Capra* sp. and one *Achatina immaculata* (Table 4.7). The total sample is listed in Table 4.10, and the bovid post-cranial sample in 4.11. The Bov.II size category is not well represented in this sample. Bone flake sizes are given in Table 4.12; the largest size category is the 2-3 cm group as in the main Level 1 sample.

Feature A6.1.3. was a concentration of bones and potsherds associated with a clay figurine. The feature consisted of the right distal humerus and three rib fragments of an individual of *B. taurus;* these were associated with seven waste fragments. 18,2% of the sample carried cut marks. The presence of waste bone suggests that this concentration represents a single dump of food remains rather than an offering. (Table 4.7 and 4.13).

Level 2

Level 2 yielded the largest sample of bone (5805 pieces); a minimum of 42 individuals belonging to twenty species were identified, a similar yield to Level 1. The species list is given in Table 4.14, and the total sample and bovid post-cranial remains in 4.15 and 4.16 respectively.

The Bovidae are dominated by domestic species; the Bov.I specimen is likely to represent *Sylvicapra grimmia*. The dassie, hare, rodents, guinea-fowl sized bird and small bird were probably snared. This is the only level of TS1 in which enough rodents occur to suggest deliberate snaring of rodents. The springhare and reptiles may be fortuitous occurrences.

Table 4.17 lists the sizes of bone flakes from Level 2; the largest number of bone flakes fall into the 3-4 cm group, suggesting an overall larger size than is the case in Level 1.

Level 3

Table 4.18 lists the species present in Level 3, and Table 4.19 the details of the sample. The domestic species dominate the Bovidae; the non-domesticated bovid is an isolated Bov.I which is likely to have been *Sylvicapra grimmia*.

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The identified lagomorph present is *Pronolagus randensis*. It was found to be possible to separate *P. randensis* from *Lepus* spp. on certain post-cranial bones; this has been done where possible. The young *Aethomys chrysophilus* specimen could be a fortuitous inclusion. The guinea-fowl, tortoise, fish and *A. immaculata* suggest snaring and collecting.

Table 4.20 lists the bovid postcranial material; most body parts are represented in the Bov.II sample, but bones of the forelimb are entirely absent in the Bov.III sample. The most numerous bone flake size class is 2-3 cm, as in Level 1. (Table 4.21).

Level 4

Although the faunal sample from this level is smaller than that of Level 3, the material represented a higher M.IND. and range of species than the latter level. This was because of the larger number of smaller species. Hare, rodents, birds, fish and mollusca are present on the species list as well as two individuals of Bov.I (possibly *S. grimmia)* and the domestic bovids. (Tables 4.22 and 4.23).

Bov.I is represented only by limb bones, mostly from the hind limb; Bov.III is represented by a humerus, pelvis and tibia as well as small elements of the lower leg and a horn core. (Table 4.24). Bov.II is represented by most of the bones of the body.

Table 4.25 lists bone flake sizes; the largest group is again 2-3 cm.

Level 5

This relatively small faunal sample immediately overlies bedrock. The species list shows a similar variety of species to the higher levels, i.e. three domesticated bovids, a small wild bovid, rodents, a bird and mollusc. (Tables 4.26 and 4.27). The bovid post-cranial sample is small, and consists mainly of Bov.II skeletal parts. (Table 4.28). The size distribution of bone flakes is shown in Table 4.29; an equal number of specimens (18) occurs in size classes 2-3, 3-4 and 4-5. This is probably an artefact of the small size of the sample.

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TEST TRENCH 2 (TS2)

Test trench 2 was located close to TS1 within the zone on the southern slope of Bambandyanalo which supported the living areas (Fig.4.1). Eleven squares were excavated in 1972, 1974 and 1975; they yielded the largest bone sample retrieved during the course of the excavation (25877 pieces). The deposit was divided during excavation into four arbitrary levels. Levels 1, 2 and 3 consisted of faded brown sandy soil, while Level 4 was of light brown sandy soil (Fig. 4.3). Level 2 included 3 features or concentrations of ash, bone and pottery; Level 3 included 3 features and the remains of a grave; Level 4 included five features. All four levels have been grouped into a single cultural unit by Meyer (pers.comm.), and classed as Phase 2 of the Greefswald sequence.

A minimum of 217 individuals was identified, belonging to 34 species, on a basis of 2787 identified bone pieces (Table 4.30). Skull and rib fragments made up a similar proportion of the total sample (7,16 and 7,59% respectively), with half the number of vertebral fragments (3,45%). The proportion of miscellaneous skeletal parts was exceptionally low (17,82%), but the proportion of bone flakes was even higher than in TS1 (maxima of 76,65% and 66,36% compared to 41,8%). (Table 4,31).

The same procedure of analysis was used for Levels 1, 2 and 4 as for TS1, with the exception that the bone flakes and miscellaneous skeletal parts from Levels 2 and 4 were not divided into categories of burnt, gnawed or weathered. In Level 3 these categories were not listed for any of the sample, but the identifiable parts were examined in the normal way to determine minimum numbers of individuals. Human and carnivore damage was noted throughout the TS2 sample.

The fauna from Level 1.

The total sample from Level 1 is listed in Table 4.32. Of the sample of 8718 pieces, only 6,8% was identified to family level. This level had the highest proportion and number of bone flakes (66,36%/5785) apart from Level 4(b); Level 4(b) was however a very small sample of only 167 specimens. The high number of bone flakes could be due to breakage from trampling and weathering, although overall weathering of the sample was not excessive.

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The high number of skull fragments was due to the large number of fragments of tooth enamel. Table 4.32 lists the minimum number of species present and the skeletal parts used in the identifications. Domesticated bovids constituted 46% of the sample. *Sylvicapra grimmia* is the only wild bovid identified; in view of this the three Bov.I specimens are probably also members of this species. Similarly the lagomorph is probably the same individual as that identified as *Lepus* sp. This would reduce the number of non-domesticated species to 13.

Loxodonta africana has been identified on the basis of 24 pieces of ivory. The hippopotamus was firmly identified on the basis of a first phalanx.

The snake present in the sample was likely to have died on the site and became incorporated in the deposit; the *Varanus* specimen on the other hand was probably a food item. The presence of crocodile is interesting; the specimen was most probably brought in as a non-food item.

Level 1 is the only Level in TS2 which included fish, in this case a dermal plate of *Clarias* sp.

Bovid skeletal parts and bone flake sizes are listed in Tables 4.34 and 4.35 respectively. In the bovid skeletal parts an unusual feature is the high number (98) of Bov.III phalanges. Among the bone flakes, the 2-3 and 3-4 cm size categories are the most numerous, with very similar representation.

Level 2

The total bone sample for Level 2 is listed in Table 4.31. 13% of the sample was utilised in identifying a minimum of 70 specimens belonging to 20 species. The proportion of bone flakes was 49,94%.

Table 4.36 lists the species identified and the skeletal parts used in identification. Exactly 50% of the individuals were domesticated; most important of these is a specimen of domesticated dog. The hunting-dog sized canid metacarpals could possibly have come from the same animal.

The baboon phalanx was almost certainly a non-food item. All the other mammal specimens were probably contributors to

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the diet, including the suid and elephant. The suid is unfortunately not identifiable even to generic level. The elephant is represented mainly by ivory fragments; however a very large rib, associated with a modified stone flake, matched best with the elephant ribs available at the Museum. The rib could have been scavenged for use as a tool of some sort; however it might equally well suggest that elephant meat formed part of the diet in Level 2.

The incompletely fused phalanx referred to as hippopotamus or rhinoceros was not elephant, as it came closer to these two species. In view of the hippo in Level 1, it seems reasonable to assume that this specimen is part of the same hippo.

Two wild bovids are represented. The *Connochaetes* specimen is a tentative identification; Rautenbach recorded *C. taurinus* (blue wildebeest) in the area, whereas *C. gnou* (black wildebeest) has a very limited distribution. There is an exceptionally high number of Bov.I specimens; these were possibly again *S. grimmia*. The high proportion of juveniles is interesting, although Bov.I and Bov.II juveniles, when represented only by a long bone shaft, are not always easy to separate.

The small mammal specimens were not identifiable; the fragment of skull listed as medium sized mammal was from a very young animal, and could have come from a bovid.

The rest of the species were the result of collecting, except for the two cowries which would have been trade items.

Bovid skeletal parts are listed in Table 4.37. Bov.I is well represented on this list, while there is a high number of Bov.III phalanges as in Level 1.

Bone flake sizes are listed in Table 4.38; in this level the two most numerous categories are 3-4 and 4-5 cm, each of which include just over 20% of the bone flakes.

Level 2(i) was dug as a single feature and consisted of 277 pieces, 9,8% of which were identifiable to at least Family level. Of the three bovid species identified, three were domesticated specimens (Table 4.39). The small bovid skeletal sample is listed in Table 4.40.

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Level 2(ii) was a feature containing six elements of a juvenile human skeleton and one *B. taurus* tooth. It probably represents the remains of a disturbed burial. (Table 4.39).

2(i) and 2(ii) have been combined with Level 2 in the analysis.

Level 3

The total sample for Level 3 is listed in Table 4.31. 12,75% of the sample of 4212 pieces was identified at least to Family level, with a minimum number count of 33 individuals belonging to 17 species. 196 of the skull fragments were enamel fragments from disintegrated teeth.

Domesticated animals made up 54,6% of the individuals. Only one non-domesticated bovid was present (Table 4.41).

Loxodonta africana was represented by 14 pieces of ivory. Of interest is the presence of *Equus burchelli*, a species which occurs in very few of the levels even though it is a desirable food animal.

The snake represented in the sample is likely to have died naturally on the site; the small fish could have been a specimen of *Clarias* sp. but was not identifiable.

Table 4.42 lists the bovid skeletal parts from this level.

Three assemblages were excavated as separate features on visual grounds; analysed separately, they are combined with Level 3 in the interpretive sections.

Level 3(a)

The total sample from this feature is listed in Table 4.31. Individuals totalling 18,85% of the sample were identifiable to generic level, with the exception of one indeterminate marine mollusc. 10 individuals belonging to five species were identified; 8 of the individuals were domestic animals. The wild bovid present was referred to *Aepyceros melampus*, an unusually rare species in the Greefswald sample (Table 4.43).

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Unfortunately the fragment of marine mollusc was not identifiable.

The list of bovid skeletal parts is given in Table 4.44.

Level 3 (Grave)

This sample included the remains of 4 species. Miscellaneous skeletal parts and bone flakes made up 68,48% of the sample. The species list is given in Table 4.43.

Level 3.(i) yielded a very small sample; only two specimens were identifiable (Table 4.43).

Level 4

The total bone sample for Level 4 is listed in Table 4.46. Individuals totalling 12,39% of the sample were identifiable to family level, providing a total of 16 individuals belonging to 10 species.

The species list is given in Table 4.45; 56,25% of the sample was made up of domesticated species. One individual belonging to the Bov.I size class was present.

The tortoise was represented by ten fragments of the same carapace. The small fish could, once again, have been an individual belonging to *Clarias* sp.

Bovid skeletal parts are listed in Table 4.47. Four features were excavated separately as follows:

Level 4(a). The total sample from this feature is listed in Table 4.49. Individuals constituting 12,22% of the sample could be identified to family level; of the larger samples, this level yielded the lowest proportion of bone flakes (17,56%) and the second highest proportion of miscellaneous skeletal parts (43,77%). 5 species were identified (Table 4.48), 75% of the individuals being domesticated animals.

Table 4.50 lists the identified bovid skeletal parts.

Level 4(b). The total sample is listed in Table 4.31, with the species list given in Table 4.48. Most of the sample consists of bone flakes; the only identified individuals are domesticated

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species.

Level 4(c) is listed in Table 4.51. No bovid or non-bovid teeth were present in this sample; nevertheless the species list (Table 4.48) contains eight species. The most interesting specimen was a left calcaneum which was identified as belonging to a carnivore; unfortunately it was not possible to identify it any closer than this. The animal was larger than a cheetah; a leopard would perhaps be a closer match.

Table 4.52 lists the bovid skeletal parts from this level.

The sample from Level 4.1. is made up largely of skull fragments and miscellaneous skeletal parts (Table 4.31). Two specimens of domesticated species were identified from this level (Table 4.48).

These features have been combined with Level 4 in the interpretive sections.

TS2 and MK1 yielded the largest faunal samples from Mapungubwe; of the two samples, TS2 provided the larger variety of species (34 as against 27 from MK1). This sample can therefore be expected to be the most useful in interpreting economic patterns.

TEST TRENCH 3 (TS3)

Test trench 3 covered the smallest area of the three test trenches analysed in detail; it however provided the longest sequence of deposit (5,2 m). The trench is situated on the eastern edge of Gardner's long trial trench through the K2 midden; it was excavated in order to examine the stratigraphy of this midden (Fig.4.1). The main excavation covered two squares, one of 2x3 m and one of 3.3 but was reduced to one square of 2mx 1,4m at a depth of 1,5m.

The deposit was divided into 24 levels (Fig. 4.4). Levels 1-12 consist of a grey ash deposit. Levels 13-15 form a relatively horizontal grey ash deposit. At the base of level 15 Meyer recorded a heavily burnt horizon which included burnt millet. The rest of level 15 consisted of ashy soil; levels 16-21 are less ashy, with light brown sandy soil interspersed and reasonably horizontal stratification. Levels 22 and 23 consist of a "dung floor" which

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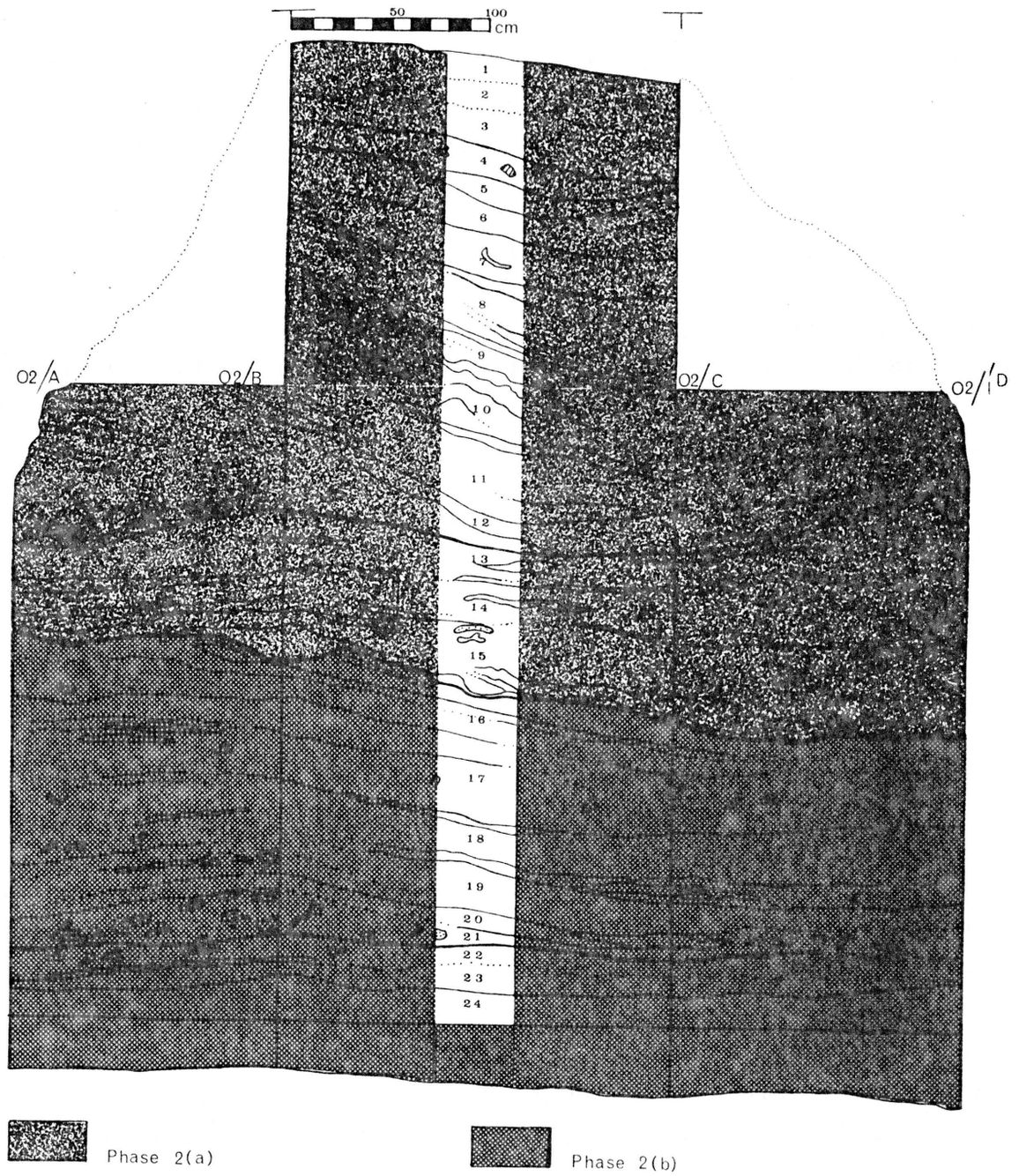

Fig. 4.4. Section of K2/TS3, showing 24 stratigraphic levels and Meyers Cultural Phases 2(a) and 2(b).

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probably represents the edge of the central cattle kraal postulated by Gardner. The whole deposit is rich in bone and cultural material, with concentrations of bone occurring at various points.

Meyer has divided this sequences into two main units on the basis of changes in the appearance of the deposit. The one unit consists of Levels 1-15, the other of Levels 16-24. Both yielded pure M2 pottery. During the formation of the TS3 deposit occupation had already begun on the Hill and the Southern Terrace. The end of this sequence marks the end of the pure K2 tradition at Greefswald.

All the teeth and identifiable non-bovid fragments were analysed, as well as the bovid skeletal parts from nine levels. All waste material from these nine levels was also counted, but no details of burning, bone flake sizes etc. were recorded.

The equivalent of the upper levels of TS3 in MST/K8 are Levels 16 and 17, while MK1/Level 11 is the equivalent on the Hill. (Meyer pers. comm.).

The bone sample from TS3 represented 471 individuals belonging to 36 species (Table 4.53). These identifications were based on 3 035 bones, which made up 37,4% of the total analysed sample of 8 116 pieces (Table 4.54).

The fauna from Level 1

The total faunal sample from Level 1 is given in Table 4.54, with the species list and bovid skeletal parts in Tables 4,55 and 4.56 respectively. 15 of the 26 individuals are bovids, all but 4 of which are domesticated bovids. *Aepyceros melampus* is present; the two Bov.I specimens are possibly *Sylvicapra grimmia*.

The jackal-sized canid could either have been a jackal or, possibly, a domestic dog. The human remains are difficult to explain; they presumably came from a disturbed burial.

Level 2

The species present in Level 2 are listed in Table 4.57. The assemblage is dominated by bovids.

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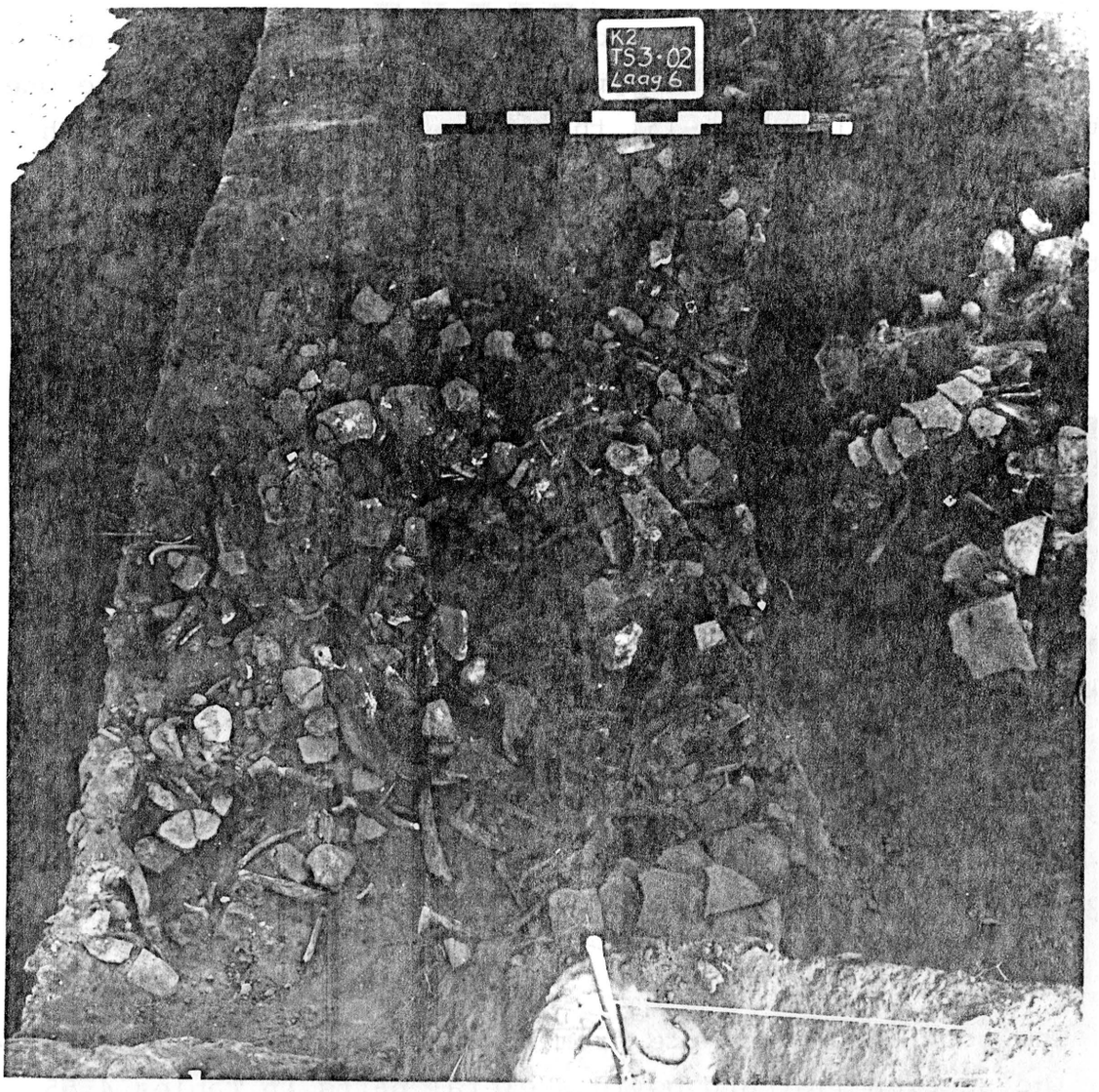

Plate 4.1. K2/TS3/02/Level 6. Bone accumulation. Photograph: University of Pretoria.

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Level 3

Table 4.58 lists the species present in this level. There are no unusual features of this assemblage, apart from the presence of a small fish, one fragment of elephant ivory, and the two carnivores. The jackal-sized canid, represented by an isolated $M\bar{2}$, could be the same animal as in Level 1, as Levels 1, 2 and 3 are arbitrary sub-divisions. It was not possible to identify the hyaenid, as only a portion of the cranial vault was present, with a piece of the sagittal crest. It is most likely that this bone came from an animal killed within the settlement, or from a skull brought back as a trophy.

Level 4.

Level 4 yielded a portion of elephant tusk which has been lightly worked over its entire surface (See Plate 7.1.). The tusk has a large central cavity, suggesting that it may have come from a juvenile individual. The snake vertebra probably came from a snake which died naturally on the site.

The species list is given in Table 4.59. The species for Level 5 are listed in Table 4.60. A fragment of elephant ivory and of a fish bone are present; the other unusual occurrence is the presence of a hyrax. This could either have been *Procavia capensis* or *Heterohyrax brucei*.

When Level 5 was excavated, it was arbitrarily divided into three sections, Levels 5, 5(i) and 5(ii). Level 5(i) yielded the remains of two different domesticated animals and a lagomorph (Table 4.60), while 5(ii) yielded the same three groups of animals as well as two bones of a guinea-fowl sized bird and a fragment of ostrich eggshell (Table 4.60). The three features have been combined in later sections.

The species list for Level 6 (Table 4.61) shows a very wide variety of animals. Of particular interest is the identification of the Cape Hunting Dog; this animal may have been deliberately hunted or accidentally snared. Dassie, elephant and a male warthog are present, as well as two wild bovids, *Aepyceros melampus* and *Sylvicapra grimmia*.

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The level yielded a large number of remains of domestic animals. Among these remains were twelve post-cranial bones which belonged to the same animal, an immature specimen of *Bos taurus*. A number of almost complete vertebrae and ribs had been treated in the field with glyptal, and probably also belonged to the same specimen. The left humerus and radius articulated.

It is unusual to find so many associated bones of a single skeleton; this suggests deliberate interment, possibly after the beast had been eaten at a communal feast.

Table 4.62 lists the bovid skeletal parts from this level.

Level 7

Level 7 yielded the sagittal crest of a hyaenid skull, a different individual from that from Level 3. Of particular interest is the $M\bar{2}$ which belonged to a specimen of *Canis familiaris* (Table 4.63).

In Level 8 the metacarpal listed as "Cape hunting dog size" could either be from *Lycaon* sp. or from the specimen of *C. familiaris* in the overlying level. The presence of a large bird in this sample is interesting; the bone could have been from a goose or crane-sized bird. It is at least suggestive of bird hunting (Table 4.64).

The species list from Level 9 (Table 4.65) shows no unusual features except the presence of the right side of a human mandible, and a distal humerus of a young felid. Within Level 9 a feature, 9.2.1, was excavated (Table 4.65). This consisted of a concentration of bones which appeared to be dominated by skull and mandible fragments; they appear to have been deposited in a slight depression. No unusual disproportion was noted while sorting, although the feature did yield enough teeth to identify 6 individuals.

This feature is included in Level 9 in future sections.

Level 10 (Tables 4.66 and 4.67) provided the first skeletal evidence for the presence of humped cattle at Greefswald when two bifid vertical processes of thoracic vertebrae were found among the bovid post-cranial material. The other unusual feature

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about this level is the number of carnivore remains found, suggesting two or three carnivores of different sizes.

Feature 10.1 consisted of five teeth from the same right maxilla, associated with a left mandible with almost complete dentition. In addition, a loose fragment of both the mandible and the maxilla were present, as well as a portion of a left pelvis. The bone is very friable, and is being broken down by crystal formation.

Level 11 yielded a small sample which consisted entirely of domesticated bovids, with the exception of a fragment of terrapin carapace (Table 4.68).

Similarly, the sample from Level 12 is dominated by domesticated specimens, the only other two species present being *A. immaculata* and *C. annulus* (Tables 4.69 and 4.70). Level 12 included a concentration of bones which was readily noticeable during excavation.

Level 13. The species and bovid skeletal parts from this level are listed in tables 4.71 and 4.72. Two fragments of elephant ivory occur in the sample, as well as a very weathered fragment of a pelvis. This pelvic fragment could have been from any of the very large mammals; in view of the presence of ivory, it probably came from an elephant skeleton. A number of specimens with pathological complaints occurred in this level.

Level 14. The species list for Level 14 is given in Table 4.73.

During the sorting of the material, it was noticed that, until level 15, burning of bone was rare in the sample. From Level 15 downwards, burning appeared to become common; a record of the number of burnt specimens was therefore kept for Levels 15 and 16. These two levels showed burning in more than 50% of the specimens (Tables 4.75 and 4.78).

Level 15. The total sample, species and bovid skeletal parts for this level are listed in Tables 4.74-4.76. Apart from the percentage of burning, there is nothing unusual in this level.

Level 15 represents the base of the upper unit at K2. With the high percentage of burning in Level 16 as well, one feels

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that possibly Level 14 is the base of the unit, and that Levels 15 and 16 may represent destruction levels at the close of the earlier phase of occupation.

Level 16. Tables 4.77-4.79 contain the data on Level 16. The only uncommon species in the level is the hyrax.

Level 17. The species list for this level (Table 4.80) shows hyrax and elephant as well as domestic bovids. Of interest is the presence of *C. mesomelas* and possibly of *Lycaon pictus*. A jackal-sized canid also occurs in Level 18 (Table 4,81); this could perhaps be the same specimen as *C. mesomelas* in Level 17. Level 19 yielded one fragment of elephant ivory (Table 4.82); the largest group of animals in this level was the *Ovis/Capra* group. This is the same situation (as regards bovids) in Level 20 (Table 4.83).

Level 21 (Tables 4,84 and 4,85) yielded only bovids, 2 molluscs and a fragment of ostrich eggshell. Among the bovid material a fragment of bifid thoracic vertebra was found, indicating the presence of humped cattle. Burnt bovid skeletal parts made up 8,08% of the bovid sample from this level. These included a *B. taurus* left humerus and left distal femur which were probably from the same animal. The epiphyses of both were loose, but could be re-united with the shafts.

Level 22 (Tables 4,86 and 4,87) was also dominated by bovids; one fragment of elephant ivory was present in the sample.

Level 23 (Tables 4.88 and 4.89) yielded a small sample which consisted only of bovid remains.

Level 24, the lowest level in the TS3 sequence, yielded the remains of two bovids and a small fish (Table 4.90).

In general terms, the sample from TS3 is characterised by a wide range of species, including an unusually large number of carnivores. Elephant ivory occurs in 13 levels, *A. immaculata* in 19 levels and *C. annulus* in 13 levels. Different groupings of these three species occur in TS1 and TS2. In TS1, ivory is absent, but the two mollusc species occur in 5 and 4 levels respectively (out of a total of 5 levels). In TS2, ivory and *Achatina* occur in all 4 levels, although *C. annulus* occurs in

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only one level. No elephant ivory occurs in MST/K8 or MK/1, and only one cowrie occurs (MST/K8/17). Thus this particular grouping of species is characteristic of K2.

TEST TRENCH 4 (TS4)

This excavation covered 3 squares (A2, A3 and B2), and a stratigraphy divided into 7 layers.

The material was not analysed in detail, since it was felt that the sample from TS1, TS2 and TS3 were probably adequate to give a representative picture of the K2 economy and fauna. However, all the bone material from TS4 was sorted through, being divided into teeth, identifiable post-cranial material and a waste group consisting of bone flakes and miscellaneous skeletal parts. All non-bovid material was noted and checked for identification where necessary. The bovid tooth material was sorted into two categories (three if necessary) to cover *Bos taurus* and *Ovis/Capra*. The teeth were then sorted into uppers and lowers, lefts and rights, and the minimum numbers of individuals represented were calculated. (Table 4.91).

Species represented

There was no noticeable difference in the species represented compared to those from TS1, TS2 and TS3. Cattle and the *Ovis/Capra* category dominated the fauna. A number of the individuals (33,3%) were sub-adult. Smaller species such as hare and jackal are sparsely represented. Ostrich eggshell was abundant in two levels, *Achatina* sp. occurred sparsely throughout.

Three points are worth noting. Hippopotamus is definitely present in this sample, represented as it is by 3 phalanges and a tooth fragment. The unfused epiphyses suggest a juvenile specimen.

The second notable aspect of the assemblage was the sudden diversification of species in levels 4-6 (Level 7 contained very little bone). Most of the additional species were aquatic or small creatures, possibly obtained by snaring. The exception is the evidence for crocodile in Level 5.

Thirdly TS4/3(iv) yielded an almost complete skull of a domestic dog. This is described in detail in Chapter 6.

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The metatarsals identified as cf *Felis serval* could possibly have come from another similar-sized carnivore. They appeared to be too long and slender for jackal, but did correspond well with the serval specimen in the comparative collection. The elephant ivory in level 2 showed no sign of working.

It would seem, then, than the people responsible for the lower levels of TS4 were supplementing their diet quite considerably by means of smaller creatures and by fishing.

Physical characteristics of the TS4 faunal sample

The TS4 assemblage appeared, on superficial examination, to contain a very much higher percentage of burnt bone than did the other K2 samples. Since this sample was associated with floors, it would seem to be reasonable to assume that the bone sample from TS4 represents the more immediate living area debris of the K2 settlement. It is possible that the material is slightly more fragmented than in the other test trenches. However, otherwise the TS4 sample showed no major differences from the other K2 faunal samples included in this analysis.

Cultural modification

One ostrich eggshell fragment from Level 2 retained the remains of the type of perforation associated with eggshell water bottles.

TEST TRENCH 6 (TS 6).

During the sorting of Level 3, TS4, some packets of TS6 Level 3 were accidentally included in the collection. Andrie Meyer stated that TS4/Level 3 was a gravelly layer with little fauna, whereas TS6/Level 3 was a bone-rich ashy midden. Since the majority of the material sorted was covered in fine grey ash, it is safe to assume that most of the material analysed as "Level 3" comes from TS6. The only material included in the TS4 species list from this level is the small amount of Bovid material which was not mixed, and the charred fragments of ostrich eggshell.

TS6 Level 3 included a large number of *Bos taurus* teeth and some from *Ovis/Capra* sp. The following minimum number of individuals was calculated:

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Bos taurus	4 adult, 1 sub-adult
Ovis/Capra sp.	3 adult, 1 juvenile
Achatina sp.	1 individual

Thus the picture of a *Bos/Ovis/Capra* orientated economy remains in this case.

II MAPUNGUBWE SOUTHERN TERRACE (MST)

Around the southern side of Mapungubwe Hill lies the deep deposit which forms the Southern Terrace. Schofield undertook excavations there, and Coertse, Eloff and Sentker opened up a fairly large area. Eloff and Meyer excavated four main test pits, as well as re-opening an older excavation to check stratigraphy (Fig. 4.5). The present analysis concentrated on only one of these test pits, K8, although three features from F4 and one from H5 were also examined.

K8

K8 was divided into 17 levels (Fig. 4.6). The top three levels were a relatively ashy deposit; Levels 4-12 were a mixture of sandy soil and ash, with the remains of floors of at least two different types. In addition, lenses of burnt hut rubble occurred intermittently throughout this section. Several stone "structures" occurred in the section.

At the very base of the section, in Level 17, a few Gokomere-type sherds were found in the sandy deposit. However, the rest of the pottery from this level showed strong K2 affinities, so that Levels 16 and 17 have been equated with Phase 2 (i.e. the K2 phase) of the Greefswald sequence. Levels 4-15 appear to show an increasing proportion of "M1" pottery, with K2 types of pottery also present. These levels have been grouped by Meyer to form Phase 3 of the sequence. The uppermost levels (1-3) are dominated by "M1" pottery and include a large amount of worked bone; these levels form Phase 4. (Meyer, pers. comm.).

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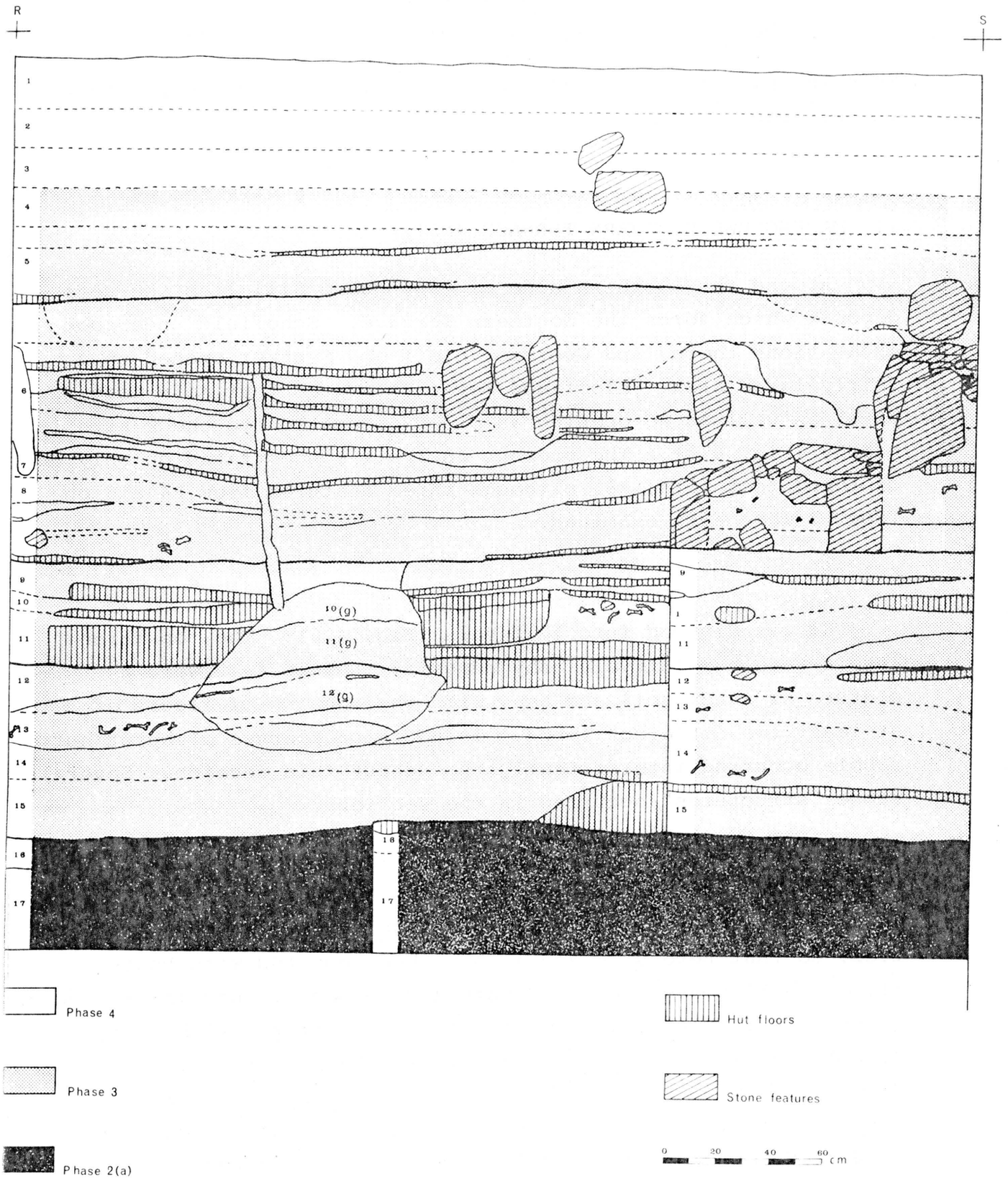

Fig. 4.6 Section of MST/K8, indicating Meyers' Cultural Phases 2(a), 3 and 4.

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A series of C14 dates is available from the Southern Terrace. Level 1 of K8 is dated to 1180 $\pm$ 50 AD; Level 2 to 1160 $\pm$ 50 AD; Level 3/4 1100 $\pm$ 40 AD and Levels 15/16 to 1090 $\pm$ 40 AD and 920 $\pm$ 50 AD. The basal level of F4 (Level 10) is dated to 930 AD, and the base of H5 to 1040 AD. Thus the Southern Terrace sequence covers, at the extreme limits, a period of about 950 - 1150 AD.

The bone sample from K8 included the remains of 207 individuals belonging to 24 species (Table 4.92). A total of 8 779 bones was examined; the identification of individuals was based on 1 360 bones, or 15,4% of the analysed sample. All teeth and all non-bovid material was analysed. In addition, the total bone yield from 7 levels was analysed (Table 4.93).

It will be noted from the section that there is a large disturbance in levels 10-12; the deposit occurring in the disturbance was excavated as 10(g), 11(g) and 12(g). It is now fairly certain that this disturbance was dug down through Levels 9-13 from Level 8. The material appears in the tables as 10(g) etc; in the later chapters these three units have been combined with Level 8.

Level 1

Two-thirds of the sample from this level was made up of bovids, the rest of the sample consisting of a hare, rodent, tortoise and two molluscs. The species list and list of bovid skeletal parts are given in Tables 4.94 and 4.95.

Level 2

The total sample for Level 2 is listed in Table 4.98 and the species list in 4,96. Individuals totalling 8,4% of the sample were identifiable to at least family level; there is an almost equal proportion of miscellaneous skeletal parts and bone flakes.

A human maxilla and an isolated $M\bar{3}$ of a jackal are the only two unusual occurrences in this level. A second human specimen was identified in Level 8.

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Bov.II and Bov.III skeletal parts are almost equally represented (Table 4.99). In examining the bone flakes (Table 4.100, the two most common size classes (3-4 and 4-5 cm) form exactly the same proportion of the bone flakes (27,5%).

The Level 3 sample is again dominated by bovids, the major number of which belong to the *Ovis/Capra* group (Tables 4.97 and 4.101). Level 3 marks the base of the Phase IV sequence.

Level 4 (Tables 4.102 and 4.103) includes, besides 10 bovids, two birds of different sizes, a tortoise and four species of mollusc. One of these, *Nassarius kraussianus*, is a small marine species.

The sample from Level 5 (Tables 4.104 and 4.105) yielded bovids, 2 rodents, a bird and two molluscs. Among the bovid skeletal parts, 26,9% were burnt as opposed to 4,6% in Level 4. Both samples are less than 100; nevertheless there does appear to be a valid difference between the degree of burning.

Feature 5.3 (field number K8/5/ Structure X) consisted of a more or less circular arrangement of stones approximately 80 cm in diameter. The centre of the circle was filled with a soft, light brown, sandy soil mixed with bone. The bone sample was very small (16 pieces), but represented two individuals of *B. taurus*, two of *Ovis/Capra* sp. and one bird. There is nothing unusual about the accumulation compared to Level 5; both Level 5 and the feature contain the same species and have juveniles in both groups of domesticated animals (Table 4.106).

5.3 has been included in Level 5 in later chapters. Level 6 yielded the third largest sample from K8, with the highest number of individuals. The list of species showed that bovids were in the majority, with a hare, rodent, bird and two molluscs also present (Tables 4.107 and 4.108).

Level 6(a) is in fact a series of thin levels interleaved between a series of red gravel floors. The fauna from 6(a) has been treated separately (Tables 4.109 and 4.110), but the identifiable material shows no differences in composition or relative proportion of finds, except that Bov.I post cranial material is present in Level 6. The waste bone shows a difference in relative proportions in the skull and rib fragments. There appears however to be no reason why these two assemblages should be kept separate in later chapter

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The material from Level 7 is listed in Tables 4.111 and 4.112, and shows no unusual features.

Level 8 is the other level from K8 to yield human remains, in this case a deciduous premolar. Apart from this, there is nothing unusual in the sample. (Tables 4.113 and 4.114). Levels 10g, 11g and 12g will be grouped with Level 8 in later chapters, since the large disturbance containing these levels was dug through a thick floor in Level 8 overlain by hut rubble.

Level 9 (Tables 4.115 and 4.116) yielded no unusual information; the only additional species present is the ostrich, represented by 4 fragments of eggshell.

Level 10 yielded a sparse sample which represented only 4 individuals. Level 10(g) (i.e. 8) yielded the remains of 4 bovids, the only difference with Level 10 being the presence of Bov.I. Bov.I also occurs in Level 8. (Tables 4.117 and 4.118).

Level 11 yielded the remains of 5 bovids, a tortoise and a mollusc. (Table 4.119). The bovid skeletal parts from this level belonged to all three size classes (Table 4.120). Level 11(g) (i.e. 8) yielded the remains of 4 bovids, and sixteen post cranial parts belonging to Bov.III *(B. taurus)* size class. (Tables 4.119 and 4.120). Level 11 contained three juveniles, while 11(g) produced two. Of these two, one was a neonate calf, represented by a right mandible in which only the very tips of $dp\bar{3}$ and $dp\bar{4}$ showed light wear. If grouped with Level 8, this would mean that Level 8 yielded two very young calves; Level 8 contains 6 juveniles without the two additional juveniles in 11(g). The presence of these young animals lends support to 11(g) being part of the Level 8 assemblage.

Level 12 yielded only the remains of bovids, two of which were juveniles. Level 12(g) yielded an identical sample of bovids associated with a rodent and mollusc. The juveniles in 12(g) are much younger than those from Level 12, so match better the specimens from Level 8. (Tables 4.121 and 4.122).

Level 13 Individuals totalling 11,2% of the sample were identifiable to family level (Table 4.124), Apart from the presence of a baboon, the species list (Table 4.123) is similar to those of the preceeding levels, i.e. mainly bovids. Of the sample of bovid skeletal parts, 22,6% were burnt (Table 4.125). In the bone flake sample, 24,2% of the flakes were burnt. The

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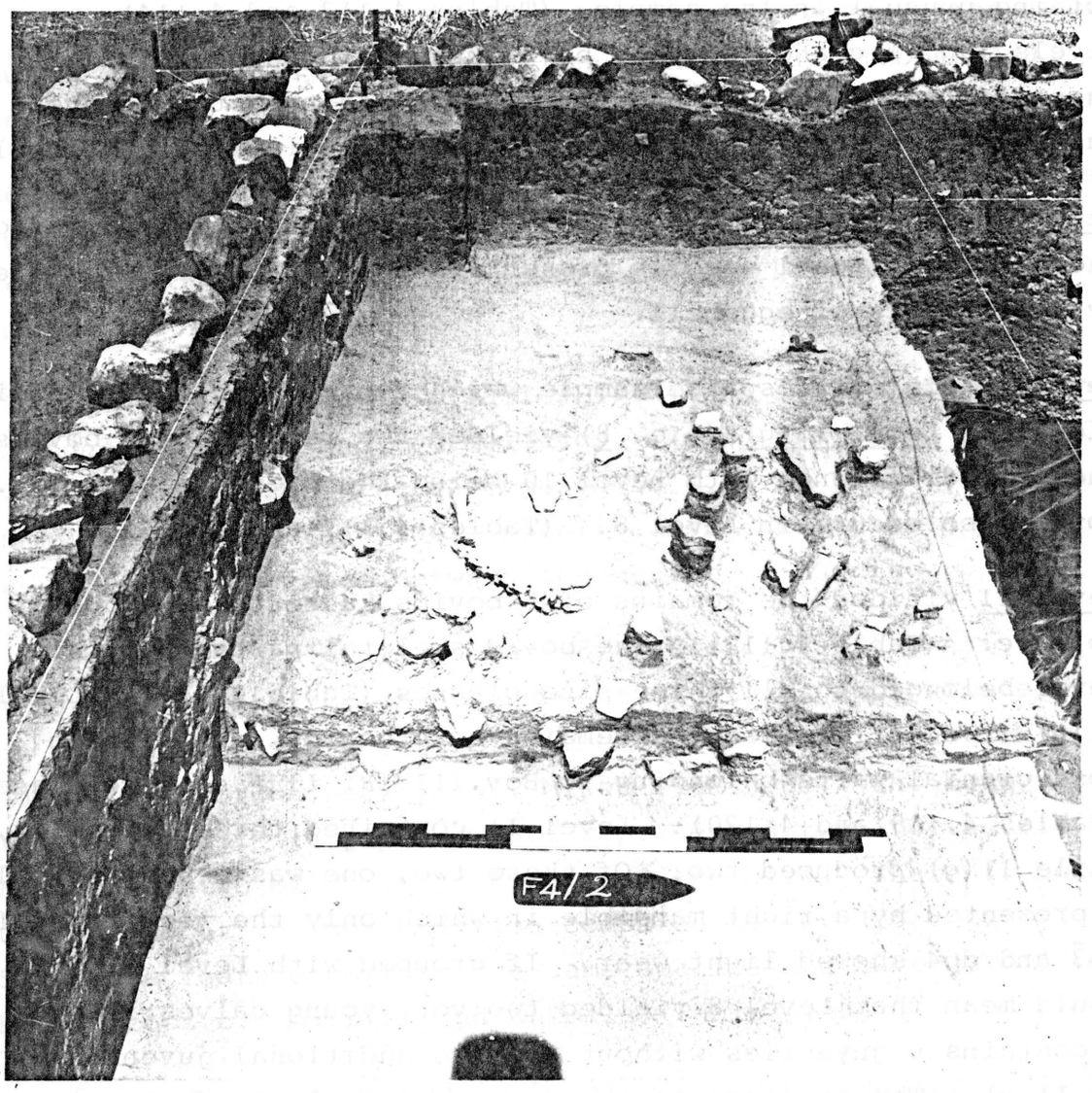

Plate 4.2 Plan of MST/F4/2(i)x, showing articulating vertebrae, complete metapodial, *B. taurus* skull and horn core. Photograph: University of Pretoria.

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largest bone flake size category was the 3-4 cm group (Table 4.126).

Level 14 yielded only one specimen, an Incisor of a sheep or goat (Table 4.127). Level 15 showed a slight improvement by yielding three Incisors, one of which might have belonged to the individual in Level 14 (Table 4.127).

Level 15 is regarded as the base of Phase 3 of the Greefswald sequence. There was no bone material from Level 16; Level 17 yielded only one specimen, half a cowrie shell (Table 4.127). If Level 17 is to be linked with K2, no more suitable species could have been found!

The faunal sample from K8 is characterised by a relatively limited species list, with domesticated bovids in the majority. An interesting feature is the fact that Bov.I individuals occur in twelve of the seventeen levels; in Level 6 alone three individuals occurred. In addition, 14 birds of various sizes were identified. The K8 sample thus shows some interesting variations compared to the K2 or MK1 samples.

MST/F4/Feature 2(i) x

This assemblage of bones was excavated as a unit; the horizontal distribution of the material is shown in Plate 4.2. The assemblage consisted of the following:

Bos taurus:	Almost complete frontal of skull, with right horn chopped away and left horn broken away;
	Right horn core
	Left distal humerus
	Right astragalus
	Metatarsal shaft with unfused epiphysis.
Ovis aries:	Portion of frontal, no horns.
	1 rib and 1 vertebral fragment.
	7 articulated lumbar vertebrae with sacrum.

The *B. taurus* frontal has an almost flat horizontal profile; it can therefore be described as being of the "Sanga" type. There is a single deep chop mark on the right side of the skull, resulting from butchering activities. The horn core is thin walled and hollow; the piece which remains indicates a straight horn turning upwards from the horizontal. This would be in accordance

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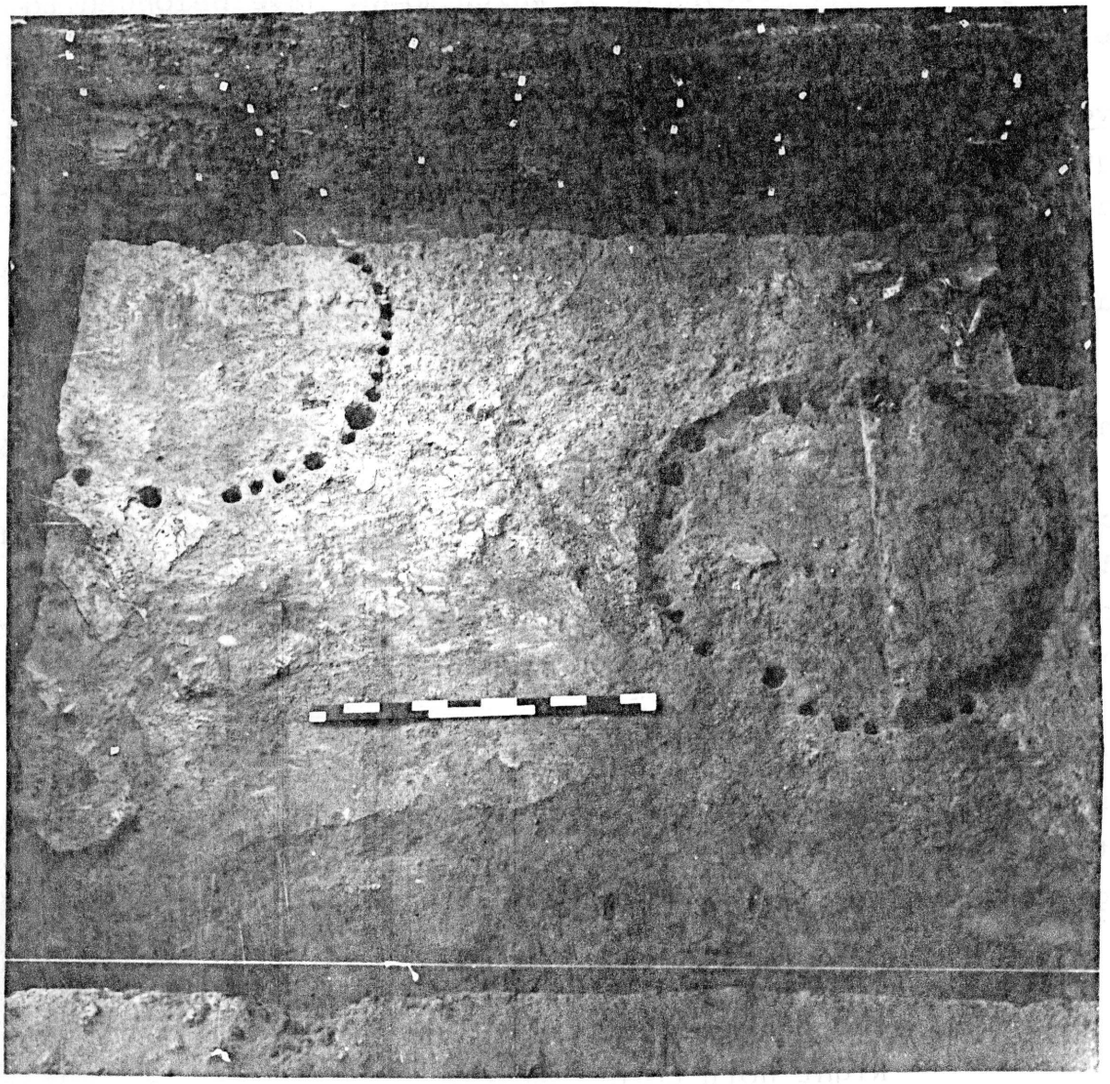

Plate 4.3. Post holes of small huts immediately overlying bone accumulation F4/8(iv).a. Photograph: University of Pretoria.

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with the "Sanga" type. The humerus and astragalus both show butchering damage.

The *Ovis aries* frontal has no indication of horns; there is a slight hollow behind the orbit, and the sides of the skull are cut away. On the basis of this, it is very likely that the specimen was a female sheep. The articulated vertebrae indicate that the meat was cleaned off the bones and the vertebral column discarded with some sinew holding the bones together.

The above evidence suggests that this feature consists of some of the remains of an immature "Sanga" type animal and the skull and vertebrae of a sheep.

MST/F4/2(iii)

The feature consisted of very soft, fine-grained, light grey ashy soil, containing stones, potsherds and large bones. The bones from this feature came from adult, sub-adult and very young animals of all three domesticated species of bovid as listed below.

Bos taurus	Left mandible with $dp\bar{2}$ - $dp\bar{4}$ (MST/912);
	Right humerus shaft, both epiphyses unfused, belongs to MST/912;
	Complete right radius, unfused distal epiphysis, with fusion line of proximal epiphysis visible.
	Anterior portion of a lumbar vertebra;
	Left scapula (fragment);
	Left distal humerus;
	Shaft and distal end of right radius with ulna shaft attached;
	Shaft and proximal end of left radius;
	1 complete right Calcaneum;
	1 carpal/tarsal.
Capra/hircus	1 complete terminal phalanx
	2 right and 1 left pelvis
c.f. *Ovis aries*	Occipital of skull with foramen magnum, Y-shaped coronal/frontal and straight lamboid sutures. Opisthion is notched.
Ovis/Capra sp.	Anterior portion of right mandible with $P\bar{2}$ and $P\bar{3}$, alveoli for Incisors and $P\bar{4}$. Medium wear on teeth;
	Axis, one cervical and five articulating thoracic

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Plate 4.4 MST/F4/8(iv)a. Bone accumulation underlying hut remains shown in Plate 4.2. Photograph: University of Pretoria.

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vertebrae with unfused discs, 5 rib fragments. All were probably from the same animal . 2 right and 1 left scapula, the edge of one right specimen is not fused;
Left and right articulating first and second phalanges of the same foot;
1 long bone shaft.

Bov.I Burnt anterior portion of right mandible with worn $P\bar{3}$-$M\bar{1}$, alveolus for $P\bar{2}$.

Large freshwater bivalve. Portion of a valve.

12 fragments of waste bone.

The mandible MST/912 was from a neonate calf; there is no sign of wear on the teeth. The right radius was from a young animal, while the rest of the material came from an adult specimen. The very large right calcaneum carried extensive butchering damage in the form of heavy chop marks.

Two specimens of *C. hircus* were present; one of these was probably sub-adult, in view of the vertebrae with unfused discs.

There is a small hollow on the occipital region of the *O. aries* skull; this was probably formed as a result of an abcess.

The articulated foot bones suggest that the foot was discarded in the skin, or at least while still joined with sinews.

The Bov.I mandible would probably have come from *Sylvicapra grimmia*, the only small, wild species of bovid identified to generic level from Greefswald.

The material from this feature thus came from a very large adult, a young and a neo-nate *Bos taurus*, one adult and one juvenile *C. hircus*, one specimen of *Ovis aries* and one Bov.I.

MST/F4/8(iv)a

This feature yielded a sample of 572 bones. (Tables 4.128-4.130). Of this sample, 46,2% (268 pieces) were unidentifiable , and a further 21,7% (126 pieces) were bone flakes. This high proportion of unidentifiable specimens was due to extensive weathering, which resulted in heavy fragmentation of the bone. 40 of the 65 identifiable bovid skeletal parts, i.e. 61,5%, showed similar weathering. It is therefore likely that this sample of bone was exposed to the elements for some time before it was covered by

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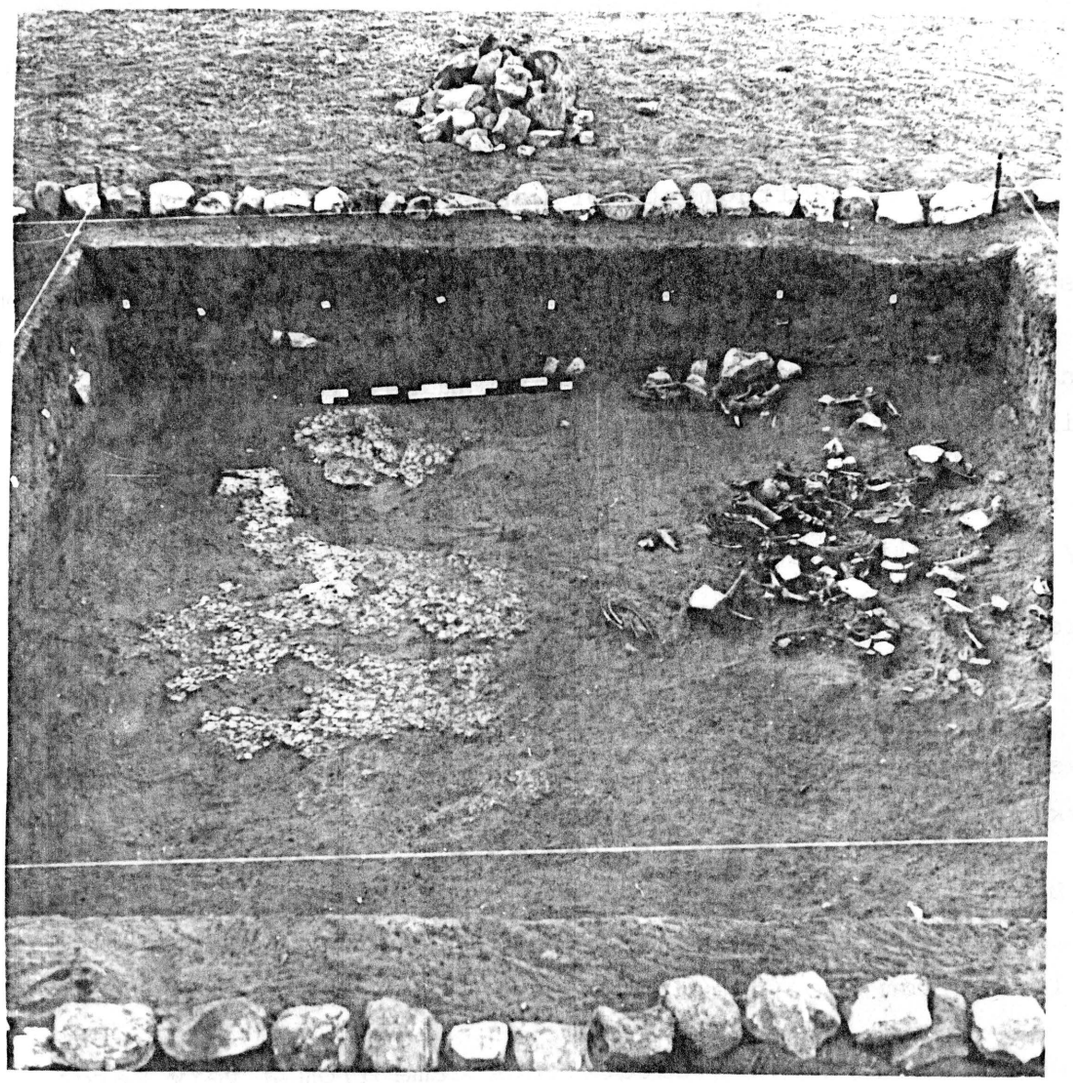

Plate 4.5. MST/H5/2(iii).2. General view of bone accumulation.
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deposit.

The assemblage of bones lay in a concentration as shown in Plate 4.4. Immediately overlying the concentration was an accumulation of hut rubble (F4/8iii) and two small circles of post holes (Plate 4.3). These post holes continued from Level 8(iii) through 8(iv). Meyer has interpreted this feature as being the remains of small huts on poles, with bone waste discarded under the huts. The weathered condition of the bone would support the idea of the bone lying in a position in which it was exposed to weathering but not to rapid deposition of material. Remains of burnt sorghum were found associated with the bone. It seems likely that the small huts could have been grain storage huts close to a living area, and that the bones were tossed into the vicinity of the huts by the occupiers.

The sample represents a minimum of seven individuals, 4 of which were juveniles, One of the cattle was very young, with M1 just erupting. The only *Bos* frontal preserved is very flat in profile, suggesting a "Sanga" type.

It is not impossible that the Bov.I bones could have come from the juvenile Bov.II individual, as insufficient of the epiphysis was preserved to ascertain the state of fusion of the bone. The Bov.II tibia shaft showed a healed, eruption on the shaft; this could have been the result of abscessing or of a healed wound.

The only unusual feature of this assemblage lies in the high number of individuals represented and, in particular, the high proportion of juveniles present.

MST/H5/2(iii)2

The distribution of bone in this feature is shown in Plates 4.5 and 4.6. The feature was characterised by three groups of articulated vertebrae. The assemblage consisted of the following:

Bos taurus: Portion of right orbit of skull;
Neural spine or thoracic vertebra;
Fragment of distal humerus;

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	Left femur shaft;
	Complete right astragalus.
Ovis aries	Complete articulating foot with Phalanx 1, 2 and 3 and distal metacarpal. Abscess on metacarpal.
Capra hircus	Right maxilla with P2-M3. Light wear on posterior lobe of M3;
	Right mandible with $P\bar{2}$-$M\bar{3}$, heavy wear on all teeth. Heaviest wear on $M\bar{1}$.
	Vault of skull with bases of both broken off horn cores. Nasals chopped away; adult.
(Individual no. 1)	Articulating axis vertebra and 4 cervical vertebrae;
(Individual no.2)	Complete atlas vertebra
	Articulating vertebrae; eight thoracic, five lumbar, possibly belonging to individual no.1.
	One thoracic vertebra with unfused discs, not from individual no. 1;
	2 left scapulas, 2 fragments of scapula blade;
	2 right humeri, one with unfused epiphysis;
	Shaft of left humerus, with unfused epiphysis;
	Left and right ulna of two different animals;
	Shaft of right tibia;
	Complete sacrum.
Bov. I	Five articulated thoracic vertebrae with unfused discs;
	12 waste bone fragments.

The *B. taurus* specimen appears to have come from an individual of advanced age in view of the fact that the orbit is very rugous and has an uneven edge.

Two individuals of *C. hircus* were present, one of which was subadult, or a young adult, i.e. M3 has only very light wear. These two individuals were probably the same as the two individuals represented in the post cranial material, since one of these was also sub-adult by virtue of the unfused vertebral discs and unfused distal humeri. The skull was from an adult animal with well-developed horns.

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The right lateral processes of the two anterior thoracic vertebrae from the Bov. I specimen were cut off during the butchering process.

The bones in the feature thus represent four individuals: a mature, adult *Bos taurus*, an adult and sub-adult *C. hircus* and a sub-adult Bov.I. The fact that the vertebrae of the various animals can be re-articulated indicates that they were discarded while still held by some ligaments. This is somewhat unusual for Greefswald, as most of the vertebrae recovered were usually extensively damaged by butchering and are dis-articulated. There is nothing in the remains to suggest any ritual significance in the accumulation.

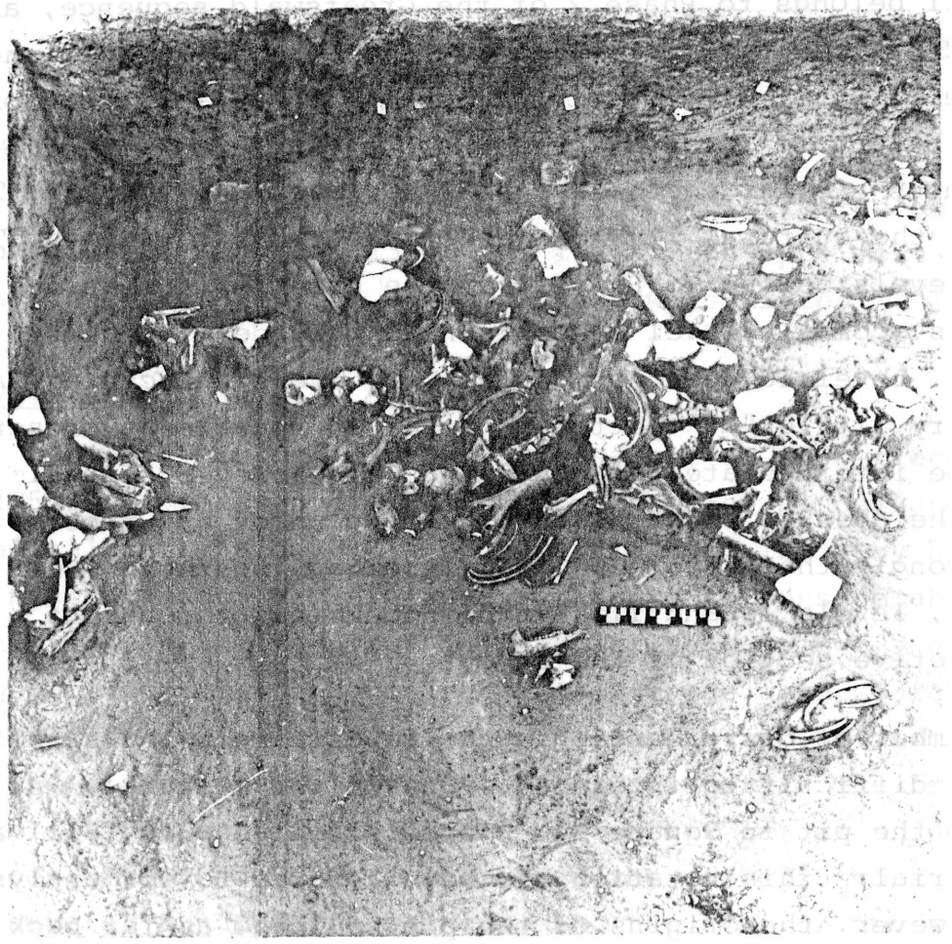

Plate 4.6 MST/H5/2(iii).2. Detail of bone accumulation, showing articulating ribs and vertebrae. Photograph: University of Pretoria.

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III MAPUNGUBWE HILL (MK1)

Two major excavations were undertaken on top of the Hill during this latest phase of investigations. The largest of these was MK1, which consisted of six three metre squares and reached a maximum depth of approximately 2,5 metres. MK1 is situated on the northern end of Mapungubwe Hill (Fig. 4.5). The deposit was divided into eleven levels, several of which had numerous subdivisions (Fig. 4.7).

The top three levels consist of a sandy soil. Thin floors begin to appear in Level 3. Levels 4-11 consist of sandy soil with prominent hut floors and the rubble of collapsed burnt huts, post holes etc. Pottery and bones are well preserved.

Level 11 belongs to Phase 2 of the Greefswald sequence, and contains K2 pottery; a few stamped ware (? Gokomere type) sherds at the base of Level 11 suggest some sparse Phase 1 occupation. Levels 4-9 belong to Phase 3; crude stone platforms and other stone features similar to those in MST/K8/Levels 4-11 occur. This strengthens the cultural link between these two excavations. The top three levels belong to Phase 4 of the Greefswald sequence. (Meyer, pers. comm.) Level 10 contains a good deal of burnt hut rubble; Level 10 does not contain any stone structures, and contains very little "M2" pottery. Level 10 appears at present (1977) to be intermediate between 9 and 11; however, faunal evidence, the absence of stone and the topping of hut rubble suggest strongly that levels 10 and 11 belong together. For this reason, levels 10 and 11 have been combined throughout the interpretive section of the study.

A number of disturbances in the deposit make the stratigraphy very difficult to interpret. One of the most awkward features is the pit in Square B5. This is filled with "9(i) and 9(ii)" material; this notation has been adhered to for analysis. In fact, however, the origins of the pit could go as far back as level 2, since a soft ashy area was noticeable at this spot from Level 2 downwards.

Two dates are available for MK1/Level 11, both of which work out at 1110 $\pm$ 40 AD.

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The bone sample from MK1 yielded the remains of a minimum of 326 individuals belonging to 27 species (Table 4.131). This was based on an analysed sample of 22938 pieces (Table 4.132); of these, 3406 or 14,83% were used in the identifications.

During excavation Levels 9 and 10 were each divided into several units. Where these units proved to be similar, they have been grouped with Level 9 or 10 accordingly in the later sections.

In Level 11, 11.1 was excavated and analysed as a separate feature, but has been grouped with Level 11 in the later chapters. Features B3.11.7 and B.3.11.8 have however been kept separate throughout.

All except five of the levels were analysed in full.

The fauna from Level 1

Level 1 yielded the remains of 6 domesticated bovids and two molluscs (Table 4.133). As it was the uppermost level, only the teeth and non bovid remains were listed.

Level 2.

Level 2 yielded a very large sample of 3830 pieces (Table 4.135). Of this sample 60.78% consisted of miscellaneous skeletal parts and 18,64% of bone flakes. The very high number of miscellaneous skeletal parts was due to considerable fragmentation in the sample. The sample included two small plastic bags full of minute bone fragments. These were searched through for identifiable pieces, then put aside and not included in the miscellaneous skeletal parts category. The fragments were all unidentifiable pieces broken off larger unidentifiable pieces; they would have increased the miscellaneous sample by several hundred, thus increasing the size of the sample even further.

The sample showed very similar proportions of human damage, burning and weathering. Bone flake sizes are listed in Table 4.138; the largest class is the 4-5 cm size group.

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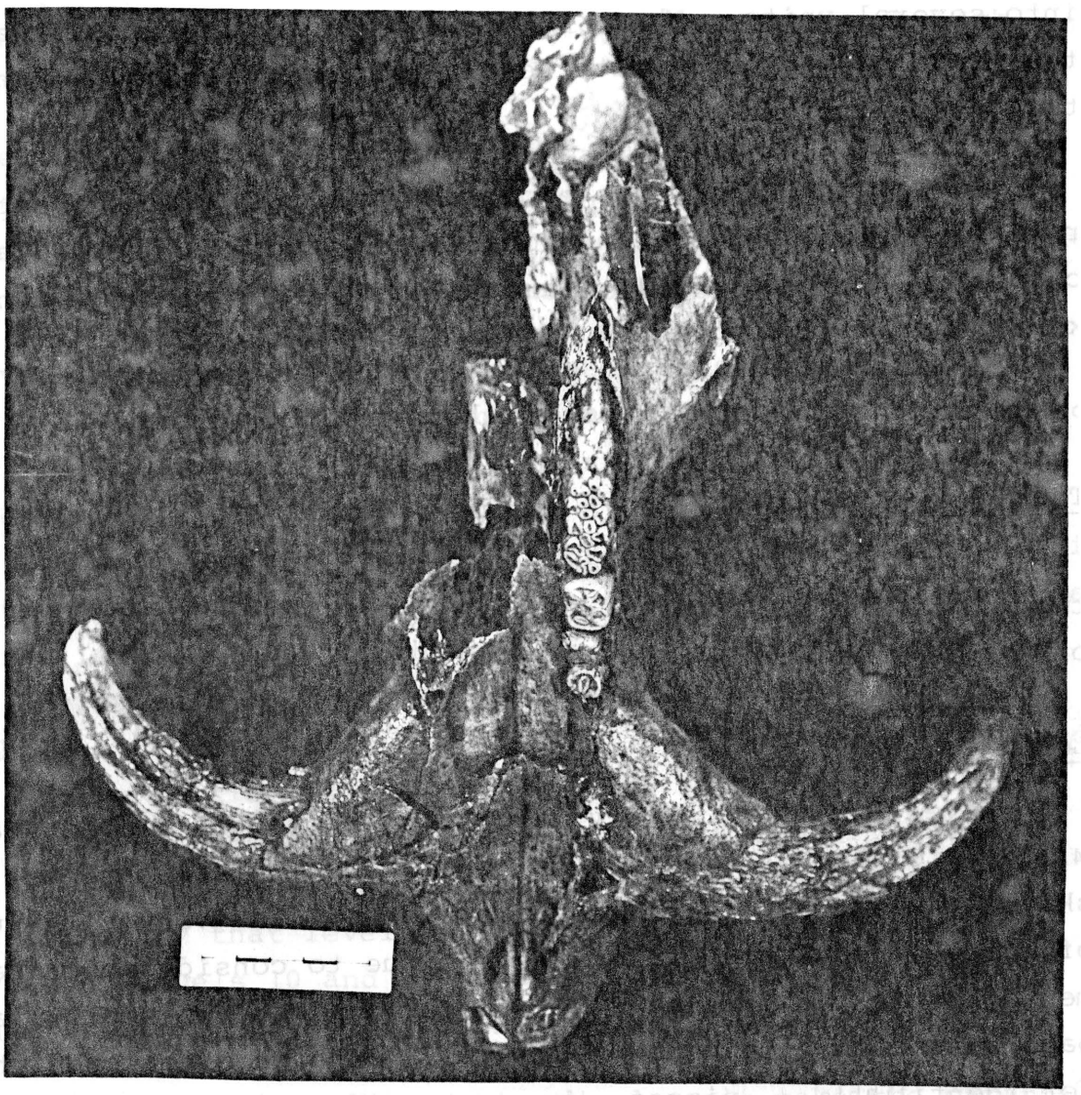

Plate 4.7. MK/1182. Warthog skull from MK1/Level 2.

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The species list (Table 4.134) shows a wide variety of species. A minimum of 19 domesticated bovids is associated with the remains of two zebra, a hyrax and jackal, hare, rodent and small bird. The remains of a terrapin is interesting. Molluscs of several sizes were also present. There are a number of juvenile specimens among the mammals. The presence of zebra is interesting; MK1 yielded evidence for 7 individuals of this species, the highest number for the site, suggesting a consistent hunting pattern. The presence of *Synodontis* sp. indicates fishing in waters which are running, as this fish lives only in moving water. It does not occur south of the Limpopo River or Lowveld systems. The fish carries poisonous spines, but is good eating.

Plate 4.7 illustrates one of the best-preserved non-bovid specimens from the Greefswald assemblage (MK/1182). The specimen consists of the frontals, maxilla and pre-maxilla of a warthog, with both incisors and canines in place, and right P4-M3. The alveoli for both P3 are present; M1 is heavily worn. There is a small cut mark close to the tip of the left tusk, and a deep one in the flat, pre-maxillary bone at the base of the same tusk. The palatal surface of the skull is in fresh condition, but the upper surface shows medium to heavy weathering. The left portion of the skull is broken away. Child et al. (1965) documented tooth eruption patterns and sizes for warthogs. Their metric data relate to mandibular teeth only. As a very broad guide, the upper and lower RM3 of nine warthog skulls in the Transvaal Museum Mammal Department were measured to see whether there was a correlation between upper and lower tooth sizes. Table 4.136 lists the length of the crowns of the teeth, with the percentage difference between the lengths and the mean variation. The crown length of the M3 of MK/1182 is 3.3 cm; if 5% of its length is added, it would suggest a possible $\bar{M3}$ length of 3.5 cm. The tusk length is greater than 8.87. Using the data given by Child (op.cit.) this would suggest that the skull is from a male animal of about 36 months. Skull length would be considerably greater than 32.0 cm. The area close to the tusks is distorted downwards, suggesting that the tusks might have been tilted in towards the skull as in male animals. It is thus likely that the isolated tusk from the same level is also from a male.

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Table 4.137 lists the bovid skeletal parts preserved; Bov.II and Bov.III are almost equally represented. The remains from Level 3 were extremely sparse; this level in fact only occurred in one square. The few teeth preserved indicated the presence of domesticated bovids and a rodent (Table 4.139). Level 4, the uppermost level of Phase 3, also yielded a sparse sample of identifiable remains. The species list (Table 4.140) contains a minimum of five bovids, four of which were domesticated. Two interesting species occur among the other remains. A vulture is represented by an almost complete skull. On the basis of size, it is most likely to belong to the species *Torgos tracheliotis*, the lappet-faced vulture. A healed depression caused by an abscess occurs on the occiput , and a smaller diseased patch on the right side of the skull, close to the salt gland. Among the mollusca, the presence of the marine species *Polynices tumidus* is of interest; this species also occurs on K2.

Level 5.

Table 4.141 list the species present in this level. There are no unusual features except for the presence of 2 articulating snake vertebrae.

Level 6 yielded just less than 1 000 specimens (Table 4.144); of these, 32,51% belong to the miscellaneous skeletal parts class, and 24,56% to the bone flakes.

Tables 4.142 and 4.145 list the species present and the bovid skeletal parts. The sample is dominated by bovids; the only example of *Oreotragus oreotragus* (Klipspringer) to occur in the whole Greefswald sample occurred in this level.

The left scapula and three first phalanges classified as "Bov.IIb" were too large for *Ovis/Capra;* they could have come from an impala.

The mandible classified as c.f. *Hyaena brunnea* matched closely in size and morphology the comparative material available.

In the bovid skeletal part sample, the Bov.III class constitutes 51,7% of the assemblage. Most of the assemblage is made up

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of limb bones, with very small numbers of bones from below the metapodials.

Within level 6, a feature B5.6.1 was excavated as a unit. The species list (Table 4.143) shows no features which differ from those of Level 6; it can therefore be regarded as an integral part of Level 6.

It has been noted that bone link shafts, which are characteristic of Level 2, were found in Level 6, in squares A5 and B5. At this point the deposit was a slightly softer texture; it is therefore possible that some mixing of the levels occurred and that the link shafts in Level 6 were an intrusion.

Level 7. A primate distal humerus found in this sample has been listed as "larger than vervet, smaller than baboon." This specimen might have come from a larger forest dwelling species, eg. Samango; this species is not however known from the area. In all likelihood the specimen comes from a small individual of *Papio* (Table 4.146).

Level 8 yielded the remains of a zebra and a small canid which was too incomplete for identification (Table 4.147). The bovid material included the bifid process of a thoracic vertebra, indicating the presence of a humped form of cattle. The bovid skeletal parts from Level 8 are listed in Table 4.148.

Level 9 was excavated as several units: 9, 9(i), 9(ii) 9(ii).1 and B5.9ii.4. All except the last yielded relatively small samples of 300 bones or less: within this level, the pottery showed an increasing tendency towards "M2" type ware. An important feature of this level was the large pit in B5. The pit contained a large concentration of bone, the cavities of which were filled with an ashy soil.

The five units are treated separately here, but grouped together in the later chapters. Level 9 yielded a sample of 320 pieces (Table 4.150), representing a minimum of 8 individuals belonging to five species (Table 5.149). The sample is dominated by domesticated bovids. Table 4.151 lists the bovid skeletal parts preserved. The proportion of burning and

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weathering is highest in this Level.

The species represented in Levels 9(i), 9(ii) and 9(ii).1 are the same, except for the presence of a zebra in 9(ii).1 (Table 4.152). Table 4.153 gives the total sample of Level 9(i); the sample shows a fair degree of weathering, but little burning. In Level 9(ii) (Table 4.154) there is a higher percentage of burning. The small sample of bovid skeletal parts from 9(ii) is listed in Table 4.155. The cattle and sheep/goat groups are the same size in this sample.

In 9(ii).1 the proportion of weathering is almost the same in 9(i); however there is a higher proportion of miscellaneous skeletal parts (Table 4.156). There are no bovid teeth in this sample, nor in B5.9ii.4. The bovid skeletal parts from 9(ii).1 are listed in Table 4.157 in this sample, cattle bones outnumber sheep/goat bones almost 2:1.

The material from the pit in B5 is listed in Table 4.158 and 4.159. More than half of the sample was unidentifiable; nevertheless it did produce a good skeletal part sample in which the Bov.III parts outnumbered the Bov.II parts almost 2:1. Only *B. taurus* and *Ovis/Capra* were identified from this sample; the sample gave a very high M.IND. count, considering that no teeth were found.

In Level 10, the deposit was divided into four units. Each unit produced a large sample (Table 4.132), and was analysed separately. However, there is very little difference between the samples; almost identical percentages of the samples are made up by the waste classes in each unit. These units can be grouped together as one level.

The species listsare given in Tables 4.160 and 4.162. Zebra occurs in Level 10 and 10(i); there is a strong likelihood that these remains represent 2 individuals, 1 adult and 1 Juvenile, as the one specimen is an unfused phalanx and the other is a fused proximal femur. A lagomorph occurs in all the units except Level 10 itself. Level 10(i) contains the remains of a rodent, and of a Bov.I which matched in size both *Cephalophus* sp. and *Raphicerus* sp. Molluscs occurred in three of the levels.

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In general, these units within Level 10 were characterised by a very large number of domesticated bovids, as well as Bov.I size bovids. Level 10(i) yielded a particularly large sample of 28 domesticated bovids. One of these was a humped specimen, as 3 bifid thoracic vertebrae were found.

A Bov.IIb (?impala) occurred in 10(ii).

Tables 4.163-4.166 list the bovid skeletal parts from each unit. In three of these, Bov.III outnumbers Bov.II. However, in 10(ii) and 10(iii), there are eleven more Bov.II skeletal parts than Bov.III in both cases. In a total sample from these two levels of 287, this is not enough to justify separating the units.

Level 11. In this level, 4 units yielded bone samples: 11, 11,1, 11.7 and 11.8. Of these, 11 and 11.1 have been combined later, but 11.7 and 11.8, although an integral part of Level 11, are associated with specific hut features and have therefore been kept separate.

Level 11 yielded the largest sample from MK1 (4605 pieces). The unidentifiable material made up 36.3% of this sample. 19,3% was made up of bone flakes, 828 bones (17,98% were used to identify a minimum of 44 individuals belonging to 12 species). (Table 4.168). The species list (Table 4.167) is dominated by a large number of domesticated bovids, a minimum of 30 individuals belonging to this group. Of the other two bovids present, one is a neonate specimen of *Cephalophus* sp./ *Raphiceros* sp. size.

Zebra is again present and a hyrax. The dermal plate of a barbel suggests some fishing, one of the few fish from MK1. The marine mollusc *Polynices tumidus* appears to be present again.

Table 4.169 lists the large skeletal part sample, in which the small bovids outnumber the larger. In Table 4.170 the bone flakes are listed according to size and damage; the largest group is the 4-5 cm sample. There is a high proportion of burning in both the total sample and the bone flake sample.

Table 4.172 lists the total bone samples from the features in Level 11. The largest of these comes from 11.1, the species list of which is given in Table 4.171. The sample represented

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nine bovids, seven of which were domesticated. Bov.IIb size is present. The skeletal parts are listed in Table 4.173.

Feature B3.11.7 was an irregularly distributed scatter of bones underlying the burnt rubble of a hut (Hut B3.11.3). The hut had a sandy floor in which the bones occurred; the bones were obviously associated with the hut. A date of 1110 $\pm$ 50 AD has been recorded for the hut. It is a relatively small sample (Table 4.172), which contained remains representing a minimum of two cattle, two sheep/goat, one Bov.I and one hare. (Table 4.171). The skeletal parts are listed in Table 4.174.

Feature B3.11.8 was also associated with burnt hut rubble. In this case, the bones were planted vertically in an irregular pattern in the sand below the hut rubble. It is a very small sample (Table 4.172), containing parts of the fore and hind limb of two cattle, and the right radius of a sheep/goat (Table 4.171). A large proportion of the sample, i.e. 56,3%, was unidentifiable; the meaning of such a concentration remains obscure.

The MK1 sample contains fewer species than any of the other samples, but many of them are unusual, eg. vulture and hyaena. The upper levels contain a number of individuals belonging to the domestic species. In Level 10 and 11, however, the domestic species increase drastically. One of the most important problems to be solved is the relationship between K2 and the Hill; it appears that a study of the economies of the various parts of the site might be able to shed some light on this aspect of Greefswald's history.

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CHAPTER 5

INTERPRETATION OF THE GREEFSWALD FAUNA 1 : ECONOMY AND DIET

One of the prime aims of faunal studies is to attempt to reconstruct the economy and diet of the people who brought the animal bones to the site. Economy and diet are wholly interdependant; the faunal remains found on a site are the mute evidence of the pattern of living of the people, and also the evidence of the composition of their diet.

In attempting to interpret faunal remains in these terms, one accepts as axiomatic that in every calculation one is dealing with minimum quantities. The material with which one works has survived by a series of happy accidents; although one may speak of it as if it represents the actual number or quantity of animals present, it must be borne in mind that it in fact only represents the minimum quantities for which concrete evidence has survived. We are looking at a sample in every sense - a sample of all the surviving bone, a sample of the butchering pattern and a sample from a point in time. This last factor is critical; to say that the inhabitants of a site consumed eight cattle during their occupancy, when they occupied a site for three hundred years, is patently ridiculous. What we are doing is describing a sample which belongs to a limited point in time - a sample which indicates the possible pattern of behaviour of the group, a pattern which must be mentally extrapolated across the time span of the site.

In order to interpret faunal remains, some form of "unit" needs to be defined for use in identification, allowing one to build up species lists and to calculate the relative importance of each species. We have for many years used the minimum number of individuals as the basis for interpretation, as described in Chapter 3. This method results in the calculation of actual numbers; bearing in mind the limitations outlined above, these numbers can be taken as reflecting the pattern of living on a site.

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It is generally accepted that different methods produce different results, and "best" methods only exist for a single site. Thus in the Greefswald analysis I have chosen to adhere to the M.IND. calculations arrived at by our own methods as being the "best" reflection of the part played by the fauna at Greefswald.

The economy of Greefswald

Faunal remains reflect the economic basis of a community. The economic basis could be divided into three sections: the means whereby the community obtained its food, the existence of trade contacts outside the community, and the existence of crafts within the community.

The people of Greefswald were agriculturalists who practised hoe agriculture and maintained flocks and herds. Remains of burnt millet have been found, suggesting that this was a staple food. Other plant remains are scarce; it is likely that the people collected wild plant foods as a supplement to their diet in the same way that the people of Africa do at present.

Animal food can be obtained in a variety of ways, each requiring different techniques and degrees of involvement. By virtue of being pastoralists, the Greefswald people had available a "captive" source of protein in the form of flocks and herds. The place of these flocks and herds in the community is one of the most important problems of the current research project. The management of these domestic animals is discussed in Chapter 6.

I have suggested elsewhere (Icon: Voigt, in press) that food may be obtained in five main ways. These are by utilising domestic stock, by hunting, snaring, gathering and fishing. These are very different types of activities. In utilising domestic stock, the food resource is immediately at hand; the herds and flocks may not be the property of the people concerned in that they might come into a community as tribute or by barter or raiding. Utilisation of the communities own stock would probably involve some form of animal husbandry, i.e. only certain animals might be available for food. Hunting, snaring and gathering can be divided into active and passive pursuit of food. Hunting requires active seeking and killing of prey, butchering and carrying back of the meat; it may be a solitary or a communal activity. Snaring of small animals is a "passive" activity in that the hunter

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sets the snare then leaves it and checks later to see whether an animal has fallen into his trap. It is basically a solitary activity, and would be dependant upon personal preferences. It would be indulged in by young boys and men, and might be practised in the vicinity of the settlement (for instance on the periphery of cultivated areas) and in areas some distance away, for instance by herdboys guarding stock away from the settlement. In the latter situation, it is unlikely that remains of the animals would find their way into the food refuse of the settlement.

Men and women could supplement the diet by gathering foods - tortoise, shellfish, varanus lizards etc. Food could be collected while out hunting, herding or collecting firewood; in Iron Age groups it is likely that this would be a casual activity dependant on individual enterprise.

Another possible source of food is fishing, which was most likely a male past-time; this was not a major activity at any stage of the Greefswald sequence.

In describing the economic basis of Greefswald I have interpreted the presence of species in terms of these five types of activities, i.e. domesticated animals(herding), hunting, snaring, gathering and fishing. Species have been grouped under these activities on the basis of minimum numbers of individuals. "Hunting" has been taken to embrace all larger game, i.e. bovids, suids and equids. "Snaring" includes dassies, hares, birds and rodents, while "gathering" includes smaller creatures, most of which are reptiles (tortoise, varanus), the giant land snail, *Achatina immaculata* and other freshwater molluscs. Many of the *Achatina* shells from Greefswald are intact; this creature appears to have been of some importance to the Greefswald people. I have assumed that its multiple roles included its contribution as a food animal, a role which it fills in many present-day African societies. These categories are not mutually exclusive; birds, hares, dassies and rodents could have been hunted or snared, but as there is no evidence, for instance, of specialised bird hunting, I have assumed that these smaller animals were usually snared.

In addition, a sixth group of animals occurs. This is the "Non-contributor" category, which includes species which are unlikely to have been food animals, eg. carnivores and primates, and items of trade and raw materials (cowries, ostrich eggshell). Ostrich

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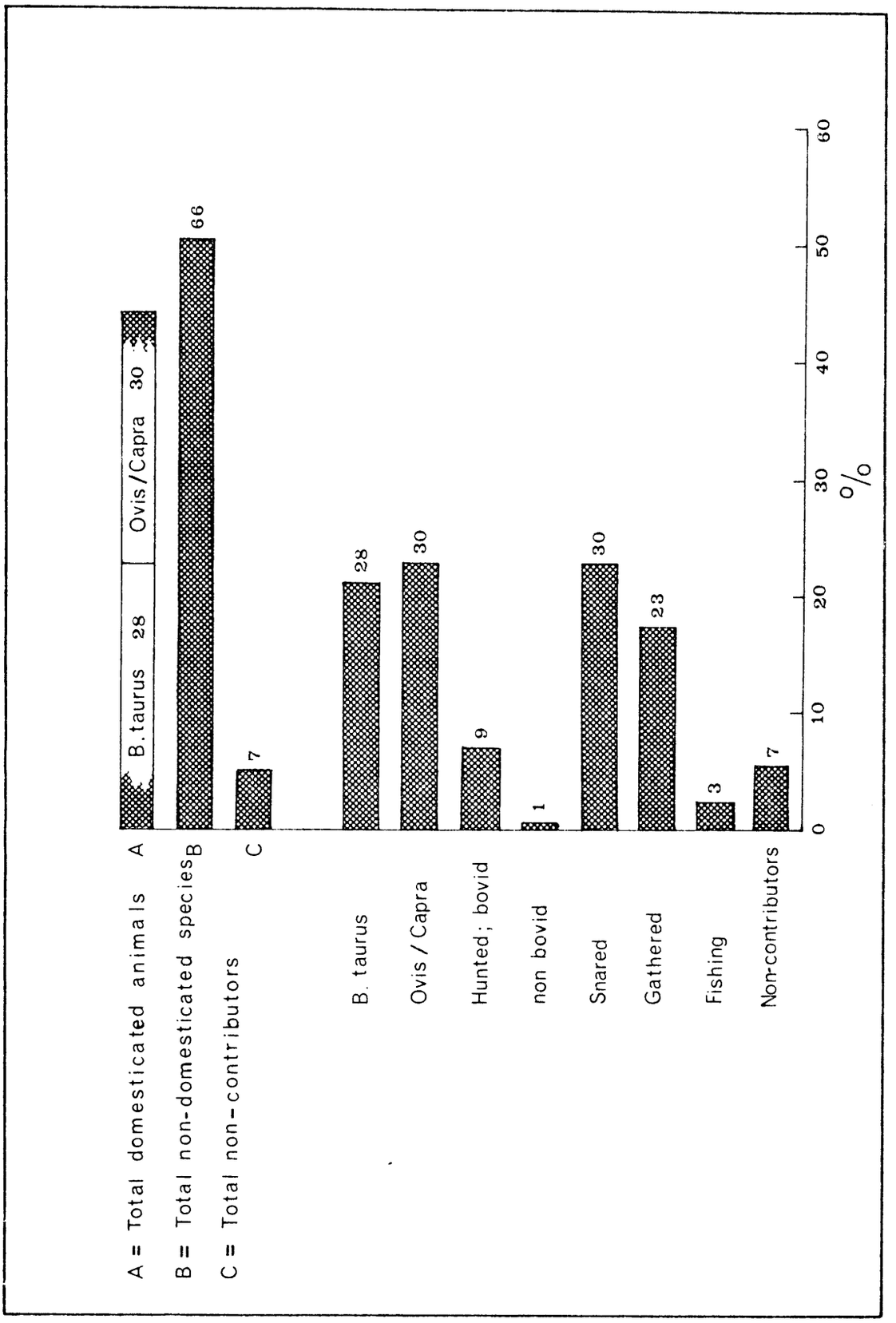

Figs. 5.1. K2/TS1. Economic activities on the basis of minimum numbers of individuals as percentages of the total TS1 sample.

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eggs could have been brought back intact, utilised as food, then used as a raw material for beads. However, shell fragments could also have been brought back as raw material; thus I have grouped this item with non-contributors.

Elephant ivory is problematical from this point of view. Tusks may have been scavenged from decaying carcasses; however, there is some evidence for elephant and hippopotamus bones, so that I think it is justifiable to group "elephant" with the hunted items.

Isolated rodents have not been listed unless more than two individuals are represented in the sample; this level of representation suggests more than the chance death of a rodent in the relevant archaeological level. In such cases, rodents have been grouped with "snared" items.

Economic activities at Greefswald

a) TS1. TS1 falls within Phase 2 of the Greefswald sequence. The species list is given in Table 4.1. In utilising this information for economic interpretations, the following individuals were not included:

One Bov.I specimen from Level 1, as an individual of *Sylvicapra grimmia* was identified from the same level and the Bov.I specimen could therefore have come from the same individual.

Cryptomys and *Otomys* sp; only one individual of each is present, so that the occurrence in the deposit is likely to be fortuitous. The indet. rodents in Level 1 were omitted for the same reason.

All the indet. mammals were omitted, as they might be represented by body parts belonging to identified species.

The snake was probably a natural occurrence on the site, as were the springhares - K2 is a favourite home for these animals.

The indeterminate mollusc, being totally unidentifiable, was not included.

The composition of the sample as an expression of the economy is given in Table 5.1 and in fig. 5.1. Non-domesticated animals made up 50.4% of the TS1 sample. Of these, the majority (23%)

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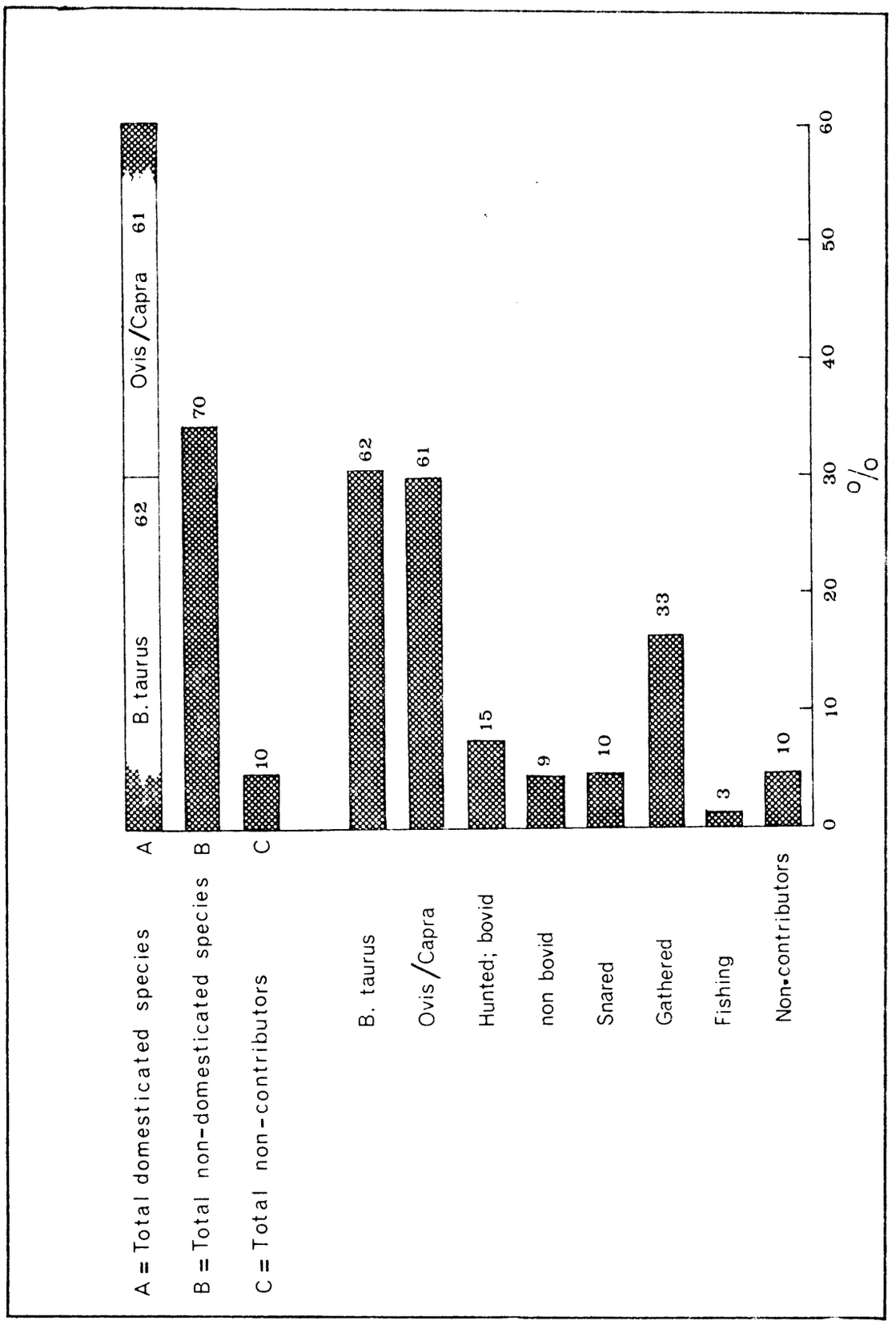

Fig. 5.2. K2/TS2. Economic activities on the basis of minimum numbers of individuals as percentages of the total TS2 sample.

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were snared, and gathered (17,6%). Only 7,7% were hunted; 2,3% were obtained by fishing.

The snared animals included dassie and hare. This sample is unusual because of the large proportion of rodents - 9 individuals of *Aethomys chrysophilus* and 8 of *Praomys natalensis*. In Level 5, one of the *Aethomys* specimens in fact probably died in the deposit, since seven bones of the same individual were found. This is a very large specimen; comparison with available material suggested that it was close to the upper limit of the size range. Initially, the possibility existed that it might be *Rattus rattus* because of its size.

Six birds occur in the sample, four of which were probably guinea fowls. The owl-sized bird in Level 2 was identified on the basis of a claw; if it were a raptor, it is unlikely to have been a food animal.

The gathered material is dominated by *Achatina*, which occurs in every level. A tortoise, two gekkos and two lizards were also collected.

The people of TS1 occasionally hunted, taking impala, duiker and bushpig. It is not impossible that the duiker were snared rather than hunted.

The non-contributors are ostrich eggshell, which was probably collected for raw material, and six cowries. The eggshell fragments were taken to represent 2 individual eggs for the whole trench. TS1 is the only excavation analysed from K2 which did not include elephant ivory.

The sample in TS1 therefore suggests a heavier dependence on naturally occurring foods, including very small items such as rodents and reptiles. The river was being utilised, as evidenced by two freshwater bivalves and three fish. Domestic stock were being utilised; individuals from the sheep/goat group were slightly more common (22,9%) than cattle (21,4%). 13.8% of the slaughtered domestic beasts were juveniles.

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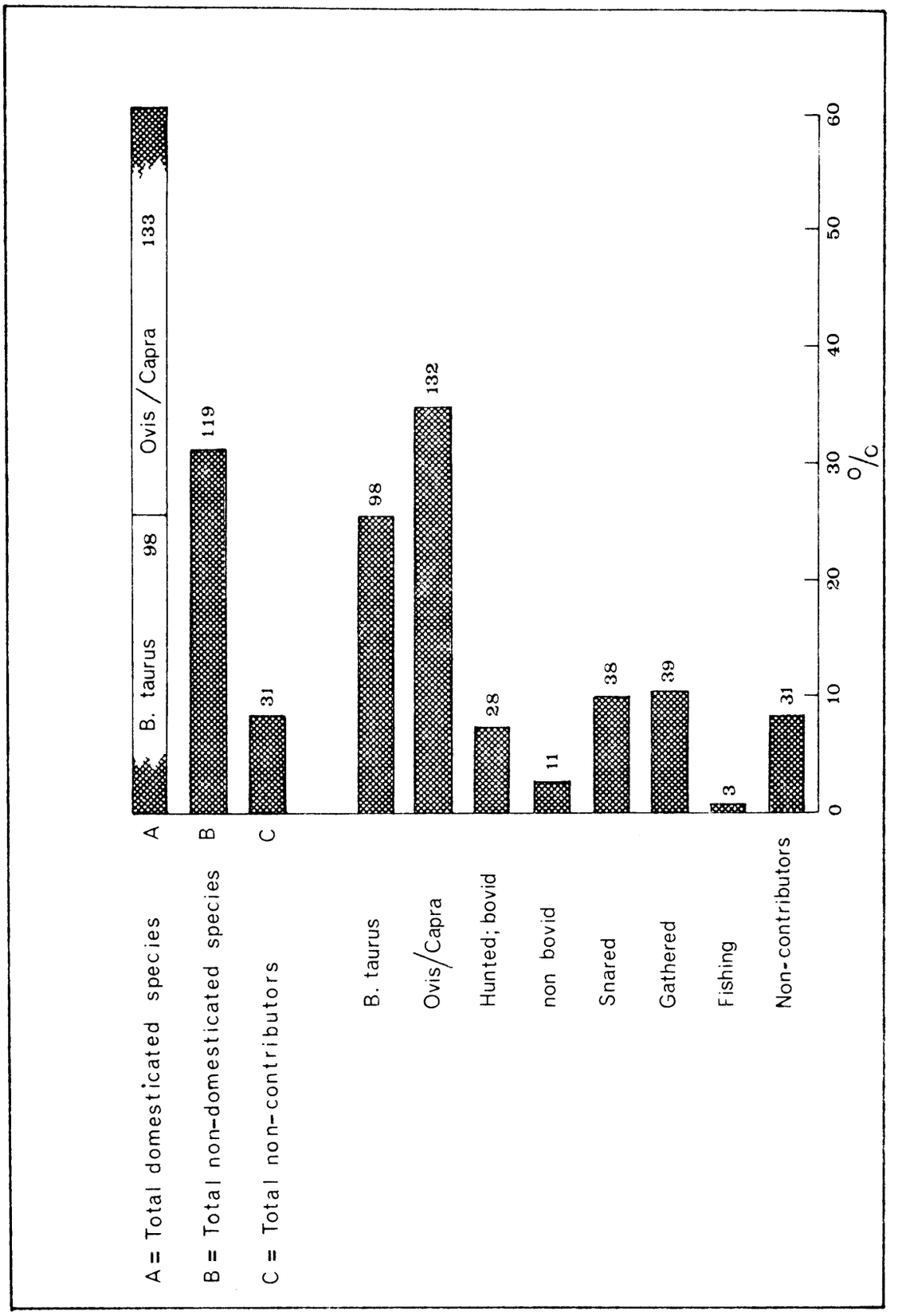

Fig. 5.3. K2/TS3/Levels 1-15. Economic activities on the basis of minimum numbers of individuals as percentages of the total TS3/1-15 sample.

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b) TS2. This sample included the axis, cervical and thoracic vertebrae, 2 metacarpals and an unfused proximal humerus belonging to a young human being. It is likely that these fragments come from a disturbed burial. This specimen was omitted from the following calculations, as well as one Bov.I specimen, one lagomorph, the indeterminate rodent and mammals and the two snakes.

The TS2 sample is dominated by domestic species (60,6% of the sample); within this group the *Ovis/Capra* and cattle groups are of almost equal size (30,1% and 30,6% respectively). (Table 5.2 and Fig. 5.2).

Three humped cattle were identified in the sample, one of which was a juvenile. They were represented by thoracic vertebrae, the vertical spines of which are thickened dorsally, suggesting the presence of a hump.

In Level 2, a mandible assigned to domestic dog was identified.

Hunting made up 11,8% of the sample; this part of the sample includes thirteen Bov.I individuals, a duiker, impala and *Connochaetes* sp. Of interest is the presence of zebra, which was found elsewhere only in MK1, and hippopotamus. Elephant ivory was found in five levels; in addition a very large rib, which probably came from an elephant, was found in Level 2.

Gathering contributed 16,3% to the sample. This included four tortoises, two Varanus lizards, 21 *Achatina* specimens and six freshwater bivalves. The presence of fish and bivalves indicate that the river was being drawn upon as a food source.

Unlike TS1, the contribution made by snaring is small (4,9%), and includes only hares and birds.

The non-contributor group includes ostrich eggshell (counted as 1), a baboon, three carnivores and three marine molluscs. The carnivores are of three sizes. It is possible that they represent a jackal and a leopard; the hunting-dog sized specimen could well be either a Cape hunting dog or the domestic dog, which occurs in the same level. It is most likely that the carnivores and baboon were hunted for skins.

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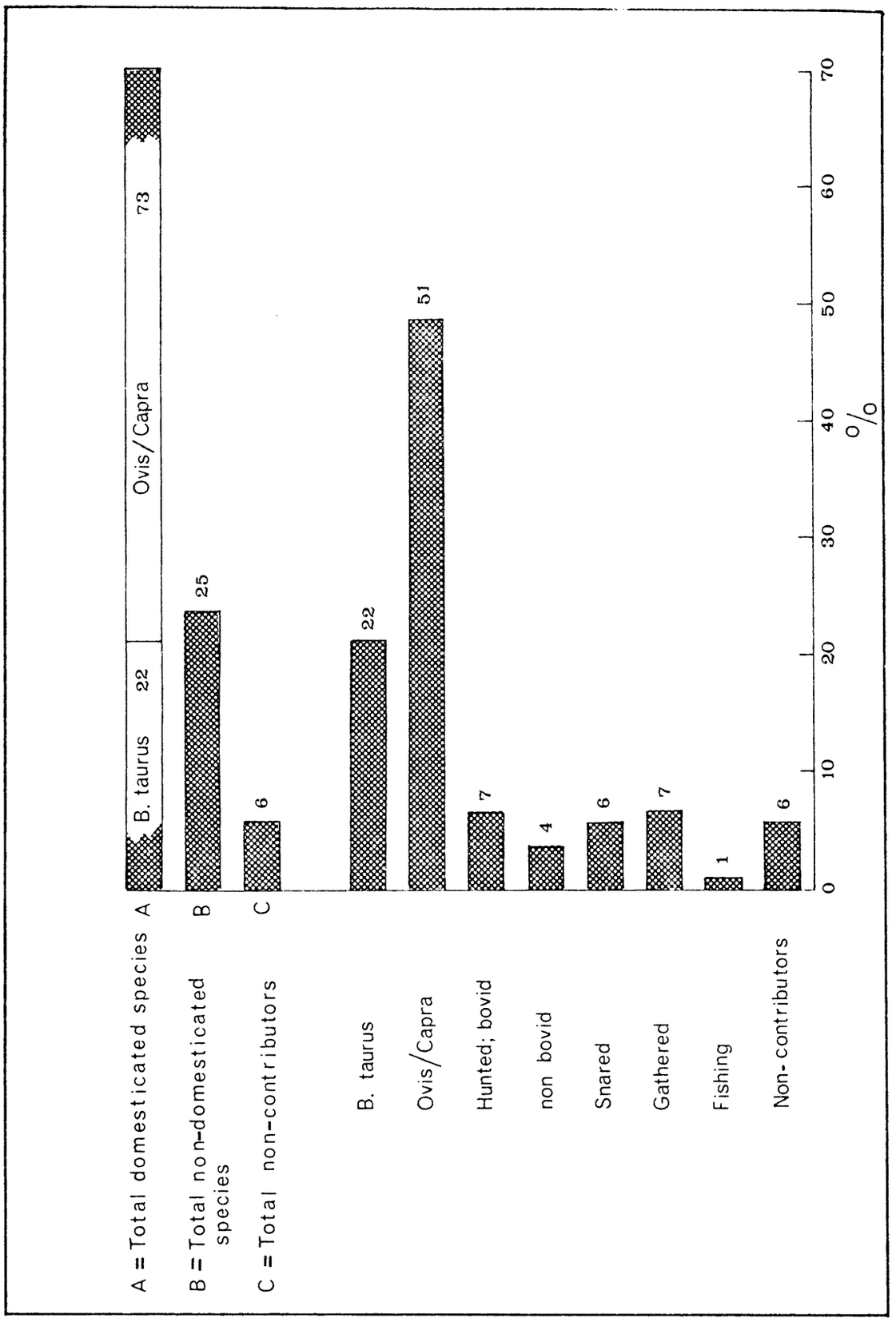

Fig. 5.4 K2/TS3/Levels 16-24. Economic activities on the basis of minimum numbers of individuals as percentages of the total TS3/16-24 sample.

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This sample thus indicates a group which drew on domestic animals for food, with hunting and gathering contributing a further 25% to the diet. Juveniles constituted 18% of the domestic bovids killed. There are a few unusual species compared to TS1, i.e. crocodile, baboon and carnivores. The fauna suggests a more affluent sector of the community than that living in the area of TS1 in that the occupiers of this area worked ivory, which is absent from TS1, and utilised their domesticated stock more extensively. In order to test whether TS1 and TS2 differed significantly in their economic basis, the contributions of the different activities were tested against each other by means of a Chi ^{2} test. It was found that the samples differed significantly at 0,1% level of significance.

	B. taurus	*Ovis/Capra*	Hunted	Snared/Gathered/ Fished	Total
K2/TS1	28	30	10	56	124
K2/TS2	62	61	24	46	193
Total	90	91	34	102	317

$\chi^2 = 16$, df = 3.

c) TS3

The sample from TS3 yielded a very wide range of species. A number of bones could only be identified to order or class level, and have been omitted from the calculations of dietary contributions. The snake and five rodents have also been omitted. Only one species of murid *Praomys natalensis*, was identified; this and the four other rodents were represented by finds of isolated teeth and could therefore have been fortuitous occurrences.

The TS3 sequence has been divided into two units, consisting of Levels 1-15 and 16-24. Both units contain a majority of domesticated species (Tables 5.3 and Figs. 5.3 and 5.4). Among the cattle bones, there is evidence of humped cattle in both units. The sheep/goat group is the largest group of domesticated bovids. In both units, 10% of the animals were hunted. The proportion of snared and gathered animals however varies, snaring and gathering being more important in the upper unit. *Achatina* is an important item in both units.

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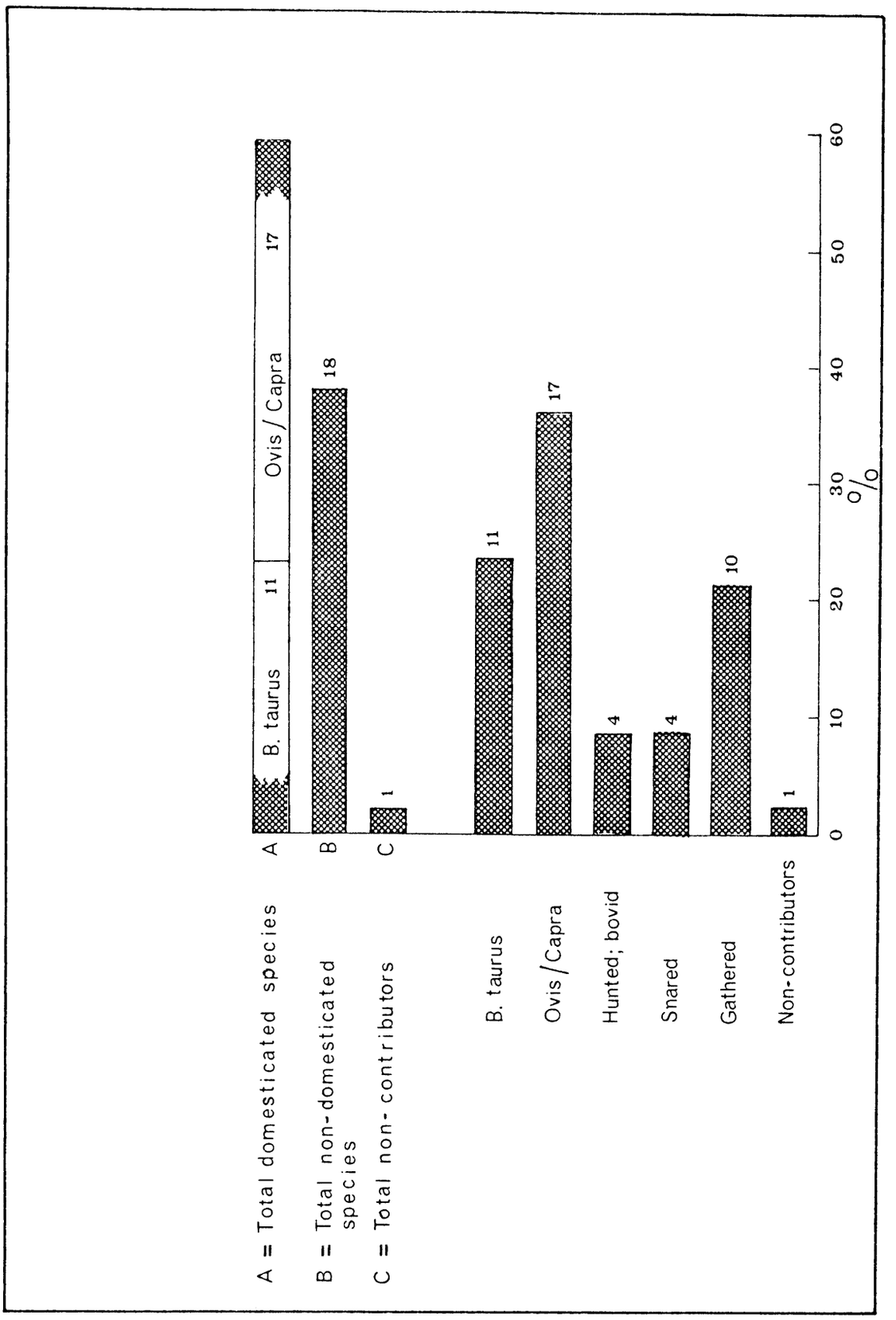

Fig. 5.5 MST/K8/Levels 1-3. Economic activities on the basis of minimum numbers of individuals as percentages of the total K8/1-3 sample.

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The non-contributor group shows two interesting features. Cowries are very numerous in both units, with an additional marine species occurring in the lower unit. Of particular interest is the large number of carnivores of various sizes occurring in the upper unit: 10 individuals were actually identified as carnivores, although three of these could not be identified as being either canid or felid. This high number suggests that there might have been some concentration on snaring or hunting of carnivores, most likely for their pelts.

Fishing was of minimal importance in both units (0,8% and 1%).

The two units are not significantly different with respect to the contribution made by the different activities. However, the relative proportion of the sheep/goat group is much higher in the lower unit than the upper one. If seen as a continuum, it appears that the people responsible for the lower levels kept more sheep and goats, and depended very little on snaring and gathering; on the other hand in the upper levels hunting, snaring and gathering were more important, with a decrease in the sheep/goat group. This was confirmed by applying the Chi 2 test to the figures for domesticated and non-domesticated animals.

In order to test whether there was a significant difference between the numbers of domesticated and non-domesticated animals in the two units, the data were tested used the Chi ^{2} test. It was found that $P < 0.1$, and that the samples were not significantly different at 10% level of significance.

	Domesticated	Non-domesticated	Total
TS3/Upper unit	230	119	349
TS3/Lower unit	73	25	98
TOTAL	303	144	447

$\chi^2 = 2.7$, df = 1.

This may indicate a slight shift in emphasis in the economic basis. The upper limit of TS3 is similar in its dietary pattern to TS2. The lower unit contains 70,2% domesticated animals; the closest match to this unit with regard to percentages occurs in MK1, where Levels 4-9 contain 68,9% domesticated animals, and Levels 10 and 11 73,6%. The percentage of non-domesticated animals is similar between these three units (24,0, 27,2 and 25,8%), but the distri-

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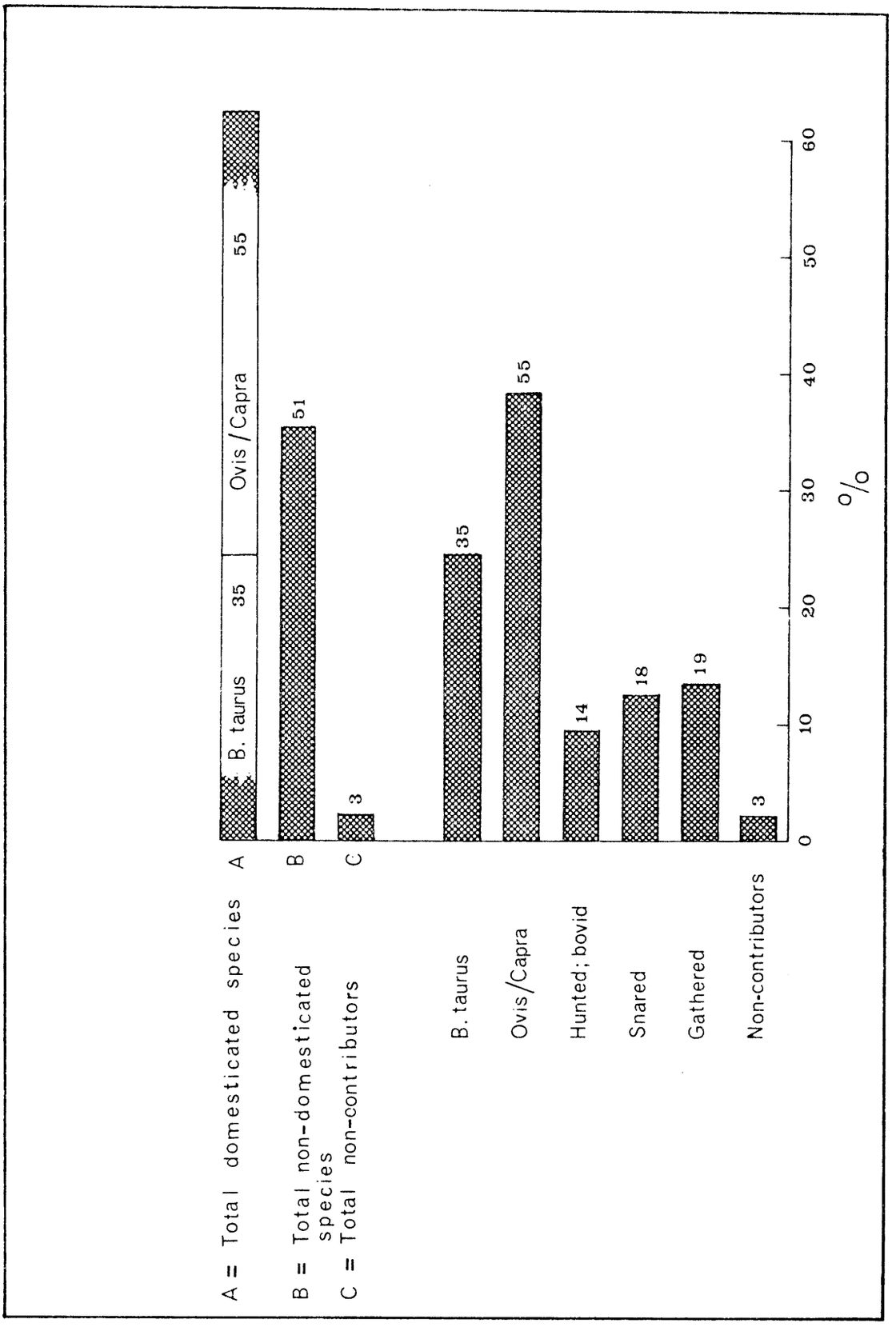

Fig. 5.6. MST/K8/Levels 4-15. Economic activities on the basis of minimum numbers of individuals as percentages of the total K8/4-15 sample.

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bution of activities within this group differs.

d) MST/K8

The lowest two levels of K8 have been equated with Phase 2 (K2); as they contain only one specimen (a cowrie), it is not possible to carry this comparison any further.

The rest of the sequence is divided into Phases 3 and 4. The economic pattern of the two phases is very similar, with domestic animals dominating both (Table 5.4, figs. 5.5 and 5.6). The sample sizes differ (47 and 144), but the percentages for the three main categories are close, i.e. domesticated animals 59,6 and 62,5%, non-domesticated animals 38,3 and 35,4%, non-contributors 2,1%. The only difference exists in the proportion of snaring and gathering; in Phase 4 the proportions are 8,5% and 21,3% respectively, while in Phase 3 they are 12,5% and 13,2%. There is no evidence for fishing at MST.

This suggests strongly that the cultural changes observed in MST/K8 occurred within a group which was dependant upon the same economic pattern.

The level of activities in the two phases was tested for similarity using the Chi^2 test; it was found that there was no significant difference between the phases even at the 95% level of significance.

	Bos taurus	*Ovis/Capra*	Hunted	Snared/gathered/ fished	Total
MST/Phase 4	11	17	4	14	46
MST/Phase 3	35	55	14	37	141
Total	46	72	18	51	187

$\chi^2 = 0.313$, df = 3, $P < 0.95$.

e) MK1

The MK1 sequence was divided into the same three phases as K8, and in this case the economic basis changed. All three phases are dominated by domesticated animals, but the proportion increases as one moves down the sequence, i.e. from Phase 4 to 2. (Tables 5.5 and 5.6, figs. 5.7-5.9).

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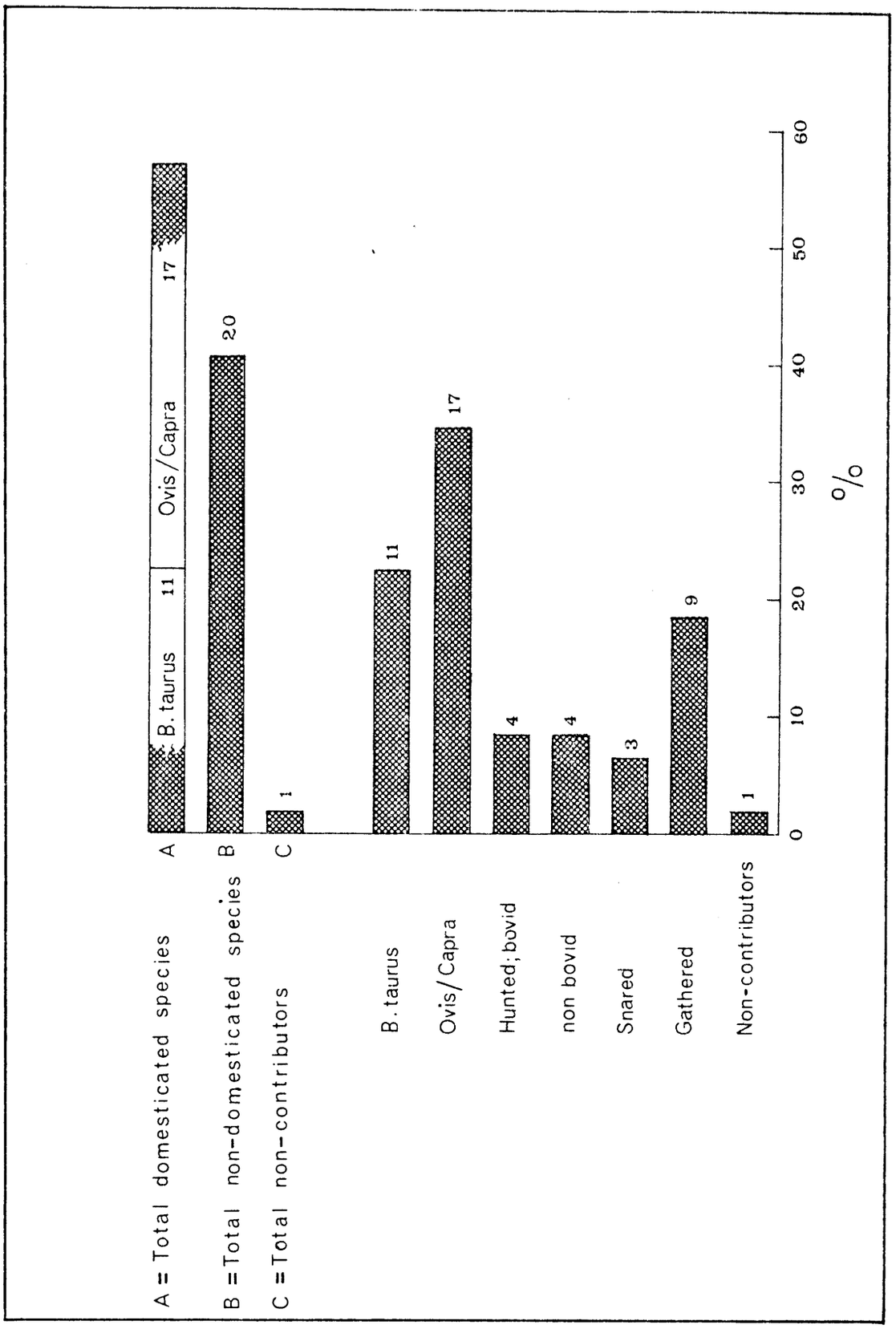

Fig. 5.7. MK1/Levels 1-3. Economic activities on basis of minimum numbers of individuals as percentages of the total MK1/1-3 sample.

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In Phase 4, domesticated animals constitute 57,1% of the sample; 40,8% consists of non-domesticated animals, the major portion of which were hunted (16,4%) and gathered (18,4%). In Phase 3, the proportion of domesticated animals has increased to 68,9%, with hunting contributing 12,6% and gathering 12,6%. Fishing contributes 0,8% to the diet.

Phase 2 is regarded as being represented by Level 11, with Level 10 somewhere in between Phases 2 and 3. On faunal evidence, Level 10 forms part of the same pattern as Level 11. The proportion of domesticated animals are 73,6 and of non-domesticated 25,8%; 0,7% of the sample is made up of non-contributors.

When the Chi Square test was applied to the two levels, it was found that there was no significant difference between the levels. It can therefore be assumed that Levels 10 and 11 form a homogenous unit and can be treated as a single unit.

	Bos taurus	*Ovis/Capra*	Hunted	Snared/Gathered Fishing	Total
MK1/10	29	41	11	12	93
MK1/11	18	26	5	11	60
Total	47	67	16	23	153

$\chi^2 = 1.195$ df= 3, $P < 0.7$

Phase 2 of MK1 therefore shows a major dependence on domesticated species, with the larger portion of this group being made up of the sheep/goat group. In Level 11 hunting, snaring and gathering contributed almost equal proportions; in Level 10 hunting is of more importance.

When the three phases of MK1 were tested, it was found that there is a highly significant difference between them at below 0.1% level of significance ($\chi^2 = 25.2$). When Phases 3 and 2 were tested, they were found not to be significantly different at the 50% level of significance.

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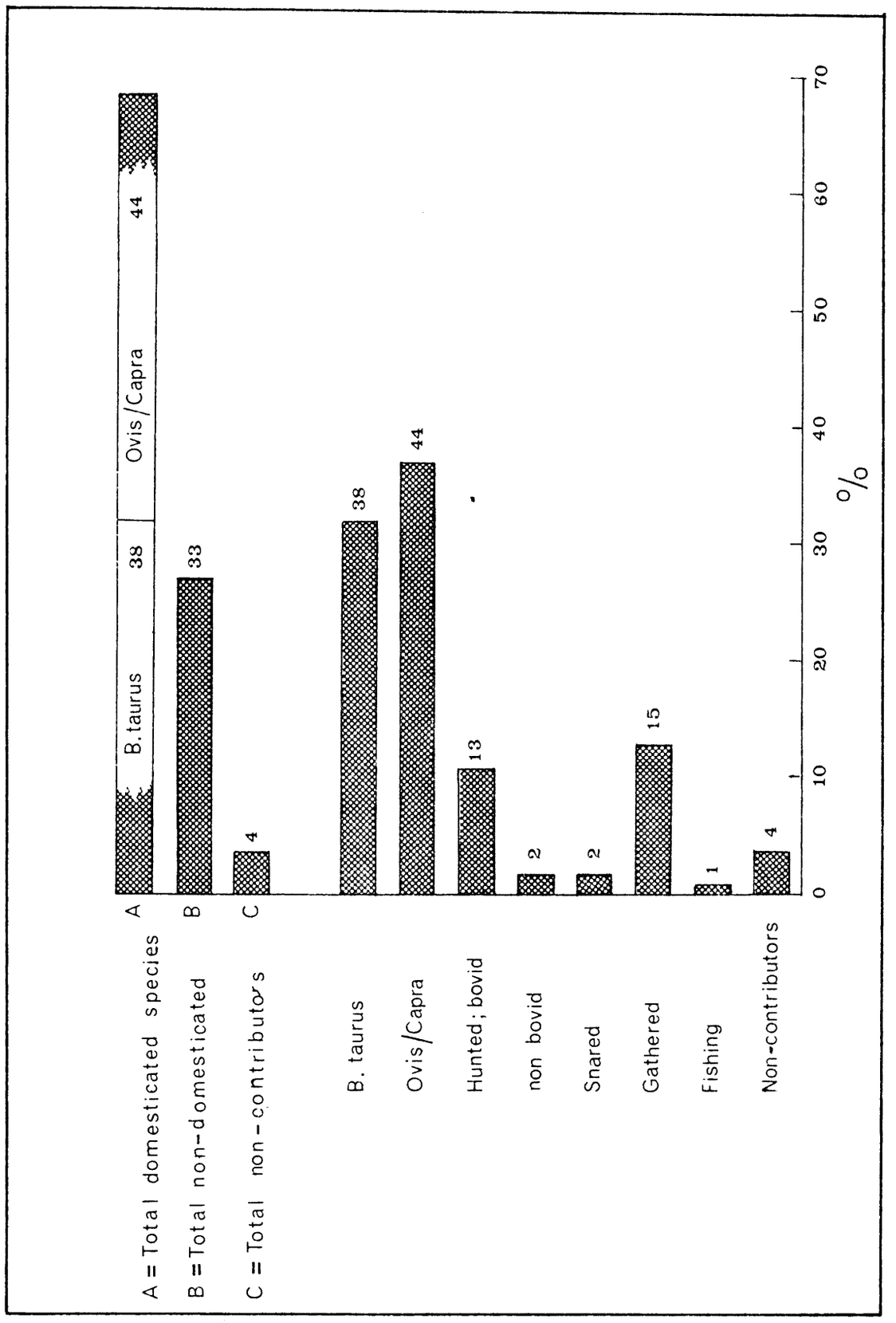

Fig. 5.8. MK1/Levels 4-9. Economic activities on the basis of minimum numbers of individuals as a percentage of the total MK1/4-9 sample.

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	Bos taurus	*Ovis/Capra*	Hunted	Snared/Gathered Fished	Total
MK1/Phase 3	38	44	7	12	101
MK1/Phase 2	47	67	16	23	153
Total	85	111	23	35	254

$\chi^2 = 2.03$, df= 3, $P < 0.5$

Thus Phases 3 and 2 show a close similarity. The question then arose as to the relationship between the K2 samples, and the samples from the three different areas of the site.

TS2 and TS3 were not significantly different at the 10% level of significance ($\chi^2 = 5.08$, $P < 0.1$) If TS1 were added to the sample, a highly significant difference was observable ($\chi^2 = 42,96$). Thus, on K2, TS2 and TS3 do not significantly differ from one another, whereas TS1 differs significantly from both of them.

MST, K2/TS2 and K2/TS3 showed no significant difference at 20% level of significance.

	Bos taurus	*Ovis/Capra*	Hunted	Snared/Gathered Fished	Total
MST	46	72	18	51	187
TS2	62	61	24	46	193
TS3	120	183	50	94	447
Total	228	316	92	191	827

$\chi^2 = 8.596$, df= 6, $P < 0.2$

MST and TS1 are significantly different at the 1% level of significance. ($\chi^2 = 11.94$, $P < 0.01$). Thus TS1 does not fit into the pattern for MST.

MST differs significantly from both MK1 Phase 4 and MK1 Phases 3 and 2.

MST/MK1 Phase 4: $\chi^2 = 10.19$, $P < 0.02$
MST/MK1 Phases 3 and 2: $\chi^2 = 13.57$, $P < 0.01$

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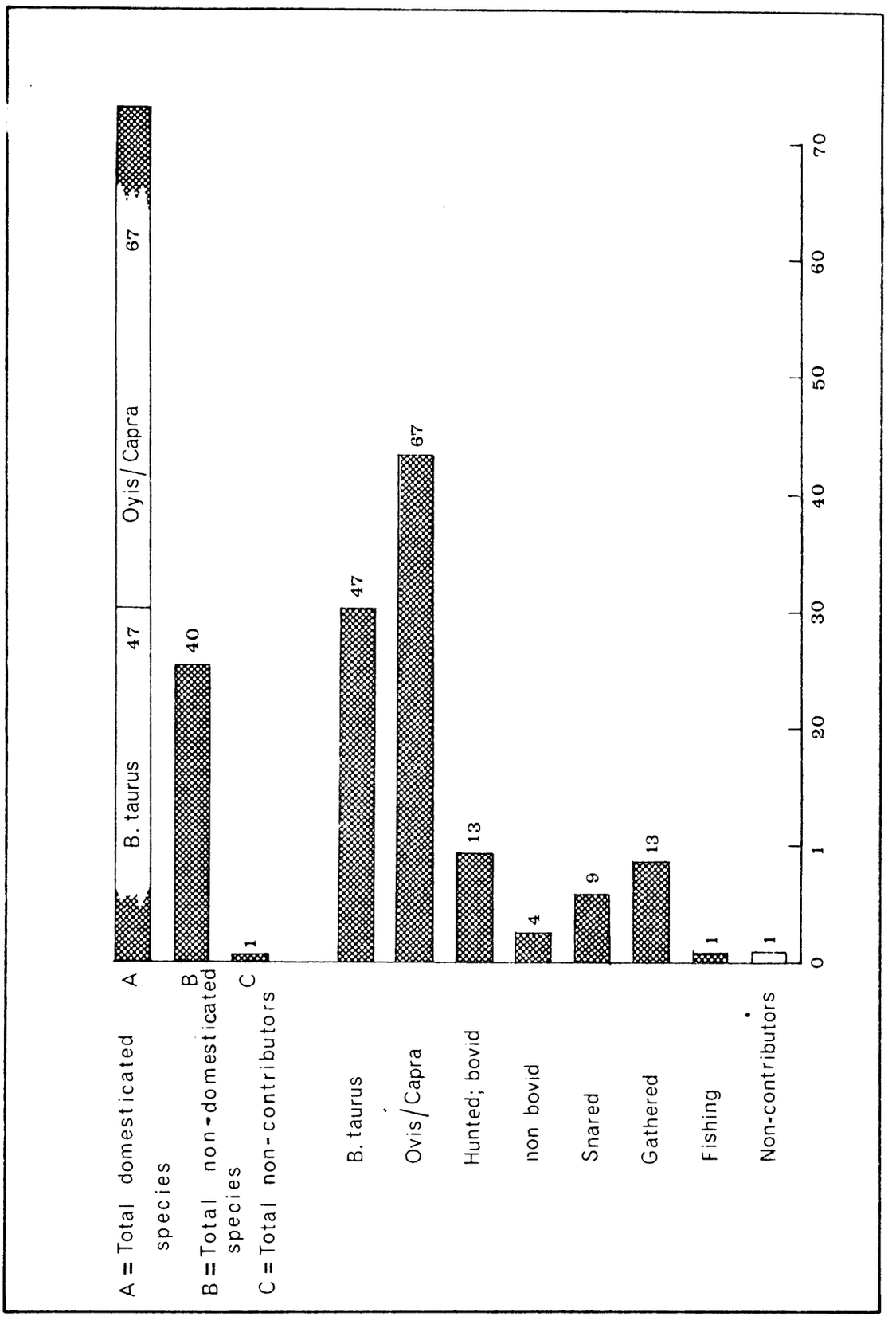

Fig. 5.9. MK1/Levels 10 and 11. Economic activities on the basis of minimum numbers of individuals as a percentage of the total MK1/10-11 sample.

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MK1 Phase 4 differs significantly at 1% level of significance from TS1; these two samples cannot therefore be related.

	Bos taurus	*Ovis/Capra*	Hunted	Snared/Gathered Fished	Total
MK1/Phase 4	11	17	15	18	61
K2/TS1	28	30	10	56	124
Total	39	47	25	74	185

$\chi^2 = 11.57$, df. = 3, $P < 0.01$

Similarly, MK1 Phases 3 and 2 differ significantly from TS1 below 0,1% level of significance ($\chi^2 = 46.31$), and MK1 Phase 4 differs significantly from MK1 Phase 3 ($\chi^2 = 22.43$).

In view of the above, the faunal samples form four distinct groups on the basis of economic activities. These are K2/TS1; MST/K8 with K2/TS2 and TS3; MK1 Phases 3 and 2; and MK1 Phase 4. It seems likely that these differences are caused by differences in the proportions of cattle to sheep and goats, as well as differences between hunting and snaring/gathering.

Excavation	*Bos taurus*	*Ovis/Capra*	Hunted	Snared/ Gathered/Fished	Total
TS1	28	30	10	56	124
TS2	62	61	24	46	193
TS3	120	183	50	94	447
MST	46	72	18	51	187
MK1	96	128	38	53	315
TOTAL	352	474	140	300	1266

Table 5.7 and Fig. 5.10 give an overall impression of the variations in the composition of the faunal sample in all the excavations.

Interpretation of economic activities in terms of diet

In order to define the dietary contribution of the fauna from Greefswald, the minimum number counts must be converted to meat weights. This requires that each species be allocated a weight value which represents the amount of meat which one carcass could be expected to yield. To obtain a meat weight value for a species, weight ranges given in the literature have been used.

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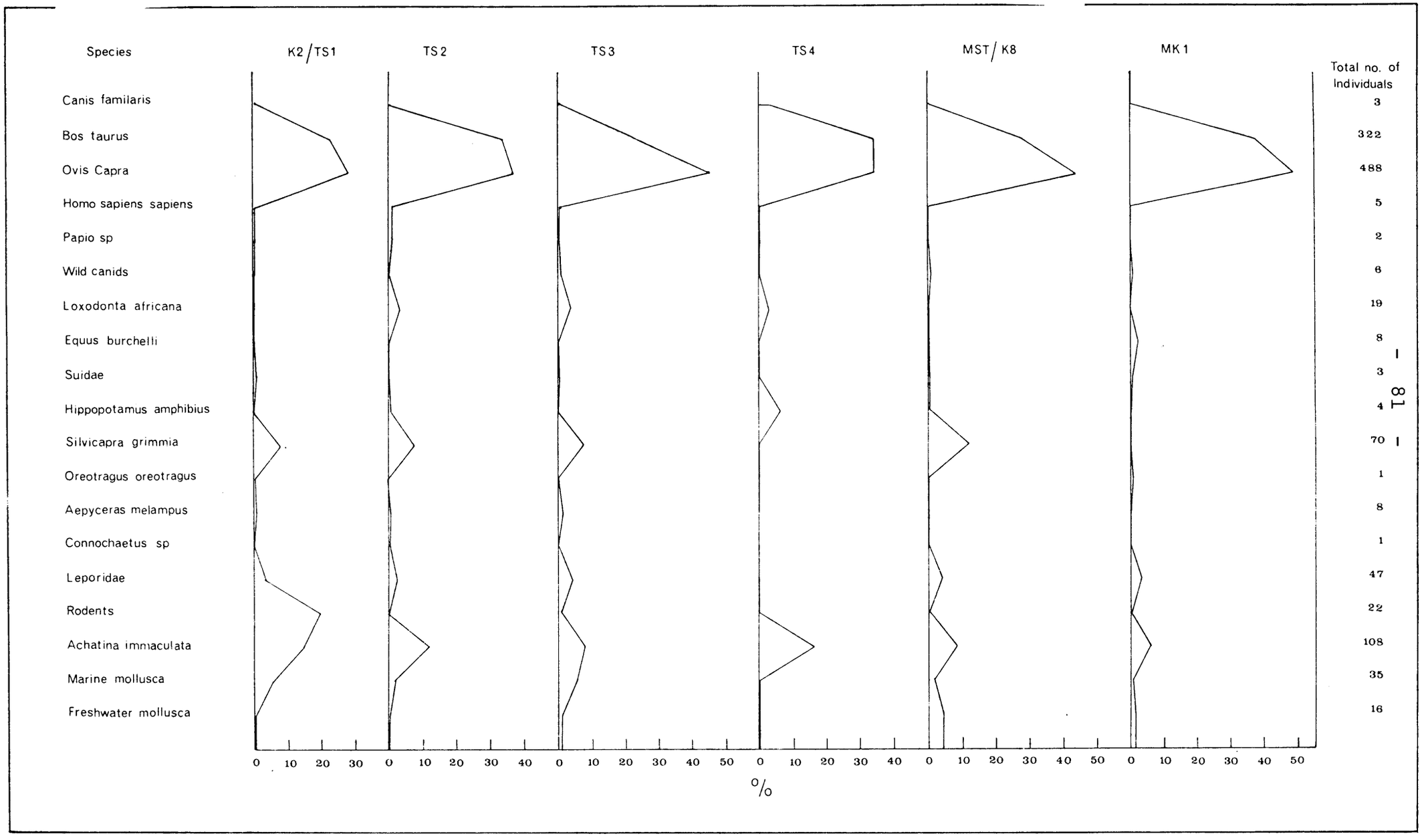
Fig. 5.10. Percentage of species present in each excavation.



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In most larger mammal species there is a considerable difference between the weight of adult males and adult females. Since it is not possible to divide the faunal sample according to sex, a mean value has been taken for each species. The meat weights for wild animals which have been used are those published by Brain (1974(a)), Smithers (1971 - *Aethomys* and *Praomys)*, and those provided by T. Crowe of the Percy Fitzpatrick Ornithological Institute (Guinea-fowl), and Brain (pers. comm.). An exception is the impala meat weight; in this case I have used data collected by myself in 1970 in the Kruger National Park.

Epstein (1971) gives male and female live weights for many of the breeds he describes. For sheep and goats he gives the following weights for local breeds in the northern Transvaal and Mocambique/Natal:

	Ram	Ewe	Mean weight
Pedi sheep	-	40 kg	40 kg
Landim sheep (Mocambique)	46	28	37
Nguni goat	40	30	35
Landim goat	32	24	28

I have chosen 32 kg, the mean weight for Landim sheep and goats combined, as the standard weight for the sheep/goat category. Newborn sheep weights available give an average of 5,4 kg; I have chosen to calculate juvenile sheep/goat weights, i.e. weight at 24 months, as 80% of adult weight, i.e. 25,6 kg. This is an arbitrary choice, although a modern two-year old sheep slaughters out at about 30 kg.

The choice of a live weight for cattle presented several possibilities. Epstein (1971), Mansvelt and Skinner (1962) and Mason and Maule (1960) give the following weight ranges for different breeds:

	Male (kg)	Female (kg)
Epstein: Nguni cattle, Natal & Swaziland	500	340
Bapedi cattle	680	440
Mansvelt & Skinner : Ba Venda cattle, sweet veld	668	328-334
Mason & Maule: Tonga	500	300
Mashona	-	±320
Tswana (ox: 532)	576	468

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	Male (kg)	Female (kg)
Tuli (Ngwato)	±790	±525
Nguni (ox: ± 650)	550	±350
Bapedi	680 (max)	520 (max)
Africander	745	525

(Mason and Maule provided considerable information on absolute size of many of the breeds which they discuss).

The Pedi (BaPedi) cattle tend to be larger than the more southern Nguni cattle. The weights given by Epstein are for animals on improved grazing. Mansvelt and Skinner calculated their cattle weights on measurements taken on unimproved cattle on natural (sweet veld) grazing in the Sibasa area. For this reason, although the weights are lower, I have chosen to take a mean live weight of 498 kg for an adult animal, and 198 kg for a two-year old, i.e. juvenile, animal, utilising the latter authors' data.

Research by Joubert and Dreyer (1965) suggests that, under certain circumstances, there is nothing to be gained by castrating male calves in order to improve slaughter weights. Their experiments showed that bulls and steers had reached the same weight at a slaughter age of 14 months; information on whether a higher weight would subsequently be obtained is not available, although figures quoted by Mason and Maule do suggest that this is the case. The latter authors imply that the preferred slaughter age for unimproved cattle is about six years.

It has been suggested by White (1953(a)) that only 50% of a carcass is usable to people with "primitive" butchering techniques. In his work on American bison, he regards the head, skin, bones and viscera as being "waste", and thus calculates meat weights on

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the basis of 50% of the live weight. A number of workers, including myself, feel that this is too low a proportion. Among the San people, intestines and other parts of the viscera are eaten or utilised in other ways. In addition, bones are cracked for marrow. We know that marrow was extracted from the bones at Greefswald; there is a good likelihood that viscera would also have been partly utilised as food. Mason & Maule (op.cit. :30,41), suggest 52%-57% of body mass for dressed weight of Barotse and Nguni cattle. In order to test the hypothesis of 50% utilisation, I returned to unpublished data collected by myself during a visit to the Kruger National Park in 1970, and Lebowa in 1976.

During the visit to the Kruger National Park, the limb bones and skulls of 48 impala were collected for comparative material. The dead weights and cleaned carcass weights of 38 of these specimens were also recorded; the carcass weight was the weight of the skinned and gutted carcass without the head.

The mean dead weight of the impala was 40,35 kg; these yielded a mean meat weight, of 19,17 kg. The mean weight loss resulting from the cleaning of the carcass was 42,95%; this means that 57,05% of the carcass was made up of meat and bones.

During a visit to Arabie Agricultural College in Lebowa, we obtained a complete, five year old Pedi cow. The live weight of the cow was 310 kg; the carcass was skinned and gutted and the meat cut off from the bones. The skin and offal, meat and bones were weighed. It was found that the skin and offal together constituted 140,6kg or45,2% of the live weight; the bones made up 66,9 kg or 21,6% of the live weight, and the meat 102,5 kg or 32,9% of the live weight. It is hoped that further similar experiments will be carried out in the future; at present however this evidence suggests that 50% of the carcass weight is indeed a reasonable reflection of the meat potential of a carcass. This percentage of the body mass has therefore been used throughout the present study.

The following standard meat weights have been utilised per species (Table 5.8). In the cattle and sheep/goat categories, the group is divided into juvenile and adult animals. "Juveniles" are those individuals with unfused epiphyses or those with a third molar which is unerupted or incompletely erupted. Elephant and

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Fig. 5.11

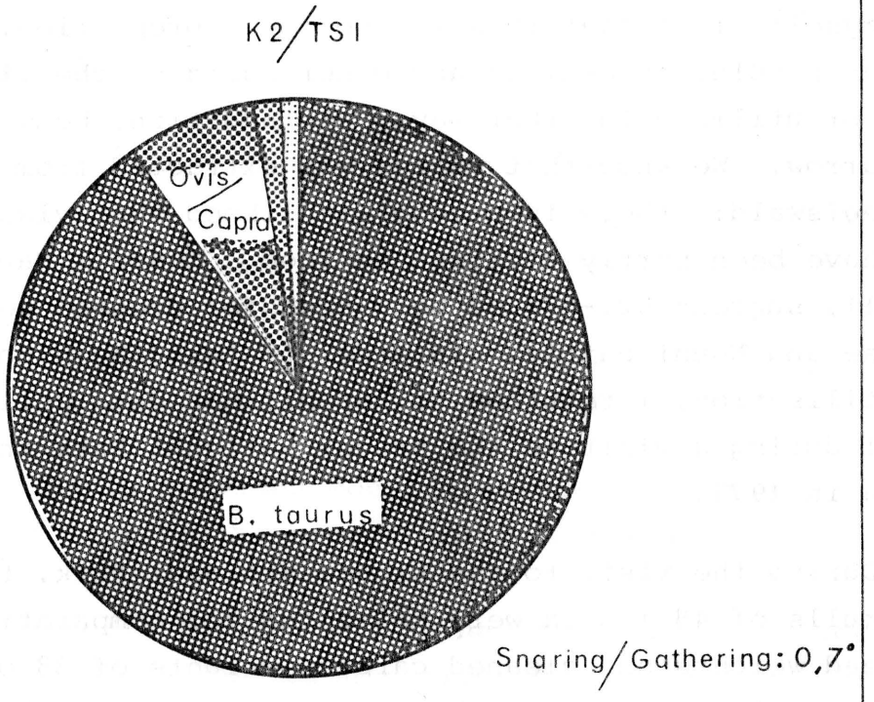
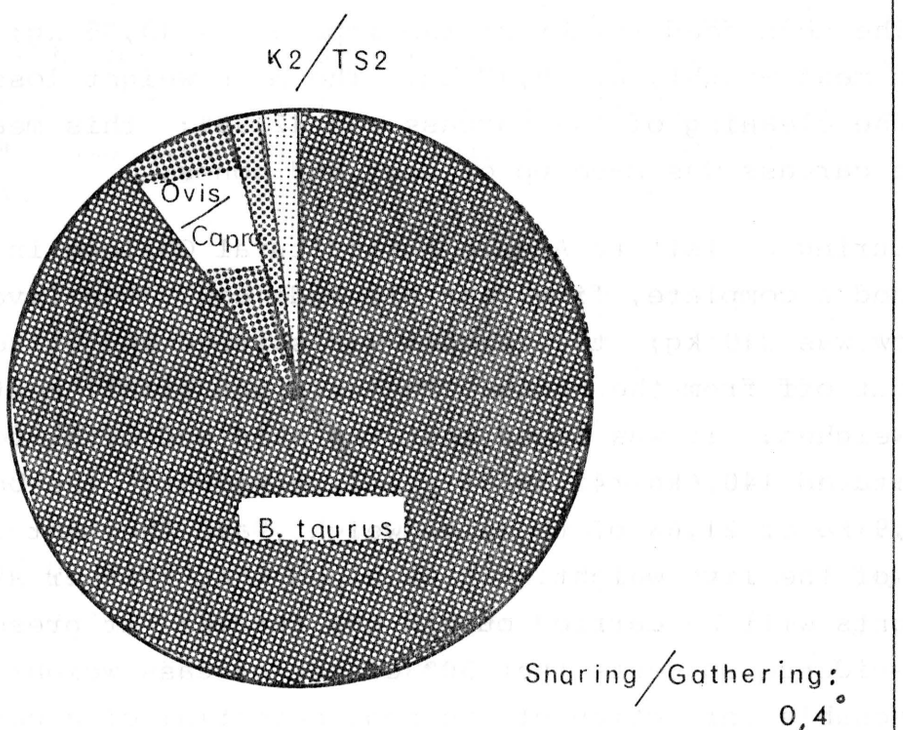


Fig. 5.12



Figs. 5.11 and 5.12. Percentage contribution to diet of K2/TS1 and K2/TS2 in terms of kg of meat contributed by each major economic activity.

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hippopotamus have not been included in the calculations because of their disproportionate size.

Fish and mollusca have not been expressed as meat weights.

The contributions made to the diet by the various species is as follows. All weights are in kilograms; the results are presented diagramatically in Fig. 5.11-5.18.

TS1 yielded a faunal collection which showed significant differences when compared to all the other samples. The emphasis in activities lay with hunting, snaring and gathering. However, when the results of these activities are expressed as meat weights, it becomes apparent that 97% of the meat consumed came from domesticated animals. (Table 5.9). The sheep/goat group outnumbers the cattle numerically, but it yielded only 7.1% of the total meat yield of domesticated animals. Wild bovids contributed 1,4% of the meat consumed by the TS1 peoples; this leaves a very small amount, i.e. less than 1%, of the total meat weight contributed by the hunting of non-bovids and by snaring. (Fig. 5.11). If TS1 is to be regarded as a hunting-snaring-gathering sample, let us see how much domesticated animals contributed to those other samples which were numerically dominated by domesticated animals.

In the TS2 sample, 96% of the meat in the diet came from domesticated animals, only 6,5% of which belonged to the sheep/goat group. Hunting contributed a further 3,3%, while snaring and gathering contributed very little. (Table 5.10 and fig. 5.12).

The TS2 sample is 50% larger than the TS1 sample. Thus, although the percentage contributed by domesticated animals is slightly less than in TS1, the numbers of individuals and the weight of meat involved is much larger. The high proportion of meat contributed by hunting is due to the presence of one zebra.

TS3

The meat contribution to the diet was worked out separately for the two units (Table 5.11).

In the upper unit, 98.2% of the meat came from domesticated animals; of this amount, 89% came from cattle and 9,2% from the sheep/goat group. In the lower unit, 98,7% came from domesticated animals; 15% of this amount came from the sheep/goat group.

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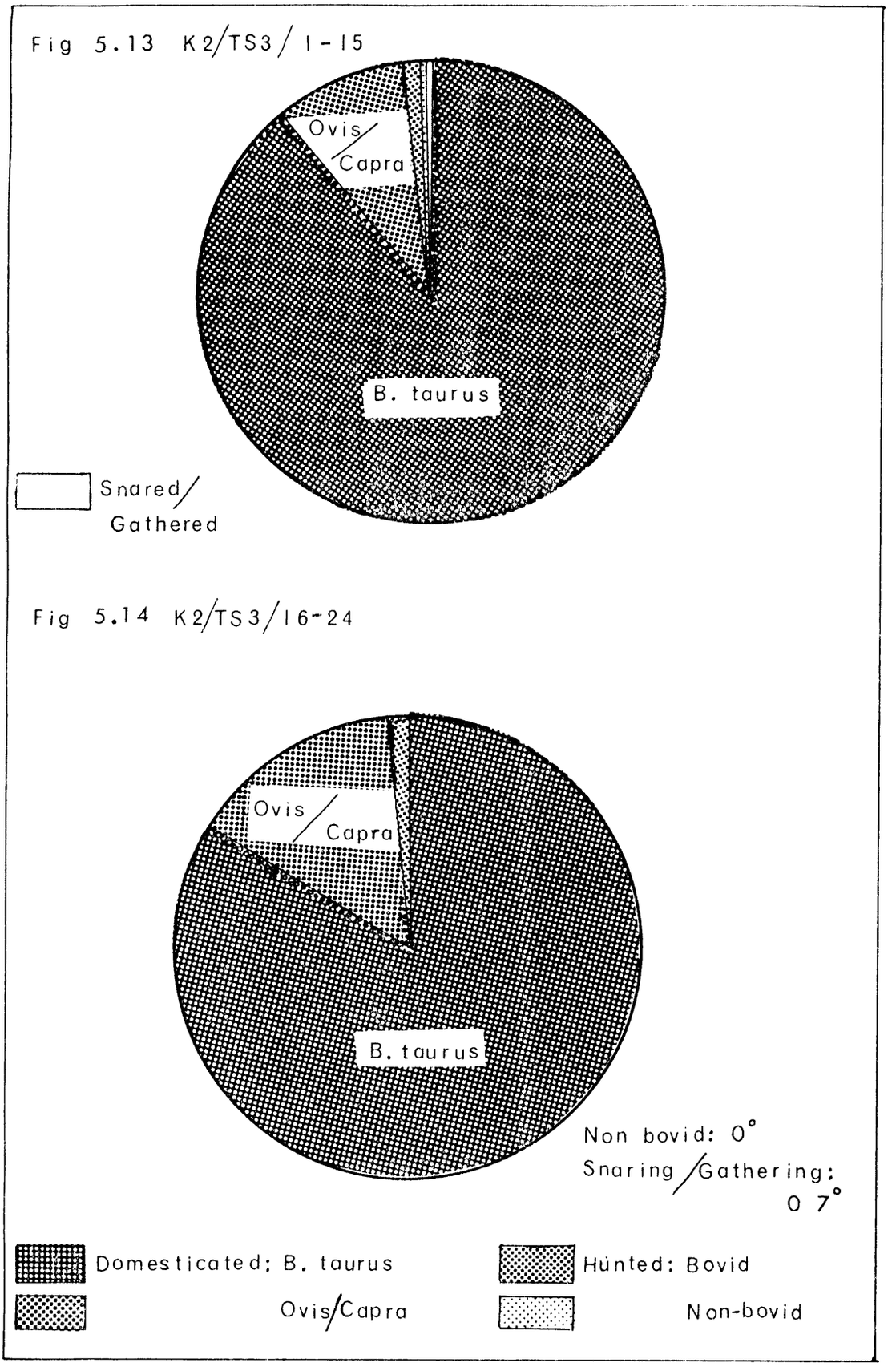

Figs. 5.13 and 5.14. Percentage contribution to diet of K2/TS3 in terms of kg of meat contributed by each major economic activity.

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These figures support the conclusion that the proportion of sheep/goat to cattle increases in the lower levels to the extent that they affect the economy of the group.

In the upper unit, 28 wild bovids are present. The small bovids (duiker and Bov.I) yielded more meat (171 kg) than did the six impala (120 kg). This suggests that the duiker sized bovids were a small but consistent contributor to the diet. In the lower unit, only the small bovids are present. The percentage contributed by the wild bovids is similar in both units, i.e. 1,3 and 1,2 % respectively.

Non-bovids made a very small contribution in both units. Of interest is the large number of hares and guinea-fowl sized birds in the upper unit; they appear to have been favourite foods.

A large number of mollusca are present.

The proportions contributed to the diet are depicted graphically in fig. 5.13-14.

MST/K8

Although it has been shown that there is no significant difference between Phases 3 and 4 in K8, the dietary results for these two phases are shown separately. (Table 5.12).

No significant difference exists between phases 3 and 4 with respect to activity patterns or dietary contributions of species. In both phases, domesticated animals contributed 98% of the meat in the diet. This is the same contribution as in the lower unit of TS3. In Phase 3 the actual number of the sheep/goat group is lower than in Phase 4. It has already been mentioned that the only difference between the phases lay in the lower proportion of snaring in Phase 4. More individuals were taken by snaring in Phase 3, giving a higher meat yield than in Phase 4. Guinea-fowl sized birds are important in this respect in Phase 3. Hunting of small bovids made a reasonable contribution to the diet in Phase 3, providing 109 kg of meat (1,5% of the diet).

The two samples are very different in size. Proportions are relatively similar, but the actual meat weights involved are very different - Phase 3 represents 6926,5 kg of meat, while Phase 4 represents 2283,6 kg; the total meat yield of the two Phases is

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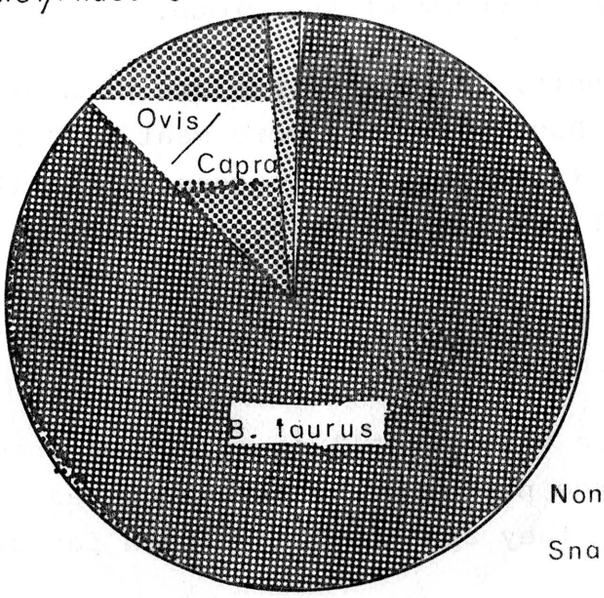
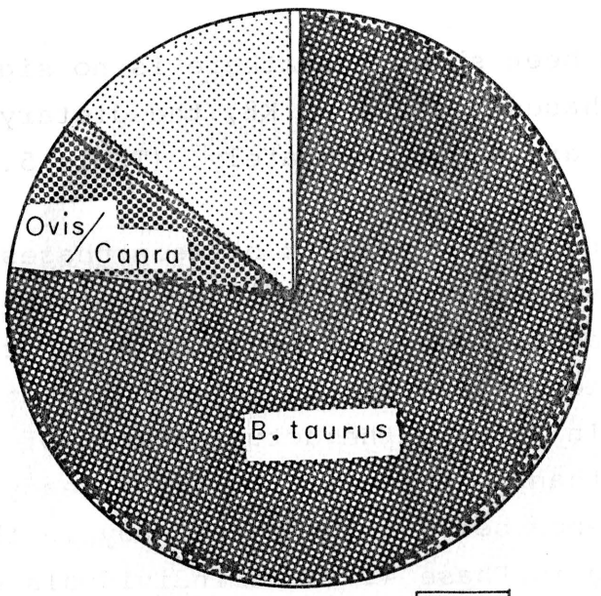
Fig. 5.15 MST/Phase 3



Non-bovids: 0°

Snaring/Gathering: 0,4°

Fig. 5.16 MK1/Phase 4



Snaring/Gathering

Domesticated: B. taurus

Ovis Capra

Hunted: Bovid

Non-bovid

Figs. 5.15 and 5.16. Percentage contribution to diet of MST/Phase 3 and MK1/Phase 4 in terms of kg of meat contributed by each major economic activity.

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thus 9210,1 kg. These aspects of the diet are shown graphically in Fig. 5-15, which shows the meat contributions to Phase 3.

MK1

The proportion of domesticated animals increases as one moves from Phase 4 to 3 to 2. (Table 5.13; fig. 5.16-5.18). This is reflected in an increase in the quantity of meat from domesticated animals in Phase 3. The proportion of meat decreases slightly in Phase 2, however. This is because of the presence of three zebra, which between them make up 5,1% of the meat. In Phase 2, the proportion of meat contributed by adult cattle decreases, while the proportion of juveniles increases. In addition, the proportion of meat provided by the sheep/goat group increases. This increase in the sheep/goat category is similar to the situation in the lower unit of TS3.

Hunting is a useful source of meat in all Phases, with an emphasis on the small bovid group and the presence of zebra. An isolated zebra occurred in TS2; in the MK1 sample, however, a total of seven individuals occurred, one of which was a juvenile. Thus the MK1 people were supplementing their meat supply quite considerably by hunting this animal.

Snaring and gathering are not major contributors; it is noticeable that the contribution by guinea-fowl sized birds is negligible, as is that of the hares. The dietary variations are shown in Fig. 5.12; the total meat yield calculated for MK1 is 23094.6 kg.

In defining the economy of Greefswald in terms of activities, the calculation of minimum numbers of individuals and then of activities indicated that the relative importance of activities varies from sample to sample. With the exception of TS1, herding was the major economic activity, with hunting, snaring and gathering playing varying roles in each sample. However, if the same data are expressed in terms of meat yield, one is left in no doubt as to the source of food at Greefswald. In all the excavations except MK1/Phase 4 the meat provided by domesticated animals constituted more than 90% of the diet. In fact, the actual contribution is 96% in six of the nine units. It can therefore be said that the inhabitants of Greefswald obtained virtually all their meat from their flocks and herds.

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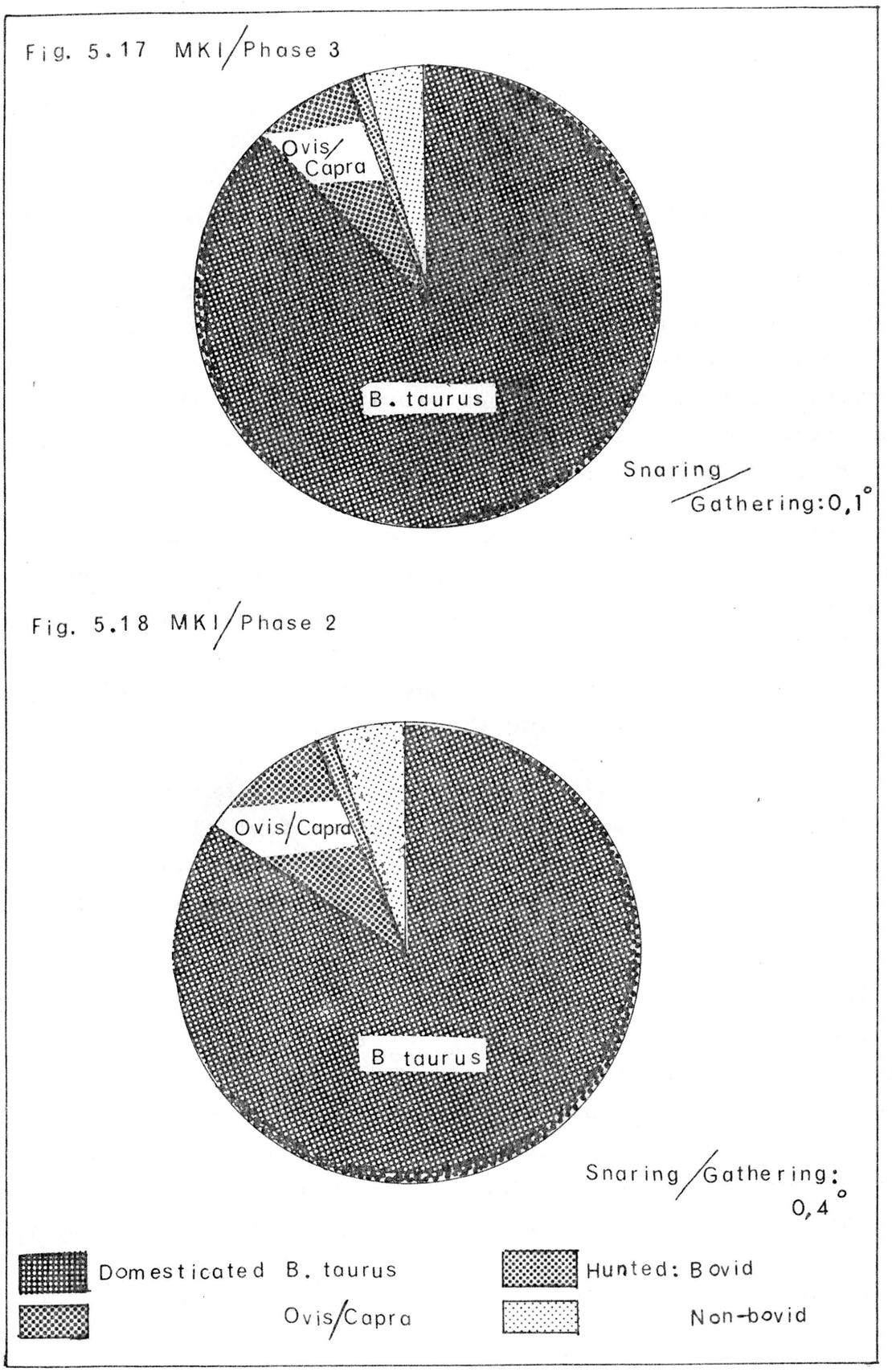

Figs. 5.17 and 5.18. Percentage contribution to diet of MK1/Phase 3 and MK1/Phase 4 in terms of kg of meat contributed by each major economic activity.

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The total meat yield from the excavations is shown below. The Greefswald sequence covers between 150 and 200 years. If we accept 150 years as the mean time span involved, we can calculate the annual meat yield from the total meat yield, using 150 as the divisor.

EXCAVATION	TOTAL MEAT YIELD (kg)	ANNUAL MEAT YIELD (kg)
TS1	6305,6	42,0
TS2	13988,4	93,3
TS3	27315,8	182,1
K8	9689,16	64,6
MK1	23094,57	154,0

The bone sample from TS3 probably represents part of the refuse of the K2 community; it is not possible to relate this to settlement or group size in any way.

TS1 and TS2 relate to ill-defined occupation areas; hut remains were not adequately preserved to allow the calculation of group sizes. It is however unlikely that the shallow deposit of TS1 and TS2 are the result of so long a period of accumulation.

If the section of MST/K8 is examined, a series of hut floors is clearly visible. Many of these floors directly underlie each other; this suggests that the series of floors which one sees is probably the result of the same family re-furbishing their hut floor. If the superpositions and juxtapositions of related fragments are taken into account, six specific hut units can be identified. This is a likely figure for the sequence, since 150 years could be expected to encompass approximately five generations, and thus five hut phases of twenty five years each.

If we assume that six huts generated enough bone waste to represent 9689.16 kg, we can suggest that each hut, and therefore each family group, had access to 1614.9 kg of meat during their twenty-five year phase. If each hut served a group of an average of 6 persons, this results in a very low annual meat consumption of 10,8 kg per person per year, a figure which appears to be unrealistic.

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Using the same criteria, MK1 appears to represent the remains of a settlement involving five hut units; one of these units appears to cut across the phase subdivision. This suggests an intake of 4618.9 kg of meat per hut unit. Two of the huts appear to be contemporary. The annual per capita intake would be 30.8 kg of meat. In the case of the hut which generated the bone waste found in 9(ii), the waste represents 914,6 kg of meat, which would give an extremely low per capita annual intake of 6,1 kg.

The above calculations indicate that attempts to calculate per capita intake are not reliable, and will fall far below a reasonable estimate of meat consumption. However, if data were available on known meat intake, it would be possible to calculate the amount of meat which could be expected to occur on a site of given size.

Information on meat intake of Bantu pastoralists is not easy to find. However, Monod (1975:115-116) quotes data collected by L.H. Brown in 1971 for Kenyan pastoralists. The original reference was not available, so the information quoted by Monod has been used. Deshler (1965) quotes data for a group of cattle-keeping people in the north-eastern Uganda, the Dodos.

Brown was working among people of the Kenya savannah who depended very heavily on milk. The importance of milk is discussed below; for the moment only meat is considered.

Brown calculated a family unit of 6,5 persons required 15 000 calories per day. Taking an average for milk and meat ratios, he translated this into a requirement of 5 606 litres of milk plus 704 kg of meat per family per year. If milk is ommitted, the annual requirement to maintain a minimum pastoral standard of living is 2,5-3 "Standard Stock units" per person, i.e. 5-6 cattle or 25-30 goats per person representing a live weight of 1134-1360 kg per person. This represents the available meat "on the hoof" per person in the group. His original calculation of 704 kg per year, i.e. 108.3 kg per person per year as representing 25% of the diet of a group of 6,5 appears to be a reasonable estimate of meat requirements.

Utilising the figure of 108.3 kg per person per year the following results are obtained for MST/K8 and MK1.

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Excavation	No. of groups	Estimated annual meat weight per group	Meat wt. for 150 years (649.8x25x no. of groups)	Meat wt. represented by sample	% of Est. meat wt. repr. by sample
MST/K8	6x6	649.8	97470.0	9689.16	9.9
MK1	5x6	649.8	81225.0	23094.57	28.4

This would suggest that we are retrieving evidence for between 10% and 29% of the total mass of meat possibly consumed by the Greefswald people.

Deshler (op.cit.:164) on the other hand calculates the maximum per capita annual meat intake of the Dodos as 20.45 kg (50 lbs) of beef. This group however utilises blood and milk as an addition to their diet; the basis for its subsistence is in fact grain (sorghum, millets and maize). Goats, which also contributed to the meat eaten by the Dodos, were not taken into consideration in Deshler's calculations. I also feel that his calculation of 81.6 kg (200 lbs) of meat from a 245 kg (600 lb) animal is too low. This group inhabits an area with a higher rainfall than Greefswald (440-612 mm per year).

Deshler maintains that the cattle are kept as emergency rations in times of drought, meat being eaten only once a week or less. However, his observations are interesting with respect to the Greefswald situation in which the original calculation of per capita annual meat intake was 10.8 kg per year. This suggests that the Greefswald calculations could perhaps be regarded with less scepticism than was originally thought; however this is a problem which can only be solved by sound field observations among African peoples in the study area.

The question of milk in the diet is difficult to resolve. Bantu peoples do utilise milk from their cattle, but taboos regulate who may drink the milk. Several of the cattle figurines from Greefswald show well developed udders; this I believe indicates that milk was of importance to the Greefswald people. It is however impossible to calculate the effective contribution of milk. Mansvelt and Skinner (1962:3 and 9) record that the BaVenda cattle are on average not good milk producers, a yield of a pint (0,5 l) per cow per day being regarded as an average yield. The authors mention that the best milk producers are milked into wooden pails (sing:

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muliso). If milk were important at Greefswald, it is interesting to consider whether special vessels were connected with milk and milking.

The faunal remains from Greefswald thus reflect a diet based on herding. Those remains which can be identified as cattle, sheep or goat have been further examined for evidence of breeds and of animal husbandry, and provide the basis for the next chapter.

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CHAPTER 6.

INTERPRETATION OF THE GREEFSWALD FAUNA 2: DOMESTIC SPECIES AND ANIMAL HUSBANDRY AT GREEFSWALD.

Gardner stated that the people living around Mapungubwe Hill possessed only sheep and cattle, and that two breeds of cattle were present, i.e. Africander and Sanga. The bones from Greefswald tell a fuller story than this; they supplied evidence of four domesticated species, and raised a number of interesting possibilities with regard to Iron Age animal husbandry.

I. Sheep and goats at Greefswald

The distinction between sheep and goats is difficult in the archaeological record. Two major literature sources are available to the research worker, i.e. Boessneck, Müller and Teichert (1964) and Boessneck (1971). It was felt that, before the criteria laid down in these publications were used, they should preferably be tested against South African material. Due to lack of comparative material this could not be done during the course of the current research project. Individuals belonging to one or other of the two species were however identified on the basis of the following criteria:

a) Horn cores - shape, and size. Ewes do not normally carry horns; in some breeds, including Landim and Pedi sheep (Epstein, 1971, Vol. 2:137-8) neither sexes carry horns. In goats both sexes carry horns, with the horns of females being less developed. In sheep, the horns curl outward from the skull, then downward. In goats, the horns tend to rise straight from the skull then point back towards the rump; they also have a shallow S-twist on them. The horns of female goats are generally smaller than those of male goats. Goat horns are keeled and are compressed laterally.

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b) Shape of the coronal/frontal and lamboid sutures of the skull. In sheep, the coronal-frontal suture is reputed to be Y-shaped, and the lamboid straight. In goats, the coronal-frontal is T-shaped or straight, the lamboid is curved. This characteristic was not found to be very satisfactory; it was tested against a small sample of sheep skulls available at Onderste-poort Veterinary Research Institute, and was found to be very variable. However, where skull fragments preserved clear Y- or T-shapes they were classified accordingly.

c) A more difficult criterion to use was utilised in the later stages of the project. This was the angle of the mandi-bular ramus; in sheep the angle is obtuse, whereas the angle in goats is virtually 90^{o}. (Boessneck et. alia (1964): 34-35) None of the results were satisfactory enough to use.

d) An unsuccessful attempt was made to use differences be-tween the atlas vertebrae, but did not prove practicable because of insufficient comparative material.

e) The shape of terminal phalanges of the two species is somewhat different. This criterion was applied with some caution.

f) It would appear from the complete lack of information in the literature that sheep and goat teeth cannot be seperated. Throughout the project such a separation was attempted; it appears that some small differences do exist, but they need to be checked out against a large and reliable comparative collection.

Using these criteria, the minimum number of individuals of sheep and goats positively identified in the excavations is shown in Table 6.1

It can be seen from the above that only 21% of the total Ovis/Capra group could be identified to genus level. The genera occur in roughly a 2:3 ratio; to calculate this ratio more accurately it would be essential to go back to and to identify all the post-cranial remains.

The shape of horn cores indicates quite clearly that both sheep and goats were present at Greefswald. Strong supportive evidence for the presence of both species is also found in the clay animal figurines (Chap 11:315).

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The age distribution of sheep/goats at Greefswald

An important aspect of the utilisation of flocks and herds is the age at death of animals. By calculating the ages of animals represented in the assemblage, it might be possible to define a butchering pattern and the flock age composition. Two methods of ageing can be used; these are based on tooth eruption patterns and on epiphyseal fusion. Published data exists on both aspects, i.e. Silver (1971:296 , Noddle (1974). Silver lists tooth eruption ages of improved and wild breeds of both sheep and goats; there is a marked difference between the relevant ages, and between sheep and goats; the information is given in table 6.2 and 6.3.

The tooth eruption ages given by Silver for "wild" or unimproved goats fall between those given for improved and unimproved sheep and improved goats. In the absence of observations on South African material, these are the values used in the following pages. Silver notes that the teeth of sheep come into wear 3-5 months after eruption. I have therefore listed unerupted teeth according to the ages given in Table 6.2, but have added 4 months to the ages of all teeth in wear.

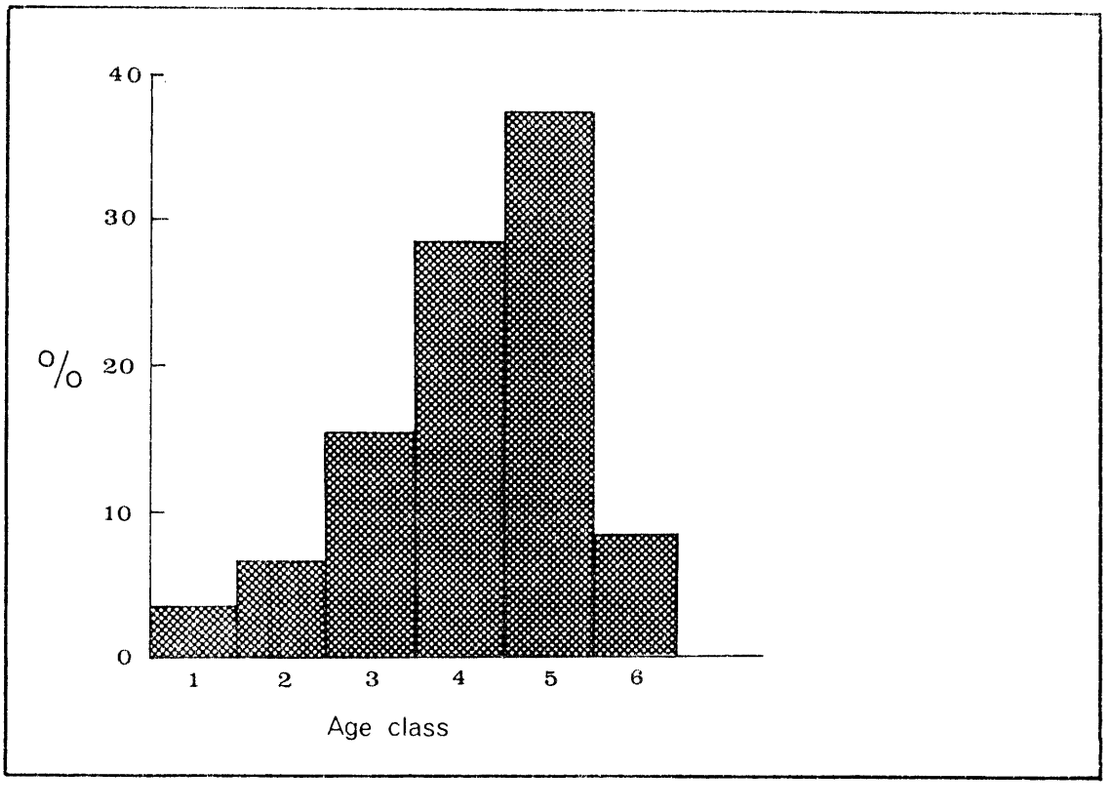

Fig. 6.1. Age distribution of *Ovis/Capra* in Greefswald assemblage on basis of tooth eruption patterns.

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Rautenbach (1971) undertook a detailed study of tooth eruption and wear in springbok (*Antidorcas marsupialis*), during which he suggested six age classes based on tooth wear. Vrba (1973) suggested sub-divisions of Class V on the basis of further study of springbok teeth.

In order to divide the Greefswald Ovis/Capra group into ages, the work of the above two authors was taken into account, and utilised in conjunction with the work of Silver. The following age classes have been utilised:

Class I Deciduous teeth show light or no wear; $M\bar{1}$ unerupted.
Age: less than 3 months.

Class II $M\bar{1}$ erupted and showing light wear, i.e. occlusal surfaces showing slight smoothing. I1 erupted, not in wear.
Age: 3 to 10 months (6+4 months)

Class III $M\bar{2}$ showing light wear, $M\bar{3}$ unerupted.
Age: 10-16 months (12+4 months)

Class IV $M\bar{3}$ erupted, no wear on posterior lobe; $P\bar{2}$ and $P\bar{4}$ erupted, not in wear. I2 erupted and in wear.
Age: 16-30 months.

Class V $M\bar{3}$ with medium wear on all lobes, i.e. even wear on all lobes with central islands visible. Central enamel islands disappeared on $M\bar{1}$. I3 and I4 erupted.
Age: 30-60 months.

Class VI $M\bar{3}$ with heavy wear, central islands disappearing. $M\bar{1}$ with occlusal surface worn flat.
Age: Older than 60 months.

During the Greefswald analysis incisors could seldom be sided or identified as to their position. In future studies these teeth should receive more attention, as they are well documented in the literature and can be used to age specimens relatively accurately.

The above age classes have not been tested against specimens of known age; they should therefore be regarded as indicating broad age classesrather than specific ages in terms of months. It was usually found that the premolars already showed wear when the posterior lobe of $M\bar{3}$ had just begun to show wear.

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Thus the combination of $M\bar{3}$ with light wear on the posterior lobe with $P\bar{3}$ and $P\bar{4}$ with medium wear has been grouped in Class IV. If $M\bar{1}$ and $P\bar{3}$ or $P\bar{4}$ occur with heavy and medium wear respectively, the specimen has been grouped in Class V.

A number of abnormalities among the teeth was noticed. One right P2 and one P3 were skewed and out of line with the rest of the teeth (MK1/11 and TS3/6), while one P3 was skewed at 90^{o} to the axis of the maxilla (TS3/8). One maxilla had much reduced premolars, while P2 was absent in a right maxilla from TS3/21, and $P\bar{2}$ from a right mandible in TS3/22. Two mandibles had lost teeth in vivo, resulting in closed alveoli (MK1/2 and MK1/5); the first specimen had actually discarded only the anterior lobe of the right $M\bar{1}$. In MK1/1 a left M1 showed excessive abnormal wear, resulting in the enamel of the buccal surface protruding some distance above the occlusal plane.

The second method of ageing of specimens is dependant on the age at which epiphyses fuse. Table 6.3 lists the fusion dates given by Silver (1971:285-286) and Noddle (1974:198-199) which are relevant to the present study. There is a marked difference between the three sets of figures given by Noddle. Of interest is the generally late age of fusion in castrates, as well as the marked difference in overall lengths of the long bones, the castrates having much longer limbs than entire animals.

I would chooseto use the values for domestic goats given by Noddle, since the goats were not subjected to selection for size and maturing (as are sheep), and were more tolerant of dry, hot climates than are sheep.

Unfused epiphyses were not common in the Greefswald sample. The 18 unfused epiphyses from TS1 came from a sample of 1 097 bovid post-cranial parts, and the TS2/T sample of 12 from an assemblage of 427. Consequently only the total number of unfused epiphyses was recorded in most samples, without reference to whether they were proximal or distal fragments. This method was not therefore used for ageing purposes. From

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examination of Tables 6.2 and 6.3 , it appears that the analyses of unfused epiphysis would be of greatest use in refining Age Class IV once the teeth have been grouped according to age classes.

The analysis of the tooth age classes shows that the Greefswald people were slaughtering mainly adult small stock. (Table 6.5 and Fig. 6.1). With the exception of TS2, very young (under three months) and old (more than 5 years) animals occur in all the samples. The peak slaughtering ages were 16-30 months (28,1%) and 30-60 months (37,7%). Sheep can breed when they are 8-12 months of age, i.e. Age Class III. The Greefswald people were thus drawing heavily on those animals which were capable of breeding. Ewes in theory drop their lambs mainly in winter; in fact, most improved sheep breed throughout the year. Those animals representing Age Class I could conceivably have been winter lambs which did not survive the frost weather in July and August. The age distribution suggests that most animals were kept until they had bred at least three times before they were slaughtered. In TS1, three of the Class IV group were 23-24 months old on the basis of epiphyses, and would thus have bred only once. The Class 1 specimen was probably neonate, since an unfused proximal first phalanx occurs in the sample, and this epiphysis is supposed to fuse before birth. Other evidence for the presence of very young individuals in the sample is the identification of what appeared to be the unfused double shafts which make up a metapodial. The bone was extremely spongy. In TS2, three of the eight Class IV group were 23-24 months old. Sheep probably obtain their maximum weight at about 18 months; the Greefswald people were slaughtering most of their animals after they reached their maximum weight. A pattern of slaughtering mainly adult sheep has been recorded from other sites. At the early Bronze Age site of Arad in the Negev, Davis (1976) recorded that the majority of sheep/goat killed were 36-72 months old.

Sexing of sheep/goats

It would be useful to be able to sex the animals represented in the deposit. In unimproved breeds such as Pedi sheep, both sexes are hornless, so that the presence or absence of horns cannot be used as a criterion when dealing with sheep remains, except to confirm the presence of sheep. Two hornless

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skulls were identified from Greefswald, (TS2/2, TS3/7). It could possibly be assumed that thick skulls belonged to male animals, but usually the skulls are too fragmentary to be able to use any other features for identifying sexual dimorphism.

Hattingh (1975) has undertaken research into the effect on horn cores of castration. Initial results suggest that in male animals the sinus cavities are restricted to the base of the horn core in the first years, but extend up the horn as the horn grows. (The horns of the study animals grew in the spring). In females the cavities are moderately developed throughout life. In whethers the development of the cavities depends upon the age at which the animal is castrated. In effect, whethers develop gracile horns similar to those of the females, the surface of the horn core becomes smoother, and the internal walls become very thin. The cavities reach almost to the tip of the horn core. The study suggests that female horn cores are long and slender, with a moderately developed sinus cavity. Whethers develop horns which resemble female horn cores in relative proportions, but which have extensively developed sinus cavities. In males, the sinus cavity increases with increasing age.

The examples illustrated are not very satisfactory; however this appears to be a fruitful line of research, and it is hoped to undertake a study of horn core cavities in male and female goats and cattle. Hattingh's remarks on damage caused by malnutrition are also worth following up.

Schaffer and Reed (1972) do not give absolute data on cornual sinus development in male and female goats, but suggest that there is no regular pattern of variability between sexes. They also make the interesting comment that cornual sinuses extend to the tips of horn cores on *C. hircus aegagrus*, but are confined to the basal third of the horn cores of domestic goats (*C. hircus hircus*). This might raise interesting questions as to the degree of "primitiveness" of African goats.

Forty-seven of the horn cores from Greefswald identified as goats were examined for the size of the sinus cavity. (Plate 6.1). Eleven of the adult specimens exhibited cavities which extended approximately 50% of the total length. In

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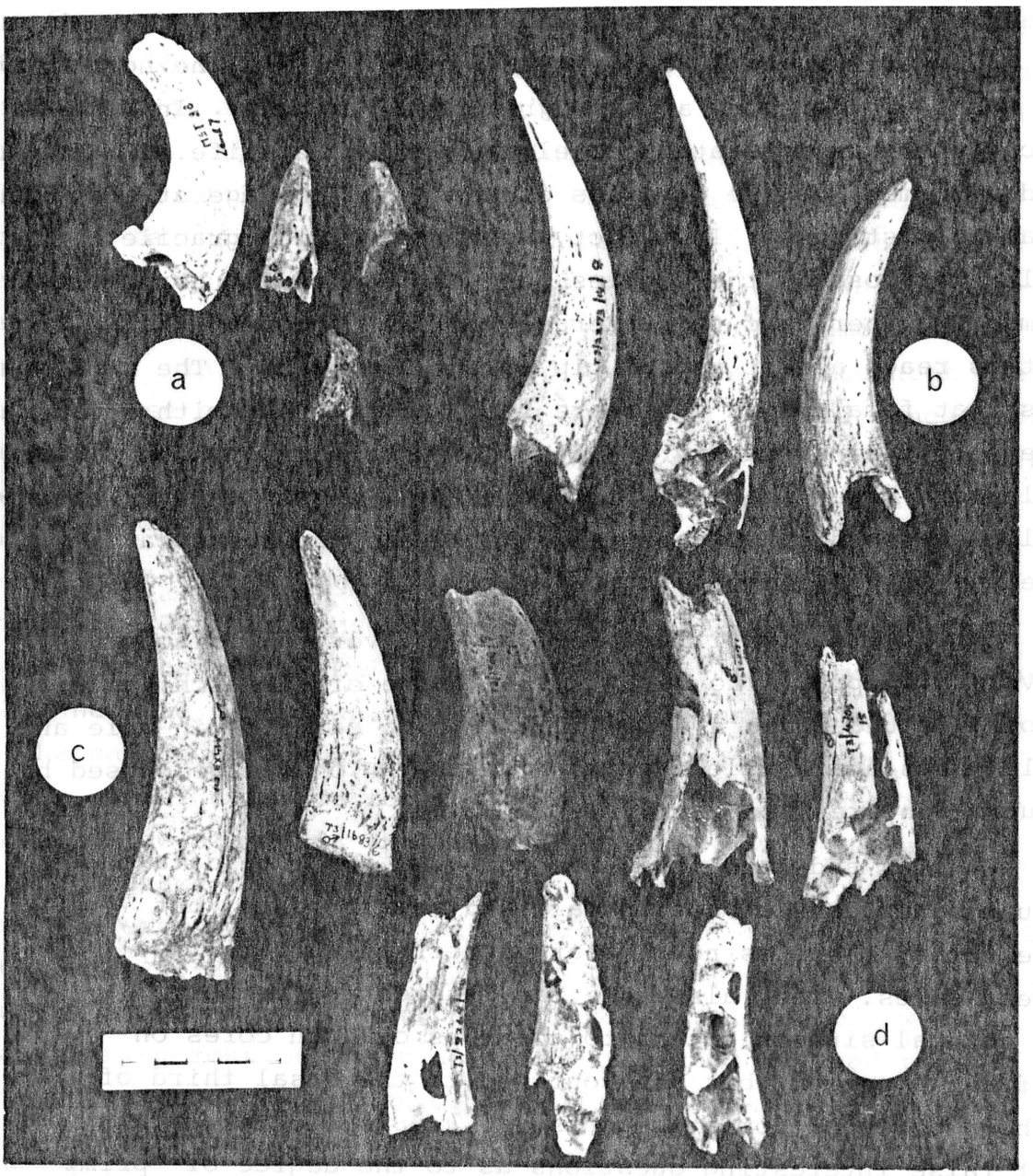

Plate6.I.a. Group of 4 sheep horn cores; b: 3 ? female goat horn cores; c: 6 ? male goat horn cores; d: fragments of 3 ? male horn cores, showing extensive sinus cavities.

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addition, four were very thin and slender, the rest tending to be much reduced in size. The thickness of the walls varied considerably. Four juvenile specimens exhibited similar sinus cavity proportions. One of these juvenile specimen shows three horn rings, which may indicate three years of poor nutrition. 25 adult and seven juvenile horn cores had sinus cavities which extended almost to the tip of the core. These cores tend to be broad in relation to their length; wall thicknesses varied.

It is suggested that the first group of 15 came from female or castrated goats, while the second group of 32 came from male goats. Epstein (1971:260) illustrates a castrated Nama goat, which suggests that Southern African peoples did practice this form of control over their livestock. The possibility of defining the sex ratio of goats by means of horn cores deserves to be investigated. In so far as Greefswald is concerned, if we accept that large sinus cavities occur in male horns, then the horn cores suggest that the Greefswald people were slaughtering their goats in a 2:1 ratio, i.e. two males to one female.

In the light of the work by Schaffer and Reed (op.cit.), the cornual sinus morphology of the Greefswald goats may differ from that of present-day domestic goats.

Evidence for disease

Evidence of disease or pathological conditions among the sheep/goat group occurs in a number of cases, most of which relate to limb bones. Evidence of lost teeth has already been mentioned. In addition, a left mandible (T2/4280) from TS2/Level 3 had no $M\bar{2}$, the $M\bar{2}$ having been lost *in vivo* and the alveolus partially closed with spongy bone. Similarly in TS3 (T3/4717) a left mandible showed evidence of abscessing in the vicinity of $P\bar{4}$, resulting in the loss of that tooth before death.

Possible evidence of abscesses which left their mark on the bone occur in three other sheep/goat specimens. A tibia shaft (MST/836/F4(8iva) had a small, healed eruption on the bone suggesting an abscess. Also from MST (MST/210/H5.2iii.2) a complete articulating foot with a distal metacarpal showed abscess damage just above the articulation on the cranial

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surface. MK1/2225/Level 10 yielded a first phalanx exhibiting a depression caused by an abscess.

Malformations of the bone proved rare; a single first phalanx from K8 Level 4 (MST/104) was malformed on the proximal articulation. The most common complaint appears to have been an apparent form of arthritis, resulting in bony outgrowths on the bones. (Plate 6.2). Most observed cases affected phalanges, in which bony outgrowths occur on the shaft of the phalanx. MK/1719, MST/331, and T3/4490 are first phalanges; MST/813 are articulating first and second phalanges and a matching first and second phalanx, all of which have bony outgrowths. From TS3 comes a second specimen (T3/4500) in which the distal end has a bony outgrowth on it. MK/1401 is a metacarpal with bony outgrowths on the shaft, resulting in a deformed shaft.

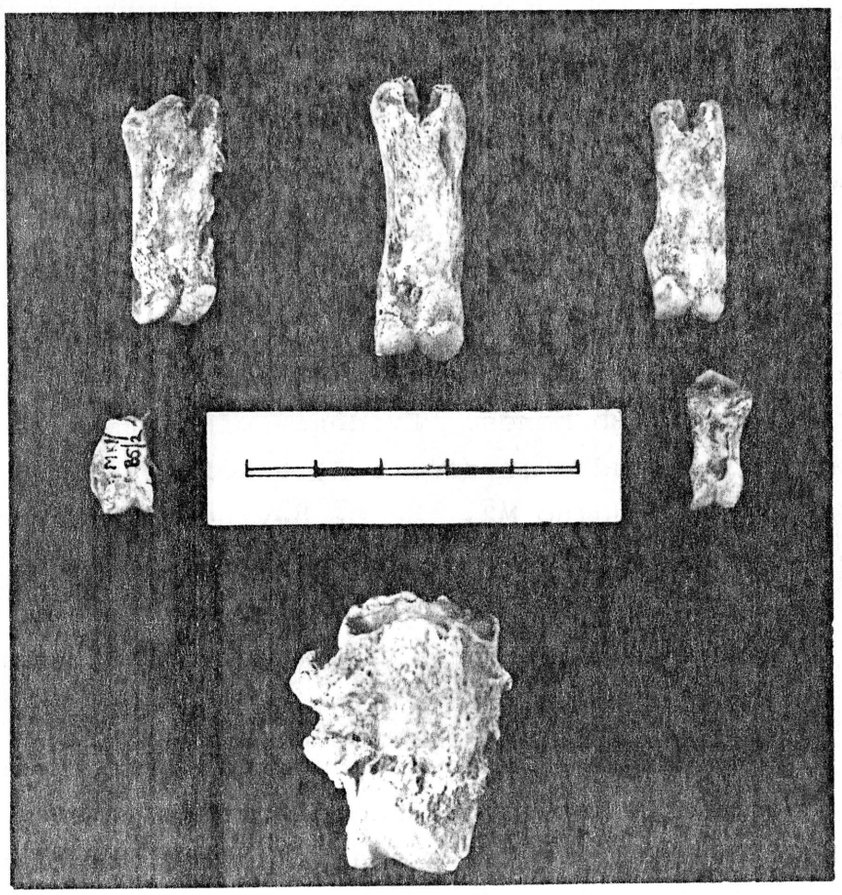

Plate 6.2. Top and centre: sheep/goat phalanges with arthritic outgrowths. Bottom: B.taurus second phalanx with extensive outgrowths (MST/K8/13).

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It is not possible to suggest the cause of these abnormalities, although it is tempting to suggest that they could be caused by excessive kraaling under unfavourable conditions.

Evidence for possible healed injuries to animals occurs in only two specimens at Greefswald. One of these is an acetabulum from TS2/C5 2.1; the acetabulum shows a possible healed lesion on one edge.

The incidence of asymmetrically developed vertebrae will be discussed later.

Animal husbandry of sheep and goats.

What did the sheep and goats of Greefswald look like? Unlike the cattle, we have very little evidence for the outward appearance of these animals; we need to turn to present-day unimproved breeds to "reconstruct" the flocks.

Epstein states that the majority of southern African native flocks of sheep consisted of fat-tailed sheep; certainly it was this characteristic which most impressed early travellers in Southern Africa who came in contact with the Khoisan peoples. The early travellers also commented with surprise on the fact that the indigenous sheep were hairy rather than woolly, a feature which still exists to-day in the unimproved breeds. (Ravenhart, 1967). Epstein (1971, Vol.2:110) states that the southern line of fat-tailed sheep entered Africa via the Straits of Bab el Mandeb (southern entrance to the Red Sea) and extended southward through Ethiopia into Uganda, Kenya and Tanzania. He does not elaborate on how they continued their southward journey; the question of whether they travelled south across the Zambesi with Khoisan peoples or with Negroid peoples or both is a critical one. The early date of 400 A.D. for sheep at Die Kelders (Schweitzer, 1974:78) indicates that sheep were present at an early date in an area occupied by Khoikoin herders. The suggestion that the Bantu peoples moved into southern Africa with cattle and goats, and acquired their sheep from their Khoisan neighbours, cannot therefore be completely ruled out.

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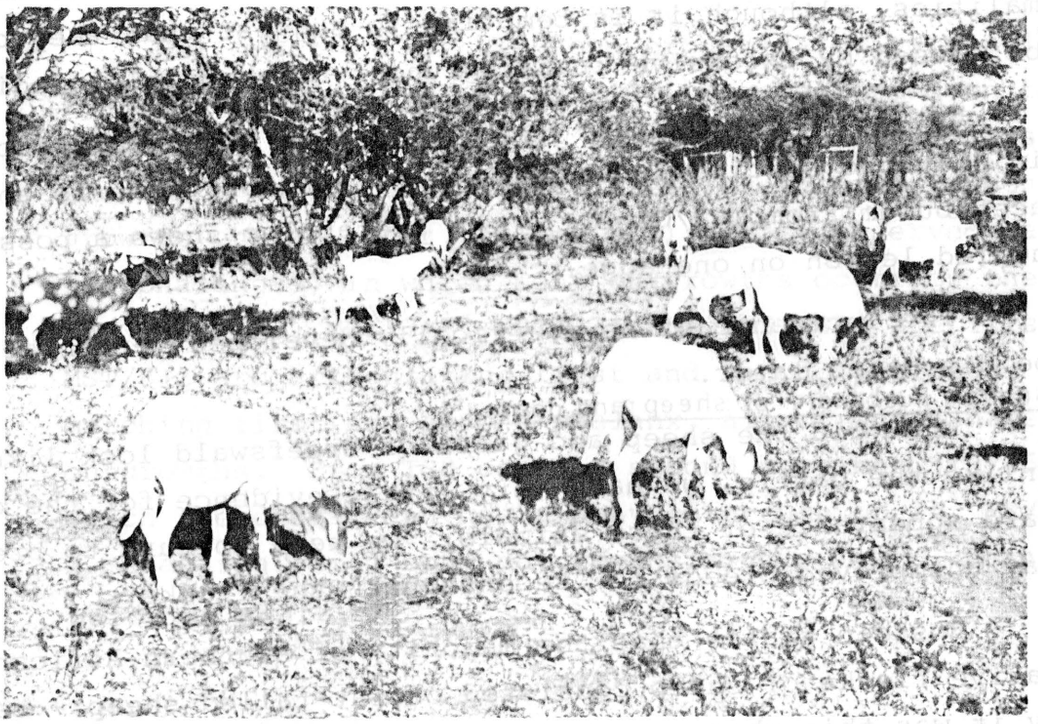

Plate 6.3. Pedi sheep, Stellenbosch Experimental farm, Lebowa. Colouration is white with red-brown heads and feet; the coat is short and hairy. Note the fat tail.

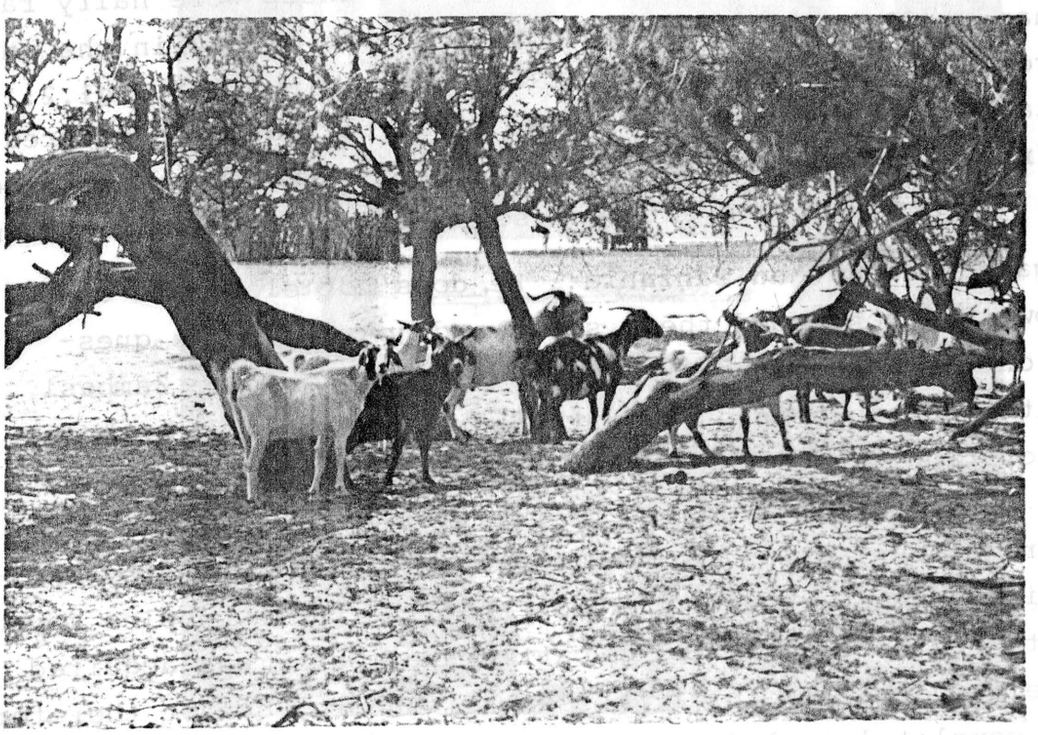

Plate 6.4. Topnaar Hottentot goats, Nossob River, South West Africa.

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Epstein (1971, Vol.2: 137-139) describes four unimproved breeds of sheep occurring in the northern Transvaal and vicinity: Landim, Venda, Pedi and Tswana. Landim sheep are native to Mocambique; they are fat-tailed with a short, hairy coat of black, light or dark red or variegated colours, and are bred for meat. Both sexes are polled, although loose and rudimentary horns occur. Venda sheep are now rare; they occur only in the Mopani veld north of the Soutpansberg, where they constitute about 4% of the stock kept by the Venda. They are long-legged, fat-tailed and hairy; both sexes are polled with rare horned animals. Present-day animals have been extensively crossed with Black-head Persian and Dorper. The Pedi sheep of Lebowa are fat-tailed, with very short hair and are polled. They are usually white, with russet red heads and legs, although black animals are also common. The fat tail is long and straight. Tswana sheep have been described from the Gwanda-Tuli block ; they are good meat animals with well-developed fat tails and a hairy coat which may include coarse wool. Present-day Tswana sheep have also been extensively crossed with Blackhead Persian.

It seems therefore that, if we are to visualise the Greefswald sheep, we should think in terms of long-legged, fat-tailed animals with hairy coats; the animals were probably mainly polled. I believe that the only extant breed coming closest to this description is the Pedi sheep of Lebowa. (Plate 6.3). Thin-tailed sheep may however have existed in pre-historic Rhodesia; this is suggested by a rock painting at Ruchera, Mtoko (Epstein, op.cit.:46).

Two final points deserve mention with regard to sheep at Greefswald. Two clay figurines of sheep have been described from the Southern Terrace. Both have the remains of horns; both also have prominent udders and carefully modelled genitalia. Only one has the vestige of a tail.

In modern sheep breeding, the tails of ewes are docked to improve breeding. Although it is possible that the emphasised genitalia are merely an emphasis on the breeding aspect of the flocks, it is also possible that the Greefswald people

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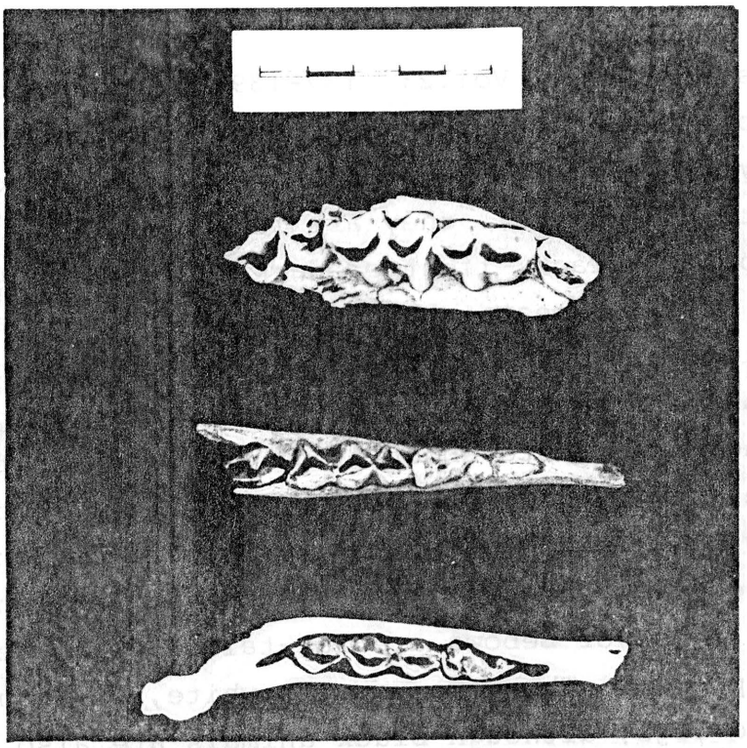

Plate 6.5. B.taurus age classes. Top: Neo-nate; centre: Class I; Bottom: Class 2.

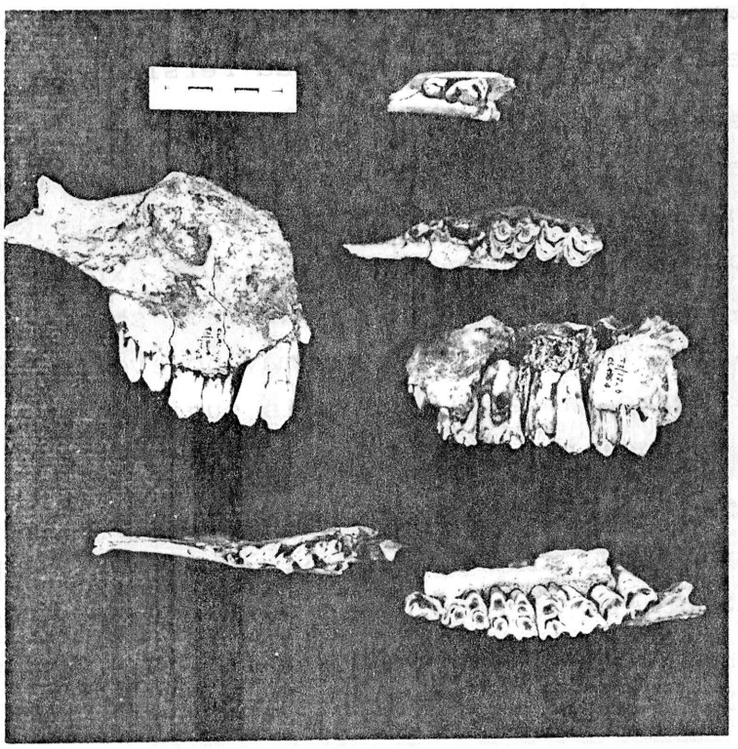

Plate 6.6. B.taurus age classes. Top right: Class 5; centre: Class 4; bottom: mandible and maxilla of Class 3.

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practiced tail docking. Epstein (op.cit.:131) states that of all African peoples, the Masai and Nandi alone practise tail docking. The Masai and Hottentots are two of a small group of African peoples who milk their ewes; west African pastoralists are also reported to utilise the milk of their ewes (A. Smith pers. comm.). Among the Hottentots, the milk is restricted in use to women and children. The carefully modelled udders of the Greefswald figurines suggest that the people of Greefswald also milked their sheep. The evidence of the figurines is strongly suggestive of tail-docking and milking among sheep, practices which appear to have originated in East Africa and may have travelled south with the Khoisan peoples. Epstein (op.cit.:156) suggests that the early Bantu-speaking peoples possessed only thin-tailed sheep, and obtained fat-tailed sheep via direct contact with Hottentots.

If we turn to a perusal of goats it is more difficult to define what the Greefswald goats looked like. Our only reliable guide is the shape of the large number of horn cores in the collection; these can be paralleled in Landim, Pafuri, Ovambo and Topnaar Hottentot goats (Plate 6.4). All these types are relatively short-haired. The Landim goat is described as having short, slender horns with a moderate, sometimes forward curvature, short, erect, tubular ears, poorly muscled and proportioned body, and a short pelage which may sometimes be long and shaggy. In short, the type of goat so common around villages to-day.

II Cattle at Greefswald

The identification of cattle at Greefswald did not involve the same difficulties as did the sheep-goat class. *Bos taurus* teeth are most likely to be confused with buffalo teeth. With the exception of about half a dozen specimens which had to be re-checked, it soon became obvious that we were in fact dealing with *B. taurus* and no other species. Since no other species of similar size was identified on the basis of the teeth, the post-cranial material assigned to the Bov.III size class was assumed to also belong to *B. taurus*. Checking against comparative material confirmed this assumption.

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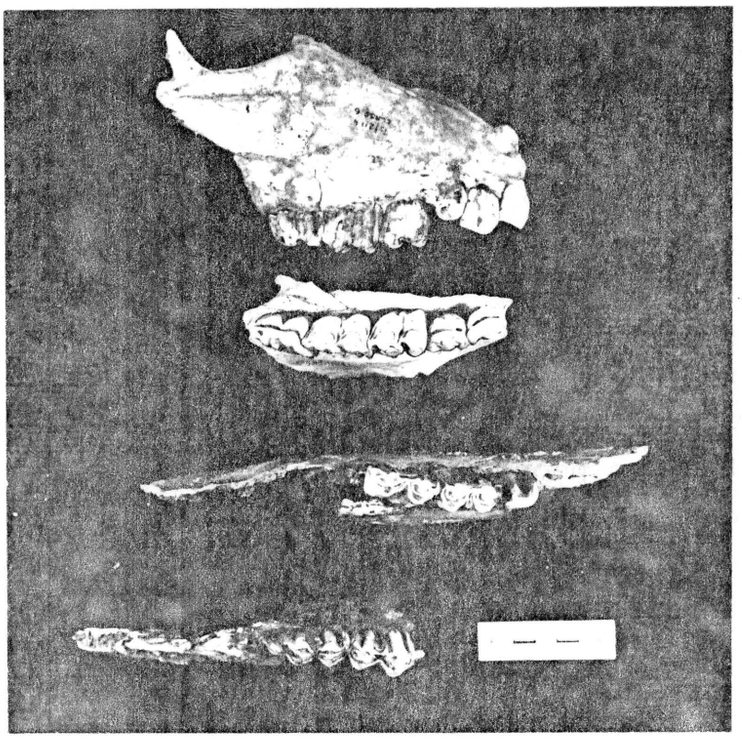

Plate 6.7. B. taurus age classes. Two maxillae and two mandibles belonging to Class 6.

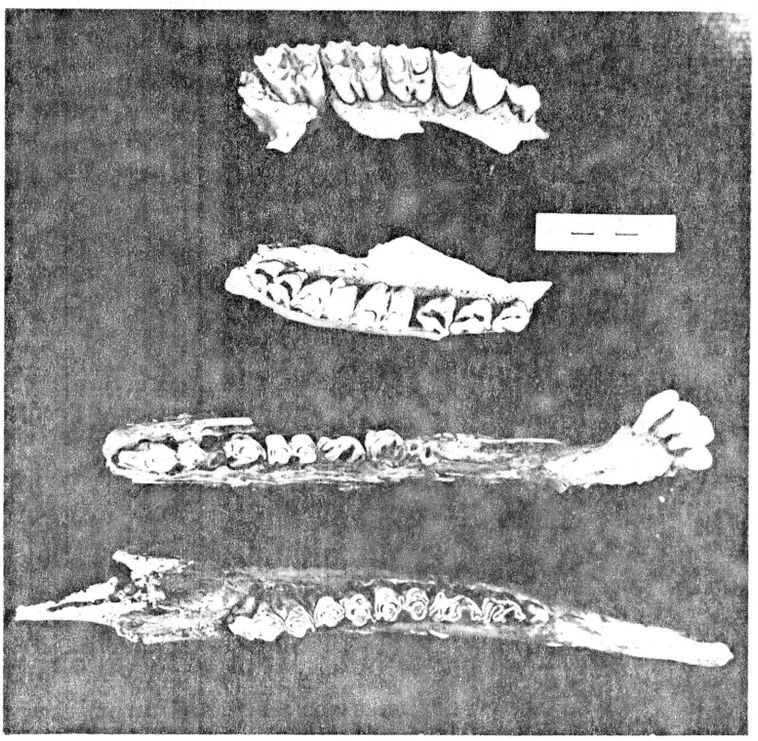

Plate 6.8. B. taurus age classes. Two maxillae and two mandibles belonging to Class 7.

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The age distribution of the Greefswald cattle

Ageing of cattle on the basis of tooth eruption involves the same pitfalls as ageing of sheep and goats. J.D.G. Steenkamp (1970 (a) and (b) has recently published the results of some excellent research into the ageing of cattle; however his work has concentrated on the eruption and wear of incisors. These teeth are very vulnerable in archaeological deposits, and incisors which are adequately preserved so as to be identified as to their positions in the mandible are rare. Nevertheless, where possible, the incisors were used as a guide to the age of the animals.

As with sheep/goats, different authors give different eruption dates. These are listed in Table. 6.6 . The age of eruption of incisors as given by Steenkamp (1970(a)) for Mashona cattle is very close to the ages given by Silver for improved breeds. For this reason, I have chosen to base my age classes on a combination of the time of eruption of teeth in improved breeds, and the tooth eruption sequence observed in the Greefswald material. Greefswald yielded an exceptional collection of maxillae and mandibles with complete or almost complete dentition; the age classes given by Silver were compared to the tooth patterns seen in the Greefswald material and amplified accordingly. One of the major problems was the early eruption date given for $M\bar{3}$; $M\bar{3}$ is given as erupting some time before unimproved breeds reach maturity, i.e. at 48 months. I4 erupts at around 42 months; as this tooth is seldom recognisable in the archaeological context, the wear pattern on $M\bar{3}$ is more important. This dental stage (42 months and older) is the oldest given by Silver; two additional stages have therefore been added on the basis of wear of $M\bar{3}$ resulting in the following full set of dental stages.

Class 1. Birth to 6 months. Deciduous incisors and premolars erupted and in wear. (Plate 6.5)

Class II. 6-15 months. $dp\bar{2}$ and $dp\bar{3}$ with medium wear. $M\bar{1}$ erupted, with light wear. (Plate 6.5)

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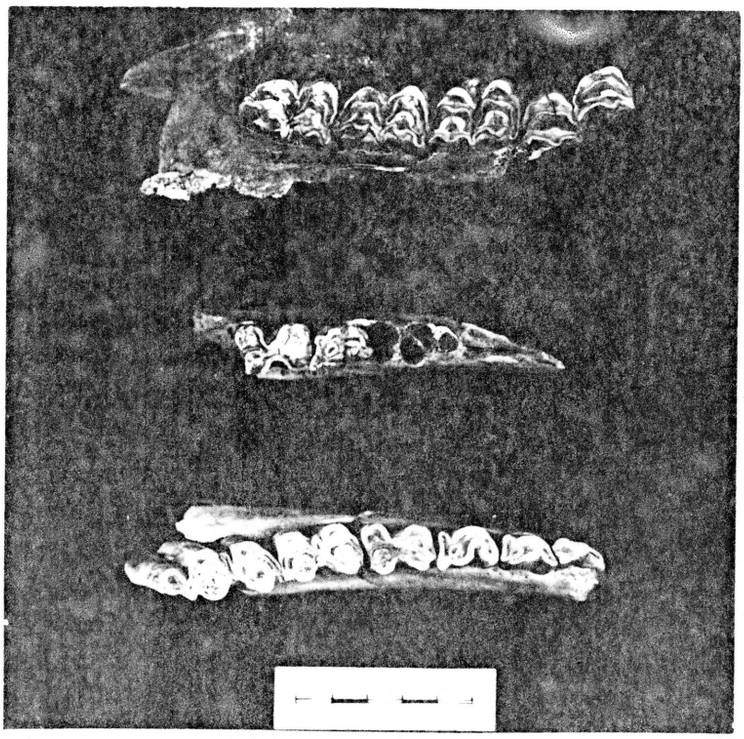

Plate 6.9. B. taurus age classes. Top specimen: Class 8; centre and bottom specimen: Class 9.

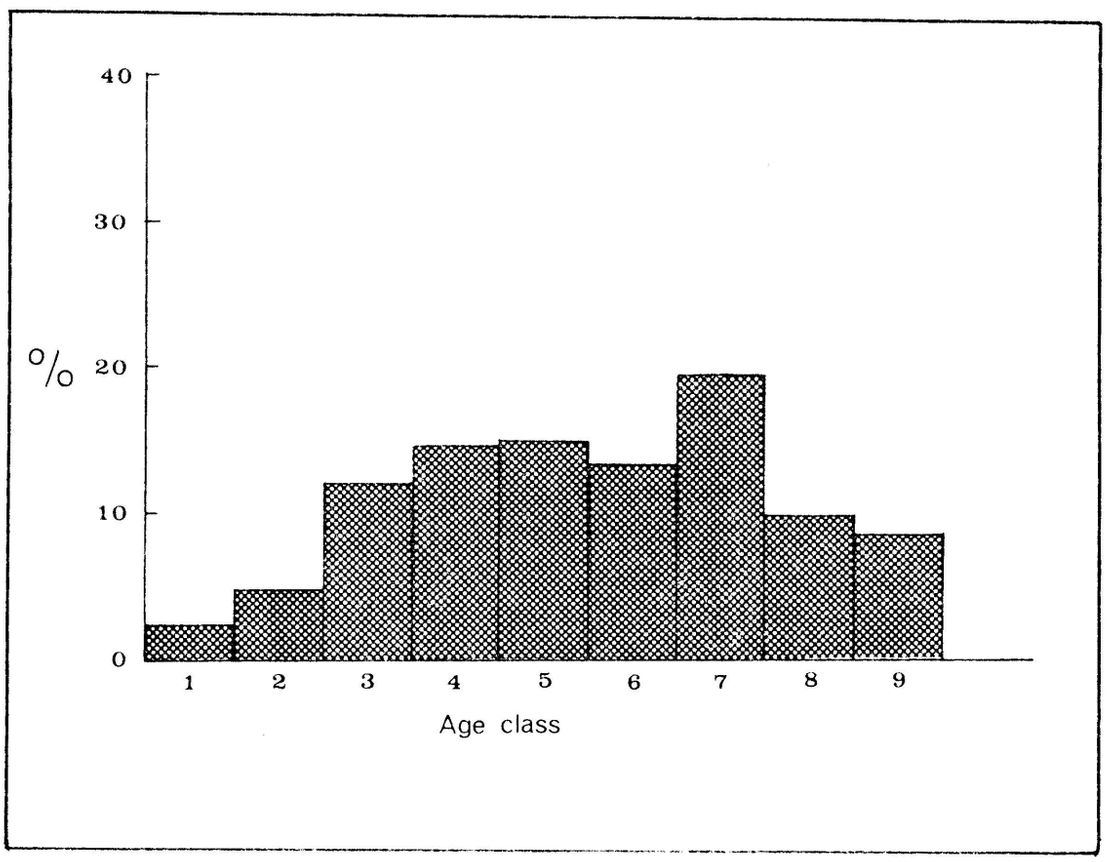

Fig. 6.2. Age distribution of *Bos taurus* in Greefswald assemblage on basis of tooth eruption pattern.

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Class III 15-18 months. $dp\bar{2}$ - $dp\bar{4}$ with heavy wear; $M\bar{1}$ with light wear, $M\bar{2}$ erupted with light wear. (Plate 6.6)

Class IV 18-24 months. Deciduous premolars with very heavy wear; $M\bar{1}$ medium wear, $M\bar{2}$ light wear, $M\bar{3}$ erupting, very light wear, I1 erupts. (Plate 6.6).

Class V 24-30 months. $M\bar{1}$ medium wear, $M\bar{2}$ medium wear, $M\bar{3}$ no wear or light wear on posterior lobe, $P\bar{2}$, $P\bar{3}$ and I2 erupting. (Plate 6.6).

Class VI 30-42 months. $M\bar{1}$ and $M\bar{2}$ medium wear, $M\bar{3}$ light wear on all three lobes, $P\bar{2}$ and $P\bar{3}$ light wear, $P\bar{4}$ and I3 erupting. (Plate 6.7).

Class VII Adult breeding animals, older than 42 months. $M\bar{1}$ heavy wear, $M\bar{2}$ and $M\bar{3}$ medium wear, $P\bar{2}$ - $P\bar{4}$ medium wear. I4 erupting (Plate 6.8).

Class VIII Mature breeding animals. $M\bar{1}$ and $M\bar{2}$ heavy wear, $M\bar{3}$ medium wear, $P\bar{2}$ - $P\bar{4}$ heavy wear, I2 - I3 with medium to heavy wear, I4 with light wear. (Plate 6.9).

Class IX Aged animals. Heavy wear on all teeth, including Incisors. Central islands disappearing on $M\bar{1}$ and $M\bar{2}$. (Plate 6.9).

The cattle teeth identified from Greefswald were grouped according to the age classes outlined above; the results are shown in Table 6.7 and Fig. 6.1. This table reflects the age at which cattle were slaughtered at Greefswald, although it is not impossible that animals which died of natural causes would also have been eaten, as is the case to-day among Venda cattle (Mansvelt and Skinner op.cit.:2). Among the present day Bantu, cattle play a major part in strengthening the social structure by means of the lobola system and the slaughter of cattle in religious ceremonies. It is likely that these cattle-linked activities have their roots in the distant past of the Bantu-speaking peoples; thus some at least of the Greefswald cattle could be expected to have been killed for social or ritual purposes.

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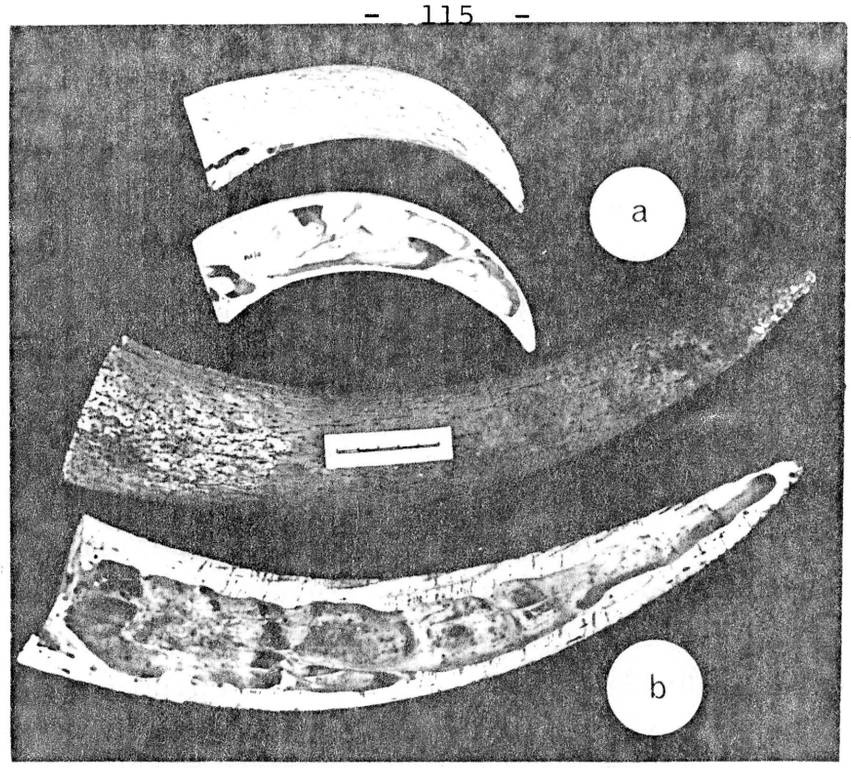

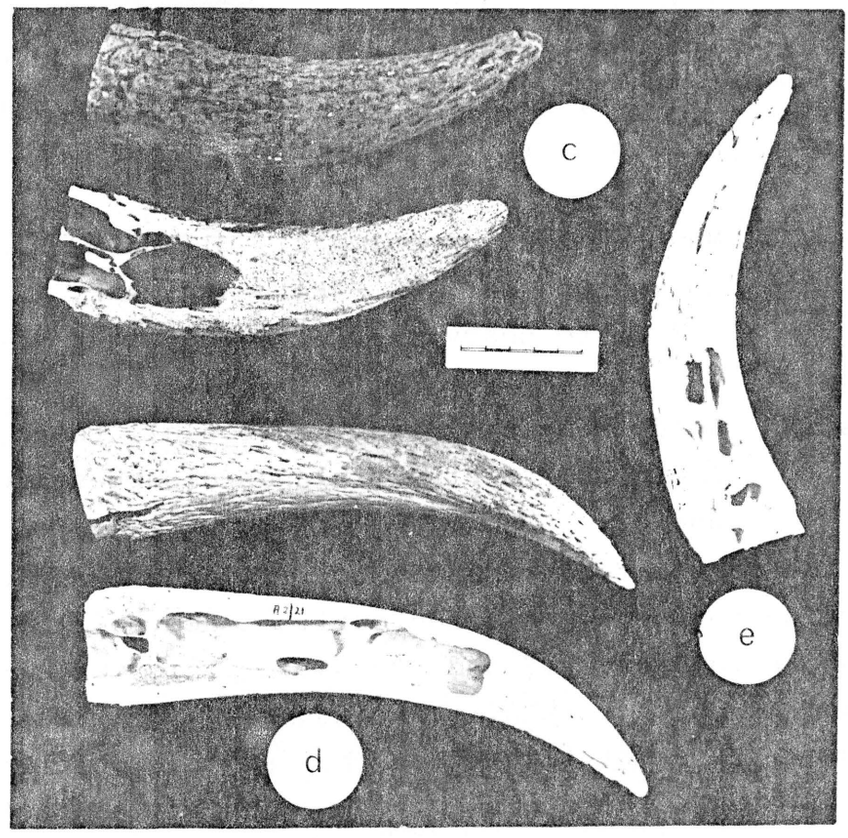

Plate 6.10. Sectioned horn cores of BaPedi (i.e. Sanga) cows.
(a) AZ/16; (b) AZ/5 ;
(c) AZ/3 (juvenile); (d) AZ/21;
(d) AZ/22 (juvenile).

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The age distribution of the cattle is interesting in that the peak "slaughtering age" involves animals of 42 months or older, i.e. adult breeding animals. In the Greefswald sample 33% of the animals did not have $M\bar{3}$ in wear; this is in marked contrast to the 56% of the same age group found by Brain at Zimbabwe (Brain 1974:306). A small percentage of young (up to 15 months) animals was slaughtered, and a larger percentage of very old animals. Bigalke (1966:3) records that calves were not usually killed among the Cape Nguni, except possibly by chiefs. He makes no mention of selection of animals on the basis of sex for rituals.

According to Mansvelt and Skinner, Venda cows first calve when they are a little less than four years old; i.e. age class 6. The age distribution of slaughtered animals shows a steady 12-14% kill rate up to 42 months, with 28% of the animals being adult or older mature animals. Again according to Mansvelt and Skinner, unwanted bulls are castrated at about 36 months, i.e. age class 6. It seems possible that these animals could be the main contributors to the group slaughtered at this age. Common sense argues against young breeding cows being used for slaughter, i.e. in Classes 7 and 8; however the evidence given below suggests that the three adult horn cores preserved were from cows. It could be that cows had a high social or ritual value on account of breeding and milk production, and were thus more desirable for ritual killings or sacrifices than were males or oxen. This would result in a high proportion of cows in prime breeding condition being represented in the sample.
A reference in Schapera (1963:298) comments on the use of cows and ewes in important sacrifices.

In TS2, six very young animals are represented by post-cranial material - an articulated foot, three left radii of very young *B. taurus* specimens, a distal metapodial from a very young neonate or foetal specimen and a calcaneum of a very young specimen. Thus the actual number of young individuals is higher than is indicated by the teeth.

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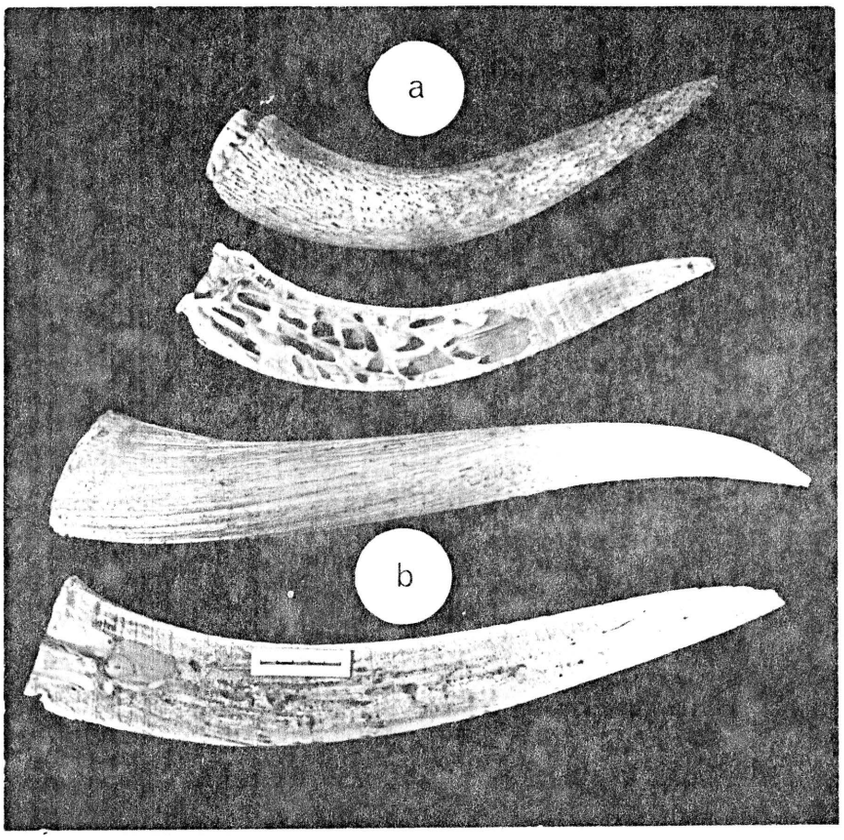

Plate 6.11. Sectioned horn cores of BaPedi cattle. (a) AZ/17 (? male); (b) AZ/11: Africander ox.

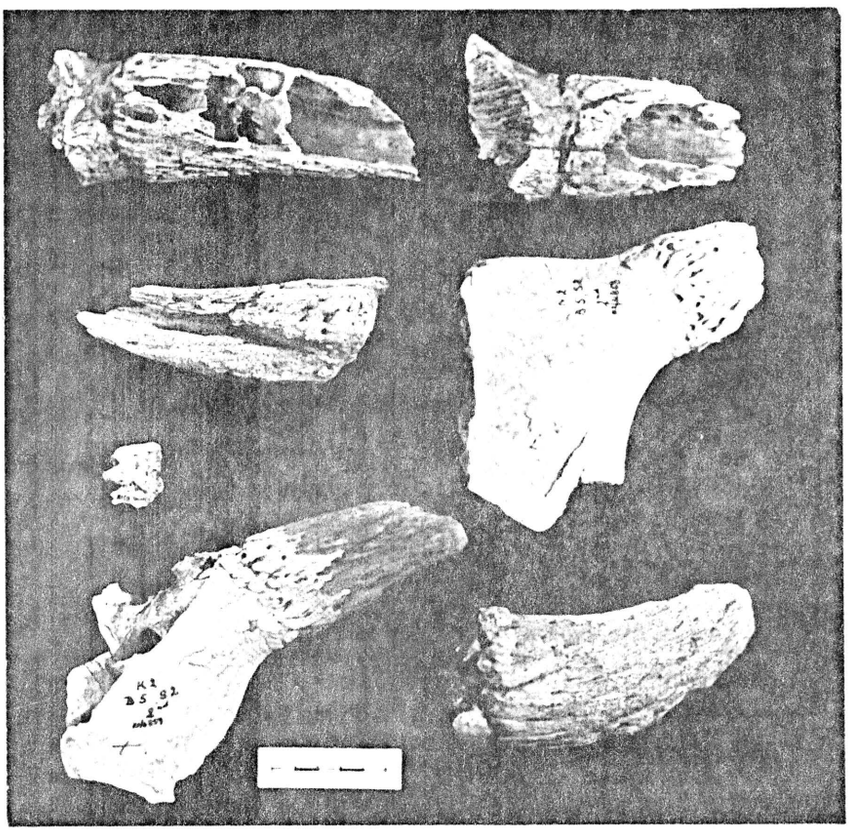

Plate 6.12(a). Top row: G/4872 (b) and (a) (? sub-adult males). Centre: G/4870 (? ox), K2/4858 (? sub-adult male). Centre left: MK1/2607, a possible scur from polling. Bottom row: K2/4859 (juvenile, G/4871 (? young short-horn).

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Sexing of cattle

Sexual characteristics of *B. taurus* skulls have been discussed in detail by Grigson (1975:116). Wide sexual dimorphism exists in horncore basal circumference measurements and horn core length. Grigson found that cows tend to have longer horns than bulls, but that bulls have longer horn cores; thus in cows the difference between horn sheath and horn core length is greater than it is in bulls. This characteristic could not be used in separating the sexes because no complete horn cores survived at Greefswald. However a number of large sections of horn core survived, and it was decided to test whether the internal structure of horn cores varied enough for this to be used in differentiating the sexes.

Grigson states that the horn cores of young animals tend to be porous and very light with large vascular canals. From 24-36 months the cores become smoother; this smoothing process continues until the animal has a very dense, smooth horn core (older than 7 years) (1976:130). She also states (1974: 375) that the horncore is hollow apart from the tip, and that the sinuses enlarge and multiply as the horncore increases in girth and length.

A sample of nine horncores from animals of known sex were cut longitudinally in half and examined with these features in mind. The results are shown in Table 6.8. It was found that the two young specimens, AZ/3 and AZ/22, had porous horn cores in which 38-39% of the length was taken up by sinus cavities. The sex of AZ/17 was in doubt. The length of the horncore and the basal measurements are closest to the two male specimens, which suggests that AZ/17 may have been a bull. AZ/16, 18, 19 and 21 are all from mature breeding animals; in all of these specimens, 72% or more of the horn core is taken up by sinus cavities, i.e. the horn cores are virtually hollow their entire length. In very strong contrast to this, the horn core of the Africander ox is almost completely solid. This suggested that adult male horn cores were largely solid; if AZ/17 were regarded as a bull, it would fit this assumption. (Plates 6.10 - 6.11).

However, AZ/5 was then examined and found to be almost completely hollow. Structurally this specimen was almost identical to AZ/19 and 21, except that the walls of the horn

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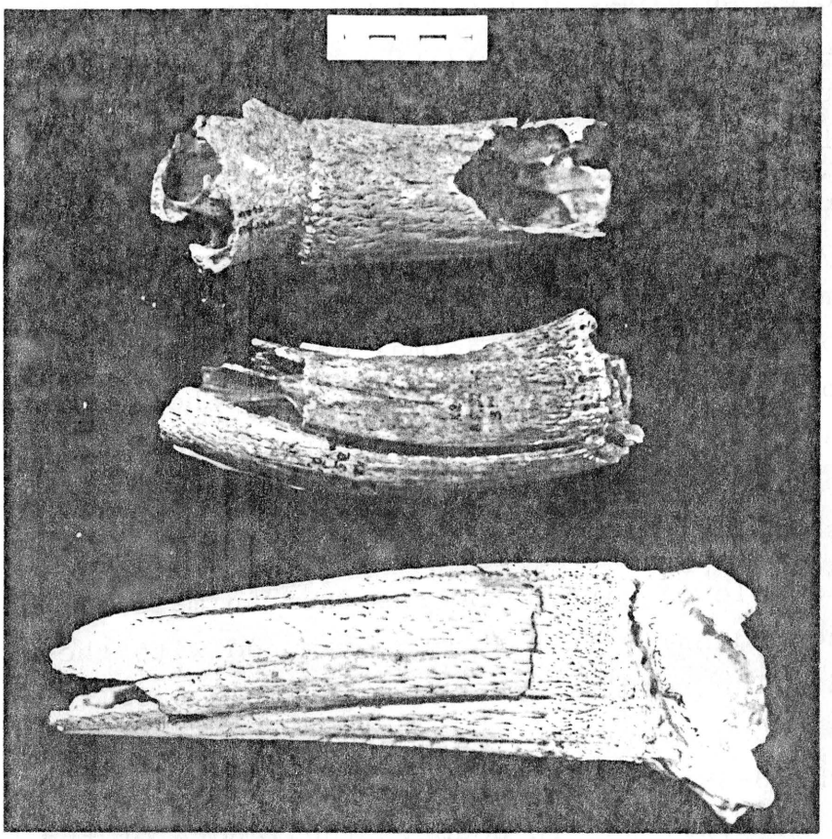

Plate 6. 12(b) Greefswald horn cores.
Top: MST/823;
Centre: K2/4864;
Bottom: G/4869.

The central and lower specimens are possibly from Africander cows.

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core were much thicker, the horn core was a great deal heavier, and the basal dimensions were noticeably larger than in the female specimens.

This appears to be a profitable line of research to follow. The limited results above suggest that:

a) Young animals have porous, rough surfaced horn cores with small sinus cavities.
b) Castrated males may develop very solid horn cores, i.e. smooth horn cores with juvenile internal characteristics.
c) Mature female horn cores are completely hollow but with thin outer walls.
d) Mature male horn cores are completely hollow with thick, robust outer walls and larger basal dimensions than females.

The horn cores from Greefswald were then studied with the following results (Plates 6.12a & 6.12b):

K2/4859, a left horn core, is porous and short with no marked sinus cavity. It is probably from a young animal. Basal dimensions: 5,28X3,99cm.
G/4871 is porous and solid. This is a very short, squat horn core and probably came from a young, short horned animal. Basal dimensions: ± 6,7X5,1cm.
G/4872(a) and K2/4858 appear to be right and left horn core of the same animal. The horn cores are porous, but thick walled with sinus cavities which extend the entire length of the surviving fragments. It is suggested that these are from sub-adult males. Basal dimensions: 5,69x4,5 (4872a) and 5,29x 4,45 (4858)cm.
G/4872(b) is a left horn core which has a harder and less porous surface than the above specimens.

The specimen is hollow, with thick walls; it may come from a sub-adult male. Basal dimensions: 5,45x4,68 cm.
G4870 is a right horn core with a relatively porous surface. The sinus cavity extends the length of the specimen, but is narrowed towards the end of the specimen. It appears as if the complete specimen would have had a limited sinus cavity, and could possibly have belonged to an ox. Basal dimensions: 5,18x4,09 cm.

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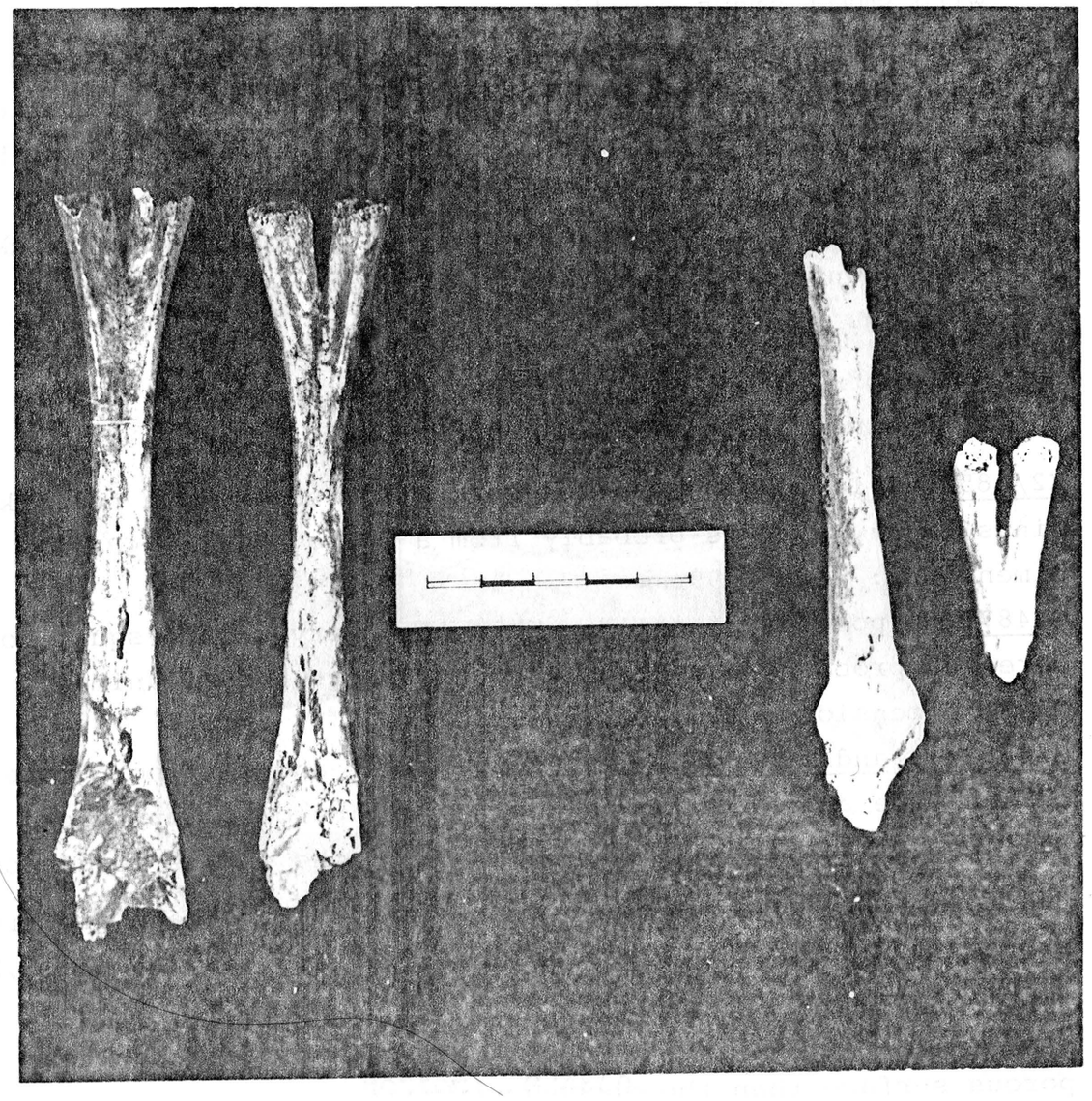

Plate 6.13. Four examples of bifid vertebrae from Greefswald. These vertebrae provide clear evidence for the presence of humped cattle on the site.

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K2/4864 has a hard, smooth surface with a deep groove along the rear face of the core. This core is in appearance very similar to the Africander horn core; however it is completely hollow and is thin walled. I suggest that this specimen came from a cow. Basal dimensions: 6,68x5,35 cm.
MST/823 has a similar outer surface to the above specimen, but has no longitudinal grooves. It is completely hollow and thin walled, and is therefore possibly from a cow. Basal dimensions 5,6x4,49 cm.
G/4869 is the best preserved horn core from Greefswald. It has a hard, dense surface, with no indication of perlon development on the base, but well defined longitudinal grooves. Visually the horn core matches the Africander specimen. However, like K2/4864, it is completely hollow and thin walled and may have come from a cow. Basal dimensions 7,28x5,1 cm.

The horn cores are illustrated alongside the modern material in plates 6.10 -12 .Basal dimensions, where available, are plotted on Fig.6 .3 On this graph, the female horn cores form a close cluster, with the bull and ox seperated by some distance. AZ/17 falls between the two groups. The Greefswald horn cores are plotted in the same graph; all except K2/4864, G/4869 and G/4871 fall within the cluster of female. This suggests that these horn cores came from cows.

Fagan (1967 and 1969) and Robinson (1966) provide minimum and mean measurements of horn core bases for cores from Behrens site, Isamu Pati and Woolandale. These dimensions fall within and below those from Greefswald with the exception of one specimen from Woolandale which is larger than any available specimen.

In a recently published paper, Armitage and Clutton-Brock (1976) suggest a classification system for horn cores. They found that bone porousity decreases with increasing age, and that horns of bulls are heavy and shorter in relation to basal dimensions. Cows have longer, more slender cores, while the cores of ox horns are longer still. No mention was made of internal structure; nevertheless it appears to be feasible to pursue this line of investigation as an aid to the sexing of animals.

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It appears from the above that, if further data on indigenous cattle horns can be accumulated, it would be possible to sex horn core fragments which are adequately preserved.

Evidence for disease

Evidence for pathological conditions among the cattle bones was very limited. Abscess scars were present on two vertebrae; one was on the neural spine of a thoracic vertebra, the other within the neural arch of a lumbar vertebra resulting in a modification of the anterior face of the vertebra.

Three phalanges showed evidence of arthritic bony outgrowths. A second phalanx from MK1/B5/10(ii) carried a small bony outgrowth on the distal articulation; a second phalanx from MST/K8/13 was badly deformed by extensive bony outgrowths. MK1/A3/11 yielded a first phalanx which was badly deformed by extensive bony outgrowths. It seems therefore that the cattle at Greefswald were less affected by this type of bone deformation than the smaller stock.(Plate 6.).

An unusual specimen came from MST/K8/12(g) (Level 8) in the form of a fifth metacarpal which was extensively wasted at one end to form a point. Initially the shape was thought to be the result of cultural modification, but was eventually identified as a pathological condition. This may have been the result of navicular disease.

Although it provided no evidence for pathological conditions, an articulating set of three phalanges from MST/K8/7 showed an unusual morphology in that the terminal phalanx had a strongly curved "sole", suggesting a deformed hoof. In addition, K2/T3/1722 provided evidence of a deformity in a tooth with the presence of an accessory pillar alongside the buccal surface of M2. The pillar was not attached, but originated between M2 and M3.

During the analysis it was noticed that some irregularities existed in the form of the base of the neural arch in both lumbar and thoracic vertebrae in the sheep/goat and cattle class. It was found that the anterior zygapophyses

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were asymmetrically developed and in some cases one side was drastically reduced. The distribution of the characteristic was as follows:

Thoracic vertebrae:	Bov.II:	13th thoracic vertebra - 1 (unfused centrum)
	Bov.III:	6 thoracic (3 unfused centra) 13th thoracic vertebrae: 7 (unfused centrum)
Lumbar vertebrae:	Bov.I:	1
	Bov.II:	2 (1 unfused centrum)
	Bov.III:	4 (1 unfused centrum). One of these specimens (MK/2597) had the mark of an abscess on the base of the spine.

In addition, one Bov.III thoracic vertebrae had a perforated base to the neural spine, and a Bov.II thoracic vertebra had an anvil shaped tip to the neural spine.

When this phenomenon was discussed with Rautenbach, it was suggested that the feature should be noted in future and observations made to see whether it occurs with any consistency in modern material. Rautenbach suggested that this asymmetry could possibly be a side effect of in-breeding or selective breeding.

Identification of cattle breeds

The Bantu-speaking peoples who moved into southern Africa either brought with them or acquired cattle of the Sanga type. The Khoikhoin people who preceeded them possessed cattle which were ancestral to the present day Africander. (Epstein, 1971, Vol. 1:482, 587). The critical question is whether these two types of cattle, ie. Sanga and Africander, are identifiable in the archaeological record.

Much has been written on "indigenous" breeds in southern Africa; this literature contains a great deal of descriptions and discussions of external characteristics, but very little on skeletal variations.

Sanga are basically cattle in which the hump is developed to a greater or lesser degree. They are the result of a crossing of Zebu (*Bos indicus*) and long horned humpless cattle.

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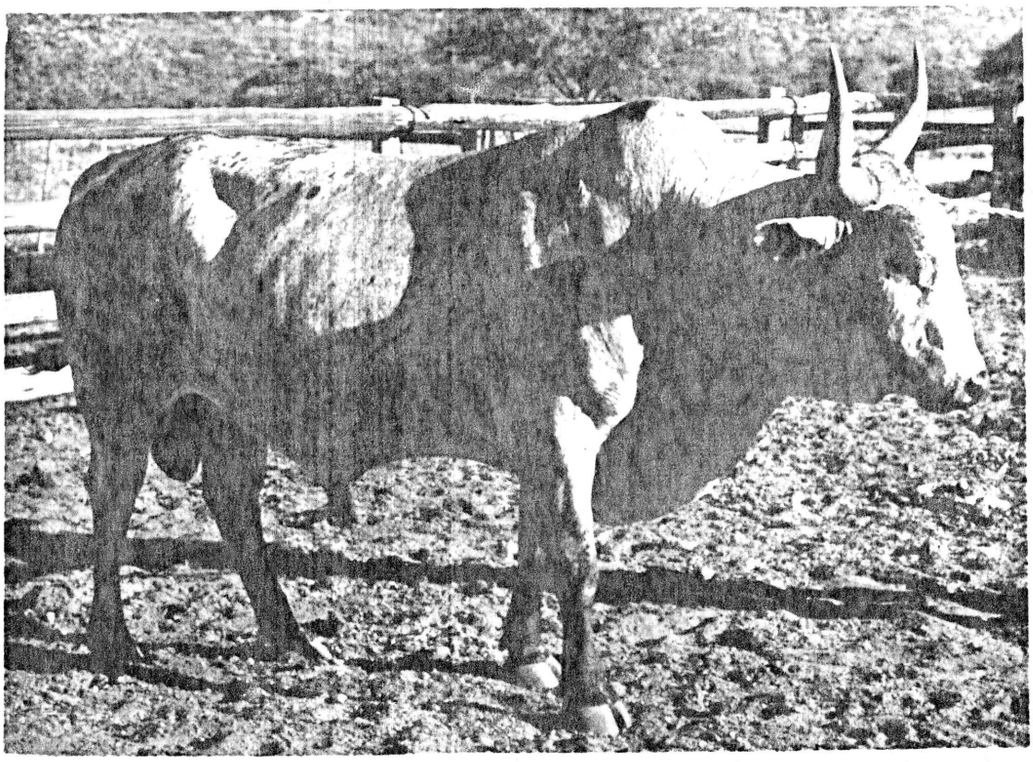

Plate 6.14. Sanga type: BaPedi bull, Arabie Agricultural College, Lebowa. Note flat facial profile and poll and well-developed hump and dewlap.

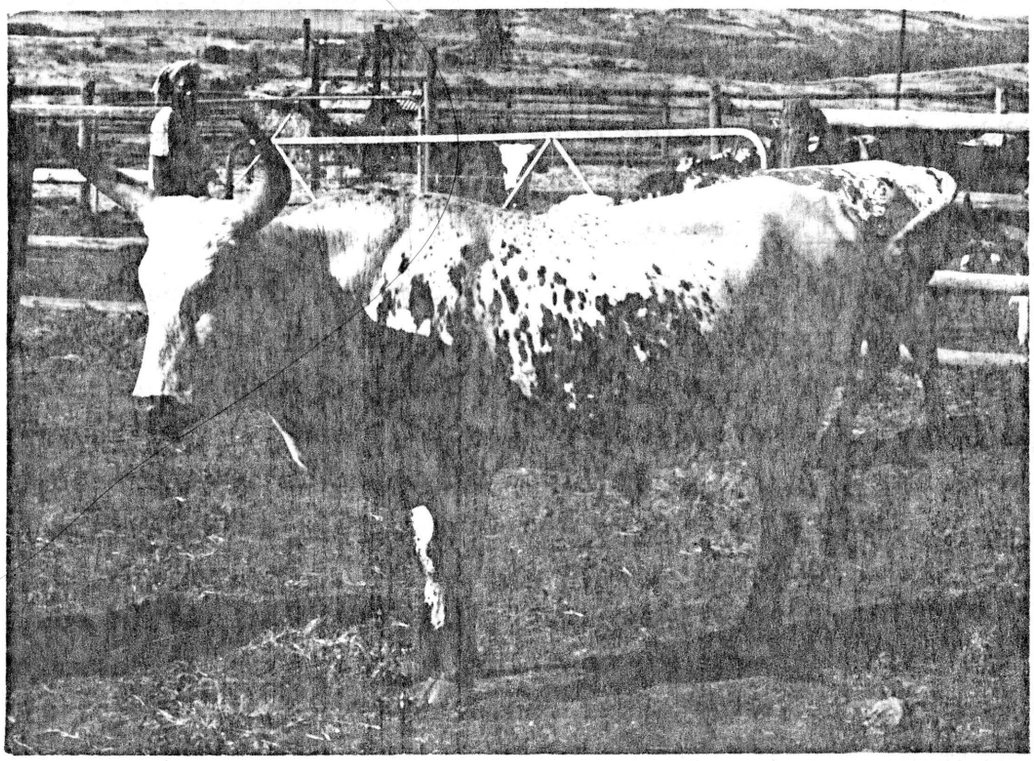

Plate 6.15. Sanga type: Nguni cow, Cwaka Agricultural College, KwaZulu. Note that facial and poll profile is straight, the hump is not very well developed. This specimen displays the black nose and ears characteristic of the "Royal Nguni" herd.

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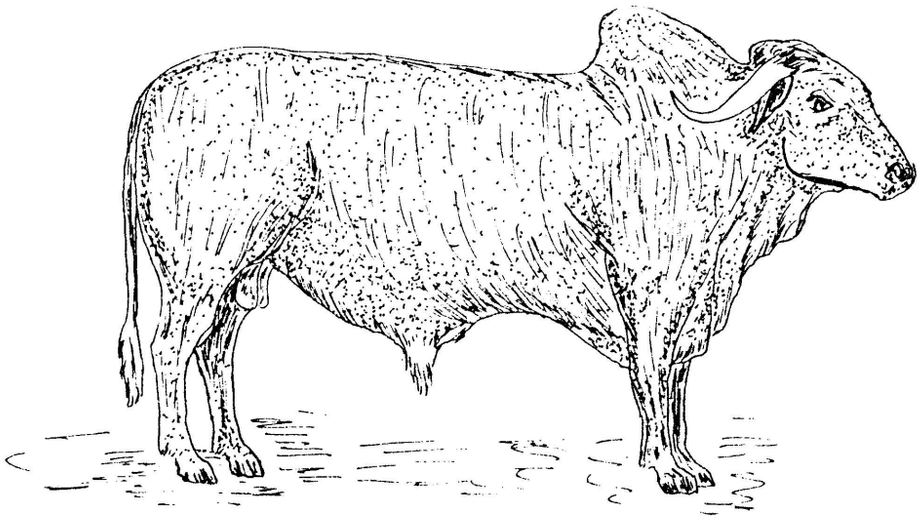

Plate 6.16. Sanga-Zebu cross? Africander bull, Grand Champion at Bloemfontein Agricultural show. Note convex facial and poll profile, horn configuration and exaggerated hump and dewlap.

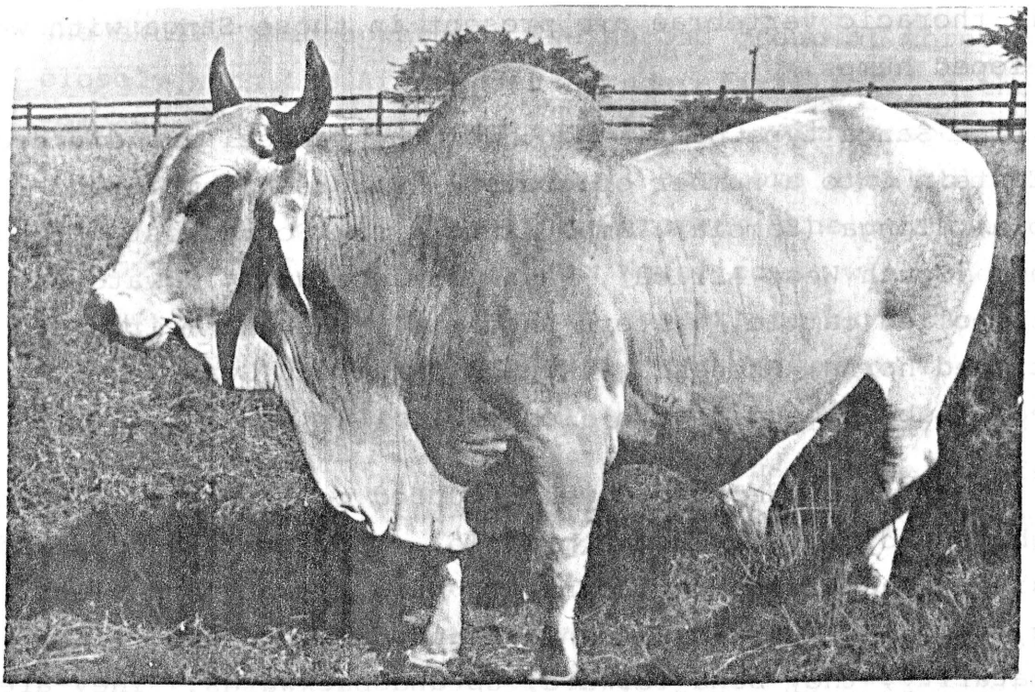

Plate 6.17. Zebu type. Pure-bred Brahman bull, Cwaka Agricultural College, KwaZulu. Note convex facial and poll profile and exaggerated hump and dewlap.

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How the Zebu reached Africa is not satisfactorily explained, but it is assumed by Epstein (1971, Vol. I:547) that they came in via the East Coast during the eighth century A.D. The definite presence of humped cattle at Greefswald at 1 000 A.D. would require a very rapid development and movement of humped Sanga types.

The head of the Sanga is long and of moderate width, with a convex (eg. Nguni) or straight (eg. Barotse) profile. The size and directions of the horns vary considerably; naturally polled cattle occur among the Venda and Nguni cattle. Two types of horns occur - a long, relatively slender and a gigantic form. Epstein states that the horns of Nguni are circular in cross-section; this has not been found to be the case in the study of the limited sample available.

The majority of Sanga are humped, the hump being well developed in bulls and either small or absent in cows. The hump is cervico-thoracic, resting on the sixth and seventh cervical vertebrae to the fourth and fifth thoracic vertebrae. Bifid thoracic vertebrae are present in those Sanga with well developed humps.

The Sanga type cattle South of the Zambezi are divided by Epstein into a number of groups: Barotse (Zambia and Angola), Tonga (Zambia), Ambo (Angola and South West Africa), Damara (South West Africa), Nama (Namaqualand), Ngwato or Tuli (polled cattle, western Rhodesia), Mashona (circular sectioned horns; Rhodesia), Nguni (Natal and Swaziland), BaPedi (Lebowa) and Basuto (Lesotho). (Plates 6.14-6.15).

The Africander has a well-rounded poll with a receding forehead and slightly Roman profile. The jaws are deep and massive. The Africander horns are hard, smooth and clean. They leave the head in a downward and backward direction; at maturity, they bend forward, up and backwards. They are oval in cross-section and may reach a great length. The horn cores are deeply furrowed on the caudal or ventral surface and are rough at the base. Cows have thinner, more lightly built horns. (Plate 6.16). (Epstein op.cit., Vol.1:472).

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The hump of the Africander is cervico-thoracic; the sixth thoracic vertebra is bifurcated.

In order to be able to say something about the breed of cattle present at Greefswald, a limited number of morphological characters should be examined. These are horn conformation and size, bifid vertebrae and cranial profile.

a) Horncores

The small sample of well-preserved horncores from Greefswald can be visually sorted into two groups. The first group consists of horncores which have a relatively spongy conformation with large sinus cavities. The second group contains only three specimens; all three are dense and compact, and two of them, G/4869 and K2/4864, have deep grooves running along the caudal surface. All three fragments appear to have come from long horns; their basal dimensions are larger than those of the Nguni specimens available. (Plate 6.12).

All the Greefswald horncores have oval cross-sections and appear to have been horns coming straight out from the side of the skull, then upwards. The second group of three matches very closely with the Africander horncore available in the collection; two specimens match exceptionally well with respect to the caudal grooves. The Nguni bull horncore available is also of dense bone, but has no such groove. The other horncores are most similar to those from Nguni cows, with the exception of one specimen (G/4871) which appears to have come from a short-horned animal. The Nguni horncores were found to have an oval cross section; and not a circular-section as stated by Epstein. The basal dimensions of the Greefswald horncores fit in well with those of the Nguni sample (Fig. 6.3).

In his report of 1939 (Appendix 2), Curson classifies G/4869, K2/4864, G/4859 and G/4872(a) as Africander. G/4859 does in fact curve slightly forward after leaving the skull laterally, and could therefore be from an Africander on this basis. However, the structure of the horn is very spongy, and I would adhere to my decision that G/4859 and G/4872(a) came from Sanga types. His classification of specimens numbers K2/4858,

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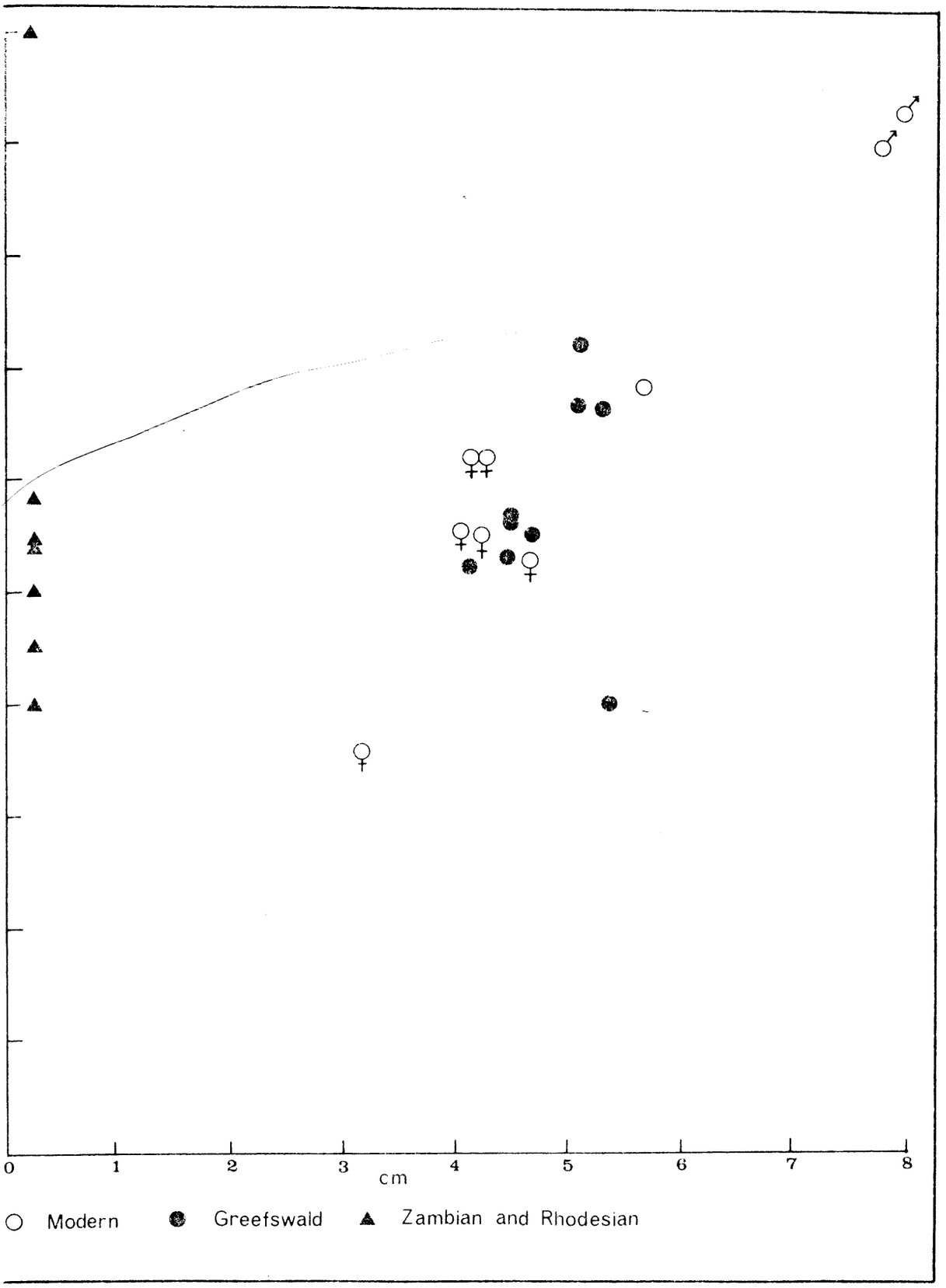

Fig. 6.3. Basal dimensions of horn cores of modern and pre-European specimens of *B. taurus*.

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G/4872(b) and G/4870 as Sanga agrees with my identification. Curson's further breed identifications were based on skull profiles, which are discussed below.

The evidence of the horncores suggests that the Greefswald people kept Sanga cattle, but also had Africander cattle among their herds. The very short horncore suggests that a short-horned breed might also be present.

Epstein and others have repeatedly mentioned the presence of bifid thoracic vertebrae in both Sanga and Africander types of cattle. The bifid structure is a functional adaptation to the development of a hump. The dorsal spine of the vertebrae broadens laterally and the tip of the dorsal spine divides into two. There is no information available on the degree of bifidity found in different types, nor the relative frequency of bifid vertebrae in Sanga or Africander types. Presumably the degree of splitting depends upon the size of the hump. Two vertebral columns of Sanga type cattle were available for study, one from a BaPedi cow and one from a Nguni animal. The thoracic vertebrae show thickening and slight bifidity, with flaring of some of the lumbar vertebrae. An Africander vertebral column showed a similar degree of splitting. Epstein (1971 Vol 1:477) illustrates a thoracic vertebra of an Africander cow with a very well-defined division on the tip of the dorsal spine.

The Greefswald sample contained fragments of eight bifid thoracic vertebrae (Plate 6.13), two thickened thoracic dorsal spines and one flared lumbar dorsal spine. The bifid spines show varying degrees of bifidity; three specimens show a very strong division, with a maximum depth of cleft of 1,39 cm. The distribution of the bifid specimens is as follows:

K2/TS2: 2 specimens
K2/TS3: 3 specimens, one of which is from a juvenile.
MK1, Phase 3: 1 specimen
MK1, Phase 2: 5 specimens, probably from a minimum of two individuals.

The presence of these bifid vertebrae therefore indicates the presence of humped cattle in three phases at Greefswald. It is the first time that these vertebrae have been recorded in an archaeological context South of the Sahara.

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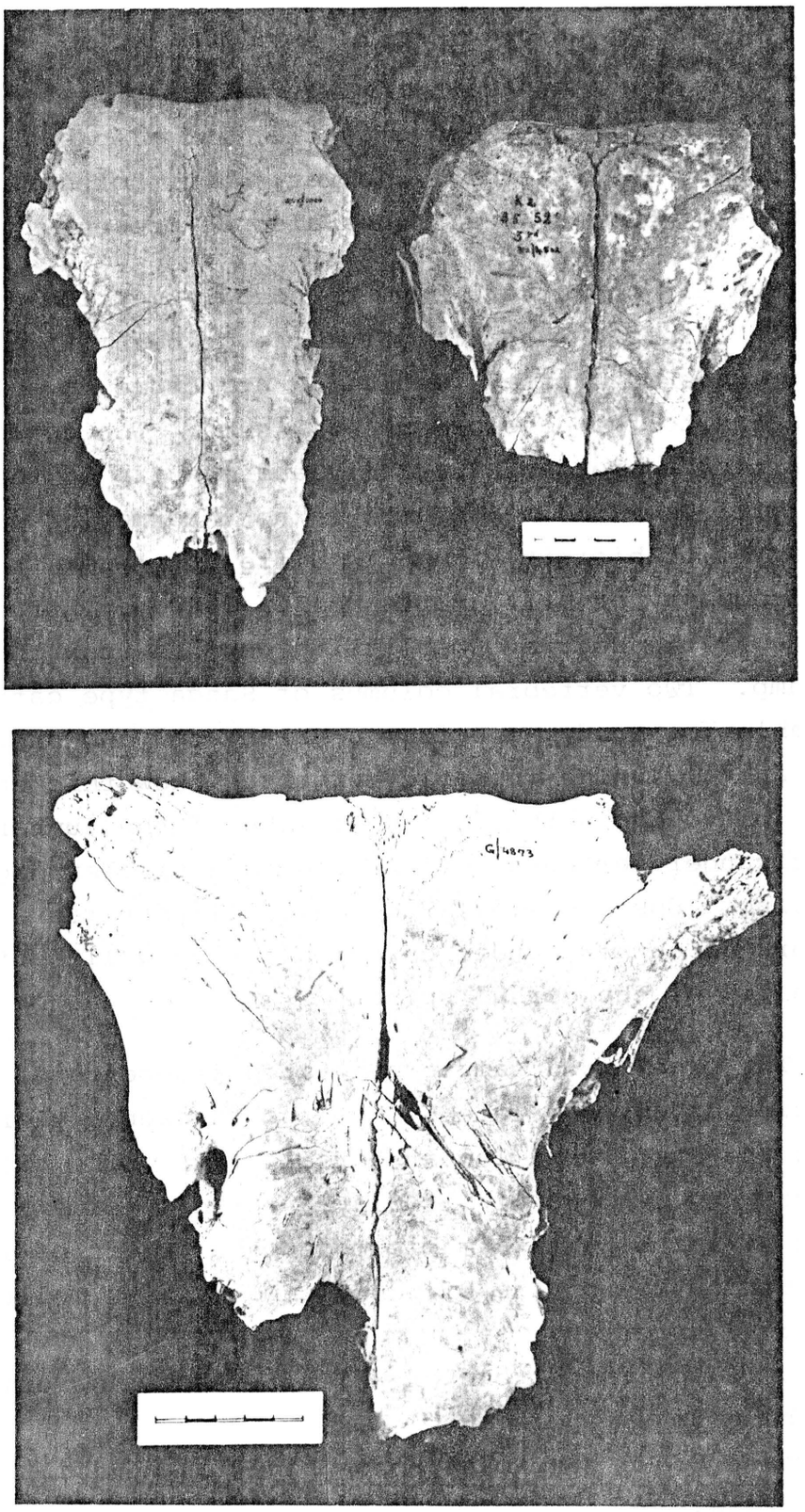

Plate 6.18. Three **frontals from Greefswald showing straight profiles and polls of the Sanga type of cattle.** Lower specimen shows extensive butchering damage (see Ch. 8:205)

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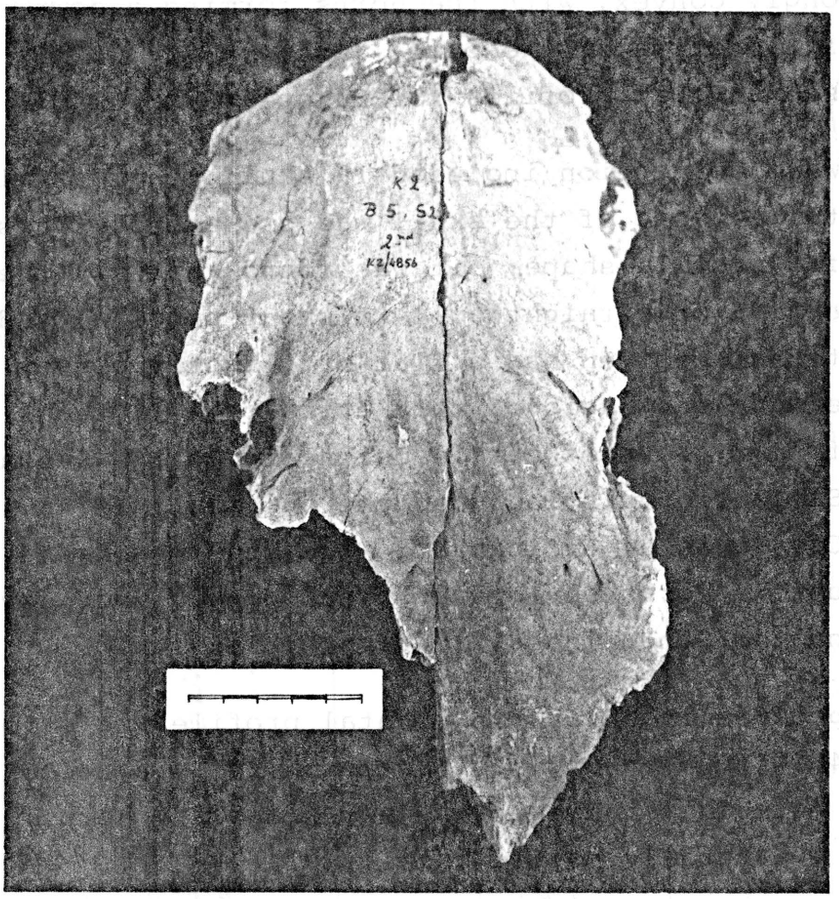

Plate 6.19. K2/4856. Remains of a naturally polled specimen of B. taurus.

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A similar bifid thoracic vertebra has since been identified by T. Huffman from a Ziwa site in Rhodesia (Huffman, pers. comm.)

c) Skull profiles

The skull profiles of Sanga and Africander types differ in two respects. Sanga cattle have a relatively flat or straight profile from poll to snout, and a relatively flat or slightly convex frontal profile. In Africander cattle the facial profile is convex or "Roman", while the poll profile is strongly convex, with the horns forming a downward continuation of the curve of the poll. Grigson (1976:126) has characterised frontal profiles for European breeds.

The Greefswald collection included 19 skull fragments in which one frontal or more of the skull was preserved. These were examined for profile shape; it was found that all the specimens had a flat or straight poll to snout profile, and that all except one specimen had a flat or slightly convex frontal profile. On the basis of this evidence, all the material came from a group of cattle belonging to the Sanga breed. These Sanga frontals included the one skull (G/4874("K") classified by Curson as an Africander. The specimen has a convex poll, but the horns obviously turned upward, not downward, confirming the Sanga identification. (Plates 6.18).

The only specimen in which the frontal profile was strongly convex was K2/4856 from the old collection. It is particularly interesting to note that the specimen never had any horns; it thus came from a naturally polled animal (Plate 6.19).

The facial and frontal profiles of the Greefswald material have been plotted in Fig. 6.6; for comparison the same profiles have been plotted for Ambo (Ovambo), Nguni and Africander cattle, (as well as for a Jersey cow for comparison) in figs. 6.4 and 6.5

(I am very grateful to Mr C. Armstrong for the data on Ambo cattle.)

The evidence suggests that the study of such profiles may be of use in isolating breeds of cattle. The Greefswald skull remains can be shown to have come only from a Sanga type of animal, with the additional information that a naturally polled animal is also present.

The size of the Greefswald cattle

The above data provided evidence for the presence of both Sanga and Africander breeds of cattle at Greefswald. A recurrent question in the

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Fig. 6.4. Facial profiles of breeds of *Bos taurus* : Ambo, Nguni, Africander and Jersey.

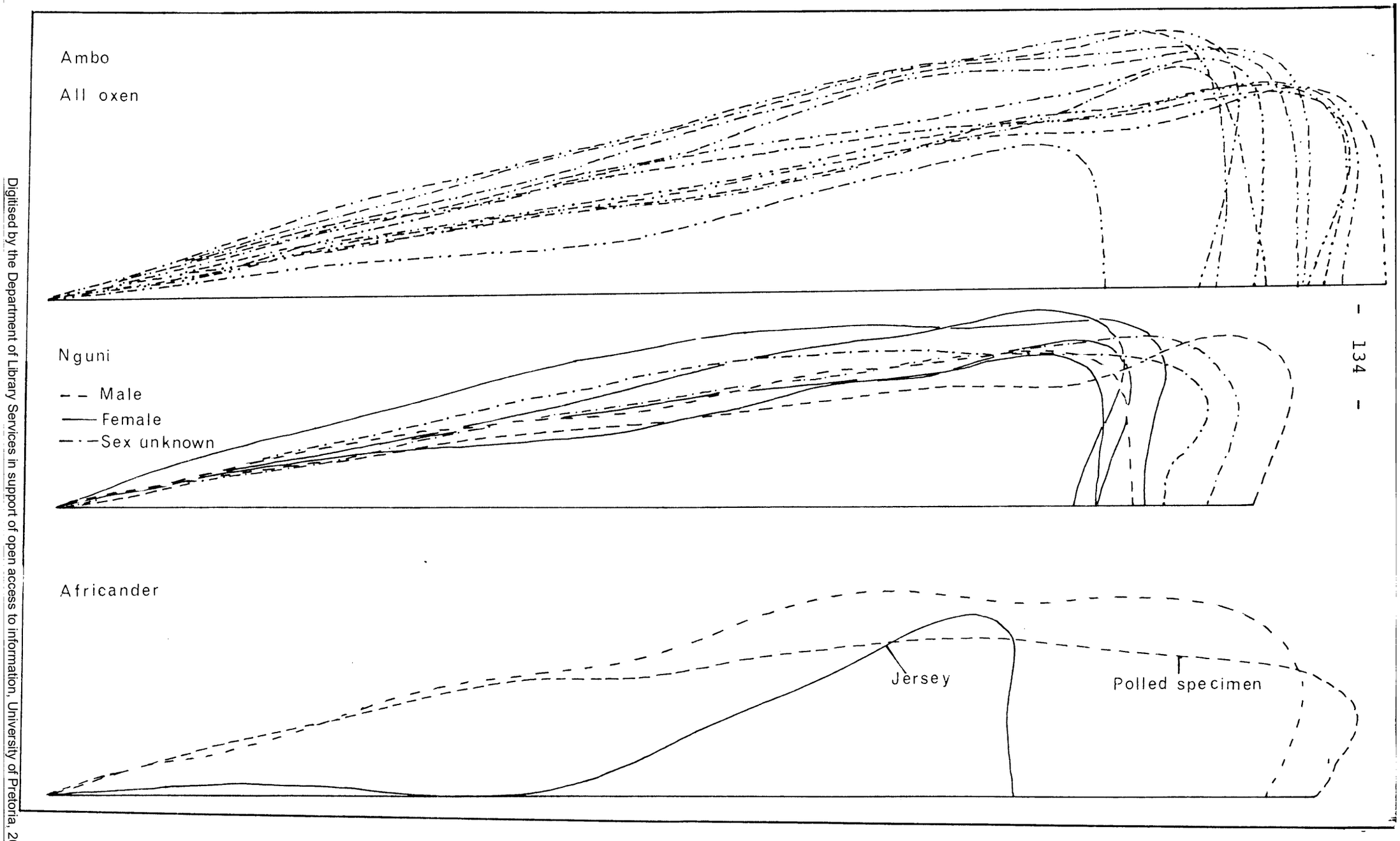

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Fig. 6.5. Poll profiles of breeds of *Bos taurus* : Nguni, Africander and Jersey.

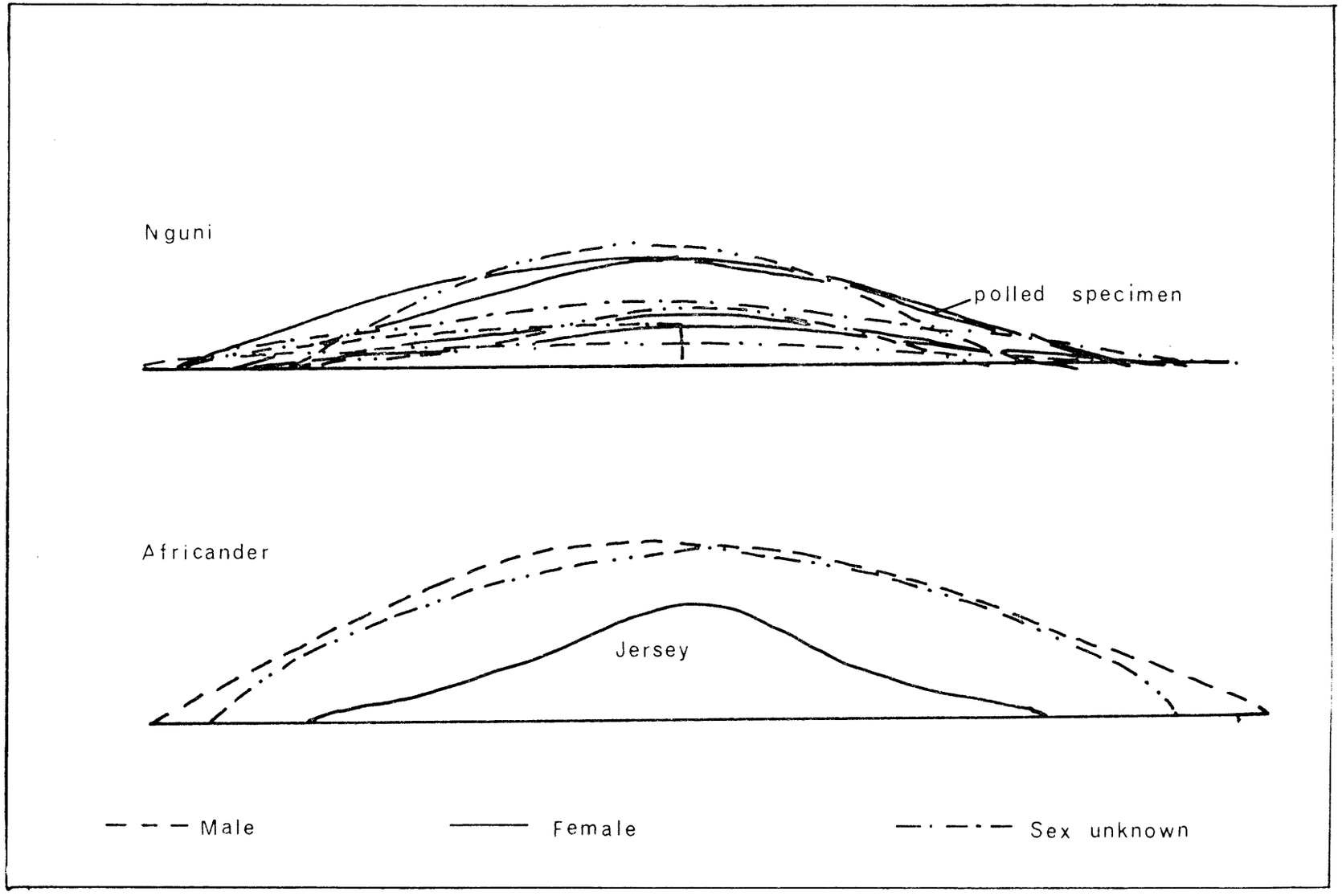

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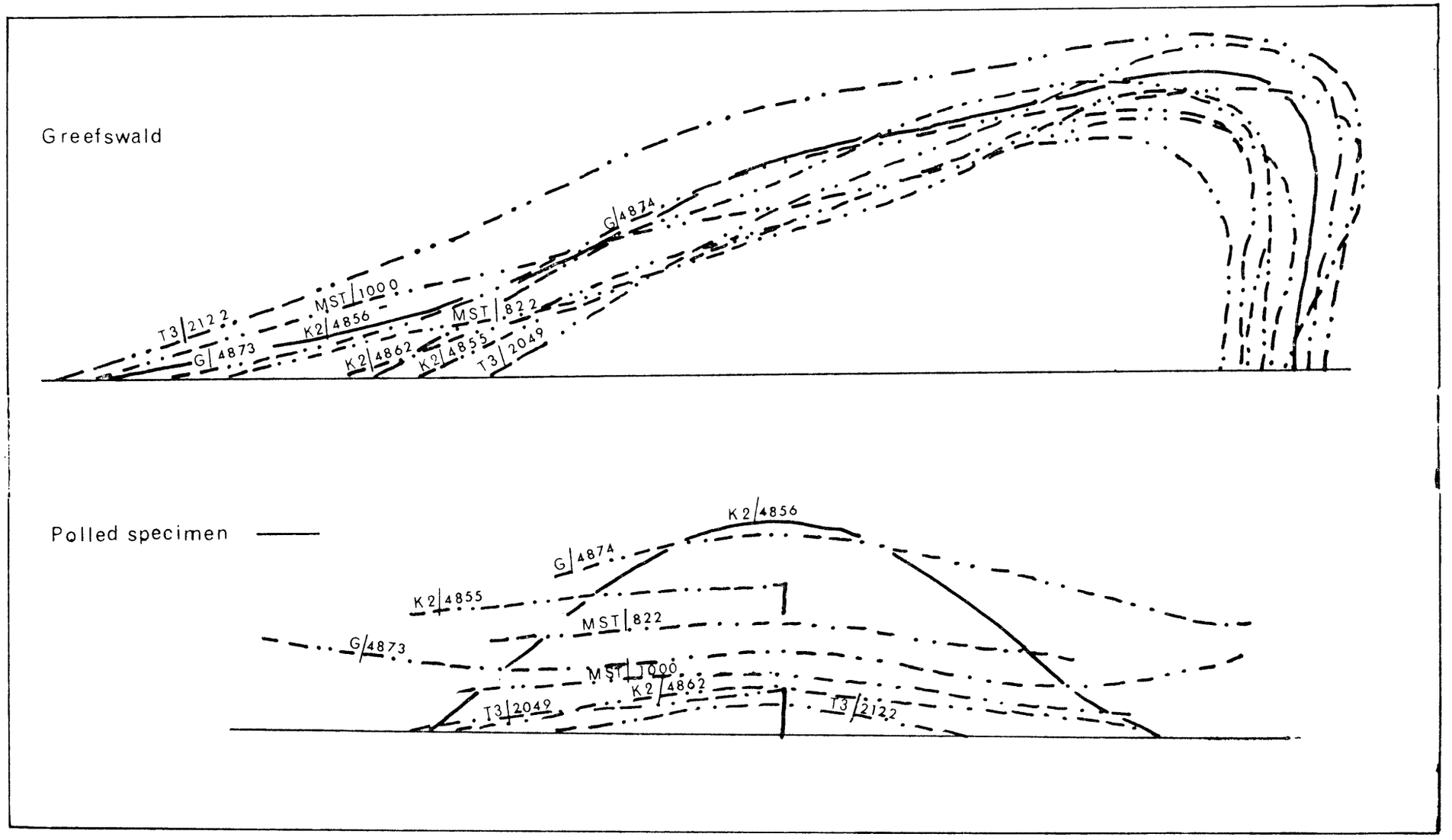
Fig. 6.6. Facial and poll profiles of *Bos taurus* from Greefswald



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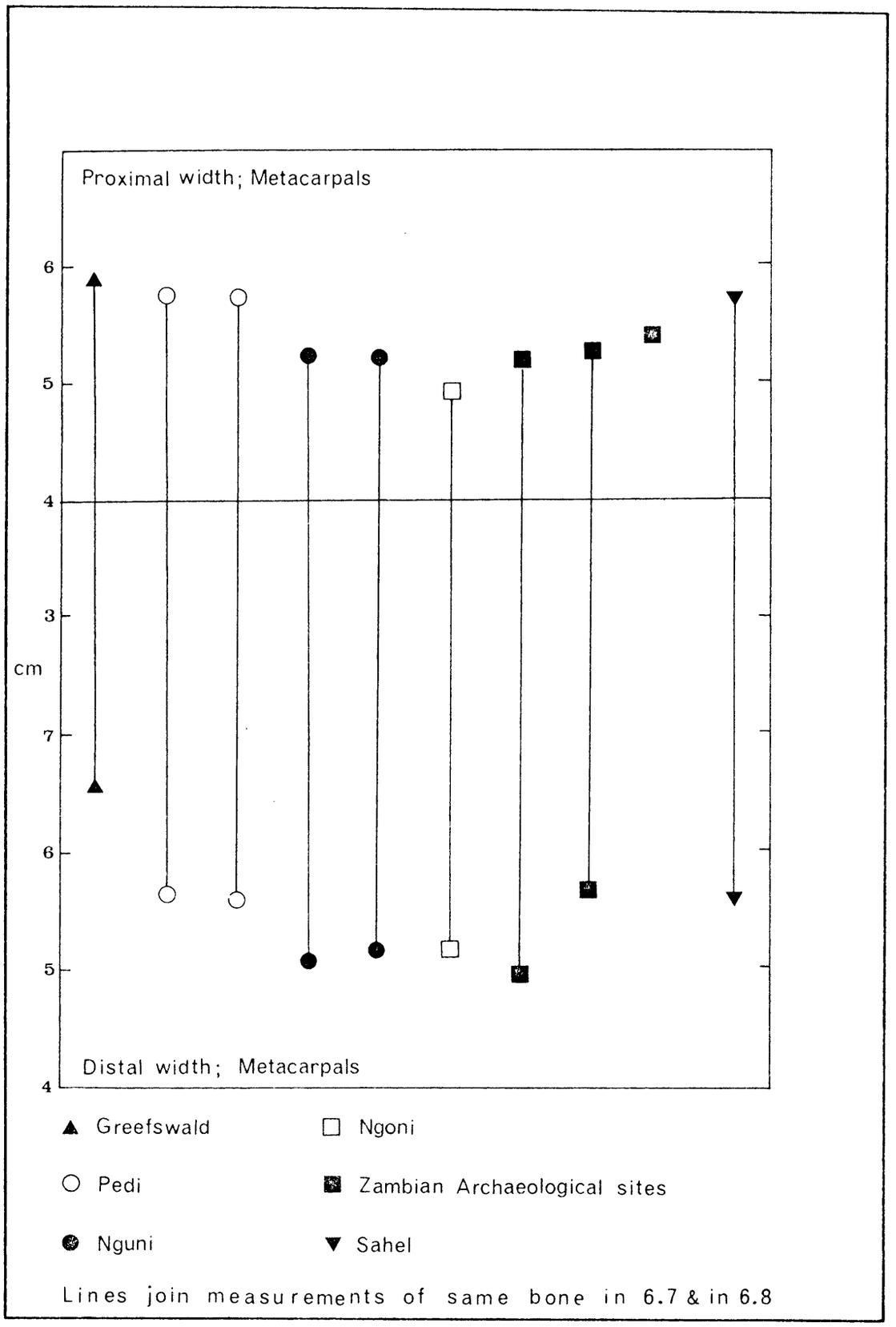

Fig. 6.7. Epiphyseal width of metacarpals of modern and pre-European specimens of *Bos taurus*.

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literature concerns the size of Iron Age cattle. This is most frequently judged on the basis of metapodial dimensions and tooth dimensions. Only three metapodials were adequately preserved at Greefswald to enable measurements to be taken. The dimensions of the epiphyses of the specimens is listed in table 6.9 ; the published dimensions of Zambian Iron Age and Saharan Neolithic cattle are also given, with additional measurements from Pedi and Nguni specimens. These measurements are plotted in Fig. 6.7 and 6.8. The measurements used were those laid down by van Dreisch (1976:92). The data show that the complete metacarpal is larger than any previously published material, the closest match being the Neolithic cattle from Daima in the Sahel. One proximal metatarsals fallsin the centre of the range of metatarsals; the other is on the extreme lower end of the range. It seems therefore that the one Greefswald specimen is from a large animal, similar to the Pedi cow available in the comparative collection. The other two specimens fall within the range of published Iron Age material. In general terms, the Zambian material falls within the range of the modern material available, and should therefore possibly not be regarded as being from excessively small animals. However it must be borne in mind that the measurements plotted are means and medians, and that the actual measurements might present a different picture.

If the complete metacarpal is an indication that the Greefswald cattle were larger than other Iron Age and possibly even present-day cattle, then it is essential to examine other possible indications of size. It was therefore decided to measure those tooth rows which were adequately preserved, and to compare these to the modern form.

Seven sets of measurements were recorded:

Length of cheektooth row: mandible and maxilla.

Length of premolar row, measured along alveoli on buccal side: mandible and maxilla.

Length of molar row, measured along alveoli on buccal side: mandible and maxilla.

Length and breadth of $M\bar{3}$ at biting surface.

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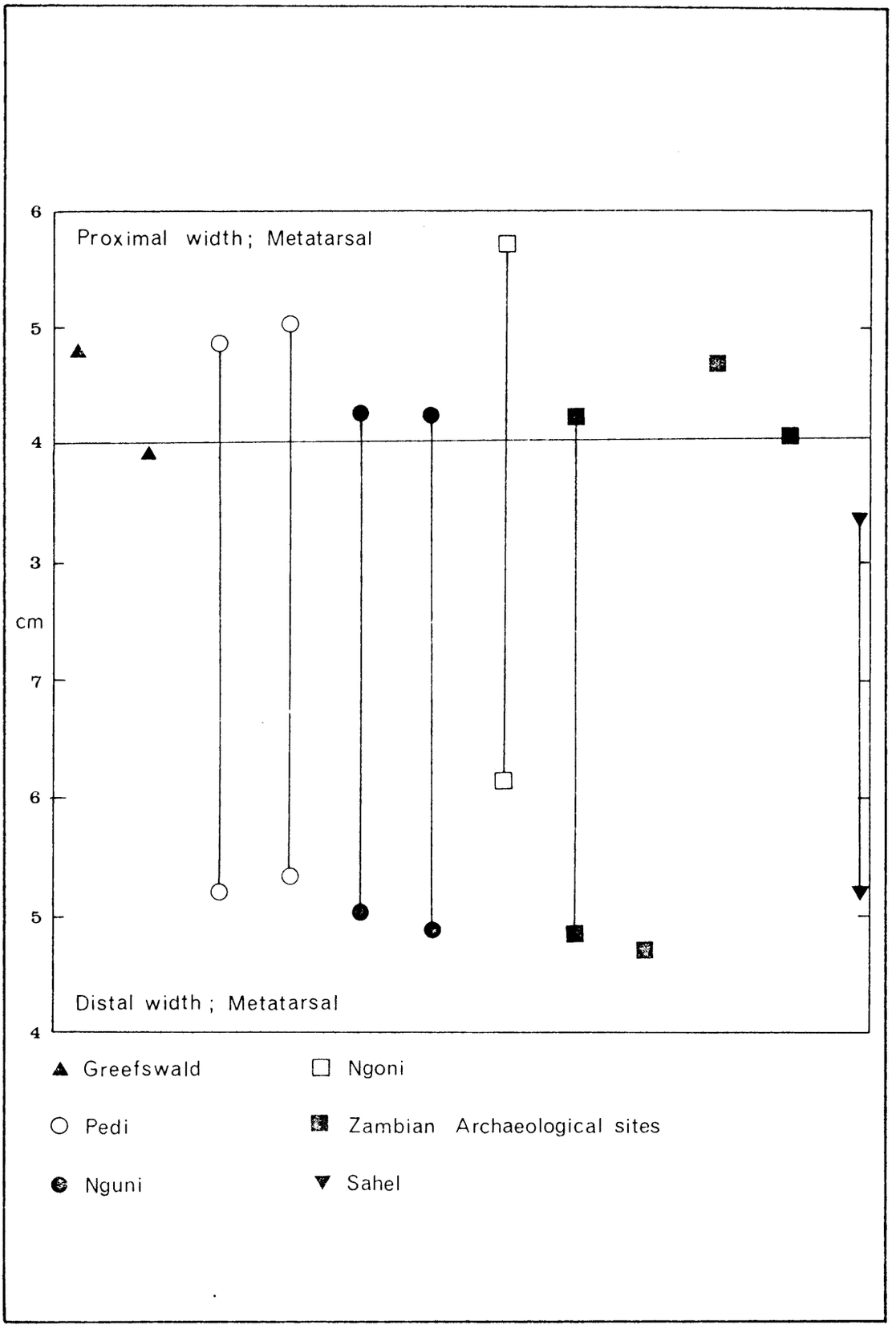

Fig. 6.8. Epiphyseal widths of metatarsals of modern and pre-European specimens of *Bos taurus*.

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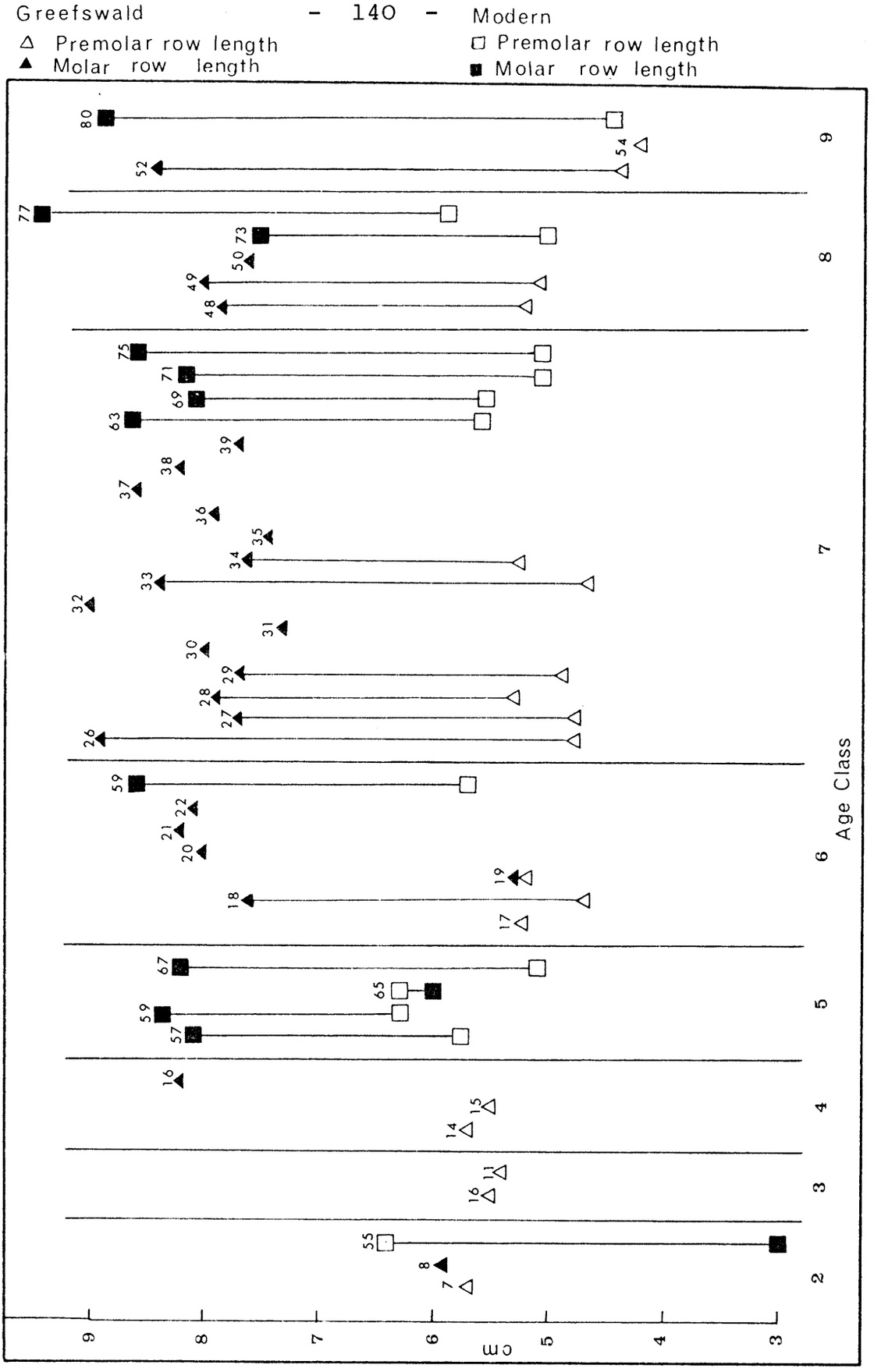

Fig. 6.9. Maxillary tooth row measurements of Greefswald and unimproved *Bos taurus* specimens. Only complete measurements are included; straight line joins measurements of the same individual. Specimen numbers above symbols.

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The results of these measurements are given in Table 6.10; where the tooth rows were complete, the length of the premolar and molar tooth rows were plotted in fig.6.9 The samples in the younger age groups are somewhat small. In classes 2, 3 and 4 they do fall below the measurements for Class 5, so that young animals were possibly smaller than their modern counterparts. In Class 6, the Greefswald specimens all fall below those of the single modern specimen, but in Classes 7, 8 and 9 the measurements are close to those of modern animals. The means for classes 6, 7 and 8 were calculated in Table 6.11.

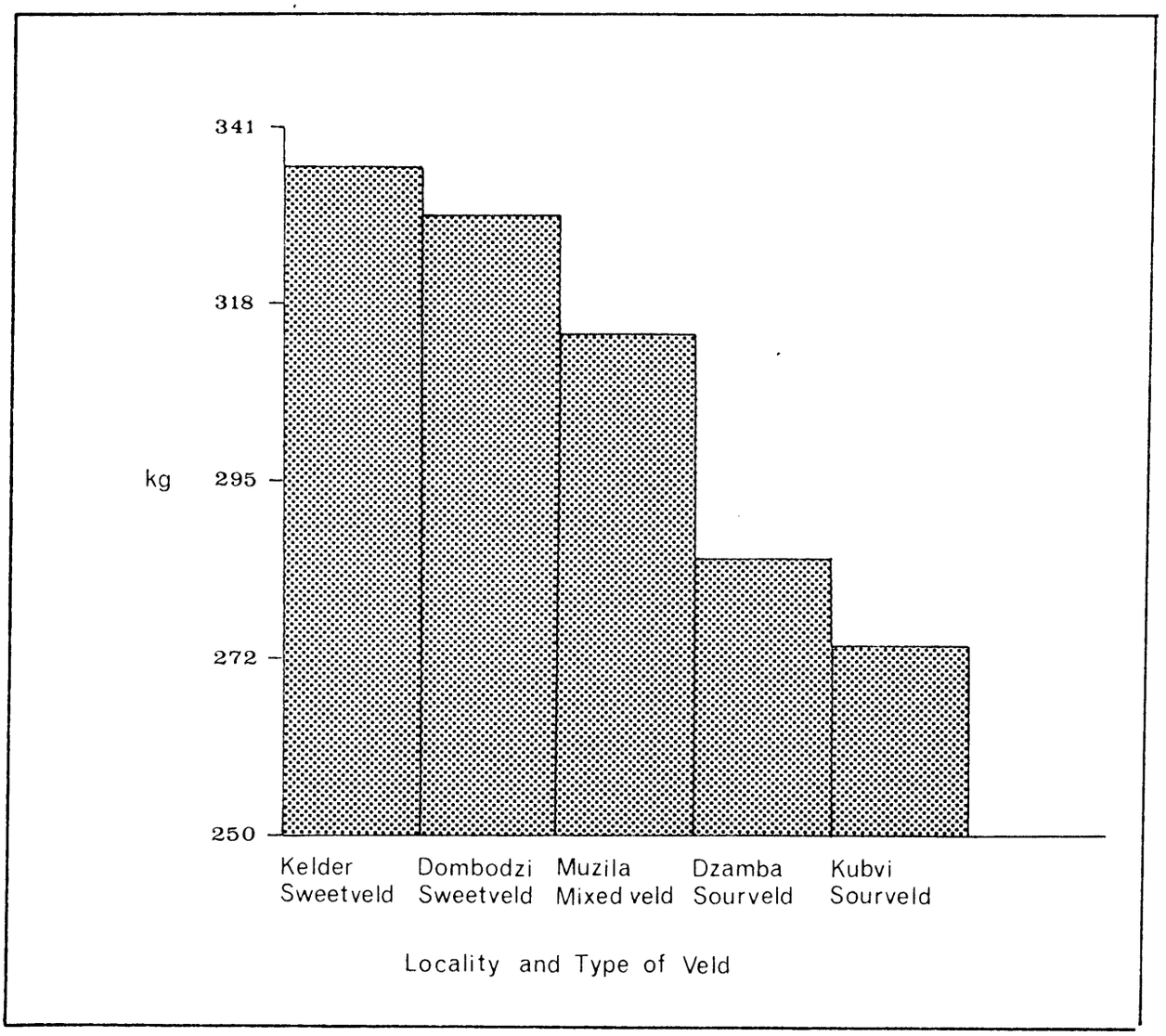

Fig. 6.10. Variations in adult Venda cow body mass on different types of veld. (Mansvelt and Skinner, 1962:6).

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The variation in the mean values is almost certainly a result of variation in sample sizes. The Class 8 modern molar row mean is very high because of the presence of a large Africander in the sample.

The present data suggest that there is no evidence at Greefswald to prove that the Iron Age cattle were significantly smaller than present day cattle; the adult animals appear to have been much the same size as the modern unimproved breeds. If one then looks at Fagan's figures for molar row lengths from Behrens, Isamu Pati and Kangila, it is clear that his mean values of 8,2 fall within the range of the Greefswald material. This would therefore suggest that these Iron Age beasts were similar in size to the Greefswald animals, and therefore close to the size of modern beasts.

The above provides some information on the breeds of cattle present at Greefswald. It remains to be seen whether there is any possibility of reconstructing bovine husbandry practices at Greefswald.

Animal husbandry of cattle

In discussing husbandry of the Greefswald cattle, the most useful source for indications of usage was the paper by Mansvelt and Skinner (1962) dealing with BaVenda cattle. The information given in this pamphlet is concerned with the husbandry of an unimproved breed in a rural area; it could therefore be used as an example of how the Greefswald people might have handled their cattle.

Mansvelt and Skinner found that animals occurring on Mopane veld and arid sweet veld were larger than those on sourveld because of the relatively constant level of nutrition of these types of veld. The figure illustrating weight variations of cows on different types of veld is reproduced as Fig. 6.10. Oxen on sweetveld reach a calculated live weight of 662,9 kg. H.P. Eloff (pers.comm.) describes the grazing on Greefswald as "typical sweetveld", in which the grass remains comparatively nutritious during the winter. Cattle suffer a weight loss from about August until adequate green grazing is available; they are in best condition from April to June.

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During dry years in the Greefswald area the growth of young cattle is retarded and fertility and milk yield decrease; however seasonal variations of the veld have not been found to have any effect on the tooth eruption pattern of cattle. (Eloff pers.comm.). The Greefswald area is subject to periodic droughts, when heavy stock losses may occur. The figures quoted by Mansvelt and Skinner (op.cit.) give some idea of the enormous scale of losses - during drought years of 1946-1948, 78 633 head of cattle died in overstocked areas. The normal annual mortality rate for the area being studied by the authors was approximately 10 000 (including slaughtering). Thus drought years at Greefswalt could be expected to have resulted in very heavy stock losses.

It is unlikely that the Greefswald people were aware of the importance of carrying capacity, which would undoubtedly have aggravated the situation in drought years. The average carrying capacity for Greefswald has been calculated at around 20 to 30 hectares per adult animal (Eloff, pers.comm.), a figure which is undoubtedly too high for primitive pastoralists. Brown (Monod, op.cit.:115) suggests that the carrying capacity of Kenyan savannah is approximately 20 standard stock units, or 40-60 cattle or 200 sheep/goats per 400 hectares, i.e. 1 cow per 40 hectares. If the human population doubles every 25-30 years, the pressure on grazing will rapidly reach a critical level. Brown calculated that cattle populations in Kenya double in 4 years, with a 10% annual reduction. Thus overgrazing will quickly develop, and drought years have a disastrous effect in the cattle population.

Among the BaVenda, the cattle are herded on common open grazing in summer, and allowed access to harvested fields in winter. The animals are kraaled until late morning and returned to the kraals at sunset. Mansvelt and Skinner mention that late access to grazing is due to a belief that early grazing, when the dew is still on the grass, is unhealthy (op.cit.:3). There is a sound basis for this in that ticks are most active in the cool, damp hours of the morning. This is so general a practice as to suggest that it is a tradition of long standing.

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It is not a tradition which would help within a tsetse-fly area, however, as tsetse tend to be most active at mid-day.

Observations on herd composition suggest that mature males made up 6-16% of the herd and breeding females 38-43%. The BaVenda allow their bulls to run with the herd; unwanted bulls are castrated at about 36 months. Heifers are late maturing, and produce their first calves when nearly 48 months old. This is a similar age of maturity to that of Pedi cattle. Armstrong and Masemola (1975) give 47 months as the age of first calving of Pedi heifers before improvement.

With regard to calving, the work by Mansvelt and Skinner suggested that calving rates improved in years of good rainfall and therefore better grazing. The peak calving periods among the BaVenda cattle in both the sweet and sour veld areas appeared to be June to August, with a minor peak in December to February. (Fig. 6.1). Winter calving appears to protect the calves from some possible setbacks, as they are not exposed to the same number of diseases as summer calves (due to ticks being less active in winter?) and are weaned when grazing conditions are good. 175 calves were weighed at about 11 days old; an average weight of 28,4 kg was recorded. Bonsma (1950) records that Nguni cows are still calving regularly at 15 years and older; thus the breeding life of a cow could be long and constant.

It is interesting to note here that research into gestation periods and calf weights of Africander cattle has shown that Africanders have a longer gestation period (295 days) than their European counterparts (e.g. 287 days for Herefords). They also produce smaller calves (32.2 kg, or 3.6 kg less than cattle of European origin). The Africander shares this characteristic of a longer gestation period with the Brahman, *Bos indicus* (Joubert and Bonsma, 1959).

On the basis of the above information, one could suggest that the Greefswald herds consisted of, perhaps, 10% mature males and 40% breeding females, and that cows matured late, i.e. once $M\bar{3}$ was fully in wear. Calving would probably mainly have occurred in the winter months, with a second calving period at the peak of the rainy season.

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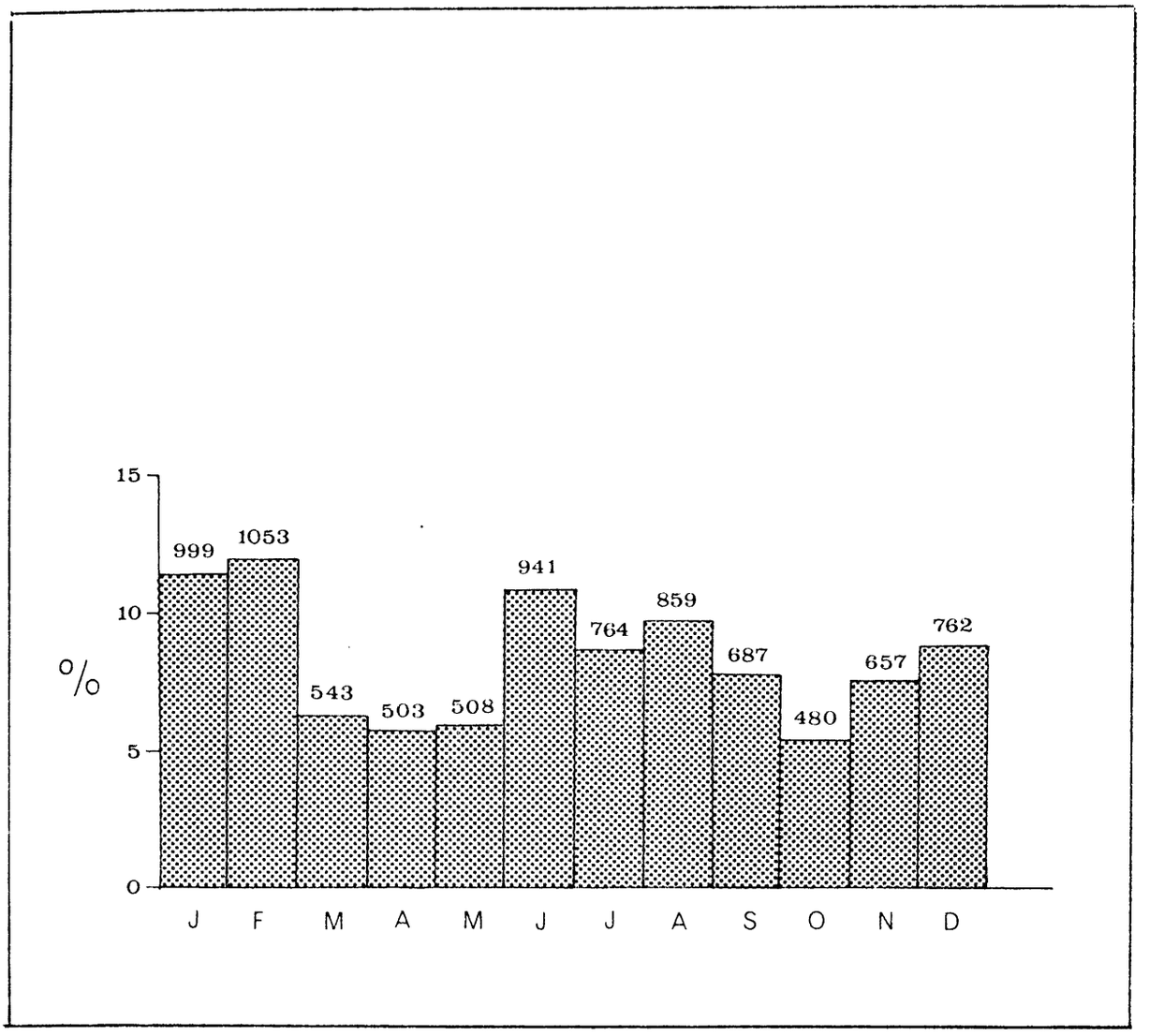

Fig. 6.11. Distribution of calving among Venda cattle between the months of a year over a four year period. Based on Mansvelt and Skinner (1962:13).

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We have very little evidence of sizes of cattle herds among present-day Bantu-speaking peoples. Jacobs (Odner, 1972:78) states that the Masai require 10-15 head of cattle per person in order to survive a normal dry season, and require more in a drought year. He states that a normal cattle unit among the Masai is 400 - 700 head. Deshler (1965:154 and 158) gives a much lower figure for the Dodos, i.e. 4 to 5 cattle per person and 70-130 cattle per group of 25 to 30 people. In order to extrapolate this information to the Greefswald situation, the size of the settlement would have to be known.

The BaVenda cattle are not much used for their milk, the average yield of a cow being about one pint a day. The Greefswald clay cattle figurines however, suggest strongly that milk was an important aspect of the Greefswald economy, so that in this respect it is to be assumed that the Greefswald pastoralists valued and possibly selected for good milk producers. Bonsma (1950) records that Nguni cows produce approximately nine litres of milk daily; some owners maintained that they received as much as 12,5 litres per day. Unimproved cattle can therefore be utilised as milk producers; one could assume that the Greefswald animals fell within this category.

Mansvelt and Skinner state that naturally polled animals are relatively common in the BaVenda herds; they recorded a figure of 14,5%. MK1 yielded a fragment of horncore which appears to be complete. It has an irregular extremity, and appears to be the residual horncore resulting from polling. The specimen (MK1/2607) may therefore indicate polling among the Greefswald cattle. (Plate 6.12a)

Finally, the question can be asked whether the Greefswald cattle were used for any purpose other than for food. The Hottentots were well-known for their use of cattle as riding and even fighting animals; Mansvelt and Skinner also mention that the BaVenda used their cattle for riding. The clay cattle figurine from K2/TS3 (Chap.11,p310) with a perforation through the snout could thus be interpreted as good evidence for the same use of cattle at Greefswald. It is therefore suggested that the Greefswald people used their cattle for riding; the possibility of their also being used for pulling sledges cannot be ruled out.

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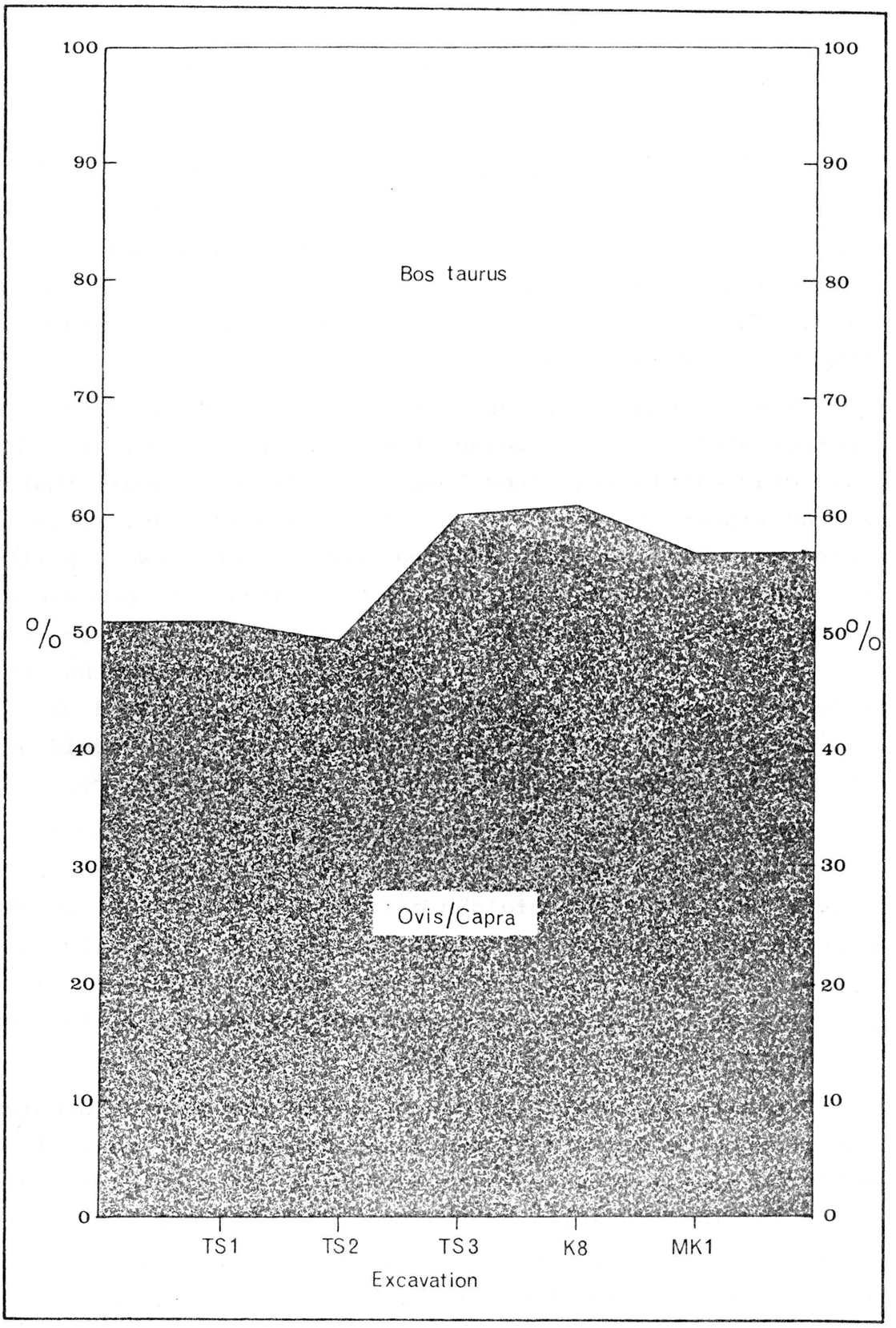

Fig. 6.12. Relative proportions of *Ovis/Capra* and *B. taurus* throughout Greefswald sequence.

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Deshler (op.cit. : 161-162) records that the cattle of the Dodos are in milk for 330 days per year. Milk production is dependant on feed and water conditions; in the wet season the cows give approximately 1 pint morning and evening after feeding their calves. However, in the dry seasons, four to six cows produce less than a quart of milk (1 litre) per day. Once again, further observations are essential in order to make meaningful comments on the possible situation at Greefswald.

Cattle, sheep and goats were the major source of food in the Greefswald economy. If one examines the total numbers of the two types of animals, the following figures emerge:

	CATTLE (M.IND.)	SHEEP/GOATS (M.IND.)	RATIO (Approx.)
K2/TS1	28	30	1:1
K2/TS2	62	61	1:1
K2/TS3	120	183	2:3
MST/K8	46	72	4:7
MK1	96	128	3:4

The people of TS3 and MST thus utilised their domestic animals in a 2:3 and 1:2 ratio; TS1 and TS2 have a 1:1 ratio, and MK1 3:4. These figures could be taken to represent the actual relative proportions of animals kept; thus on the Southern Terrace there may have been two cattle to every four sheep/goats, while on the Hill there were three cattle to four sheep/goats. The ratio is fairly constant and may thus reflect the maintenance of a fixed level in the herds and flocks (Fig. 6.11) which resulted in there always being marginally more sheep/goats compared to cattle.

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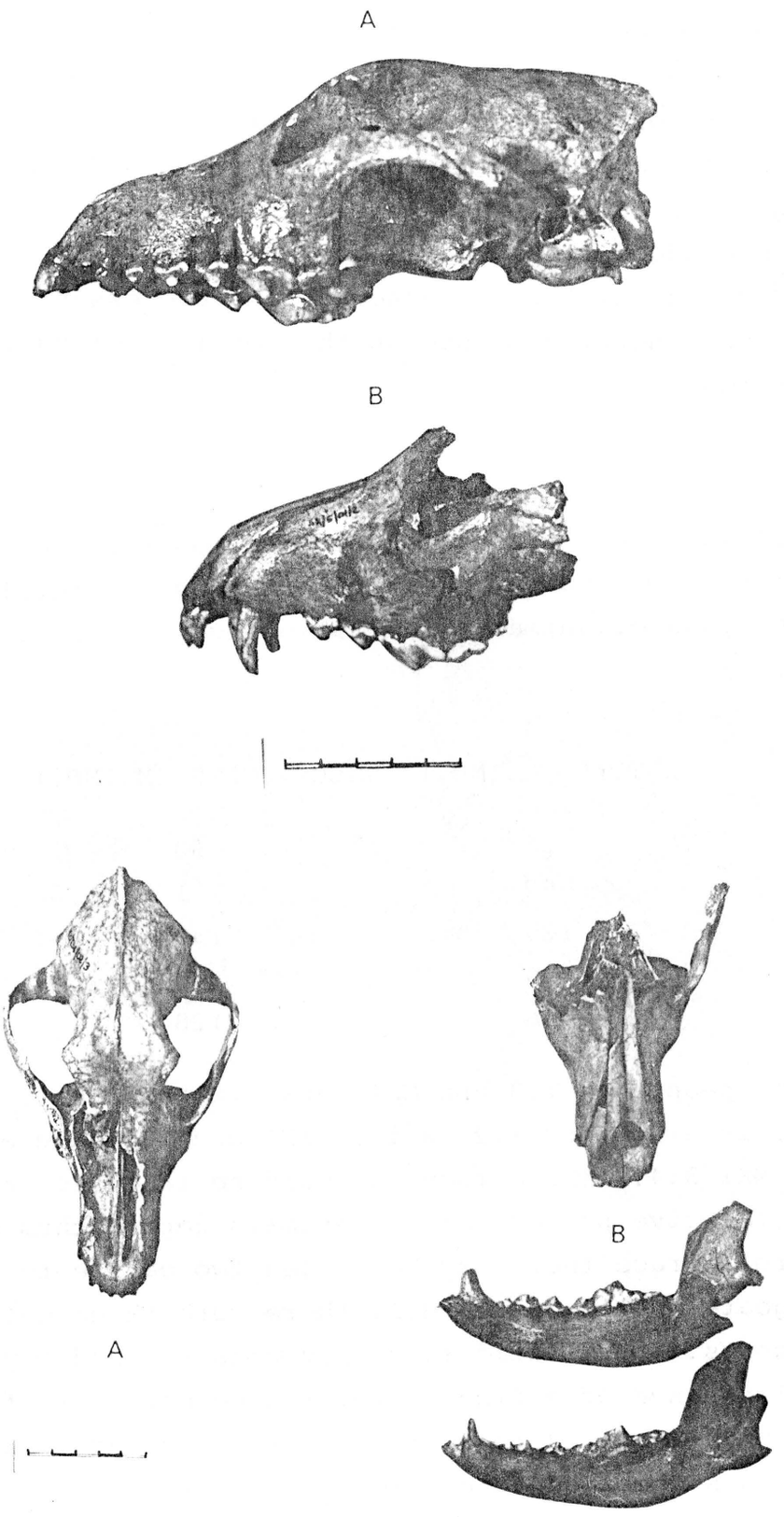

Plate 6.20. Lateral and dorsal views of
(a) K2/TS4/02/3 (from Greefswald) and
(b) SR/5/D1/2 (from Schroda)

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III The canids of Greefswald

Representations of (domesticated) dogs in association with human beings occur in a limited number of painted rock shelters in South Africa. Their association with human beings indicates that the animals were domesticated, and thus that the Later Stone Age people possessed dogs. The only representative of these pre- Iron Age domesticated animals is the juvenile specimen discovered in a "Strandloper" grave at Cape St. Francis and described by Clive Chappel (1968). The midden contained fragments of coarse pottery. Fagan excavated the remains of seven dogs at Isamu Pati; these have been described in detail by Degerbøl (Fagan, 1967:198-207) and have been included here for comparative purposes. In addition, Brain (1974b) described three dog specimens from Zimbabwe.

During the first five years of excavations at Greefswald, no remains of domesticated dogs were identified. Eventually a well-preserved skull was discovered in TS4, and subsequently fragmentary remains were identified in TS2 and TS3. In 1973, Maggs recovered a canid mandible from the uppermost level of Ntshekane (Maggs and Michael , 1976). In 1976, Hanisch discovered a well-preserved anterior portion of a skull with mandibles at Schroda, close to Greefswald. In the same year Jacobson (Jacobson et al, 1976) published a report on dog remains from Zerrissene Mountain in South West Africa. Since the completion of the Greefswald analysis an isolated M1 which has been identified as *C. familiaris* has been found at the Glennel site in Botswana (Plug. in prep.).

Thus a small sample of eight relatively well-preserved pre-European canids is available for study. In describing the Greefswald material, all these specimens have been included and compared with data on the wild canids of southern Africa. (Table 6.12). Measurements taken were according to methods recommended by Clutton - Brock et al. (1976) and von den Dreisch (1976).

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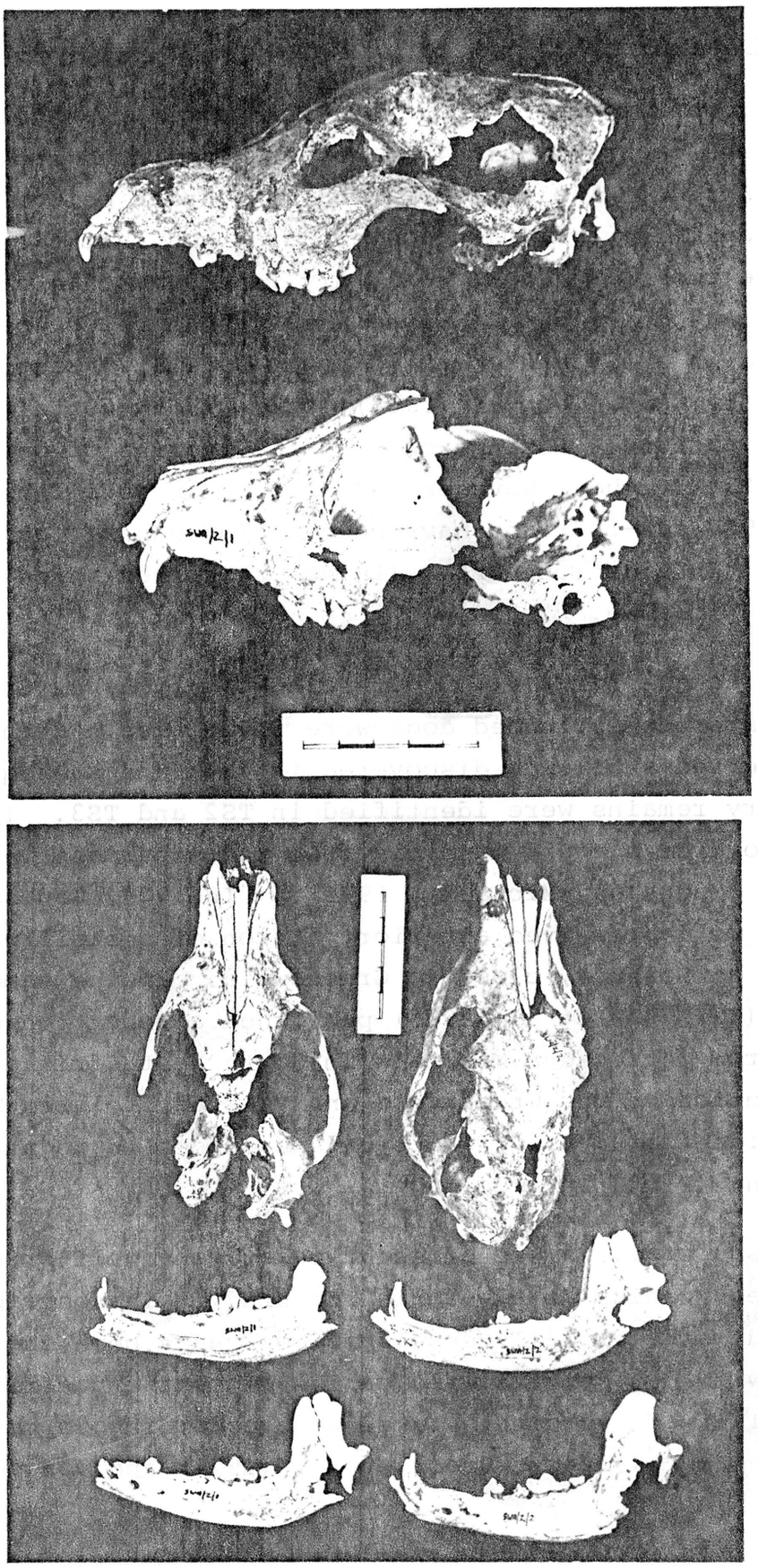

Plate 6.22. Lateral and dorsal views of the Zerissene skulls
(a) SWA/Z/1 and
(b) SWA/Z/2.

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Description of the finds

K2/TS4/02/3 An almost complete skull, with right nasals broken away and right zygomatic arch damaged. Complete dentition, but canines and incisors broken off at roots. Teeth are evenly spaced. Sutures not completely closed, relatively well-developed parietal crest which is more strongly developed than that of SWA/Z/2. (Plates 6.20 - 6.21).

T2/2892 Right mandible with alveoli for I3, C, $P\bar{1}$-$P\bar{4}$, fragment of $M\bar{1}$. Crowding of alveoli of $P\bar{1}$ and $P\bar{2}$. The base of the mandible is broken away, so that depth measurements cannot be taken.

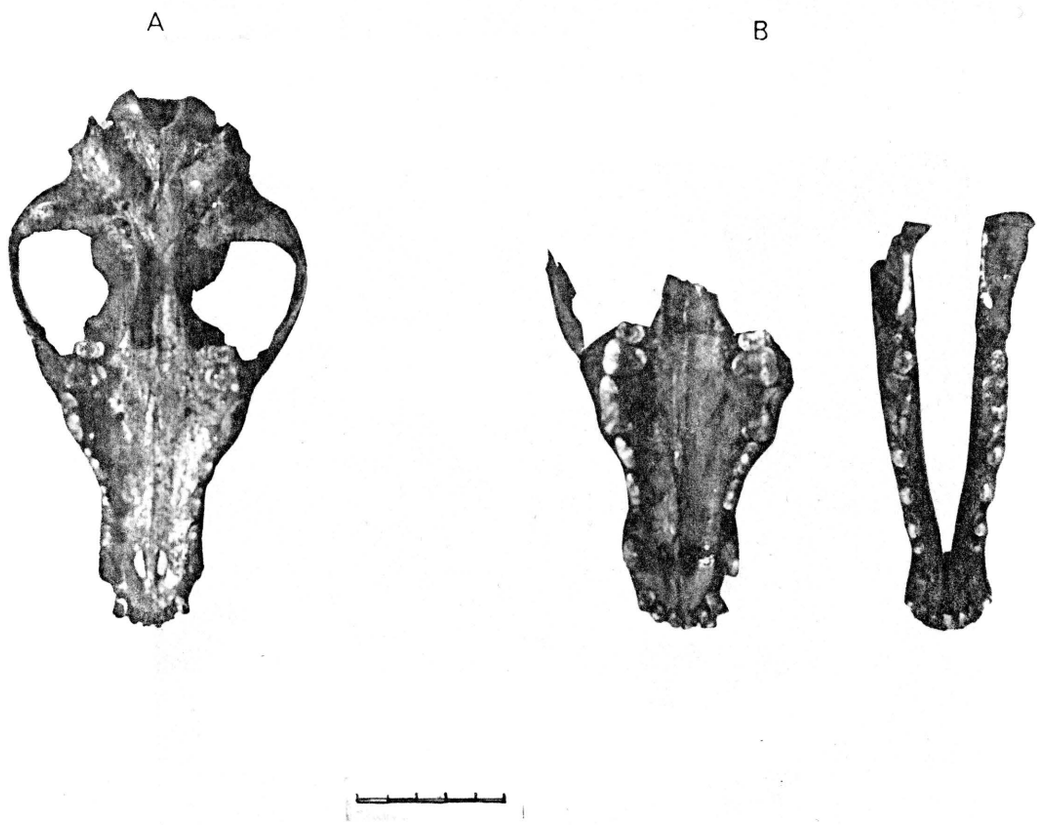

Plate 6.21. Ventral views of skulls of
(a) K2/TS4/02/3 and
(b) SR/5/D1/2.

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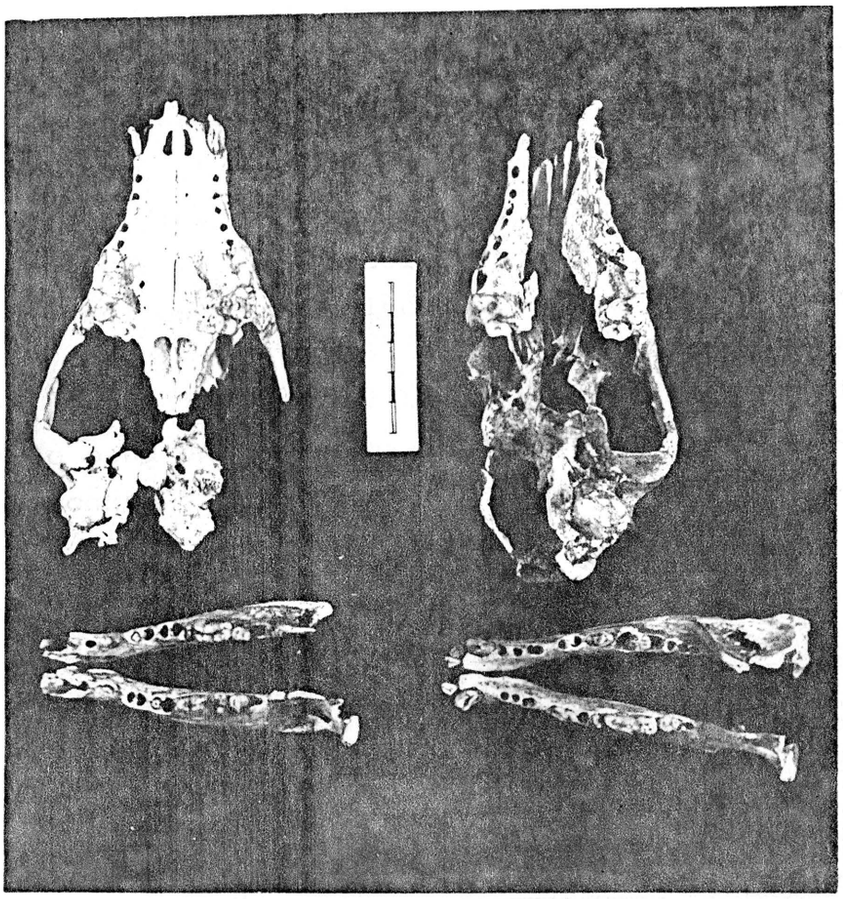

Plate 6.23. (a) SWA/Z/1 and (b) SWA/Z/2.

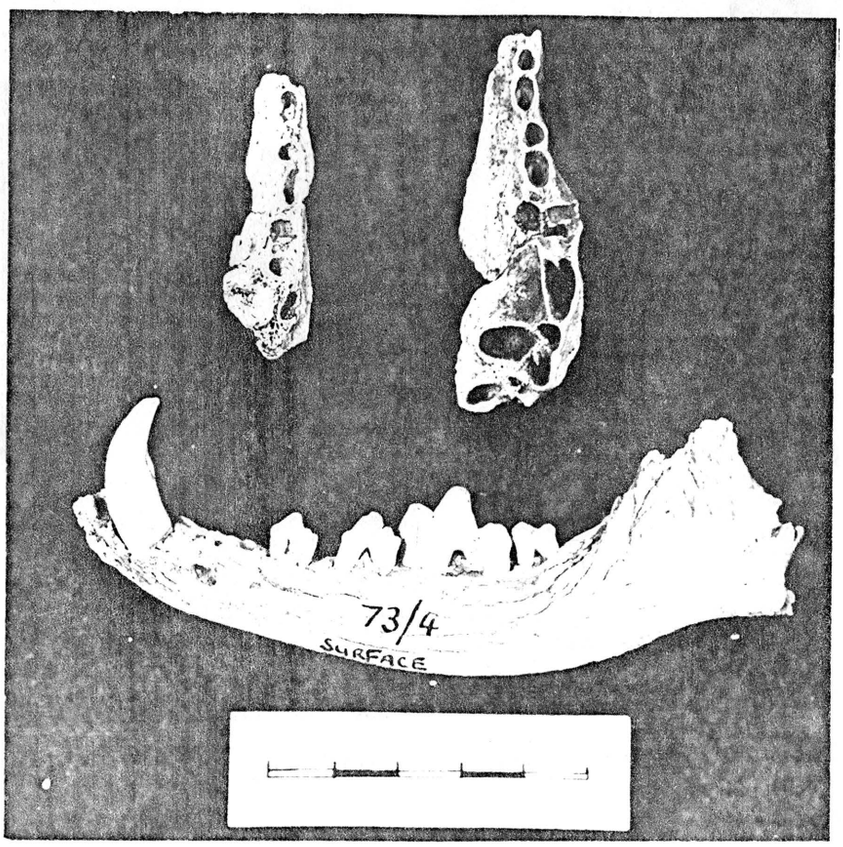

Plate 6.24. Maxillary fragments and mandible from Ntshekane N/73/4.

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T3/383 The crown of this isolated left M3 is damaged.
SR/5/D1/2 This is a very fine specimen. The skull is preserved forward of nasion, and all the teeth except P1 are present and complete. The right and left mandibles are complete except for portions of the condyles. The two $M\bar{3}$'s are loose; all the other teeth are present and undamaged, although the right $M\bar{1}$ is split along the crown. The length of the upper canines is 2,25 (R) and 2,34(L) cm. There is no crowding of the teeth, and a reasonable diastema between $\bar{C}$ and $P\bar{3}$. (Plates 6.20 - 6.21).
SWA/Z/1 and 2 The canid material submitted from Zerrissene Mountain was in a highly fragmented condition. The material was buried near a cairn of stones at the apex of the valley containing the settlement. After considerable work, A. Brown was able to reconstruct two individuals, each represented by a skull and mandibles. In addition to other bone fragments, a number of poorly preserved limb bones were also present.
SWA/Z/1 consists of the anterior portion of a skull with part of the occipital region, and the right and left mandible. The skull contained the right canine, part of P2 and P4-M1; the left side of the skull still contained C and P4-M1. The right mandible contained $\bar{C}$, $P\bar{2}$ and $M\bar{1}$ and $M\bar{2}$. The left mandible contained $\bar{C}$, $P\bar{2}$, $M\bar{1}$ and $M\bar{2}$. There is no crowding of the teeth in either mandible. (Plates 6.22 - 6.23).
SWA/Z/2 Most of the left side of the skull is preserved with the right nasals. The left P3, M1, M2 and M3 are present. The sutures are still clearly visible; the parietal crest is poorly developed. The right maxilla could not be joined to the skull; it contains M1 and M2.

The right mandible is almost complete, but contains only $I\bar{2}$ and $I\bar{3}$, $\bar{C}$ and a portion of $P\bar{4}$. The left mandible is as complete, and contains $I\bar{3}$, $\bar{C}$, $P\bar{3}$, $P\bar{4}$, $M\bar{1}$ and $M\bar{2}$. There is no crowding of the teeth. M1 and M2 are moderately worn. (Plate 6.22- 6.23).

These specimens have a smaller, lighter structure than K2/TS4/02/3 or SR/5/D1/2.

N/73/4 Maggs states that the remains of two possible domesticated dogs were found at Ntshekane. The specimens from Feature N (a pit), consists of two canines, portions of a right and left maxilla, and three other fragments. The few measurements which

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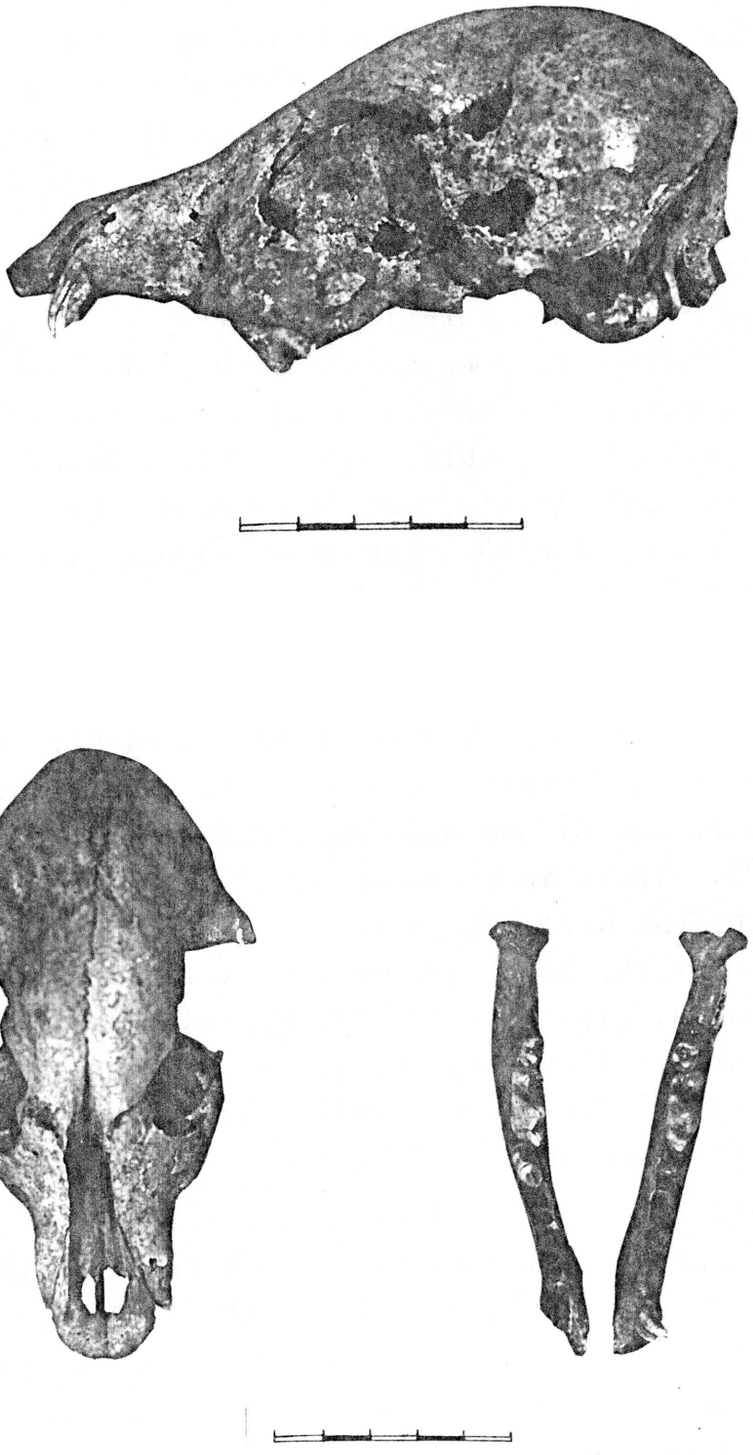

Plate 6.25. Lateral and dorsal views of Cape St. Francis canid C/1968.

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could be taken were based on the alveoli. These specimens could have come from the mandible found on the surface of the site. This is a heavily weathered left mandible with $\bar{C}$ and $P\bar{3}$-$M\bar{2}$. Maggs expressed doubt as to the validity of the association of this specimen with the rest of the deposit. Although the teeth are set close together in the mandible, there is no crowding and no diastema in the toothrow. (Plate 6.24).

C/1968 This is an interesting and virtually complete specimen. The zygomatics of the skull are damaged, and few teeth have survived; otherwise the skull is complete. The mandibles are complete.

The skull contains only the erupting permanent canines and both P4. The right mandible contains $P\bar{4}$-$M\bar{2}$, with the bone above $M\bar{3}$ open. The left mandible contains $\bar{C}$ and $M\bar{1}$-$M\bar{2}$, with the bone above $M\bar{3}$ open. The skull is rather small and compact, with incompletely fused sutures. However, the tooth eruption pattern suggests that the dog was almost six months old; it would therefore probably have been a somewhat small animal in adulthood. The teeth are very close together, but show no signs of crowding. The erupting upper canines measure +0,88 and 1,0 (Plate 6.25 & 6.26).

Comparison with wild canids

A series of 45 specimens of the three indigenous canid species was measured. In these specimens, only the right side of each was measured. (Table 6.13).

The *C. mesomelas* specimens appeared visually to have smaller teeth than the Greefswald canids. In addition, the palates appeared narrower and the premaxillas more lightly built. The *C. mesomelas* material was visually closest to the Zerrissene specimens in size. However they proved to be considerably lighter in build than the Zerrissene specimens, with a similar skull length. Three relatively young specimens were measured for comparison with C/1968, with canines still erupting. Only TM/12007 had $M\bar{3}$ erupting and is therefore directly comparable with C/1968.

Canis adustus has a lightly built skull with a shallow mandible. The premolars are widely spaced, and the teeth less robust than those of the pre-European canids.

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Plate 6.26. Skull and mandibles of C/1968

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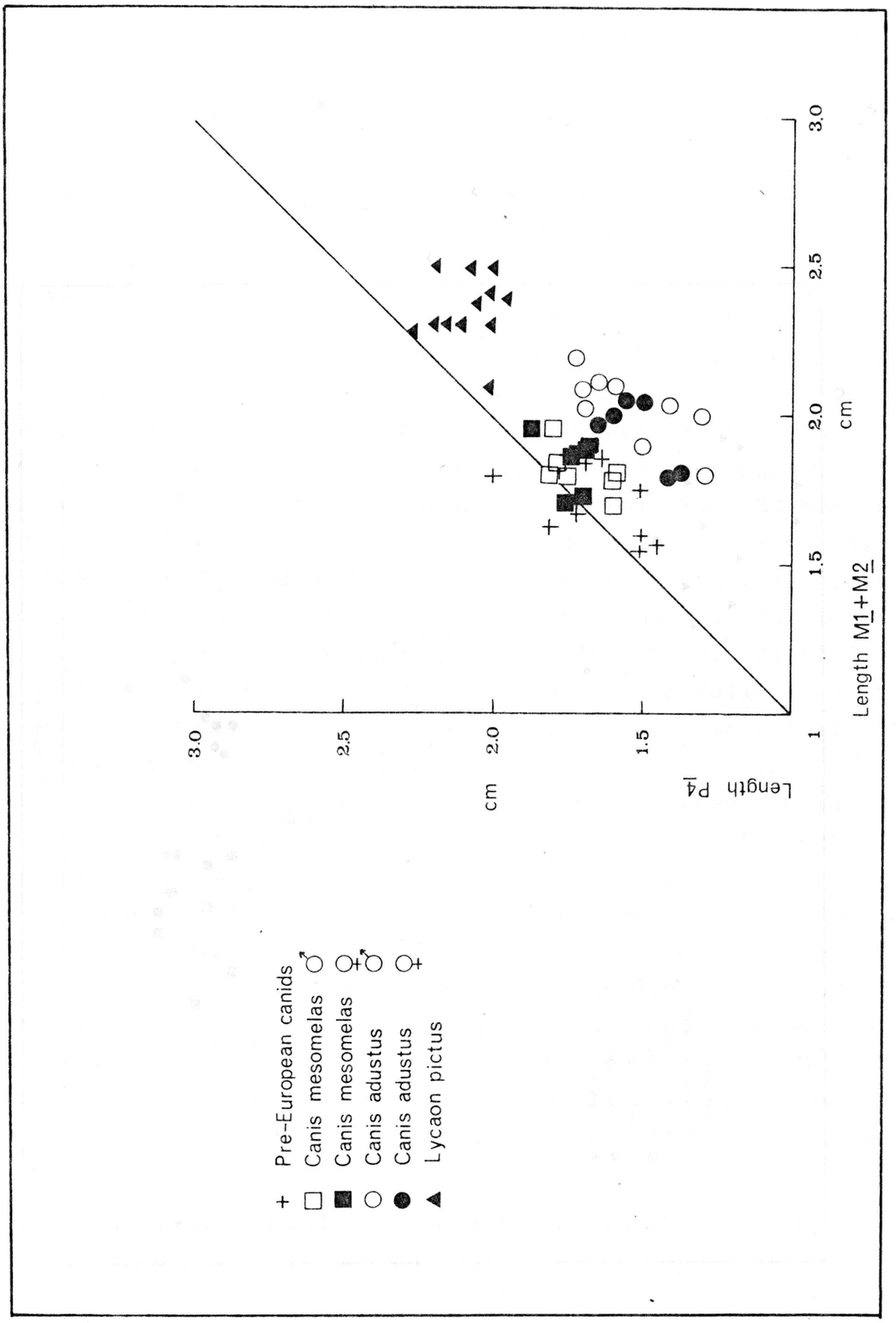

Fig. 6.13. Relationship between length of P4 and M1+M2 in pre-European and African canids.

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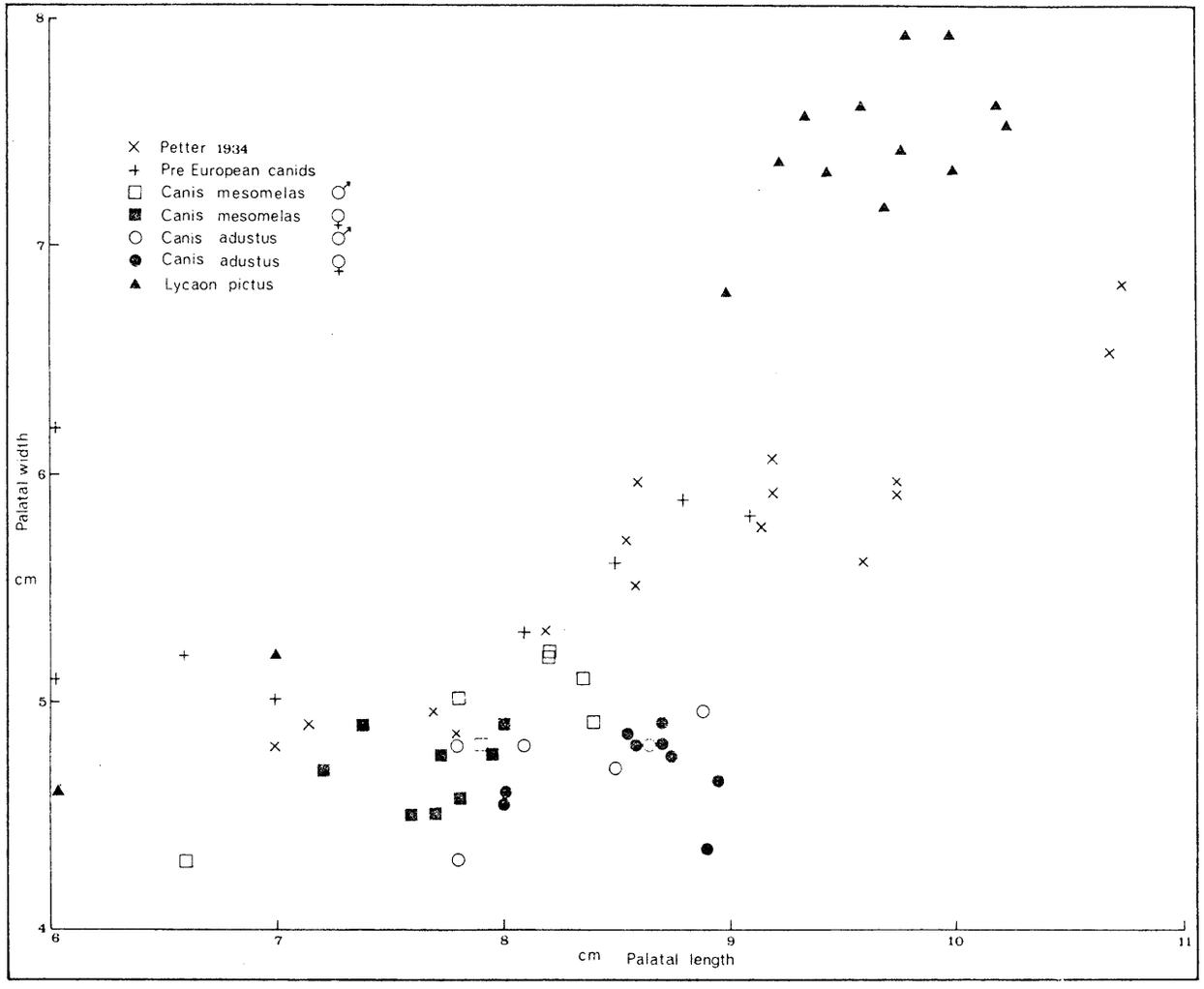
Fig. 6.14. Relationship between palatal width and length in pre-European and African canids.



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Fourteen specimens of *Lycaon pictus* were available for measuring. Unfortunately the majority of the specimens did not have a record of their sex.

The teeth are more massive than those of the pre-European canids; in addition, the palatal width is larger. Two juvenile specimens with deciduous dentition were included in the sample for comparison with C/1968. The skull proportions are not in any way similar to those of C/1968.

Definition of "domestic" dogs

An accepted criterion for the identification of domestication in dogs is the fact that, in domesticated dogs, the length of the upper carnassial is less than or equal to the sum of the length of the two upper molars. Unfortunately, jackals share this characteristic, and as can be seen from Table 6.13 and Fig. 6.13, and so does *Lycaon pictus*. The K2 canid has one $\overline{P4}$: $\overline{M1}$ + $\overline{M2}$ measurement close to unity; in the case of the canid from Schroda, $\underline{P4}$ is larger than $\underline{M1}$ and $\underline{M2}$ by five millimeters. The rest of the pre-European canids fall below the index of unity. Muzzle proportions, i.e. palatal width to palatal length, are plotted in Fig.6.14. In this figure the pre-European canids fall out of the range of the jackals, whose palates are narrower in relation to their length, and well below the range of *L. pictus* in which the palate is wide in relation to its length. When the mandible is examined by comparing the length of $\overline{M1}$ to that of the tooth row, the measurements of *L. pictus* form a distinct group, while the two species of jackal are very close together. The dimensions of the pre-European canids fall a little outside the range of the jackals, but three specimens fall within the range (Fig. 6.15). In Fig.6.16 two measurements are plotted for each specimen. These are width of $\underline{M2}$ and depth of the mandible posterior to $\overline{M1}$. The width of the pre-European canid $\underline{M2}$'s is slightly below that of the wild species; the depth of the mandible lies between that of the jackals and *L. pictus*.

The critical question to be answered is whether the previously undescribed pre-European canids represent domesticated dogs or not. On the basis of the $\underline{P4}$: $\underline{M1}$ + $\underline{M2}$ relationship, the South West African, Natal and Cape St. Francis specimens meet the

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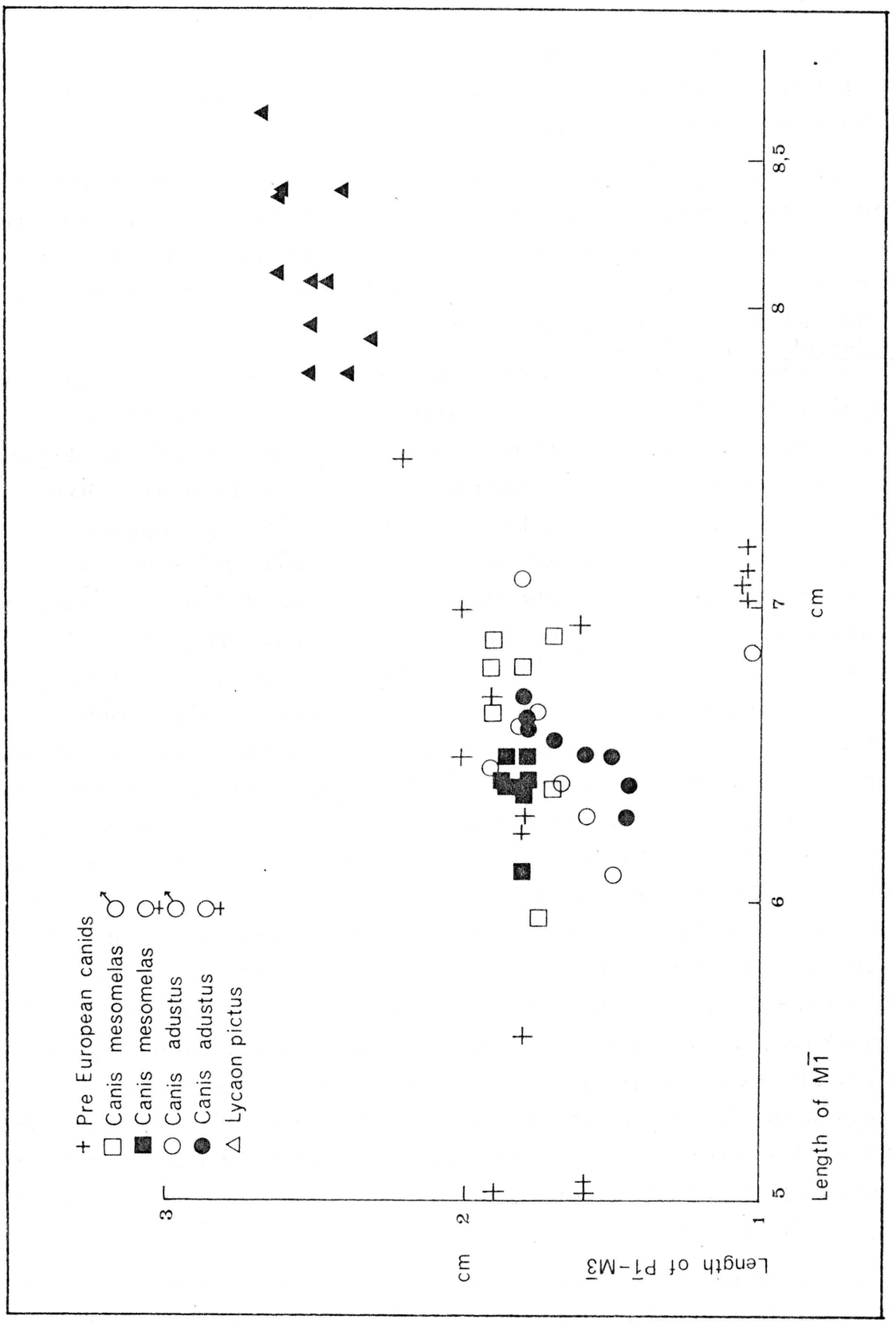

Fig. 6.15. Relationship of length of $M\bar{1}$ to length of tooth row $P\bar{1}$-$M\bar{3}$ in pre-European and African canids.

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Figure 6.16. Width of M2 and depth of mandible behind M1 of pre-European and African canids. Specimen numbers refer to Table 6.13.

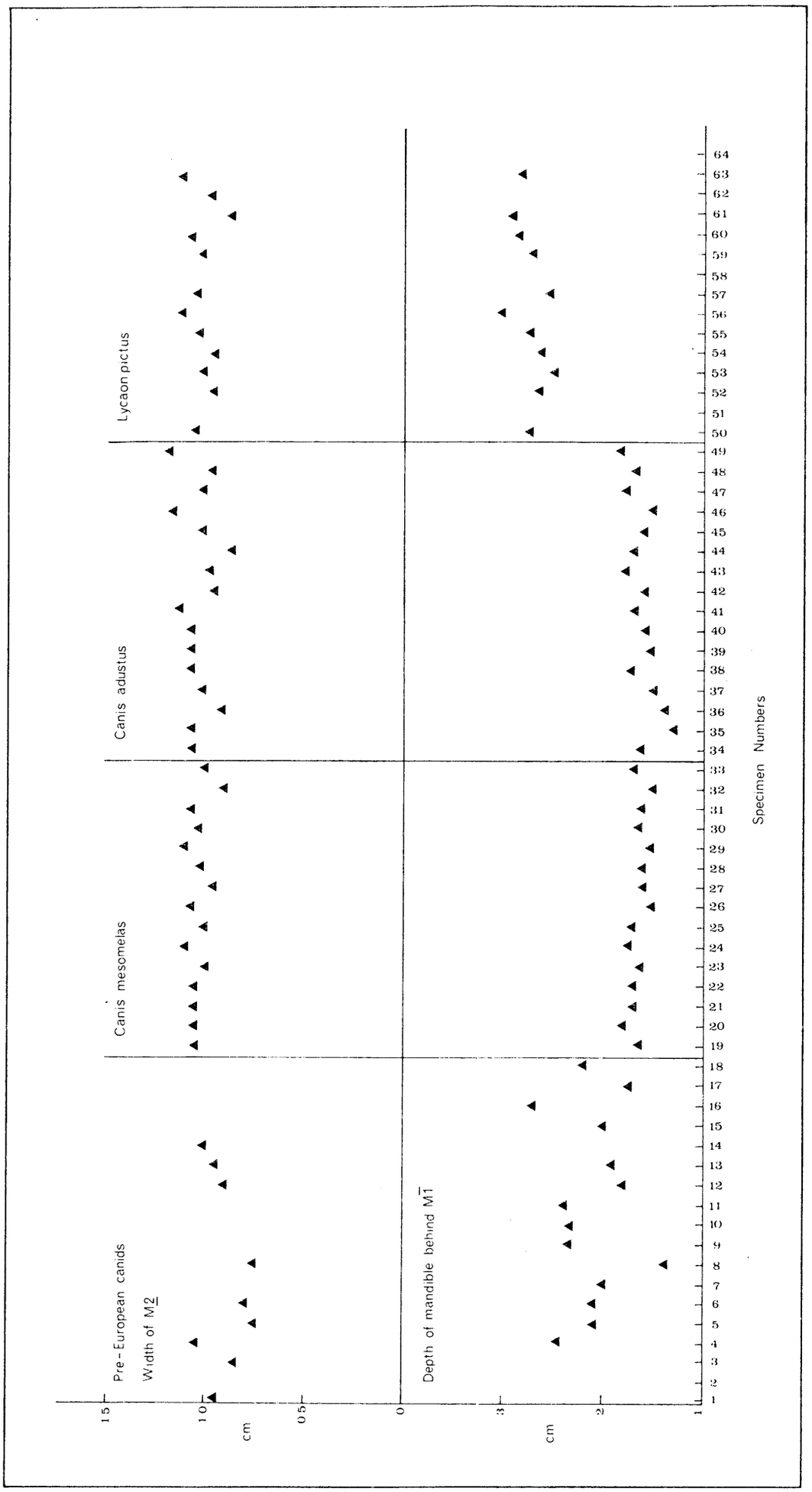

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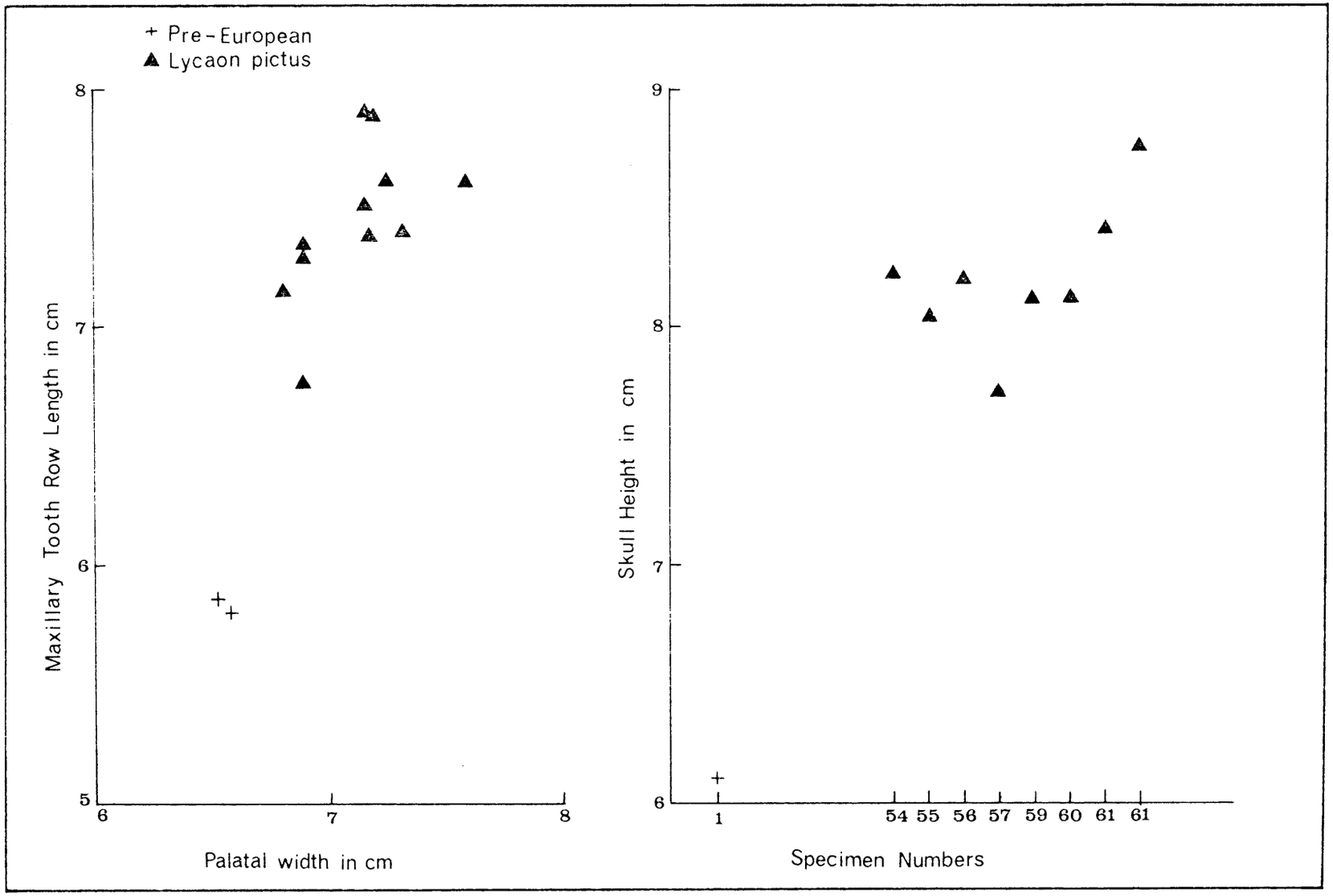
Fig. 6.17. Ratio between palatal width and maxillary tooth row length in *L. pictus* and Pre-European canids.

6.18. Skull height of *L. pictus* and Pre-European canid.



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required specification. The specimen from K2 and Schroda both have carnassial lengths 0,5 cm greater than the combined molar lengths. When the palatal breadth/length ratio is examined, these two Transvaal specimens fall between the range of the pre-European specimens and the *Canis* spp and that of *L. pictus*. On this basis, these specimens do not represent *Canis mesomelas*, *C. adustus* or *L. pictus*. It could be assumed that they might be members of *L. pictus*; but maxillary tooth dimensions are smaller that those of *L. pictus*, and the skull height is much less than that of *L. pictus*. These specimens cannot then be regarded as *L. pictus*. (Fig.6.17 and 6.18 and Table 6.14).

In the remaining specimens, the P4: M1 + M2 ratio falls below the index of unity, but is mixed in with those of *C. mesomelas* and *C. adustus*. The palatal dimensions and the mandibular measurement fall outside the range of the two jackal species. The two South West African and the Cape St. Francis specimens show a much reduced M2. On the basis of these criteria , I believe that the South West African, Natal and Cape canids can be classified as domesticated dogs; the mandibular fragment from K2/TS3 probably also came from a domesticated dog.

The K2 and Schroda specimens are unfortunately not as clearly defined as one would wish. The overall appearance and palatal dimensions seperate them from the wild species; the maxillary tooth and skull dimensions result in the same seperation. If their carnassials had been half a centimetre smaller, there would have been no problem in identifying the specimens as *C. familiaris*. In spite of this shortcoming, I believe that these specimens should be classified as domesticated dogs on the grounds that they do not conform to the dimensions of *C. mesomelas*, *C. adustus* or *L. pictus*. We have only eighteen specimens presumed to be pre-European domesticated dogs, few of which can provide all the necessary measurements. Of those measurements available, palatal proportions (i.e. muzzle proportions) and mandibular depth appear to be the most useful criteria for seperating the specimens.

Pre-European and African domestic dogs

Petter published a paper on African domestic dogs in 1934 which included some measurements. He found that in a number of the specimens which he examined, the length of P4 was equal to or greater than the sum of the length of M1 and M2. If this proportion

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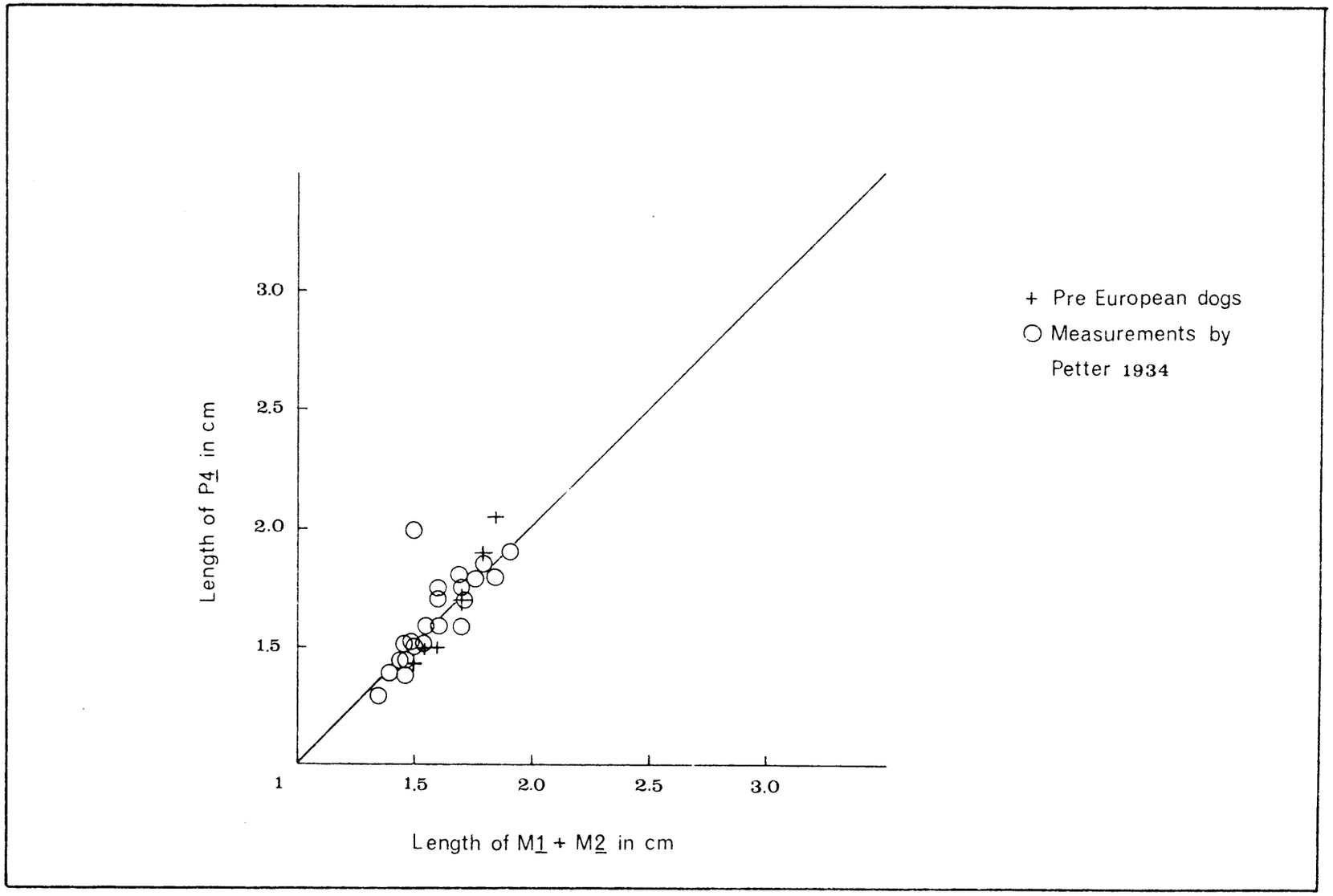
Fig. 6.19. Comparison of P4:M1+M2 lengths in Pre-European dogs and those measured by Petter (1934).



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and the palatal proportions are plotted (Table 6.15 and Fig. 6.19, Petter's measurements cluster around and accommodate those of the pre-European canids, including the K2 and Schroda animals. It can thus be accepted that these archaeological specimens are early representatives of the basic types of non-improved African breeds of domesticated dogs.

What did these early dogs look like?

The two Zerrissene specimens are smaller even than the small dogs from Isamu Pati described by Degerbøl as *C. familiaris palustris*, and the Dinka dog described by him. The Cape specimen, C/1968, would probably have grown into the same type of dog. This group of dogs was fairly small and slenderly built; modern counterparts have pricked ears and erect tails. This description fits very closely the type of dog depicted in a rock painting from the Drakensberg, now housed at the South African Museum. Epstein describes the Hottentot dogs as small and lightly built. Although the Zerrissene skulls are almost the same length as K2/TS4/02/3, the skulls themselves are more gracile, with smaller overall dimensions.

The K2 and Schroda specimens are more robustly built than the above three specimens. The Ntshekane maxilla has similar proportions to the Transvaal specimens, while the mandible is slightly smaller than the Schroda specimen.

All the specimens appear to fit the description given by Petter of the basic South African Native dog, which he describes as being of pariah type with some greyhound features. However, the group of specimens obviously includes animals of two sizes - a gracile form from South-West Africa and the Cape, and a more robust form from the Transvaal and Natal. In general, these were medium-sized dogs with long muzzles; the variability within the larger group was probably as great as is the variability among the mongrels found to-day in African villages. Although the present-day dogs of the Bantu-speaking people have obviously been exposed to the influence of European breeds, their basic form has a long and intricate history going back to the dogs of the Strandlopers and Hottentots and the larger dogs of the Transvaal Iron Age.

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CHAPTER 7

INTERPRETATION OF THE GREEFSWALD FAUNA 3: THE EVIDENCE FOR CRAFTS AND TRADE

In many areas stone-using prehistoric and modern men have achieved a high level of artistic expression. With the coming 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 Greefswald 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 at Greefswald

The major part of Chapter 10 is concerned with a description of the large quantity of worked bone present in the Greefswald assemblage. A large part of the sample of worked bone consisted of tools which conformed to a set pattern and had been polished and carefully finished over their entire surface.

Cooke and Robinson described in 1954 how they believed the Amadzimba bone tools to have been made. I agree that 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 Greefswald 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 Greefswald 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 Greefswald the stages of splinter, "chiselling" into shape and polishing are all in evidence; when completed, the majority of the formal tools retained none of the external or internal characteristics of the bone used.

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There is thus evidence for a highly developed level of craftsmanship in bone working at Greefswald. It is however interesting to note that this "craft" is very limited in spatial distribution - the majority of formal tools were found on the Hill, and most of them came from the top three foot of deposit, i.e. Meyer's Phase 4. However, similar tool types came from the top three feet 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 the bone working at Greefswald 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 time-span. I suggest that the bone tools were being made in sufficient quantities to indicate that a surplus was being deliberately produced, and that at Greefswald we have a group of skilled bone-working craftsmen who were manufacturing well-finished tools for trade. This aspect will be discussed in more detail at the end of the chapter.

The working of ivory at Greefswald

Just as the bone tools at Greefswald 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". The tusk was extensively damaged by fire; crumbling fragments of burnt earth in immediate proximity to the tusk suggests that the tusk was buried in the rubble of a burnt hut. It is however 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, eg. a dead man's hut being burnt down and the contents left untouched.

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The solid tip of a tusk was found by Gardner (W/293) at the four foot level at K2, and a 12-13 cm portion of a tusk was found in 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. The striations 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 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).

T3/1561 is covered with shallow chisel marks, suggesting that the ivory was initially trimmed to the required thickness and shape. 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 final 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.

I do not know whether it is possible to split fresh ivory along the line of the tusk; certainly the Greefswald specimens to-day 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

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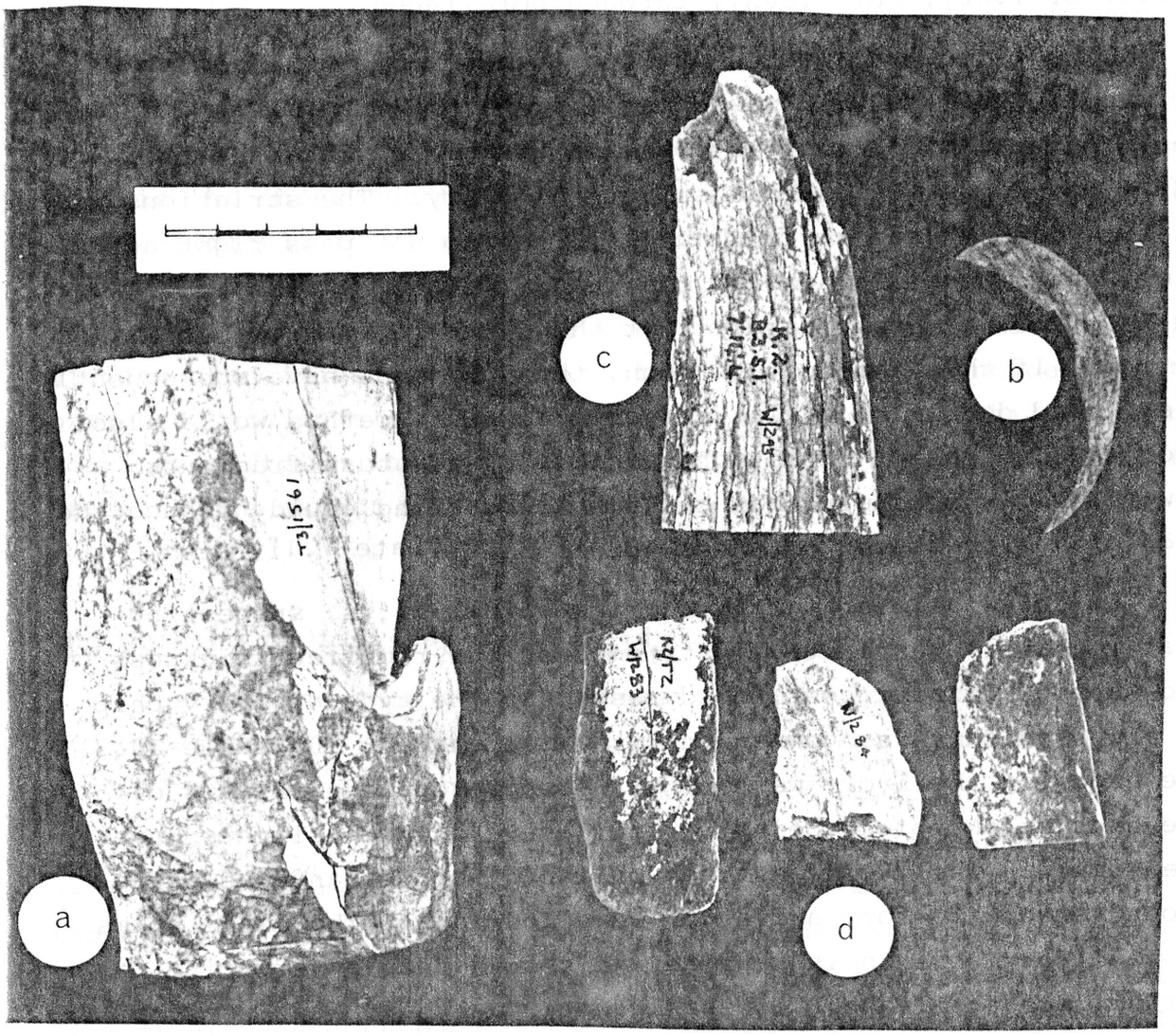

Plate 7.1. Stages in manufacture of ivory objects at K2.
(a) Worked piece of tusk T3/1561, (b) Sliver sawn off tusk
(c) solid tip of tusk (d) ivory fragments.

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desired thickness before being smoothed off. This would also facilitate producing the correct size central bore.

The ivory was thus 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. 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 the smoothing of 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 then 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 come from 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 Greefswald the presence of *C. annulus*, *P. 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 1 000 A.D. (Huffman, 1972). The marine mollusc species present are all found on the East coast from Durban to Mocambique; 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

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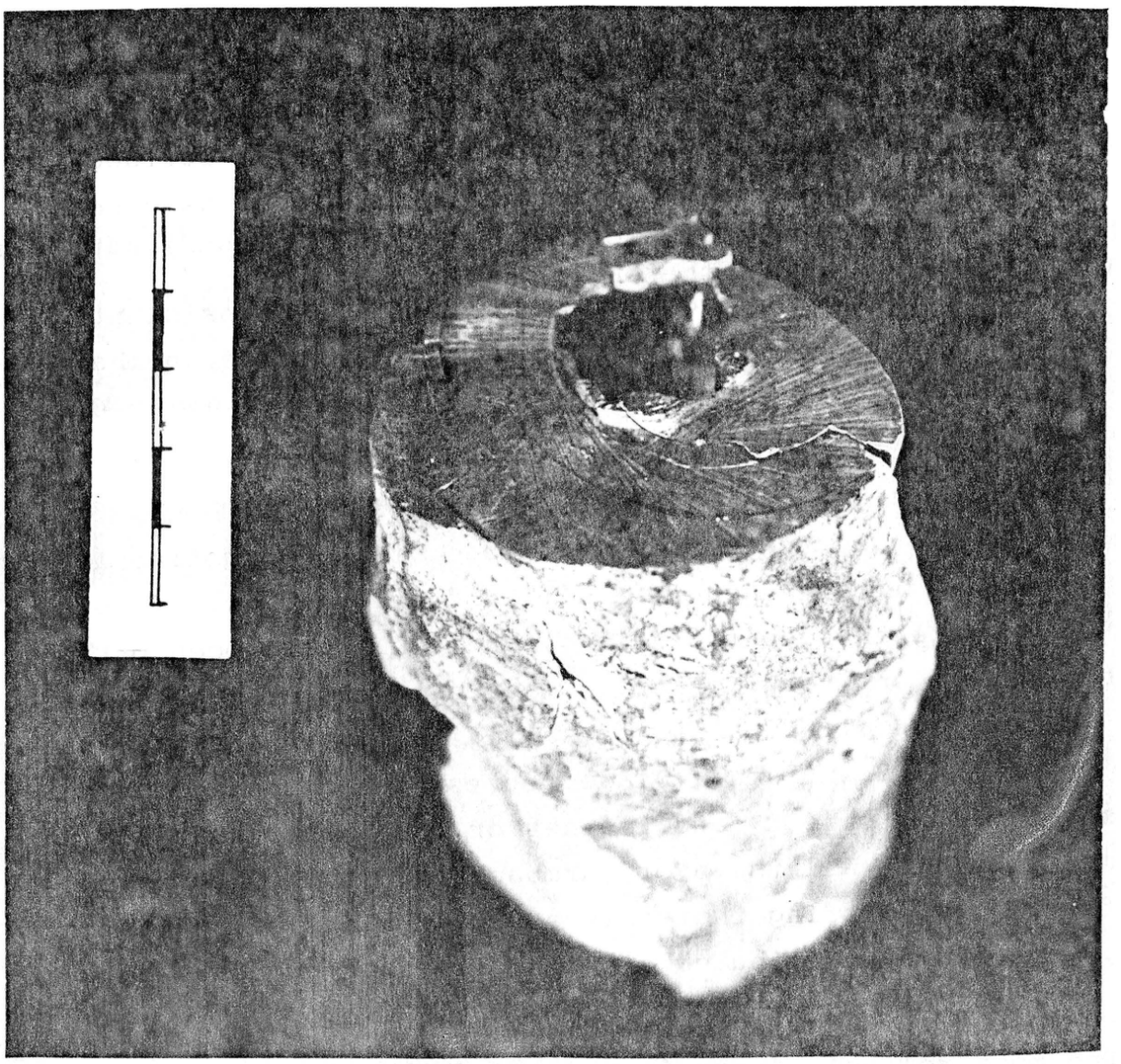

Plate 7.2. Detail of fragment of tusk T3/1561 shown on Plate 7.1(a) showing striations from sawing and chisel/chop marks.

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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 away 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 the earliest Arab dates on the coast. Although it would be very difficult to prove, I wish to 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. This would suggest that K2 might have been a centre for the collection of ivory which eventually found its way to the East coast, with cowries and glass beads travelling in the reserve direction.

The presence of gold on Mapungubwe Hill, as well as the pottery traditions, has linked the Greefswald and Zimbabwe complexes. It would seem to be not impossible that the size and social status of K2 could have initially developed on the basis of involvement in the ivory trade. Later trade contacts through Zimbabwe could have resulted in gold reaching Mapungubwe. 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 Greefswald. Large quantities of finely finished bone tools were produced; the quantities involved suggest a regular manufacturing pattern in excess of the local needs (as at Amadzimba and the main cave at Robberg). It would seem therefore to be possible that formalised bone tools were being produced at Greefswald and were being used as trade items. 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

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were producing a commodity for bartering within and outside the Greefswald community.

Thus although the evidence is sparse, it would seem that Greefswald (or K2 in particular) was 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.

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CHAPTER 8

INTERPRETATION OF THE GREEFSWALD FAUNA 4: DAMAGE TO THE BONE BY MAN AND ANIMALS.

This and the following chapter is concerned with the interpretation of the evidence preserved within the bone accumulation for the actions of Man, animals and the elements. Chapter 9 is concerned with the taphonomy of the site with respect to preservational factors. This chapter deals with evidence of activities by Man, dogs and rodents. The damage by Man embraces butchering, burning and damage from hunting weapons.

I The pattern of butchering at Greefswald.

Throughout the foregoing chapters it has been stated that the bone accumulation at Greefswald 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 occur:

1. Cut marks. Cut marks are V-shaped gashes occurring on the bone. They may be merely superficial, or may be relatively deep. They indicate the use of a sharp metal instrument, and are probably mainly the result of cutting the 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-bone 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-shape.

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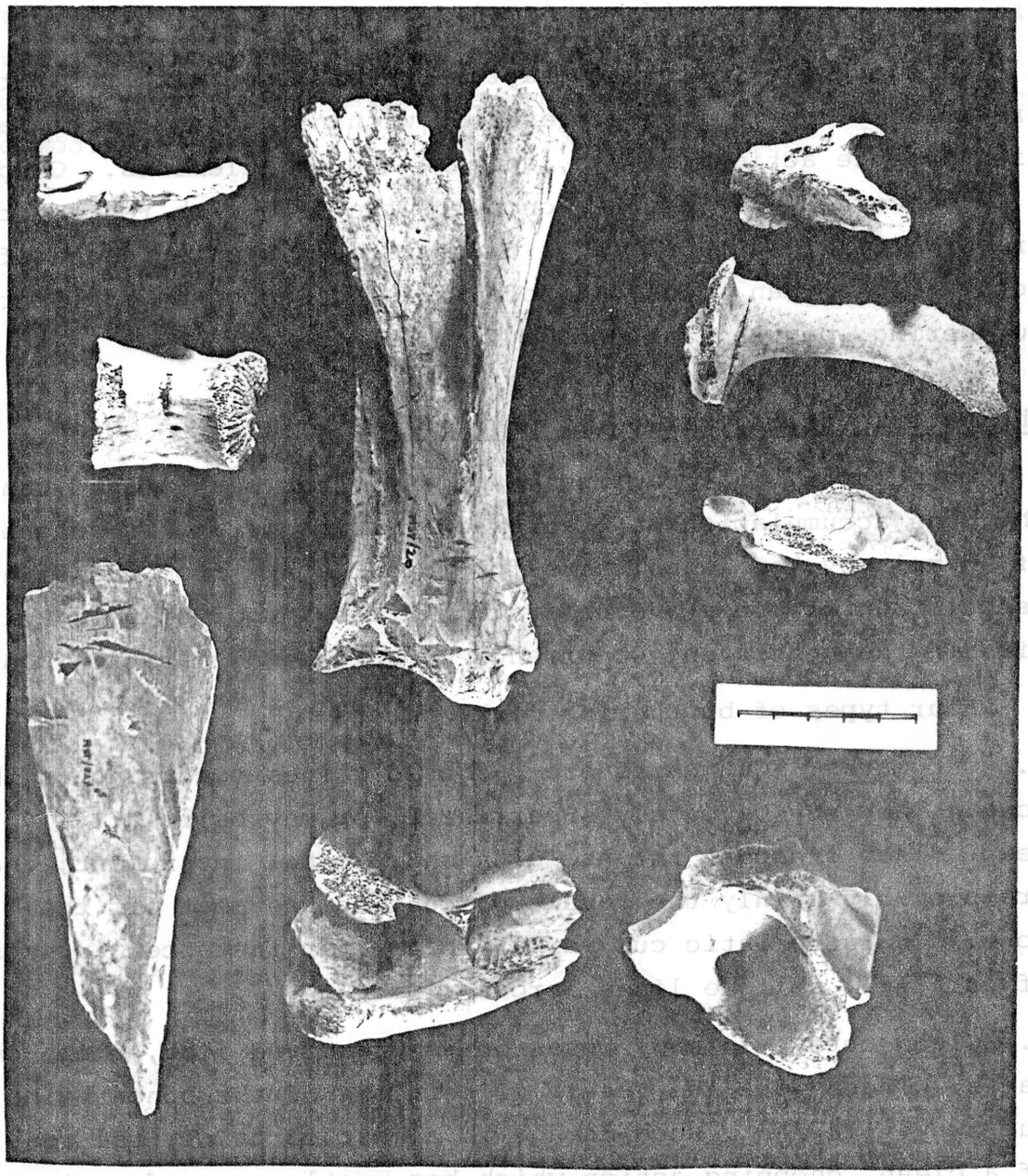

Plate 8.I. Butchering damage. Top left: 2 specimens with deep cut marks; top right: 3 specimens with cut marks; centre top: scapula with deep chop marks and chi chisel marks; bottom left: chopping damage; bottom centre and right: 2 specimens cut cleanly through.

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4. "Chisel" marks. These marks cannot be very satisfactorily explained. They consist of shallow depressions, often occurring in clusters. If 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 match the characteristics of porcupine gnawing, and the depressions do not occur in matched pairs such as you would expect from porcupine teeth. Thus this kind of damage appears to be the result of a chiselling action; it 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).

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 would have been dismembered in the same way as cattle; the best evidence comes from cattle bones.

It is likely that in most cases the animal was killed by first stunning and then cutting its throat. However some *B. taurus* frontals carry evidence of violent disposal in the form of deep chop marks on the frontal. The nature of these long chop marks suggest the use of a metal axe for stunning or killing the animal. The beautifully preserved Sanga-type frontal G/4873 (Plate 6.18) is criss-crossed with a series of such chopmarks suggesting repeated blows of an axe. A total of 17 marks can be counted. In addition, a triangular stab-mark in the centre of the frontal suggests that the coup-de-grace was delivered with a spear. One wonders why this particular animal was destined to die under such a hail of blows.

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

The horns were chopped off the skull close to the pedicle.

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The premaxilla was chopped off at or close to nasion, and the back of the skull chopped away to get at the brains. 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 mandibles of cattle are split longitudinally. Yellen (1977: 8) notes that the !Kung split the mandibles of large animals in order to reach a highly nutritious marrow contained in the bones. This could perhaps explain the splitting seen at Greefswald; Fagan (1969:89) notes the same phenomenon at Ingombe Ilede. This evidence for the treatment 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, eg. the Ovis/Capra specimens (a complete foot) from MST/F4/2(iii) (Chapter 4, page 71). 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 scapulas are frequently complete, suggesting that the shoulder was disarticulated at this point. Most of the long bone shafts were fragmented in order to obtain the marrow; Bov.II radius and tibia shafts occurred quite frequently suggesting that these were not shattered for the marrow. Metapodials were however subjected to considerable fragmentation.

Phalanges appear also to have been frequently split for

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their marrow. A record was kept of longitudinal splitting of first phalanges; second phalanges appear to have seldom been exposed to this kind of treatment. There does however appear to be a constant pattern of splitting Bov.II first phalanges along the long axis of the bone. A similar pattern was recorded by Welbourne (1971:122).

The frequent shallow cut marks on rib fragments suggest that the skin layer was stripped off the ribs during butchering; 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; complete rib articulations are rare. The horizontal processes of the thoracic vertebrae were cut away; this often extended to the lumbar vertebrae as well. It seems likely that the vertebral column was frequently stripped and discarded with sinew holding the bones together. This is suggested by the discovery of articulating vertebrae, and articulating series of vertebrae found on MST (MST/H5/2(iii)2 and MST/F4/2(iii), Plate 4.5). The vertebrae were however often broken up completely; at least 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, so that the tails of the animals were apparently 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.

Butchering damage occurs on three specimens 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. Portions of two seperate hyaenids carried chopping damage which suggests that the skulls were deliberately destroyed. T3/4826 is a portion of a sagittal crest; it has chopping damage along the break indicating that the cranium was broken open. MK/1277 is a fragment of a left mandible with a single tooth still in place. The mandible was chopped through the $P\bar{4}$ alveolus;

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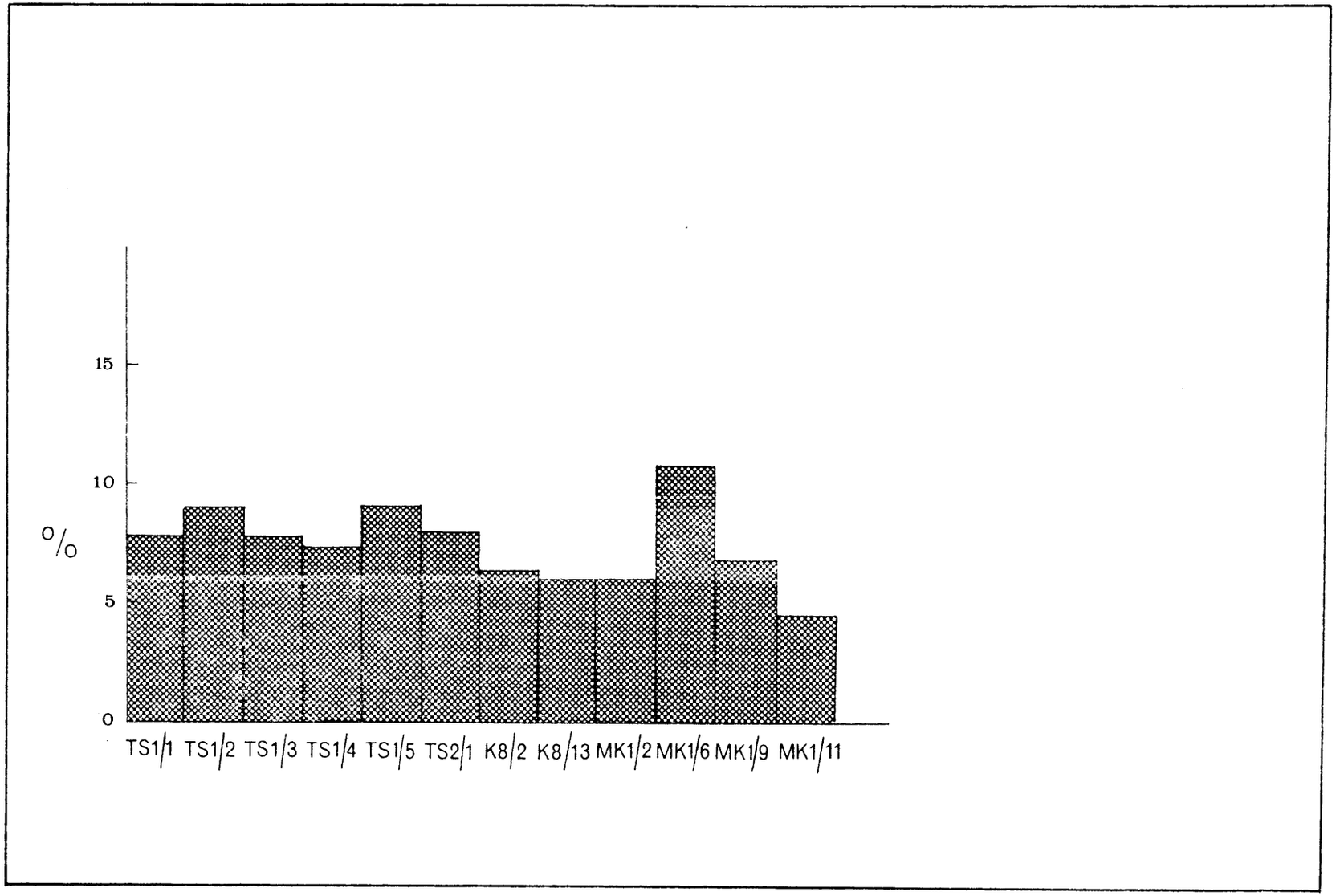
Fig. 8.1. Percentage of total sample of bone from twelve excavation units which show butchering damage.



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in addition chop marks can be clearly seen on the inner and outer surface of the mandible. It is possible that this kind of damage could have occurred while the animal was being skinned; 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 then as follows:

1. The animal is flayed, including the tail. During this process the meat is removed from the cheeks and thrown onto a fire to be charred for eating. This meat is regarded as a delicacy. 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 rib and "awarded to the herds".

3. The right shoulder is removed and distributed. The pieces of cheek and tail are eaten.

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. When (4) is complete, 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.

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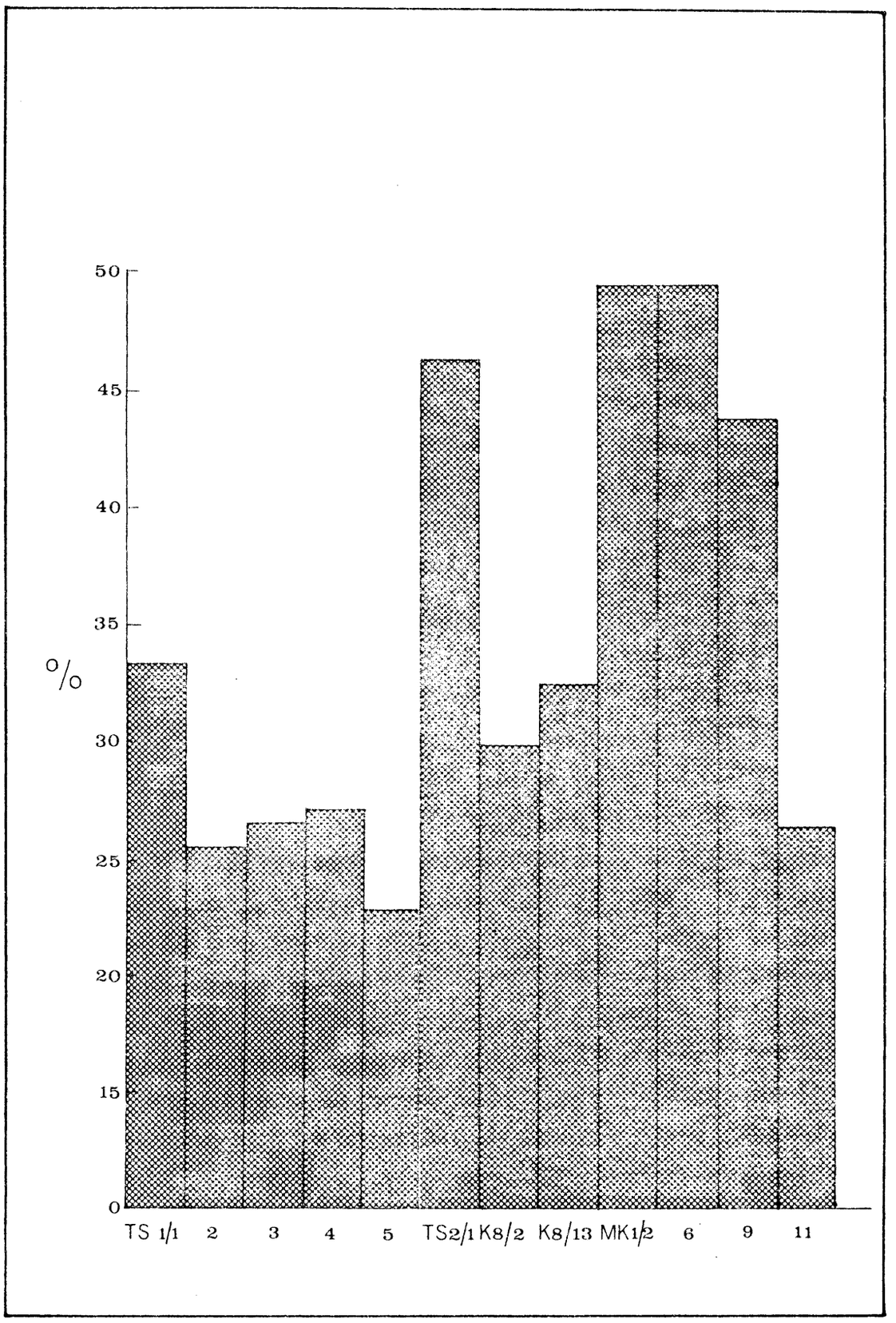

Fig. 8.2. Percentage of bovid skeletal parts from twelve excavation units showing butchering damage.

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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 carcase is wasted, and that even the dung is utilized 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 (1976:100) however, gives an account of the butchering of a goat among the Topnaar Hottentots. Most of the animal is utilised, and the skin is cured for use. The animal is eviscerated after killing and skinning; the fore and hind limbs are removed (with the pelvis being split along the pubic symphasis and sacro-iliac joints). The feet are severed above phalanx 1, and cooked by the children. Ribs are removed at the vertebral articulation, and the skull removed with the atlas and axis. The skull was always treated in the same way, i.e. the horns were broken off at their bases using an axe, then the skull 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 should exist over large areas or long periods of time. Quin's 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 Greefswald assemblage could possibly be the result of cooking rather than butchering methods.

The evidence for butchering techniques lies within the bones themselves; the distribution of this kind of damage is summarised in the graphs in Figs.8.1-8.4.

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Fig. 8.3. Distribution of butchering damage on bovid skeletal parts from K2/TS1.

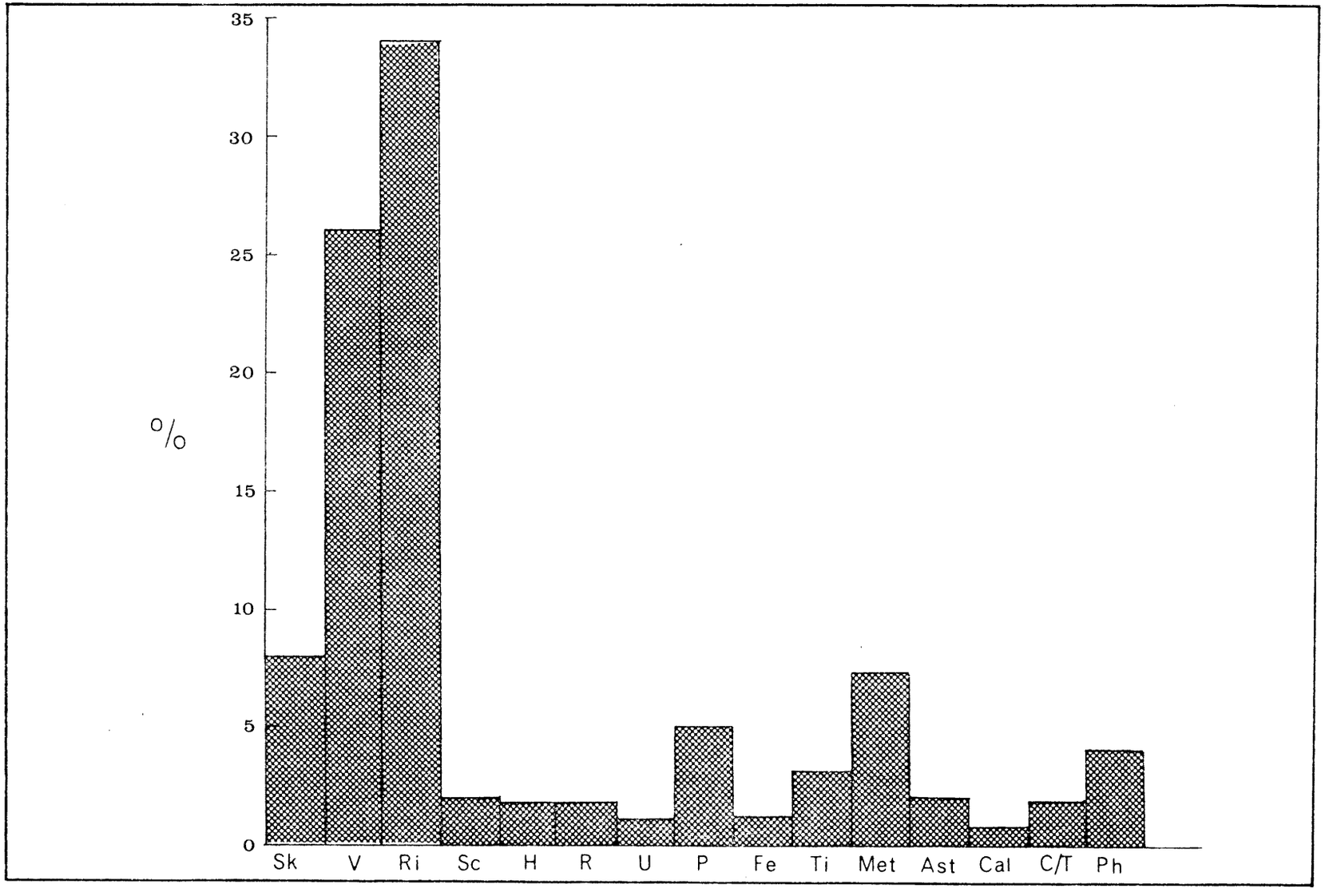

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Figure 8.1 shows the percentage of the total sample of bone from twelve excavation units which showed butchering damage. The range of damage is from 10,7% to 4,5% of the sample with a mean of 7,4%. The graph however indicates a fairly constant proportion of damage throughout the Greefswald sequence. If we examine the distribution of butchering damage within the group of bovid post-cranial remains, a somewhat different picture emerges (Fig.8.2). The range is even wider (12,9% to 39,5%). The values for TS1 are close, 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 it is interesting to note that MK1/11 is closer to the TS1 values than the other MK1 values. This could be seen as further evidence linking the base of MK1 with the K2 sequence. In the same way, the similarity between TS2 and MK1, 2 and 6 could support the similarity suggested by the quantity of bone work. Fig.8.2 therefore shows that, whereas the proportion of butchering damage is similar throughout the twelve units, the actual proportions within the bovid group vary markedly.

The reconstruction of the butchering pattern given above is dependant on the analysis of the pattern of butchering marks on bovid skeletal parts. In all cases, the largest number of specimens showing butchering marks were vertebral and rib fragments. In TS1 and TS2, skull and metapodial fragments were the next most numerous groups, with all the limb bones represented by far smaller numbers (Fig. 8.3). However, the actual proportions of the body parts varied between TS1 and TS2, TS1 having a higher proportion of vertebrae, humeri, radii, metapodials and phalanges showing such damage. The MK1 pattern is different again. The results from the three phases were examined separately, but were found to follow the same broad pattern as that of the combined levels (shown in Fig. 8.4). This graph suggests that all the limb bones show similar proportions of damage, and that there is less of a difference between the sizes of the vertebrae, rib and metapodial groups than in the TS1 and TS2 sample.

Thus although the overall pattern of butchering marks is fairly consistent throughout Greefswald, the separate units of

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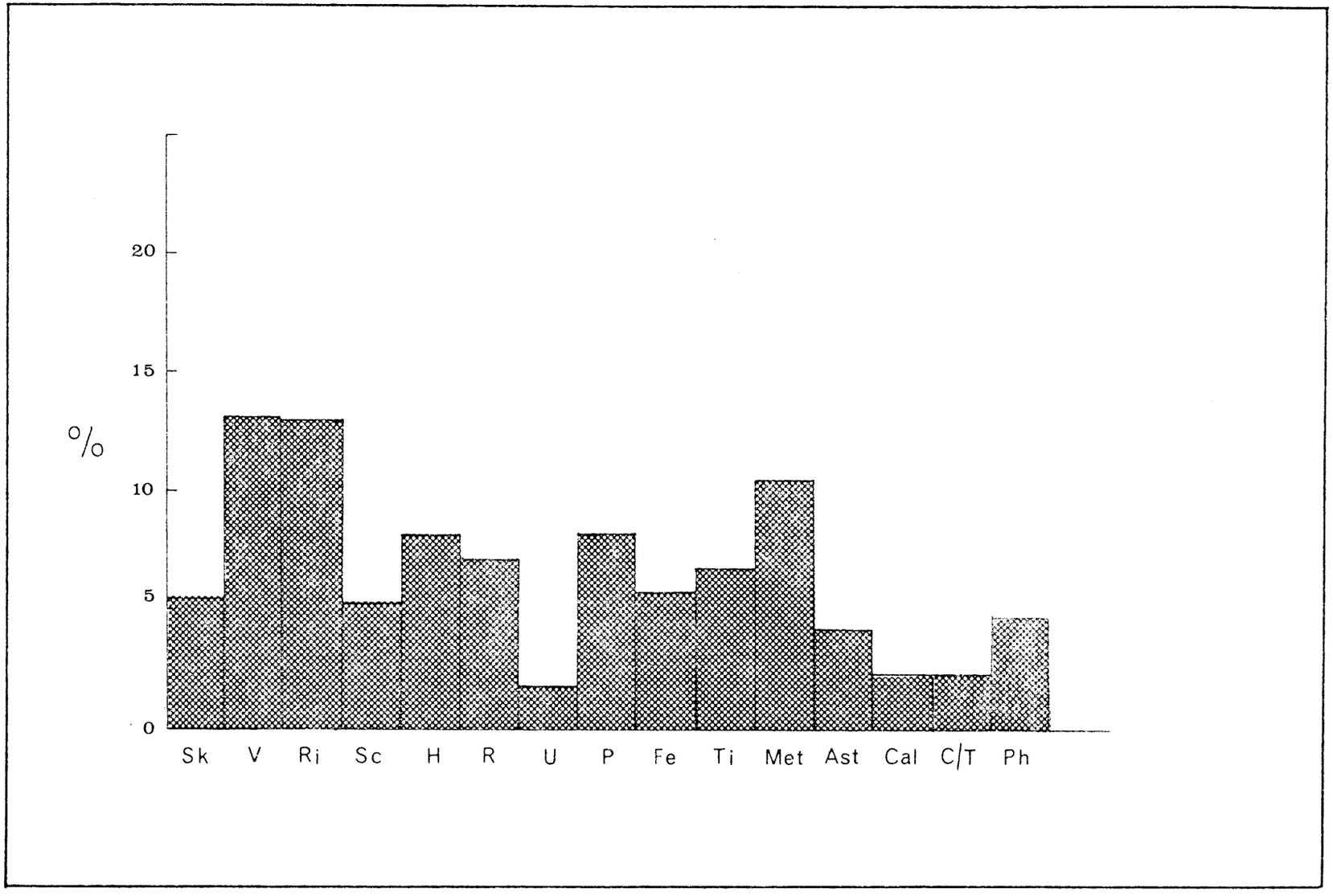
Fig. 8.4. Distribution of butchering damage on bovid skeletal parts from MK1.



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the excavation show varying proportions of damage to different parts of the bovid skeletons.

Limited evidence of butchering patterns is available in the literature.

Fagan (1967:82) records distinct butchering damage at Isamu Pati 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 domesticated bovids in his analysis of butchering techniques. However, the butchering pattern suggested is virtually identical to that observed at Greefswald.

Evidence for butchering patterns among hunter gatherers is available from Yellen (1977), who provides a little information on !Kung butchering practices. The occupants of Camp 2 killed a steenbok and a young adult male gemsbok. The steenbok was carried back to the camp and eaten there. 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. It was carried back to the camp, where it was 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 from 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. All the rest of the animal, except for one horn, part of the backbone and the cracked bones, was carried back to the camp.

At Camp 10, two gemsbok were killed on two seperate hunts.

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In both cases the liver, some ribs and the marrow from the metapodials were eaten at the kill site with the head of one animal also being eaten there. All the rest of both animals was carried back to the camp, except for the skin and horns of the second kill.

The above information suggests that little of a large kill is eaten at a kill site, i.e. very little of the skeleton does not get 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 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 Greefswald.

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. One such site is the Olsen-Chubbuck site in Colorado described by Wheat (1967). The site was the result of a buffalo stampede into an arroyo; here the piled up skeletons of almost 200 buffalo were found, the remains of a hunt in the seventh milleneum B.C. The buffalo had packed tight in the funnel shaped channel; the skeletons were so aligned that the entire sequence of the drive could be reconstructed. The bone deposit could be divided into three distinct layers: at the bottom of the arroyo were 13 complete skeletons, overlain by a layer of virtually complete specimens with only choice portions removed; on top of this layer were almost 500 articulated elements of skeletons.

From this it can be assumed that the carcasses in the uppermost level were completely disarticulated for meat. Those underlying them were robbed only of certain pieces, e.g. limbs, ribs or skulls, while those animals which had first fallen into the natural death trap were not utilised in any way, but were found intact wedged into the bottom of the arroyo.

The excavators found a constant sequence of distinct piles of limb bones - foreleg units at the bottom, then pelvic units and hind legs overlain by spinal-columns, ribs and the skulls. In most cases the jawbones were removed; hyoid bones were

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scattered through the deposit. Single bones such as shoulder blades and jawbones were all found in groups consisting of the same bones.

From the above, the following butchering pattern emerged:

The bison (several at a time) were dragged into position on flat land close to the arroyo, each carcass lying on its belly.

The skin was cut down the back and opened out to form a mat to receive the meat. The tender meat immediately underlying the skin was first cut away.

The forelegs, with the shoulder blades, were cut away and stripped of meat, the bones being thrown back into the arroyo. The highly-prized meat of the hump was then cut away.

The body cavity was probably opened next, with some of the contents being eaten raw. The tongues were removed and eaten during the butchering, as evidenced by the scatter of hyoids through the deposit.

The rib cage was then dismembered; in many cases the ribs were removed from the vertebrae.

The lumbar portion of the spine was severed, and the hind quarters seperated, stripped and the bones discarded.

The neck and skull were removed. The spinal column was stripped of meat, then the neck and skull. The jawbone was cut away; in a very few cases the horns were broken away. The Palaeo-Indians do not appear to have broken the skull open to get at the brains.

Wheat calculated a meat yield of about 550-400 pounds (approximately 250-200 kg) of meat from an adult bison; from this premise he is 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.

This kind of detailed evidence is not easy to acquire; when found, it yields invaluable information on prehistoric butchering techniques.

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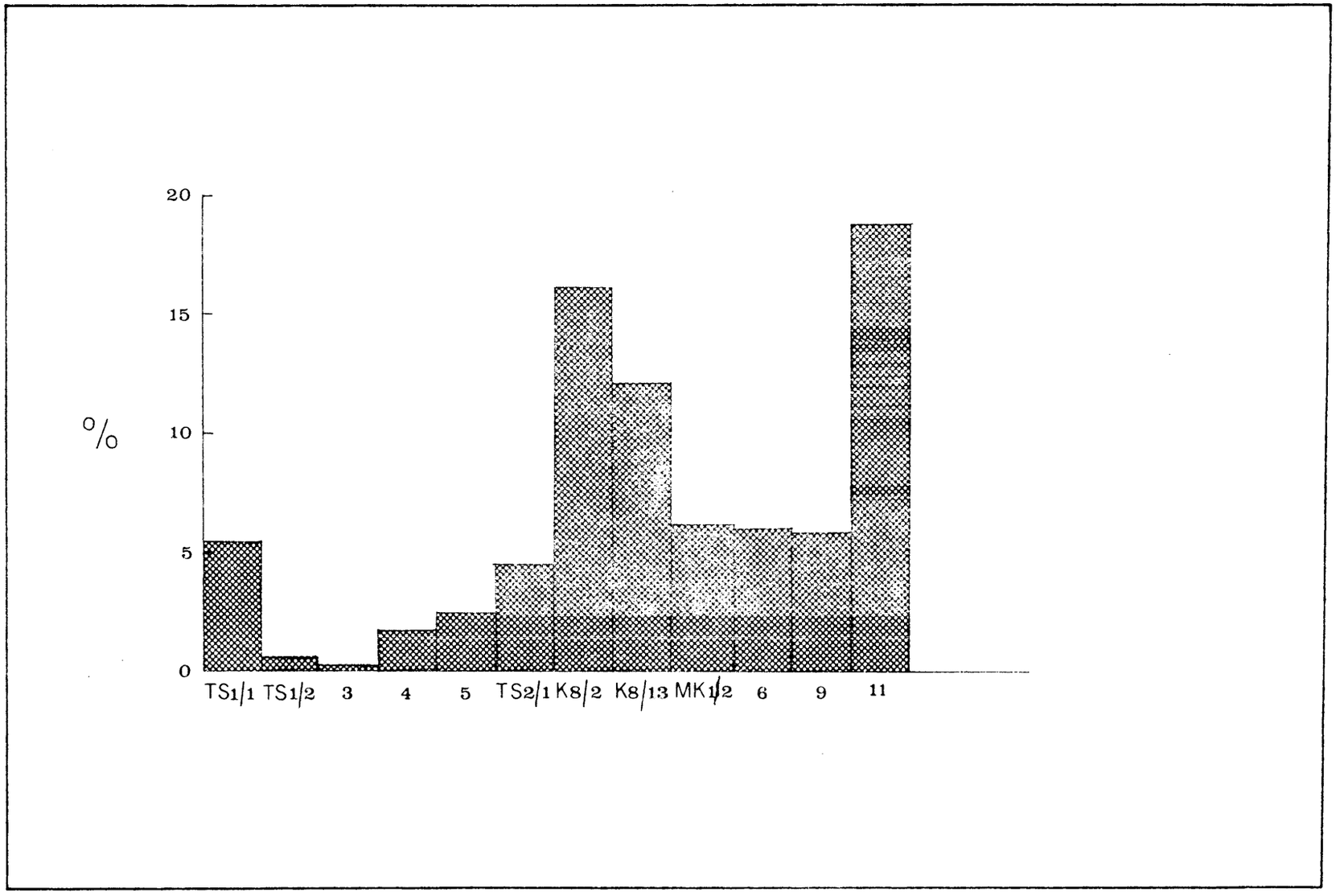
Fig. 8.5. Percentage of total sample of bone from twelve excavation units which shows burning.



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II
Burnt bone at Greefswald

During an excavation it is common to find that some of the bones retrieved are either a dark brown, black, grey or white. This characteristic is generally assumed to be the result of burning. Bone which has had a relatively short contact with fire developes 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 disintigrate; 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. We do not know the effect on bone if the bone is exposed to the fire only during cooking; presumably the bone itself will become dry, but it may not show any colour change. Brothwell (1965:18) does however suggest 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 pieces which have been roasted in the fire. She also makes the interesting suggestion that cut marks on bone suggest that the bone was cleared 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 Greefswald. 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.

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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 Greefswald, for instance a *B. taurus* left humerus and distal femur with unfused epiphyses from TS3/ Level 21. These bones are burnt right through until they are a deep brown and black; although the epiphyses are loose, they can be re-united 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 this midden were regularly being added to by throwing hot ash onto it, one would suspect that a slow charring process would continue on the midden. Thus bones covered by hot ash would 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 Greefswald?

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.

When the record of burning was examined, it was found that the pattern of burning in relation to bovid post-cranial parts differed from unit to unit; no consistency was observed. The pattern of burning in the bone flake class broadly followed that of burning in the total sample; however it does not seem to be advisable to use this category as an example of the occurrence of burning, as the observable differences between units was much smaller than was the case when dealing with either the total sample or the proportion of burnt bovid post-cranial remains.

Fig.8.5 shows the percentage of the total sample of bone from each of twelve excavation units which was burnt. There is a steadily increasing proportion from TS1/3 to MST/K8/2; on MK1, Levels 2, 6 and 9 contained very similar proportions,

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with Level 11 having a much higher proportion of burning. Visually, MST/K8/5 appeared to contain a great deal of burnt bone. Unfortunately this information was not recorded for the total sample, but it is certainly not true for the bovid sample. This emphasises the need for quantifying such data.

Fig.8.6 shows 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 post-cranial remains results in an unrealistically high figure which is not a true reflection of burning in the total sample. For this reason, statements on the relative presence of burning should preferably be based on the amount of burning found within the total sample rather than within individual components of a sample.

Very few archaeological reports contain information on burning of faunal material. At Zimbabwe, Brain (1974:308) found an extremely low proportion of burning in the sample; less than 1% of the total sample was burnt. This constitutes the only available quantitative data from Iron Age sites. On stone age sites the picture may be radically different. Thus Plug (pers.comm., unpubl. M.A. thesis) 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.

In his book Yellen (1977) includes descriptions of 13 !Kung camp sites. He 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 are in any way affected by the fire. On page 184 he comments on the fact that the hearth at Camp 6 contains a very fine wood ash, a fact which holds true of all the hearths and is attributed by the !Kung to the type of wood used. He unfortunately does not enlarge on whether this is related to tree species or to the condition of the wood itself, eg. very dry. He also mentions that hearth

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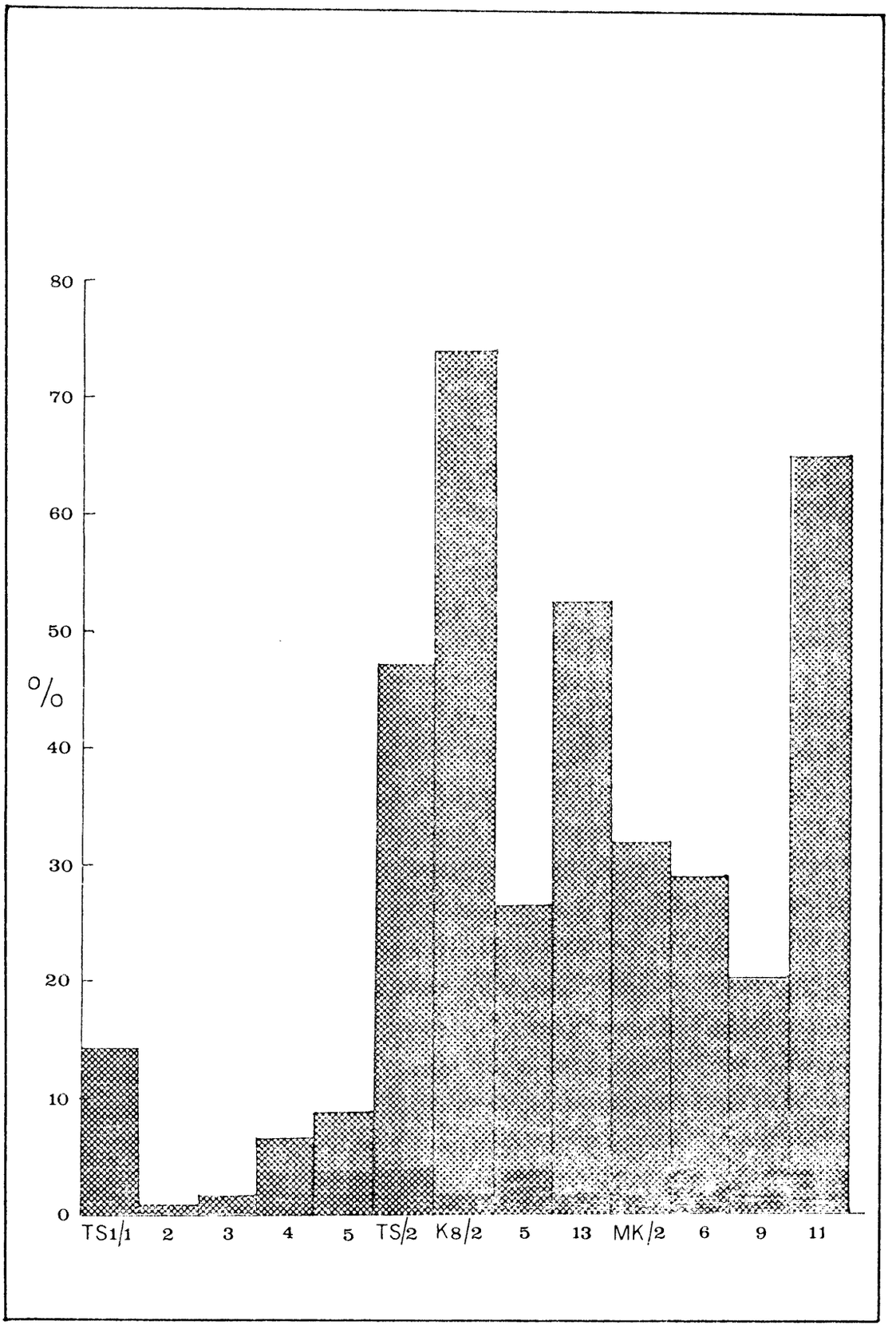

Fig. 8.6. Percentage of bovid skeletal parts from twelve excavation units which show burning.

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debris is scooped up and thrown away outside the occupation area, where it forms isolated mounds of ash and debris.

Similar 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.

III Evidence for damage by hunting weapons at Greefswald.

It is unusual in South Africa to find evidence of damage to bone caused by hunting weapons. Noe-Nygaard (1972 and 1974) has described such evidence in Mesolithic and bog remains from Denmark in detail. She found that both healed and unhealed injuries occur, and that unhealed fractures in *C. elaphus* scapulae show a definite concentration. This concentration is probably related to the vulnaribility of the animal at that point, i.e. in the centre of the scapula. The ratio of healed to unhealed fractures changes through time; the fractures indicate that the bow and arrow was used to wound or kill the animal and a spear used to despatch it. Wild boar skulls indicate the use of spear, knife and axe. The interpretation of the arrow wounds is simplified by the discovery of fragments of flint arrowheads, and even complete arrow heads, embedded in the bone or in the wound. Healing is indicated by callousing around the wound 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 time lapse to allow healing to begin. The finding of 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 very small specimens were found in the Greefswald collection showing possible healed damage on 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. T2/3643 (Level 2) is also an unidentifiable fragment. This time there

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are 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 very strongly suggest healing. I would suggest that these fragments preserve the evidence of a spear thrust or arrow which has touched the bone deeply enough to scar it; and that the animal has survived long enough for callousing to occur. The presence of the bones in the sample indicates that the animals were not so lucky the second time.

IV

Carnivore damage on bone.

Intermittently during the analysis of the Greefswald 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; 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 consists of paired grooves formed by the incisors. This kind of misidentification is unlikely to have occurred at Greefswald.

Sutcliffe (1970) illustrates similar gnawing striations on bones gnawed by young spotted hyaenas with milk teeth. He also describes the "scooping out" by carnivores of the cancellous bone forming epiphyses; this was not noted during the Greefswald analysis, but should be looked out for in future work. He also describes the appearance of regurgitated bone fragments; since the digestive juices 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.

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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; it is unlikely that any of the damage on the Greefswald material could be attributed to hyaenas, although these animals may have slipped into the confines of the settlement and stolen isolated bones from the midden.

Until domesticated dogs were identified at Greefswald, the identity of the carnivore responsible for this damage remained very uncertain. The circular perforations and depressions are small; thus the damage is unlikely to have been inflicted by any animal larger than the dog 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 very possible that this kind of damage would occur in the digestive tract of a carnivore.

This kind of damage has been recorded from a number of sites, eg. Tautswe (Welbourne, 1975:13). Domestic dogs were undoubtedly responsible for much of the damage; it is however 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 might be expected to influence the preservation of certain bones. This aspect is discussed in more detail in Chapter 9.

V

The effect of rodents on the bone.

Another 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

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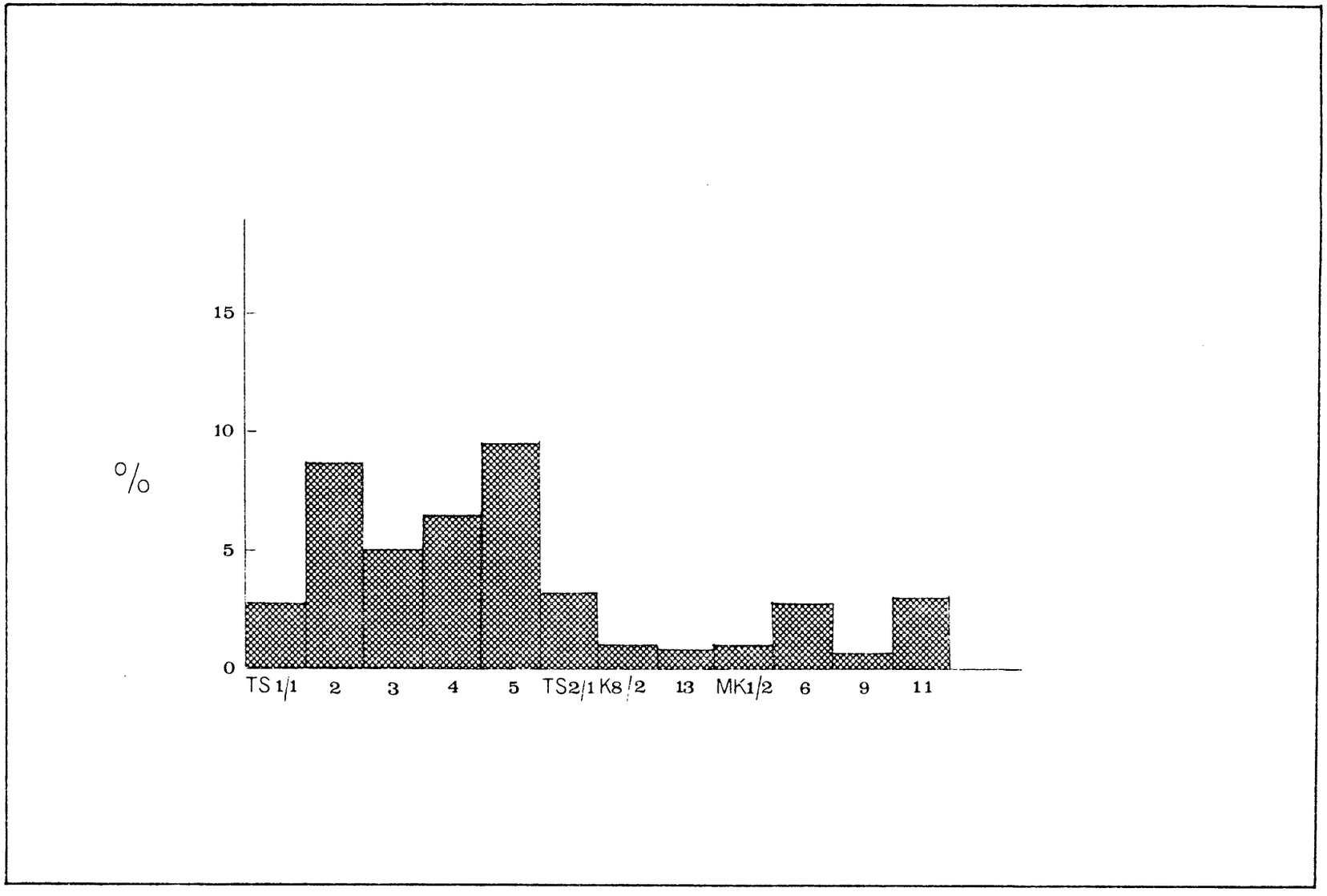
Fig. 8.7. Percentage of total sample of bone from twelve excavation units which show rodent gnawing.



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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 striations within the mark. They could be expected to be about 0,4 cm wide, and are relatively easy to identify. The gnawing of small rodents is also evidenced by pairs of marks, in this case 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 one specimen (a bovid post cranial specimen from K2/TS4/Level 4) was found with porcupine gnawing. It can therefore sately be assumed that porcupines played no part in the history of the Greefswald bones after they were discarded by the inhabitants.

Bone assemblages accumulated by porcupines appear to be characterised by a high percentage of gnawing, and a low percentage of burning and of unidentifiable fragments. Hendey and Singer (1965) found such a situation in the analysis of the bone from Andrieskraal I and II. Andrieskraal I was a rock shelter with an accumulation of human debris; 0,3% of the bones were gnawed, and 80% were unidentifiable (just over 10% of the identifiable fragments were burnt). The assemblage from the porcupine lair, however, showed 60% gnawing, virtually no indication of more than natural charring, and 42% of the assemblages were unidentifiable. Man also 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 and an overall larger size composition.

Gnawing by small rodents, however, occurred sporadically throughout the Greefswald sample, although it is not numerically significant on any of the sites. Fig.8.7 shows the relative proportions 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%, It can thus be seen that the

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amount of rodent gnawing varies from unit to unit, but in no case does it constitute more than 9,6% of the total sample. It is therefore not a significant factor in the bone assemblage.

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

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CHAPTER 9

INTERPRETATION OF THE GREEFSWALD FAUNA 5: BONE PRESERVATION AT GREEFSWALD.

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. 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 attempts to identify and describe some of the factors acting upon bone remains discarded in the Greefswald settlements.

1. Bone distribution on the site

Bone was retrieved in each excavation on Greefswald, although variations in density of bone did occur. An ideal situation would be to study the horizontal and vertical distribution of bone in a deposit. However, unless such distributions can be related to specific features or to large areas, such an exercise will yield little useful information. Thus the samples from TS1, TS3 and MST/K8 are too limited in area to be used in this way.

In order to investigate the above possibilities, 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 listed in Table 9.1 and represented graphically in Fig. 9.1. Within each level, horizontal density varied between squares This could not be related to specific features, so cannot be satisfactorily explained. 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 actual percentages of bone flakes in each square fluctuated a great deal. When the data in Table 9.1 were tested using the

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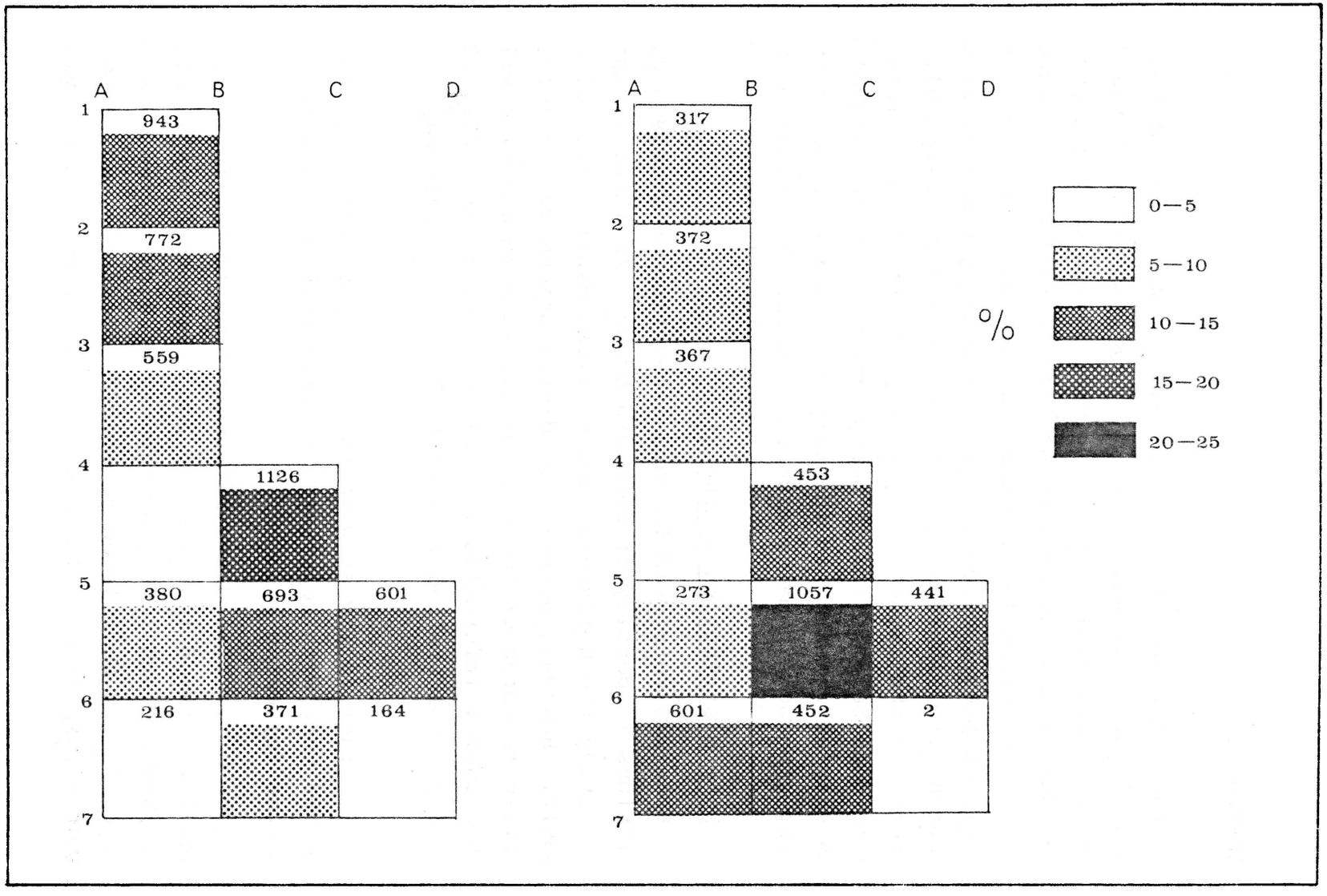
Fig. 9.1. K2/TS2/Levels 1 and 2. Horizontal variation in distribution of bone flakes. Square B4 not included. Numbers in squares are actual numbers of bone flakes.



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Chi^2 test, the variations were found to be significantly different at the 0,1% level.

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 fell within squares A4 and A5. A5 and B5 consisted mainly of a deep pit which yielded a large quantity of bone. The bone however came from Level 9 (B5.9ii.1). In A3, the dissected remains of a hut floor were found, which were seperated from the hut in A4/A5 by an irregular shaped trench. Fig.9.2 shows the relative positions of the features in relation to bone density.

Table 9.2 lists the quantities of bone found in all squares except A4; the results are represented diagramatically in Fig. 9.2. It can be seen that the least material (0,9%) came from the floor of the hut in A5, and from B5 in which the pit occurred. The largest amount of material came from B3, which included the trench between the huts; during excavation it was noticed that this trench contained a good deal of bone. The area outside the hut in B4 also yielded a large quantity of bone, as did the eroded hut remains in A3.

In the above case, the maximum amount of bone 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. one which was in disuse at the time of occupation of the A4 hut. It is possible that the eroded area between the huts was the remains of a foot path.

In a situation such as this, where a relatively large area has been opened up which shows some definition of activity areas, a study of the horizontal distribution of bone can be linked to the evidence from the excavation. However, many more examples such as these are necessary before a meaningful pattern is likely to emerge. There is therefore good reason to attempt the definition of horizontal distribution of bone where suitable settlement or activity areas have been excavated.

One interesting aspect of the Greefswald accumulation which

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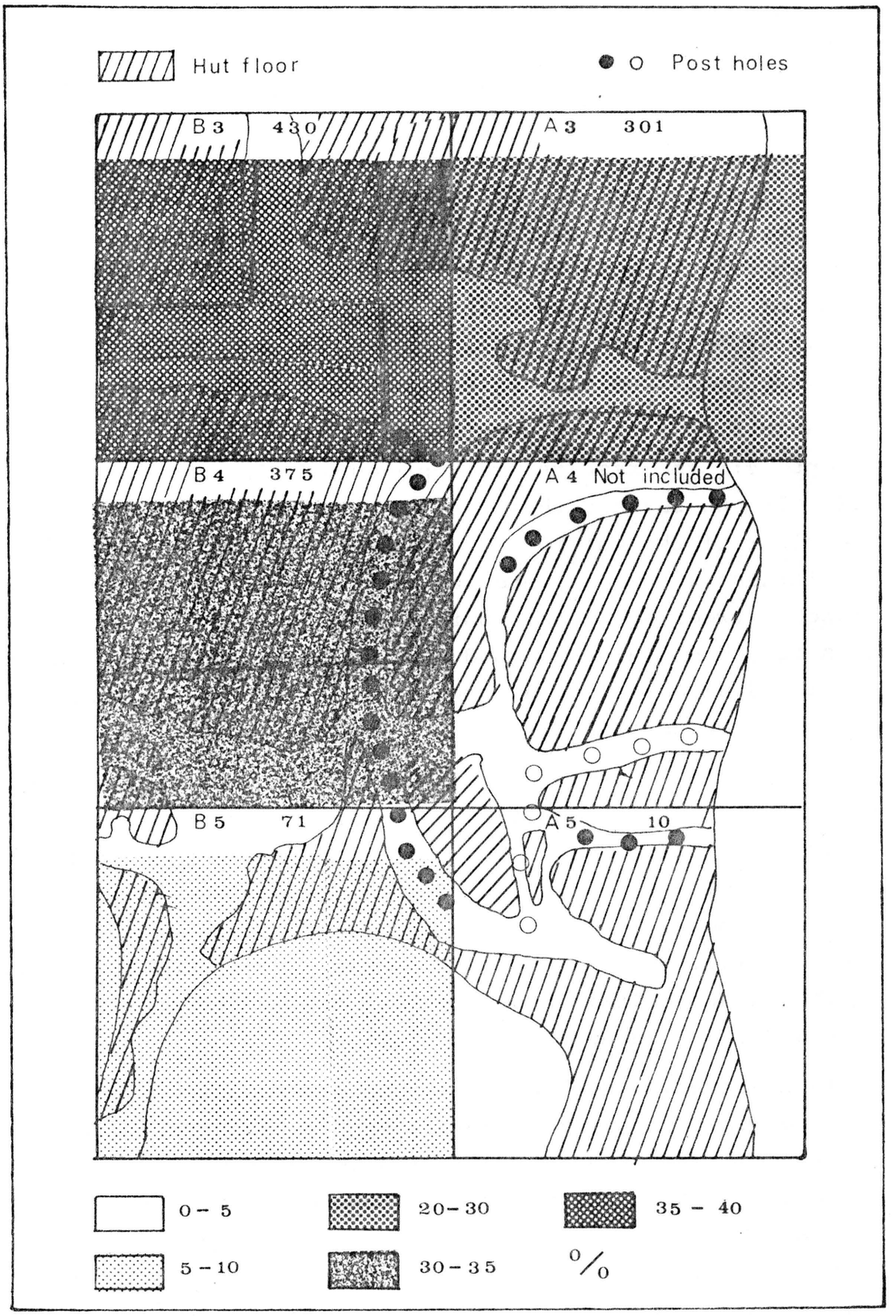

Fig. 9.2 Variation in horizontal distribution of all bone in MK1/Level 10.

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has only been briefly touched on in Chapter 8 is the occurrence of articulated bones. Articulated phalanges occurred in a number of levels (eg. MK1/2300, 1578 and 2001, MST/5) and, more rarely, articulating limb bones. Articulated vertebral columns were found on MST, e.g. F4/2(i)x (Plate 4.2) and H5/2.2 (Plate 4.5); 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 dis-articulated) animal. Thus in K2/TS3/Level 6 the major part of the skeleton of a sub-adult *B. taurus* was found, including the ribs and vertebrae. A similar situation pertained on Schroda, an Iron Age site east of Greefswald excavated by Edwin Hanisch (Hanisch in prep., Voigt, in prep.) in which the major part of the skeleton of a sheep or goat was associated with a pot burial (Schroda, Square B1, Level 6.1).

The interpretation of dis-articulated skeletons

Apart from the more dramatic discoveries of complete skeletons such as the horse skeletons in Scythian and Chinese tombs, two interesting examples of finds of entire cattle skeletons have recently been published. The first of these was a complete skeleton of an 18-24 month old ox buried in a small Bronze Age settlement in Holland called Molenaarsgraf. (1800-1500BC; Clason, 1977: 60-64). The skeleton as illustrated was complete when found, with the lower hind legs lying across the lower forelimbs, and the head bent back to rest across the scapula. Clason suggests that this burial may be indicative of the importance of cattle breeding among the inhabitants.

An even earlier find was the almost complete skeleton of a domesticated ox between two and five years old on a site dated to 3810 ± 500 B.C. at Agorass in - Last in the Adrar Bous area of the Central Sahara. The skeleton was associated with the midden debris of a Neolithic (Ténérian) settlement, and was complete except for the extremities of the long bones, which had been eroded away. The skeleton lay on its left side with the head drawn back and the limbs flexed. This posture was compared by the excavators to that of domestic animals which had died of thirst; in all cases such carcasses had been left untouched by their owners. The position of the Adrar Bous skeleton was similar to that of animals who had died a natural death; Carter

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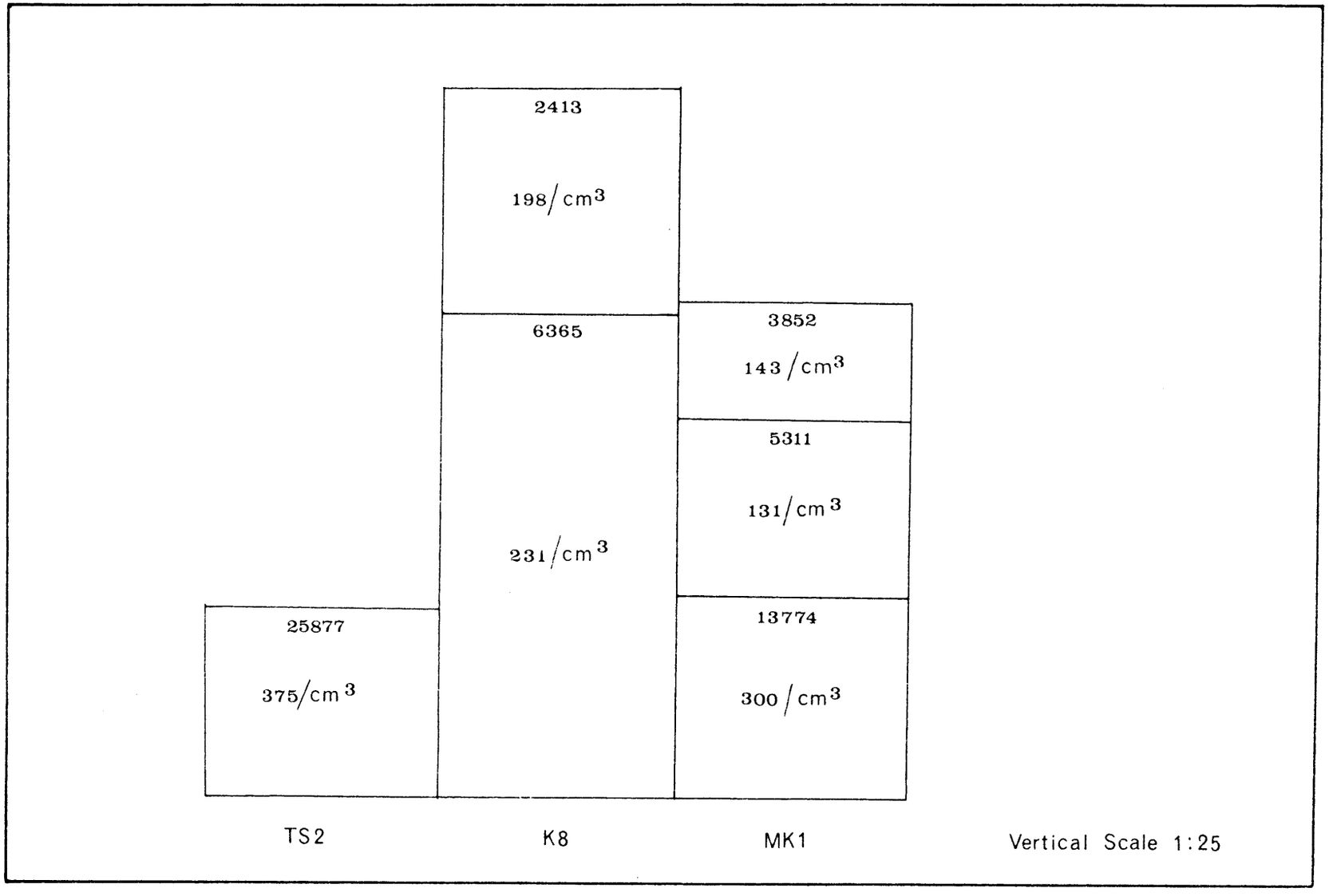
Fig. 9.3. Variation in density of bone as expressed by number of bones per cubic cm. in TS2, K8 and MK1.



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and Clark therefore interpreted the Neolithic specimen in terms of an animal which had died naturally and had been covered over by natural agencies. Utilisation of the carcass may have been prohibited by social custom, or the settlement may have been temporarily deserted. Thus in this case, the survival of a complate specimen was due to natural causes. (Clark, Williams and Smith (1973):288-291; Carter and Clark (1976)).

Two very different explanations of complete burials are involved in the above finds; interpretation in both cases involved careful observations of the local conditions and site formation. Where considerable portions of skeletons have been found at Greefswald, they have been thoroughly disarticulated. Thus in the case of Greefswald, whatever the reason for an entire animal being disposed of 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 in an excavation varied from one excavation to another. An attempt was made to quantify the density of bone occurring, the results of which appear in Table 9.3 and Fig.9.3. Three excavations were examined: K2/TS2, MST/K8 and MK1. The cubic capacitv of the excavation was worked out as closely as possible by multiplying the horizontal dimensions of each excavation by the depth of the excavation as indicated on the sections provided. Variations in the thickness of individual levels was not taken into account.

In order to calculate the density (or frequency) of bones per cubic metre, the number of bones included in the analysis was divided by the cubic capacity of the excavation. This resulted in a figure which indicates the overall number of bones in each excavation unit per cubic metre. 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, as can be seen if the total bone sample tables are referred to.

However, some interesting points emerge. TS2, although it was a shallow excavation, covered the largest horizontal area. It yielded the largest sample of bones which, in spite of the large area involved, also gave the highest density of bone, i.e. 735 bones per cubic metre. MK1/Phase 2 (Levels 10 and 11) was

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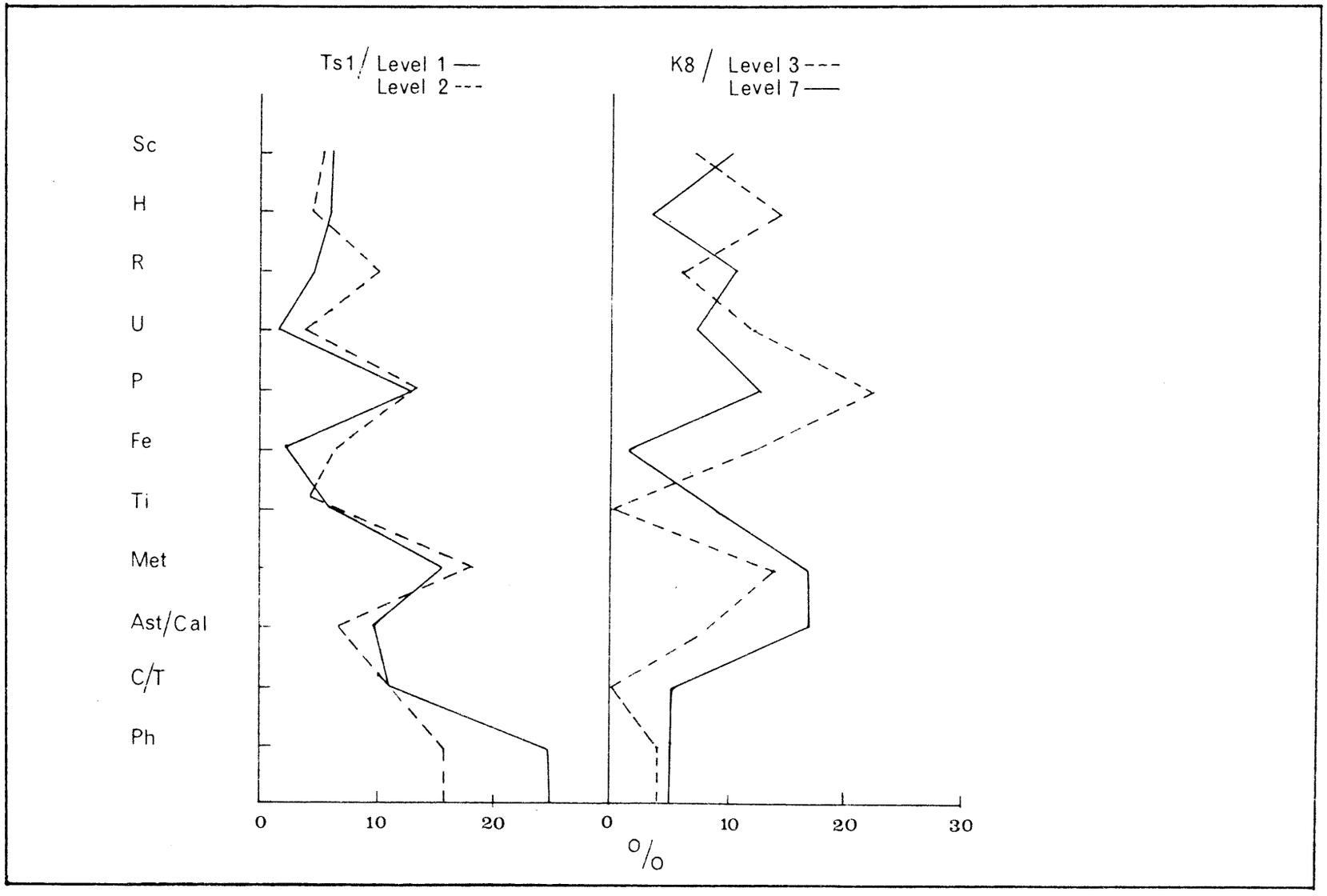
Fig.9.5(a). Percentage survival of Bov.II post-cranial body parts in TS1/Levels 1 and 2 & K8/Levels 3 & 7



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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 could possibly affect the waste disposal situation. The same argument could be applied to MST/K8/3.

Although the data for this exercise were not as complete as was desirable, it has indicated that this kind of calculation of bone density in a deposit is feasible. However, it needs to be linked to data such as pottery density and soil content of an excavation to be able to add a full dimension to the interpretation of archaeological material. In order 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.

2. The pattern of bone preservation at Greefswald.

The study of the pattern of bone present on a site is usually 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 this 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.

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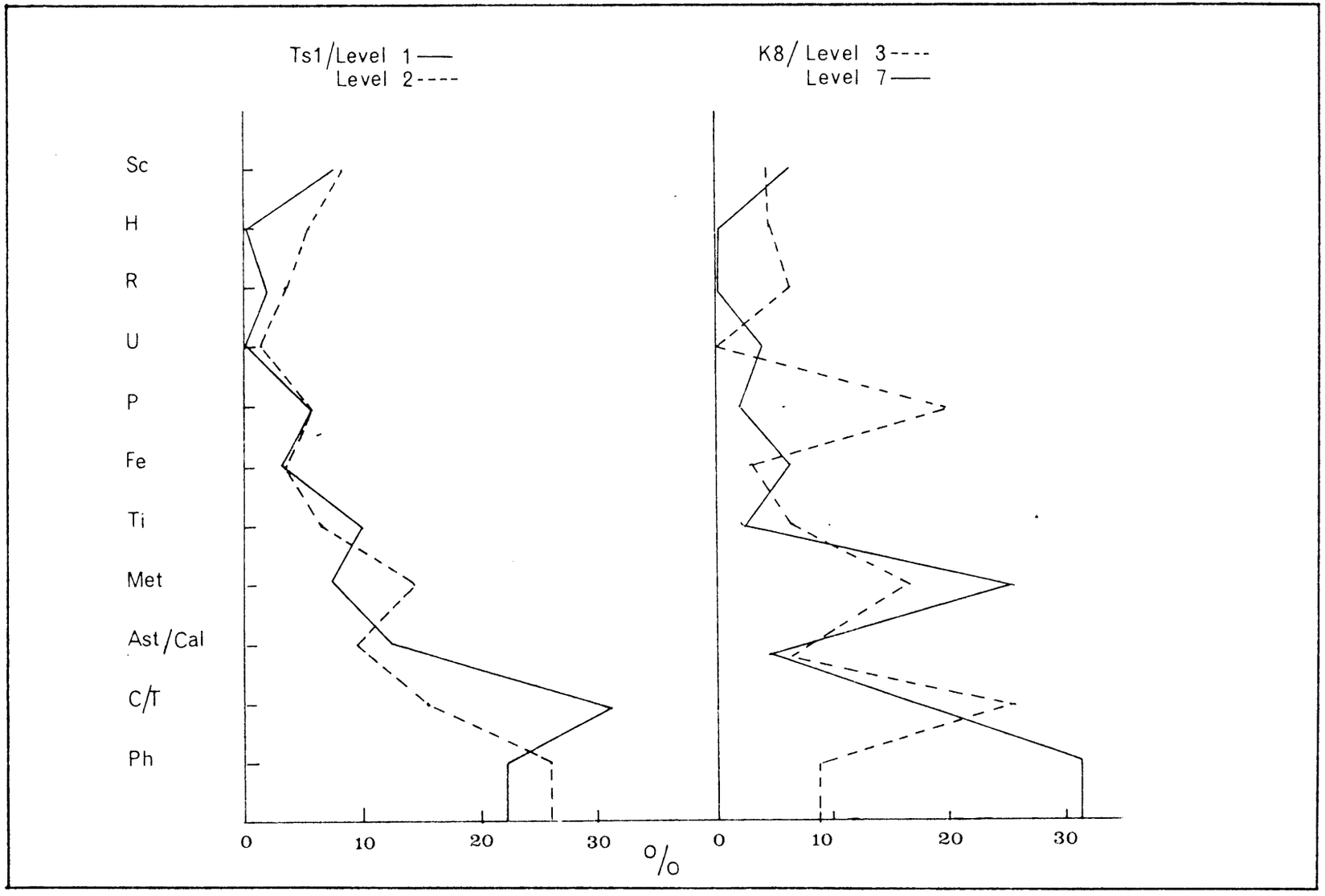
Fig. 9.5(b). Percentage survival of Bov.III post-cranial body parts in TS1/Levels 1 and 2 & K8/Levels 3 & 7.



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If the percentage distribution of the skeletal parts is examined (Figures 9,5), it can be seen that a difference exists between the preservation of Bov.II and Bov.III post-cranial remains. (Only the upper two levels, 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 forelimb is not well represented.

The above results were tested against the data from MST/K8 Levels 3 and 7, and MK1 Levels 2,8, 10 and 11. (Figs. 9.5 and 9.6).

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 part found are the phalanges. In all cases, the extremities (astragalus, calcaneum, carpals, tarsals and phalanges) are represented in very 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.

It seems then 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 parts are present. The Bov.III skeletal part lists are largely dominated by metapodials and extremities. This may be partly due to the fact that the Ovis/Capra sample is the largest of the two. However, I feel that this preservational pattern is also related to butchering practices, in that most Bov.III bones are thoroughly smashed in order

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Fig. 9.6(a). Percentage survival of Bov.II and Bov.III Post-cranial body parts in MK1/Level 2 and MK1/Level 8.

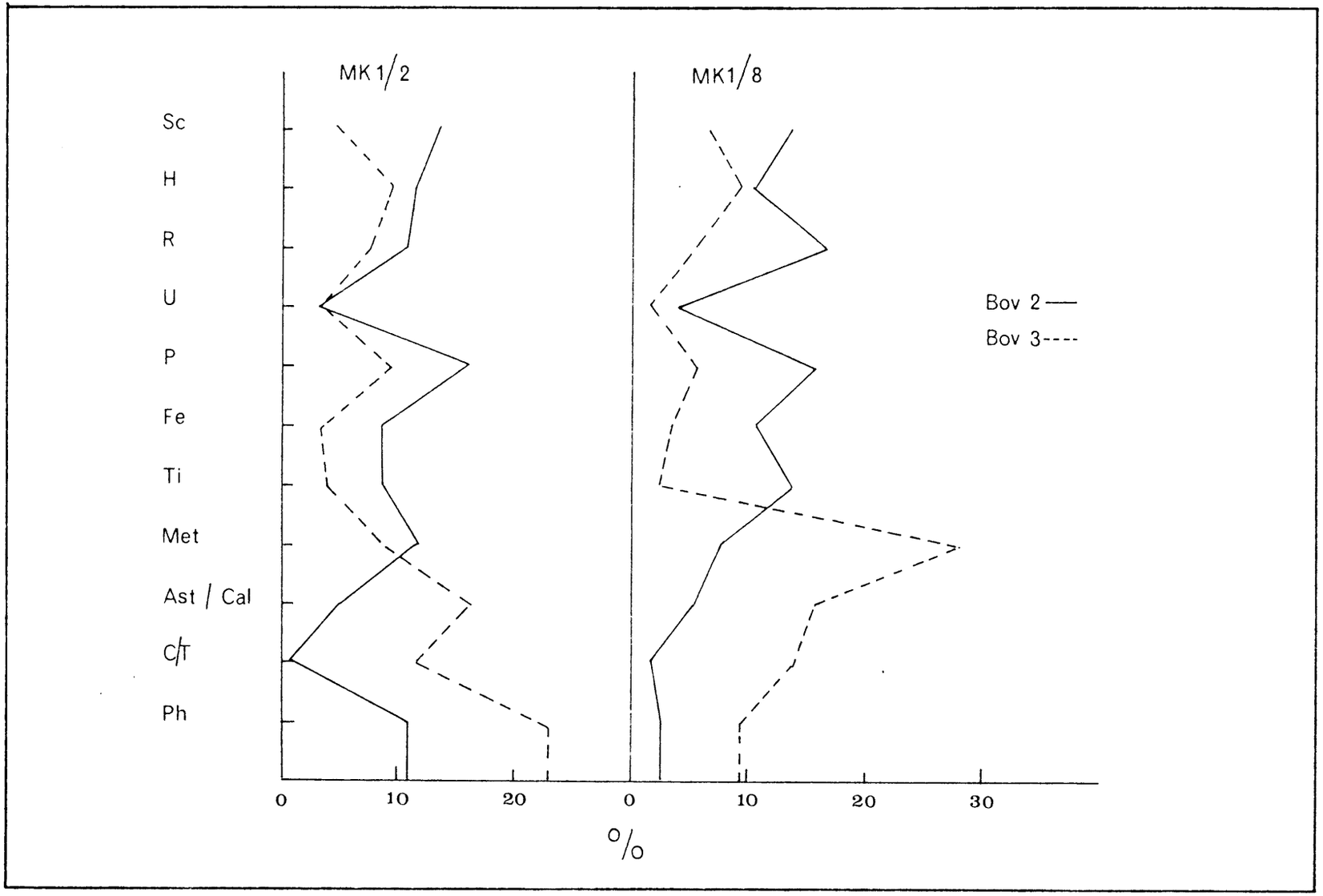

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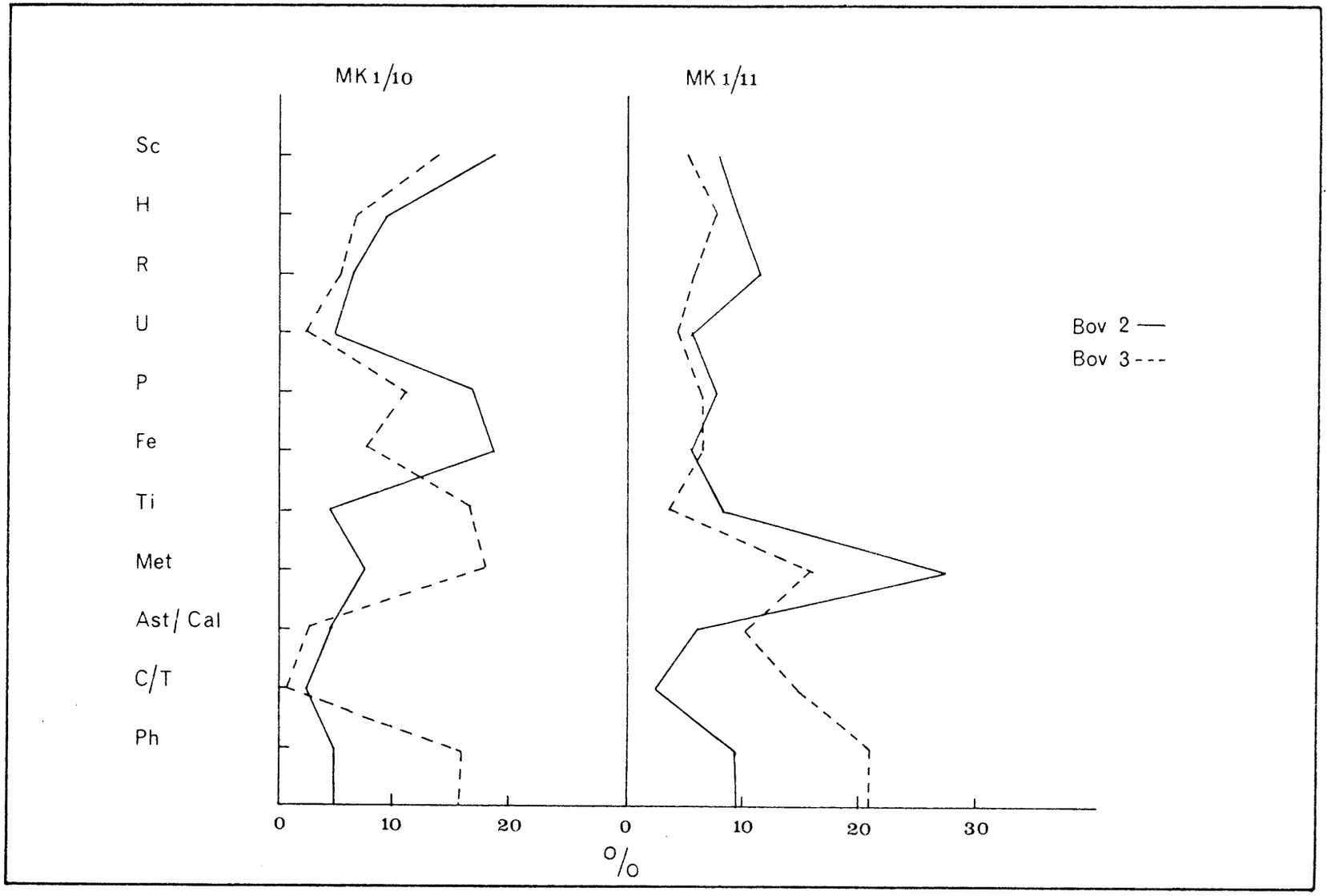
Fig. 9.6(b). Percentage survival of Bov.II and Bov.III post-cranial body parts in MK1/10 and MK1/11.



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to obtain the marrow, thus being reduced largely to bone flakes rather than being preserved as identifiable post-cranial material. The survival of skeletal parts as portions of the faunal sample is also undoubtedly linked with the question of horizontal distribution as exposed during excavation. Thus larger bones (Bov.III) might 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 relative proportions of axial/appendicular skeletal parts at kill and home sites. 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 post-cranial and limb-bone/foot-bone ratios. If the proportions of axial/appendicular bones in TS1 are listed (Table 9,4), it is found that in most cases axial material outweighs 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 only includes identifiable bovid skull material and vertebral material. In both cases, the appendicular sample consists only of bovid post-cranial remains. These figures suggest that in most cases appendicular remains represented 50% or less of all the bone samples in 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.

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 9,5).

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

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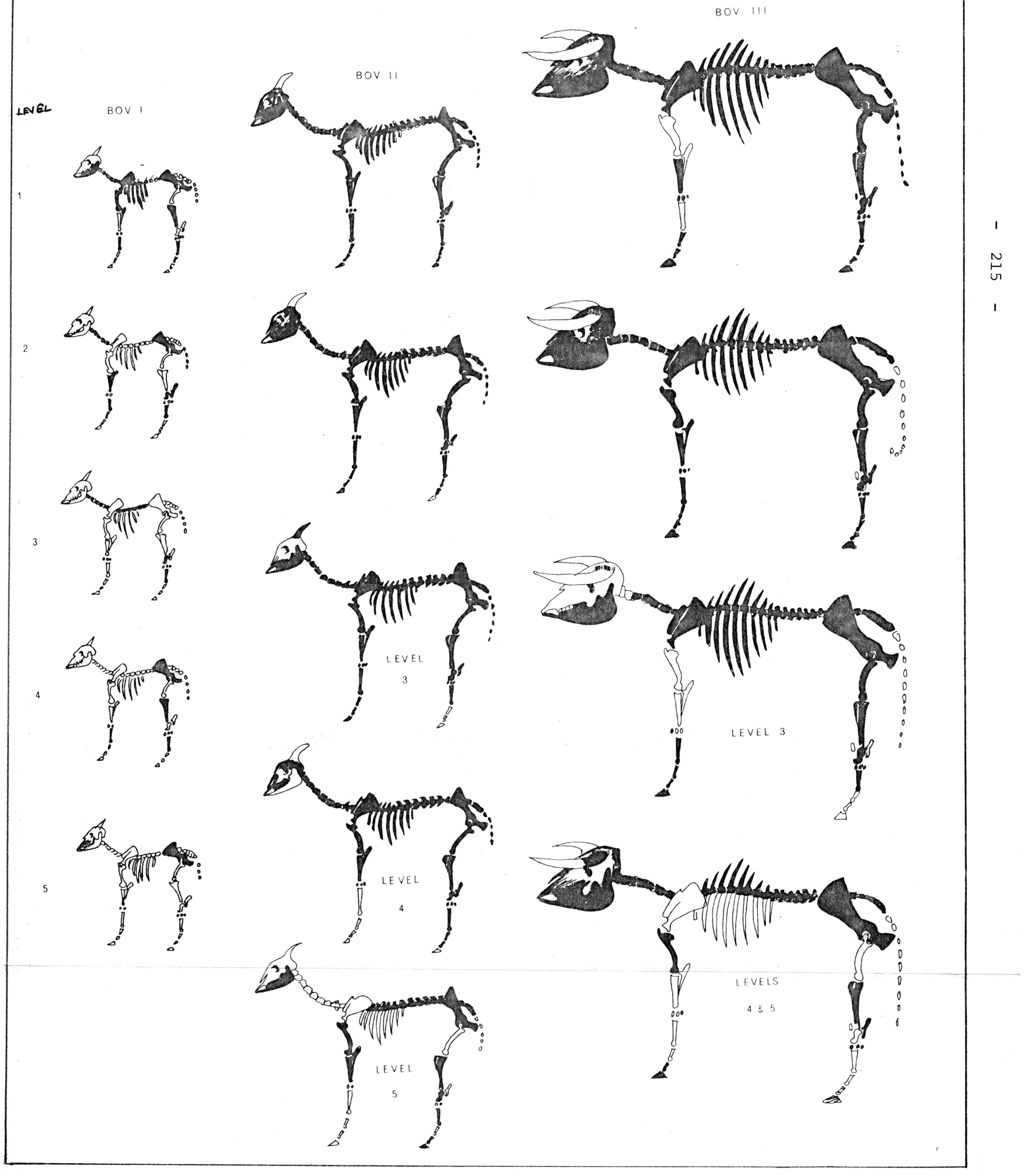

Fig. 9.7. Diagrammatic representation of Bov.I, II and III post-cranial body parts in K2/TS1.

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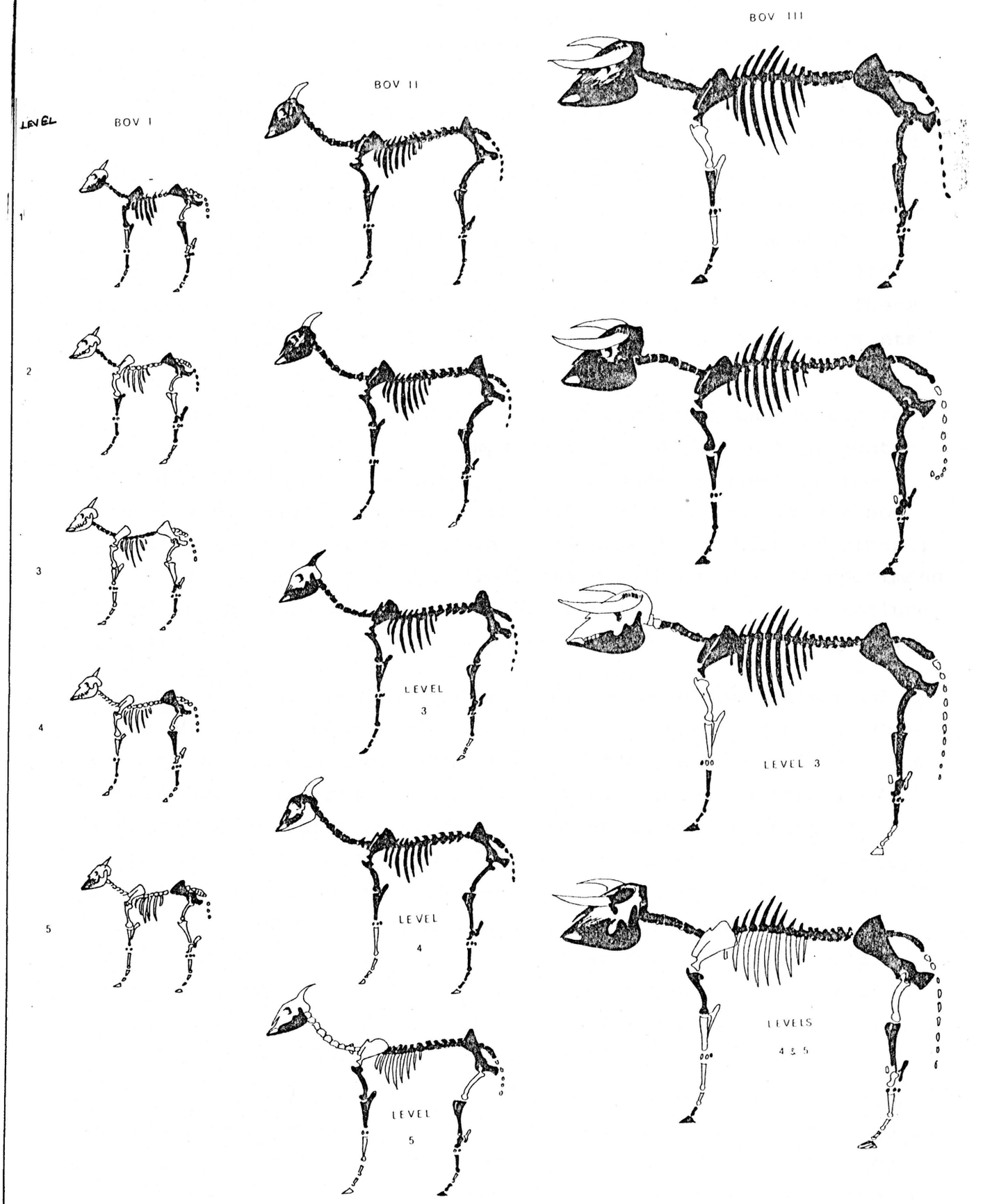

Fig. 9.7. Diagrammatic representation of Bov.I, II and III post-cranial body parts in K2/TS1.

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all contained hut floors which influenced the distributional pattern of the bone.

Brain (1974(b):307) listed the components of a bulk sample from Zimbabwe. In this sample, axial material constituted 68,9% of the bovid bones, with 31,2% appendicular remains. However, all the recognisable teeth and skull fragments had been removed from the sample; in the sample of identifiable bones, 92,9% of the sample consisted of axial material. Because the two samples cannot be directly related, this data is not comparable with the Greefswald material. At Tautswe, Welbourne (1975:10) found an axial/appendicular proportion of 69,5 to 30,5%. These figures would suggest a high proportion of axial bone fragments on Iron Age settlement sites.

The possibility was considered of examining the actual representation of body parts compared to the expected representation in relation to the number of individuals present in the assemblage. Fragmentation at the site is such that it was not possible to ascertain which fragments came from which specimens; the minimum number counts reflect the maximum number of specimens which could have been involved, but the body part counts include all fragments identifiable as having come from that body part.

In the same way, proximal and distal ends were too fragmented to be able to categorically relate parts of the same bone. Certain fragments did occur with a higher frequency than others, eg. 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 dates 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 Greefswald material, it was decided that further investigation of this aspect could add nothing to the present study. Details of the preservation of proximal and distal epiphyses are given in Tables 4,5, 4,18, 4,22, 4,26 and 4,30.

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; on the basis of these findings

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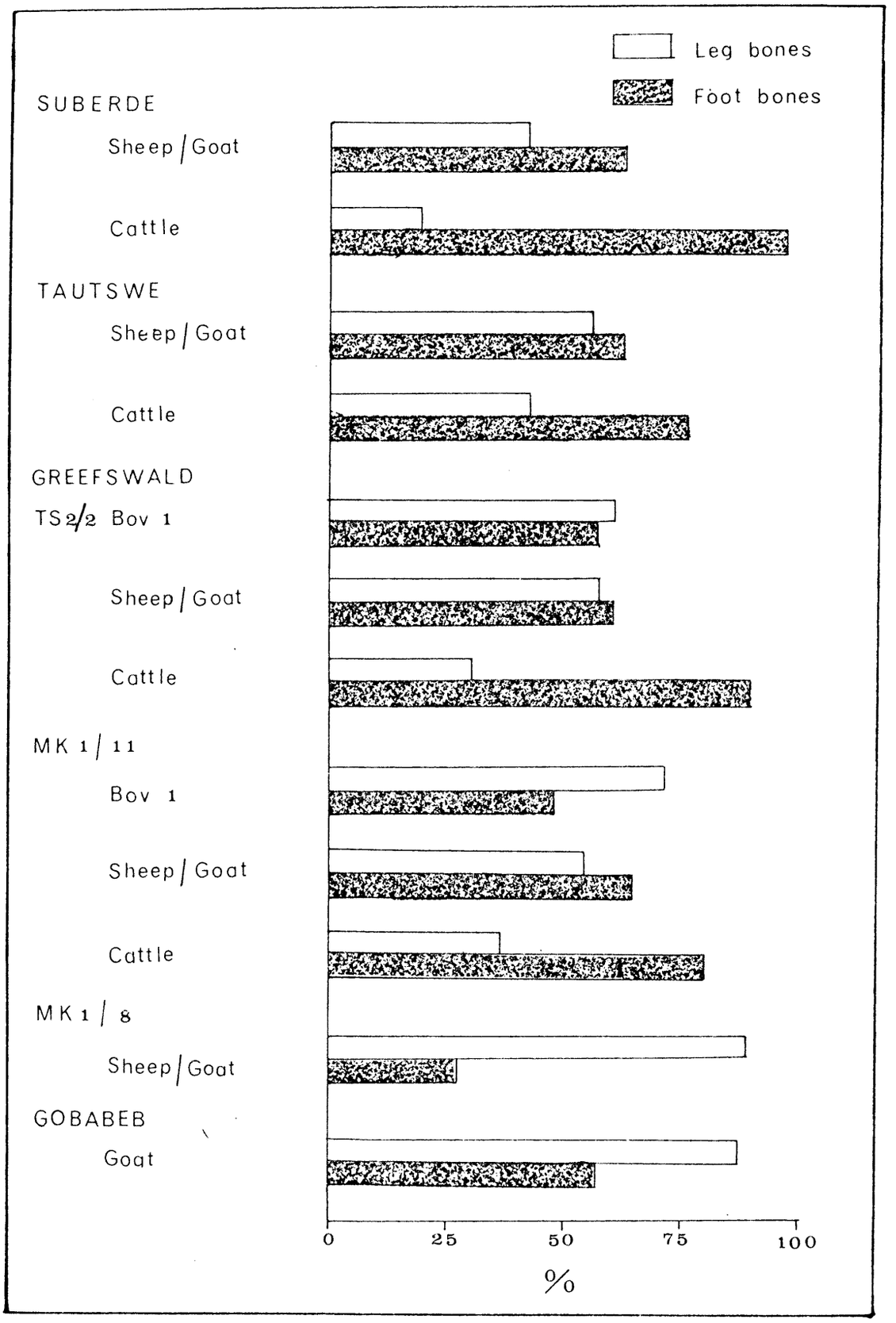

Fig. 9.8. Schlepp effect. Preservation of cattle and sheep/goat leg and foot bones at three sites for comparison with Greefswald.

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they postulated that the inhabitants butchered wild oxen at the kill site, and dragged the meat back in the hides, which still contained the foot bones. Sheep and goat carcasses were brought back to the village intact. They named the result the "schlepp effect".

This hypothesis does not stand up very well to close examination and comparison with other results. The pattern of preservation of Bov.II and Bov.III body parts at Greefswald 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 was due to the size of the bones, not the situation 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 domesticity as opposed to wild species.

In figs. 9,8 and 9,9, the relative proportions of leg and foot bones are plotted for sheep/goat and cattle and for cattle only for a number of sites. These are compared with the results from Suberde and Can Hassan. I believe that these results prove that the "schlepp effect" is a normal distributional pattern occurring 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.

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 in the Dobe area on Bushman camps. (Ch.8, p.221). It is illuminating to now examine his evidence in the light of bone preservation. Table 9,6 lists the faunal material collected at each camp at which a carcass was brought back and eaten at the home site.

At Camp 2, the carcass of an adult gemsbok and a steenbok were brought back to the camp. No complete bones were recovered from the camp site. The majority of the gemsbok remains were

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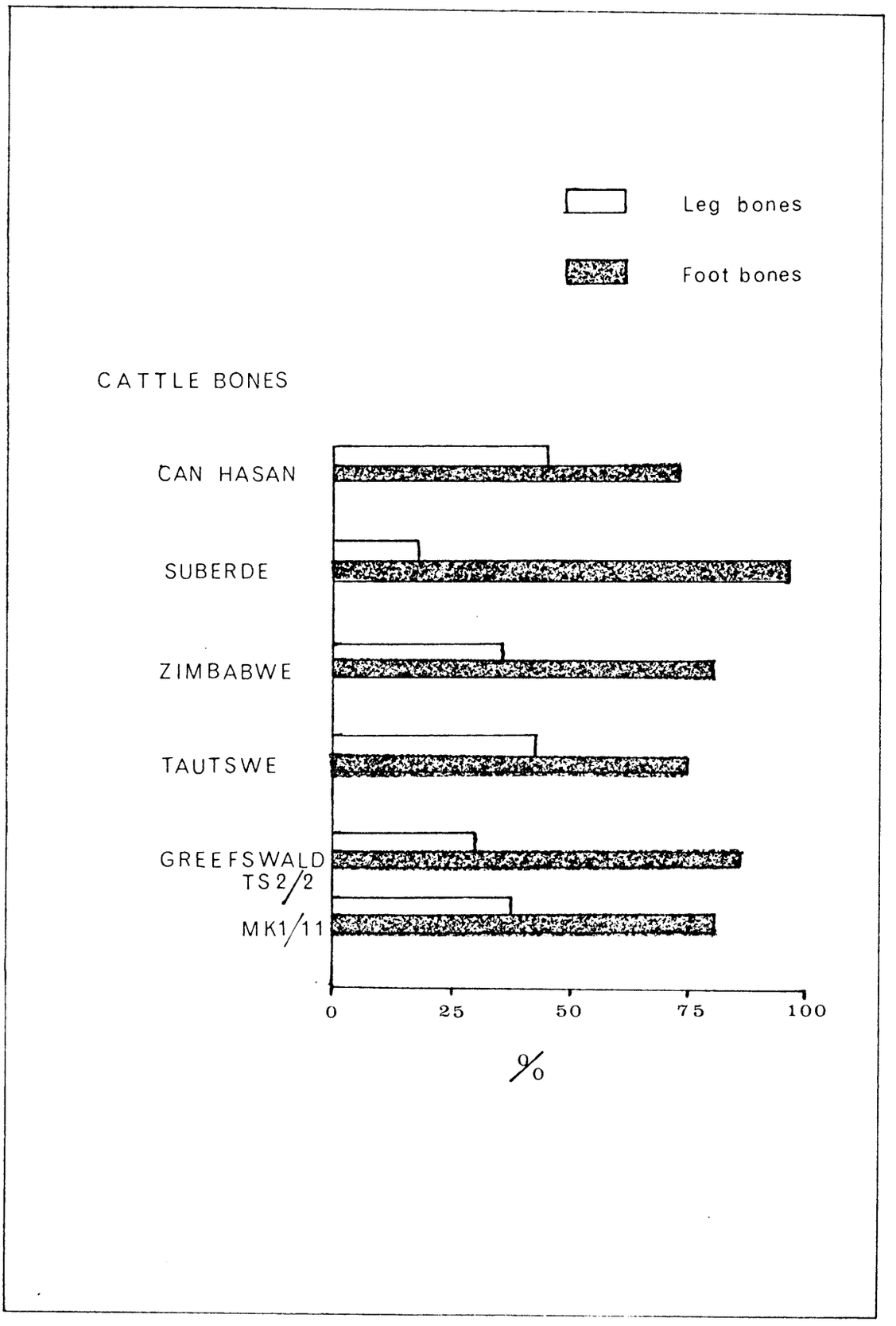

Fig. 9.9. Schlepp effect. Preservation of cattle leg and foot bones at four sites for comparison with Greefswald.

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from vertebrae and ribs; it is interesting to note that four bones (femora and tibiae) were represented by no less than 25 fragments. The steenbok fared even worse; the entire animal is represented by five bones.

Two duiker, a steenbok, 3 porcupines and a tortoise were eaten at Camp 3. 20 of the bones retrieved by Yellen were unbroken, most of them belonging to the small antelope. Fragments of ostrich eggshell were also picked up on the camp site. The duiker were represented by a wide variety of bone, the most common being vertebrae and skull fragments; nevertheless the sample of 47 bones is low considering two animals were involved. The steenbok was even less well preserved, vertebrae again being the most common. The porcupines were best preserved, although three individuals were involved and ribs and skull fragments (all of which would be difficult to identify to species level in a large sample) were the most numerous. The tortoise was definitely under-represented.

The hunters at Camp 6 killed a young gemsbok and steenbok. A horn and part of the vertebral column of the gemsbok were left at the site with the cracked metapodials. Only two complete bones were retrieved from the site; all the rest are fragmentary. Steenbok bones are more common on this site than at either Camp 2 or 3; rib, femur and fragments of the extremities are the most common. The gemsbok was represented by 50 bones, skull, femur and vertebrae being the most common. Both species of animals are represented by a similar range of skeletal parts.

The remains of two gemsbok were brought back to Camp 10. Five complete bones occur in the collection of 139 pieces; two of these are phalanges. The best represented body parts were vertebrae and ribs; it is interesting to note that the scapulae and pelves are extensively fragmented. Most of the skeletal parts are represented.

The data from the Bushman camp sites highlight several useful points to bear in mind when interpreting the preservation of skeletal parts. Skulls of the large bovids are largely 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

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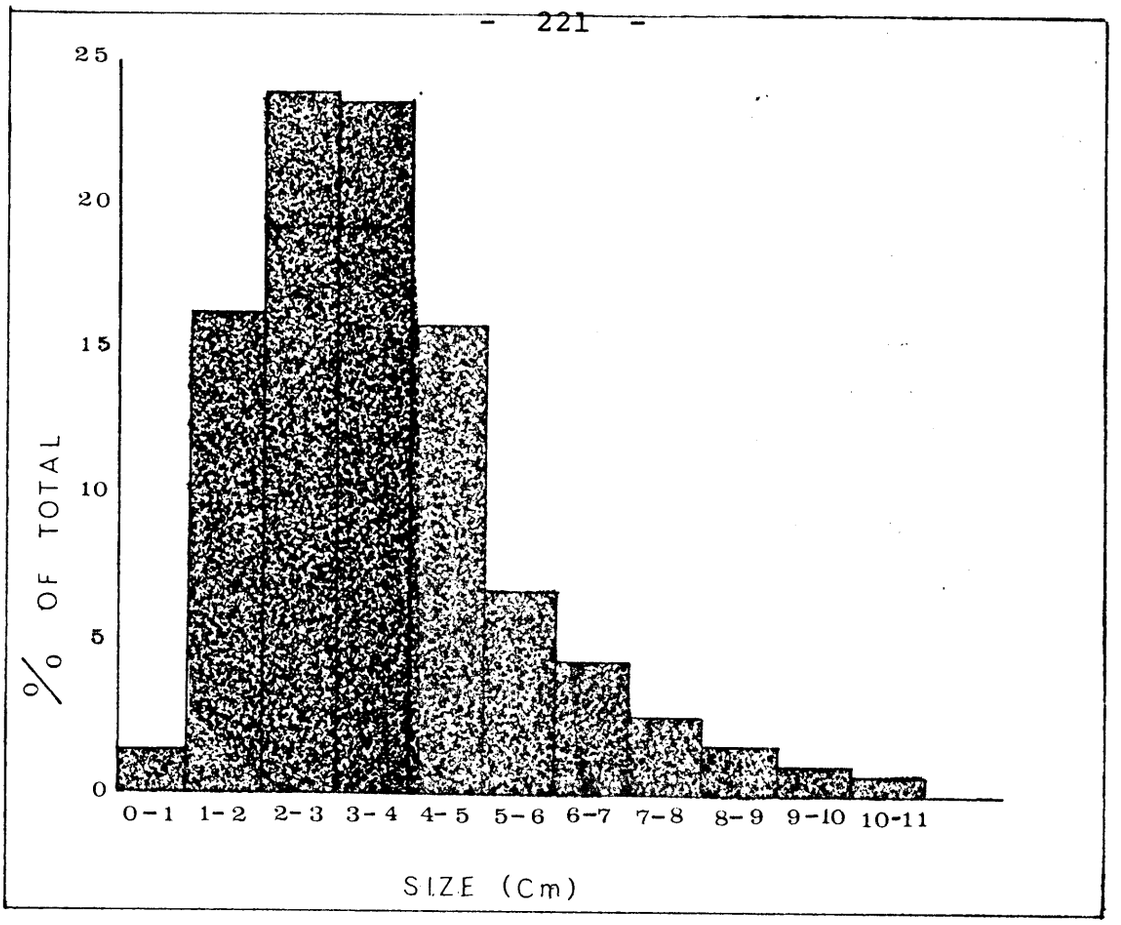

Fig. 9.10. K2/TS1. Size distribution of bone flakes in total sample.

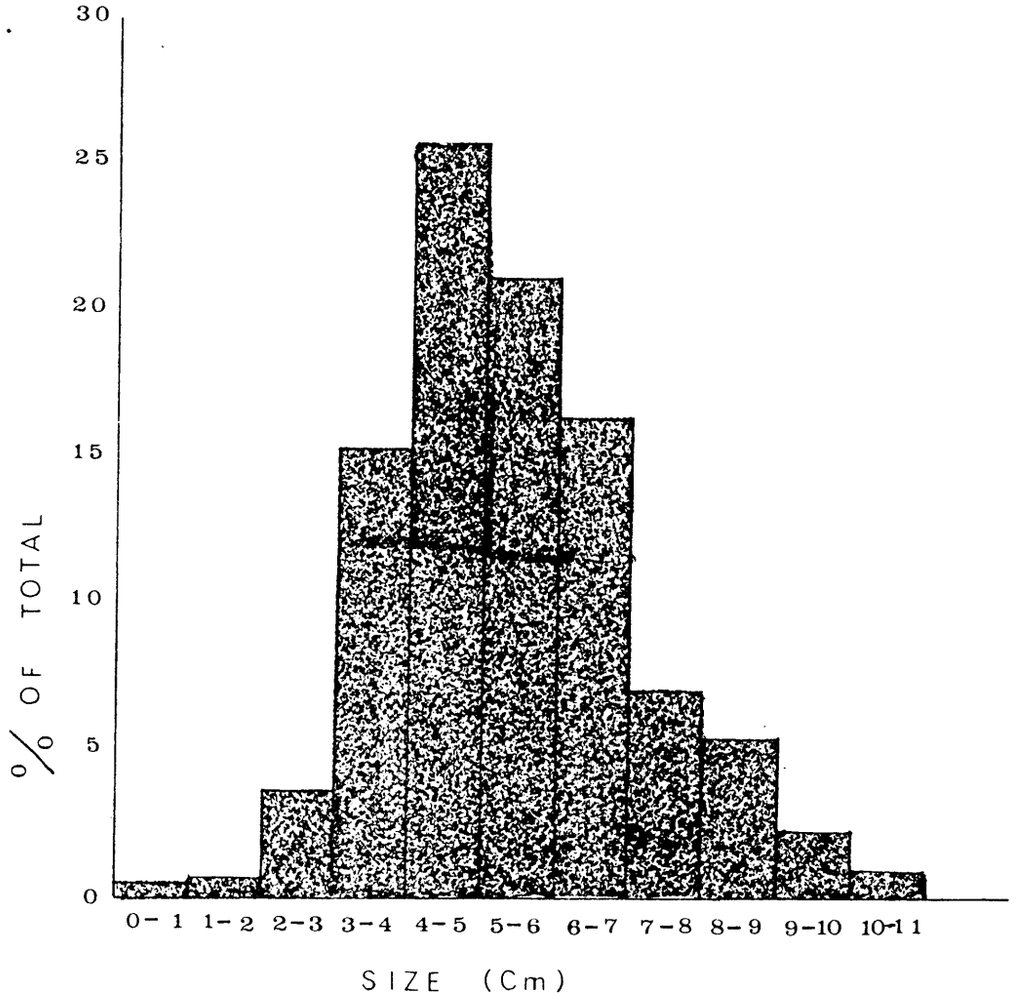

Fig. 9.11. MK1/Level 11. Size distribution of bone flakes..

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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. Finally, one of the most important factors to emerge is the fact that fragmentation results in remarkably high numbers of fragments of individual bones, eg. 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; one suspects that individual elements of a cow skeleton would become very scattered and would occur in small numbers only.

A final factor acting upon the preservation of skeletal parts is the effect of dogs on an assemblage. Since we know that domesticated dogs occur at Greefswald, 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 (Binford, 1977:77-106) discusses the effect of Eskimo dogs on caribou bones and Navajo dogs on sheep bones; this illustrates beautifully the destructive effect of dogs. Their results show that pelves and proximal metacarpals of caribou had a good survival record, while phalanges, sternum, distal femora, tarsals, calcanea and distal metatarsals had a poor survival rate. The actual presence of body parts was dependant upon the dog maintenance programme of the Eskimoes themselves, and showed seasonal shifts. The Navajo data shows the disappearance of small body parts, and also shows seasonal variation. Such seasonal variation is unlikely to occur in South Africa; however the 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.

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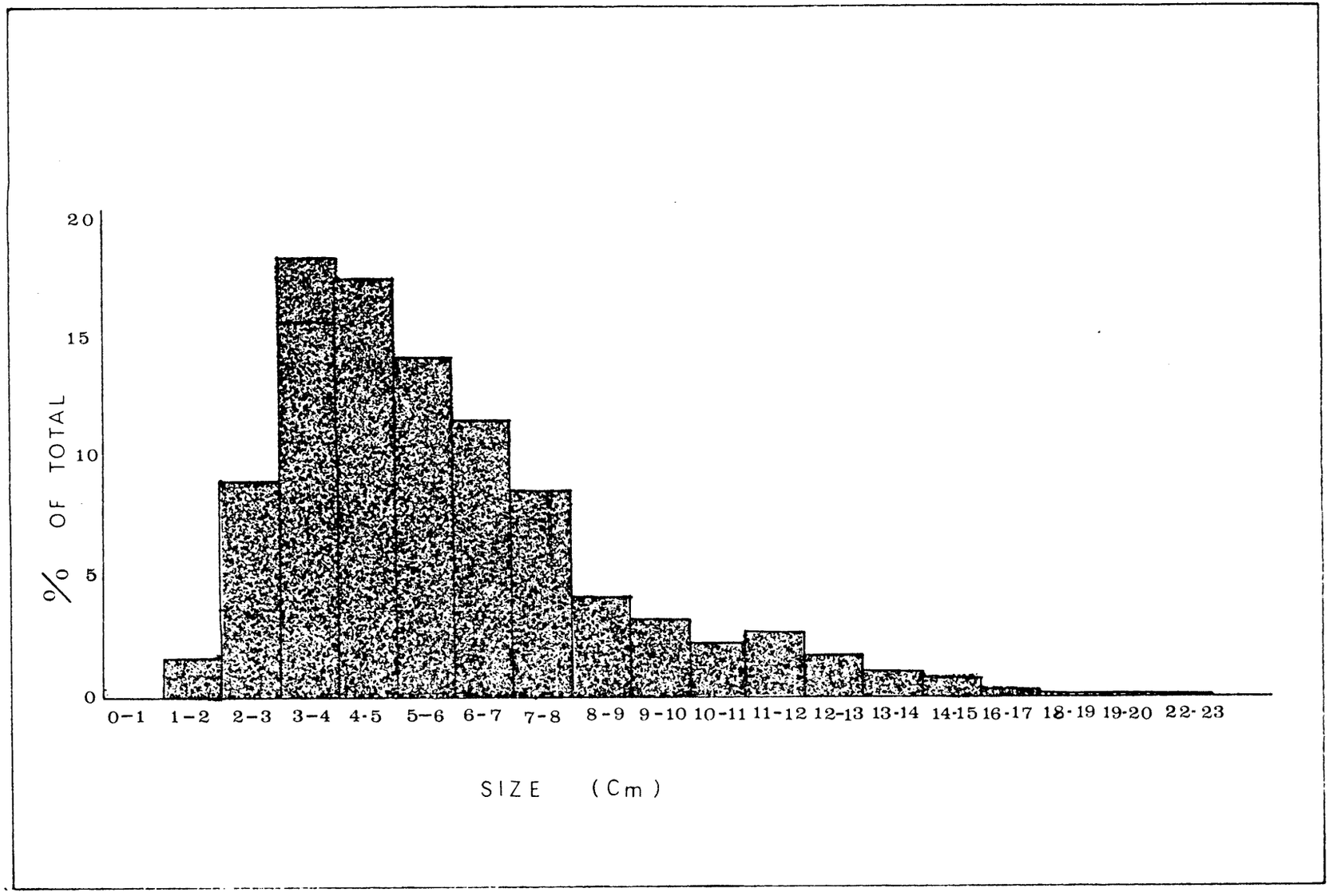
Fig. 9.12. Size distribution of bovid post-cranial skeletal parts in MK1/Level 11



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3. Bone fragmentation at Greefswald.

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. It is interesting to note that, during the sorting of bone material from Schroda Iron Age site (situated east of Greefswald), 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.

If the bone flake tables for K2/TS1 are examined (Tables 4.6, 4.19, 4.23, 4.27 and 4.31), it can be seen that, although the range of sizes is wide, a definite peak occurs in the same size classes in all except Level 1. This peak occurs in the 2-3 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 categories greater than 11 cm are represented in all the Levels by small numbers of flakes, i.e. eight flakes or less. Figure 9.10 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 (Table 4.37); 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 and 4-5 cm each have the same high number of flakes, i.e. 20%. This level is similar to TS1/ Level 5 in this respect. MST/K8 Levels 2 and 13 both show maximum numbers of bone flakes in the 3-4 cm size class, with the

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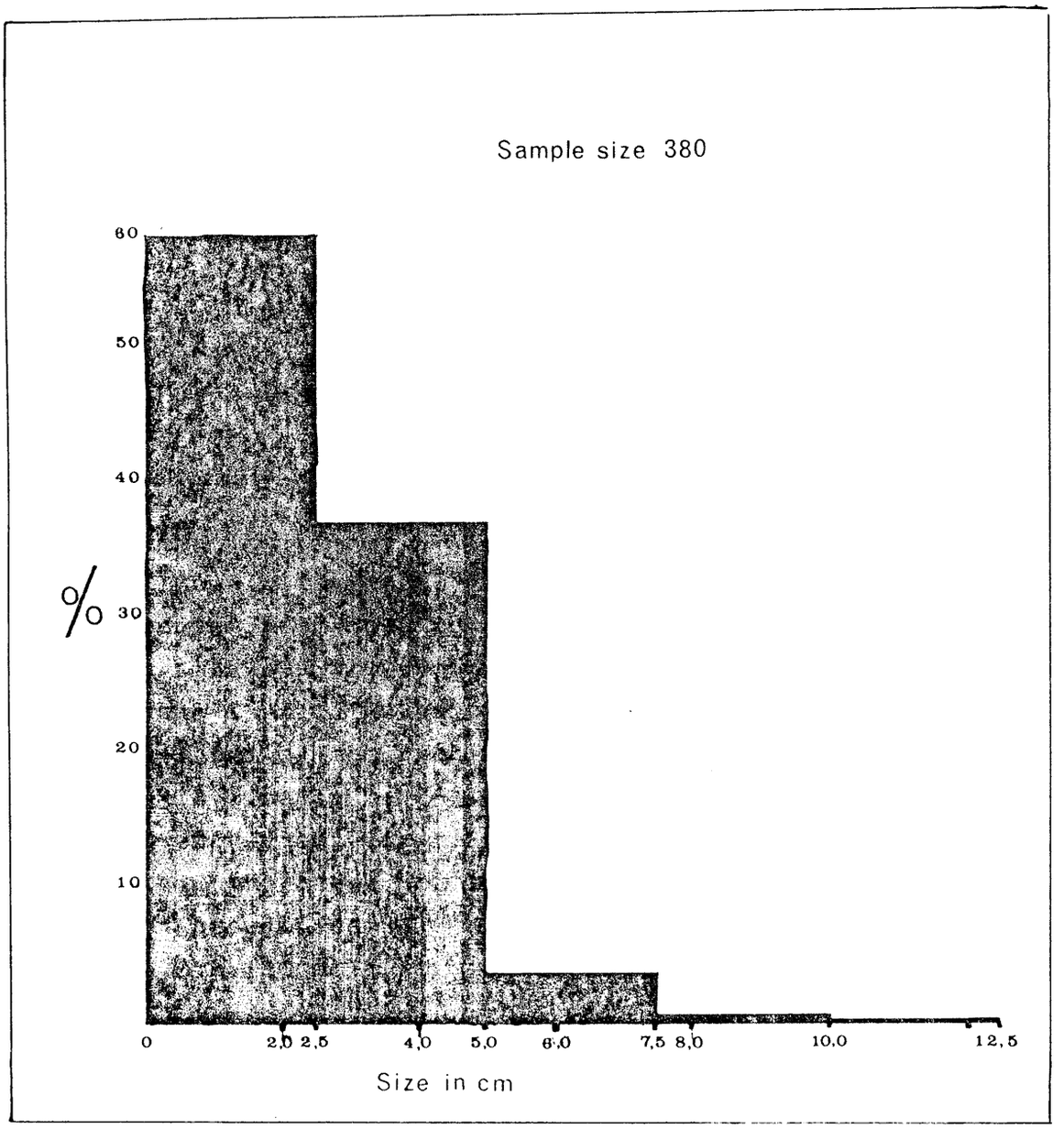

Fig. 9.13. Nkope, Malawi. Size distribution of total bone flake sample.

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same number in the 4-5 cm class in Level 2, but a reduced number in this class in Level 13. (Tables 4.107 and 4.134). The peaks are all very close, i.e. 24.2%(TS1), 27,5%(MST/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 MK1 Level 11 is shown in Fig. 9.11 for comparison with the figure for TS1.

It is apparent therefore that two different patterns of fragmentation occur at Greefswald. In one case, the majority of bone flakes fall into the 2-4 cm size classes; in the other situation the peak is in the larger size class, i.e. 4-5 cm. A third situation is present in the uppermost levels of TS1 and TS2, where the smaller size category of 1-2 cm is more common. There is no satisfactory explanation as to why some levels should have a greater number of large bone flakes than others; this is probably the result of three conditions i.e. low levels of activity in the area involved (i.e. less trampling effect), texture of deposit and rate of accumulation. It seems reasonable to suppose that rapid deposition would result in less fragmentation of the bone.

All the identifiable material analysed was also measured. In order to compare the size of the bovid skeletal parts to that of the bone flakes, post-cranial material from MK1/ Level 11 was grouped according to size categories. (Table 9.7). It was found that the range of sizes involved was much greater, i.e. up to 23 cm. There were no specimens belonging to the 0-1 cm size class. The tail of the resulting graph would thus be longer, and is certainly better developed in the larger classes than is the case with the bone flakes. It is however interesting to see that the peak occurs in the 3-4 cm size class. (Fig. 9.12). There is therefore not a totally identical pattern with respect to size between bone flakes and identifiable material. However, as the bone flake class is invariably larger, it appears to be reasonable to continue to utilise this class as an indicator of the degree of fragmentation of bone in a deposit.

Patterns of bone fragmentation on other sites

Some data is available in the literature for comparison with Greefswald. The author measured bone flakes from two Malawian sites, Nkope and Matope Court, in an attempt to define the degree of fragmentation on these sites (Speed 1970 and Voigt 1973).

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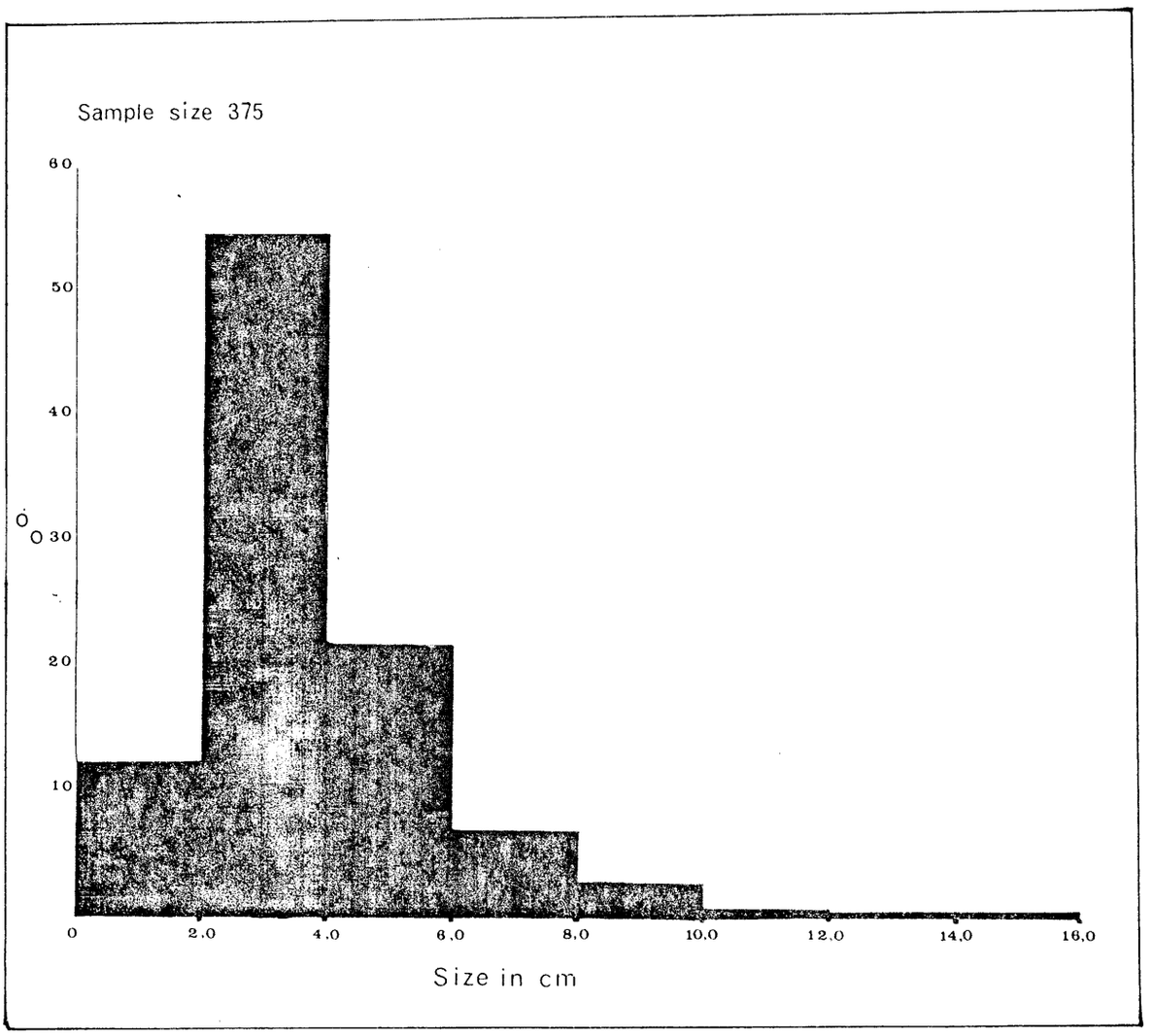

Fig. 9.14. Matope Court, Malawi. Size distribution of total bone flake sample.

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At Nkope, the peak of the bone flake graph occurs in the 0-2,5 cm size class; this class contained 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 thus not unexpected that the majority of bones in the assemblage were also very small. At Matope Court, the major group of bone flakes is the 2-4 cm size group (54,9%); it thus fits in with the pattern from Greefswald. The histograms for the Nkope and Matope Court bone flakes are given in figs. 9.13 and 9.14. On the Icon site (Voigt, in press), the peak lay at 2-3 cm, with a slightly lesser quantity in the 3-4 cm size class.

Welbourne (1975:11) published size ranges for a mixed sample of 6985 bones from Tautswe (Fig. 9.15). Again the peak of the bone flake sizes was in the 2-4 cm size group. It is striking how high a proportion of flakes fall within this group in all the sites. 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 falling into the 1-2 cm size class. The tail of these histograms is shorter than those of Greefswald, suggesting a more limited size range. In his 1969 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 (pers.comm.) 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.

Brain (1976(c)) published comparable data on the bone accumulation from a porcupine lair. The range of sizes is large (0-over 58 cm, with a peak at 1-2 inches (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 is the case with the Iron Age samples (Fig. 9.16).

There does therefore seem to be an overall pattern of fragmentation emerging in which the majority of the bone pieces fall between 2 and 4 cm in size. This may prove to be independent of the period of the archaeological site, i.e. it may cut across the Iron Age/Stone Age boundary.

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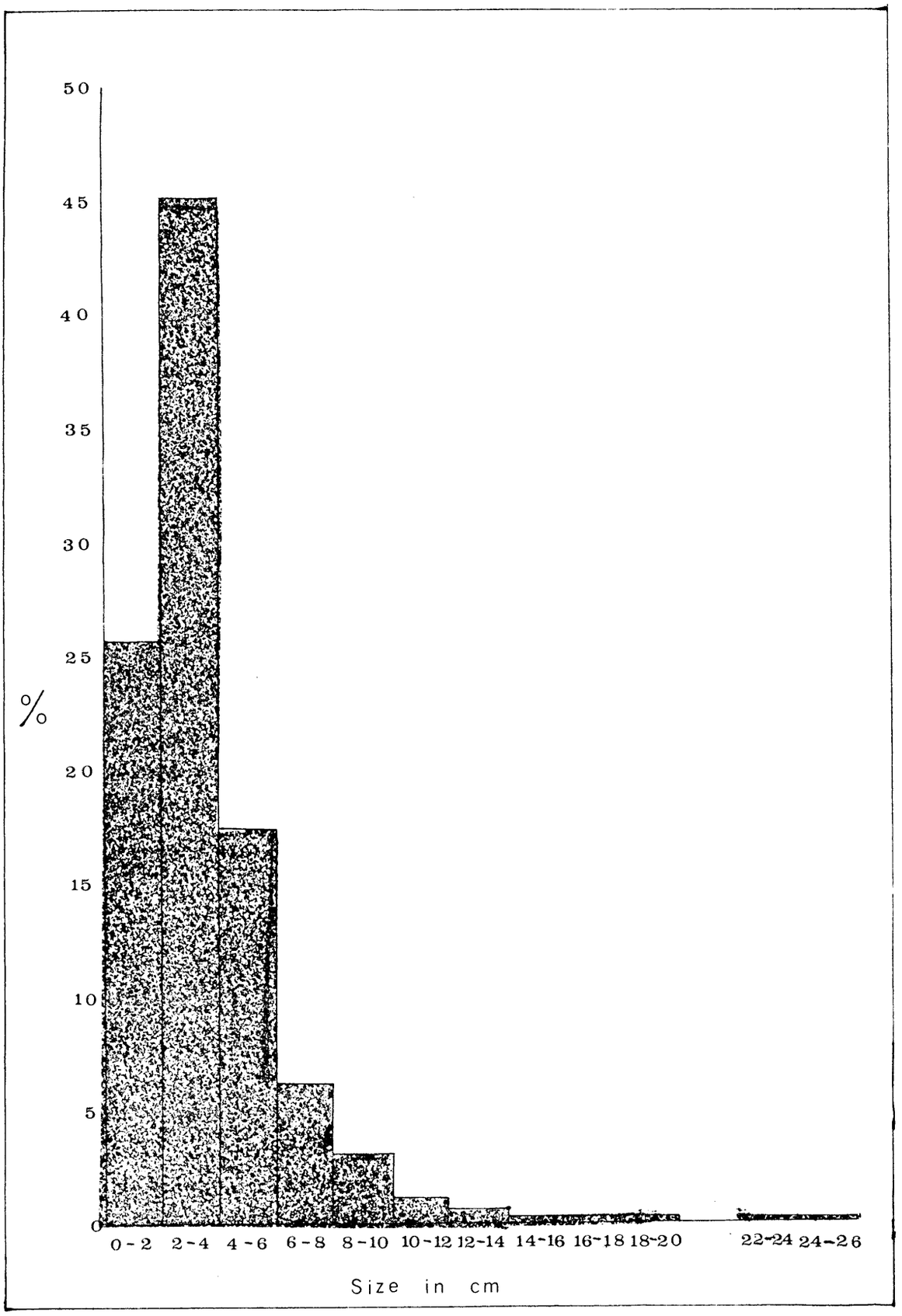

Fig. 9.15. Tautswe. Botswana: Size distribution of total bone flake sample.

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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 hypothesis of an osteodontokeratic culture practised by the Australopithecines. One of the most recent studies related to this problem is that of Sadek-Kooros (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 some very useful experimental work in this field; it also showed that the Jaguar Cave assemblage 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. There results are interesting in that a very large sample was involved in the search for deliberate fracturing. One would suspect 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." 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 Greefswald.

Noe-Nygaard (1973) re-examined a collection of Mesolithic scapula "scrapers" described by Rust with similar questions in mind to those asked by Sadek-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 Greefswald analysis; good examples of such breakage definitely occurred in the assemblage. They can therefore probably be ascribed to natural fracturing resulting from moisture and temperature changes in the deposit.

4. Weathering of bone at Greefswald

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

Stage 0. Fresh bone. The majority of the bone fell into this category; the surfaces of these bones are hard and unweathered,

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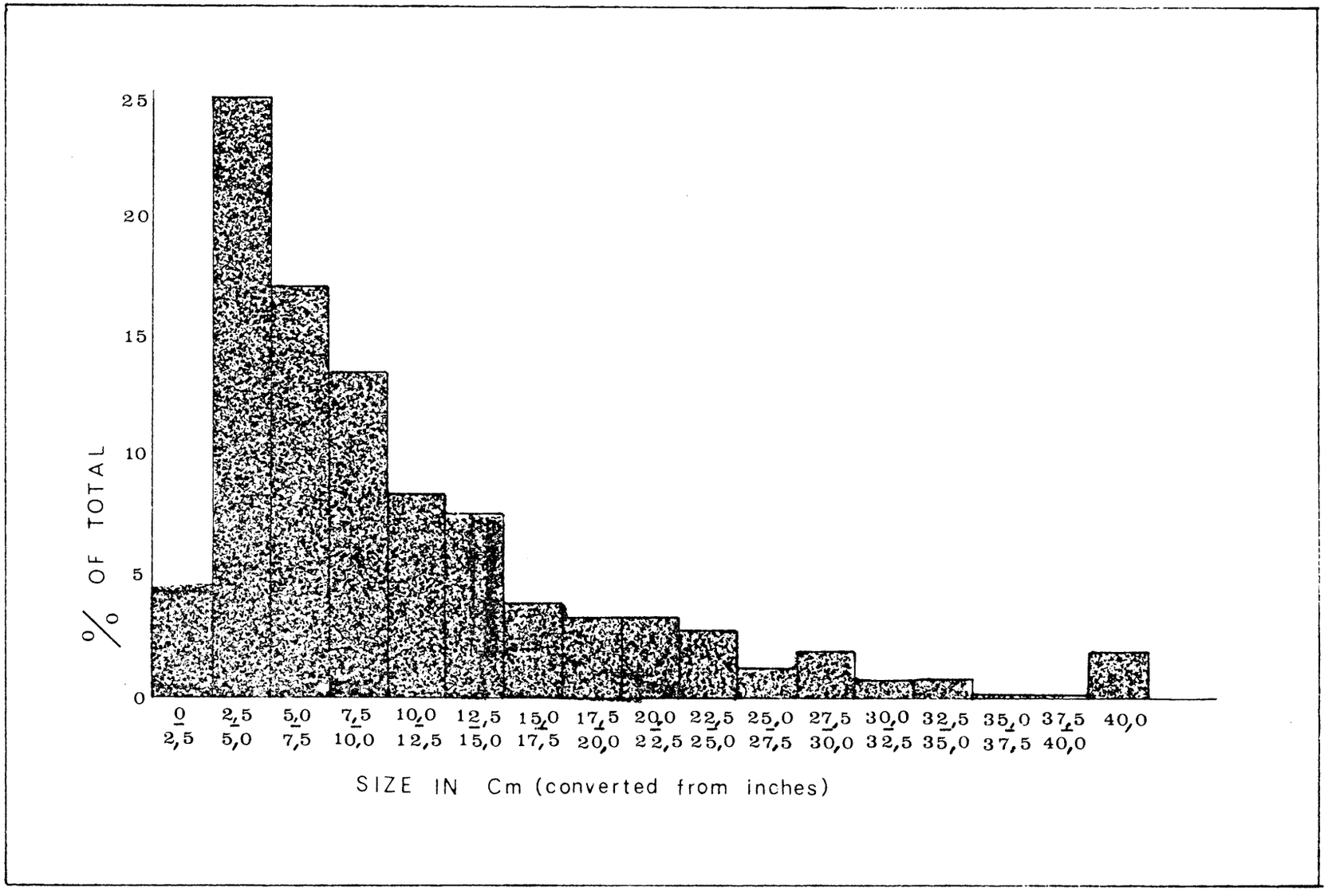
Fig. 9.16. Porcupine lair, Nossob. Size distribution of total bone sample (From Brain, 1976(c):29-30).



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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 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 formless.

The condition of a bone 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 quicker 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 for a greater or shorter period of time; a bone which is covered immediately will retain its fresh appearance. An interesting situation existed at Greefswald in which some bones show two different degrees of weathering, eg. fresh on one side or one portion, 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 dis-used midden, and weathering of the exposed portion begins. Such weathering could be expected to happen within the span of a few years, especially with the African variations in temperature and humidity. Brain (1976c:12) found that defatting and cracking of bone takes place very rapidly under desertic conditions, defatting being completed within a year.

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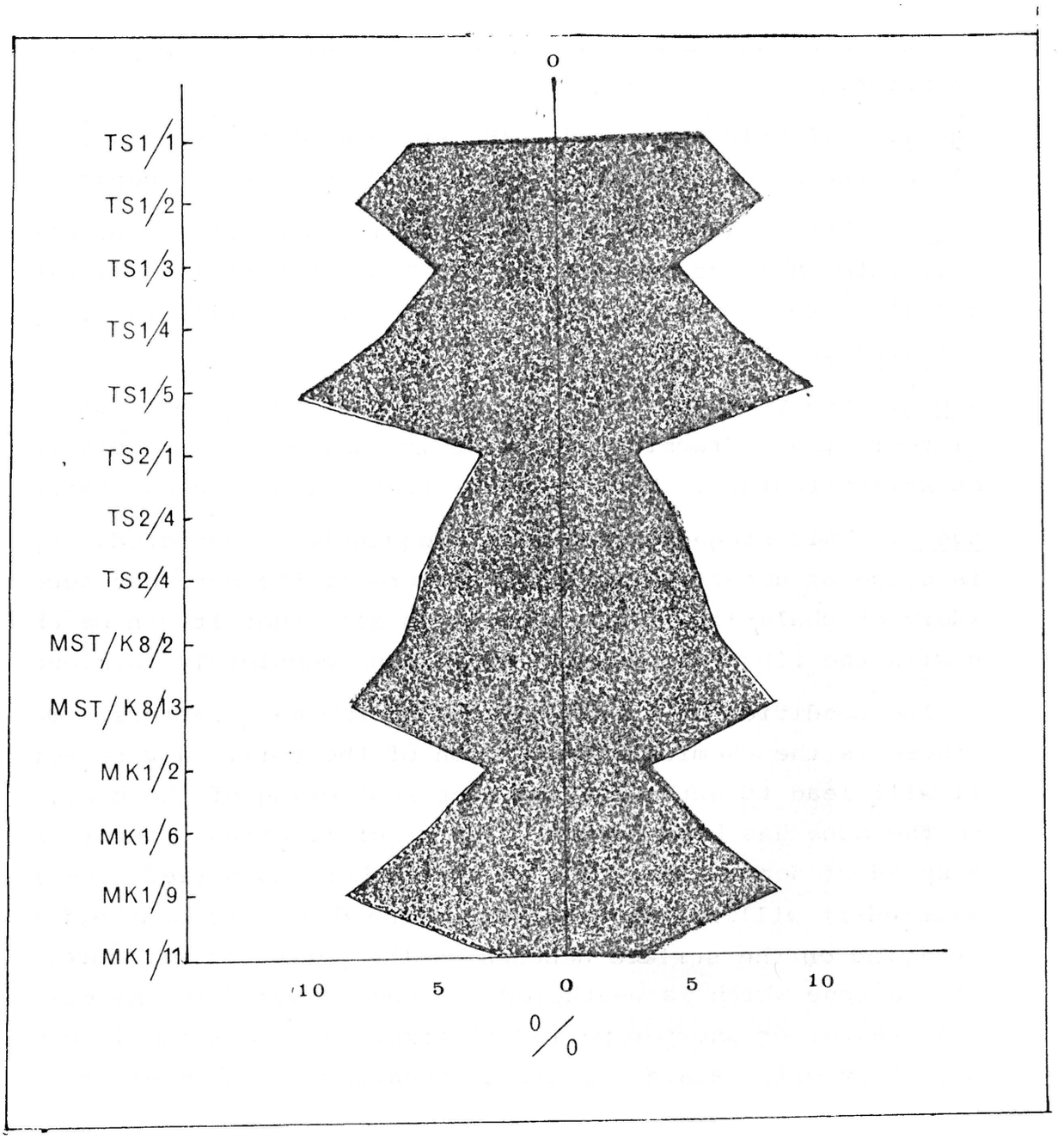

Fig. 9.17 Greefswald: Percentage of weathering in fourteen excavation units.

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After seven years the bone was completely defatted and cracked by the sun. Gifford (1976:22-26) found, during research in the Lake Turkana region, that bone could survive under dry, tropical conditions for more than 15 years. 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 similar aged bone varied according to their position in the deposit. She also quotes a good example of the influence of location on weathering when water is involved as a depositional factor.

At Greefswald weathering was not a very important factor in the bone assemblage. Weathering was most common in the upper levels of an excavation; these levels were frequently also the most fragmented. The maximum amount of weathering recorded for a reasonable sized sample was for TS2/4C; in this sample 51,7% was weathered (Table 4,57). All other levels however showed 20% or less weathering, with a mean of 1 1,9%. Figure 9.17 represents the amount of weathering in 14 levels. In K2/TS1 TS2 and MST/K8 the highest level of weathering occurs in the lowest levels; on MK1, however, Level 9 has a higher level of weathering than the rest of the section. There is thus no consistent pattern of weathering 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 Greefswald.

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CHAPTER 10

BONE, IVORY AND SHELL AS RAW MATERIAL AT GREEFSWALD

Man has utilised the bones of the animals which he killed as a source of raw material since at least the Middle Pleistocene. During the Upper Pleistocene in Europe bone became an art medium for prehistoric hunters; apart from its use in the manufacture of daily 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 rare on most sites. Exceptions have been sites such as Amadzimba Cave in Rhodesia (Cooke and Robinson 1950 and 1954) and the Robberg caves excavated in the 1930's (but unfortunately unpublished). 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 suggested 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. Greefswald proved to be an exception; numerous formalised bone tools have been excavated on the site throughout the period of investigation, and numerous "informal" bone tools were identified during the analysis of the faunal remains. The Greefswald people utilised bone, ivory and marine and freshwater shells; their craftmanship with the first two materials attained an exceptionally high standard. Gardner described bone and ivory finds in Volume 2, and illustrated some of the link shafts and points. In the following pages the culturally modified faunal material is described in some detail according to the raw material.

1. Bone tools at Greefswald: (a) Formalised tools.

During the analysis of Rhodesian Late Pleistocene and Holocene lithic collections, a typological study was undertaken which

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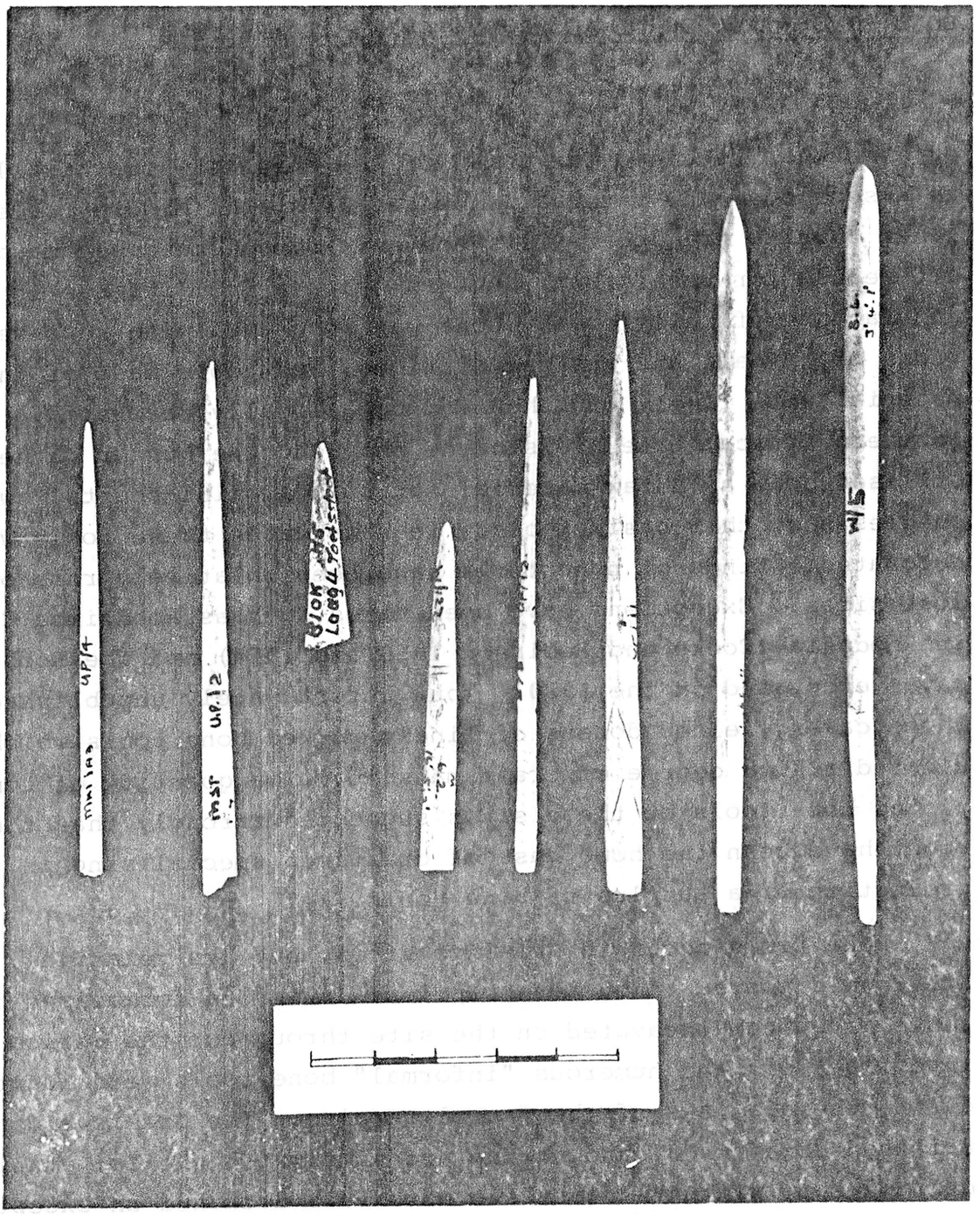

Plate 10.1.
From left to right: Type 502: UP/4, 2 and 121.
Type 503: W/122, UP/12, UP/11, W/23 and W/25.
UP/12 and 11 carry chevron decoration.
W/122, 23 and 25 from Gardner's excavation on Mapungubwe.

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was extended to bone tools. The Amadzimba bone material formed the basis for this study; thirty-eight "types" were recognised in the collection. The Greefswald material was examined with these typological classes in mind; it was found that twenty of the classes appeared in the Greefswald assemblage, and three additional type classes (514, 529 and 534). These classes have therefore been utilised in the descriptions which follow; the pre-fix "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 the bone tool types at Greefswald is given in Table 10.1.

Type 502 (Plate 10.1)

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.

Eight specimens conforming to the description were found; they occurred at all three localities (Table 10.1). All except one specimen occurred in the upper few feet of the deposit; this specimen occurred in Level 15 at K2/TS3.

Type 503 (Plate 10.1)

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 Greefswald specimens vary in their length/breadth ratio. Seven of the 11 specimens have a shallow cut mark encircling the base; this could have been 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.

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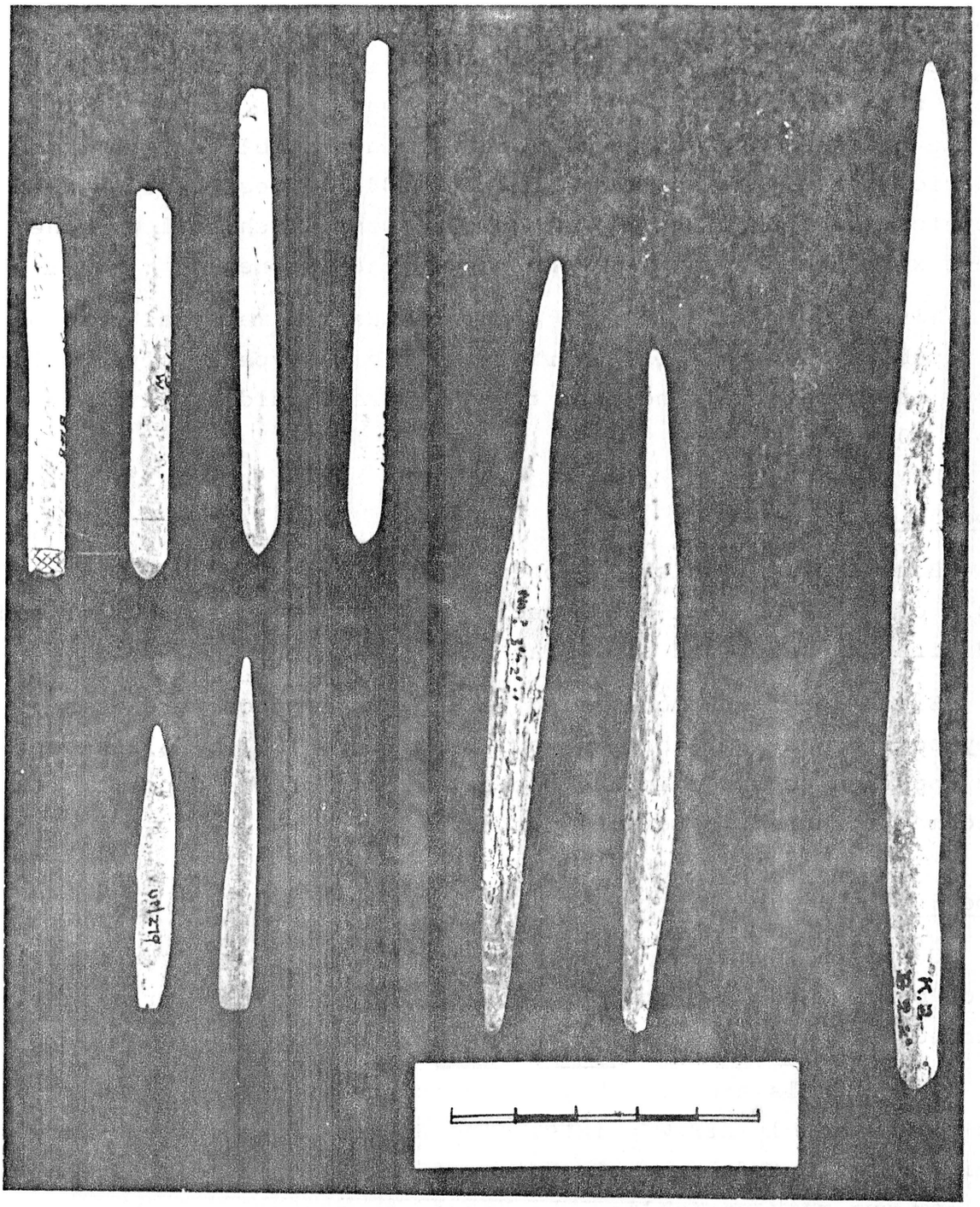

Plate 10.2. Top left: Type 504: all from Witwatersrand collection, excavated by Gardner, except for first specimen (UP/25/MK1).
Bottom left: Type 505: UP/279 and 277.
Centre: Type 507: UP/15 (K2) and UP/16 (both from Gardner's excavations).
Right: Type 509: UP/274 (Gardner, K2).

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Type 504 (Plate 10.2)

Polished piece of bone with a circular section. One end is rounded or roughly conical, 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 linkshafts. 18 specimens have one or more cut marks encircling them just above the intact end. One specimen also has a chevron pattern on the body of the piece, 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 iron stain forming a band around it. This band of staining is all that remains from a thin iron band decorating the tool.

Type 505 (Plate 10.2)

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

The difference between this type and Type 511 is that the base in 511 is U-shaped.

Only two specimens were found at Greefswald, both of which occurred on K2.

Type 507 (Plate 10.2)

Polished bone with circular, rectangular or oval section. The one end is spatulate or rounded; the opposite end is constricted and is blunt. (This class may include polished pieces which conform to the shape, but in which one or the other extremity is broken).

It is notable in these classes that the constricted end is highly polished, suggesting that these pieces were used as awls.

Type 509 (Plate 10.2)

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

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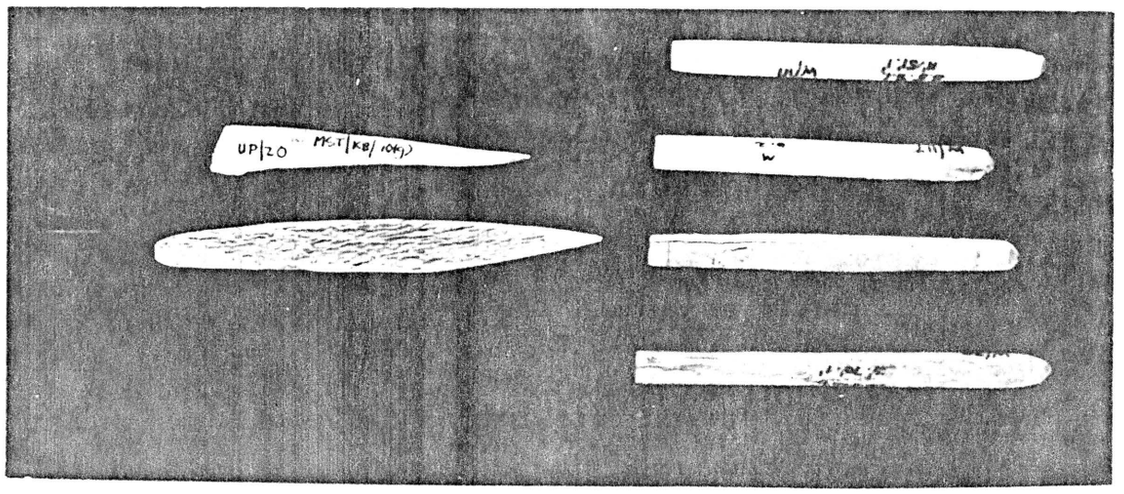

Plate 10.3. Left: Type 511: UP/20 (MST/K8/10(g)) and UP.19 (Gardner, K2).
Right: Type 510, Witwatersrand collection, Gardner's excavations.

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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 (Plate 10.3)

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. One specimen has a single, badly executed chevron on the body of the piece, 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 linkshaft used by the Naron, Auen and !Kung as being "blunted at the tip". He specifically associates this kind of linkshaft with poisoned arrows. Cooke and Robinson illustrate similar tools from Amadzimba (1950: 111 and 1954:707).

Type 511 (Plate 10.3)

Polished bone with flat, rectangular section. The one end is sharp, frequently with an almost circular section; the base is a straight, smoothed truncation. This class includes specimens with the truncated end broken away.

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

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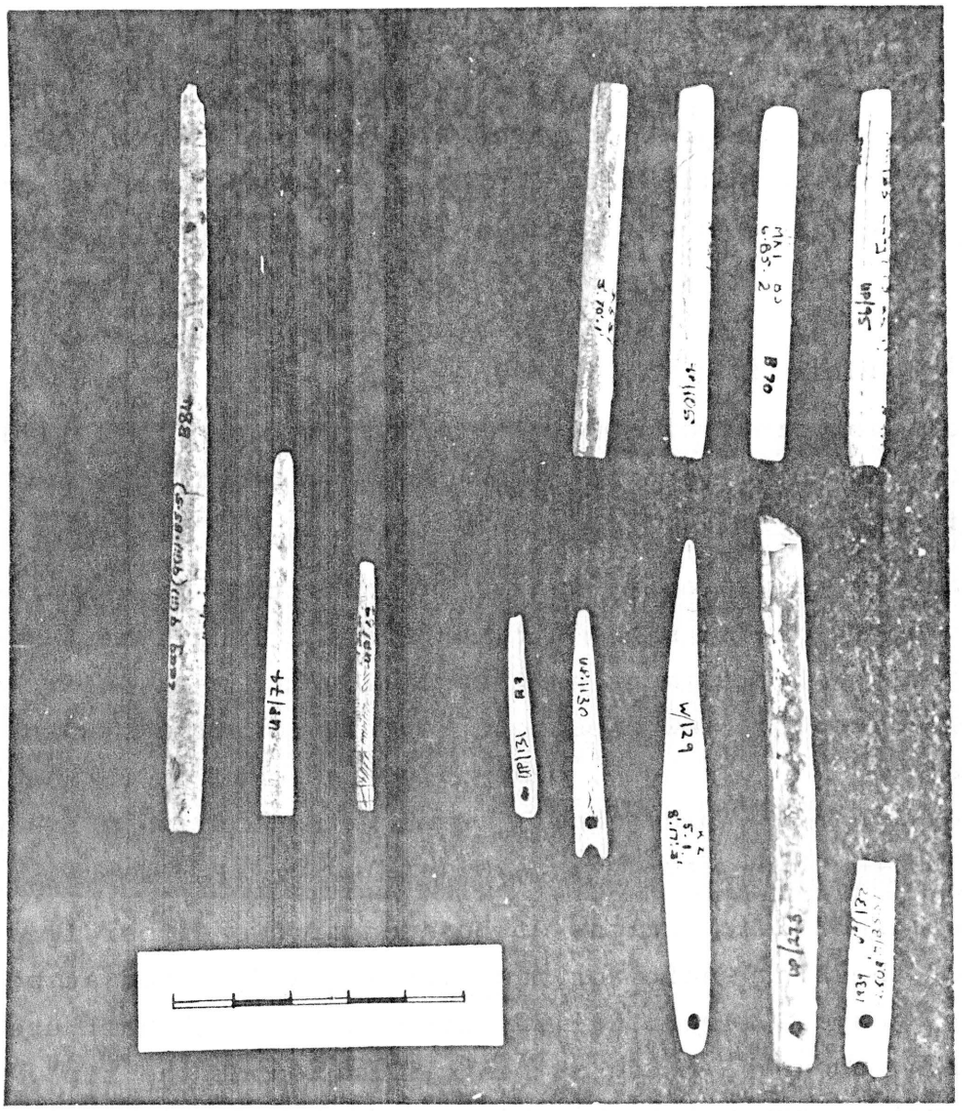

Plate 10.4. Left: Type 512 : First and second specimens from MK1, decorated specimen from K2/TS2.
Top right: Type 512: First two specimens from Gardner's excavations on Mapungubwe, second two from University of Pretoria MK1 excavation.
Bottom row: Type 522: UP/131, UP/130, W/129 (K2, Gardner) Type 523: UP/273 and UP/132 (both Mapungubwe, Gardner).

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Type 512 (Plate 10.4)

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 Greefswald, it became obvious that many of the specimens in this type class 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 decoration. One of these had a pattern of diamonds, the other a complex series of diagonal and horizontal lines with small, fine chevrons.

Type 513

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 "linkshaft". In view of the specialised type of arrow (Type 514) at Greefswald, it seems likely that these arrows with iron tips were connected to the arrow shafts by means of linkshafts. Vinnicombe (1971) and Rudner (1957) describe similar arrow points, which are used in conjunction with a linkshaft.

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

Type 514 (Plate 10.5)

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; this straight edge 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 been found in an archaeological context only at Greefswald; it was used as an arrow.

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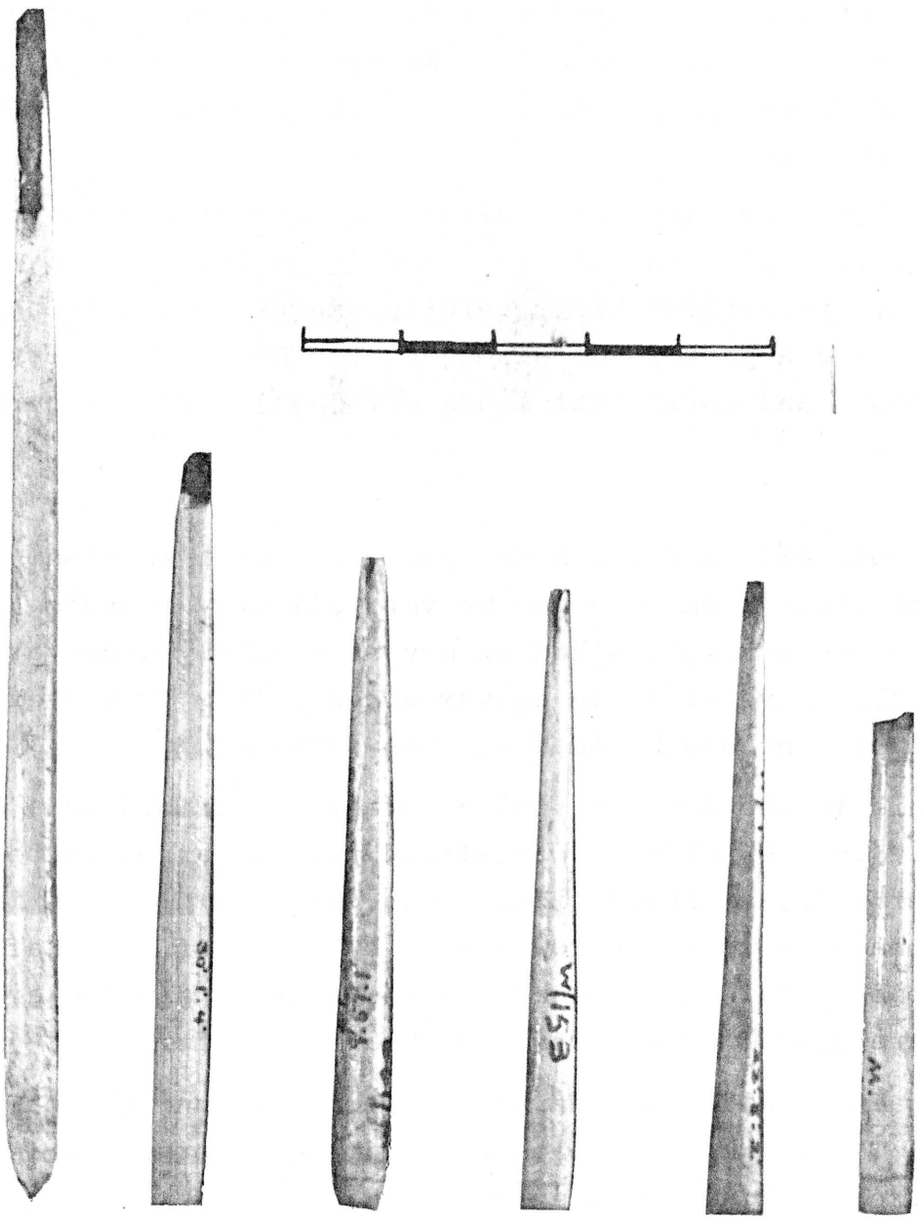

Plate 10.5. Type 514: Iron stains and split ends clearly visible. All Gardner's excavations, University of the Witwatersrand.

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Traces of iron remaining in the split bone indicate that the bone was used as a mounting shaft for an iron tip, which was probably triangular. In some cases the split bone has broken away and the remaining end 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 foreshaft may indicate that iron was a fairly rare and valuable commodity.

Stow (1905), Rudner (1957) and Vinnicombe (1971) describe arrows which have bone foreshafts armed with metal tips. Vinnicombe records that the metal tipped arrows from the Drakensberg all carried a small additional barb bound onto the foreshaft. 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 Greefswald specimens have a thin cut mark encircling the base. In addition, one specimen is decorated with seven short, horizontal cutmarks, one has four horizontal and two diagonal cut marks, and one has six diagonal cut marks decorating it close to its tip.

Three particularly interesting specimens were picked out of the Greefswald collection (UP/146-148). These specimens have been decorated with black paint and ochre. Two of the specimen each had a band of black paint encircling the specimen 2,4 and 2,6 cm from the tip. The third specimen has thin painted black bands at 0,6 and 2,4 cm from the tip. Between these two lines, the tool has been covered with red ochre, which is rubbed into the bone.

Painted (or pigmented) bone tools are rare in the archaeological record. Deacon (1976:49) describes a caracal-size atlas vertebra found at Melkhoutboom which had been used as an ornament and

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had been stained with red ochre. This is the only reference to well-documented painted bone finds which I was able to locate.

Type 522 (Plate 10.4)

Polished bone with a rectangular section. One end is a blunt point or is spatulate. The other end may be finished off in various ways or may be a partially preserved articular end. This end is perforated.

The tools falling into this type have previously been referred to in the literature as "eyed needles".

The Greefswald assemblage yielded three complete specimens and one broken one (which has been classified as Type 523). The largest specimen (9,2 cm W/129) 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". W/129 was found at K2.

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, while a shallow depression has been worn into the underside of the specimen, from eye to base by the thread used by the owner. The sides converge to form a relatively sharp point which is highly polished.

UP/131 came from MK1; it 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.

Thus the wear visible on these specimens clearly indicates

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that they were used in the same way as modern needles.

Gardner records the finding of many more eyed and notched needles than exist at present in the collections.

Type 523 (Plate 10.4)

This is most likely a type which is in fact a waste class arising from 522. It includes polished pieces of bone with one broken end; the other end is shaped in various ways, and may be a partially preserved articular end. This complete end is perforated.

It is thus very likely that such pieces are broken eyed needles.

Two specimens occurred in the Greefswald collection, both probably made from a piece of rib, as one side preserves a cellular rib-like structure. One end is (recently) broken, the other has a neat perforation, one of which is made from both sides and one from one side. Below the perforation and on the edge of UP/132 is the remains of a second perforation or notch. 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 10.6)

A completely or partially polished piece of bone with a circular, oval or rectangular section. The base may be flat or conical; the opposite end has been 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. The bases of most specimens are encircled by a shallow cut mark.

Type 529 (Plate 10.7)

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

Some of these specimens may be blanks for Types 510 and 513. Two of the specimens are cut just below the band, then snapped off. Two specimens deserve special mention.

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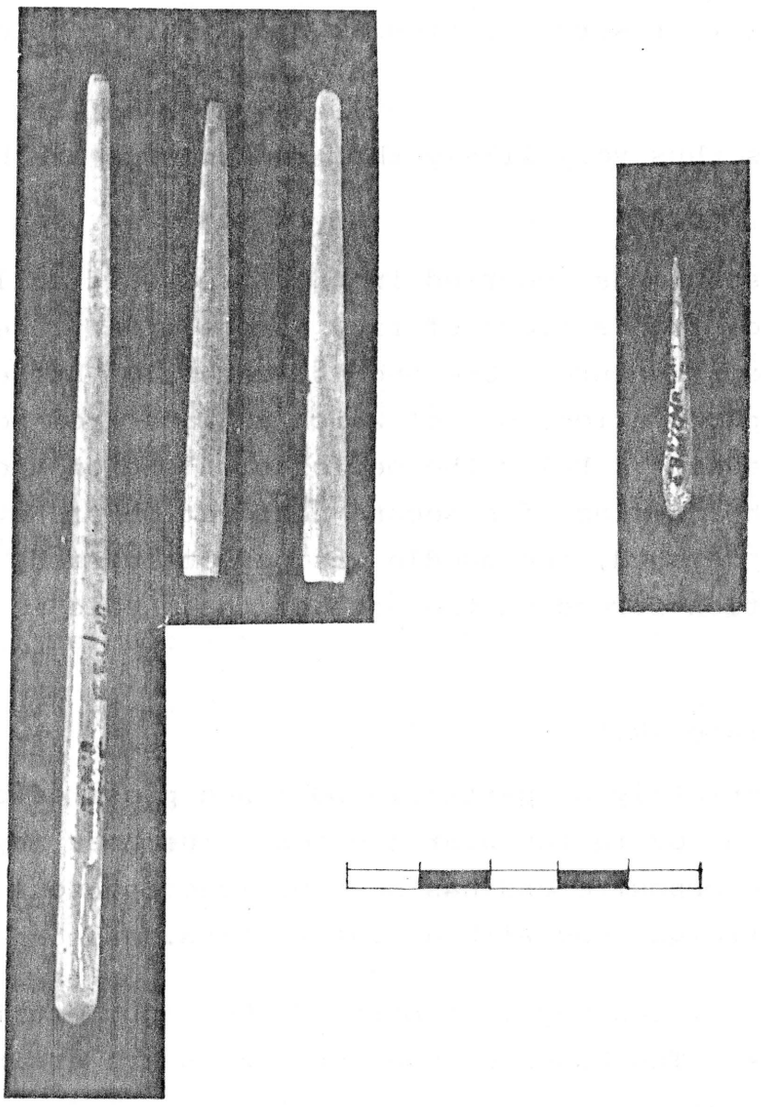

Plate 10.6. Type 525: UP/138 (Mapungubwe Hill, Gardner); W/133 and 134 (Mapungubwe Hill, Gardner). Type 527: UP/278 (K2/TS3).

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Up/196 is smoothly polished, with one broken end. The other end is flat and polished smooth. The shaft has four raised bands cut and polished below the flattened end. UP/195 is similar, except that there are only two raised bands, both of which have been polished to form smooth swellings. The top is flared and flattened. It seems possible that this specimen could have been a hair ornament.

Type 534 (Plate 10.7)

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 may have been used as pipes, receptacles or ornaments. Clark (1959: 236) also suggests that such objects might have been used as handles or for whistles.

Two such specimens were found in the Greefswald assemblage. UP/191 is a very smooth tube, made from a bird bone. Both ends are 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. The tube may have been suspended on a thong, or it could possibly have been used as a whistle. 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 pipes.

In addition to the identifiable formal bone tool types, the Greefswald collection also contained 29 completely polished mid-sections of bone with neither end intact. One of these was decorated with two vertical double lines of chevrons.

The above tools are formalised in that they conform to a consistent plan. In addition, the majority of the above types are completely polished, i.e. there is little or no indication of the type of bone used in manufacturing the tool.

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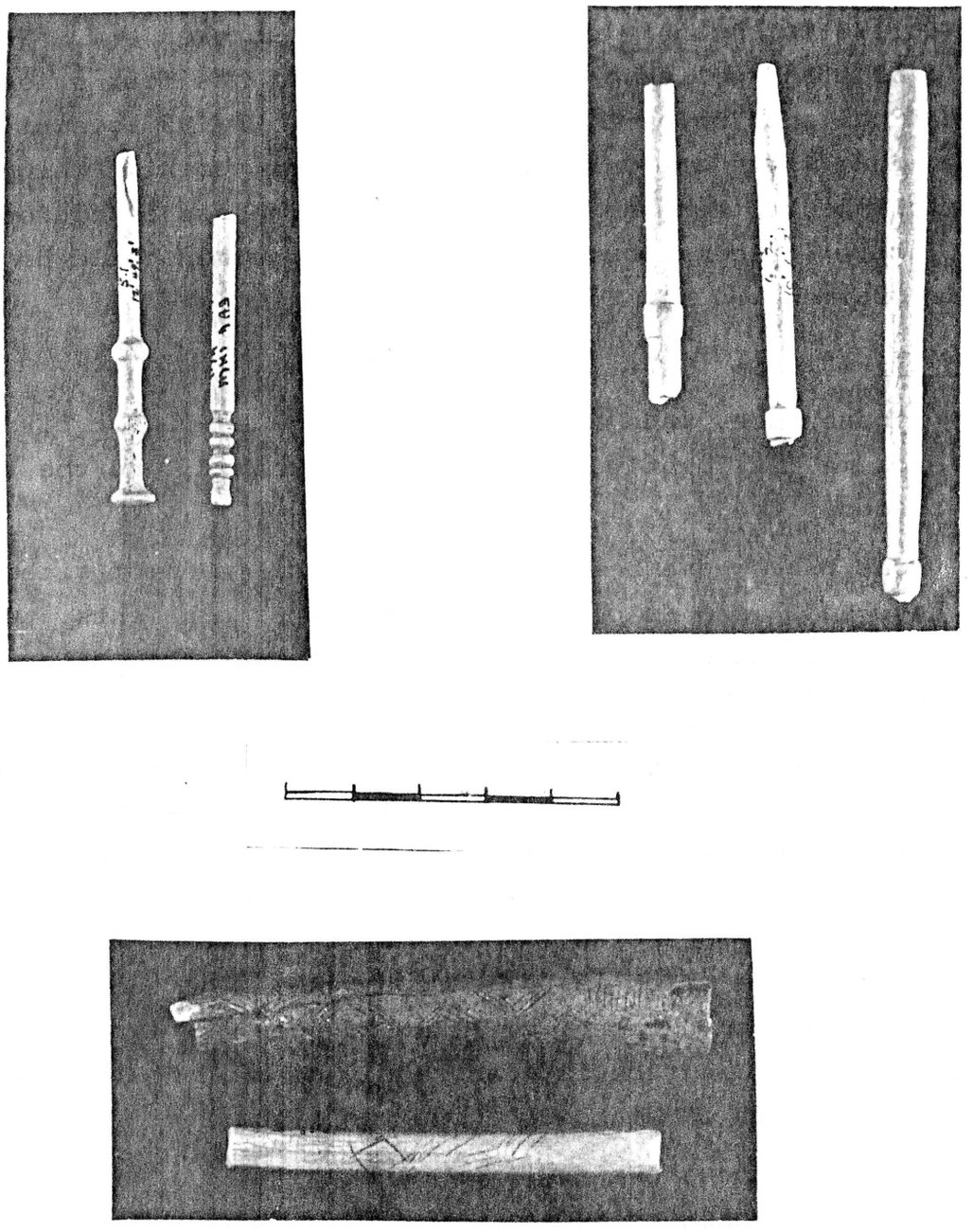

Plate 10.7. Top row: Type 529: UP/195 (Mapungubwe Hill, Gardner), UP/196 (MK1/3), W/193 (? Gardner), W/192 (2 specimens, both Mapungubwe Hill, Gardner).
Bottom row: Type 534: Witwatersrand University (Mapungubwe Hill, Gardner), UP/191 (Gardner).

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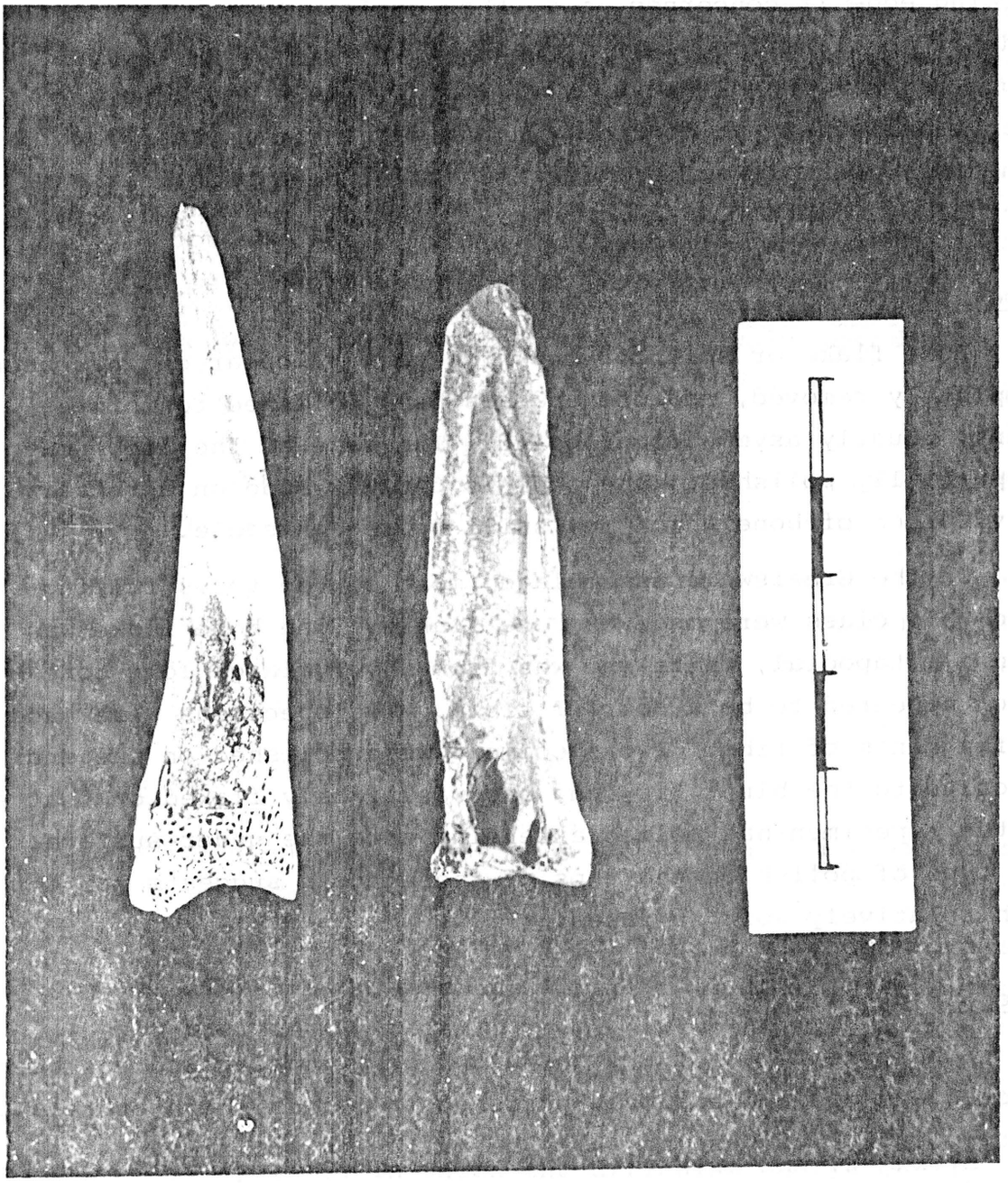

Plate 10.8. Type 519: UP/186, UP/185. Both K2/TS3.

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A second less formalised bone tool was present at Greefswald. These tools were "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 has been polished to form a blunt, usually asymmetrical point. The base of the piece may be partially polished; the tool is usually made on a relatively heavy piece of bone which may still be recognisable.

In the Greefswald assemblage, most of the tools falling into this class were made on 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 on fragments of ribs. Two specimens were polished on the end opposite to the blunt tip, and one was lightly flaked on that end. Another specimen had polish extending onto the under-surface. 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 at Greefswald was apparently made on a rib fragment and one on an ulna fragment; another appears to be part of a hyoid. These tools were probably crudely finished awls.

Type 519 (Plate 10.8)

Bone splinter in which the articular end is wholly or partially preserved and the other end has been polished to form a blunt or

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spatulate end. The base may be partially polished.

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

Type 527 (Plate 10.6)

A bone splinter with a circular, polished section in which one end is a sharp point, the other a rough cut end.

One specimen occurred in the Greefswald assemblage.

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

Type 537

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

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

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Gardner suggests that the arrowheads from Greefswald were made from ostrich leg bones and of ivory. Sparrman (Rudner, 1950) suggests that ivory was used, while Stow (1905) claims that ostrich leg bones were used. I did not identify ivory in the collection of formal tools. Although some of these tools were made of very dense white bone, I can see no reason for attributing them to ostrich bones. I believe that more than enough raw material would have been available in the form of cattle, sheep and goat limb bones, and that these were the main source of raw material at Greefswald.

(b) Non-formal bone tools

During the sorting of the Greefswald 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; in these cases sharp or natural edges had been smoothed by abrasion. Occasionally abrasion would form a very rough point; 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 Greefswald assemblage. One such bone flake came from a distal tibia; the source of the other specimens was unidentifiable.

It was of interest to find a large number of rib fragments which have 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. Two specimens had both ends convex and smoothed from use; another specimen has two polished sides which converge to form an asymmetrical point. Four specimens have 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 one edge is utilised until it

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is noticeably concave. One specimen has a concave end with some flaking from utilisation; another has an end which is 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 manufacture of riempies.

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 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 shapr, and showed utilisation damage. J.D. Clark (1959: 236-238) illustrates a similar specimen from Matjies River Cave, and quotes Le Vaillant's account 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 10.9)

An unusual specimen which could, perhaps, be classed as an informal tool came from MK1/Level 6 (MK/1902). It is the distal end of a Bov.II right tibia; five small holes have been drilled into the epiphysis. Two of the holes line up, so that they could have been used for suspending the bone. The broken

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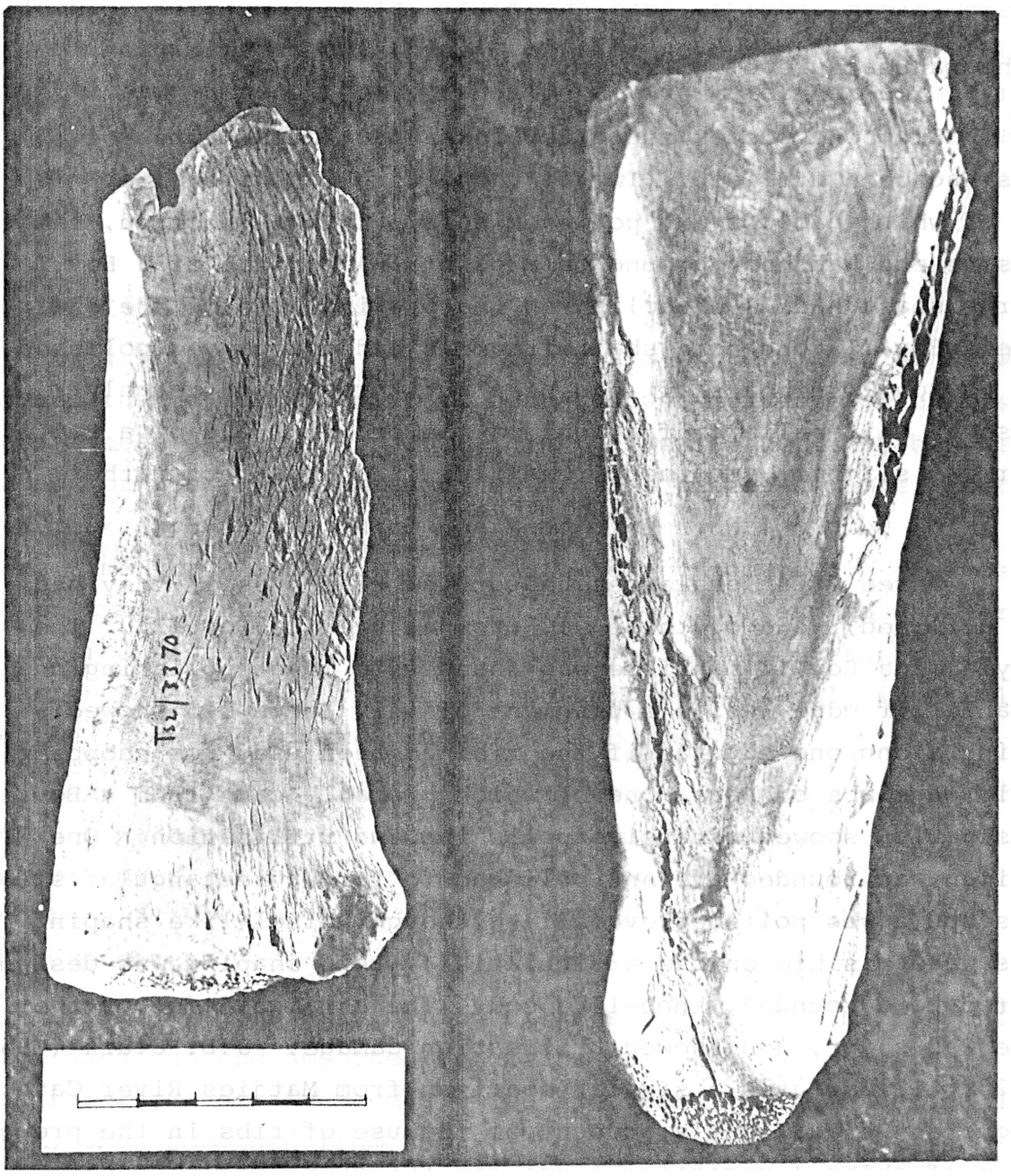

Plate 10.9a: TS2/3370. B. taurus scapula with "chopping board" damage.
b: bone "mattock" made from scapula.

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end is smooth from usage, and the shaft appears to have been reamed out until the walls are very thin. It is difficult to suggest a use for this piece, except as an ornament.

Another very unusual informal "tool" was found in TS2/ Level 1 (Plate 10.9). This is the blade of a left *B. taurus* scapula; one surface of the specimen is criss-crossed by a maze of shallow cut marks. This results in a surface much like 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; these look as if they may have been designed to improve the purchase of sinews on the bone, which may therefore have been part of a composite tool.

Another unusual piece of worked bone is a small, flat piece of bone, cut to form a rough "P" shape, with fine rodent gnawing all around the edges. It could be that the shape of this specimen is fortuitous.

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. These were obviously intended to be suspended on a thong or string, and acted as ornaments. Welbourne (1971:124) records a *B. taurus* incisor treated in the same way from Matluassi. Gramley (in Odner, 1972:90-91) also records similar incisors from Narosura in Kenya, but maintains that the grooving is natural. This does not seem to be very likely.

The Greefswald assemblage thus yielded a total of 513 formal bone tools (whole or broken), and 93 informal tools - a total yield of 606 specimens. Gardner mentions a minimum of 630 specimens; 236 of the assemblage examined during this project were found during the University of Pretoria excavations, so it seems obvious that a large part of the 1935-1939 sample has either been lost or was never kept.

The majority of the bone tools came from Mapungubwe Hill. Table 10.2 shows the vertical distribution of bone tools at all three site components; omitting most of the University of Pretoria material from TS1, TS2, TS3 and TS5, it can be seen that the

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majority of the worked bone was recovered from the upper two feet of each deposit. (316 specimens from 1' and 2' levels, 36 specimens from 3' and 4'). Gardner (1963:70) commented on this fact as well; it seems therefore that the major period of manufacture and use of bone tools was the period of the people responsible for the uppermost 24" of the long succession of deposit. However, the University of Pretoria excavations yielded a large quantity of worked bone from K2 below 2 foot level.

It has been suggested that the formalised bone tools are characteristic of Mapungubwe Hill. An examination of Table 10.1 shows that the most of the classes occur on all three areas of the site, although the majority of the surviving sample of bone tools comes from the Hill. Type 517, which is the commonest form on K2, is not a formalised tool but is more formalised than the class of "non-formal" tools. Linkshafts of Type 510 do occur on all three sites. However, "linkshaft" Type 513 does not occur on K2 or MST; it has been suggested (page 273) that these linkshafts may be related to the specialised arrows Type 514, which also 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 more than half of the worked bone from the early excavations has disappeared.

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

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2. The use of ivory at Greefswald

Ivory was utilised quite extensively at Greefswald; it occurs exclusively on K2. It is not impossible that some warthog and hippopotamus ivory was used; however it was found to be impossible to isolate any specific differences between the fragments and finished articles present, so that it was assumed that all the ivory encountered in the assemblage was elephant ivory. The only exception to this was WK2/4881, which is a fragment of warthog ivory which had been cut through and ground smooth.

Three fragments of tusk have been survived at Greefswald, proving that the ivory came on to the site in its raw form (Chapter 7: 197). The occurrence of ivory is listed in Table 10:3; it can be seen that ivory chips or fragments are quite numerous (143 specimens). Finds of ivory were made at all depths, i.e. ivory occurred at even the lowest level of TS3.

Fragments of completed "armbands" or bracelets constitute 25% of the total sample of ivory. These can be divided into two broad types: narrow and deep "armbands". (Plate 10.10). 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 very small. Gardner 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, the more mundane use as ornaments appear to be the better solution.

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 average minimum diameter (which could not be measured properly in most cases because the specimens were too incomplete) is greater than 6,0 cm.

A few of these specimens displayed certain interesting characteristics. W/296 is an almost complete ring of ivory, with a depth of 4,6 cm and a diameter of 6,5-7 cm. Both edges are ground flat. The circle is incomplete because a portion of the circle is broken away. However, the opposite end of the ring is not

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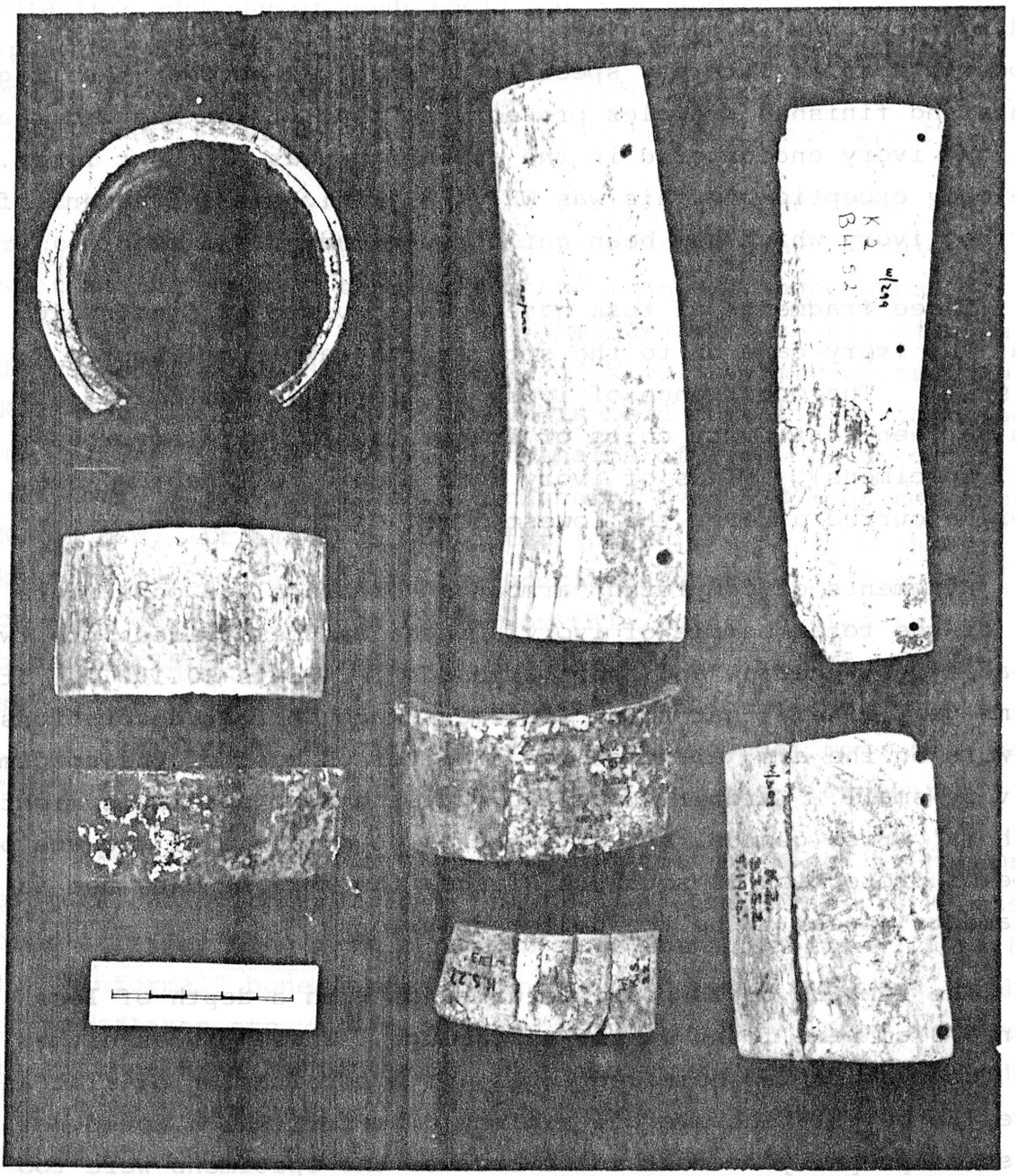

Plate 10.10. Ivory armbands from Greefswald, showing narrow and broad types. Drilled perforations clearly visible on three specimen . The specimen in the top left corner was never a complete circle.

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a break, but is a carefully smoothed, flat edge. W/297 also displays one polished, flat "end" to the circle (depth 4,2 cm diameter + 6,0 cm). 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. This would greatly facilitate putting the armband on to the arm. This feature was originally noticed by A. Brown during cataloguing 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 continued donning and removal of the armband.

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. 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 (depths 3,7 and 3,3 cm respectively) each have two holes drilled close to one edge. These holes are drilled from one and from both sides, and one is asymmetrical as if from the constant friction of a thong. The significance of these perforations is discussed later.

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 false relief wavy line pattern. The edges of the piece are worn by utilisation to a V-shape; the piece is 9,2 cm deep. (Plate 10.11).

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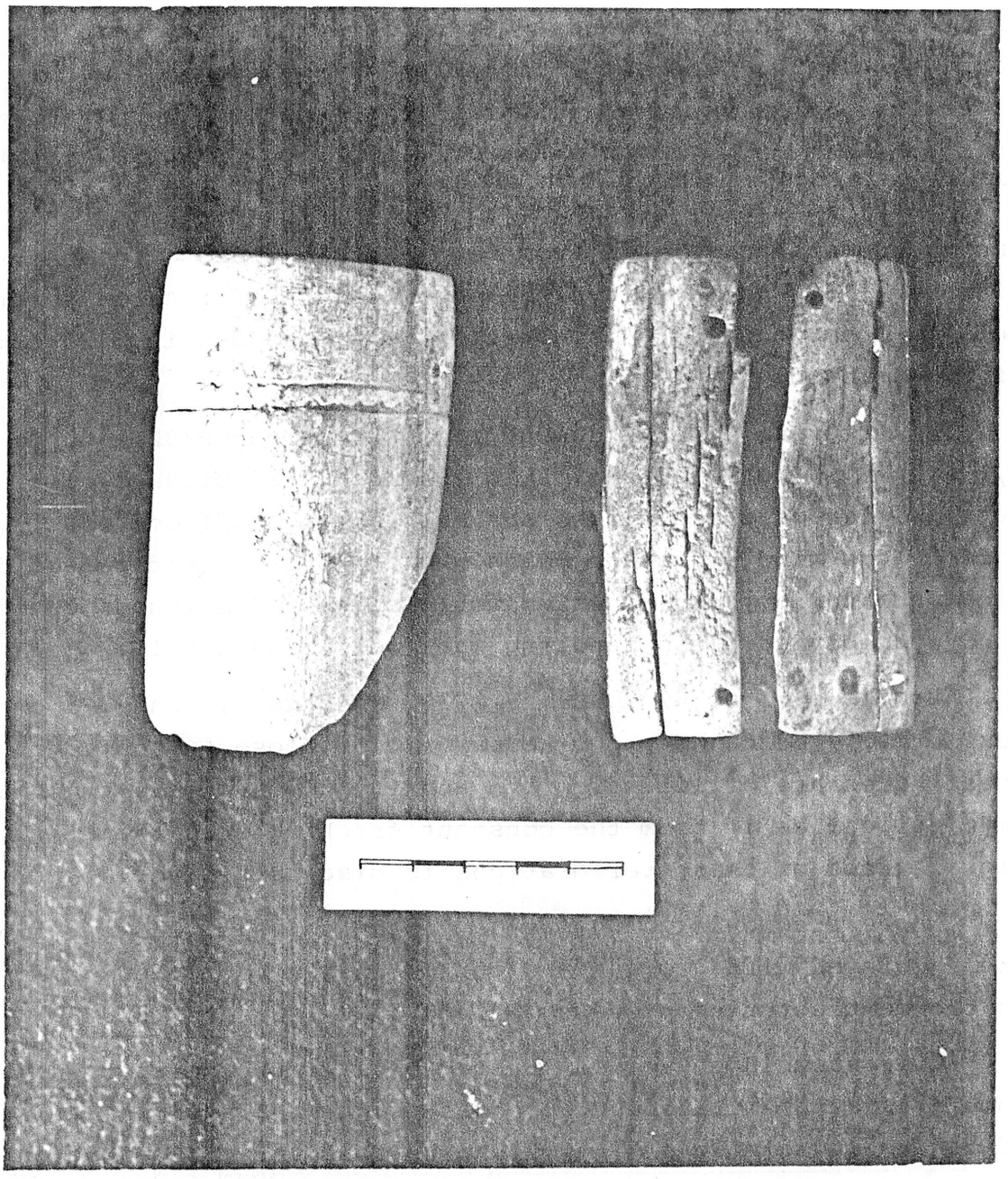

Plate 10.11. Ivory armbands UP/303 and UP/320. UP/320 shows evidence of repair work before the armband fragmented; it is an almost complete circle.

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Eleven of the fragments have perforations drilled into one or more edge; these may be drilled from one or both sides. Depths of these armbands varied from 7,0 to 15,2 cm. (Plate 10.10).

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 these armbands were not in the form of a complete circle.

Two specimens (W/299 and W/308, with depths of 15,2 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 from abrasion by a thong; in W/308 the lowest perforation shows the same type of abrasion.

What was the purpose of these perforations? Perforations in pottery fragments are well known from coastal sites; such perforations have also been found in Iron Age pottery. The purpose of this type of perforation was to enable the owner of the pot to bind the pot across a crack, thus prolonging the life of the vessel; they are thus used for repairing pottery. 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 seperate pieces to form a jointed armband.

The evidence of UP/320 suggests that these perforations may have been part of a "stitch in time" philosophy, and that they were used before the worst had happened. UP/320 has V-shaped polished edges and is from 8,8-9,2 cm deep. It was found in 9 pieces (on K2 / TS2); 5 of these pieces had perforations close to the edges. These perforations were mostly drilled from both sides, and showed signs of abrasion. On close examination, it was found to be possible to join the nine pieces together to form two large pieces; the ends of these pieces abutted neatly and could have been further joined. Where perforations bridged a "break" in the ring, the break was carefully examined. A surprising fact emerged; only two of the breaks showed weathering on one side of the break, whereas all the others were clean, and showed no sign of abrasion. Consequently they could be fitted

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neatly together and glued (Plate 10.). It seems therefore 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. The cracks only opened subsequently in the soil or during excavation. In such a case, the perforations were part of preventative 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.

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; one end is cut cleanly through. Below the cut are two deep cut marks as well as several shallow cuts. 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 inward 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 Greefswald complex and characterises the K2 phase of the 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 (1969:138) mentions "many ivory fragments" at Ingombe Ilede. 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 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 of ivory suggests that the present collection is no longer complete.

Ivory occurs on a number of sites in South Africa, Rhodesia, Botswana, Zambia and Malawi. Maggs (1976:210) records a carefully polished broken rectangle of ivory which had been perforated at one end, from OND3;he mentions fine striations on the underside which suggest shaping by sawing much like the Greefswald material.

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Welbourne (op.cit.: 124 and II 57) records eight fragments of ivory bracelet from Klipriviersberg. One of the pieces had two holes drilled into it. In Rhodesia, no ivory is recorded in Huffman's monograph on the Leopard's Kopje tradition (Huffman, 1974), nor in the excavations at Zimbabwe. Robinson (1959:155-156) describes finely carved ivory figures and "divining dice" from 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. The next record of ivory is at Ingombe Ilede (fragments only), and Isamu Pati (Fagan, 1967: 87, 92 and 122). Phillipson (1970: 107) describes two bracelet fragments from Twickenham Road in Zambia; these specimens are roughly rectangular in section, and are therefore narrow bands of ivory. Voigt (1973:138) describes a fragment of ivory from Matope Court in Malawi which displays the same kind of "sawing" striations observed at Greefswald.

In all the above cases (except Ingombe Ilede), ivory only occurs in the form of finished objects; this strongly supports the comments in Chapter 7 suggesting that Greefswald 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.

3.
Mollusca in the Greefswald culture complex.

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

a) Terrestrial species

Numerous very small terrestrial molluscs were found at Greefswald; these played no part in the cultural life of the community. However, the large land snail, *Achatina immaculata* appears to have been of considerable importance. The majority of specimens occurred on K2; only K2 yielded specimens which showed signs of cultural modification. Ten specimens from K2 had the edge or part of the edge of the opening ground flat; oblique striations or striations at 90° to the edge could be seen. Two of these

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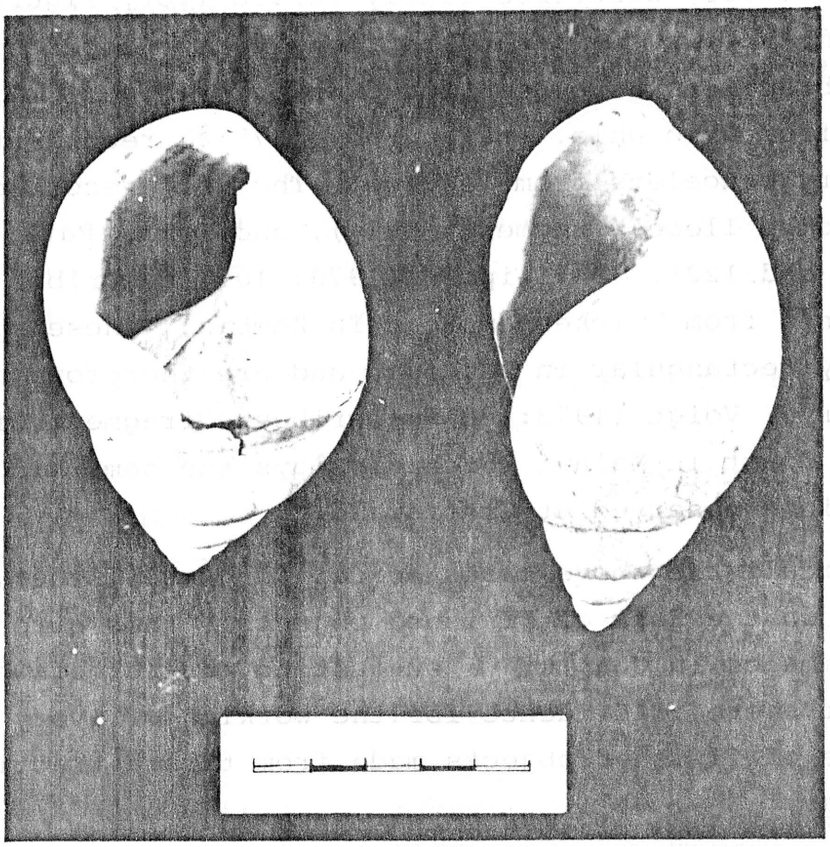

Plate 10.12. Achatina immaculata. Left-hand specimen is from Eilandt; the aperture is ground down in the same way as T2/3476. The right-hand speciment is a complete, unmodified shell from Pont Drif.

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specimens (T2/3476 and a specimen from T1/Level 3) are complete; if they had first been used as food they were possibly cooked before being removed from the shell. A complete shell with the entire edge ground flat was picked up on the surface at the Eilandt site in 1976; Ewers (pers.comm.) postulated that the shells had been used as scoops for the salt rich soil during the salt manufacturing process. van der Waal (pers.comm.) 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 (1969:90) records the use of *Achatina* shells in pottery making. (Plate 10.12).

Achatina immaculata had some spiritual value at Greefswald, 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, in many ways, a useful shell at Greefswald.

b) Freshwater species

Two large freshwater species are present at Greefswald: *Aspatheria wahlbergi* and *Unio* sp. One specimen of each was found on K2, both with one edge ground flat from utilisation. Three specimens with ground edges were found in MST/K8, and five on MK1. River mussel shells with edges ground flat have been recorded from a number of sites (eg. Maggs, 1976:191 (one specimen), Welbourne, 1971:122-123 (Klipriviersberg) and Leopard's Kopje sites (Woodward, in Huffman 1974:135-137).

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 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.

c) Marine species

Four species of marine shell were identified in the old and

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new collections during the present analysis.

Nassarius kraussianus (Koch) is an extremely small (under 1,0 cm) gastropod, commonly found in marine estuaries. It is a scavenger which frequents mudflats and lagoons from the western Cape to Mocambique. The specimen 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 Greefswald is an enigma.

Natica sp. is also a very small shell (1-2 cm); there is no indication that this specimen could have been used as an ornament.

Eight specimens of *Polynices tumidus* were found, six of them being found in the old excavation. These are almost certainly the specimens described by Gardner as *Nerita*. All except one of the specimens has a perforation in one side; six of 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 Greefswald. However, apart from one specimen in MST/K8/17, and two found by Gardner on Mapungubwe Hill, this species is only found on K2. The specimens from the Hill are both complete; six other specimens are either not obviously modified or are too fragmentary to be able to detect any modification. All the remaining 41 specimens have had their dorsal surfaces 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.

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

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some object. This cluster suggests that cowries were common enough to allow groups of the shells to be used as ornamentation.

Maggs (op.cit.:126, 190, 263) records a specimen of *Cypraea helvola* and of *Nerita* sp. from sites in the Orange Free State; *Corbicula africana* and *Unio* from OU2 and *Cypraea annulus* from OXF1; all the specimens have ground dorsal surfaces, umbones or edges. Welbourne (op.cit.:122) records only abraded mussel shells from Klipriviersberg; Robinson recorded *Cypraea* sp, c.f. *Murex brevispina* and c.f. *Polynices* sp. from Khami; the cowrie had been treated in the same way as the rest of the Greefswald material. Woodward (in Huffman op.cit.:135-137) records *Achatina* sp., *Burtoa nilotica, Limicolaria* sp., *Cafferia caffer, Mutela dubia* and *Aspatheria rubens*. The *Cafferia* specimens show polished edges as at Greefswald, and one specimen was apparently perforated for suspension. Welbourne (1975:9) recorded *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 recorded cowries specimens, *C. annulus* and *P. tumidus(mamilla)*. from Ingombe Ilede, in addition to *Achatina* sp. and other smaller terrestrial species. The cowries had been modified for use as ornaments. He also mentions *C. annulus* from Isamu Pati and Kulundu, conus shells and *Aspatheria wahlbergi* (Isamu Pati). Also in Zambia , Phillipson (op.cit.) found two cowries and fragments of *Achatina* at Twickenham Road. Only freshwater and terrestrial species (*Aspatheria* spp., *Lanistes* spp. and *Achatina* sp.) were recorded by Voigt from Matope Court in Malawi.

The above evidence shows that *Achatina* sp. and river mussels occur on most published Iron Age sites, and are 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 Greefswald people.

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CHAPTER 11

THE GREEFSWALD CLAY ANIMAL FIGURINES

The excavations at Greefswald have yielded a vast amount of pottery. However the people of Greefswald 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; this aspect will be dealt with in the report on the pottery by Meyer. It was felt that the animal figurines might yield some information on the types of animals kept by the people at Greefswald. The collection of animal figurines was studied with this idea in mind, using the distinguishing characteristics given below:

I	Horn shape		
II	Body configuration:	(a)	humps
		(b)	dewlaps
		(c)	hindquarters
III	Number of teats:	(a)	cattle and goats have a minimum of four
		(b)	sheep have two

Forty-six fragments of animal figurines retained none of the above characteristics and were not examined further. However, thirty-five specimens did show enough detail to allow them to be identified to generic 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 however, that the Greefswald material represents a form of plastic art which portrays sufficient detail to suggest that many of the figurines were modelled on the basis of animals with which the makers were very familiar. In view of this, 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."

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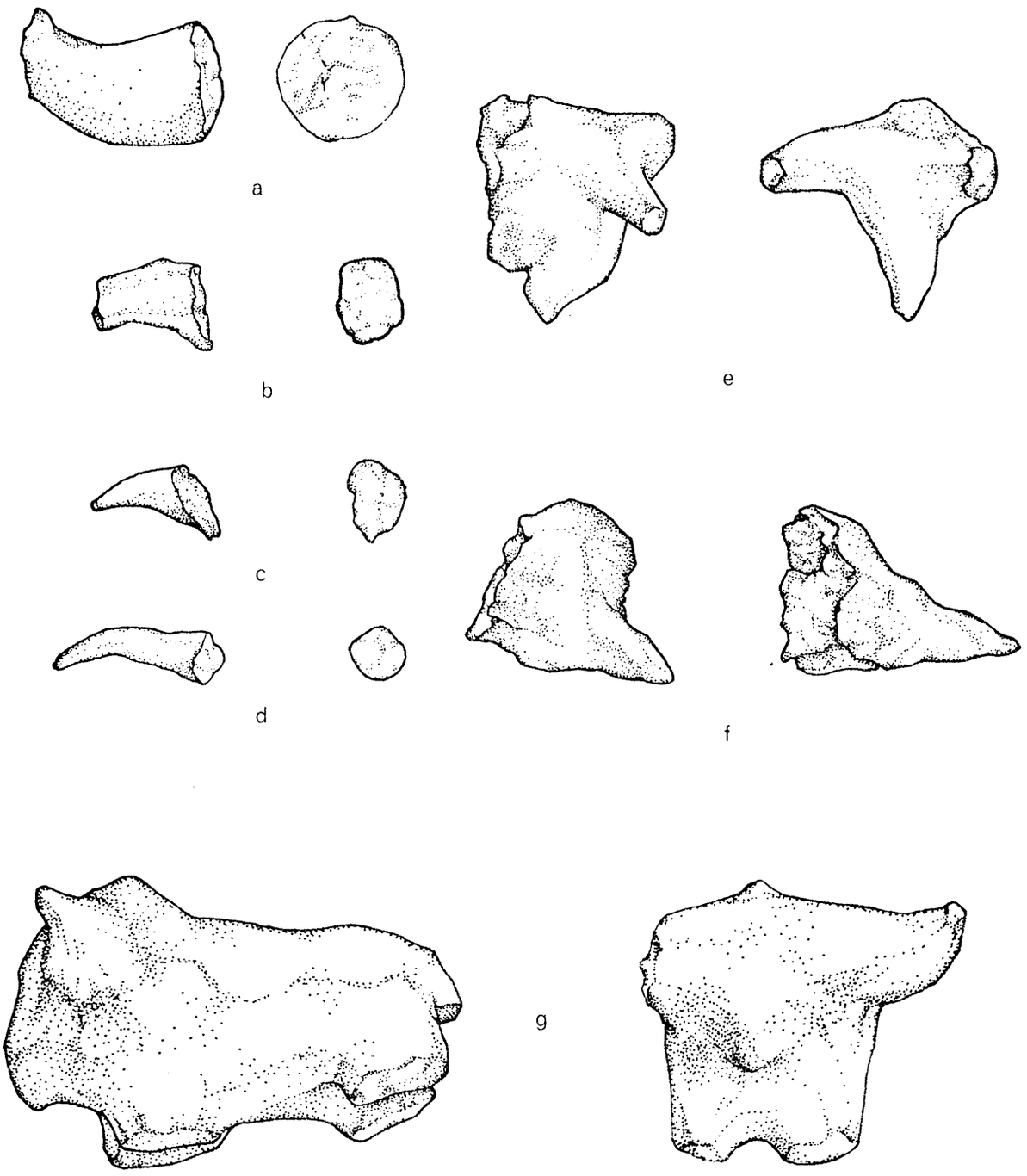

Fig. 11.1. Clay cattle figurines showing horn configuration (a-f), and horn and body configuration (g). All specimens from K2.

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A. CATTLE FIGURINES

I HORNS

Five clay objects are isolated horns broken off figurines.

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

b) Provenance: K2/TS1/A6/Level 1 (Fig. 11.1 b)
Excavation: Eloff and Meyer
Maximum dimension: 1,83 cm.
Max. and min. diameter of base: 1,44 x 1,03 cm
Tip of horn broken away. Horn forms a simple curve similar to (a).

c) Provenance: K2/2a(i) ?JS3/2(a) (Fouche 1937:p.13) (Fig. 11.1c)
Excavation: J.F. Schofield excavated JS3 (Mahobe) in 1934.
Max. dimension: 1,85 cm
Max. and min. diameter of base: 1,3x0,90 cm
Horn almost complete. Rather straight curve, very similar to specimen (f).

d) Provenance: K2/TS3/A2/Level 1.1.1 (Fig. 11.1d).
Excavation: Eloff and Meyer
Max. dimension: 2,59 cm
Max. and min. diameter of base: 0,80x0,80 cm
Complete specimen. Very finely made, forms an S-curve. The shape is very close 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 x 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: 1,2x1,03 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, (Fig. 11.1(g) and 11.4(a)) the horns are similarly shaped but are tilted slightly up and slightly down respectively.

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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 Africander 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

a. 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 features also occur in the Africander; however the latter breed is also characterised by a high proportion of animals with a convex facial profile, a high, convex poll between the horns, and short, forward curving horns.

Six of the cattle figurines from Greefswald carry humps.

a) Provenance: K2/TS3/A2/Level 4 (Fig. 11.1 g)
Excavator: Eloff and Meyer
Maximum dimension: Nose to tail, 7,35 cm.
Maximum height (at hump): 4,40 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 is short, and curves forward and slightly up. The dimensions at the base of the complete horn are 1,69x1,63 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 (Fouche 1937:p.14 and Plate XV 5) (Fig. 11.2 a).
Excavator: ? Schofield, 1934.
Max dimension: 4,83 cm
Max height: 3,16 cm

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A black clay figurine, poorly baked. It is roughly made - the clay shows signs of repeated remodelling. Left horn broken off; right side appears to have an ear rather than a horn.

Distinct hump behind 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. 11.2 b).
Excavator: ?
Max. dimension: 5,3 cm.
Max. 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. 11.2
Excavator: Gardner.
Excavated in 1935. See Gardner 1963:94.
Max. Dimension: 6,55 cm.
Max. Height: 3,69 cm.

Well-fired figurine. The horns are broken, but curve slightly downward after leaving skull at 90^{o} 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 stumpy "feet" with flattened bases; there are a number of shallow, V-shaped cuts across these bases which 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 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 animal's left

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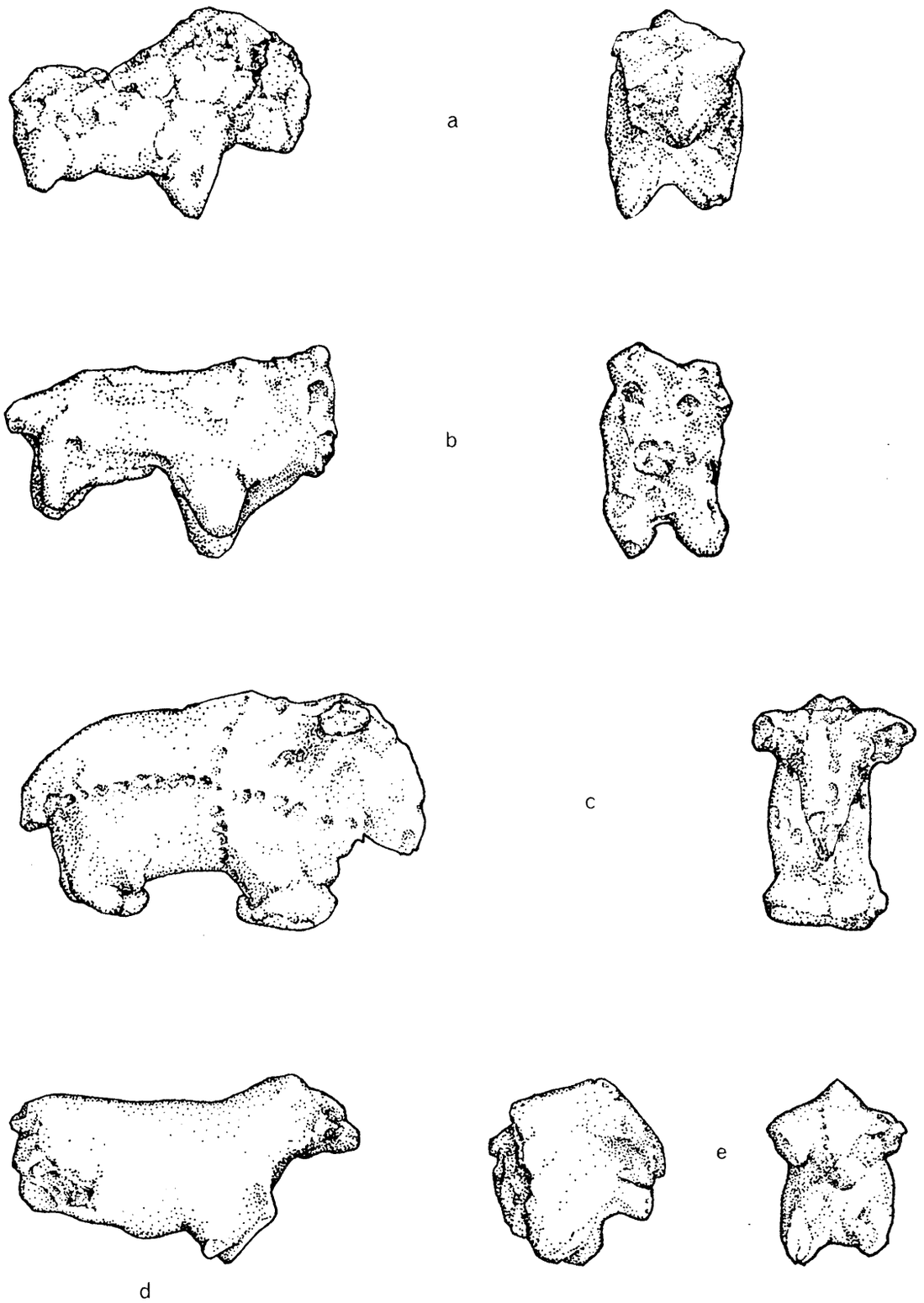

Fig. 11.2. Clay cattle figurines showing body configuration: representation of humps. (a) and (e) from K2, the rest from old excavations. (c) and (e) are decorated, possibly to represent colouration. (b) probably originally had beads for eyes.

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cheek, along the line of its 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: 34.2.F Maybe K2, Trench 1, S34, 2'. (Figure 11.2 d).

Excavator: Gardner, 1935. See Gardner 1963:97.

Max. dimension: 5,32 cm.

Max. 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. 11.2 e).

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. 11.3 f) 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 Greefswald were humped, or that prominent humps were unusual. The size of the hump in Sanga cattle does vary a great deal, so that even virtually straight-backed animals are encountered. Only one of the above specimens has a combination of both hump and dewlap.

b. Dewlaps

The dewlap is well developed in the Sanga and the Africander breed of cattle. Eleven of the cattle figurines have dewlaps modelled in.

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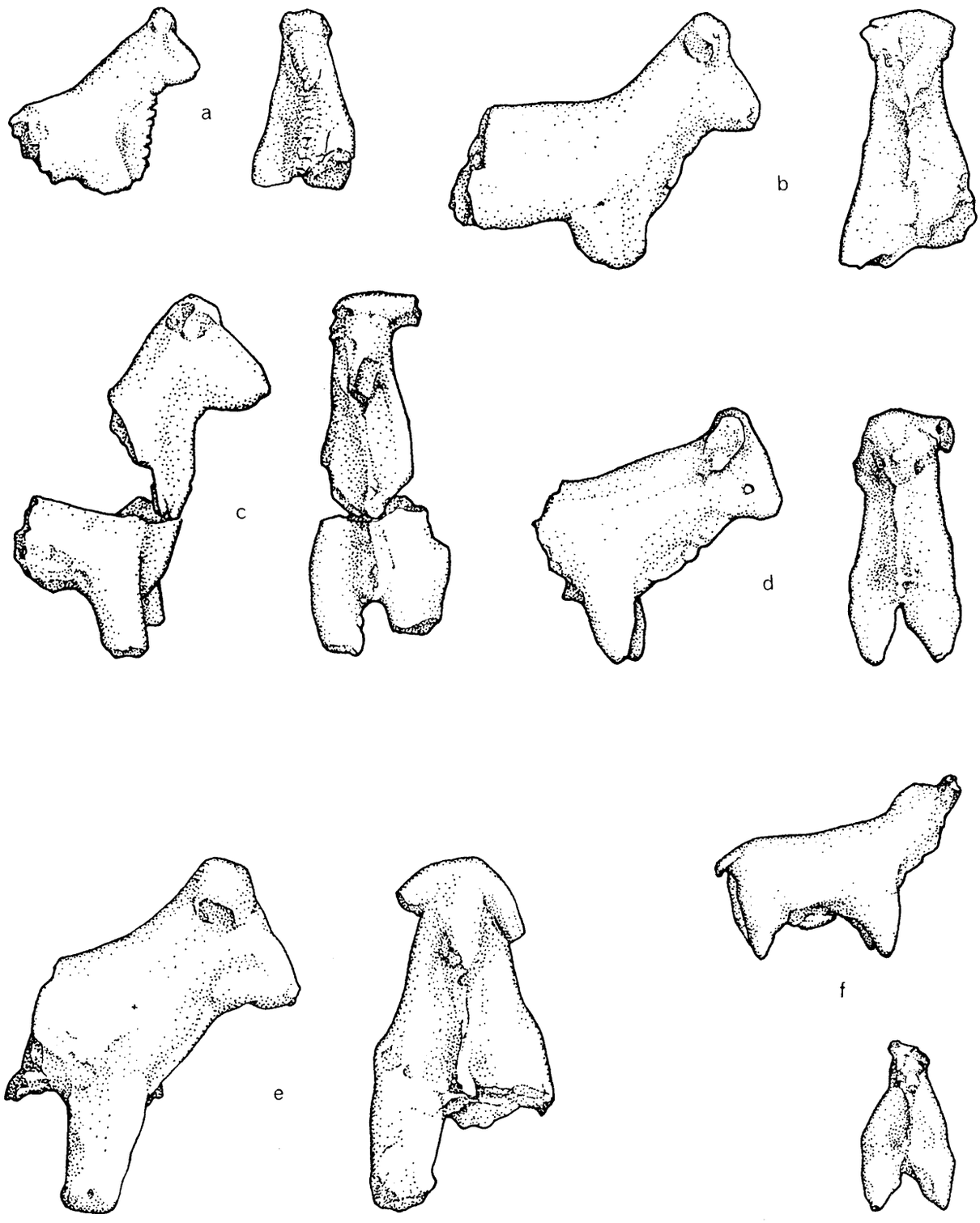

Fig. 11.3. Clay cattle figurines showing various aspects of body configuration, including dewlaps. All from K2, except for (f) which has no provenance. (d) has hole drilled through muzzle.

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Of these, six specimens are distinctive only for the presence of a dewlap.

(a) Provenance: K2/TS1/A6/Level 1 (Fig. 11.3 a).
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. 11.3 b).
Excavator: Gardner, 1935-1940.
Maximum dimension: Nose to broken edge : 5,14 cm.

The specimen, which is of poorly fired clay, consists of the fore-quarters 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 (e) 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. 11.3 c).
Excavator: Gardner, probably 1936
Maximum dimension: poll to feet, approx. 5,90 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 (b), although the poll is not so 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.

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(d) Provenance: K2/TS3/A2/Level 5.1. (Fig. 11.3 d).
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 of the figurine. 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 Greefswald people as draught or as riding animals.

(e) Provenance: K2/S15/No. 3 (Fig. 11.3 e).
Excavator: Gardner, probably 1936. 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 down, 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: ? Labelled "No. 42" (Fig. 11.3 f).
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 animal's chest. The penis is modelled in.

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III Teats

The udders of cows and she-goats have multiple teats, whereas those of ewes have only two. The usual number in cows is four; nine of the cattle figurines from Greefswald 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 identity of the animals portrayed.

(a) Provenance: M/6-1/55-11-3/. B6/S1/2, Mapungubwe Hill (Fig. 11.4 a).
Excavator: Gardner, 1940. 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 forward and downward. 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 homogenous; it is extremely fortunate that this figure has survived so well.

(b) Provenance: K2/TS3/A2/Level 5.1 (Fig. 11.4 b).
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. 11.4 c).
Excavator: Eloff and Meyer.
Maximum dimension: nose to tail 6,73 cm.
Maximum height: poll to feet 4,22 cm

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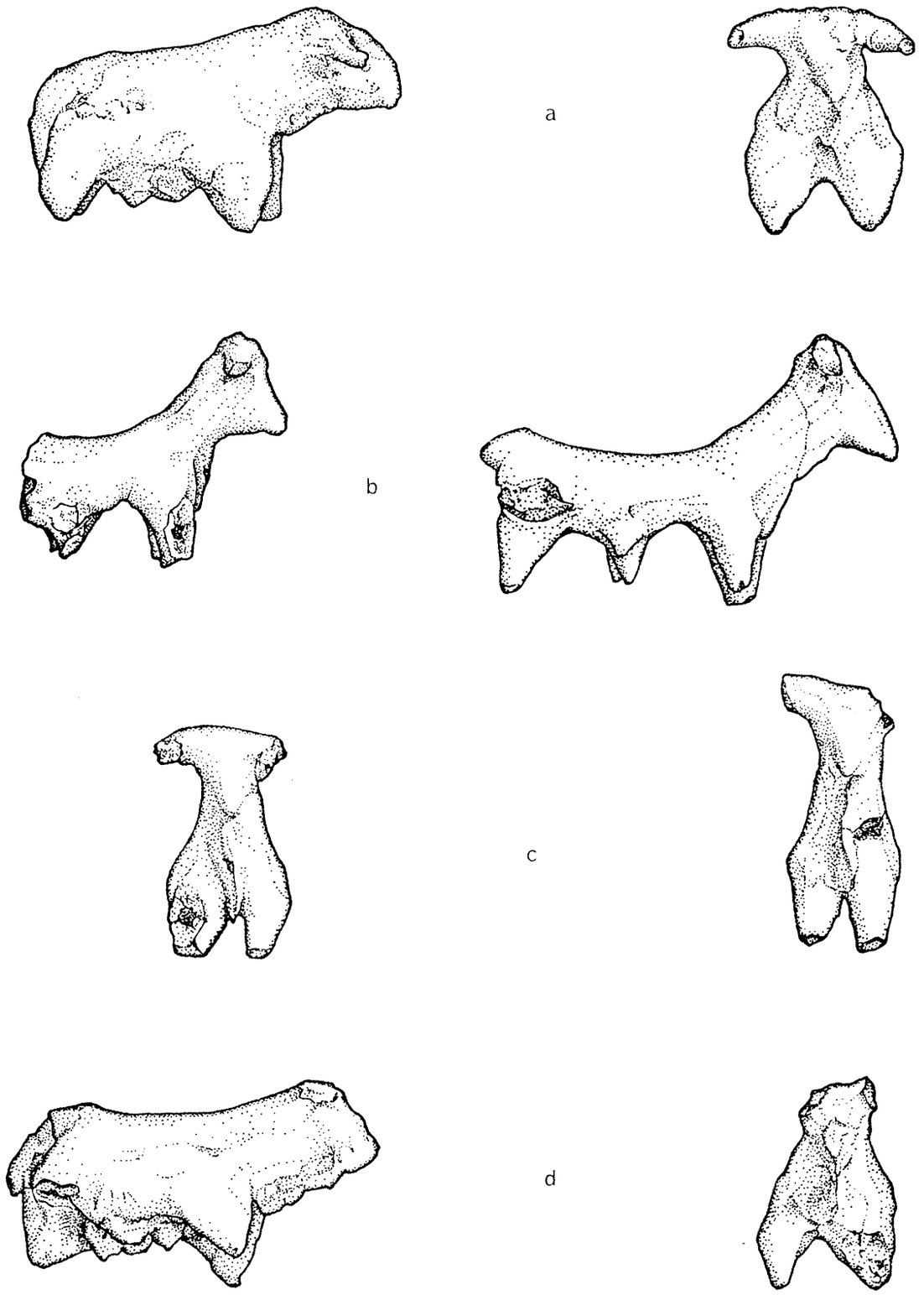

Fig. 11.4. Clay cattle figurines showing body configurations: representations of udders. (a) and (d) from old excavations, (b) and (c) from Meyer's excavations on K2.

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This specimen is complete except for the horns and right hind leg. It is carefully finished, with the same "fluting" on the surface as specimen IIa.a. The profile of the face is slightly convex, with a concave poll. The stump of the right horn curves upwards then begins to turn down. 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. 11.4 d).
Excavator: Gardner, 1940 : B6/S1/2 feet. 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 III (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: ? (Fig. 11.5 a).
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. 11.5 b).
Excavator: Eloff and Meyer.
Maximum dimension: foreleg to hindleg 4,08 cm
Maximum height: broken neck to feet 3.40 cm.

The figurine is headless and has lost both left legs. However the presence of five teats suggests strongly that it represents a cow.

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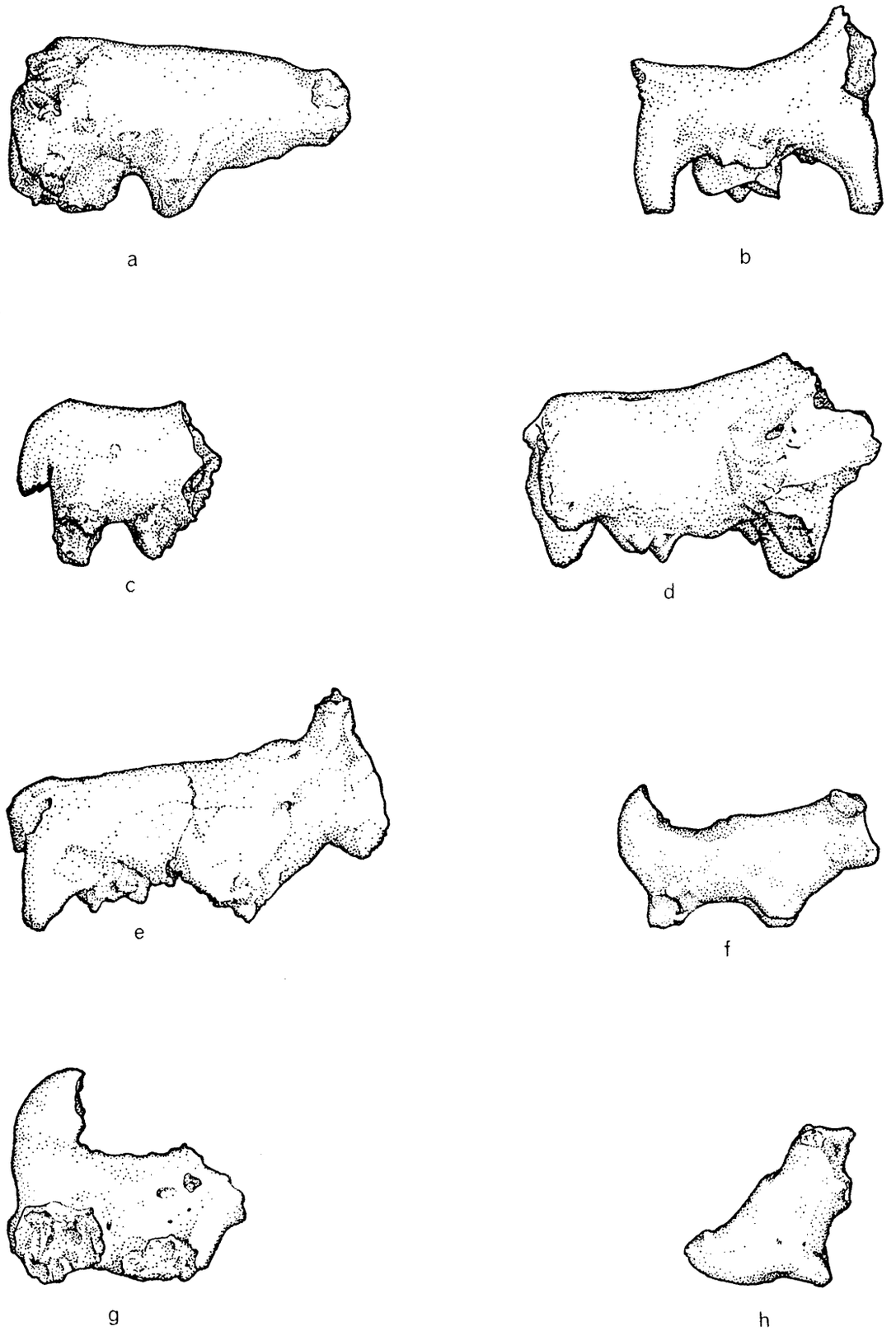

Fig. 11.5. (a)-(e): Clay cattle figurines with representations of udders. (b) from Meyer's K2 excavations, (c)-(e) from old excavations, (a) has no provenance. (f) and (g): Possible goat figurines. (f) from Meyer's K2 excavations, (g) from Gardner's K2 excavation. (h) Springhare.Meyer, K2.

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(g) Provenance: K2/B5/S3/9'20'3' (Fig. 11.5 c).
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. 11.5 d).
Excavator: Schofield, 1934. See Fouche 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 completely missing, and three of the legs are damaged. There is a circular hole sunk into the body under the tail.

A cluster of three teats is modelled onto the belly of the figurine.

(i) Provenance: K2/2a(i) ?JS3/2(a) (Fouche 1937:15) (Fig. 11.5 e).
Excavator: J.F. Schofield excavated JS3 (Mahobe) in 1934.
Maximum dimension: nose to tail 6,34 cm.
Maximum height: Tip of broken horn to tip of broken leg: 4,00 cm.

The face and legs have been damaged by a spade or trowel. However the remains of the face shows 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 under the belly of the figurine.

B. 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".

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(a) Provenance: K2/TS3/A2/Level 10 (Test trench) (Fig. 11.5 f).
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 hindquarters are damaged. However, the specimen has a broad, upright tail which curls up over its back; this suggests strongly that the figurine represents a goat.

(b) Provenance: K2/B5/S14/1'3'1' (Fig. 11.5 g).
Excavator: Gardner, 1938. See Gardner 1963:123.
Maximum dimension: 3,96 cm.

Although badly damaged, the orientation of this figurine as shown on the plate 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. 11.6 c).
Excavator: Gardner, 1940. Not listed in Gardner.
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 Greefswald dogs had upright ears and tails I feel that this figurine almost certainly represents a goat.

C. SHEEP FIGURINES

Although the above three specimens are interesting, the identification of two sheep figurines was perhaps the most exciting result of this study of the Greefswald animal figurines. The rear end of a ewe has a very distinctive shape; the two figurines are made in such a way as to emphasise this.

(a) Provenance: MST/K8/Level 7 (Fig. 11.6 a).
Excavator: Eloff and Meyer
Maximum dimension: nose to tail: 4,98 cm.

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Maximum height: top of head to feet 2,98 cm.

The legs and horns of the figurine are damaged. The horns appear to have risen straight from the skull and then to have turned back. The line of the back is high at the shoulders, the tail is broken off. Two small perforations have been made under the tail of the figurine, the lower one having a lip. Two teats are modelled under the belly of the animal.

(b) Provenance: MST/K8/Level 7 (Fig. 11.6 b).
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 horns and right leg, this specimen is complete. It is neatly modelled, although the clay is not smoothed. The surviving horn (on the right side) turns down 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.

D. WILD ANIMALS

Springhare

(a) Provenance: K2/TS3/01/Level 9 (Fig. 11.5 h).
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 small projections which could be ears. The tail is wide and upright as in specimens B(a) and (b). Although initially this specimen was classified as a goat figurine, continued scrutiny suggested that it was not really like any of the domestic animal figurines. The specimen also balances very well on its tail and hind legs. I therefore wish to suggest very tentatively that it represents a spring-hare. There is a small circular hole under its chin. When examined by a mammalogist, this specimen was again identified as a springhare.

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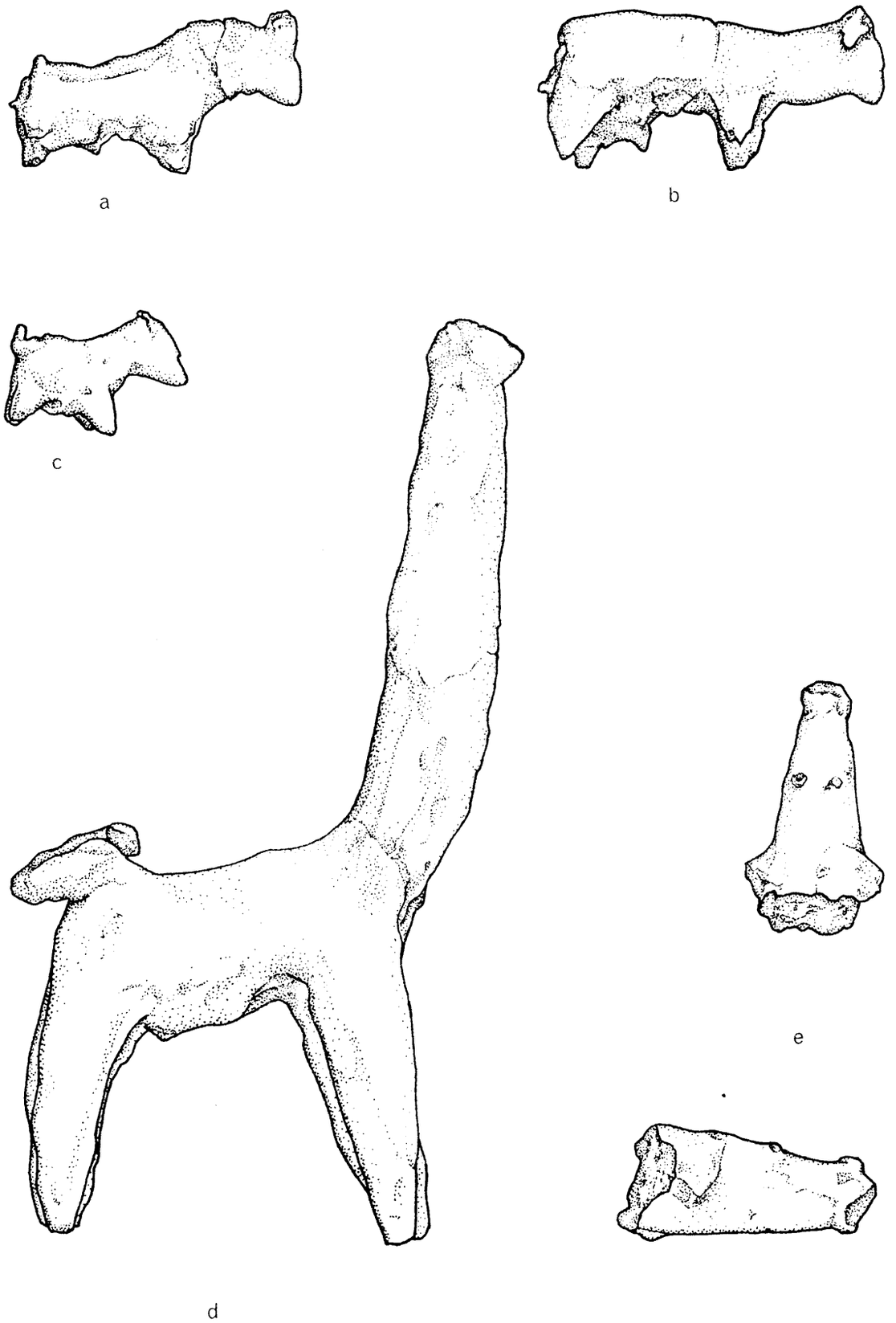

Fig. 11.6. (a) and (b): Sheep figurines, both MST/K8; (c): Goat figurine, Gardner, 1940; (d) Giraffe, Mahobe, Schofield; (e) "Hippopotamus", Gardner, K2.

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Giraffe

(b) Provenance: Mahobe, JS3 (Fig. 11.6 d).
Excavator: J. Schofield, 1934 Fouche 1937:18; Plate XV, 5.
Maximum dimension: chest to tail 6,80 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" (Fig. 11.6 e).

Provenance: K2/B1/S13/1 foot.
Excavator: Gardner, 1936. Gardner 1963 : 100 .

Gardner described 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; there is a reasonably preserved fingerprint on the convex facet and above the beads. Fine grooves on the surface of the piece indicate refined finishing work.

The specimen illustrated is probably the one described by Gardner as a hippopotamus. Meyer feels that the figurine is a broken portion of a stylised human figurine (pers. comm.). The protruberences on the "side" are much like the stylised arms of human figurines. However, the top of the specimen is sculptured in such a way as to suggest a snout rather than the top of a head. While it is possible that this figurine is a portion of a stylised human figurine, I feel that it could equally well be described as an animal head, possibly being an elongated head of a suid or of a hippopotamus. Because the figurine is broken, the specimen cannot be unequivocally identified.

CONCLUSIONS

The animal figurines from Greefswald can thus be said to reflect

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some of the characteristics of the animals familiar to the inhabitants of the site. It would appear 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 (Fig. 11.2(c), 11.3 (b), (d) and (e), 11.4 (a) and (b)) do show down-turned horns; these would strongly support the idea that Africander cattle were also kept by the people at Greefswald. The presence of convex face profiles in only some of the figurines is also highly suggestive of Africander characteristics, although so small a feature would be very dependent upon the skill of the maker of the figurines.

The accent on the representation of multiple teats on the cow figurines suggests strongly that the Greefswald herds included good milk cows, and that milk had some importance in the diet of the people.

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

The figurines indicate the presence of all three major domesticated 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. Present-day farmers dock the tails of ewes to increase the breeding potential of their flocks. The two sheep figurines tentatively suggest that the Greefswald people might have followed the same practise, although evidence for this among present-day negroid pastoralists is limited.

The presence of at least two figurines of wild animals in the Greefswald collection is interesting. These creatures 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.

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CHAPTER 12

THE GREEFSWALD FAUNAL REMAINS : CONCLUSIONS AND INTERPRETATIONS

The concept of an "Iron Age" in southern Africa implies the existence of semi-sedentary groups practising mixed farming who manufactured pottery and who 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 for the cultivation of cereal crops (such as millet and sorghum) by these people is often inferred, but may exist in the form or carbonised grain. The preservation of faunal remains on the sites holds out excellent possibilities for a far greater understanding of the animal aspect of mixed agriculture than we can hope for in the preservation of plant remains.

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

The present study also clearly shows that economic and dietary interpretations of faunal remains involve two separate approaches, 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 activities of a group; relatively small variations in this pattern of activities will lead to quite large variations in dietary patterns. On the basis of economic activities, all

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the archaeological occurences at Greefswald except TS1 yielded 60% or more dependance on domestic animals; TS1 showed 23% snaring and 17% gathering, with only 50% herding. Thus the TS1 people were less dependent on their herds in terms of economic activities than were the older Greefswald groups. However, if the activities are translated into dietary contributions, a very different picture emerges - a picture in which all the occurrences, except MK1, yielded a figure of 96% to 98.7% meat from domesticated animals. In all cases, the meat contribution of other economic activities was negligible. The exception to this pattern was MK1 Phase 4, in which the meat contribution of domesticated animals dropped to 85,3%. The reason for this drop was the presence of four zebra in the sample - these equids contributed 12% of the meat of the recorded diet.

It is thus clear that there is a great difference between the pattern of economic activity and the dietary pattern; in defining the overall economy of any site it is therefore essential to attempt to express the results of the various activities in terms of meat contribution before we can make a satisfactory statement regarding the economic bases of a group.

Gardner originally suggested that the K2 people subsisted on meat and milk, although they were averse to killing their cattle (Gardner 1963:27). The evidence of the present study indicates similar utilisation of large and small stock, with slightly more small stock being slaughtered than large. However, the quantity of stock represented suggests that the Greefswald people regarded their herds and flocks as a prime source of food; animals belonging to a wide range of ages were slaughtered in both groups. We do not know what proportion of the diet was contributed by plant foods; nevertheless it appears to be justifiable to state that the Greefswald people utilised their stock regularly as a food source. 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 Greefswald community enjoyed a high social status which provided it with access to stock belonging to other groups.

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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 used as a medium of exchange in certain instances in place of cattle. Iron and cattle have been and are rare 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 to the author that the present high value enjoyed by cattle is an historically recent development. I would suggest that, insofar as the Transvaal is concerned, cattle were swept out of the social structure firstly by the raiding and destruction caused by the Matabele movements in the 1830's, then again by the rinderpest epidemic of 1876-77 and the destruction of stock during the Second War of Independence of 1899-1902. It would seem possible that the drop in the cattle population in the middle of last century might have resulted in bush encroachment in certain regions which would result in the spread of tsetse fly, thus rendering previous cattle-keeping areas unsuitable for ranching. 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 status.

The above is suggested as an hypothesis which requires investigation by ethnologists and social anthropologists. It is obvious that stock - including small stock - also had some religious significance at Greefswald, 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 safely be assumed that cattle represented wealth at all times, but that this was, so to speak, permissably consumable wealth. Cattle could therefore be expected to be attracted to centres with a high social standing within a culture phase in the form of tribute or payment of social obligations.

The above hypothesis would satisfactorily explain the enormous number of cattle concentrated on Zimbabwe. We unfortunately have no comparable data as yet on contemporary sites for comparison with Greefswald. However, as already noted, domestic

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animals constituted more than half the animals represented at all the occurrences at Greefswald. A notable difference from the situation at Zimbabwe is the fact that small stock was more numerous than cattle; nevertheless the total numbers of domestic stock are high. The question which must be examined is whether the pattern at Greefswald is in any way abnormal, thus indicating a special social position for the community.

Detailed analysis of the faunal material showed that the Greefswald people kept sheep, goats, cattle and dogs. Criteria established in Europe for separating the first two species were not utilised in the Greefswald analysis because the South African material available suggested that more variation existed between the species than was shown in the publications. Before the published information is utilized, it needs to be checked against an adequate sample of specimens from unimproved South African breeds. However, goats were clearly identified at Greefswald 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:) identified a sheep figurine from Khami Waterworks, but this specimen had a tail preserved. One of the Greefswald figurines was tailless; this suggested the possible practice of tail docking at Greefswald, a practice which improves fertility and which is practised in East Africa.

Sheep, goats and cattle were slaughtered when mature. The graph showing the age at death of sheep/goats has a strong peak at the 30-60 month phase; thus the animals were 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 phase of older than 42 months.

When it is found that mature animals of breeding age are being slaughtered, it becomes useful to know whether these animals were selected on the basis of sex.

Examination of the goat horn cores from Greefswald shows that the length of the sinus cavity in the horn cores varied, with one group being about 50% hollow, the other being completely hollow. Research overseas has suggested that the size of the sinus cavity is related to the sex of the animal; on this basis, the Greefswald sample contained one female to each two male goats.

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This is a line of research which needs to be pursued.

Similar work on the cattle horn cores suggested sexual dimorphism in the structure of the horn cores. The results obtained were more variable than in the case of the goat sample; however the sample was also very much smaller. Nevertheless, a tentative hypothesis is proposed suggesting that young animals have horn cores with a rough, porous outer structure, that cows have thin-walled, hollow and bulls robust-walled, hollow horn cores. On the basis of this proposition the Greefswald horn cores appear to have come from two juvenile, three female, two male and one castrated animal. Once again this appears to be a potentially useful line of research.

A problem of particular interest at Greefswald was that of cattle breeds. Both "Sanga" and "Africander" breeds were said to be present. Skull remains indicated the presence of a Sanga type, and horn core remains indicated the presence of the Africander breed. The presence of bifid thoracic vertebrae provided clear evidence of humped cattle; since both Sanga and Africanders may have bifid vertebrae, these cannot be interpreted as certain evidence for Africander cattle. Sanga types can be humped or humpless, and indeed the clay cattle figurines suggest the presence of both; the size of the hump is variable, and is related to the sex of the animal, large bulls having larger humps than cows.

However the faunal evidence for humped and humpless Sanga and for Africander cattle is excellent.

The importance of the difference between Sanga and Africander is perhaps over-emphasised in the literature. Osterhoff (1975) has shown that the Africander is a purely local breed which owes none of its characteristics to imported cattle, and that it is closely related to Sanga types. The Sanga and Africander blood groups indicate contact with the Zebu type, *Bos indicus*. We do not know at what point of time this admixture occurred, but it must have been at least during the first millennium A.D. and possibly in East Africa. The Africander 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 upon its cultural relationship with the Hottentots. The Africander

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can be regarded as a "pure" breed of indigenous cattle with a very long history. It is not impossible that it came to South Africa with the Khoikhoin peoples, but there is no archaeological evidence for this. Similarly, it is not impossible that the Bantu-speaking peoples could have obtained Africander cattle from contact with Khoikhoin peoples; the most important fact to emerge from the present study is that both Africander and Sanga breeds were present at Greefswald. The critical question is whether both breeds occur at any other sites, and whether such combinations are time or culture linked.

The examination of the cattle remains showed quite clearly that there is no evidence for "dwarf" cattle at Greefswald, and that the "dwarf" cattle described from Zambia fall within the size range of the Greefswald 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 Greefswald. Two major results were obtained from this part of the study. The first is the fact that the major European criterion of dog domestication (Length $\underline{P4} \leq$ length $\underline{M1}$ and $\underline{M2}$) cannot be applied in the South African context. In African dogs the length of $\underline{P4}$ has been found to be equal to or greater than that of $\underline{M1}$ + $\underline{M2}$. 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, while the second is found on sites in the Transvaal and Natal.

It has already been stated that Greefswald was an unusually large settlement with intensive occupation over a limited period. This in itself suggests a large concentration of people. There is another factor which sets Greefswald apart from other sites, and this is the extensive evidence for ivory working.

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 the likelihood of contact with the East Coast by means of the ivory trade, could have been the basis of specialisation which raised K2

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above its contemporaries. Evidence for contact with the East Coast exists on all three components of the site in the form of trade beads; it seems likely that, by the time of the occupation of the Hill, Greefswald was no longer directly involved in the ivory trade but could have been acting as a "clearing house" for another centre. This other centre could conceivably have been Zimbabwe, which began to develop as a large settlement by the end of the 12th and beginning of the 13th Centuries A.D. (Huffman (1974a). As Zimbabwe became involved in the gold trade, gold filtered back down the trade route to Greefswald, to appear only in the superficial levels on Mapungubwe Hill, thus marking the apex and the demise of a trading centre with a history stretching back to the beginning of the first millennium A.D. On this basis, Greefswald could be expected to have enjoyed a high social status within its own cultural complex.

This social structure would in itself attract people to Greefswald, and would also result in a concentration of domestic animals as a result of the concentration of people and stock and the use of stock as a form of tribute.

It is interesting to note that bone tools only occur in quantity on Mapungubwe Hill in the uppermost levels. These same levels were associated with an increased contribution to the diet by hunting. This might indicate a decreasing availability of domestic animals to the inhabitants as the importance of Greefswald declined with the rise to prominence of Zimbabwe.

The bone tool types encountered on the Hill occur in lesser quantities on the other two archaeological areas. Thus finely worked bone tools occur in the upper levels of all three components of the site, suggesting a cultural continuum through these levels, although the ivory is limited to K2.

The bone assemblage was carefully studied for evidence of human and animal damage and for taphonomic evidence. Evidence for butchering patterns is very clear, with chop, cut and chisel marks present on many of the bones. These enabled some reconstruction of butchering pattern to be undertaken. Two small specimens showed evidence of healed injuries. Rodent and carnivore damage was not very common on the site. The rodent damage was caused by small murids; only one example of porcupine gnawing was found. The

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carnivore damage could have been caused by domestic dogs as well as small carnivores, such as jackals, scavenging on the middens.

Burning of bone occurred throughout the sample in small quantities, this could either have been the result of throwing the bones directly into the fire, or of throwing hot ash onto the middens, thus resulting in charring of the bone.

The horizontal distribution of bone within one excavation (K2/TS2) was found to vary between levels; it is not possible to explain this phenomenon unless a wide area is opened up. In the same way, the density of bone per cubic metre was found to vary considerably between excavations. Both aspects of bone distribution are undoubtedly related to activity areas on the site. A further interesting aspect of the bone assemblage which was noted was the occurrence of dis-articulated but virtually complete skeletons or parts of skeletons. In the case of complete skeletons, some ritual was most likely involved; the portions of skeletons found were usually foot bones, suggesting that this portion of the animal was discarded while still articulated.

The preservation of bovid skeletal parts showed some variation which was largely due to the size of the animal involved. This information was compared to that available from Bushman camps; it is informative to see how small a proportion of a skeleton is preserved on a site after even a short period of time. In studying the degree of fragmentation of the sample, it was found that two degrees of fragmentation occurrred. In the one case, the 2-4 cm size class was the largest size group in the bone flakes, while in the other case the 4-5 cm size class was the largest. There was no correlation between the degree of fragmentation of bone flakes with that of bovid post-cranial parts in the sample measured; nevertheless it is suggested that the larger class, i.e. bone flakes, can be used as an indicator of fragmentation on a site. This fragmentation is brought about by the breaking up of the bones for marrow, and is then subsequently affected by trampling and the depth of the deposit.

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The study of the Greefswald 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 Greefswald communities utilised their domestic stock extensively; this, combined with the size of the settlement, suggests a high social prestige site at the turn of the first millennium A.D. The presence of ivory working may explain the reason for this high prestige. However, a final question which remains to be answered is the status of domesticated animals in other Iron Age economies, and the pattern of Iron Age economic development during the first millennium A.D.

There are two aspects to this problem: what are the earliest dates for domesticated stock in southern Africa, and what evidence do we have for the composition of such stock through time?

At present, detailed information on the composition of domestic stock on early sites is almost non-existent; 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 earliest evidence for domesticated stock comes from East Africa, where bones of domestic animals were found in association with pottery and stone bowls. The earliest date comes from an unpublished manuscript by Bower and Nelson (1977) of 4800-5599 B.P.; cattle and sheep/goat bones were associated with Narosura Ware. The validity of this date is difficult to judge from the literature.

Mary Leakey (1945) found bifid cattle vertebrae in her excavations in the North-Eastern village at Hyrax Hill. 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 re-classified as Lanet Ware, and dated to the middle of the second millennium A.D. (Posnanky 1962 and 1967). This leaves us with the earliest date for domesticated animals south of the Sahara at Narosura in Kenya (Odner, 1972). Cattle and sheep/goats were identified, as well as a small number of wild animals. Jacobs suggested in his faunal report on the mate-

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rial that the worn state of the teeth indicated that the cattle were kept for milking, the site is dated 410-810 B.C.

There is no dated evidence for domesticated animals from this time until the beginning of the first millennium A.D. At Mabveni in Rhodesia 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 show these two different types of economy (Plug, unpubl. ms.), while Kumadzalo showed a balance between animal husbandry and domesticated animals (Vogel, 1971). Kumadzalo yielded the earliest evidence for the presence of humped cattle in southern Africa in the form of humped cattle figurines. It is at this point of time - the 4th to 6th centuries A.D. - that we must recognise two different types of Iron Age economies. In the one situation, domesticated animals and hunting/gathering form the basis of the economy (Makwe, Nanga and Kumadzalo), while in the other situation the economy is based almost exclusively on hunting and gathering (Thandwe, Namakale, Nkope). In Malawi, evidence for domesticated animals in the Early Iron Age is very tenuous, consisting of the find of a possible sheep/goat at Tambala Village and, even less certain, at Banda Hill (Robinson, 1975:18 and 43, Voigt 1977).

Malawi is a very interesting example of what one might expect to find during the first millennium. Present evidence indicates a heavy dependence on the lake and on hunting throughout this period, and oral traditions suggest that cattle are relatively late comers to the area (Agnew, 1972:43-45). Even to-day, the rural economy is more dependent upon the cultivation of grain crops and trading of fish from the lake than on domesticated 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 were not apparently making iron (Maggs, 1977). On the other hand, the Broederstroom site, which is contemporary with Lukenya Hill, has yielded evidence of extensive iron working, and domesticated animals have been identified from the site (Welbourne, 1973).

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From the ninth century A.D. domesticated 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 Malawi unfortunately peters out at this point; in Zambia, Kalundu, Kangila and Ingombe Ilede all yielded evidence of domesticated animals associated with hunting (Fagan, 1967). In Rhodesia, sites belonging to the Leopards Kopje tradition yielded enough bones of domesticated stock to suggest a fair dependence on these animals, although the lack of other material does not entirely 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 Leopards Kopje sites (Huffman, 1974 (b) and Robinson, 1966). Evidence from the Zambian and Rhodesian sites is of humped and humpless cattle. Huffman (1970) suggested that cattle only become important in the second phase of the Leopards Kopje culture.

Tautswe is broadly contemporaneous with the Greefswald sequence. Welbourne (1975) shows that the domesticated 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 Greefswald, we have evidence for the continuation of the mixed dependence on domestic animals and on hunting which can be seen in the earlier cultures.

If we are then to view Greefswald against the wider background of the Iron Age of sub-Saharan Africa, it does appear to occupy an unusual position. Examining the evidence of Table 12.1, a general hypothesis can be formulated which suggests that the place of domesticated animals in Iron Age economies has a long history, 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 Malawi and Zambia, remained heavily dependent on hunting as a source of food. The other group, identified in East Africa, Zambia, Rhodesia and South Africa, kept herds and flocks which appear to have increased in importance with the passage of time. Why this increase occurred we do not know; possibly this was a period of peaceful sedentarism during which a group could build up its reserves of domesticated animals in such a way that it was possible to utilise them as a stabilising

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factor within their economic and social structure. Within this group, larger centres developed which were the fore-runners of the Zimbabwe complex; these centres 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. The present study suggests that an example of such a centre can be found south of the Limpopo, in the tri-partite settlement of the Greefswald complex. Greefswald can thus be regarded as a cultural "capital" or settlement with a high social prestige in the Northern Transvaal during the first few centuries of the second millennium A.D.

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APPENDIX 1

IDENTIFICATION OF TERRESTRIAL AND FRESHWATER MOLLUSCA FROM GREEFSWALD

The following species of terrestrial and freshwater mollusca have been identified in the Greefswald collection. The information given here is quoted direct from correspondence with specialists, to whom I am 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, late of the Bilharzia Research Unit, Nelspruit, and now in Australia.

TERRESTRIAL MOLLUSCA

K2/TS1/1.
(Identified by AVB) *Succinea badia* (Morelet 1868)
Pupoides calaharicus (Boettger 1886)
Xerocerastus burchelli (Gray 1834)
Curvella transvaalensis n.s p.
Archachatina
Achatina immaculata

K2/TS2/1
(Identified by AVB) *Pupoides calaharicus*
Xerocerastus burchelli
Curvella transvaalensis

K2/TS3/1
(Identified by AVB) *Succinea badia*
Pupoides calaharicus

K2 (All trenches)
(Identified by AVB) *Succinea badia*
Pupoides calaharicus
Xerocerastus burchelli
Curvella transvaalensis
Opeas lineare

MST

MST/K8

Pupoides calaharicus
Xerocerastus burchelli
Curvella transvaalensis n.s p.

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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 a kind of 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*: "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 (eg. snuff) (when) they are stoppered with wads of moss or other material."

FRESHWATER MOLLUSCA

K2/TS1/1 — *Melanoides tuberculata* (Müller 1774) (AVB)
Unio caffer Krauss (AVB)

K2/TS3/1/1134; TS3/3/1437; TS3/ /1563. *Corbicula africana* Krauss 1848 (I dent. AVB):

TS3/2190; TS3/13; TS3/8/1872. *Unio caffer* Krauss (I dent. AVB)

TS3/1; TS3/3/1438; TS3/14/2265. *Aspatheria (Spathopsis) wahlbergi* (Ident. AVB):

K2/All tranches (Ident. AVB) — *Melanoides tuberculata*
Pyrgophysa forskallii (Ehrenberg, 1831)

MST/K8 — *Melanoides tuberculata* (AVB)
Bulinus sp. (AVB)

MST/K8/2(ii)/436, MST/K8/4/500; MST/K8/5/13; MST/K8/6/533; MST/K8/7/591 — *Aspatheria (Spathopsis) wahlbergi* (AVB):

MST/K8/4/500 — *Unio caffer* (CA)

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."

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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 Greefswald 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 how useful such tiny organisms can be underlines again the necessity for retaining all material from an archaeological excavation, and the necessity of an interdisciplinary approach in archaeology.

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APPENDIX 3

TABLES

Please note: (1) c.f. indicates that a specimen has, after comparison, proved to be most similar to the species then named. This prefix implies that insufficient of the specimen remained to allow it to be definitely identified as belonging to that species.

(2) In those tables in which the bone material is divided according to damage, burning etc., some specimens occur twice, i.e. in more than one column. Thus the column and row totals and percentages do not add up to the same amount.

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Table number	Caption
1.1	Greefswald: Vegetation species listed by Acocks.
1.2	Greefswald: Mamal species listed by Rautenbach.
3.1	Relative frequency of Bov. I, II and III in TS/2 using three methods of analysis. Calculated M.IND. values are given in brackets.
4.1	K2/TS1. Minimum numbers of individuals per species.
4.2	K2/TS1. Total bone sample.
4.29	K2/TS1/Level 5. Bone flakes.
4.31	K2/TS2. Total bone sample.
4.30	K2/TS2. Minimum numbers of individuals per species.
4.53	K2/TS3. Minimum number of individuals per species.
4.54	K2/TS3. Total bone sample.
4.91	K2/TS4. Minimum number of individuals per species.
4.92	MST/K8. Minimum number of individuals per species.
4.131	MK1. Minimum number of individuals per species.
4.132	MK1. Total bone sample.
4.135	MK1/Level 2. Total bone sample.
4.136	Length of right $M\bar{3}$ and M3 of warthogs.

5/1 ..

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Table number	Caption
5.1	K2/TS1. Economic activities on the basis of M.IND.
5.2	K2/TS2. Economic activities on the basis of M.IND.
5.3	K2/TS3. Economic activities on the basis of M.IND.
5.4	MST/K8. Economic activieties on the basis of M.IND.
5.5	MK1, Phases 3 and 4 Economic activities on the basis of M.IND.
5.6	MK1, Phase 2. Economic activities on the basis of M.IND.
5.8	Live weights and meat weights for animals contributing to the Greefswald economy.
5.7	Identified species present in the Greefs= wald excavations.
5.9	K2/TS1. Meat contribution to diet by animals on basis of economic activities.
5.10	K2/TS2. Meat contribution to diet by animals on basis of economic activities.
5.11	K2/TS3. Meat contribution to diet by animals on basis of economic activities.
5.12	MST/K8. Meat contribution to diet by animals on basis of economic activities.

5.13 ..

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5.13 MK1. Meat contribution to diet by animals on basis of economic activities

6.1 Basis for identification of material identified as sheep or goat from all excavations

6.2 Tooth eruption patterns for sheep and goats (Noddle and Silver)

6.3 Epiphysial fusion in cattle, sheep and goats (Silver and Noddle)

6.4 Unfused epiphyses of *Ovis/Capra* sp. in TS1 and TS2/2

6.5 Age classes of *Ovis/Capra* in each excavation on basis of tooth eruption and wear

6.6 Tooth eruption patterns for *B. taurus* (Silver, Sisson and Steenkamp)

6.7 Age classes of *B. taurus* in each excavation on basis of tooth eruption and wear according to M.IND.

6.8 Horn core and sinus cavity dimensions in *B. taurus*

6.9 Measurements of *B. taurus* metapodials

6.11 Means of maxillary tooth row measurements of *B. taurus*

6.10 Mandibular and maxillary measurements of *B. taurus* from Greefswald and from unimproved breeds

6.12 Provenance of canid material

6.14 Comparison of K2/TS4 and SR/5 with *L. pictus*

6.13 Measurements of canid skulls

6.15 Pre-European canids compared with Potter (1934)

9.1 K2/TS2. Horizontal distribution of bone flakes in levels 1 and 2

9.2 MK1. Horizontal distribution of waste bone and bovid post-cranial parts in Level 10

9.3 Density of identified bone in relation to the depth of excavations

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9.4 Relative proportions of axial/appendicular remains in K2/TS1

9.5 Relative proportions of axial/appendicular remains in MST and MK1

9.6 Preservation of skeletal parts at four Bushman camps

9.7 MK1/11. Size categories of bovid skeletal parts

10.1 Distribution of bone tool types from Greefswald assemblage

10.2 Vertical distribution of bone tools

10.3 The occurrence of ivory at Greefswald

11.1 Distribution of clay animal figurines

12.1 Summary of faunal evidence within the Iron Age of sub-Saharan Africa

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TABLE 1 :1.

GREEFSWALD: VEGETATION SPECIES LISTED BY ACOCKS

National tree number	SPECIES
	A. Mopani veld
198	*Colophospermum mopane* (Mopani)
188	*Acacia tortilis* subsp. *heteracantha* (Haak-en-steek)
178	*Acacia nigrescens* (Knoppiesdoring)
	Other *Acacia* sp.
532	*Combretum apiculatum* (Rooibos, red bush willow)
360	*Sclerocarya caffra* (Marula)
190	*Dichrostachys cinerea* subsp. *africana*
	Cadaba termitaria
203	*Schotia capitata*
127	*Boscia foetida* subsp. *rehmanniana*
122	*Boscia albitrunca*
212	*Cassia abbreviata* subsp. *beareana*
	Commiphora spp.
	Grewia spp.
	Ximenia spp.
	Lycium spp.
550	*Terminalia prunioides* (Sterkbos)
467	*Adansonia digitata* (Baobab)

B. Grasses

Anthephora pubescens	*Chloris roxburghiana*
Brochiaria nigropedata	*Tricholaena monachne*
Bothriochloa insculpta	*Cenchrus ciliaris*
Eragrostis superba	*Panicum maximum*
Eragrostis nindensis	*Digitaria ariantha*
Schmidtia pappophoroides	*Neorautaneria* sp.
Heteropogon contortus	*Enneapogon Cenchroides*
Stipagrostis uniplumis	
Aristida congesta subsp. *barbicollis*	

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C. Riverine Vegetation

172 *Acacia karroo* (Soetdoring)

188 *Acacia tortilis* subsp. *heteracantha* (Haak-en-steek)

176 *Acacia mellifera* subsp. *detinens*

164 *Acacia erubescens*

Panicum maximum

127 *Boscia foetida* subsp. *rehmanniana*

122 *Boscia albitrunca*

285 *Commiphora pyrocanthoides*

550 *Terminalia prunioides* (Sterkbos)

226 *Mundelea sericea* (Blou ertjies boom)

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TABLE 1.:2

GREEFSWALD: MAMMAL SPECIES LISTED BY RAUTENBACH

■ = Collected ▲ = Sighted ● faunal sample

Phylum: CHORDATA

Class: Mammalia

Order: Macroscelidae

■ *Elephantulus myurus* (Naked-tail elephant shrew)

Order: Chiroptera

■ *Epomophorus wahlbergi* (Wahlberg's epauletted fruit bat)

■ *Epomophorus crypturus* (Peter's epauletted fruit bat)

■ *Nycteris thebaica* (Egyptian slit-faced bat)

■ *Rhinolophus hildebrandti* (Hildebrandt's horseshoe bat)

■ *Rhinolophus darlingi* (Darling's horseshoe bat)

Order: Primates

■ *Galago crassicaudatus* (Grand galago)

■ *Galago senegalensis* (Lesser galago)

● ▲ *Papio ursinus* (Baboon)

■ *Cercopithecus aethiops* (Vervet monkey)

Order: Carnivora

▲ *Otocyon megalotis* (Bat eared fox)

● ▲ *Canis mesomelas* (Black-backed jackal)

▲ *Ichtonyx striatus* (Polecat)

▲ *Viverra civetta* (Civet)

■ *Genetta rubiginosa* (Rusty spotted genet)

■ *Herpestes sanguineus* (Slender mongoose)

▲ *Mungos mungo* (Banded mongoose)

■ *Helogale parvula* (Dwarf mongoose)

▲ *Felis lybica* (Cape wild cat)

▲ *Felis serval* (Serval cat)

▲ *Felis caracal* (Lynx)

▲ *Panthera pardus* (Leopard)

▲ *Panthera leo* (Lion)

▲ *Acinonyx jubatus* (Cheetah)

Order: Tubulidentata

▲ *Orycteropus afer* (Aardvark)

Order: Proboscidae

● ▲ *Loxodonta africana* (Elephant)

● Order: Hyracoidea

■ *Procavia capensis* (Rock hyrax)

■ *Heterohyrax brucei* (Yellow spotted dassie)

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Order: Perissodactyla

Equus burchelli (Zebra)

Order: Artiodactyla

Potamochoerus porcus (Bushpig)

Phacochoerus aethiopicus (Warthog)

Hippopotamus amphibius (Hippopotamus)

Sylvicapra grimmia (Grey duiker)

Raphicerus campestris (Steenbok)

Raphicerus melanotis (Grysbok)

Oreotragus oreotragus (Klipspringer)

Redunca fulvorufula (Mountain reedbuck)

Kobus elipsiprymnus (Waterbuck)

Aepyceros melampus (Impala)

Connochaetes taurinus (Blue wildebeest)

Tragelaphus scriptus (Bushbuck)

Tragelaphus strepsiceros (Kudu)

Taurotragus oryx (Eland)

Order: Lagomorpha

Lepus capensis (Cape hare)

Lepus saxtilis (Scrub hare)

Pronolagus randensis (Natal red hare)

Order: Rodentia

Hystrix africaeaustralis (Porcupine)

Thryonomus swinderianus (Cane rat)

Paraxerus cepapi (Tree squirrel)

Pedetes capensis (Springhare)

Acomys spinosissimus (Spiny mouse)

Aethomys namaquensis (Rock rat)

Aethomys chrysophilus (African (bush) rat)

Tatera leucogaster (Bushveld gerbil)

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TABLE 3.1. Relative frequency of Bov.I, II and III in TS2 using three methods of analysis. Calculated M.IND. values are given in brackets.

LEVEL	METHOD	BOV.I r.f.	SHEEP/GOAT r.f.	CATTLE r.f.
TS2/1	PERKINS	0,23	0,39	0,38
	M.IND.	0,14 (3)	0,36 (8)	0,5 (11)
	SKELETAL PART	0,05	0,36	0,59
TS2/2	PERKINS	0,21	0,35	0,43
	M.IND.	0,15 (6)	0,47 (19)	0,37 (15
	SKELETAL PART	0,12	0,37	0,51
TS2/3	PERKINS	0,22	0,37	0,41
	M.IND.	0,05 (1)	0,42 (8)	0,53 (10
	SKELETAL PART	0,06	0,55	0,4
TS2/4	PERKINS	0,37	0,25	0,38
	M.IND.	0,1 (1)	0,5 (5)	0,4 (4)
	SKELETAL PART	0,1	0,43	0,47

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TABLE 4 : 1

K2/TS1. MINIMUM NUMBERS OF INDIVIDUALS PER SPECIES

Figures in brackets indicate number of immature individuals

SPECIES	LEVEL									
PHYLUM CHORDATA	1	5.1.2	5.1.3	6.1.3	2	3	4	5	TOTAL	PERCENTAGE OF M.IND.
CLASS MAMMALIA										
A. DOMESTICATED										
ORDER ARTIODACTYLA										
Family Bovidae										
Bos taurus	10(3)	2(1)	2	1	5(2)	4(2)	3(1)	1	28(9)	18,9
Ovis/Capra sp.	7(2)	2	1	0	7(2)	6(1)	4(3)	3(1)	30(9)	20,3
TOTAL M.IND. DOMESTICATED	17(5)	4(1)	3	1	12(4)	10(3)	7(4)	4(1)	58(18)	39,2 (12,2)
B. NON-DOMESTICATED										
ORDER HYRACOIDEA										
Family Procaviidae	0	0	0	0	1	0	0	0	1	0,7
ORDER ARTIODACTYLA										
Family Suidae										
Potamochoerus porcus	1	0	0	0	0	0	0	0	1	0,7
Family Bovidae										
Sylvicapra grimmia	1	0	0	0	0	0	0	0	1	0,7
Aepyceros melampus	1	0	0	0	0	0	0	0	1	0,7
Bov.I	2	1(1)	0	0	1(1)	1	2	1	8(2)	5,4
ORDER LAGOMORPHA										
Family Leporidae										
Lepus capensis/L. saxatilis	1	0	0	0	1	0	0	0	2	1,4
Pronolagus randensis	0	0	0	0	0	1	0	0	1	0,7
Indet. lagomorph	0	0	0	0	0	0	1	0	1	0,7
ORDER RODENTIA										
Family Bathyergidae										
Cryptomys sp.	0	0	0	0	0	0	1	0	1	0,7
Family Pedetidae										
Pedetes capensis	1	0	0	0	1	0	0	0	2	1,4
Family Muridae										
Aethomys chrysophilus	1	0	0	0	5	1(1)	1	1	9(1)	6,1
Praomys natalensis	1	0	0	0	5	0	1	1	8	5,4
Otomys sp.	0	0	0	0	1	0	0	0	1	0,1
Indet. rodent	2(1)	0	0	0	0	0	0	0	2(1)	1,4
Indet. large mammal	1	0	0	0	0	0	0	0	1	0,7
Indet. (medium) mammal	0	0	0	0	1	1(1)	1(c.f. carnivore)	0	3(1)	2,0
Indet, small mammal	0	0	0	0	1	0	1	1(1)	3(1)	2,0
CLASS AVES										
Family Struthionidae										
Struthio camelus	1	0	0	0	1	0	0	0	2	1,4
Family Estrildinae	1	0	0	0	0	0	0	0	1	0,7
Guinea-fowl sized bird	0	0	0	0	1	1	1	1	4	2,7
Raptor- large owl sized bird	0	0	0	0	1	0	0	0	1	0,7
Indeterminate small bird	0	0	0	0	1	0	1	0	2	1,4
CLASS REPTILIA										
ORDER CHELONIA										
Family Testudinidae	0	0	0	0	0	1	0	0	1	0,7
Tortoise										
ORDER SQUAMATA										
Family Gekkonidae	1	0	0	0	1	0	0	0	2	1,4
Indeterminate small lizard	1	0	0	0	1	0	0	0	2	1,4
SUB-ORDER SERPENTES										
Adder-sized snake	0	0	0	0	1	0	0	0	1	0,7
CLASS OSTEICHTHYES										
Family Clariidae										
Clarias sp.	0	0	0	0	0	0	1	0	1	0,7
Indeterminate small fish	0	0	0	0	0	1	1	0	2	1,4
PHYLUM MOLLUSCA										
CLASS GASTROPODA										
Family Achatinidae										
Achatina immaculata	7	0	1	0	4	2	1	1	16	10,8
Family Cypraeadae										
Cypraea annulus	1	0	0	0	0	1	2	2	6	4,1
CLASS PELECYPODA										
Family Unionidae	1	0	0	0	0	0	0	0	1	0,7
Indeterminate bivalve	0	0	0	0	0	0	1	0	1	0,7
Indeterminate mollusc	0	0	0	0	0	0	1	0	1	0,7
TOTAL M.IND NON-DOMESTICATED	25	1	1	0	28	10	17	8	90	60,8
TOTAL M.IND.	42	5	4	1	40	20	24	12	148	
NO. OF SPECIES	20	4	4	1	20	12	18	10	36	

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TABLE 4 : 2

K2/TS1 TOTAL BONE SAMPLE

% of level sample

SKELETAL PART	LEVEL 1		5.1.2		5.1.3		6.1.3		2		3		4		5		TOTAL	% of total sample
	No.	%	No.	%	No.	%	No.	%	No.	%	No	%	No	%	No	%		
Isolated bovid teeth	95	1,75	13	8,55	10	2,76	0	0	105	1,81	51	3,21	31	2,50	2	0,45	307	2,04
Bovid tooth rows	1	0,02	1	0,66	1	0,28	0	0	4	0,06	5	0,32	3	0,24	2	0,45	17	0,11
Bovid skeletal parts	304	5,55	14	9,21	26	7,16	1	9,09	529	9,11	116	7,30	70	5,65	31	6,95	1097	7,27
Other identified remains	101	1,81	0	0	2	0,55	0	0	85	1,46	17	1,07	25	2,02	17	3,81	247	1,64
Skull fragments	589	10,75	18	11,84	34	9,37	0	0	445	7,66	154	9,69	39	3,15	20	4,48	1299	8,61
Vertebral fragments	248	4,53	14	9,21	27	7,44	0	0	569	9,8	153	9,63	100	8,07	34	7,62	1145	7,59
Rib fragments	459	8,38	23	15,13	28	7,71	3	27,27	739	12,72	250	15,73	150	12,11	88	19,73	1734	11,49
Miscellaneous skeletal parts	1395	25,46	69	45,4	151	41,6	5	45,46	2186	37,63	540	33,98	518	41,81	172	38,57	5036	33,38
Bone flakes	2288	41,76	0	0	84	23,14	2	18,18	1147	19,75	303	19,07	302	24,38	80	17,94	4206	27,88
TOTAL	5480		152		363		11		5809		1589		1238		446		15088	
Percentage of total sample		36,32		1,01		2,41		0,07		38,50		10,53		8,21		,96		

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TABLE 4 : 29

K2/TS1/LEVEL 5 BONE FLAKES

SIZE (cm)	DAMAGED No.	BURNT No.	GNAWED No.	WEATHERED No.	UNMODIFIED No.	TOTAL No.	%
0-1	-	-	-	-	-	-	-
1-2	1	-	1	1	6	9	11,25
2-3	-	3	4	2	9	18	22,5
3-4	1	1	-	6	11	18	22,5
4-5	3	2	-	2	11	18	22,5
5-6	-	-	-	2	5	7	8,75
6-7	-	-	-	1	3	4	5,0
7-8	1	-	-	-	2	3	3,75
8-9	-	-	-	-	-	-	-
9-10	-	-	-	1	-	1	1,25
10-11	-	-	-	-	-	-	-
11-12	-	-	-	-	-	-	-
12-13	-	-	-	-	1	1	1,25
13-14	-	-	-	-	-	-	-
14-15	-	-	-	-	-	-	-
15-16	-	-	-	-	-	-	-
16-17	-	-	-	-	1	1	1,25
TOTAL	6	6	5	15	49	80	
% of flake sample	7,5	7,5	6,25	18,75	61,25		

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TABLE 4:31

K2/TS2 TOTAL BONE SAMPLE

% a = Percentage of bone sample from level

% b = Percentage of total bone sample

LEVEL	BOVID TEETH		BOVID TOOTH ROWS		BOVID SKELETAL PARTS		OTHER IDENTIFIED REMAINS		SKULL FRAGMENTS		VERTEBRAL FRAGMENTS		RIB FRAGMENTS		MISCELLAN. SKELETAL PARTS		BONE FLAKES		T O T A L	
	No.	%a	No.	%a	No.	%a	No.	%a	No.	%a	No.	%a	No.	%a	No.	%a	No.	%a	No.	%(b)
LEVEL 1	128	1,47	9	0,10	409	4,69	47	0,54	550	6,31	201	2,31	382	4,38	1207	13,85	5785	66,36	8718	33,69
2	238	2,5	23	0,24	864	9,07	113	1,19	623	6,54	336	3,53	822	8,63	1749	18,36	4756	49,94	9524	36,8
2(i)	3	1,1	0	0	21	7,6	3	1,1	30	10,83	0	0	31	11,2	31	11,2	158	57,0	277	1,07
2(ii)	1	14,29	0	0	0	0	6	85,71	0	0	0	0	0	0	0	0	0	0	7	0,03
3	130	3,09	15	0,36	324	7,69	68	1,61	426	10,11	217	5,15	454+1	10,78	752	17,85	1826	43,35	4212	16,28
3(a)	15	4,79	3	0,96	40	12,78	1	0,32	18	5,75	16	5,11	31	9,90	77	24,60	112	35,78	313	1,21
3 (Grave)	4	1,79	1	0,45	3	1,35	1	0,45	12	5,38	13	5,83	14	6,28	103	46,19	72	32,29	223	0,86
3(i)	0	0	0	0	2	25,0	0	0	0	0	1	12,5	1	12,5	0	0	4	50,0	8	0,03
4	49	2,99	5	0,31	118	7,2	31	1,89	124	7,56	60	3,66	143	8,72	338	20,61	772	47,07	1640	6,34
4(a)	1	0,26	2	0,51	43	10,94	2	0,51	16	4,07	42	10,69	46	11,71	172	43,77	69	17,56	393	1,52
4(b)	18	10,76	0	0	0	0	0	0	0	0	0	0	0	0	21	12,58	128	76,65	167	0,65
4(c)	0	0	0	0	36	10,47	4	1,16	38	11,05	6	1,74	38	11,05	143	41,57	79	22,97	344	1,33
4(i)	2	3,92	0	0	4	7,84	0	0	16	31,37	1	1,96	2	3,92	18	35,29	8	15,69	51	0,2
TOTAL	589		58		1864		276		1853		893		1964		4611		13769		25877	
Percentage (b)	2,28		0,22		7,2		1,07		7,16		3,45		7,59		17,82		53,21			

+ 1 specimen utilized

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TABLE 4.30

F2/TS2 MINIMUM NUMBERS OF INDIVIDUALS PER SPECIES

Figures in brackets indicate number of immature individuals

SPECIES	1	2	2(i)&(ii)	3	3a	3(Grave) and 3(i)	4	4(a)&(b)	4(c)&(1)	TOTAL	% CONTRIBUTION
PHYLUM CHORDATA											
CLASS MAMMALIA											
A. DOMESTICATED											
ORDER CARNIVORA											
Family Canidae											
Canis familiaris	0	1	0	0	0	0	0	0	0	1	0,5
ORDER ARTIODACTYLA											
Family Bovidae											
Bos taurus	11(5)	16(5)	2; 1(2ii)	13(5)	4(1)	1	5(1)	2(1); 2(4b)	1 1(4i)	58(18)	26,7
Bos taurus var. Zebu	0	2(1)	0	1	0	0	0	0	0	3(1)	1,4
Bos taurus var. Sanga	0	1	0	0	0	0	0	0	0	1	0,5
Ovis aries	1(cf)	1	0	2(1)	0	0	0	0	0	4(1)	1,8
Capra hircus	1	2(1)	0	0	0	0	0	1	0	4(1)	1,8
Ovis/Capra sp.	6(3)	16(3)	1	7(2)	3	1(1) 1(3i)	5(2)	3(3) 5(1)(4b)	4(1) 1(4i)	53	24,4
TOTAL M.IND. DOMESTICATED	19(8)	39(10)	3 1(2(ii)	22(8)	7(1)	2(1) 1(3i)	10(3)	6(4) 7(1)(4b)	5(1) 2(4i)	124 (37)	57,1 (17,1)
Family Varanidae											
Varanus sp.	1	1	0	0	0	0	0	0	0	2	0,9
ORDER CROCODILIA											
Family Crocodilidae											
Crocodylus niloticus	1	0	0	0	0	0	0	0	0	1	0,5
CLASS OSTEICHTHYES											
Family Clariidae											
Clarias sp.	1	0	0	0	0	0	0	0	0	1	0,5
Indeterminate small fish	0	0	0	1	0	0	1	0	0	2	0,9
PHYLUM MOLLUSCA											
CLASS GASTROPODA											
Family Achatinidae											
Achatina immaculata	5	10	1	1	0	1	1	1	1	21	9,7
Family Cypraeadae											
Cypraea annulus	0	2	0	0	0	0	0	0	0	2	0,9
Indeterminate marine mollusc	0	0	0	0	1	0	0	0	0	1	0,5
CLASS PELECYPODA											
Indeterminate bivalve	1	1	0	2	0	0	1	0	1	6	2,8
TOTAL NON-DOMESTICATED	22	35(4)	2;(2ii)	15	2	2	7(2)	2	5	93	42,9
TOTAL M.IND.	41	74	7	37	9	5	17	15	12	217	
NO. OF SPECIES	18	20	5	17	5	5	10	5	8	34	

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TABLE 4.30

F2/TS2 MINIMUM NUMBERS OF INDIVIDUALS PER SPECIES

Figures in brackets indicate number of immature individuals

SPECIES	1	2	2(i)&(ii)	3	3a	3(Grave) and 3(i)	4	4(a)&(b)	4(c)&(1)	TOTAL	% CONTRIBUTION
PHYLUM CHORDATA											
CLASS MAMMALIA											
A. DOMESTICATED											
ORDER CARNIVORA											
Family Canidae											
Canis familiaris	0	1	0	0	0	0	0	0	0	1	0,5
ORDER ARTIODACTYLA											
Family Bovidae											
Bos taurus	11(5)	16(5)	2; 1(2ii)	12(5)	4(1)	1	5(1)	2(1); 2(4b)	1 1(4i)	58(18)	26,7
Bos taurus var. Zebu	0	2(1)	0	1	0	0	0	0	0	3(1)	1,4
Bos taurus var. Sanga	0	1	0	0	0	0	0	0	0	1	0,5
Ovis aries	1(cf)	1	0	2(1)	0	0	0	0	0	4(1)	1,8
Capra hircus	1	2(1)	0	0	0	0	0	1	0	4(1)	1,8
Ovis/Capra sp.	6(3)	16(3)	1	7(2)	3	1(1) 1(3i)	5(2)	3(3) 5(1)(4b)	4(1) 1(4i)	53	24,4
TOTAL M.IND. DOMESTICATED	19(8)	39(10)	3 1(2(ii)	22(8)	7(1)	2(1) 1(3i)	10(3)	6(4) 7(1)(4b)	5(1) 2(4i)	124 (37)	57,1 (17,1)
B. NON-DOMESTICATED											
ORDER PRIMATES											
Family Cercopithecoidea											
Papio sp.	0	1	0	0	0	0	0	0	0	1	0,5
Family Hominidae											
Homo sapiens sapiens	0	0	1(2ii)	0	0	0	0	0	0	1	0,5
ORDER CARNIVORA											
Jackal-sized carnivore	1	0	0	0	0	0	0	0	0	1	0,5
Hunting dog-sized carnivore	0	1	0	0	0	0	0	0	0	1	0,5
Large carnivore, larger than cheetah	0	0	0	0	0	0	0	0	1	1	0,5
ORDER PROBOSCIDAE											
Family Elephantidae											
Loxodonta africana	1	1	0	1	0	0	1	0	1	5	2,3
ORDER PERISSIODACTYLA											
Family Equidae											
Equus burchelli	0	0	0	1	0	0	0	0	0	1	0,5
ORDER ARTIODACTYLA											
Family Suidae											
Indeterminate suid	0	1	0	1	0	0	0	0	0	2	0,9
Family Hippopotamidae											
Hippopotamus amphibius	1	0	0	0	0	0	0	0	0	1	0,5
Family Bovidae											
Sylvicapra grimmia	1	0	0	0	0	0	0	0	0	1	0,5
Aepyceros melampus	0	0	0	0	1	0	0	0	0	1	0,5
Connochaetes sp.	0	1	0	0	0	0	0	0	0	1	0,5
Bov.I	3	6(3)	1	1	0	0	1(1)	0	1	13	6,0
ORDER LAGOMORPHA											
Family Leporidae											
Lepus saxtilis or*L.capensis*	1	0	0	1	0	0	0	0	0	2	0,9
Indeterminate lagomorph	1	1	0	0	0	0	0	1	0	3	1,4
ORDER RODENTIA											
Family Muridae											
Indeterminate rodent	0	0	0	1	0	0	0	0	0	1	0,5
Indeterminate mammal	1	4(1)	0	1	0	0	(1)	0	0	7	3,2
CLASS AVES											
Family Struthionidae											
Struthio camelus	1	1	0	0	0	0	0	0	0	2	0,9
Vulture/goose-sized bird	0	0	0	0	0	1	0	0	0	1	0,5
Guinea-fowl sized bird	1	1	0	1	0	0	0	0	0	3	1,4
Small bird	0	1	0	1	0	0	0	0	0	2	0,9
CLASS REPTILIA											
ORDER CHELONIA											
Tortoise	0	2	0	1	0	0	1	0	0	4	1,8
ORDER SQUAMATA											
Puffadder/python-sized snake	1	0	0	0	0	0	0	0	0	1	0,5
Indeterminate small snake	0	0	0	1	0	0	0	0	0	1	0,5
ORDER SAURIA											
Family Varanidae											
Varanus sp.	1	1	0	0	0	0	0	0	0	2	0,9
ORDER CROCODILIA											
Family Crocodilidae											
Crocodylus niloticus	1	0	0	0	0	0	0	0	0	1	0,5
CLASS OSTEICHTHYES											
Family Clariidae											
Clarias sp.	1	0	0	0	0	0	0	0	0	1	0,5
Indeterminate small fish	0	0	0	1	0	0	1	0	0	2	0,9
PHYLUM MOLLUSCA											
CLASS GASTROPODA											
Family Achatinidae											
Achatina immaculata	5	10	1	1	0	1	1	1	1	21	9,7
Family Cypraeadae											
Cypraea moneta	0	2	0	0	0	0	0	0	0	2	0,9
Indeterminate marine mollusc	0	0	0	0	1	0	0	0	0	1	0,5
CLASS PELECYPODA											
Indeterminate bivalve	1	1	0	2	0	0	1	0	1	6	2,8
TOTAL NON-DOMESTICATED	22	35(4)	2;(2ii)	15	2	2	7(2)	2	5	93	42,9
TOTAL M.IND.	41	74	7	37	9	5	17	15	12		
NO. OF SPECIES	18	20	5	17	5	5	10	5	8	34	

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TABLE 4 : 53

K2/TS3. M.IND. OF SPECIES
NUMBER OF JUVENILES GIVEN IN BRACKETS

SPECIES LEVELS	1	2	3	4	5	5(i)	5(ii)	6	7	8	9	9.2.1	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL	% of sample
PHYLUM CHORDATA																													
CLASS MAMMALIA																													
A. DOMESTICATED																													
ORDER CARNIVORA																													
Family Canidae																													
Canis familiaris	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0,2
ORDER ARTIODACTYLA																													
Family Bovidae																													
Bos taurus	8(4)	8(3)	5(2)	4(2)	2(1)	1	3(1)	10(2)	8(2)	9(3)	9	4(1)	5(2)	3(1)	3(2)	7(3)	5(1)	3	2(1)	2	3	1	2	5(3)	3(1)	2(1)	(1)	118(39)	22,9
B. taurus var. Zebu	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	0,4
Capra hircus	1	1	1	0	0	0	0	5	1	2	3(1)	0	3	1	0	1	2	1	0	0	1c.f.	1	1	2	1	0	0	28(1)	5,4
Ovis aries	0	0	0	0	0	0	0	2(1)	1	2	2(1)	1	2(1)	0	0	0	0	0	0	0	1c.f.	0	(1)	3	1	1	0	17(4)	3,3
Ovis/Capra sp.	6	7	4(2)	4(1)	5(2)	1	5(1)	9(2)	8(3)	12(1)	6(1)	(1)	5(2)	5	7(2)	6(2)	5	4(2)	5(1)	3	5(1)	5(1)	6(1)	6(3)	6(2)	1	1	138(31)	26,8
TOTAL DOMESTICATED	15(4)	16(3)	10(4)	8(3)	7(3)	2	8(2)	26(5)	19(5)	25(4)	20(5)	6(2)	16(5)	9(1)	10(4)	14(5)	12(1)	8(2)	7(2)	5	10(1)	7(1)	10(2)	17(6)	11(3)	4(1)	2(1)	304(75)	59,0
B. NON DOMESTICATED																													
ORDER LIPOTYPHLA																													
Family Soricidae																													
Suncus lixus	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0,2
ORDER PRIMATES																													
Family Hominidae																													
Homo sapiens sapiens	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0,4
ORDER CARNIVORA																													
Family Canidae																													
Canis mesomelas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0,2
Lycaon pictus	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2	0,4
Family Hyaenidae																													
Crocuta crocuta or *Hyaena brunnea*	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0,4
Jackal sized canid	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	3	0,6
Hunting dog sized canid	0	0	0	0	0	0	0	0	0	1	0	0	(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0,4
Indeterminate canid	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0,2
Family Felidae																													
Indeterminate small felid	0	0	0	0	0	0	0	0	0	0	(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0,2
Indet. small carnivore	0	0	0	0	0	0	0	0	0	0	0	0	(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0,2
Indet. medium carnivore	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0,2
ORDER PROBOSCIDAE																													
Family Elephantidae																													
Loxodonta africana	0	0	1	1(?1)	1	0	0	1	0	1	1	0	(1)	0	0	1	0	1	0	1	1	1	1	0	0	1	0	0	13	2,5
ORDER HYRACOIDEA																													
Family Procaviidae	0	0	1	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	7	1,4
ORDER ARTIODACTYLA																													
Family Suidae																													
Phacochoerus aethiopicus	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0,2
Indet. suid	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0,2
Family Bovidae																													
Sylvicapra grimmia	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3	0,6
Aepyceros melampus	2 c.f.	0	3	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	1,2
Bov.I	2	3(2)	1	1	1	0	0	2	1	2(1)	1	0	3	1	1	1	1	1	1	1	1	0	0	(2)	1	1	0	29	5,6
ORDER LAGOMORPHA																													
Family Leporidae																													
Lepus saxatilis or *L. capensis*	1	0	2	0	0	0	0	2	1	2(1)	1	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	11	2,1
Lagomorph	1	2	1	2(1)	1	(1)	1	2	1	1	1	0	1	0	0	1	1	0	0	0	1	0	0	0	0	0	0	18	3,5
ORDER RODENTIA																													
Family Muridae																													
Praomys natalensis	0	0	0	0	0	0	0	0	1c.f.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0,2
Indet. rodent	0	0	1	0	0	0	0	(1)	0	0	0	0	0	0	0	1	0	0	0	0	0	(1)	0	0	0	0	0	4	0,8
Indet. mammal	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0,4
CLASS AVES																													
Family Struthionidae																													
Struthio camelus	0	0	0	0	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	6	1,2
Guinea-fowl sized bird	1	1	1	0	1	0	1	1	1	2(1)	1	0	1	0	0	0	1	0	0	0	1	1	0	0	0	0	0	14	2,7
Large (blue crane) sized bird	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0,2
Indet. small bird	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0,2
CLASS REPTILIA																													
ORDER CHELONIA																													
Family Testudinidae																													
Tortoise	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0,2
Family Pelomedusidae																													
Terrapin	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0,2
ORDER SAURIA																													
Family Varanidae																													
Varanus sp.	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0,2
ORDER SQUAMATA																													
Family Serpentes																													
Python/Puffadder sized snake	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0,2
CLASS OSTEICHTHYES (PISCES)																													
Indet. fish	0	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4	0,8
PHYLUM MOLLUSCA																													
CLASS GASTROPODA																													
Family Achatinidae																													
Achatina immaculata	1	4	1	4	1	0	0	3	2	1	3	0	2	1	0	2	1	0	1	1	0	1	1	2	1	0	0	33	6,4
Family Cypraeadae																													
Cypraea annulus	1	2	2	2	2	0	0	0	2	2	3	0	1	2	0	0	0	1	1	1	0	0	0	0	0	0	0	22	4,3
Family Naticidae																													
Polynices tumidus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0,2
CLASS PELECYPODA																													
Family Unionidae																													
Aspatheria (Spathopsis) wahlbergi	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	3	0,6
Family Unionidae																													
Unio caffer	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0,4
Indet. bivalve	2	1	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	1,4
TOTAL NON DOMESTICATED	15	13(2)	19	13(1)	13	(1)	3	18(1)	12	17(2)	14(1)	0	15(3)	5	1	8	5	3	6	7	6	5(1)	2	5	3	1	1	211	41,0
NO. OF SPECIES	12	6	15	7	12	1	3	13	10	13	10	0	12	4	1	7	4	3	6	7	6	5	2	4	3	1	1	33	
TOTAL MINIMUM NO. OF INDIVIDUALS	30	29	29	21	20	3	11	44	31	42	34	6	31	14	11	22	17	11	13	12	16	12	12	22	14	5	3	515	
TOTAL NO. OF SPECIES	15	9	18	10	15	3	6	16	14	16	13		15	7	4	10	7	3	9	10	9	8	5	7	6	4	4	36	

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TABLE 5 :7

IDENTIFIED SPECIES PRESENT IN THE GREEFSWALD EXCAVATIONS

SPECIES	K2/TS1	K2/TS2	K2/TS3	TS4	MST/K8	MK1	TOTAL M.IND.
A. DOMESTICATED							
ORDER CARNIVORA							
Canis familiaris (domestic dog)	-	1	1	1	-	-	3
ORDER ARTIODACTYLA							
Bos taurus (cattle)	24	5	89	16	45	90	315
Bos taurus var. Zebu	-	3	2	-	-	2	7
Ovis aries (Sheep)	-	3	28	-	7	6	44
Capra hircus (Goat)	-	4	16	-	4	10	34
Ovis/Capra sp.	30	53	138	16	61	112	410
B. NON-DOMESTICATED							
ORDER LIPOTYPHLA							
Suncus lixus (Shrew)	-	-	1	-	-	-	1
ORDER PRIMATES							
Homo sapiens sapiens (Man)	-	1	2	-	2	-	5
Papio sp. (Baboon)	-	1	-	-	1	-	2
ORDER CARNIVORA							
Canis mesomelas (Black-backed jackal)	-	-	1	-	1	1cf.	3
Lycaon pictus (Cape Hunting Dog)	-	-	2	-	-	-	2
Hyaena brunnea (Brown hyaena)	-	-	-	-	-	1	1
Hyaenid	-	-	2	-	-	-	2
Carnivore	-	3	3	1	-	-	7
ORDER PROBOSCIDAE							
Loxodonta africana (African elephant)	-	5	13	1	-	-	19
ORDER HYRACOIDEA							
Hyrax	1	-	7	-	-	2	10
ORDER PERISSODACTYLA							
Equus burchelli (Burchell's zebra)	-	1	-	-	-	7	8
ORDER ARTIODACTYLA							
Family Suidae							
Phacochoerus aethiopicus (Warthog)	-	-	1	-	-	1	2
Potamochoerus porcus (Bushpig)	1	-	-	-	-	-	1
Suid	-	2	-	-	-	-	2
Hippopotamus amphibius (Hippo)	-	1	-	3	-	-	4
Sylvicapra grimmia (Grey duiker)	8	13	30	-	19	-	70
Oreotragus oreotragus (Klipspringer)	-	-	-	-	-	1	1
Aepyceros melampus (Impala)	1	1	6	-	-	-	8
Connochaetes sp. (Wildebeest)	-	1	-	-	-	-	1
ORDER LAGOMORPHA							
Lepus sp. (Hare)	3	4	20	-	7	9	43
Pronolagus randensis (Natal red hare)	1	-	-	3	-	-	4
ORDER RODENTIA							
Cryptomys sp.	1	-	-	-	-	-	1
Pedetes capensis (Spring hare)	2	-	-	-	-	-	2
Aethomys chrysophilus (African bush rat)	9	-	-	-	-	-	9
Praomys natalensis	8	-	1	-	-	-	9
Otomys sp.	1	-	-	-	-	-	1
Rodent	-	8	-	3	7	6	24
CLASS AVES							
Struthio camelus (ostrich)	2	2	6	3	1	1	15
Torgos tracheliotis (Lappet faced vulture)	-	-	-	-	-	1	1
Guinea-fowl sized bird	4	3	14	1	8	2	32
Other birds	4	3	2	4	7	1	21
CLASS REPTILIA							
Tortoise	1	4	1	-	5	-	11
Terrapin	-	-	1	-	-	1	2
Lizard	2	-	-	-	-	-	2
Snake	1	1	-	1	-	1	4
Varanus sp.	-	2	1	-	-	-	3
Crocodylus niloticus (Crocodile)	-	1	-	1	-	-	2
CLASS PISCES							
Clarias sp.	1	1	-	6	-	1	9
Indeterminate fish	2	-	4	-	-	1	7
ORDER CRUSTACEA							
Freshwater crab	-	-	-	1	-	-	1
CLASS GASTROPODA							
Achatina immaculata (Giant land snail)	16	21	33	8	14	16	108
Cypraea annulus (Ringed cowrie)	6	2	22	-	1	-	31
Polynices tumidus (Marine shell)	-	-	1	-	-	2	3
Nassarius kraussianus	-	-	-	-	1	-	1
CLASS PELECYPODA							
Unio caffer (Freshwater mussel)	-	-	2	-	1	-	3
Aspatheria wahlbergi	-	-	3	-	7	-	10
Corbicula africana	-	-	-	-	-	3	3
Indeterminate bivalve	3	6	-	-	-	17	26
NO. OF SPECIES	26	29	31	16	19	25	1
TOTAL M.IND	132	202	453	69	199	295	1350

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TABLE 4: 54
K2/TS3 TOTAL BONE SAMPLE
%a = % of sample of level %b = % of total bone sample

LEVEL	ISOLATED BOVID TEETH		BOVID TOOTH RONS		BOVID SKELETAL PARTS		OTHER IDENTIFIED REMAINS		SKULL FRAGMENTS		VERTEBRAL FRAGMENTS		RIB FRAGMENTS		MISCEL. SKELETAL PARTS		BONE FLAKES		TOTAL	%b
	No	%a	No.	%a	No.	%a	No.	%a	No.	%a	No.	%a	No.	%a	No.	%a	No.	%a	No.	
1	74	25,97	7	2,46	170	59,65	21	7,37	13	4,56	-	-	-	-	-	-	-	-	285	3,51
2	108	66,67	13	8,03	25	15,43	16	9,88	-	-	-	-	-	-	-	-	-	-	162	2,0
3	79	57,66	6	4,38	11	8,03	41	29,93	-	-	-	-	-	-	-	-	-	-	137	1,69
4	22	45,83	5	10,42	-	-	21	43,75	-	-	-	-	-	-	-	-	-	-	48	0,59
5	26	55,32	7	14,89	1	2,13	13	27,66	-	-	-	-	-	-	-	-	-	-	47	0,58
5(i)	1	33,33	1	33,33	-	-	1	33,33	-	-	-	-	-	-	-	-	-	-	3	0,04
5(ii)	22	75,86	3	10,35	-	-	4	13,79	-	-	-	-	-	-	-	-	-	-	29	0,36
6	57	10,33	25	4,53	342	61,96	29	5,25	99	17,94	-	-	-	-	-	-	-	-	552	6,8
7	61	54,96	13	11,71	4	3,60	33	29,73	-	-	-	-	-	-	-	-	-	-	111	1,37
8	68	42,24	24	14,91	25	15,53	44	27,33	-	-	-	-	-	-	-	-	-	-	161	1,98
9	80	51,95	20	12,99	24	15,58	30	19,48	-	-	-	-	-	-	-	-	-	-	154	1,9
9.2.1.	1	7,14	10	71,43	3	21,43	-	-	-	-	-	-	-	-	-	-	-	-	14	0,17
10	22	1,58	18	1,29	155	11,1	15	1,07	116	8,30	122	8,73	333	23,84	222	15,89	394	28,20	1397	17,21
10.1	0	0	2	40,00	3	60,00	0	0	0	0	0	0	0	0	0	0	0	0	5	0,06
11	17	68,0	3	12,0	4	16,00	1	4,00	-	-	-	-	-	-	-	-	-	-	25	0,31
12	21	2,5	8	0,95	159	18,91	3	0,36	60	7,13	86	10,23	85	10,11	181	21,52	238	28,3	841	10,36
13	44	3,89	11	0,97	158	13,96	8	0,71	71	6,27	95	8,39	201	17,76	336	29,68	208	18,38	1132	13,95
14	28	42,42	16	24,24	16	24,24	4	6,06	2	3,03	-	-	-	-	-	-	-	-	66	0,81
15	8	1,6	2	0,4	60	12,0	2	0,4	15	3,0	65	13,0	117	23,4	76	15,2	155	31,0	500	6,16
16	6	1,38	8	1,84	62	14,29	3	0,69	33	7,60	28	6,45	105	24,19	31	7,14	158	36,41	434	5,35
17	17	45,95	7	18,92	4	10,81	7	18,92	1	2,7	-	-	-	-	-	-	1	2,7	37	0,46
18	35	52,24	7	10,45	6	8,96	19	28,36	-	-	-	-	-	-	-	-	-	-	67	0,83
19	14	45,16	7	22,58	2	6,45	7	22,58	1	3,23	-	-	-	-	-	-	-	-	31	0,38
20	15	38,46	8	20,51	13	33,33	3	7,69	-	-	-	-	-	-	-	-	-	-	39	0,48
21	24	1,92	22	1,76	161	12,85	3	0,24	88	7,02	119	9,5	257	20,51	316	25,22	263	20,99	1253	15,44
22	9	2,54	9	2,54	48	13,56	2	0,57	29	8,19	31	8,76	87	24,58	50	14,12	89	25,14	354	4,36
23	5	2,86	1	0,57	16	9,14	0	0	14	8,0	18	10,29	17	9,71	34	19,43	70	40,00	175	2,16
24	3	5,3	0	0	3	5,3	1	1,8	2	3,5	0	0	12	21,1	8	14,0	28	49,1	57	0,70
TOTAL	867		263		1475		331		544		564		1214		1254		1604		8116	
%b		10,68		3,24		18,17		4,08		6,70		6,95		14,96		15,45		19,76		

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TABLE 4 : 91

K2/TS4. MINIMUM NUMBER OF INDIVIDUALS PER SPECIES

	LEVEL										
SPECIES	1	2	3	3.1	4	5	5.1	6	7	TOTAL	%
PHYLUM CHORDATA											
CLASS MAMMALIA											
A. DOMESTICATED											
ORDER CARNIVORA											
Family Canidae											
Canis familiaris	0	0	1	0	0	0	0	0	0	1	1,37
ORDER ARTIODACTYLA											
Family Bovidae											
Bos taurus	3	7(1)	0	1	2	(2)	0	1	0	16	21,92
Ovis/Capra sp.	2	5(2)	(1)	0	3(2)	(2)	0	3(2)	0	16	21,92
TOTAL DOMESTICATES	5	12(3)	(1)	1	5(2)	(4)	0	4(2)	0	33	45,21
B. NON-DOMESTICATED											
ORDER CARNIVORA											
Family Canidae											
Jackal-sized carnivora	0	0	0	0	0	1	0	0	0	1	1,37
Family Felidae											
c.f. *Felis serval*	0	0	0	0	1	0	0	0	0	1	1,37
ORDER PROBOSCIDAE											
Family Elephantidae											
Loxodonta africana	0	1	0	0	0	0	0	0	0	1	1,37
ORDER PERISSODACTYLA											
Family Hippopotamidae											
Hippopotamus amphibius	0	1	0	0	(1)	0	0	(1)	0	3	4,11
ORDER ARTIODACTYLA											
Family Bovidae											
Bov.I	0	0	1	0	1	0	0	1	0	3	4,11
ORDER LAGOMORPHA											
Family Leporidae											
c.f. *Pronolagus* sp.	0	0	0	0	1	0	0	0	0	1	1,37
Indeterminate Lagomorph	0	0	0	0	0	1	0	1	0	2	2,74
ORDER RODENTIA											
Family Muridae											
Indeterminate rodent	0	0	0	0	0	1	0	1	1	3	4,11
CLASS AVES											
Family Struthionidae											
Struthio camelus	0	1	1	0	0	0	0	1	0	3	4,11
Francolin sized bird	0	0	0	0	1	1	0	1	0	3	4,11
Guinea fowl sized bird	0	0	0	0	0	1	0	0	0	1	1,37
Indeterminate small bird	0	0	0	0	0	0	0	1	0	1	1,37
CLASS REPTILIA											
ORDER CROCODYLIA											
Family Crocodilidae											
Crocodylus niloticus	0	0	0	0	0	1	0	0	0	1	1,37
ORDER SQUAMATA											
Medium sized snake	0	0	0	0	0	0	0	1	0	1	1,37
CLASS OSTEICHTHYES											
Family Clariidae											
Clarias sp.	0	0	0	0	1	1	1	3	0	6	8,22
PHYLUM ARTHROPODA											
CLASS CRUSTACEA											
ORDER REPTANTIA											
Freshwater crab	0	0	0	0	0	0	0	1	0	1	1,37
PHYLUM MOLLUSCA											
CLASS GASTROPODA											
Family Achatinidae											
Achatina immaculata	1	2	0	0	2	1	1	1	0	8	10,96
TOTAL NON-DOMESTICATED	1	5	2	0	8(1)	8	2	13(1)	1	40	54,79
TOTAL M.IND.	6	17	4	1	13	12	2	17	1	73	
TOTAL SPECIES	4	7	4	1	10	11	2	14	1	20	

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Table 4.92

MST/K8 M.IND. OF SPECIES

Number in brackets denotes number of juveniles

Note: Features 5.3 and 6(a) have been combined with levels 5 and 6 respectively.

SPECIES	LEVEL 1	2	3	4	5 and 5.3	6 and 6(a)	7	8	9	10	10g	11	11g	12	12g	13	14	15	17	Total	% M.IND
PHYLUM CHORDATA																					
CLASS MAMMALIA																					
A. DOMESTICATED SPECIES																					
ORDER ARTIODACTYLA																					
Family Bovidae																					
Bos taurus	6(2)	3(1)	2(1)	3(1)	5(3)	5(1)	2(1)	3(2)	2(1)	1	(1)	1(1)	3(1)	2(1)	2(1)	4(2)	0	1	0	46	22,2
Ovis aries	0	1cf	1	1cf	0	1	1	0	1	0	0	0	0	0	0	1	0	0	0	7	3,4
Capra hircus	0	0	0	1cf	0	0	0	0	0	0	0	1	0	0	0	2	0	0	0	4	1,9
Ovis/Capra sp.	3(1)	6(1)	6(2)	4(2)	4(2)	5(2)	9(2)	4(3)	4(1)	2	2(1)	2(1)	(1)	3(1)	2(1)	2(1)	1	1	0	61	29,5
TOTAL M.IND.	9(3)	10(2)	9(3)	9(3)	9(5)	11(3)	12(3)	7(5)	7(2)	3	3(2)	4(2)	4(2)	5(2)	4(2)	9(3)	1	2	0	118	57,0
B. NON-DOMESTICATED SPECIES																					
ORDER PRIMATES																					
Family Cercopithecidae																					
Papio sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0,5
Family Hominidae																					
Homo sapiens sapiens	0	1	0	0	0	0	0	(1)	0	0	0	0	0	0	0	0	0	0	0	2	1,0
ORDER CARNIVORA																					
Family Canidae																					
Canis mesomelas	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0,5
ORDER ARTIODACTYLA																					
Family Bovidae																					
Sylvicapra grimmia	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0,5
Bov.I	1	(1)	2(1)	1	0	3(1)	2(1)	2(1)	1	1	0	1	0	1	1	1	0	0	0	18	8,7
ORDER LAGOMORPHA																					
Family Leporidae																					
Lepus saxtilis/L. capensis	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1,0
Lagomorph	0	0	0	0	0	1	2	1	1	1	0	0	0	0	0	0	0	0	0	6	2,9
ORDER RODENTIA																					
Family Muridae																					
Indeterminate rodent	(1)	0	0	0	2(1)	1	0	(1)	(1)	0	0	0	0	0	(1)	0	0	0	0	7	3,4
Indeterminate small mammal	0	0	0	(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0,5
CLASS AVES																					
Family Struthionidae																					
Struthio camelus	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0,5
Indeterminate bird	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2	1,0
Partridge-sized bird	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1,0
Guinea-fowl sized bird	0	0	1	1	1	1	0	2	2	0	0	0	0	0	0	0	0	0	0	8	3,9
Blue-crane sized bird	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0,5
Indeterminate small bird	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2	1,0
CLASS REPTILIA																					
ORDER CHELONIA																					
Tortoise	1	1	0	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	5	2,4
PHYLUM MOLLUSCA																					
CLASS GASTROPODA																					
Family Achatinidae																					
Achatina immaculata	1	2	2	1	1	2	1	1	1	0	0	0	0	0	1	1	0	0	0	14	6,8
Family Cypraeadae																					
Cypraea sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0,5
Nassarius kraussianus	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0,5
CLASS PELECYPODA																					
Aspatheria (Spathopsis) wahlbergi	0	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	5	2,4
Family Unionidae																					
Unio caffer	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0,5
Indeterminate bivalve	1	1	1	1	0	1	0	0	1	0	0	1	0	0	0	0	0	0	0	7	3,4
TOTAL M.IND. NON-DOMESTICATED SPECIES	6(1)	9(1)	7(1)	11(1)	7(1)	11(1)	7(1)	9(3)	9	2	0	3	0	1	3	3	0	0	1	89	43,0
TOTAL M.IND	15	19	16	20	16	22	19	16	14	5	3	7	4	6	7	12	1	2	1	207	
NO. OF SPECIES	9	10	8	12	7	9	8	10	10	5	3	4	3	4	6	6	1	2	1	24	

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TABLE: 4:9 3

MST/K8 TOTAL BONE SAMPLE

%a = % of sample from level. %b = % of total sample

LEVEL	ISOLATED BOVID TEETH		BOVID TOOTH ROWS		BOVID SKELETAL PARTS		OTHER IDENTIFIED REMAINS		SKULL FRAGMENTS		VERTE-BRAL FRAGMENTS		RIB FRAGMENTS		MISCEL. SKELETAL PARTS		BONE FLAKES		TOTAL	%b
	No.	%a	No.	%a	No.	%a	No.	%a	No.	%a	No.	%a	No.	%a	No.	%a	No.	%a		
1	30	31,58	0	0	56	58,95	8	8,42	1	1,05	-	-	-	-	-	-	-	-	95	1,08
2	27	1,25	0	0	139	6,42	17	0,79	68	3,14	91	4,2	159	7,34	802	37,03	863	39,84	2166	24,67
3	19	12,5	8	5,26	103	67,76	14	9,21	5	3,29	3	1,97	-	-	-	-	-	-	152	1,73
4	12	10,08	3	2,52	88	73,95	12	10,08	4	3,36	-	-	-	-	-	-	-	-	119	1,36
5	5	6,94	1	1,39	52	72,22	9	12,5	5	6,94	-	-	-	-	-	-	-	-	72	0,82
5																				
5,3	2	12,5	0	0	13	81,25	1	6,25	-	-	-	-	-	-	-	-	-	-	16	0,18
6	15	1,32	1	0,09	36	3,18	13	1,15	31	2,74	64	5,65	139	12,27	547	48,28	287	25,33	1133	12,91
6(a)	4	0,72	0	0	15	2,68	5	0,9	2	0,36	32	5,73	42	7,51	288	51,52	171	30,59	559	6,37
7	44	1,99	2	0,09	126	5,70	22	1,0	91	4,12	128	5,8	314	14,22	874	39,57	608	27,52	2209	25,16
8	7	9,21	2	2,63	60	78,95	7	9,21	-	-	-	-	-	-	-	-	-	-	76	0,87
9	11	13,92	2	2,53	53	67,09	11	13,92	2	2,53	-	-	-	-	-	-	-	-	79	0,9
10	2	15,39	0	0	9	69,23	1	7,69	1	7,69	-	-	-	-	-	-	-	-	13	0,15
10g	2	9,52	1	4,76	16	76,19	0	0	2	9,52	-	-	-	-	-	-	-	-	21	0,24
11	7	1,44	3	0,62	28	5,77	2	0,41	24	4,95	16	3,3	51	10,52	252	51,96	102	21,03	485	5,52
11g	2	0,45	2	0,45	17	3,86	0	0	15	3,40	25	5,67	80	18,14	192	43,54	108	24,49	441	5,02
12	14	22,58	0	0	42	67,74	0	0	6	9,68	-	-	-	-	-	-	-	-	62	0,71
12g	2	5,71	1	2,86	31	88,57	1	2,86	-	-	-	-	-	-	-	-	-	-	35	0,4
13	17	1,63	2	0,19	96	9,22	2	0,19	62	5,96	81	7,78	108	10,38	409	39,29	264	25,36	1041	11,9
14	1	100,0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0,01
15	3	100,0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0,03
17	0	0	0	0	0	0	1	100,0	0	0	0	0	0	0	0	0	0	0	1	0,01
TOTAL	226		28		980		126		319		440		893		3364		2403		8779	
%b		2,57		0,32		11,16		1,44		3,63		5,01		10,17		38,32		27,37		

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TABLE 4:131
MK1. MINIMUM NUMBERS OF INDIVIDUALS PER SPECIES.
Figures in brackets indicate number of immature individuals.

SPECIES	LEVEL 1	2	3	4	5	6	6.1	7	8	9	9(i)	9(ii)	9(ii).1	9(ii).4	10	10(i)	10(ii)	10(iii)	10(iv)	11	11.1	11.7	11.8	TOTAL	% OF SAMPLE
PHYLUM CHORDATA																									
CLASS MAMMALIA																									
A. DOMESTICATED																									
ORDER ARTIODACTYLA																									
Family Bovidae																									
Bos taurus	2(1)	8(2)	1	1	3(2)	4(1)	1	4(1)	6(1)	2(1)	2(1)	4(1)	2(1)	8(1)	4(1)	11(3)	5(2)	3(1)	5(2)	11(3)	3(2)	2(1)	2(1)	94	28,1
B. taurus var Zebu	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2	0,6
Ovis aries	0	0	0	0	1	0	0	0	0	1	0	0	1	0	0	0	1	0	0	1	0	0	0	5	1,5
Capra hircus	0	1cf	0	0	0	1	0	0	0	0	0	0	0	0	1	2	1	1	1	2	1	0	0	11	3,3
Ovis/Capra sp.	4(2)	10(3)	2(1)	4(1)	3(1)	6(1)	2(1)	6(3)	5(1)	3(1)	0	3(1)	3(1)	5(1)	3(1)	14(4)	8(2)	5(2)	4(1)	16(3)	3(1)	2	1	112	33,4
TOTAL DOMESTICATED	6(3)	19(5)	3(1)	5(1)	7(3)	11(2)	3(1)	10(4)	12(2)	6(2)	2(1)	7(2)	6(2)	13(2)	8(2)	28(7)	15(4)	9(3)	10(3)	30(6)	7(3)	4(1)	3(1)	224(61)	66,9
B. NON-DOMESTICATED																									
ORDER PRIMATES																									
Family Cercopithecidae																									
Indeterminate primate	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0,3
ORDER CARNIVORA																									
Family Canidae																									
Canis adustus or																									
C. mesomelas	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0,3
Family Hyaenidae																									
Hyaena brunnea	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0,3
Indeterminate small canid	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0,3
ORDER HYRACOIDEA																									
Family Procaviidae	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	0,6
ORDER PERISSODACTYLA																									
Family Equidae																									
Equus burchelli	0	2(1)	0	0	0	0	0	0	1	0	0	0	1	0	1	1	0	0	0	1	0	0	0	7	2,1
ORDER ARTIODACTYLA																									
Family Suidae																									
Phacochoerus aethiopicus	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0,6
Family Bovidae																									
Oreotragus oreotragus	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0,3
Cephalophus/Raphiceros size	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	2	0,6
Bov.I	0	3(2)	1	1	1	2(1)	1	1	2	1	0	1	1	0	1	2	2(1)	1	2	1	1	1	0	26	7,8
Bov.IIb	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	3	0,9
ORDER LAGOMORPHA																									
Family Leporidae																									
Lepus sp.	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	9	2,7
Indeterminate lagomorph	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0,3
ORDER RODENTIA																									
Family Muridae																									
Indeterminate rodent	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	4	1,2
Indeterminate mammal	0	(1)	0	0	0	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	4	1,2
CLASS AVES																									
Family Struthionidae																									
Struthio camelus	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0,3
Family Aegypiidae																									
Torgos c.f. *T. tracheliotis*	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0,3
Francolin-sized bird	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0,3
Guinea fowl-sized bird	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	0,6
CLASS REPTILIA																									
Family Pelomedusidae																									
Terrapin	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0,3
ORDER SQUAMATA																									
Adder-sized snake	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0,3
CLASS OSTEICHTHYES (PISCES)																									
Clarias sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0,3
Indeterminate fish	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0,3
PHYLUM MOLLUSCA																									
CLASS GASTROPODA																									
Family Achatinidae																									
Achatina immaculata	1	2	0	1	0	1	1	2	1	0	0	0	0	0	0	1	1	1	0	4	0	0	0	16	4,8
Family Naticidae																									
Polynices tumidus	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	0,6
CLASS PELECYPODA																									
Family Cyrenidae																									
Corbicula africana	0	0	0	2(sp)	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0,9
Indeterminate freshwater bivalve	1	4	0	1	0	2	0	2	1	0	0	0	0	0	0	4	1	0	0	1	0	0	0	17	5,1
TOTAL	2	20(4)	2	7	3	8(1)	2	11	6	2	0	1	2	0	3	11	7(1)	3	3	14	3	2	0	112	328
TOTAL M.IND.	8	39	5	12	10	19	5		18	8	2	8	8	13	11	39	22	12	13	44	10	6	3	336	
NO. OF SPECIES	5	14	5	9	6	9	5	12	8	5	1	4	5	3	6	9	9	6	5	12	6	5	3	27	

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TABLE 4.132

MK1 TOTAL BONE SAMPLE

Percentage (a) = % of sample from each level. Percentage (b) = % of total sample

LEVEL	ISOLATED BOVID TEETH		BOVID TOOTH ROWS		BOVIDAE SKELETAL PARTS		OTHER IDENTI-FIABLE REMAINS		SKULL FRAGMENTS		VERTEBRAL FRAGMENTS		RIB FRAGMENTS		MISCEL-LANEOUS		BONE FLAKES		TOTAL	
	No.	%a	No.	%a	No.	%a	No.	%a	No.	%a	No.	%a	No.	%a	No.	%a	No.	%a	No.	%b
LEVEL 1	12	70,59	0	0	0	0	5	29,41	-	-	-	-	-	-	-	-	-	-	17	0,07
LEVEL 2	56	1,46	10	0,26	305	7,96	33	0,86	91	2,38	114	2,98	179	4,67	2328	60,78	714	18,64	3830	16,68
LEVEL 3	6	54,55	0	0	4	36,36	1	9,09	-	-	-	-	-	-	-	-	-	-	11	0,05
LEVEL 4	15	50,0	2	6,67	5	16,67	8	26,67	-	-	-	-	-	-	-	-	-	-	30	0,13
LEVEL 5	23	60,53	3	7,9	9	23,68	3	7,9	-	-	-	-	-	-	-	-	-	-	38	0,17
LEVEL 6	16	1,65	4	0,41	145	14,93	9	0,93	28	2,88	98	10,09	118	12,15	315	32,44	238	24,51	971	4,23
LEVEL 6.1	2	2,56	1	1,28	11	14,10	1	1,28	1	1,28	9	11,54	11	14,10	16	20,51	26	33,33	78	0,34
LEVEL 7	32	49,23	4	6,15	4	6,15	25	38,46	-	-	-	-	-	-	-	-	-	-	65	0,28
LEVEL 8	34	1,75	2	0,10	226	11,65	9	0,46	78	4,02	188	9,69	197	10,16	779	40,16	427	22,01	1940	8,55
LEVEL 9	12	3,75	2	0,63	66	20,63	1	0,31	11	3,44	32	10,0	22	6,88	112	35,0	62	19,38	320	1,39
LEVEL 9(i)	4	1,68	0	0	3	1,26	0	0	23	9,66	22	9,24	37	15,55	94	39,5	55	23,11	238	1,04
LEVEL 9(ii)	14	5,13	4	1,47	28	10,26	0	0	16	5,86	37	13,55	23	8,43	85	31,14	66	27,18	273	1,19
LEVEL 9(ii).1	0	0	0	0	38	13,38	2	0,70	8	2,82	14	4,93	46	16,20	119	41,9	57	20,07	284	1,24
LEVEL9ii B5.4	0	0	0	0	129	12,01	0	0	27	2,51	64	5,96	128	11,92	589	54,84	137	12,76	1074	4,68
LEVEL 10	25	2,03	1	0,08	119	9,65	2	0,16	59	4,79	164	13,30	114	9,25	479	38,85	270	21,9	1233	5,37
LEVEL 10(i)	32	1,42	6	0,17	427	11,93	17	0,48	97	2,71	361	10,09	720	20,12	1207	33,73	712	19,89	3579	15,58
LEVEL 10(ii)	26	1,38	6	0,32	196	10,40	11	0,58	92	4,89	211	11,21	179	9,51	847	45,00	314	16,68	1882	8,19
LEVEL 10(iii)	18	1,64	2	0,18	96	8,76	5	0,46	54	4,93	147	13,91	101	9,22	496	42,26	177	16,15	1096	4,77
LEVEL 10(iv)	9	1,10	0	0	149	18,28	1	0,12	38	4,66	97	11,90	83	10,18	302	37,05	136	16,69	815	3,55
LEVEL 11	94	2,04	14	0,30	707	15,35	13	0,28	192	4,17	573	12,44	452	9,82	1671	36,29	889	19,31	4605	20,05
LEVEL 11.1	5	1,71	0	0	36	12,29	1	0,34	17	5,80	38	12,97	52	17,75	73	24,91	71	24,23	293	1,28
LEVEL 11.7	0	0	0	0	28	12,56	1	0,45	0	0	28	12,56	63	28,25	52	23,32	51	22,87	223	0,97
LEVEL 11.8	0	0	0	0	7	14,58	0	0	1	2,08	1	2,08	10	20,83	27	56,25	2	4,17	48	0,21
TOTAL	435		61		2763		147		833		2198		2535		9591		4404		22938	
Percentage of MK1 sample		1,89		0,27		12,03		0,64		3,63		9,57		11,04		41,76		19,18		

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TABLE 4:135
MK1/LEVEL 2 TOTAL BONE SAMPLE

SKELETAL PART	DAMAGED No.	BURNT No.	GNAWED No.	WEATHERED No.	UNMODIFIED No.	TOTAL No.	%
Bovid teeth	-	-	-	-	56	56	1,46
Bovid tooth rows	-	-	-	-	10	10	0,26
Bovid skeletal parts	109	80	27	46	26	292	7,62
Other identifiable fragments	4	2	1	9	17	33	0,86
Skull fragments	10	2	4	6	82	104	2,72
Vertebral fragments	9	1	0	3	102	114	2,98
Rib fragments	22	13	2	1	141	179	4,67
Miscellaneous skeletal parts	36	84	3	105	2100	2328	60,78
Bone flakes	40	56	1	65	552	714	18,64
TOTAL	230	241	38	235	3105	3830	
% of Sample	6,0	6,29	0,99	6,14	81,07		

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Table 4:136 Length of right $M\bar{3}$ and $M\underline{3}$ of warthogs.

SPECIMEN NO.	SEX	$RM\bar{3}$	$RM\underline{3}$	% DIFFERENCE OF $M\underline{3}$
TM/3347	♂	3,78	3,6	-4,8
3356	♂	4,19	4,74	+13,1
12029	♀	4,29	4,07	-5,1
13208	♀	4,87	4,5	-7,6
3353	-	4,55	4,5	-1,1
13205	-	3,2	3,05	-4,7
13212	-	4,03	4,2	+4,2
16675	-	4,0	3,89	-2,8
16676	-	3,9	3,59	-8,0
Mean of negative differences				-4,9

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Table 5.1. K2/TS1: Economic activities on the basis of minimum numbers of individuals

ECONOMIC ACTIVITY		TOTAL	JUVENILES	% JUV.	% TOTAL M.IND.
A. DOMESTICATED SPECIES					
Bos taurus		28	9	6,9	21,4
Ovis/Capra sp.		30	9	6,9	22,9
TOTAL		58	18	13,7	44,3
B. NON-DOMESTICATED SPECIES					
Hunted:	Bovids	9	2	1,5	6,9
	Non-bovids	1	0	0	0,8
Snared		30	1	0,8	22,9
Gathered		23	0	0	17,6
Fishing		3	0	0	2,3
TOTAL		66	0	0	50,4
TOTAL FOOD ANIMALS		124	-	-	94,7
C. NON-CONTRIBUTORS		7	0	0	5,3
TOTAL MIN. No. OF INDIVIDUALS		131			

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Table 5.2. K2/TS2. Economic activities on the basis of minimum numbers of individuals

ECONOMIC ACTIVITY	TOTAL	JUVENILES	% JUV.	% TOTAL M.IND.
A. DOMESTICATED SPECIES				
Bos taurus	59	18	8,9	29,1
B. taurus var. Zebu	3	1	0,5	1,5
Ovis/Capra sp.	61	18	8,9	30,1
TOTAL	123	37	18,3	60,6
B. NON-DOMESTICATED SPECIES				
Hunted: Bovids	15	0	0	7,4
Non-bovids	9	0	0	4,4
Snared	10	0	0	4,9
Gathered	33	0	0	16,3
Fishing	3	0	0	1,5
TOTAL	70	0	0	34,5
TOTAL FOOD ANIMALS	193	-	-	95,1
C. NON-CONTRIBUTORS	10	0	0	4,9
TOTAL MIN. NO. OF INDIVIDUALS	203			

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Table 5.3. K2/TS3 Economic activities on the basis of minimum numbers of individuals

ECONOMIC ACTIVITY	TS3 LEVELS 1-15				TS3 LEVELS 16-24			
	TOTAL	JUVENILES	% JUVENILES	% TOTAL M.IND.	TOTAL	JUVENILES	% JUV.	% TOTAL M.IND.
A. DOMESTICATED SPECIES								
Bos taurus	97	32	8,4	25,5	21	7	6,7	20,2
Bos taurus var. Zebu	1	0	0	0,3	1	0	0	1,0
Ovis/Capra	132	26	6,8	34,7	51	10	9,6	49,0
TOTAL	230	58	15,3	60,5	73	17	16,4	70,2
B. NON-DOMESTICATED SPECIES								
Hunted: Bovids	28	3	0,8	7,4	7	0	0	6,7
Non-bovids	11	1	0,3	2,9	4	0	0	3,9
Snared	38	0	0	10,0	6	0	0	5,8
Gathered	39	0	0	10,3	7	0	0	6,7
Fishing	3	0	0	0,8	1	0	0	1,0
TOTAL NON-DOMESTICATED	119	4	1,1	31,3	25	0	0	24,0
TOTAL FOOD ANIMALS	349	-	-	91,8	98	-	-	94,2
C. NON-CONTRIBUTORS	31	-	-	8,2	6	1	1,0	5,8
TOTAL MIN. NO. OF INDIVIDUALS	380				104			

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Table 5.4 MST/K8 Economic activities on the basis of minimum numbers of individuals

ECONOMIC ACTIVITY	MST/K8/1-3 (Phase 4)				MST/K8/4-15 (Phase 3)			
	Total	Juv.	% Juv.	% total	Total	Juv.	% Juv.	% Total
A. DOMESTICATED SPECIES								
Bos taurus	11	0	0	23,4	35	16	11,1	24,3
Ovis/Capra sp.	17	4	8,5	36,2	55	18	12,5	38,2
TOTAL	28	4	8,5	59,6	90	34	23,6	62,5
B. NON-DOMESTICATED SPECIES								
Hunted: Bovids	4	2	4,3	8,5	14	3	2,1	9,7
Snared	4	0	0	8,5	18	0	0	12,5
Gathered	10	0	0	21,3	19	0	0	13,2
TOTAL NON-DOMESTICATED	18	0	0	38,3	51	3	2,1	35,4
TOTAL FOOD ANIMALS	46	2	4,3	97,9	141	-	-	97,9
C. NON-CONTRIBUTORS	1	-	-	2,1	3	-	-	2,1
TOTAL M.IND. NO. OF INDIVIDUALS	47				144			

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Table 5.5 MK1, Phases 3 and 4. Economic activities on basis of minimum number of individuals

ECONOMIC ACTIVITY	PHASE 4 TOTAL	JUVENILE	% JUV.	% TOTAL M.IND.	PHASE 3 TOTAL	JUVENILE	% JUV.	% TOTAL M.IND.
A. DOMESTICATED SPECIES								
Bos taurus	11	3	6,1	22,5	37	10	8,4	31,1
Bos taurus var. Zebu	0	0	0	0	1	0	0	0,8
Ovis/Capra sp.	17	6	12,3	34,7	44	12	10,1	37,0
TOTAL	28	9	18,4	57,1	82	22	18,5	68,9
B. NON-DOMESTICATED SPECIES								
Hunted: Bovids	4	1	2,0	8,2	13	1	0,8	10,9
Non-bovids	4	1	2,0	8,2	2	0	0	1,7
Snared	3	0	0	6,1	2	0	0	1,7
Gathered	9	0	0	18,4	15	0	0	12,6
Fishing	0	0	0	0	1	0	0	0,8
TOTAL NON-DOMESTICATED	20	2	2,0	40,8	33	1	0,8	27,7
TOTAL FOOD ANIMALS	48	-	-	98,0	115	-	-	96,6
C. NON-CONTRIBUTORS	1	0	0	2,0	4	0	0	3,4
TOTAL MIN. NO. OF INDIVIDUALS	49				119			

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TABLE 5:6

MK1, PHASE 2 (LEVELS 10 AND 11). ECONOMIC ACTIVITIES ON THE BASIS OF MINIMUM NUMBERS OF INDIVIDUALS

ECONOMIC ACTIVITY	TOTAL	JUVENILE	% JUVENILE	TOTAL M.IND.
A. DOMESTICATED SPECIES				
Bos taurus	47	16	10,3	30,3
Ovis/Capra	67	14	9,0	43,2
TOTAL	114	30	19,4	73,6
B. NON-DOMESTICATED SPECIES				
Hunted : Bovids	13	0	0	8,4
Non-bovids	4	0	0	2,6
Snared	9	0	0	5,8
Gathered	13	0	0	8,4
Fishing	1	0	0	0,7
TOTAL NON-DOMESTICATED	40	0	0	25,8
TOTAL FOOD ANIMALS	154	-	-	99,4
C. NON-CONTRIBUTORS	1	-	-	0,7
TOTAL MIN. NO. OF INDIVIDUALS	155			

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TABLE 5 : 8. LIVE AND MEAT WEIGHTS IN KG OF ANIMALS PRESENT IN GREEFSWALD DIETS

SPECIES		LIVE WEIGHT (kg)	MEAT WEIGHT (50% OF LIVE WEIGHT)
Bos taurus:	Juvenile	198	99
	Adult	498	249
Ovis/Capra:	Juvenile	25,6	12,8
	Adult	32	16
Hyrax		4,1	2
Zebra		362,9	181,4
Warthog		63,5	31,7
Bushpig		81,64	40,82
Indeterminate suid.		72,57	36,28
Grey duiker		15,6	7,8
Klipspringer		13,0	6,5
Impala		40,35	20,15
Wildebeest		170,0	85,0
Hare (Natal red and Cape hare)		2,27	1,13
Rodent:	Aethomys	0,09	0,05
	Praomys	0,06	0,03
Guinea-fowl sized bird		1,5	0,75
Indet. bird (Chicken sized)		1,0	0,5
Tortoise		1,36	,68
Terrapin		1,36	,68
Varanus sp.		3,2	1,6

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TABLE 5 :9

K2/TS1 MEAT CONTRIBUTION TO DIET BY ANIMALS ON BASIS OF ECONOMIC ACTIVITIES

SPECIES	M.IND.	INDIVIDUAL LIVE WT. (KG)	MEAT WT. (50% OF LIVE WT.	TOTAL MEAT WT	% OF MEAT
A. DOMESTICATED					
Bos taurus Adult	19	498	249	4731	76,1
Juvenile	9	198	99	891	14,3
Ovis/Capra Adult	21	32	16	336	5,4
Juvenile	9	25,6	12,8	115,2	1,9
TOTAL DOMESTICATED	58			6073,2	97,7
B. NON-DOMESTICATED					
Hunted: Duiker	1	15,6	7,8	7,8	0,1
Impala	1	40,35	20,17	20,17	0,3
Bov.I	8	15,6	7,8	62,4	1,0
TOTAL BOVIDS	10			90,37	1,4
Non-bovids Bushpig	1	81,64	40,82	40,82	0,7
Snaring : Hyrax	1	4,1	2,05	2,05	0,03
Hare	4	2,27	1,13	4,52	0.1
Rodents : *Aethomys*, *Chrysophilus*	9	0,093	0,05	0,45	0,007
Praomys natalensis	8	0,058	0,03	0,24	0,004
Guinea-fowl sized bird	4	1,5	0,75	3,0	0,05
Gathered: Tortoise	1	1,36	0,68	0,68	0,01
TOTAL	38			142,13	2,3
Gecko and lizard	4				
Fish	3				
Achatina immaculata	16				
Freshwater bivalve	3				
TOTAL CONTRIBUTION	96			6215,3	

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TABLE 5 :10

K2/TS2 MEAT CONTRIBUTION TO DIET BY ANIMALS ON BASIS OF ECONOMIC ACTIVITIES

SPECIES		M.IND.	INDIVIDUAL LIVE WT. (KG)	MEAT WT (50% OF LIVE WT)	TOTAL MEAT WT.	% OF TOTAL MEAT
A. DOMESTICATED						
Bos taurus:	Adult	43	498	249	10707	76,5
	Juvenile	19	198	99	1881	13,5
Ovis/Capra:	Adult	43	32	16	688	4,9
	Juvenile	18	25,6	12,8	230,4	1,6
TOTAL DOMESTICATED		123			13506,4	96,6
Hunted: Bovids:	Duiker	1	15,6	7,8	7,8	0,1
	Impala	1	40,35	20,15	20,15	0,2
	Wildebeest	1	170,0	85,0	85,0	0,7
	Bov.I	13	15,6	7,8	101,4	0,8
TOTAL BOVID		16			214,35	1,8
Non-bovid:	Zebra	1	362,9	181,4	181,4	1,3
	Suid	2	72,57	36,28	72,56	0,5
Snaring:	Hare	4	2,27	1,13	4,52	0,04
Guinea-fowl sized bird		3	1,5	0,75	2,25	0,02
Small bird		2	1,0	0,5	1,0	0,008
Gathered:	Tortoise	4	1,36	0,68	2,72	0,02
	Varanus	2	3,2	1,6	3,2	0,03
TOTAL		34			267,65	1,9
Fish		3				
Aethiina immaculata		21				
Freshwater bivalve		6				
TOTAL CONTRIBUTION		149			13988,4	

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TABLE 5 :11

K2/TS3 MEAT CONTRIBUTION TO DIET BY ANIMALS ON BASIS OF ECONOMIC ACTIVITIES

		TS3, LEVELS 1-15					TS3,LEVELS 16-24		
		M.IND.	INDIVIDUAL WEIGHT KG	MEAT WEIGHT	TOTAL MEAT WEIGHT	PERCENTAGE OF MEAT WT	M.IND.	TOTAL MEAT WEIGHT	PERCENTAGE OF MEAT
A. DOMESTICATED									
Bos taurus	Adult	66	498	249	16434,0	74,6	15	3735	70,7
	Juvenile	32	198	99	3168	14,4	7	693	13,1
Ovis/Capra	Adult	106	32	16	1696	7,7	41	656	12,4
	Juvenile	26	25,6	12,8	332,8	1,5	10	128	2,4
TOTAL DOMESTICATED		230			21630,8	98,2	73	5212	98,6
B. NON-DOMESTICATED									
HUNTED Bovids:	Duiker	2	15,6	7,8	15,6	0,1	1	7,8	0,2
	Impala	6	40,35	20,15	120,9	0,55	0	0	0
	Bov.I	20	15,6	7,8	156	0,71	7	54,6	1,0
TOTAL BOVIDS		28			292,5	1,3	8	62,4	1,2
NON-BOVIDS:	Warthog	1	63,5	31,7	31,7	0,1	0	0	0
	Suid	1	72,57	36,28	36,28	0,2	0	0	0
SNARED:	Dassie	5	4,1	2	10	0,05	2	4	0,1
	Hare	18	2,27	1,13	20,34	0,1	2	2,26	0,04
Guinea-fowl sized bird		12	1,5	0,75	9	0,04	2	1,5	0,03
GATHERED:	Tortoise	1	1,36	0,68	0,68	0,003	0	0	0
	Terrapin	1	1,36	0,68	0,68	0,003	0	0	0
	Varanus	1	3,2	1,6	1,6	0,01	0	0	0
TOTAL NON-BOVIDS		40			110,28	0,68	6	7,76	0,15
Fish		3					1		
Achatina immaculata		26					7		
Freshwater bivalve		10					0		
TOTAL CONTRIBUTION		298			22033,58		85	5282,16	

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TABLE 5 :12

MST/K8 MEAT CONTRIBUTION TO DIET BY ANIMALS ON BASIS OF ECONOMIC ACTIVITIES

		MST/K8 LEVELS 1-3 (Phase 4)					LEVELS 4-15 (Phase 3)		
		M.IND.	INDIVIDUAL WEIGHT (KG)	MEAT WEIGHT	TOTAL MEAT WEIGHT	% OF MEAT WEIGHT	M.IND.	TOTAL WEIGHT	% OF MEAT WEIGHT
A. DOMESTICATED									
Bos taurus	Adult	7	498	249	1743	71,6	19	4731	65.2
	Juvenile	4	198	99	396	16,3	16	1584	21,8
Ovis/Capra	Adult	13	32	16	208	8,6	37	592	8,2
	Juvenile	4	25,6	12,8	51,2	2,1	18	230,4	3,2
TOTAL DOMESTICATED		28			2398,2	98,5	90	7137,4	98,4
B. NON-DOMESTICATED									
HUNTED BOVIDS									
Duiker		0	0	7,8	0	0	1	7,8	0,1
Bov.I		4	15,6	7,8	31,2	1,3	13	101,4	1,4
TOTAL BOVIDS		4			31,2	1,3	14	109,2	1,5
SNARED: Hare		1	2,27	1,13	1,13	0,05	1	1,13	0,02
Guinea-fowl sized bird		1	1,5	0,75	0,75	0,03	7	5,25	0,07
Indeterminate bird		2	1,0	0,5	1,0	0,04	1	0,5	0,01
GATHERED: Tortoise		2	1,36	0,68	1,36	0,06	3	2,04	0,03
TOTAL NON-BOVIDS		6			4,24	0,18	12	8,92	0,12
Achatina immaculata		5					9		
Freshwater bivalves		1					5		
TOTAL CONTRIBUTION		38			2433,64		116	7255,52	

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TABLE 5 :13

MK1: MEAT CONTRIBUTION TO DIET BY ANIMALS ON BASIS OF ECONOMIC ACTIVITIES

	MK1/LEVELS 1-3 (Phase 4)					LEVELS 4-9 (Phase 3)			LEVELS 10 & 11 (Phase 2)		
	M.IND.	INDIVIDUAL WEIGHT KG	MEAT WEIGHT	TOTAL MEAT WEIGHT	% OF MEAT WEIGHT	M.IND.	TOTAL MEAT WEIGHT	% OF MEAT WEIGHT	M.IND.	TOTAL MEAT WEIGHT	% OF MEAT WEIGHT
A. DOMESTICATED											
Bos taurus Adult	8	498	249	1992	66,4	28	6972	76,6	31	7719	70,1
Juve-nile	3	198	99	297	9,9	10	990	10,9	16	1584	14,4
Ovis/Capra Adult	11	32	16	176	5,9	32	512	5,6	53	848	7,7
Juve-nile	6	25,6	12,8	76,8	2,6	12	153,6	1,7	14	179,2	1,6
TOTAL DOMESTICATED	28			2541,8	84,8	82	8627,6	94,8	114	10330,2	93,8
B. NON-DOMESTICATED											
HUNTED: Bovids											
Klipspringer	0	13,0	6,5	0	0	1	6,5	0,07	0	0	0
Bov.I	3	15,6	7,8	23,4	0,8	11	85,8	0,9	11	85,8	0,8
Bov.IIb (Impala sized)	0	40,35	20,15	0	0	1	20,15	0,2	2	40,35	0,4
TOTAL BOVIDS	3			23,4	0,8	13	112,45	1,2	13	126,15	1,2
Non-bovids: Zebra	2	362,9	181,4	362,9	12,1	2	362,9	4,0	3	544,2	4,9
Warthog	2	63,5	31,7	63,4	2,1	0	0	0	0	0	0
TOTAL NON-BOVIDS				426,3	14,2		362,9	4,0		544,2	4,9
SNARED: Dassie	1	4,1	2,0	2,0	0,07	0	0	0	1	2,0	0,02
Hare	1	2,27	1,13	1,13	0,04	1	1,13	0,01	7	7,91	0,07
Guinea-fowl sized bird	0	1,5	0,75	0	0	1	0,75	0,01	1	0,75	0,07
Indeterminate bird	1	1,0	0,5	0,5	0,02	0	0	0	0	0	0
GATHERED: Terrapin	1	1,36	6,8	6,8	0,2	0	0	0	0	0	0
TOTAL NON-BOVIDS	7			10,43	0,3	4	1,88	0,02	12	10,66	0,1
Fish	1					1			1		
Achatina immaculata	3					6			7		
Freshwater bivalves	5					7			6		
TOTAL CONTRI-BUTION	38			300,93		97	9104,83		137	11011,21	

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TABLE 6 : 1. BASIS FOR IDENTIFICATION OF MATERIAL IDENTIFIED AS SHEEP OR GOAT FROM ALL EXCAVATIONS

EXCAVATION	SHEEP	BASIS FOR IDENTIFICATION	GOAT	BASIS FOR IDENTIFICATION	OVIS/CAPRA
TS1	0				30
TS2/1	1(cf)	Skull sutures	1	Skull sutures	8
TS2/2	1	Hornless skull	2	Horn, mandible, skull sutures, phalanges	17
TS2/3	1	Skull sutures	0		7
TS2/4	0		1	Skull, horn core	18
TS3/1	0		1	Skull	6
TS3/2	0		1	Horn cores	7
TS3/3	0		1	Horn core	4
TS3/6	2	Skull, horn cores	5	Horn cores	9
TS3/7	1	Hornless skull	1	Horn core	4
TS3/8	2	Skull sutures	2	Horn cores	12
TS3/9	3	Skull, horn cores	3	Horn cores, skull, phalanges	6
TS3/10	1	Skull	3	Horn cores	5
TS3/11	0		1	Horn core	2
TS3/13	0		1	Horn core	6
TS3/14	0		2	Horn cores	4
TS3/15	0		1	Horn core	4
TS3/18	1 (c.f.)	Horn core	1 (c.f.)	Skull with sutures	5
TS3/19	0		1	Skull with sutures	5
TS3/20	1	Horn core	1	Horn core	3
TS3/21	3	Skull with sutures	2	Horn cores	6
TS3/22	1	Skull	1	Skull with suture	6
TS3/23	1	Skull with sutures	0		1
MST/K8/2	1 (c.f.)	Skull	0		6
MST/K8/3	1	Terminal phalanx	0		6
MST/K8/4	1 (c.f.)	Terminal phalanx	1 (c.f.)	Skull with sutures	4

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Table 6.1 (Cont.)

EXCAVATION	SHEEP	BASIS FOR IDENTIFICATION	GOAT	BASIS FOR IDENTIFICATION	OVIS/CAPRA
MST/K8/6	1	Terminal phalanx	0		5
MST/K8/7	1	Horn core; phalanges	0		5
MST/K8/9	1	Terminal phalanges	0		4
MST/K8/11	0		1	Terminal phalanx	2
MST/K8/13	1	Terminal phalanx	2	Horn cores	2
MK1/2	0		1 (c.f.)	Horn cores & skull	7
MK1/5	1	Skull with sutures	0		3
MK1/6	0		1	Horn core	6
MK1/9	2	Skulls	0		14
MK1/10	1	Phalanges	6	Horn cores, phalanges, skull with sutures	34
MK1/11	1	Phalanges	3	Horn core, phalanges	22
TOTAL	31		47		292
OVIS + CAPRA + OVIS/CAPRA	8,6%		13,1%		360

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TABLE 6.2 TOOTH ERUPTION PATTERNS FOR SHEEP AND GOATS (NODDLE AND SILVER)

	SHEEP			GOAT			
TOOTH	DECIDUOUS	PERMANENT		DECIDUOUS	PERMANENT		
		Improved	Wild		Improved	Wild	Noddle
I1	Birth to 1 week	12-18 months	18 months	Birth	15 months	(11)	11
I2	Birth to 1 week	18-24 months	30 months	Birth	21 months	27 months	12-16
I3	Birth to 2 weeks	27-30 months	42 months	Birth	27 months	36 months	23 (in wear)
I4	Birth to 3 weeks	33-48 months	50 months	1-3 weeks	36 months	40 months	33-45
P2	Birth to 6 weeks	21-24 months	30 months	3 months	17-20 "	30 months	23 mnths
P3	Birth to 6 weeks	21-24 months	30 months	3 months	17-20 "	30 months	23 "
P4	Birth to 6 weeks	21-24 months	40 months	3 months	17-20 "	30 months	23 "
M1		$\underline{5}$ and $\bar{3}$ months	6 months		5-6 "	5-6 "	9-11
M2		9-12 months	16 months		8-10 "	12 "	
M3		18-24 months	36-48 "		18-24 "	30 "	Less than 36

Sheep teeth come into wear 3-5 months after eruption

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Table 6.3. Epiphysial fusion in cattle, sheep and goats. (After Silver and Noddle). Ages given in months.

SKELETAL PART	CATTLE	SHEEP (SILVER)	GOAT (NODDLE)		
			DOMESTIC	FERAL	CASTRATE
Humerus:	42-48	36-42	23-24	48	84+
Proximal	months				
Distal	12-18	10	11-12	12-13	4-6
Radius:	12-18	10	4-9	-	-
Proximal					
Distal	42-48	36	33-40	48+	84
Ulna:	42-48	30	24-31	48-60	60-84
Olecranon					
Femur:	42	30-36	23-24	36	60-84
Proximal					
Distal	42-48	36-42	23-24	48	60
Tibia:	42-48	36-42	23-24	36+	60
Proximal					
Distal	24-30	18-24	19-	24+	23+
Metacarpal:	24-30	18-24	23-30	24-36	23+
Distal					
Metatarsal:	27-36	20-28	23-30	24-3	23+
Distal					
Calcaneum	36-42	30-36	23	36-48	60
Phalanx 1:	Before	Before	-	-	-
Proximal	birth	birth			
Distal	18	13-16	11-12	24	15
Phalanx 2:	Before	Before	-	-	-
Proximal	birth	birth			
Distal	18	13-16	9-11	12+	13

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Table 6.4 Unfused epiphyses of *Ovis/Capra* in TS1/ and TS2/2

	TS1	TS2/2	AGE (MONTHS)
Humerus: Prox.	1	2	23-24
Dist.	0	2	11-12
Radius: Prox.	2	0	4-9
Dist.	5	0	33-4
Ulna: Prox.	3	1	24-31
Femur: Prox.	2	3	23-24
Dist.	0	0	23-24
Tibia: Prox.	0	1	23-24
Dist.	1	0	19
Metapodial: Dist.	1	2	23-30
Calcaneum	2	1	23
Phalanx 1: Prox.	1	0	Before birth
Dist.	0	0	11-12
Phalanx 2: Prox.	0	0	Before birth
Dist.	0	0	9-11

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Table 6.5

Age Classes of Ovis/Capra in each excavation on basis of tooth eruption and wear. (M. IND)

AGE CLASS	TS1	TS2	TS3			MST		MK1			
			Upper	Lower	Phase 4	Phase 3	Phase 4	3	2	TOTAL	%
CLASS I (Juvenile) (Less than 3 months)	1	0	1	2	1	2	1	2	2	12	3.3
CLASS II (Juvenile) (3-10 months)	2	2	7	1	1	5	2	1	3	24	6.6
CLASS III (Sub-adult) (10-16 months)	7	8	12	6	4	10	2	3	5	57	15.6
CLASS IV (Adult) (16-30 months)	5	8	34	13	2	11	4	8	18	103	28.1
CLASS V (30-60 months)	11	15	43	18	3	15	5	15	13	138	37.7
CLASS VI (More than 60 months)	1	6	10	1	1	4	1	2	6	32	8.7
TOTAL	27	39	107	41	12	47	15	31	47	366	

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TABLE 6.6 TOOTH ERUPTION PATTERNS FOR *B.TAURUS* (AFTER SILVER, SISSON AND STEENKAMP)

		DECIDUOUS	SILVER 19th CENTURY PERMANENT	MODERN IMPROVED PERMENENT	SISSON DECIDUOUS	SISSON PERMANENT		STEENKAMP MASHONA	STEENKAMP AFRIKANDER
Incisors:	1	At birth	18 months	20-24 months	Birth-2 weeks	18-24 months	Incisors: 1	25 months	26 months
	2	"	30 months	30 months	"	24-30 months	2	32 months	35 months
	3	" or 2 weeks	42 months	36 months	"	36 months	3	40 months	40 months
	4	At birth or 2 wks	54 months	42-48 months	"	42-48 months	4	46 months	50 months
P1		Occasional	-	-	-	-			
P2		Birth-3 weeks	18 months	30 months	Birth-2 weeks	24-30 months			
P3		"	30 months	30 months	Birth to few days	18-30 months			
P4		"	42 months	36 months	"	30-36 months			
M1		-	6-9 months	6 months	-	5-6 months			
M2		-	30 months	15-18 months	-	12-18 months			
M3		-	48-60 months	24 months	-	24-30 months			

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TABLE 6.7 AGE CLASSES OF *BOS TAURUS* IN EACH EXCAVATION ON BASIS OF TOOTH ERUPTION AND WEAR (M.IND.)

AGE CLASS	TS1	TS2	TS3		MST		MK1			TOTAL	%
			Upper	Lower	Phase 4	Phase 3	Phase 4	Phase 3	Phase 2		
CLASS 1 Birth-6 months	1	1	2	0	0	2	0	0	0	6	2,3
CLASS 2 6-15 months	2	3	4	0	1	0	0	2	1	13	4,9
CLASS 3 15-18 months	5	5	11	1	3	1	1	2	3	32	12,2
CLASS 4 18-24 months	1	8	12	4	1	4	2	4	2	38	14,5
CLASS 5 24-30 months	3	7	12	3	2	5	1	4	2	39	14,8
CLASS 6 30-42 months	3	7	13	2	1	1	1	3	4	35	13,3
CLASS 7 Older than 42 months. Adult breeding animals	4	9	14	5	2	4	1	6	6	51	19,4
CLASS 8 Mature breeding animals	0	7	11	3	2	0	0	0	3	26	9,9
CLASS 9 Aged animals	1	3	9	1	2	3	0	2	2	23	8,8
TOTAL	20	50	88	19	14	20	6	23	23	263	

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TABLE 6.8 HORN CORE AND SINUS CAVITY DIMENSIONS IN *B. TAURUS*. MEASUREMENTS IN CM.

CATALOGUE NO.	BREED	SEX	TOOTH AGE CLASS	LENGTH OF HORN SHEATH (OUTER CURVE) cm	LENGTH OF OUTER CURVE OF HORN CORE	TEXTURE OF HORN CORE	LENGTH OF SINUS CAVITY	% OF CORE	BASE OF CORE
AZ/3	Pedi	Cow	4	-	21,0	Porous	8,3	39,5	6,2x4,2
AZ/5	Pedi	Bull	Old	-	44,2	Hard and smooth	37,5	84,8	9,2x8,0
AZ/11	Afrikander	Ox	8	85,0	56,0	Hard and smooth	9,8	17,5	8,9x7,8
AZ/16	Nguni	Cow	7	31,6	22,0	Hard, relatively smooth	17,1	77,7	6,2x4,3
AZ/17	Nguni	?Cow	5	50,3	43,1	Porous but hard	24,0	55,7	6,8x5,7
AZ/18	Jersey	Cow	9	23,9	16,3	Hard and smooth	14,8	90,8	3,6x3,2
AZ/19	Nguni	Cow	8	35,5	22,1	Hard and smooth	20,8	94,1	5,5x4,3
AZ/21	Nguni	Cow	8	45,0	26,1	Hard and smooth	18,9	72,4	5,3x4,7
AZ/22	Nguni	Cow	6	29,2	23,2	Hard, slightly porous	8,9	38,4	5,6x4,1

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Table 6.9

MEASUREMENTS OF *B. taurus* METAPODIALS. Measurements in cm.

	PROXIMAL WIDTH (Bp)	DISTAL WIDTH (Bd)	SHAFT LENGTH
Greefswald			
K2/T2/4041 Complete meta-carpal	5,98	6,55	19,7
MK1/B5/2065: Proximal metatarsal	4,74	-	
MK1/B5/2171: Proximal metatarsal, slightly damaged	3,94	-	
Pedi cow, AZ/1 Right metacarpal	5,78	5,68	21,0
Left matacarpal	5,78	5,65	20,5
Right metatarsal	4,82	5,25	24,2
Left metatarsal	5,05	5,36	24,3
Nguni cow, AZ/21 Right metacarpal	5,22	5,1	18,8
Left metacarpal	5,22	5,2	18,4
Right metatarsal	4,23	5,02	22,1
Left metatarsal	4,25	4,89	22,1
Ngoni ox (Fagan, 1967)			
Metacarpal	4,95	5,2	-
Metatarsal	5,7	6,15	-
Zambia: Behrens site (Fagan, et al., 1969)			
Metacarpal: mean dimensions	5,15	5,00	18,3
Metatarsal: mean dimensions	4,2	4,86	21,5
Zambia: Isamu Pati (Fagan, 1967)			
Metacarpal	5,2	5,7	-
Metatarsal	-	4,7	-
Kalundu (Fagan, op.cit.)			
Metacarpal	5,4	-	-
Metatarsal	4,7	-	-

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Table 6.9 (continued)

Kangila (Fagan, op.cit.)			
Metatarsal	4,1	-	-
Daima Satel (Fagan, in press)			
Metacarpal: median	5,7	5,6	-
Metatarsal: median	3,4	5,2	-

TABLE 6 : 11. MEANS OF MAXILLARY TOOTHROW MEASUREMENTS OF *B. TAURUS*

AGE CLASS	Provenance	Maxillary tooth row	Sample No.	MEAN
6	Greefswald	Premolar row	3	5,1
6	Greefswald	Molar row	5	7,5
6	Modern	Premolar row	1	5,8
6	Modern	Molar row	1	8,6
7	Greefswald	Premolar row	6	4,4
7	Greefswald	Molar row	13	8,1
7	Modern	Premolar row	4	5,4
7	Modern	Molar row	4	8,4
8	Greefswald	Premolar row	2	5,2
8	Greefswald	Molar row	3	7,8
8	Modern	Premolar row	2	5,5
8	Modern	Molar row	2	8,5

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TABLE 6 : 10

Mandibular and maxillary measurements of *B. taurus* from Greefswald and unimproved breeds

+ Indicates tooth row broken

SPECIMEN NO.		MAXILLA			MANDIBLE					AGE CLASS
		CHEEKTOOTH Row	PREMOLAR Row	MOLAR Row	CHEEKTOOTH Row	PREMOLAR Row	MOLAR Row	$M\bar{3}$ L	$M\bar{3}$ B	
GREEFSWALD										
1 MST/11(g)/664	Right	-	-	-	2) 6,17	5,34	-	-	-	Neonate
3 MST/912	Left	-	-	-	4) 7,24+	5,50	1,8+	-	-	1
5 K2/T2/3063	Right	-	-	-	6) +	4,74+	-	-	-	1
7 MST/873	Right	8,15+	5,69	2,74+	-	-	-	-	-	2
8 K2/T3/1915	Right	6,86+	5,92	+	-	-	-	-	-	2
9 MST(?)1007	Left	7,99+	5,43+	3,0+	-	-	-	-	-	2
10 K2/T3/2501	Right	12,4+	5,57	6,44+	-	-	-	-	-	3
11 MK1/1133	Right	12,5+	5,49	7,46+	-	-	-	-	-	3
12 K2/T3/2112	Left	-	-	-	13) +	5,96	-	-	-	3
14 K2/TS/1727	Left	8,68+	5,7	-	-	-	-	-	-	4
15 K2/T3/1726	Left	11,44+	5,54	5,78+	-	-	-	-	-	4
16 K2/T3/1742	Right	+	-	8,27	-	-	-	-	-	4
No measurable specimens		-	-	-	-	-	-	-	-	6
17 K2/T3/2465	Right	14,8+	5,22	6,12+	-	-	-	-	-	6
18 K2/T3/2114	Right	14,0	4,68	7,60	-	-	-	-	-	6
19 K2/T2/2952	Left	10,5+	5,35	5,45	-	-	-	-	-	6
20 MST(?)/1006	Left	10,18	+	8,04	-	-	-	-	-	6
21 K2/T3/2289	Left	12,2+	3,70+	8,23	-	-	-	-	-	6
22 K2/4851	Left	13,7+	5,18+	8,1	-	-	-	-	-	6
23 K2/T3/1845	Right	-	-	-	24) 15,8+	+	9,47	-	-	6
25 MK1/1465	Right	-	-	-	-	-	-	3,67	1,37	6
26 MK1/1414	Right	14,4	4,88	8,96	-	-	-	-	-	7
27 K2/T2/2867	Right	13,7	4,88	7,75	-	-	-	-	-	7
28 K2/T3/2125	Left	13,6	5,35	7,94	-	-	-	-	-	7
29 K2/T3/1724	Right	14,0	4,96	7,73	-	-	-	-	-	7
30 K2/T3/2124	Right	13,5+	5,24+	8,05	-	-	-	-	-	7
31 K2/T3/2115	Right	11,5+	3,35+	7,33	-	-	-	-	-	7
32 K2/T3/1722	Right	15,7+	5,44+	9.07	-	-	-	-	-	7
33 K2/T3/1723	Left	14,3	4,7	8,47	-	-	-	-	-	7
34 K2/4850	Left	14,4	5,29	7,69	-	-	-	-	-	7
35 K2/T3/1721	Left	13,2+	5,14+	7,47	-	-	-	-	-	7
36 MK1/1492	Left	13,7+	5,15+	7,90	-	-	-	-	-	7
37 K2/T3/2290	Right	13,3+	3,85+	8,64	-	-	-	-	-	7
38 K2/T3/2123	Left	9,1+	-	8,22	-	-	-	-	-	7
39 K2/T3/1725	Right	13,3+	-	7,73	-	-	-	-	-	7
40 MK1/1597	Right	-	-	-	-	-	-	3,46	1,25	7
41 MK1/1597	Left	-	-	-	-	-	-	3,56	1,25	7
42 K2/TS3/1510	Left	-	-	-	43) 14,7	5,29	8,89	3,72	1,37	7
44 K2/T3/2121	Left	-	-	-	45) 15,0	5,3	8,42	3,39	1,34	7
46 K2/T3/1684	Left	-	-	-	47) 13,3+	4,43+	8,47	3,44	1,28	7
48 K2/4852	Left	14,0	5,28	7,85	-	-	-	-	-	8
49 K2/T3/1864	Left	14,7	5,13	8,0	-	-	-	-	-	8
50 K2/T3/2120	Left	12,3+	-	7,65	-	-	-	-	-	8
51 K2/T3/2412	Left	-	-	-	52) 14,4	4,45	8,45	3,63	1,46	9
53 MK1/1419	Left	-	-	-	54) +	4,25	-	-	-	9
55 AZ/2 Pedi	Right	9,8	6,42	3,0	56) 8,8	5,94	2,29	-	-	2
57 AZ/14 Nguni	Right	14,5	5,78	8,03	58) 14,7	6,3	8,3	3,6	1,1	5
59 AZ/23 Nguni	Right	14,9	6,3	8,38	60) 15,3	6,43	8,57	3,53	1,09	5
61 AZ/17 Nguni	Right	15,2	5,75	8,6	62) 15,0	5,8	9,06	4,73	1,11	6
63 AZ/15 Nguni	Right	15,2	5,64	8,68	64) 15,1	5,75	8,4	No 3rd pillar		7
65 AZ/22 Nguni	Right	15,4	6,3	6,0	66) 15,4	5,74	9,0	3,96	1,17	5
67 AZ/19 Nguni	Right	15,0	5,17	8,20	68) 14,3	4,84	8,89	3,83	1,28	5
69 AZ/16 Nguni	Right	14,8	5,63	8,13	70) 15,9	5,73	8,78	3,39	1,27	7
71 AZ/21 Nguni	Right	14,3	5,07	8,20	72) 14,9	5,18	8,73	3,58	1,35	7
73 AZ/20 Nguni	Right	13,9	5,08	7,59	74) 14,8	5,19	8,64	3,9	1,64	8
75 AZ/1 Pedi	Right	14,7	5,13	8,69	76) 15,0	5,19	9,15	3,69	1,44	7
77 AZ/11 Afrikander	R	17,1	5,96	9.45	78) 16,3	5,12	10,09 (Abnormal)	4,02	1,67	8
79 AZ/10 Afrikander	R	15,4	5,36	8,25	80) 15,0	4,55	8,99	4,14	1,70	9

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TABLE 6.12 PROVENANCE OF CANID MATERIAL

SITE	CODE NO.	DESCRIPTION	DATE
Greefswald: K2/TS4/3	K2/TS4/02/3	Skull	1000-1060 AD
K2/TS2/A6/2	TS2/2892	Frag. right mandible	"
K2/TS3/02/7	TS3/383	Isolated left M3	"
Schroda, excavation 5/D1/2	SR/5/D1/2	Anterior portion of skull with both mandibles	
Zerrissene Mountain, South-West Africa	SWA/Z/1	Anterior portion of skull with mandibles	1640 AD
Zerrissene Mountain	SWA/Z/2	Skull with mandibles	1640 AD
Ntshekane, Natal	N/73/4	Left mandible, maxilla and skull fragments	Post-800 AD
Cape St. Francis midden	C/1968	Skull with mandibles	Pottery L.S.A.
Isamu Pati, Zambia	-	Skulls and mandibles	950-1000 AD
Zimbabwe, Central area K midden	-	20 fragments of five individuals	1300-1500 AD

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TABLE 6.14 COMPARISON OF K2/TS4 and SR/5 with *L. pictus*.

Specimen no.	Tooth row length (P1-M3)	Upper canine length	Skull heights (auditory bulla to parietal crest)
1 K2/TS4/02/3	6,52	-	6,09
4 SR/5/D1/2	6,59	2,20	-
L. pictus			
50 TM/3207	7,33	2,61	-
52 TM/3208	6,88	2,09	-
53 TM/11500	6,89	2,47	-
54 TM/177	6,87	2,47	8,23
55 TM/11895	7,58	2,69	8,02
56 TM/11896	7,15	2,35	8,20
57 TM/11897	6,79	2,32	7,73
59 TM/750	7,23	2,05	8,13
60 TM/3211	7,14	2,43	8,14
61 TM/9710	7,18	2,32	8,41
62 TM/16752	7,18	2,07	8,76

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TABLE 6.13 MEASUREMENTS OF CANID SKULLS (in cm)

SPECIMEN NO.	TOTAL SKULL LENGTH	PALATAL WIDTH AT M1	PALATAL LENGTH	% RATIO OF PALATE	LENGTH OF P4 Right	LENGTH OF P4 Left	LENGTH OF M1+M2 Right	LENGTH OF M1+M2 Left	WIDTH OF M2 Right	WIDTH OF M2 Left	TOTAL LENGTH OF MANDIBLE Right	TOTAL LENGTH OF MANDIBLE Left	DEPTH OF MANDIBLE BELOW P4 Right	DEPTH OF MANDIBLE BELOW P4 Left	DEPTH OF MANDIBLE POSTERIOR TO M1 Right	DEPTH OF MANDIBLE POSTERIOR TO M1 Left	CANINE LENGTH Right	CANINE LENGTH Left	P1-M3 LENGTH Right	P1-M3 LENGTH Left	M1 LENGTH Right	M1 LENGTH Left	WIDTH OF M3 Right	WIDTH OF M3 Left
1 K2/TS4/02/3	18,0	5,87	8,82		1,73	1,84	1,68	1,64	0,95	0,95	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2 TS2/2892	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+5,08	-	+1,65	-	-	-
3 TS3/383	-	-	-	-	-	-	-	-	-	0,85	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4 SR/5/D1/2	-	5,8	9,1	-	2,05	2,00	1,85	1,79	1,07	1,05	13,7	13,7	2,15	2,14	2,49	2,43	2,01	2,18	7,59	7,45	2,23	2,3	0,46	0,46
5 SWA/Z/1	+15,8	5,37	8,13		1,5	1,5	1,6	1,69	0,76	0,84	+10,3	+11,6	1,78	1,75	2,07	1,94	+1,27	+0,6	6,29	6,44	1,83	1,80	-	-
6 SWA/Z/2	+16,1	± 6,2	-	-	1,53	1,7	1,55	1,68	0,8	0,82	+11,8	11,6	1,79	1,87	2,12	2,19	+1,81	+1,59	6,95	6,70	±1,63	1,69	-	-
7 N/73/4	-	-	-	-	-	1,93	-	+ 1,79	-	-	-	+11,8	-	1,8	-	2,0	-	1,48	-	6,3	-	1,78	-	-
8 C/1968	13,0	5,19	6,64		1,46	1,45	+ 1,53	+ 1,6	-	0,78	9,5	9,6	1,25	1,19	1,47	1,48	-	1,0(e)	5,57	5,69	1,8	1,8	Uner.	Uner.
9 Zimbabwe: Z46	-	-	-	-	-	-	-	-	-	-	-	-	-			2,36	-	-	7,05	-	-	-	-	-
10 Z47	-	-	-	-	-	-	-	-	-	-	-	-	-			2,34	-	-	7,08	-	-	-	-	-
11 Z48	-	-	-	-	-	-	-	-	-	-	-	-	-			2,44	-	-	7,26	-	-	-	-	-
12 Zambia: VIA, D4.8	-14,9	5,0	7,7		1,68	-	+ 1,75	-	0,9	-	1,13	-	-		1,8	-	-	-	6,52	-	2,0	-	-	-
13 VI.B6.4	-	5,2	-		1,5	-	1,75	-	0,97	-	1,11	-	-	-	1,9	-	-	-	6,25	-	1,84	-	-	-
14 A.3.3	-16,0	5,6	8,5		1,65	-	1,85	-	1,03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15 VIA.B1.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2,0	-	-	-	6,7	-	1,9	-	-	-
16 Ext.CC.b.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2,7	-	-	-	7,07	-	2,05	-	-	-
17 ID.3.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,75	-	-	-	-	-	1,60	-	-	-
18 VIA.B4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2,2	-	-	-	-	-	1,90	-	-	-
Canis mesomelas ♂																								
19 TM/12012 Wolmaranstad	18,3	5,14	8,37		1,75	-	1,8	-	1,07	-	13,0	-	1,85	-	1,67	-	1,70	-	6,79	-	1,93	-	0,35	-
20 TM/12003 "	17,8	5,27	8,22		1,83	-	1,83	-	1,07	-	12,6	-	1,75	-	1,82	-	1,49	-	6,83	-	1,89	-	0,40	-
21 TM11997 "	16,5	5,05	7,84		1,80	-	1,96	-	1,08	-	11,8	-	1,57	-	1,72	-	1,47	-	6,69	-	1,95	-	0,41	-
22 TM/11999 "	17,7	4,92	8,42		1,69	-	1,82	-	1,05	-	12,4	-	1,9	-	1,78	-	1,55	-	6,9	-	1,79	-	0,40	-
23 TM/12008 "	16,4	4,88	7,92		1,68	-	1,79	-	1,00	-	11,2	-	1,44	-	1,65	-	1,39	-	6,38	-	1,77	-	0,39	-
24 TM/12000 "	18,2	5,26	8,29		1,83	-	1,85	-	1,10	-	12,4	-	1,59	-	1,78	-	1,58	-	6,9	-	1,92	-	0,39	-
C. mesomelas ♀																								
25 TM/12005 Wolmaranstad	17,3	4,93	8,09		1,74	-	1,78	-	1,02	-	11,8	-	1,65	-	1,70	-	1,50	-	6,51	-	1,87	-	0,38	-
26 TM/12006 "	15,8	4,9	17,37		1,7	-	1,85	-	1,09	-	-	-	1,39	-	1,49	-	1,39	-	6,43	-	1,82	-	0,42	-
27 TM/12013 "	16,3	4,78	7,74		1,75	-	1,85	-	0,97	-	11,7	-	1,55	-	1,60	-	1,45	-	6,43	-	1,83	-	0,38	-
28 TM/4419 KNGP	15,8	4,56	7,77		1,75	-	1,82	-	1,03	-	11,3	-	1,47	-	1,67	-	1,49	-	6,44	-	1,80	-	0,40	-
29 TM/16785 KNGP	16,1	4,54	7,70		1,88	-	1,95	-	1,12	-	11,5	-	1,58	-	1,58	-	1,46	-	6,43	-	1,90	-	0,38	-
30 TM/16446 Pretoria	17,1	4,78	7,97		1,74	-	1,82	-	1,08	-	11,8	-	1,5	-	1,68	-	1,08	-	6,53	-	1.83	-	0,43	-
C. mesomelas (Juv) ♀																								
31 TM/12007 Wolmaranstad	15,5	4,69	7,23		1,7	-	1,86	-	1,08	-	11,3	-	1,14	-	1,60	-	0,83e	-	6,39	-	1,88e	-	erupt.	-
32 TM/16455 Pretoria Zoo ♂	14,8	4,39	6,65		1,6	-	1,7	-	0,91	-	10,	-	1,28	-	1,49	-	1,18e	-	5,98	-	1,78	-	-	-
33 TM/23736 Acornhoek ♀	15,7	4,5	7,59		1,75	-	1,70	-	1,00	-	10,9	-	1,38	-	1,69	-	1,28e	-	6,19	-	1,87	-	0,40	-
Canis adustus ♂																								
34 TM/4414 Sabi	17,9	4,74	8,50	-	1,3	-	2,04	-	1,08	-	13,1		1,6	-	1,64	-	1,69	-	6,89	-	1,00	-	0,42	-
35 TM/4385 Acornhoek	16,9	4,83	7,83	-	1,46	-	2,12	-	1,07	-	11,8	-	1,37	-	1,30	-	1,59	-	6,13	-	1,65	-	0,44	-
36 TM/4386 Acornhoek	16,3	4,37	7,89	-	1,37	-	1,80	-	0,93	-	11,6	-	1,35	-	1,47	-	1,46	-	6,32	-	1,62	-	0,37	-
37 TM/7266 Klaserie	17,5	4,82	8,13	-	1,59	-	1,95	-	1,02	-	12,1	-	1,28	-	1,53	-	-	-	6,44	-	1,74	-	0,45	-
38 TM/5291 Klaserie	18,1	4,88	8,65	-	1,74	-	2,20	-	1,09	-	12,8	-	1,59	-	1,76	-	1,76	-	6,66	-	1,81	-	0,37	-
39 TM/10907 Maringaskraal	17,8	4,87	8,68	-	1,7	-	2,14	-	1,09	-	12,5	-	1,53	-	1,56	-	1,73	-	6,65	-	1,76	-	0,43	-
40 TM/6562 Mochaba River	17,2	4,55	8,04	-	1,63	-	2,14	-	1,09	-	11,8	-	1,59	-	1,59	-	1,42	-	6,49	-	1,91	-	-	-
41 TM/12666 Zambia	18,2	4,95	8,87	-	1,69	-	2,10	-	1,14	-	13,0	-	1,56	-	1,68	-	1,78	-	7,1	-	1,8	-	0,43	-
42 TM/999 Malawi	17,9	4,8	8,7		1,55	-	1,96	-	0,95		12,6		1,65	-	1,62	-	1,70	-	6,5	-	1,6	-	0,46	-
43 TM/1000 Malawi	18,1	4,91	8,78	-	1,55	-	2,05	-	0,99	-	13,4	-	1,69	-	1,81	-	1,69	-	6,67	-	1,73	-	0,39	-
44 TM/1001 Malawi	18,7	4,77	8,79		1,39	-	1,8	-	0,89	-	11,9	-	1,78	-	1.70	-	1,86	-	6,41	-	1,47	-	0,39	-
C. adustus ♀																								
45 TM/1004 Malawi	17,2	4,57	8,09		1,44	-	1,80	-	1,02	-	11,9	-	1,48	-	1,58	-	1,54	-	6,29	-	1,49	-	0,36	-
46 TM/10058 Malawi	16,9	4,75	8,05	-	1,57	-	2,09	-	1,17	-	12,1	-	1,49	-	1,54	-	1,46	-	6,54	-	1,65	-	0,37	-
47 TM/7267 Klaserie	17,8	4,86	8,58		1,6	-	2,0	-	1,02	-	12,6	-	1,7	-	1,78	-	1.06	-	6,87	-	1,7	-	-	-
48 TM/4387 Acornhoek	17,6	4,39	8,93		1,65	-	1,97	-	0,97	-	11,7	-	1,65	-	1,73	-	1,69	-	6,60	-	1,73	-	0,40	-
49 TM/11572 Shongombo	17,6	4,64	8,96		1,70	-	2,09	-	1,17	-	12,6	-	1,59	-	1,85	-	1,90	-	6,70	-	1,80	-	0,40	-
Lycaon pictus ♂																								
50 TM/3207 Zoutpansberg	-	7,40	9,78		2,25	-	2,48	-	1,05	-	15,8	-	2,45	-	2,75	-	2,39	-	8,39	-	2,62	-	0,46	-
51 TM/16705 juv. Zoo	13,4	4,63	5,69		Milk dentition	-			-		8,6	-	1,69											
L. pictus ♂																								
52 TM/3208 Zoutpansberg	-	7,35	9,24		2,00	-	2,44	-	0,97	-	14,5	-	2,34	-	2,66	-	2,12	-	7,90	-	2,34	-	0,47	-
53 TM/11500 Msusa	-	6,79	9,06		2,12	-	2,40	-	1,00		14,2	-	2,30	-	2,50	-	2,46	-	8,10	-	2,47	-	0,49	-
L. pictus Sex unknown																								
54 TM/177 Transvaal	22,6	7,34	9,47	-	2,06	-	2,14	-	0,95	-	15,2	-	2,30	-	2,68	-	2,15	-	7,95	-	2,54	-	0,43	-
55 TM/11895 White River	23,1	7,63	10,20	-	2,20	-	2,50	-	1,03	-	16,0	-	2,53	-	2,77	-	2,20	-	8,64	-	2,69	-	0,53	-
56 TM/11896 White River	23,1	7,52	10,24	-	2,18	-	2,54	-	1,14	-	16,0	-	2,54	-	3,04	-	2,30	-	8,40	-	2,61	-	0,49	-
57 TM/11897 White River	21,3	7,15	9,70	-	2,04	-	2,30	-	1,04	-	14,7	-	2,30	-	2,59	-	2,14	-	7,72	-	2,37	-	0,46	-
58 TM/11898 White River	-	5,25	7,07	-	Milk dentition				-		10,7	-	-	-	-	-	-	-	-	-	-	-	-	-
59 TM/750 Singwitsi Game Reserve	22,7	7,60	9,60	-	2,0	-	2,40	-	1,02	-	15,1	-	2,54	-	2,72	-	2,35	-	8,47	-	2,44	-	-	-
60 TM/3211 SE Rhodesia	23,8	7,90	9,82	-	2,05	-	2,50	-	1,09	-	15,9	-	2,35	-	2,85	-	2,17	-	8,14	-	2,64	-	0,45	-
61 TM/9710 Zambia	22,8	7,39	16,04	-	2,15	-	2,32	-	0,88	-	15,6	-	2,49	-	2,90	-	2,28	-	8,15	-	2,50	-	0,50	-
62 TM/16752 Loc. Unknown	23,8	7,92	10,00	-	2,20	-	2,34	-	0,98	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
63 TM/18775 ♂ Zoo	21,2	7,58	9,39	-	2,15	-	2,34	-	1,14	-	14,8	-	2,35	-	2,87	-	2,07	-	7,78	-	2,52	-	0,48	-

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TABLE 6:15. PRE-EUROPEAN CANIDS COMPARED WITH PETTER (1934)

SPECIMEN NO.	PALATAL WIDTH AT M1	PALATAL LENGTH	LENGTH OF P4	LENGTH OF M1+M2	LENGTH OF PREMOLAR ROW
1 K2/TS4/02/3	5,87	8,82	1,73	1,68	5,0
4 SR/5/D1/2	5,8	9,1	2,05	1,85	4,9
5 SWA/Z/1	5,37	8,13	1,5	1,6	4,4
6 SWA/Z/2	± 6,2	-	1,53	1,55	4,6
7 N/73/4	-	-	1,93	+ 1,79	+ 4,9
8 C/1968	5,19	6,64	1,46	+ 1,53	3,78
Petter (1934)	(Measurement No.20)	(No.10)	(No.15)	(No.13)	(No.14)
1	5,6	9,6	1,8	1,7	5,15
2	5,95	9,75	1,9	1,9	5,4
3	5,9	9,75	1,7	1,6	5,45
4	6,05	9,2	1,85	1,8	4,8
5	5,7	8,55	1,9	1,8	4,6
6	5,45	-	1,8	1,75	4,5
7	5,4	-	1,75	1,6	4,5
8	-	-	1,75	1,7	4,65
9	4,85	7,8	1,5	1,5	4,4
10	4,95	+ 7,7	1,3	1,35	3,9
11	5,75	9,15	1,6	1,7	4,9
12	5,9	9,2	1,6	1,55	4,9
13	6,8	10,75	1,9	1,9	5,85
14	5,95	8,6	1,7	1,7	4,9
15	5,2	7,2	1,5	1,5	4,1
16	5,35	8,2	1,6	1,6	4,55
17	6,5	10,7	2,0	2,0	5,55
18	5,5	8,65	1,5	1,5	4,65
19	5,6	-	1,5	1,5	4,6
20	4,8	7,0	1,4	1,4	3,7
21	4,9	7,15	1,4	1,45	4,0
22	-	6,9	1,45	1,45	3,9

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Table 9.1. K2/TS2. HORIZONTAL DISTRIBUTION OF BONE FLAKES IN LEVELS 1 AND 2.

SQUARE NO.	LEVEL 1		LEVEL 2	
	No.	% OF BONE FLAKES	No.	% OF BONE FLAKES
A1	943	16,2	317	7,3
A2	772	13,3	372	8,6
A3	559	9,6	367	8,5
A5	380	6,5	273	6,3
A6	216	3,7	601	13,9
B4	1126	19,3	453	10,5
B5	693	11,9	1057	24,4
B6	371	6,4	452	10,4
C5	601	10,3	441	10,2
C6	164	2,8	2	0,5
TOTAL	5825		4335	

Table 9.2. MK1 : HORIZONTAL DISTRIBUTION OF WASTE BONE & BOVID POST-CRANIAL PARTS IN LEVEL 10. SQUARE A4 NOT INCLUDED.

SQUARE NO.	BOVID POST-CRANIAL		WASTE BONE		TOTAL	
	No.	% of Total	No.	% of Total	No.	%
A3	28	2,4	273	23,0	301	25,4
B3	40	3,4	390	32,9	430	36,3
B4	37	3,1	338	28,5	375	31,6
A5	0	0	10	0,9	10	0,9
B5	7	0,6	64	5,4	71	6,0
TOTAL	112		1075		1187	

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Table 9.3. DENSITY OF IDENTIFIED BONE IN RELATION TO THE DEPTH OF EXCAVATIONS.

EXCAVATION	SIZE(m)	m^3	NO. OF BONES	BONES PER m^3
K2/TS2	2x22x0,8	35,2	25877	735,1
MST/K8/Phase 4	3,6x3,6x0,94	12,18	2413	198,1
MST/K8/Phase 3	3,6x3,6x2,13	27,6	6365	230,6
MK1/Phase 4	9x6x0,5	27,0	3858	142,9
MK1/Phase 3	9x6x0,75	40,5	5311	131,21
MK1/Phase 2	9x6x0,85	45,9	13774	300,1

TABLE 9.4 RELATIVE PROPORTIONS OF AXIAL/APPENDICULAR REMAINS IN K2/TS1.

LEVEL	TOTAL AXIAL		APPENDICULAR		TOTAL	AXIAL (IDENTIFIED SKULL & ALL VERTEBRAE)		APPENDICULAR		TOTAL
	No.	%	No.	%		No.	%	No.	%	
1	1392	82,1	304	17,9	1696	344	53,1	304	46,9	648
2	1862	77,9	529	22,1	2391	511	49,1	529	50,9	1040
3	613	84,1	116	15,9	729	209	64,3	116	35,7	325
4	323	82,2	70	17,8	393	134	65,7	70	34,3	204
5	143	80,8	31	17,5	177	38	55,1	31	44,9	69

TABLE 9,5. RELATIVE PROPORTIONS OF AXIAL/APPENDICULAR REMAINS ON MST AND MK1.

LEVEL	TOTAL AXIAL		APPENDICULAR		TOTAL	AXIAL (IDENTIFIED SKULL & ALL VERTEBRAE)		APPENDICULAR		TOTAL
	No	%	No	%		No	%	No	%	
K8/7	579	82,1	126	17,9	705	174	58,0	126	42,0	300
MK1/2	450	59,6	305	40,4	755	180	37,1	305	62,9	485
MK1/8	499	68,8	226	31,2	725	224	49,8	226	50,2	450
MK1/10	363	75,3	119	24,7	482	190	61,5	119	38,5	309
MK1/11	1325	65,2	707	34,8	2032	681	49,1	707	50,9	1388

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TABLE 9,6. PRESERVATION OF SKELETAL PARTS AT FOUR BUSHMAN CAMPS. NUMBER IN BRACKETS IS NUMBER OF INDIVIDUALS BROUGHT BACK TO CAMP.

	CAMP 2		CAMP 3				CAMP 6		CAMP 10
SKELETAL PART	GEMSBOK (1)	STEENBOK (1)	DUIKER (2)	STEENBOK (1)	PORCUPINE (3)	TORTOISE (1)	GEMSBOK (1)	STEENBOK (1)	GEMSBOK (2)
Skull (incl. mandible)		1	10	3	17		11	3	4
Vertebrae	17		11	5	5		8	1	43
Sternum									1
Rib	16		5		29		6	6	31
Scapula		1			7		1	1	17
Humerus	1		2		5		5	1	7
Radius					1		3	1	2
Ulna		1	1		6		1	3	3
Pelvis			5		7				15
Femur	16		2	2	7		10	6	8
Tibia	9		1		1			1	1
Fibula					1				
Metapodial		2	2		1		1		
Hoof					1		3		2
Other extremities			7	1				7	4
Unidentified bones			1				1		1
Carapace						3			
TOTAL	59	5	47	11	88	3	50	30	139

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TABLE 9.7 MK1/11: SIZE CATEGORIES OF BOVID SKELETAL PARTS

SIZE (cm)	Scapula	Humerus	Radius	Ulna	Pelvis	Femur	Tibia	Metapodials	Astragalus/ Calcaneum	Carpals/tarsals/ Sesamoids	Phalanges	Long bone shafts	TOTAL	%
1-2	0	1	1	0	1	2	0	3	0	2	1	0	11	1,7
2-3	5	2	5	0	0	3	5	7	8	9	16	1	61	9,6
3-4	11	9	8	6	5	7	3	13	6	14	35	3	120	18,8
4-5	4	17	11	6	11	9	7	25	4	7	10	3	114	17,8
5-6	10	4	10	6	9	4	4	22	7	5	5	4	90	14,1
6-7	1	5	9	6	4	2	8	21	11	1	3	3	74	11,6
7-8	3	4	6	4	3	3	7	19	1	2	1	4	57	8,9
8-9	3	1	5	2	3	1	4	8	0	0	0	1	28	4,4
9-10	0	4	1	1	2	3	0	6	0	0	0	3	20	3,1
10-11	1	0	2	0	1	2	0	10	0	0	0	0	16	2,5
11-12	3	0	2	1	3	0	1	8	0	0	0	1	19	3,0
12-13	1	0	1	1	3	0	1	3	1	0	0	0	11	1,7
13-14	0	1	2	0	1	1	0	2	0	0	0	0	7	1,1
14-15	2	0	1	0	0	0	1	1	0	0	0	1	6	0,9
16-17	2	0	0	0	0	0	0	0	0	0	0	0	2	0,3
18-19	0	0	0	0	0	0	1	0	0	0	0	0	1	0,2
19-20	1	0	0	0	0	0	0	0	0	0	0	0	1	0,2
22-23	0	0	0	0	0	0	1	0	0	0	0	0	1	0,2
TOTAL	47	48	64	33	46	37	43	148	38	40	71	24	639	

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Table 10.1. DISTRIBUTION OF BONE TOOL TYPES FROM GREEFSWALD ASSEMBLAGE.

TYPE NO.	K2	MST	MK1	PROVENANCE UNKNOWN	TOTAL
502	3	2	3	0	8
503	2	0	12	2	16
504	1	1	62	2	66
505	2	0	0	0	2
507	1	0	2	5	8
509	2	1	17	3	23
510	3	2	92	8	105
511	3	1	0	1	5
512	3	3	73	8	87
513	0	0	50	4	54
514	0	1	43	2	46
517	35	10	5	0	50
518	5	1	2	0	8
519	3	0	0	0	3
522	1	0	1	1	3
523	1	0	1	0	2
525	0	0	11	1	12
527	1	0	0	0	1
529	0	5	0	1	6
531	1	0	0	0	1
534	0	1	0	1	2
537	0	0	1	0	1
538	4	0	0	0	4
TOTAL NO. OF FORMAL AND SEMI-FORMAL TOOLS	71	28	375	39	513
NON-FORMAL TOOLS:					
Bone flakes	21	12	2	0	35
Ribs	30	5	6	0	41
Other	9	0	8	0	17
TOTAL NON-FORMAL TOOLS	60	17	16	0	93

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TABLE 10.2 VERTICAL DISTRIBUTION OF BONE TOOLS

DESCRIPTION		FORMAL TOOLS	INFORMAL TOOLS	TOTAL
1' LEVEL				
1935-1940	K2	2	0	2
	MK1	112	0	112
U.P. EXCAVATIONS				
	K2	8	11	19
	MST	11	4	15
	MK1	38	5	43
TOTAL		171	20	191
2' LEVEL				
1935-1940	K2	5	1	6
	MK1	105	0	105
U.P.	K2	8	1	9
	MST	1	2	3
	MK1	2	0	2
TOTAL		121	4	125
3' LEVEL				
1935-1940	K2	4	1	5
	MK1	18	0	18
U.P.	K2	1	0	1
TOTAL		23	1	24
4' LEVEL				
1935-1940	MK1	11	1	12
1935-1940: BELOW 4'		3	1	4
OTHER U.P. EXCAVATIONS TS1, TS2, TS5 and TS1, TS2 AND TS3 below 2'		77	68	145
PROVENANCE/DEPTH UNKNOWN		133	0	133
TOTAL		213	69	282

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TABLE 10.3 THE OCCURRENCE OF IVORY AT GREEFSWALD

DESCRIPTION	PROVENANCE K2: LEVELS						TOTAL
	1'	2'	3'	4'	DEEPER	UNKNOWN	
Tusk fragments	0	0	0	1	TS3/Level 4	RN2	3
"Segments" cut from tusks	1	0	1	5	TS2/Level 2 TS3/4	0	9
Ivory chips with cut marks	5	1	0	0	TS3/15 & 19 8' (4)	16	28
Ivory chips, no cut marks	29	14	0	0	TS2(6) TS3(30), 8'(3)	31	115
Ivory armband fragments	4	3	10	4	6'(1), 8'(4) TS2(11) TS3(6)	K2(7) K1(2)	52
TOTAL	39	18	11	10	70	56	207

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TABLE: 11.1 DISTRIBUTION OF CLAY ANIMAL FIGURINES;

PROVENANCE	CATTLE	GOATS	SHEEP	WILD ANIMAL
K2/1934/1935	1 (JS.4)	0	0	0
Mahobe/1934-1935	0	0	0	1 (Giraffe)
K2/1935-1940	6	1	0	1 ("Hippopotamus")
M/6-1/55-11-3	2	0	0	0
M.1940	0	1	0	0
34.2F	1	0	0	0
Numbered specimens	2	0	0	0
?K2	1	0	0	0
(? Mahobe)	2	0	0	0
Prov. Unknown	1	0	0	0
K2/TS1/Level 1	2	0	0	0
K2/TS3/A2/1.1.1	1	0	0	0
K2/TS3/A2/4	1	0	0	0
K2/TS3/A2/5.1	3	0	0	0
K2/TS3/A2/5.2	1	0	0	0
K2/TS3/A2/6	1	0	0	0
K2/TS3/02/8	1	0	0	0
K2/TS3/01/9	1	0	0	1 (Springhare)
K2/TS3/A2/10	0	1	0	0
MST/K8/7	0	0	2	0
TOTAL	27	3	2	3

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TABLE 12.1. SUMMARY OF FAUNAL EVIDENCE WITHIN THE IRON AGE OF SUB-SAHARAN AFRICA.

DATE	SITE	CATTLE	SHEEP/ GOATS	"DOMESTIC ANIMALS"	CATTLE FIGURINES	HUNTING
410-810BC	Narosura Kenya	x	x	-	-	Some
180AD and 570AD	Mabveni, Rhodesia	1(1)	(3)	-	-	-
220-980AD	Makwe Shelter, Zambia	x	x	-	-	In majority
330-1060AD	Thandwe Shelter, Zambia	-	-	-	-	x
360-775AD	Nkope Malawi	?	-	-	-	41% aquatic species, rest hunted.
450AD	Lukenya Hill, Kenya	x	x	-	-	-
460AD	Broederstroom, Transvaal	x	x	-	-	x
550AD	Banda Hill, Malawi	-	(1)?	-	-	-
579AD	Kumadzalo, Zambia	x	?	-	Humped	x
590AD	Namakala, Zambia	-	-	?	-	x
"Early I.A."	Nanga, Zambia	12	2	-	-	-
600-1300AD	Matope Court, Malawi	1?	-	-	-	31% aquatic 37% hunted bovids
"Early Iron Age"	Tambala Village, Dedza, Malawi	-	-	x	-	-
690AD	Makuru, Rhodesia	12(6)	x	-	-	-

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TABLE 12.1 continued

DATE	SITE	CATTLE	SHEEP/ GOATS	"DOMESTIC ANIMALS"	CATTLE FIGURINES	HUNTING
700-800 AD	Leopard's Kopje Site XII, Taba Zikamambo, Rhodesia	-	-	-	x	-
880 AD	Deloraine Farm, Nakuru District, Kenya (Sutton 1972)	x	-	-	-	-
800 AD	Ntshekane, Natal (Maggs & Michael, 1976)	x	x	-	Humped	Almost equal number of wild bovids
1000AD	Kalundu Mound, Zambia	x	x	-	Humped & humpless	x
850-1000 AD	Ingombe Ilede, Zambia	x	x	-	x	x
800-1000 AD	Leopard's Kopje Culture, Rhodesia:					
	Leopard's Kopje (Main Kraal)	68 Beast burial	12	-	x	-
	Blue Jay/Bunting Close	5(3)	1	-	Humped	-
1000 AD	Tautswe Botswana	46	56	-	-	x
1215-1410 AD	Ivuna salt pans, Tanzania	x	x	-	-	x
1300 AD	Enyandeni Farm (LKIII)	3 (Beast burials)	?	-	x	-
1440 AD	Kangila, Zambia	x	Few	-	-	28%

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HOOFSTUK 8. PLANTOORBLYFSELS.
MENSLIKE SKELETMATERIAAL.
DATERING.

		Bladsy
1.	PLANTOORBLYFSELS	
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BYLAE 8/1
8/2
8/3

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HOOFSTUK 8. PLANTOORBLYFSELS. MENSLIKE SKELETMATERIAAL. DATERING.

1. PLANTOORBLYFSELS

1.1 Kommentaar

Sade van wilde sowel as gedomestikeerde plante is op al drie die Greefswaldterreine in verskillende woonlae gevind. Dit is waarskynlik dat die vondste nie die totale ver= skeidenheid van plantreste verteenwoordig nie, want die opgrawings het slegs 'n klein deeltjie van die betrokke terreine gedek. Nietemin dui die wilde sade daarop dat die natuurlike plantegroei min of meer dieselfde as die huidige moes gewees het. Die gedomestikeerde sade, nl. sorghum en 'n boontjie-spesie, verteenwoordig akkerboubedry= wighede wat ook op ander ystertydperkterreine vasgestel is en wat in historiese tye nog onder die Bantoe voorkom. Soos uit die aangehegte bylae blyk, bestaan daar twyfel oor die aanwesigheid van pennisetum (babala, "pearl millet"), m.a.w. dit kon nie met sekerheid geïdentifiseer word nie. Daarom word daar in die klassifikasie-tabel 'n ope kolom vir pennisetum gelaat.

Volgens die stratigrafiese indeling van die klassifikasie-tabel het sorghum vanaf die onderste tot die boonste lae op K2 sowel as die Suidelike Terras en Mapungubwekop voor= gekom en dit kan dus aanvaar word dat hierdie plantvoedsel deurgaans deur die Greefswaldmense verbou is. In etlike gevalle is die sorghumsaad in die vorm van 'n gebrande, saamgekoekte klont gevind, wat waarskynlik die oorblyfsels verteenwoordig van 'n graanhouer wat afgebrand het. Boontjie= sade is slegs in twee lae gevind, maar 'n hele aantal stukkies houtskool wat nie duidelik geïdentifiseer kon word nie, kon

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moontlik boontjiesade gewees het. Die boontjies wat in Ts 4 op K2 gevind is, was in 'n redelike groot massa saam= gekoek en moes ook in een of ander houer gebêre gewees het.

Die plantkundige vondste is te beperk om omvattende afleidings te maak in verband met die voedselgebruike en akkerboubedrywighede van die Greefswaldmense.

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TERREIN K2

Opgrawing	Blok	Laag	Gedomestikeerde sade			Wilde sade					
			Vigna unguiculata Boontjie sp	Sorghum bicolor Kafferkoring	Pennisetum typhoides Babala	Sclerocarya caffra Maroela	Xanthocercis zambesiaca Nyalabessie	Vangueria infausta Mispel	Citrullus lanatus Tsamma	Syzygium cordatum Waterbessie	Adansonia digitata Kremetart
Rn 2	C3	1		x							
	B8	2		x							
	C8	2		x							
	C4	2		x							
	E10	2		x		x			x	x	
	D10	2.2						x			x
	D9	3		x				x			
	D10	3		x							
	E10	3		x		x					
	D9	4		x		x		x			
	B7	5		x							
	C4	5		x			x				
	C7	5		x		x					
Ts 2	B4	1				x					
	A4	2				x					
		3(a)					x				
Ts 3	O1	1		x							
	O2	3				x	x				
	O2	5				x					
	O2	6		x							
	O2	7		x							
	O2	8		x		x					
	O1	9		x							
	O2	9		x		x	x				

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TERREIN K2 (vervolg)

Opgrawing	Blok	Laag	Gedomestikeerde sade			Wilde sade					
			Vigna unguiculata Boontjie sp	Sorghum bicolor Kafferkoring	Pennisetum typhoides Babala	Sclerocarya caffra Maroela	Xanthocercis zambesiaca Nyalabessie	Vangueria infausta Mispel	Citrullus lanatus Tsamma	Syzygium cordatum Waterbessie	Adansonia digitata Kremetart
Ts 3	O2	10		x		x					
	O2	12		x							
	O2	14		x							
	O2	19		x			x				
Ts 4	A1	1					x				
	AO	2					x				
	A2	2					x				
	A3	3					x				
	A1	3(ii)					x				
	AO	4	x								
	A1	4				x					
	A1	5		x			x				
	A2	5				x					
	A3	5		x		x					
	A3	6		x							
	A2	7					x				
Ts 6	A2	1		x							
	A2	2		x							
	A2	3		x		x	x				
	A2	3				x					
	A2	3					x				
	A2	6					x				

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TERREIN SUIDELIKE TERRAS

Opgrawing	Blok	Laag	Gedomestikeerde sade			Wilde sade					
			Vigna unguiculata Boontjie sp	Sorghum bicolor Kafferkoring	Pennisetum typhoides Babala	Sclerocarya caffra Maroela	Xanthocercis zambesiaca Nyalabessie	Vangueria infausta Mispel	Citrullus lanatus Tsamma	Syzygium cordatum Waterbessie	Adansonia digitata Kremetart
MST	F4	2(iii)					x				
		3(iii)					x				
		8(ii)		x			x				
		8(iii) a		x							
		8(iii) b		x							
		8(iii) c		x		x					
		8(iii) d					x				
		8(iv)		x							
MST	H5	2(iii)					x				
		5(i) a		x							
		5(iv)		x			x				
		6(iii)					x				
		6(iii) b					x				
MST	K8	4							x		
		5		x					x		
		6		x							
		10		x							
		11		x							
		11+12		x							
		12		x							
		13		x			x			x	
MST I	A2	3				x					
		11							x		

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TERREIN MAPUNGUBWEKOP

Opgrawing	Blok	Laag	Gedomestikeerde sade			Wilde sade					
			Vigna unguiculata Boontjie sp	Sorghum bicolor Kafferkoring	Pennisetum typhoides Babala	Sclerocarya caffra Maroela	Xanthocercis zambesiaca Nyalabessie	Vangueria infausta Mispel	Citrullus lanatus Tsamma	Syzygium cordatum Waterbessie	Adansonia digitata Kremetart
Mk 1	B5	9(i)					x				
	B3	9(ii)		x			x		x		
	A3	9(ii)		x					x		
	B3	10		x							
	B4	10		x		x	x				
	B3	10(i)		x							
	B4	10(ii)		x							x
	A3	10(iii)					x				
	A3	11		x							
	B5	11		x		x	x			x	x
	B4	11	x	x							
Mk 3	A1	1		x							
	A2	5		x							
	A3	6		x							

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2. MENSLIKE SKELETMATERIAAL

2.1 Kommentaar

Agt menslike geraamtes, almal afkomstig van K2, is deur dr. Hertha de Villiers geïdentifiseer as verteenwoordigend van 'n negroïede fisieke tipe. Die identifikasie stem dus ooreen met dié van Rightmire en met die 116 Leopard's Kopje-geraamtes wat deur Huffman vermeld word (Huffman 1974).

Met uitsondering van een individu van tussen agt en nege jaar oud, is al die skelette dié van kinders van vyf jaar of minder. Hulle is almal gevind in die vlak as-afsettings rondom die woonhut-area (vergelyk hoofstuk 4). Ouere kinders en volwassenes moes dus elders begrawe gewees het. Volgens Gardner se vondste kan daar ook nie vasgestel word waar die volwassenes begrawe is nie want ook hý het hoof= saaklik kindergeraamtes gevind.

Die wyse waarop die kinders begrawe is, word in hoofstuk 4 beskryf. Dit stem ooreen met die gebruike soos deur Huffman (1974) in verband met Leopard's Kopje beskryf is.

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3. DATERING

3.1 Kommentaar

Vier-en-twintig daterings is deur J.C. Vogel gedoen. Vogel is van mening dat die datums mekaar in so 'n mate aanvul en kontroleer dat verdere daterings nie nodig is nie. Slegs een belangrike area is nie direk gedateer nie, nl. die een woonhut-area, komponent 2, op K2 wat tussen Bambandyanalo en die groot sentrale ashoop geleë is. Die verskil in ouderdom tussen Ts 1 teen die hang van Bambandya= nalo, nl. 970 n.C., en die begin van die sentrale ashoop, nl. 1000 n.C., is egter so klein dat die woonhut-area se ouderdom eintlik in daardie selfde tydsfase moet val.

In meeste gevalle is die materiaal wat vir datering gebruik is, los stukkies houtskool wat in 'n stratigrafiese verband opgegrawe is. In 'n paar gevalle is egter verkoolde hout= paaltjies gebruik. So, byvoorbeeld, is twee van die datums wat die einde van fase II op die Suidelike Terras aandui, gebaseer op verkoolde paaltjies wat met spesifieke vloere verband hou.

Die strekking van Vogel se verslag i.v.m. die kulturele fases op Greefswald is soos volg.

(i) Greefswald is slegs vir 3 eeue deur die sg. Greefs= waldmense bewoon.

(ii) K2, die Suidelike Terras en Mapungubwekop is gelyk= tydig deur die K2-mense beset tot ongeveer 1070 n.C.

(iii) K2 is ongeveer 1070 n.C. ontruim, want geen jongere datum kon t.o.v. die terrein bepaal word nie.

(iv) Ná die beëindiging van die bewoning van K2 het die bewoning van die Suidelike Terras en Mapungubwekop voortgegaan tot ongeveer 1200 n.C.

(v) Die middel- en jongste fase van die sg. Mapungubwekultuur (fases III en IV) val min of meer saam met die vroeëre gedeelte van Periode III by Zimbabwe.

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(vi) Die chronologie van Greefswald is dan soos volg.

K2 Terrein en Mk/ST	(Fase II)	970 tot 1070 n.C.
Mapungubwe/Suidelike Terras	(Fase II)	: voor 1070 n.C.
" " "	(Fase III)	: 1070 tot 1150 n.C.
" " "	(Fase IV)	: 1150 tot 1200 n.C.

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BYLAE 8/1

VERSLAG OOR GEÏDENTIFISEERDE PLANTESADE

Monsters van plantesade is aan mnr. J.N. Pienaar van die Navorsingsinstituut vir Plantkunde oorhandig vir identifi= kasie. Die monsters is afkomstig van verskillende blokke en lae van die drie terreine K2, Suidelike Terras en Mapungubwekop. Die sade was byna sonder uitsondering in 'n verkoolde toestand en die identifikasie daarvan was gevolglik soms moeilik.

Die volgende plante is geïdentifiseer.

Wilde plante

Sclerocarya caffra (Maroela)
Xanthocercis zambesiaca (Nyalabessie)
Vangueria infausta (Mispel)
Citrullus lanatus (Tsamma)
Syzygium cordatum (Waterbessie)
Adansonia digitata (Kremetart)

Gedomestikeerde plante

Vigna unguiculata (Boontjie spesie)
Sorghum bicolor (Kafferkoring).
Pennisetum typhoides (Babala)

Oor die pennisetum was daar 'n mate van onsekerheid. Die betrokke saad het saam met sorghum voorgekom in aanmekaar= gekoekte, verkoolde klonte wat oënskynlik die oorblyfsels is van graan wat gebêre was in graanhouers wat toe afgebrand het.

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Monsters van die gedomestikeerde sade is vir kontrole-doeleindes na mev. E.J. du Plessis van die afdeling Plant- en saadbeheer, dept. Landboutegniese dienste, geneem en haar bevindinge het met dié van mnr. Pienaar ooreengestem. Weer eens was daar onsekerheid oor die teenwoordigheid van pennisetum.

'n Derde identifikasie is deur mejj. Retief, Smook en van Hoepen van die Navorsingsinstituut vir Plantkunde, onderneem, maar dit het niks nuuts opgelewer nie.

J.F. Eloff

Departement Argeologie
Universiteit van Pretoria

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BYLAE 8/2

VERSLAG OOR MENSLIKE SKELETMATERIAAL

deur H de Villiers,
Universiteit van die Witwatersrand

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HUMAN SKELETAL MATERIAL FROM K2 SITE - Excavated 1972-73

(J.F.Eloff, Department of Archaeology, University of Pretoria)

The human skeletal remains comprise:

1. K2 Grave TS 5/1 (Figures 1 and 2)

Cranium and mandible; vertebrae and parts thereof; ribs and portions thereof; left clavicle; proximal part of left humerus, fragments of scapulae; phalanges and metacarpals; two epiphyses.
Deciduous teeth in situ: maxillary - left incisors, canine and molars; right central incisor, canine and molars.
Permanent crowns in situ: first molars
Permanent crowns isolated: right central incisor
Deciduous teeth in situ: mandible - right and left molars
Deciduous teeth isolated: left lateral incisor and canine
Permanent crowns isolated: incisors and left canine.

2 blue-green glass beads.

The remains are those of a child of between 3 to 4 years of age. The cranial vault, base and facial skeleton have been crushed, fractured & distorted. A partial reconstruction is shown in Figure 2.

2. K2 Grave TS 5/2 (Figures 3 and 4)

Cranium and right half of mandible; vertebrae and fragments thereof; ribs and fragments thereof; left clavicle and distal portion of right; right and left scapular fragments; humerus, left as well as proximal ulna and radius; femur left, tibia and fibula, fractured and fragmented; proximal portion of right tibia; fragmented right and left os coxae; phalanges.
Deciduous teeth in situ: maxillary - incisors, canines, erupted first molars; second molar crowns present but as yet unerupted.
Permanent teeth in situ: first molar crowns.
Deciduous teeth in situ: mandible - first molar and second molar crown.
Permanent teeth in situ: first molar crown.

Also ungulate incisor
29 red glass beads.

The remains are those of a child of between 18 months to two years of age. The os coxae suggest a female child. The cranial vault, base and facial skeleton have been crushed and fractured but the distortion is minimal in this specimen.

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3. K2B Grave TS 2/2 (Figures 5 and 6)

Cranium and mandible as well as portions of the first three cervical vertebrae.
The cranial vault, base and facial skeleton are fractured, fragmented and somewhat distorted. The cranial vault has been reconstructed as far fragmentation and distortion permitted (Figure 6).
Deciduous teeth isolated: all twenty deciduous teeth are present. The lower left central incisor duplicated crowns and root which have fused.
Permanent crowns isolated: upper central incisors, lateral incisors, canines and first molars; lower central incisors and left first molar.

4 ostrich egg shell beads and two pot sherds.

The remains are those of a child of between 4 to 5 years of age.

4. K2 B Grave TS 2/1

Fragments of cranial vault bones (9) and mandible (1); 3 phalanges and fragments thereof; 1 metacarpal bone; fragment of vertebra.
As well as 3 animal bones and 3 ungulate teeth.

The remains are those of a human infant but are too fragmentary to allow an assessment of the age at death.

5. K2 TS 5/2 Grave 1

Fragments of ribs and vertebrae; fragments of long bones, 2 tarsal bones and phalanges.
As well as 5 fragments of animal bone, a fragment of an ungulate tooth and a metal shaving.

The remains are those of a human infant but too fragmentary to allow for an accurate assessment of the age at death.

6. K2 TS 2/3 Grave 2

Very fragmentary remains of vertebrae; ribs; os coxae; humerus, radius ulna, femur, tibia, fibula and epiphyses; carpal and tarsal bones, metacarpal, metatarsal bones and phalanges.

The remains are those of a child, probably female, of about 3 years of age.

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7. K2 TS 2/1 Grave 1

Cranium and mandible: portions of right parietal, frontal, sphenoid and temporal bone; portions of the occipital, zygomatic and maxillary bones; 4 fragments of mandible.
Deciduous teeth isolated: upper lateral incisors, canine and secodn molar; lower canines, (one with bifid crown), lower first and second molars.
Permanent teeth isolated: crowns of upper central and lateral incisor; canines and first molars; lower first molar.
Fragments of ribs, vertebrae, os coxae, long bones and 7 phalanges. Also 5 glass beads (blue).

The remains are those of a child, probably female, of between 3 and 4 years of age.

The human skeletal remains from the seven graves are those of children ranging in age from approximately 18 months to about 5 years. The cranial and mandibular features, where identifiable, are essentially Negroid in character, that is, the temporal squame is expanded and the parietotemporal sutures ri_ses above the level of pterion. The frontal processes of the maxilla are directed laterally as well as anteriorly, and some degree of subnasal as well as total facial projection are apparent in TS 5/2 (Figure 4). The foramen magnum appears to have been large, elongated and oval inshape; the mandibular notch of moderate depth and the crowns of the permanent teeth large. The cranial contour in norma verticalis appears to have been ovoid rather than pentagonoid, although distortion of the cranial vault bones makes it difficult to determine this parameter with accuracy, and the orbits appear to have been hypsiconch.

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FIG 1

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FIG 2a

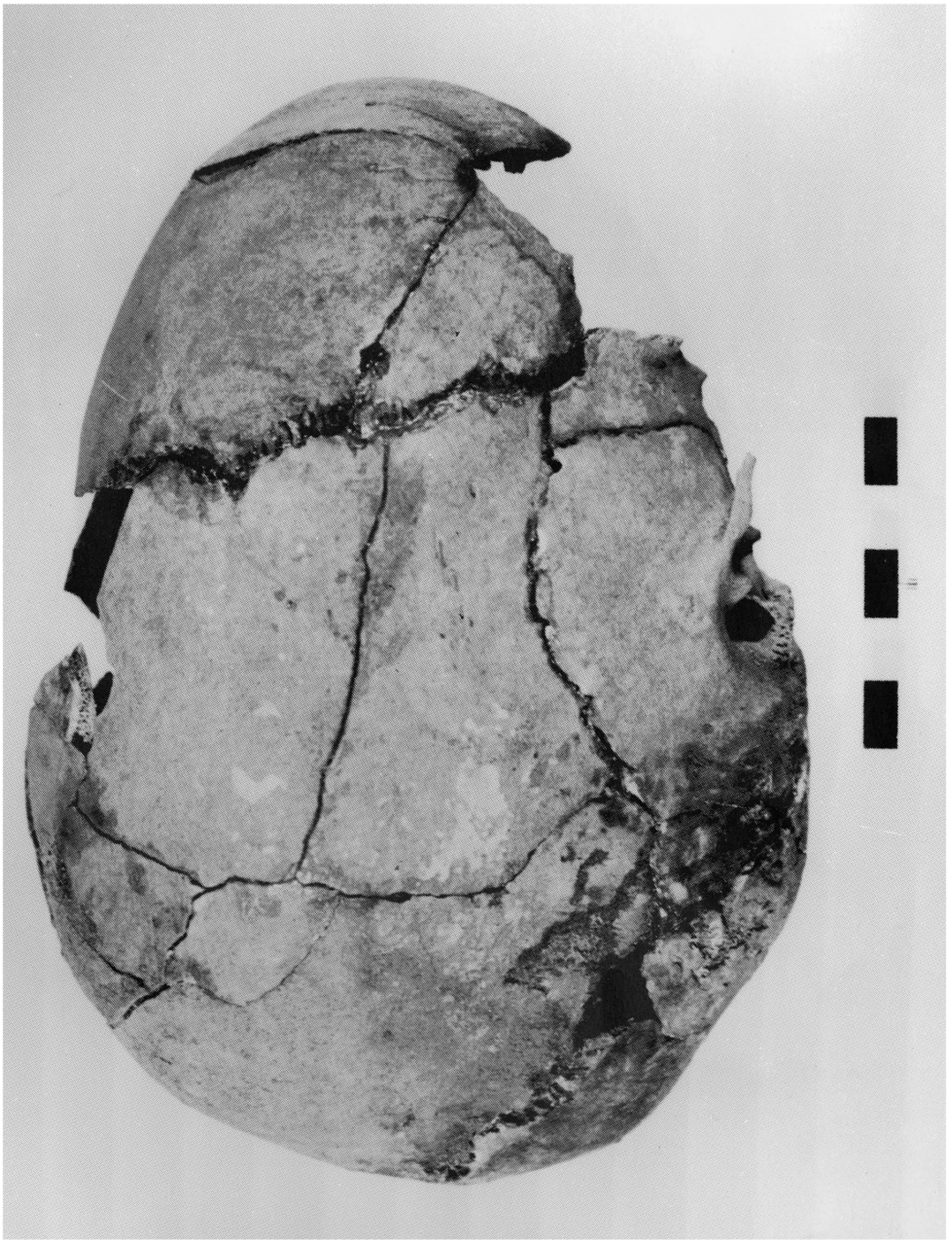

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FIG 2b

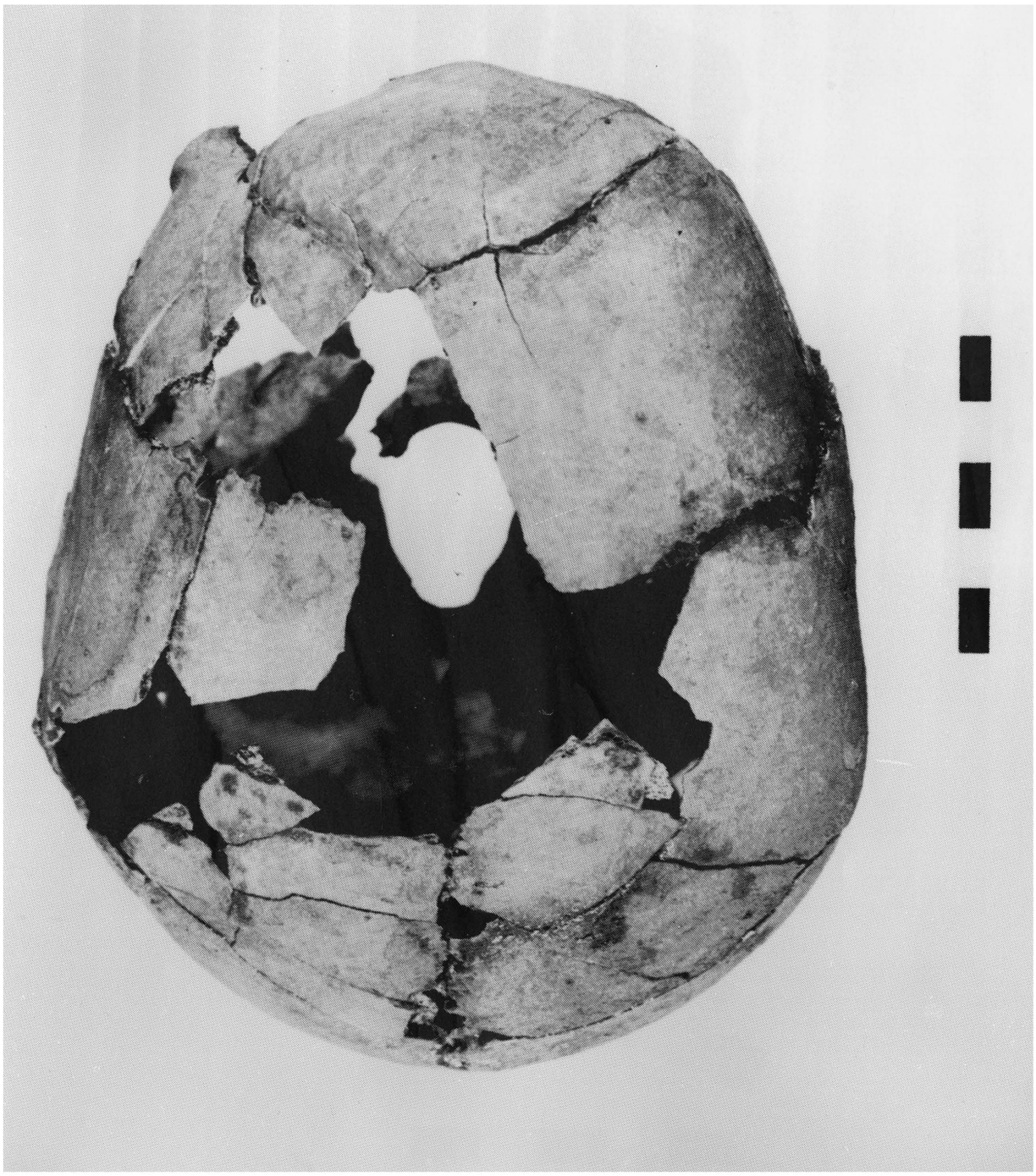

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FIG 2c

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FIG 3

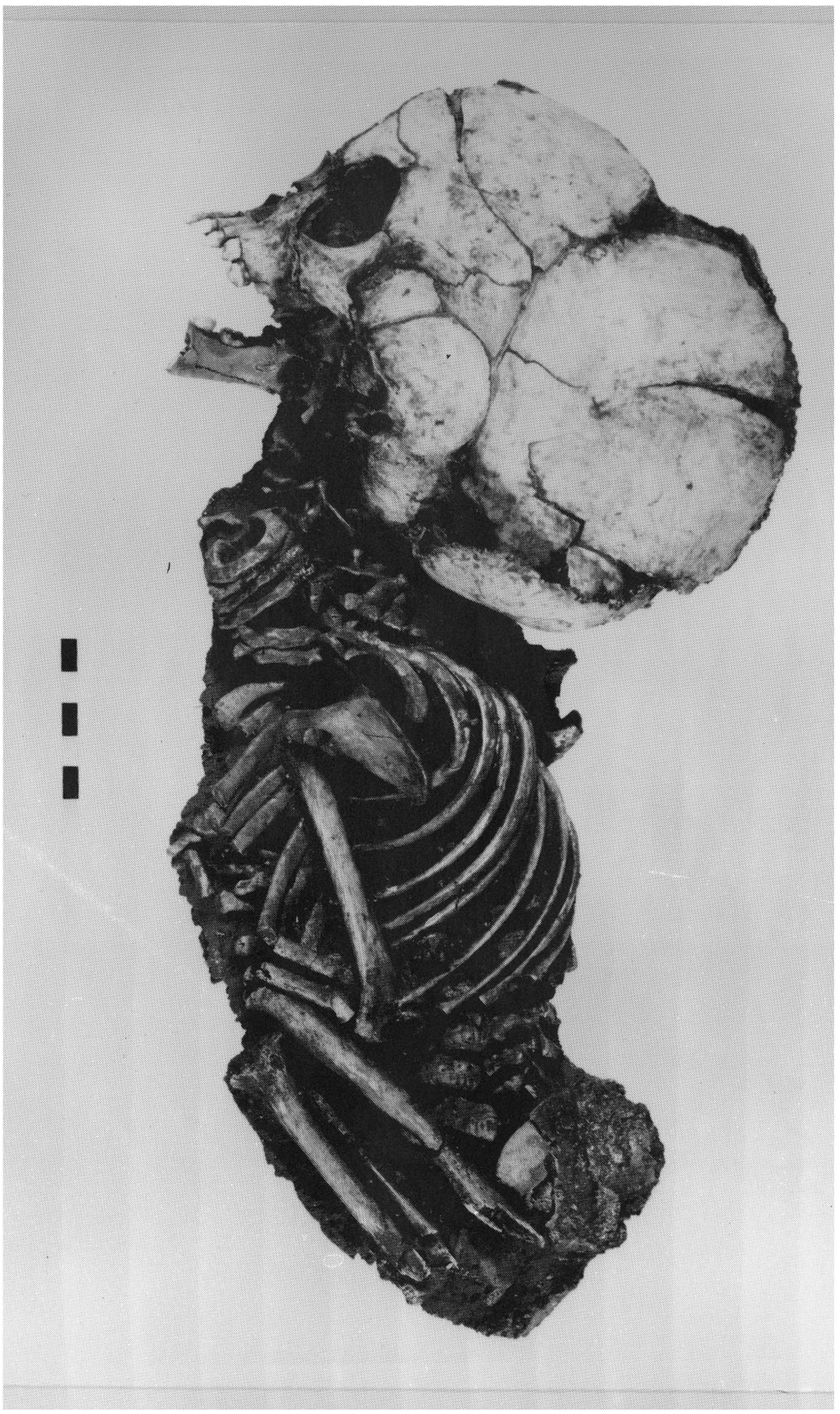

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FIG 4 a

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FIG 4b

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FIG 4c

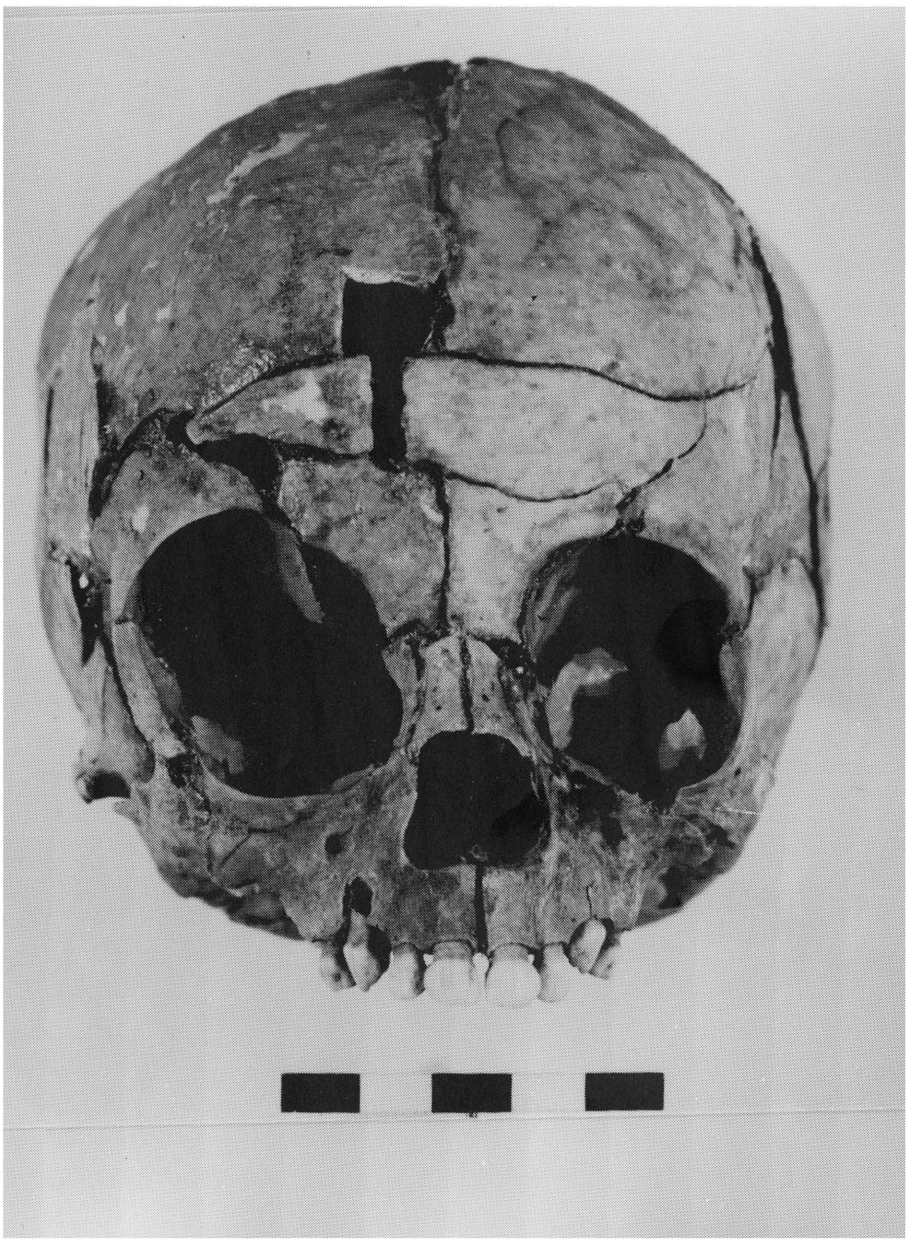

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FIG 5

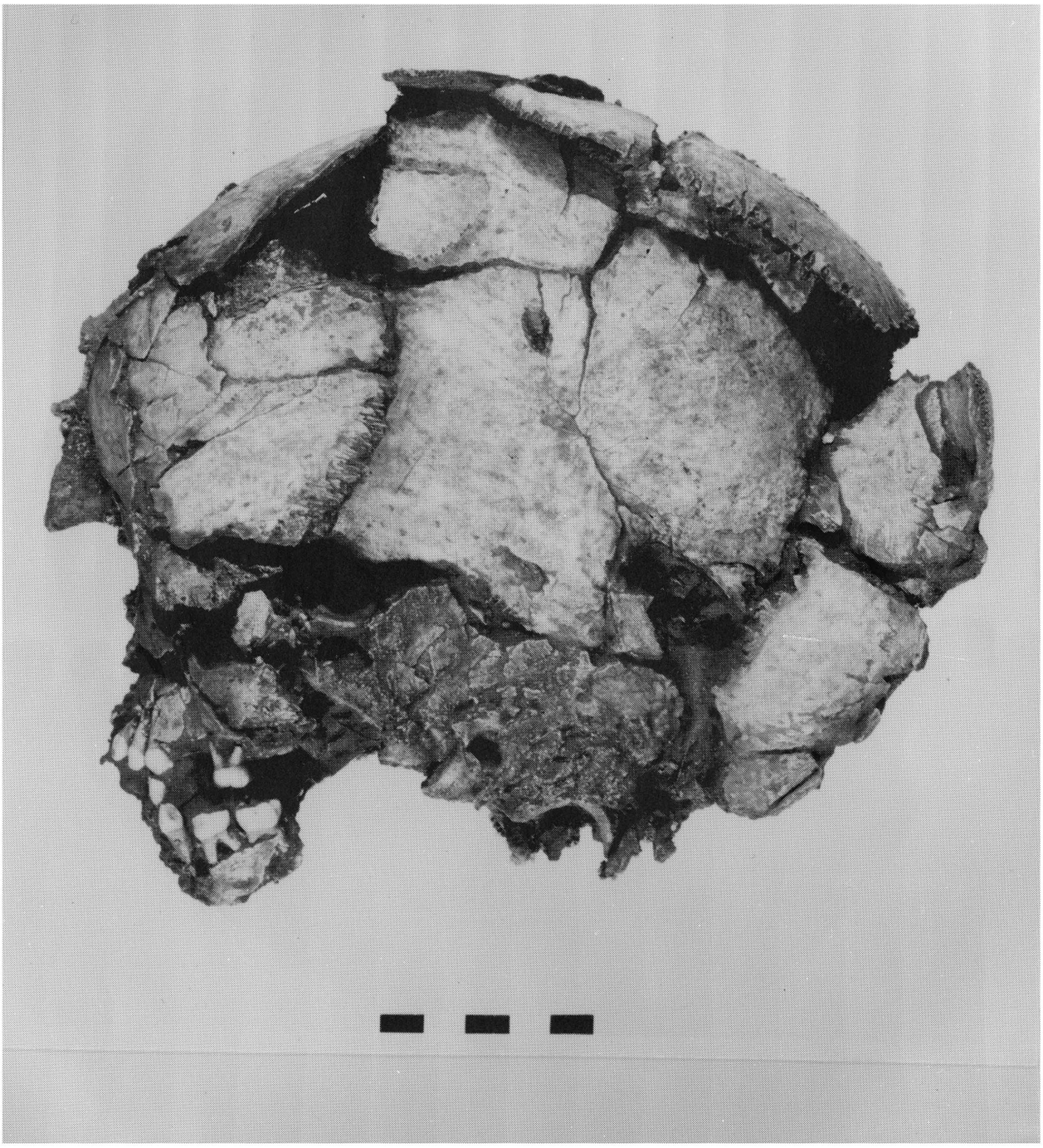

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FIG 6a

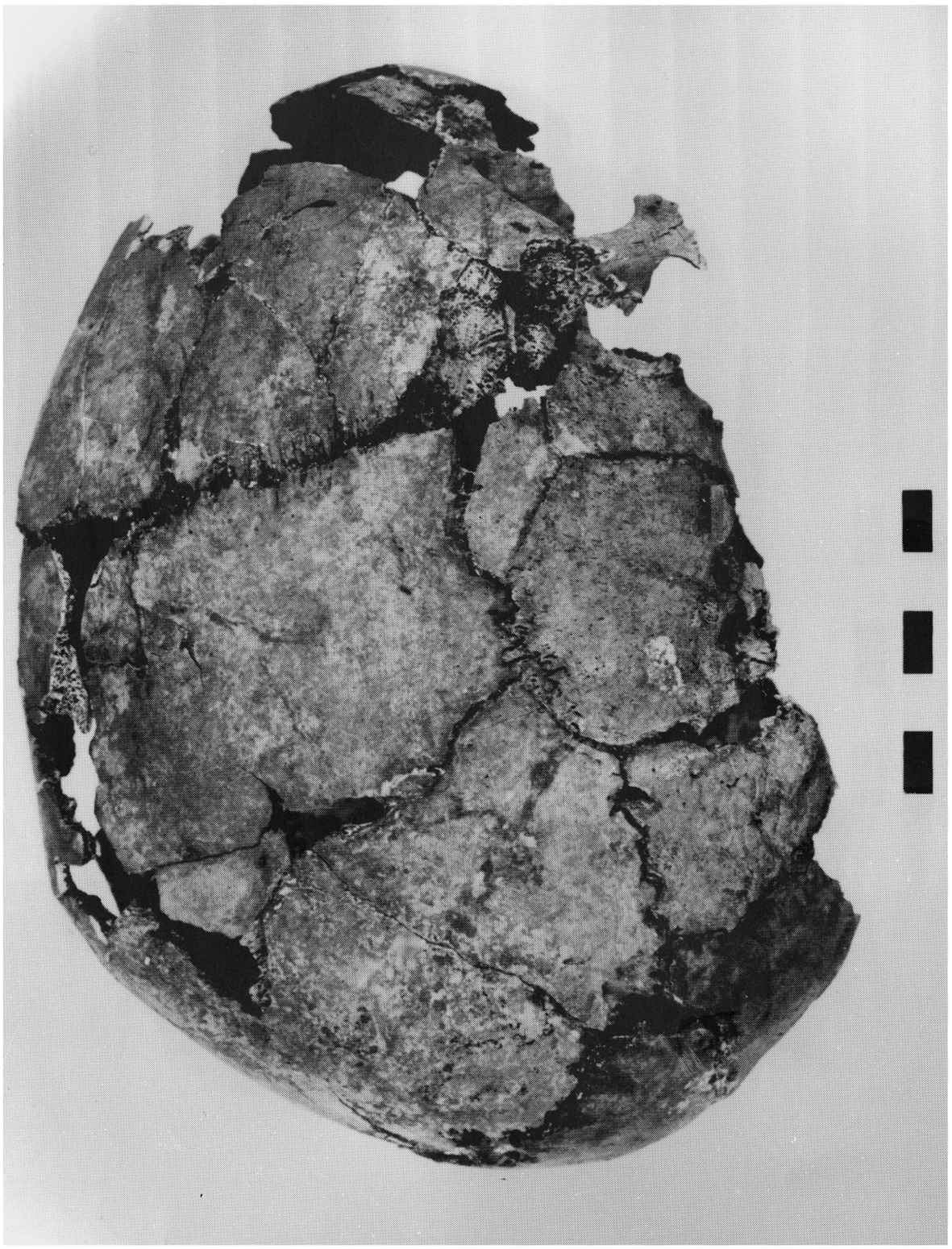

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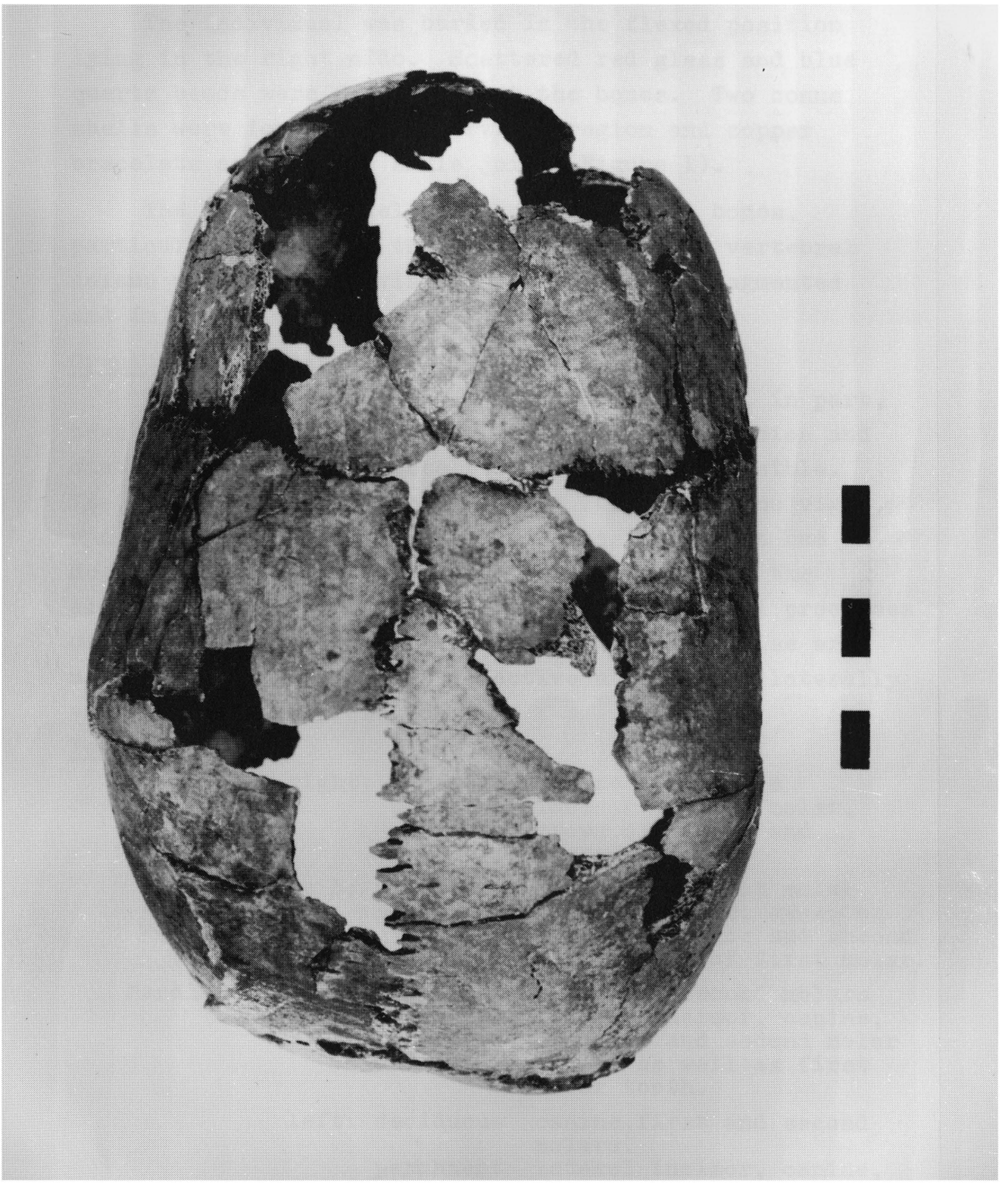
FIG 6b



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TS 2.G3

Report on human juvenile skeleton from K2 site.

The individual was buried in the flexed position lying in the right side. Scattered red glass and blue quartz beads were found amongst the bones. Two conus shells were found in the cervical region and copper bracelets around each ankle joint (Figure 1).

The cranial as well as the postcranial bones, particularly those of the right side, of the vertebral column and of the pelvis had been crushed, fragmented and in part eroded.

Cranium and Mandible.

The cranial vault, base and mandible have, in part, been reconstructed (Figures 2, 3, 4 and 5), erosion and distortion made a complete reconstruction impossible. The facial skeleton is represented largely by the right and left maxillary and zygomatic bones. Erosion had destroyed the palatal portions of the maxillae, the alveolar margins, as well as much of the frontal processes of the maxillary bones. The nasal bones, likewise are missing. The mandible is defective anteriorly, laterally and in the alveolar region.

Teeth

Maxillary	right:	decidous	canine and molars
		permanent	incisors, first molar, crown of canine and second molar.
	left:	deciduous	canine and first molar
		permanent	medial incisor, crown of lateral incisor and second molar, root of first molar.
Mandibular	right:	decidous	first and second molars
		permanent	lateral incisor, canine, premolar and second molar crowns as well as first molar tooth.
	left:	deciduous	canine,first and second molars.
		permanent	lateral incisor, canine, premolar and second molar crowns, as well as first molar tooth.

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The remains are those of a, probably female, juvenile individual of between eigth to nine years of age.

The cranium and mandible correspond in their general features with the juvenile Negro skull: the cranial vault is ovoid in norma verticalis (Figure 2) and appears to be long, of moderate breadth and height (dolicho=orthocranial). Owing to the distortion and damage no reliable measurements could be made. The frontal curvature recedes gradually to the apex. The vault is convex, the highest point being behind bregma (Figure 3). Laterally, the parietal bone above asterion is slightly flattened and the parietotemporal suture appears to have risen above pterion. The mastoid process is small and the mastoid crest slight - these are juvenile characteristics. The tympanic ring shows a moderate degree of development. The posterior root of the zygoma is somewhat delicate and the supramastoid crest slight. On the inferior aspect of the temporal bone, the digastric fossa is shallow but not expanded posteriorly. The glenoid fossa is shallow, the articular eminence and post glenoid tubercle small. The hard palate has been destroyed by erosion the permanent teeth, however, are large (Figures 4 and 5).

The ramus of the mandible is of moderate height and breadth, the mandibular notch is likewise of moderate depth with little bony buttressing between the coronoid and condyloid processes. The coronoid process is of moderate size with a slight anterior convexity, its apex being directed upwards and slightly backwards. The condyle is oval in shape and the angle of the mandible is slightly everted at the masseteric impression (Figure 5).

Conclusion

The remains are those of a Southern African Negroid juvenile, probably female, aged between eight to nine years of age.

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Figure 1. K2 Burial of juvenile.

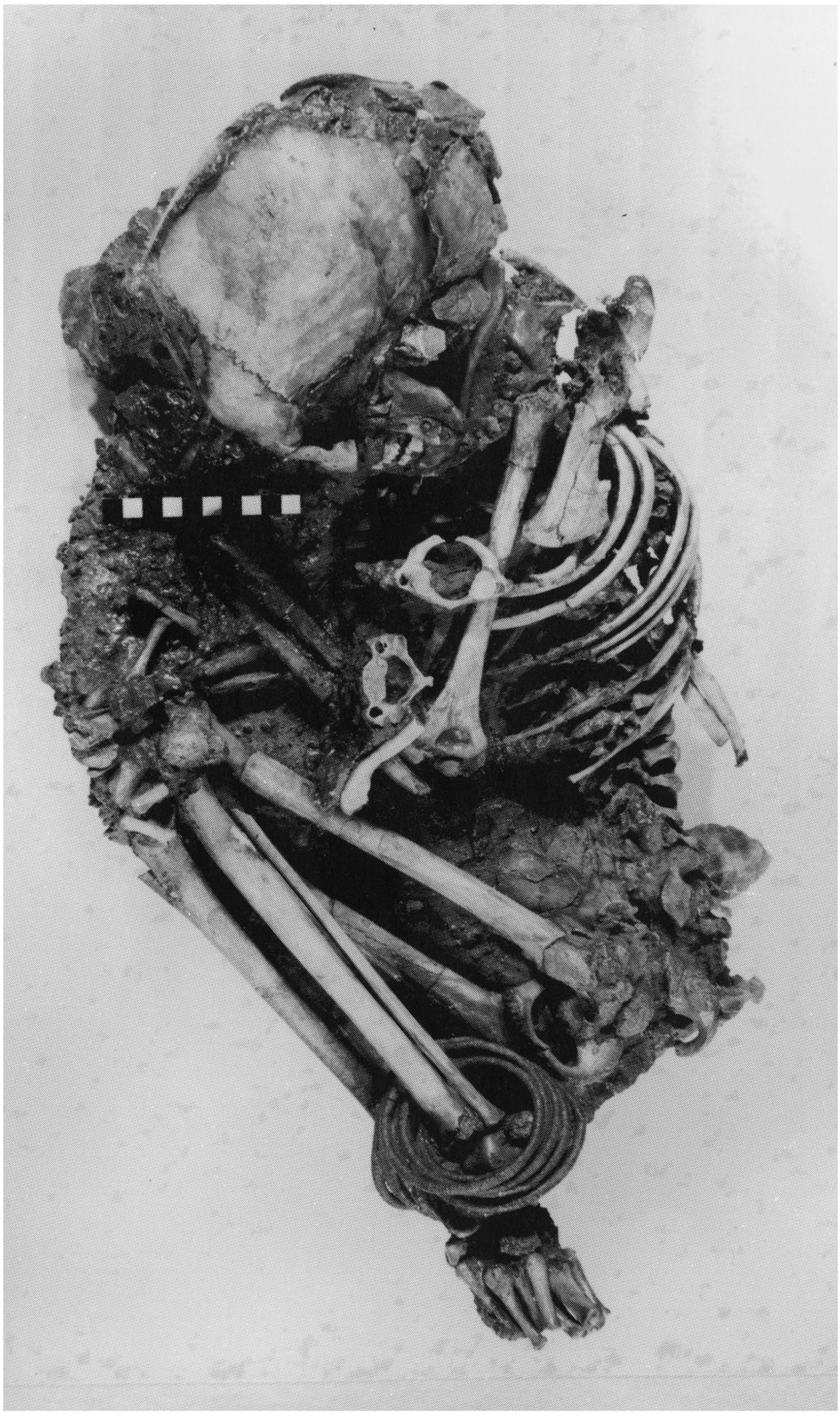

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Figure 2. K2 Juvenile Cranium Norma verticalis

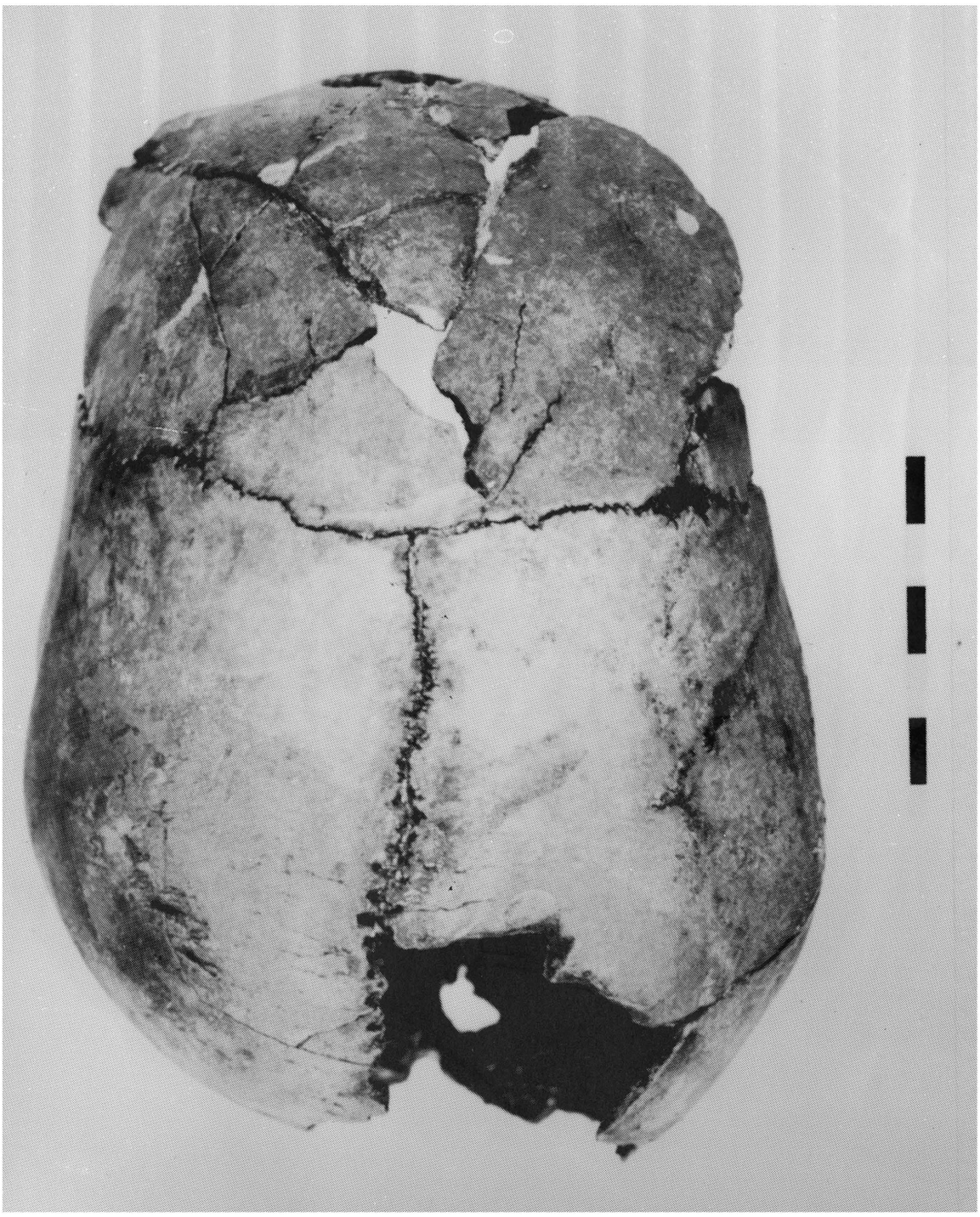

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Figure 3. K2 Juvenile. Cranium Norma lateralis

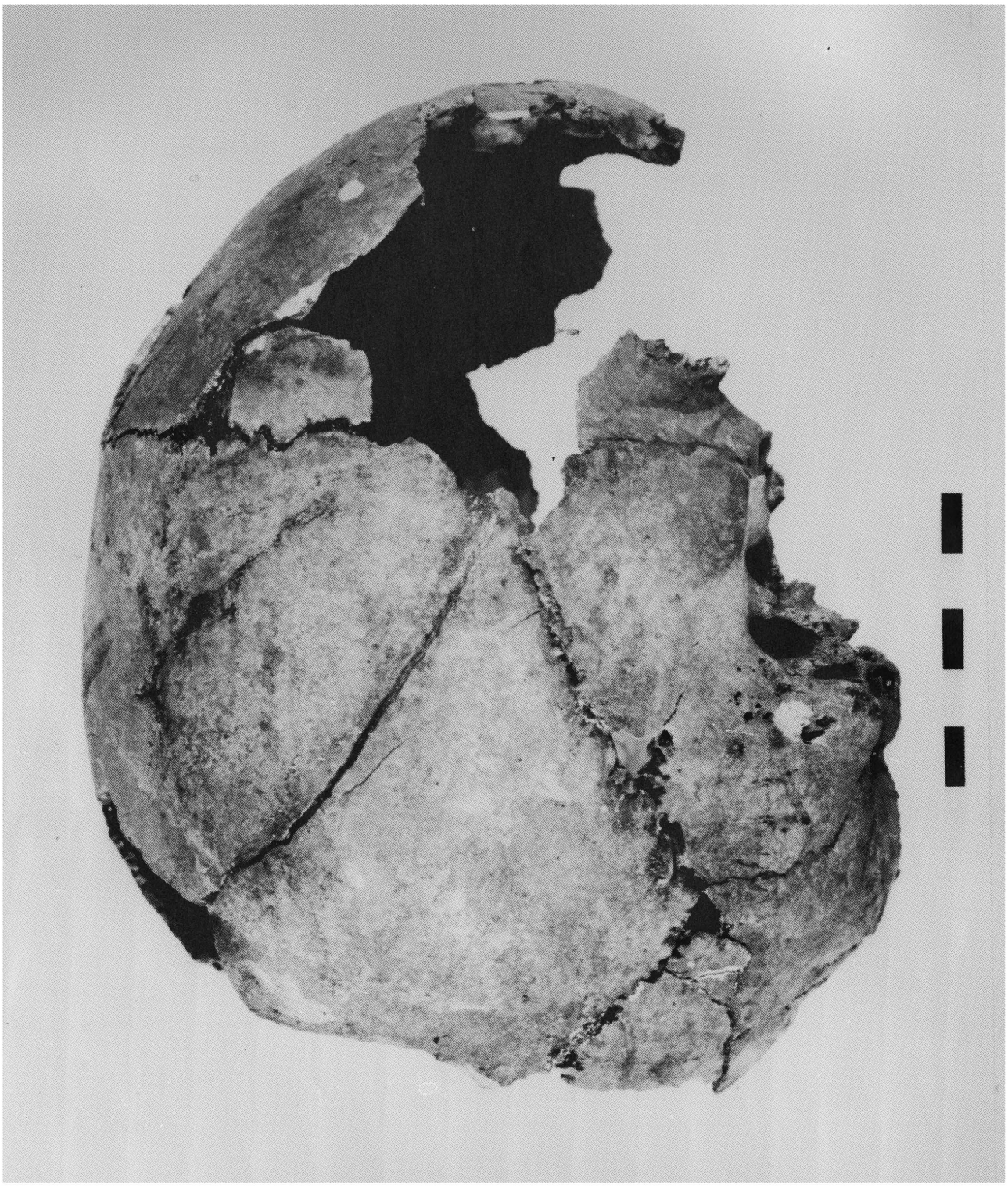

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Figure 4. K2 Juvenile Maxillae

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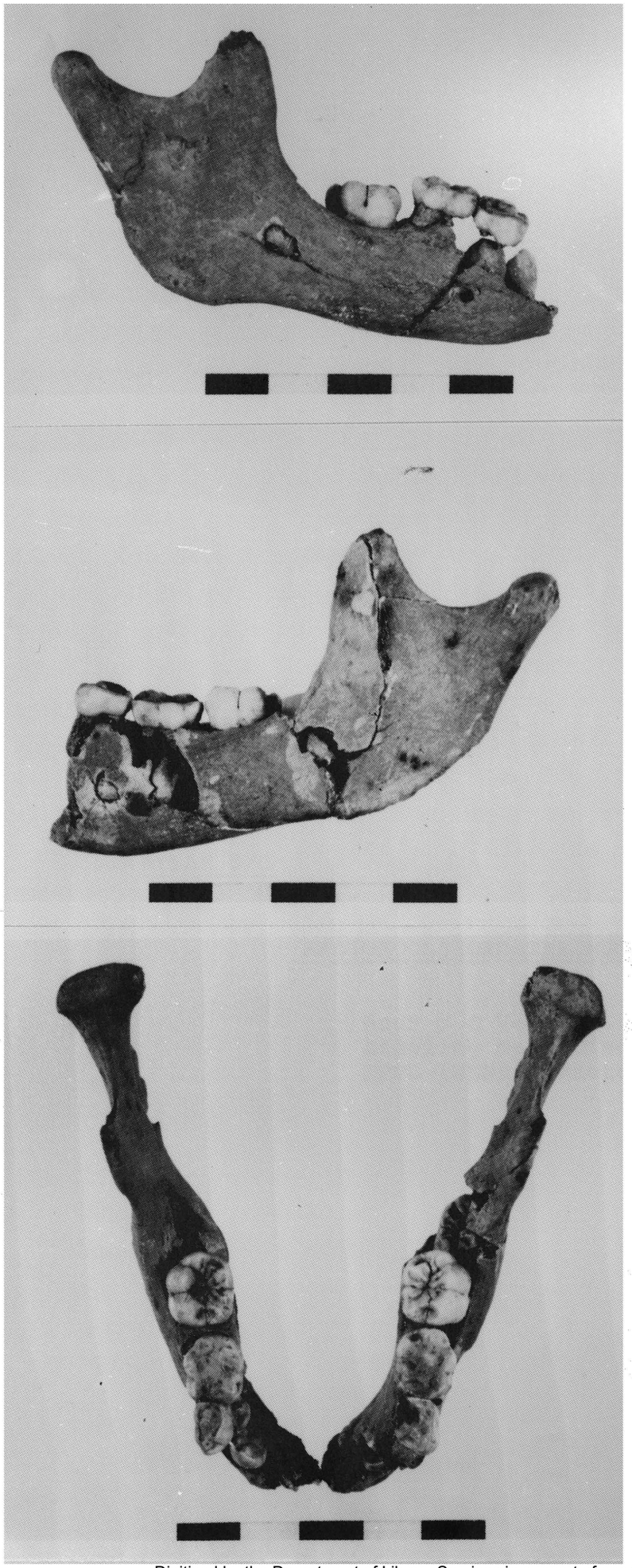
Figure 5. K2 Juvenile Mandible



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BYLAE 8/3

RADIOKOOLSTOFDATERINGS

deur J C Vogel
Afdeling Natuurisotope,
NFNL (WNNR), Pretoria

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RADIOKOOLSTOFDATERING VAN NEDERSETTINGS UIT DIE YSTERTYDPERK OP GREEFSWALD

J C Vogel

Afdeling Natuurisotope, NFNL, Pretoria

1. INLEIDING

In die afgelope aantal jare is 'n totaal van 24 radiokoolstof-ouderdomsbepalings op uitgesoekte monsters van die opgrawings op die plaas Greefswald (22° 12' S, 29° 22' E) net suid van die Limpopo-rivier, distr. Louis Trichardt, uitgevoer. Met behulp van hierdie metings kan die datum van bewoning op beide die K2-terrein (Bambandyanalo) en op Mapungubwekop en die aangrensende Suidelike Terras met redelike noukeurigheid bepaal word. Dit was veral nodig om nuwe daterings te verkry, aangesien twee van die drie ouderdoms-bepalings wat in die laat vyftiger jare gedoen is (Deevey *et al.*, 1959), verkeerd blyk te wees. Die rede hiervoor is dat die afwykende koolstofisotoopsamestelling van die verkoolde graan (*Sorghum/Pennisetum*) wat vir die metings gebruik is, nie in aanmerking geneem is nie. Dit is naamlik bekend dat die graansoorte wat in pre-historiese tye in suidelike Afrika gekweek is, asook baie van die grasse in die subkontinent 'n hoër konsentrasie van die swaarder koolstofisotope ^{13}C en ^{14}C bevat as die meeste landplante (Vogel *et al.*, 1978). Dit het die gevolg dat daterings gebaseer op ^{14}C tot 240 jaar te jonk skyn te wees indien geen aanpassing hiervoor gemaak word nie. Die nodige korreksie kan aangebring word indien die $^{12}C/^{13}C$-verhouding van die monster terselfdertyd gemeet word (Vogel, 1969). Die monster Pta-372 kan ter demonstrasie hiervan gebruik word. Die meetresultate is soos volg:

Pta-372 Mapungubwekop, verkoolde graan	
Skynbare ^{14}C-ouderdom	*650 ± 45 jr. v.H.*
Relatiewe ^{13}C-konsentrasie	*-10,8 ‰*
Korreksie vir isotoopverhouding	*230 jr.*
Gekorrigeerde ouderdom	*880 ± 45 jr. v.H.*
d.w.s.	*1070 ± 45 n.Chr.*

Die vroeëre twee metings vir Mapungubwekop (Y-135-4 en Y-135-9) is volgens die monsterbeskrywings (*op.cit.*) gedoen op "charred millet

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and wood" and "charred millet" onderskeidelik en sou dus 'n soortgelyke aanpassing geverg het. Dit sou beide daterings in die twaalfde eeu n.Chr. geplaas het i.p.v. in die veertiende/vyftiende eeu soos die niksvermoedende opgrawer verkeerdelik moes aanvaar.

2. MONSTERBESKRYWING

2.1 K2-terrein

'n Negetal monsters uit drie opgrawings op hierdie terrein is geanaliseer. Al die monsters verteenwoordig bewoningsfase I.

Pta-1214 K2. Opgrawing TS1 Laag 2 — *980 ± 40*
970 n.Chr.
$\delta^{13}C$ = -24,9 ‰

Houtskool van Blok 6, Laag 2 op 30 cm diepte in opgrawing TS1; versamel 1972 deur A. Meyer.

Pta-1226 K2. Opgrawing TS3 Laag 24 — *950 ± 50*
1000 n.Chr.
$\delta^{13}C$ = -24,2 ‰

Houtskool van Blok 02, Laag 24 op c. 460 cm diepte in opgrawing TS3; versamel 1972 deur A. Meyer.

Pta-1157 K2. Opgrawing TS3 Laag 15 — *950 ± 40*
1000 n.Chr.
$\delta^{13}C$ = - 9,5 ‰

Verkoolde graan van Blok 02, Laag 15 op c. 280 cm diepte in opgrawing TS3; versamel 1972 deur A. Meyer.

Pta-1215 K2. Opgrawing TS3 Laag 15 — *970 ± 50*
980 n.Chr.
$\delta^{13}C$ = -23,5 ‰

Houtskool van Blok 02, Laag 15 op c. 280 cm diepte in opgrawing TS3; versamel 1972 deur A. Meyer

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Pta-2051 K2. Opgrawing TS3 Laag 6 *950 ± 40*
1000 n.Chr.
$\delta^{13}C = -10,8$ ‰

Bene van Laag 6 op 100 - 200 cm diepte in opgrawing TS3; versamel 1972 deur A. Meyer.

Pta-307 K2. Lyn A6 Laag 11 *930 ± 45*
1020 n.Chr.
$\delta^{13}C = -24,2$ ‰

Houtskool van onderste laag, Laag 11, op c. 155 cm diepte in klein opgrawing langs lyn A6, Blok 6, Seksie 2 van Gardner (1963, kaart 1); versamel 1969 deur J.F. Eloff.

Pta-306 K2. Lyn A6 Laag 8b *850 ± 50*
1100 n.Chr.
$\delta^{13}C = -24,2$ ‰

Houtskool van Laag 8b op c. 120 cm diepte in Blok 6, Seksie 2 van Gardner; versamel 1969 deur J.F. Eloff.

Pta-305 K2. Lyn A6 Laag 6 *890 ± 50*
1060 n.Chr.
$\delta^{13}C = -24,2$ ‰

Houtskool van Laag 6 op c. 92 cm diepte in Blok 6, Seksie 2 van Gardner; versamel 1969 deur J.F. Eloff.

Pta-304 K2. Lyn A6 Laag 3 *880 ± 40*
1070 n.Chr.
$\delta^{13}C = -24,5$ ‰

Houtskool van Laag 3 op c. 50 cm diepte in Blok 6, Seksie 2 van Gardner; versamel 1969 deur J.F. Eloff.

2.2 Mapungubwe Suidelike Terras

Elf monsters uit vier verskillende blokke wat die bewoningsfases II tot IV dek, is van hierdie terrein geanaliseer.

Pta-2024 Mapungubwe ST, F4 Laag 10 *1020 ± 40*
930 n.Chr.
$\delta^{13}C = -24,4$ ‰

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Verkoolde houtstomp op hutvloer uit onderste laag, Laag 10, in Blok F4 (Fase II); versamel 1971 deur A. Meyer.

Pta-2023 Mapungubwe ST, H5 Laag 6iii *910 ± 40*
1040 n.Chr.
$\delta^{13}C = -24,3$ ‰

Verkoolde paaltjies van hutvloer van onderste laag, Laag 6iii, in Blok H5 (Fase II); versamel 1971 deur A. Meyer.

Pta-1138 Mapungubwe ST, H5 Laag 2ii *590 ± 55*
1360 n.Chr.
$\delta^{13}C = -24,4$ ‰

Houtskool uit Laag 2ii op 30 cm diepte in Blok H5 (Fase IV); versamel 1971 deur A. Meyer. Vergelyk Pta-1209, hieronder.

Pta-768 Mapungubwe ST, K8 Laag 16 *1030 ± 50*
920 n.Chr.
$\delta^{13}C = -23,0$ ‰

Houtskool uit Laag 16 op c. 292 cm diepte in Blok K8 (Fase II); versamel 1971 deur A. Meyer.

Pta-1156 Mapungubwe ST, K8 Laag 15 *860 ± 40*
1090 n.Chr.
$\delta^{13}C = -24,1$ ‰

Houtskool uit Laag 15 op c. 285 cm diepte in Blok K8 (Fase III); versamel 1971 deur A. Meyer.

Pta-766 Mapungubwe ST, K8 Laag 3 *850 ± 40*
1100 n.Chr.
$\delta^{13}C = -23,8$ ‰

Houtskool uit Laag 3 op c. 88 cm diepte in Blok K8 (Fase IV); versamel 1971 deur A. Meyer

Pta-752 Mapungubwe ST, K8 Laag 2ii *790 ± 50*
1160 n.Chr.
$\delta^{13}C = -24,6$ ‰

Houtskool uit Laag 2ii op c. 64 cm diepte in Blok K8 (Fase IV); versamel 1971 deur A. Meyer.

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Pta-1209 *Mapungubwe ST, K8 Laag 1iii* *770 ± 50*
1180 n.Chr.
$\delta^{13}C = -24,7$ ‰

Houtskool uit Laag 1iii op c. 28 cm diepte in Blok K8 (Fase IV); versamel 1971 deur A. Meyer. Vergelyk Pta-1138 hierbo.

Pta-439 *Mapungubwe ST, E2 Laag 10* *840 ± 50*
1110 n.Chr.
$\delta^{13}C = -23,4$ ‰

Houtskool uit onderste laag, Laag 10, op c. 188 cm diepte in Blok E2 (Fase III); versamel 1970 deur J.F. Eloff.

Pta-438 *Mapungubwe ST, E2 Laag 7* *820 ± 60*
1130 n.Chr.
$\delta^{13}C = -22,9$ ‰

Houtskool uit Laag 7 op c. 147 cm diepte in Blok E2 (Fase III); versamel 1970 deur J.F. Eloff.

Pta-437 *Mapungubwe ST, E2 Laag 5* *800 ± 45*
1150 n.Chr.
$\delta^{13}C = -23,9$ ‰

Houtskool uit Laag 5 op c. 95 cm diepte in Blok E1 (Fase III); versamel 1969 deur J.F. Eloff.

2.3 Mapungubwekop

Net vier monsters van hierdie terrein is geanaliseer, een daarvan uit die versameling van Gardner in die besit van R. Mason, Univ. van die Witwatersrand.

Pta-372 *Mapungubwekop 6-4, 5'* *880 ± 45*
1070 n.Chr.
$\delta^{13}C = -10,8$ ‰

Verkoolde graan van hutvloer op c. 127 cm diepte in Blok 6, Seksie 4 van Gardner se opgrawing, koördinate 35 - 0 - 5; versamel 1940 deur Van Tonder. *Opmerking*: Hierdie is 'n ander gedeelte van dieselfde monster Y-135-14 wat in 1959 in Yale gedateer is met die resultaat 570 ± 60 (sien Inleiding) en dateer Gardner se Zone 3 (*op. cit.* p. 82).

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Pta-1158 *Mapungubwekop MK1, A3 Laag 11* *840 ± 50*
1110 n.Chr.
$\delta^{13}C$ = -23,9 ‰

Houtskool uit Laag 11 op c. 180 cm diepte in Blok A3 van opgrawing MK1 (Fase II); versamel 1973 deur A. Meyer.

Pta-1159 *Mapungubwekop MK1, B3 Laag 11* *840 ± 40*
1110 n.Chr.
$\delta^{13}C$ = -23,5 ‰

Houtskool uit Laag 11 in Blok B3 van opgrawing MK1 (Fase II); versamel 1973 deur A. Meyer.

Pta-1145 *Mapungubwekop MK3, A2 Laag 3* *880 ± 40*
1070 n.Chr.
$\delta^{13}C$ = -24,2 ‰

Houtskool uit Laag 3 op 35 cm diepte in Blok A2 van opgrawing MK 3 (Fase IV); versamel 1973 deur A. Meyer.

3. SAMEVATTING

By die interpretasie van 'n reeks radiokoolstofdaterings moet onthou word dat die organiese koolstof wat geanaliseer word uit die aard van die saak altyd ouer is as die gebeurtenis (bv. die maak van 'n vuur met hout) wat die argeoloog eintlik wil dateer. Dit kan dus gebeur dat enkele resultate tot 50 of 100 jaar ouer is as die laag waarin die houtskool voorkom. Dit is dus makliker om die ouderdom van die einde van 'n fase te bepaal as die begin. Monster Pta-2024 is 'n spesifieke geval uit hierdie reeks wat moontlik te oud kan wees omdat die houtskool afkomstig is van 'n verkoolde balk.

Andersyds kan monsters wat baie naby aan die oppervlakte geneem word, maklik plantereste van veel jonger ouderdom bevat. Monster Pta-1138: 1360 n.Chr. kan dus nie as bewys aangevoer word dat die bewoning tot in die 14de eeu geduur het nie, veral wanneer die ander metings vir Fase IV in ag geneem word.

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Al die resultate is grafies in Fig. 1 aangedui. Met inagneming van die stratigrafiese posisie van die monsters, kan die volgende datums vir die verskillende bewoningsfases op die drie terreine afgelei word:

K2 Terrein	*(Fase II)*	*970 tot 1070 n.Chr.*
Mapungubwe Suidelike Terras	*(Fase II):*	*voor 1070 n.Chr.*
" "	*(Fase III):*	*1070 tot 1150 n.Chr.*
" "	*(Fase IV):*	*1150 tot 1200 n.Chr.*

Alvier die daterings vir Mapungubwekop val binne die tydperk vir Fase III op die Suidelike Terras, alhoewel sommige monsters van bo en onder hierdie Fase versamel is. Geen noukeuriger datum kan dus vir Fase III op die kop afgelei word as dié wat reeds vir die Suidelike Terras verkry is nie. Die datums wat hierbo aangegee is, sal volgens skatting binne dertig jaar van die werklike datums wees.

4. KORRELASIE MET ZIMBABWE

Een van die groot voordele van radiokoolstofdatering is dat dit 'n moontlikheid bied om objektiewe chronologiese korrelasies oor lang afstande te kan maak. Vir die ontwikkelingsgeskiedenis van Mapungubwe is in hierdie opsig die datering van Groot-Zimbabwe in Rhodesië van besondere belang sodat hier kortliks daarna verwys sal word.

Volgens resente ouderdomsbepalings vir Zimbabwe (Hoffmann & Vogel, ongepubliseer) begin die Periode III aldaar (Robinson *et al.*, 1961) omstreeks 1100 n.Chr. en duur tot kort na 1300 n.Chr. Die bloeiperiode van die nedersetting moet heel aan die einde van hierdie tydperk geplaas word en dit is toe eers dat sommige van die groter P-styl klipmure opgerig is. Dit blyk dus dat Fases III en IV by Mapungubwe saamval met die vroeëre gedeelte van Periode III by Zimbabwe. Van 'n chronologiese standpunt is dit dus moontlik dat die opbloei van Zimbabwe in verband gebring kan word met die agteruitgang en uiteindelike verlating van Mapungubwe.

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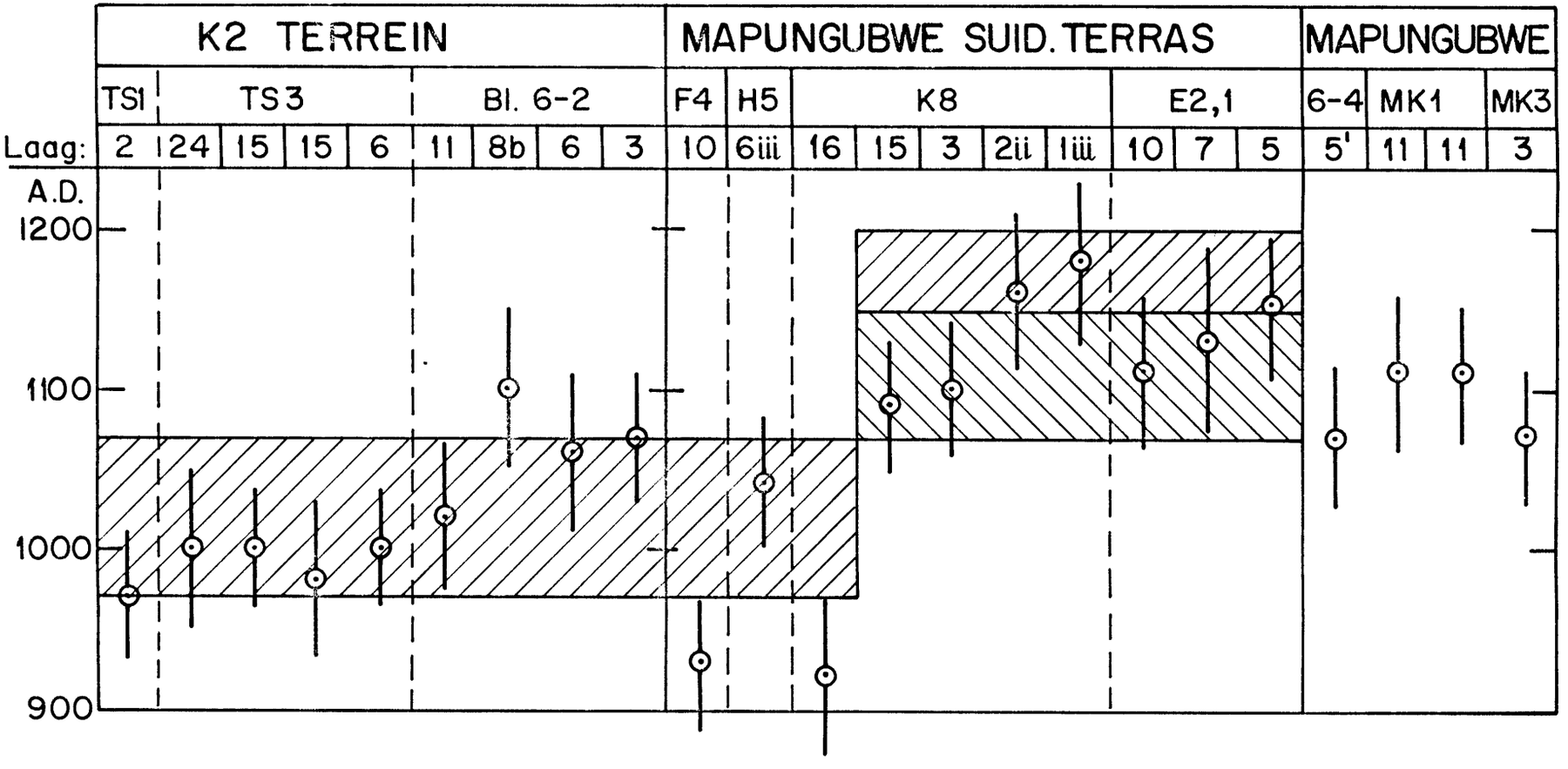

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HOOFSTUK 9. SAMEVATTING EN INTERPRETASIE

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HOOFSTUK 9. SAMEVATTING EN INTERPRETASIE

9.1 ALGEMEEN

Vervolgens word 'n sintese en interpretasie van die gegewens van die vorige hoofstukke gemaak ten einde die identiteit en ouderdom van die Greefswaldkulture aan te dui en daarby aansluitend die Greefswaldmense se lewenswyse asook die verloop van die geskiedenis van Greefswald te beskryf.

9.2 DIE TERREIN K2

9.2.1 IDENTITEIT EN OUDERDOM

(a) Fisieke tipe

Verskeie kinderskelette van K2 is deur De Villiers geïdenti= fiseer as 'n negroïede fisieke tipe (vgl. hoofstuk 8:bylae 8/2). Dit stem ooreen met Rightmire se identifikasie van 'n aantal K2-skelette as 'n negroïede tipe (Rightmire 1970).

(b) Ekonomiese lewe

(i) Veeherdery

Veeboerdery het 'n prominente deel uitgemaak van die ekonomiese bedrywighede van die K2-mense. Volgens Voigt (hoofstuk 7) is Sanga-, Afrikaner- en Zebu-beestipes aangehou, sowel as bokke, skape en ook honde. Tussen 96.6% en 98.6% van die totale vleisverbruik (per massa bereken) was dié van gedomestikeerde diere en hulle is hoofsaaklik op volwasse ouderdom geslag.

(ii) Akkerbou

Voedselgewasse is geproduseer vanaf die vroegste fase tot aan die einde van die bewoning van K2. Oorblyfsels van Babala ("Pearl millet", Pennisetum typhoides), asook kaffer= koring (Sorghum bicolor) en 'n tipe boontjie (Vigna unguiculata) is in verskillende woonlae gevind. Die graan is gestoor in klein hutjies. Slegs 'n klein aantal klippe met holtes waarin

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graan gemaal of gestamp kon gewees het, is by K2 gevind en dit dui daarop dat daar nie 'n groot hoeveelheid graan geproduseer is nie.

(iii) Jag

Die wilde diere wat deur die K2-mense gejag is, is dieselfde as dié wat tans nog in die omgewing voorkom. Die beoefening van die jagbedryf was relatief onbelangrik, want volgens die beendere-oorblyfsels was minder as 4% van die vleisdieet (per vleismassa bereken) dié van wilde diere (vgl. hoofstuk 7). Die aanwesigheid van ivoor dui daarop dat olifante gejag is. Geen olifantbeendere is op K2 gevind nie, soos trouens verwag kan word.

(iv) Versamel

Klein diersoorte is versamel, maar so min dat hulle nie 'n belangrike rol gespeel het in die dieet van die K2-mense nie. Wilde vrugte wat versamel is, is dieselfde spesies wat tans nog in die gebied voorkom.

(v) Handel

Ingevoerde glaskrale kom in alle woonlae voor. Die glaskrale word deur Davison in drie chemiese groepe verdeel, nl. die M1-Chemiese Groep, die Passaatwind-kraal Chemiese Groep ("Trade Wind Bead Chemical Group") en die Mapungubwe Chemiese Groep I (vgl. hoofstuk 5, bylae 5/3). Die M1-Chemiese Groep kom die meeste op K2 voor en volgens Davison hou dit waarskynlik verband met 'n handelskontak van Arabiese oorsprong. Volgens Davison kom die M1-Chemiese Groep net op Greefswald voor. Daar is egter onlangs verskeie K2-tipe terreine in die Limpopo-Shashigebied gevind waarop daar moontlik van die M1-Chemiese Groep kan voorkom. Die aanwesigheid van kauriskulpe is 'n verdere aanduiding van die kontak met die ooskus. Die enigste goedere wat die K2-mense as 'n ruilmiddel aan daardie handelaars kon aanbied,

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was ivoor. Die aanwesigheid van 'n olifanttand en van talle ivoorstukkies, maar slegs 'n klein hoeveelheid ivoor-artefakte, dui daarop dat ivoor slegs in 'n beperkte mate vir tuisgebruik benut is en dat dit hoofsaaklik as 'n handels=artikel aangewend is.

(c) Vestiging

(i) Woonhut-komplekse
(vgl. hoofstuk 4; boekdeel V:sketsfig. 100)

Die K2-mense het paal-en-klei-hutte opgerig vir woon- en bergingsdoeleindes. Hulle het verkies om hutte op te rig teen die suidoostelike helling van Bambandyanalo-rant (terrein-komponent 5) en op 'n plato aan die voet van die rant (terrein-komponent 2). Die presiese patroon van die groepering van die hutte kon tot dusver nog nie vasgestel word nie. Geen aan=duidings is gevind van klipmure, klipstrukture of enige ander soort bouwerke wat deur die K2-mense opgerig is nie. Geen assosiasie is gevind tussen die bewonings-oorblyfsels van K2 en die klipmure of kliphope wat op Bambandyanalo-rant en elders in die nabyheid van die terrein voorkom nie.

(ii) Veekrale

Die K2-mense het vee aangehou in 'n groot kraal (terrein-komponent 1) aan die suidwestekant van die hutkompleks (terrein-komponent 2). Sowat 70 m noord van hierdie kraal kom tekens van 'n tweede, kleiner kraal voor (vgl. hoofstuk 4: opgrawing Ts 6). Die krale is albei na aan die rand van die hutkompleks (komponent 2) geleë en die kraal-oorblyfsels is in albei gevalle later deur ashope bedek.

(iii) Ashope

Die K2-mense het besonder groot hoeveelhede as en ander huis=houdelike afval soos bene en potskerwe rondom hulle woonhut-areas weggegooi. Teen die helling van Bambandyanalo-rant is 'n breë ashoop-area (terrein-komponent 6) wat die weggooi-

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materiaal is van die mense wat hoër op teen die helling gewoon het (terrein-komponent 5). Aan die suidwestekant daarvan rondom die tweede woonhut-area (terrein-komponent 2) kom ook 'n ashoop-area (terrein-komponent 4) voor. Aan die suidwestekant hiervan kom die groot sentrale ashoop (terrein-komponent 3) voor wat gedeeltelik oor die groot beeskraal lê.

(d) Tegniese skeppinge

(i) Boustrukture

Die enigste boustrukture wat tot dusver op K2 gevind is, is die hutte. Hulle het 'n sirkelvormige tot effens ovaal=vormige planvorm. Hulle wissel in grootte, nl. klein hutjies (huttipes 1 en 2), medium-grootte hutte (huttipe 3) en heel groot hutte (huttipe 4) (vgl. hoofstuk 5). Die hutte is almal op dieselfde wyse opgerig, nl. met dunnerige pale wat in 'n smal fondasiesloot regop geplant is en met grond uit die omgewing afgepleister is. Klein en medium hutte het dun sandvloere gehad, maar sommige medium hutte en alle groot hutte het vloere van skaliegruis gehad. Die dak het waarskynlik die gewone koniese vorm gehad. Rondom die hutte is buitevloere van skaliegruis gelê en op plekke is vuur daarop gemaak.

(ii) Metaalwerk

Die K2-mense het yster en koper op die woonterrein verwerk. Die aanwesigheid van slegs klein hoeveelhede slak, asook die afwesigheid van reduksie-oonde, dui daarop dat reeds geredu=seerde ru-materiaal op K2 verwerk is tot gereedskap of orna=mente. Die gereedskap was pikke, dissels, pylpunte, assegaai=lemme en "sweetskrapers" van yster en die ornamente was ringe en arm- of enkelbande van koper en yster.

(iii) Glaskrale

Benewens die klein glaskraletjies wat m.b.v. handel verkry is, het die K2-mense groot "tuinroller"-glaskrale plaaslik

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vervaardig. Die tuinroller-glaskrale vertoon grootliks dieselfde chemiese eienskappe as die M1-Chemiese Groep handels-glaskraletjies en is klaarblyklik vervaardig van glas wat verkry is deur die klein kraletjies te smelt. Al drie die chemiese kraalgroepe wat deur Davison beskryf word, kom op K2 voor, maar die M1-Chemiese Groep is die mees talryke groep en dus die mees algemene krale wat op= gesmelt kon word vir die vervaaridiging van die groot krale.

(iv) Artefakte van been, ivoor, skulp en eierdop

Huishoudelike artikels wat plaaslik van been en ivoor ver= vaardig is, is naalde, else en armbande. Krale van volstruis= eierdop kom in groot hoeveelhede voor en been- en skulpkrale in 'n mindere mate.

(v) Klipartefakte

Enkele vyselklippe kom op K2 voor en dit is 'n aanduiding dat die K2-mense wel sodanige klipartefakte gebruik het, maar nie op 'n betekenisvolle skaal nie. Kleinerige ronde of ovaalvormige klippe met gladgeskuurde vlakke en soms klein holtes daarin (vgl. hoofstuk 5: artefaktipes 5.1 en 5.2) is gebruik vir skuur- of stampwerk. 'n Aantal spoel= klippies kom ook voor, maar meeste van hulle toon geen gebruiksmerke nie.

(vi) Keramiek

Groot hoeveelhede potwerk (houers van gebakte klei) is vir huishoudelike doeleindes vervaardig. Die potwerk vertoon tipologiese attribute wat kenmerkend van K2 is. Die potwerk= tipes wat onderskei word, word deur Meyer as die K2-serie beskryf (vgl. hoofstuk 6). Benewens die potwerk is mense= figuurtjies en dierefiguurtjies, feitlik alles voorstellings van vee, van klei gemaak. Klei-kraalvormpies waarin tuin= roller-glaskrale vervaardig is, is deur die K2-mense gemaak

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en gebruik, terwyl kleikrale ook vervaardig is. Lepels van gebakte klei is soms gemaak.

(c) Grafte

Die K2-mense het hulle dooies in 'n saamgetrekte posisie op hulle sykante begrawe (vgl. hoofstuk 4). Wanneer die ouderdomme van die kinders (soos geïdentifiseer deur De Villiers: vgl. hoofstuk 8) in verband gebring word met die aard van die grafgoedere (soos beskryf in hoofstuk 4) wil dit voorkom of die kleiner kinders begrawe is met slegs krale en in een geval die blad van 'n dier as grafgoedere. Daarteenoor is die ouer kinders begrawe met doelbewus-gebreekte kleipotte en in sommige gevalle ook heel kleipotte wat op en om die dooie geplaas is. Hierdie verskynsel is opgemerk t.o.v. die ses grafte wat in hoofstuk 4 beskryf is, maar dit kan nie uit hierdie paar vondste afgelei word of die begrafniswyse 'n algemene kulturele gebruik was nie. Volgens die geraamtes wat opgegrawe is, is groterige kinders in die ashope om die woonhut-areas begrawe terwyl babas gewoonlik in die woonhut-area begrawe is. Gardner vermeld enkele volwassenes wat begrawe is in die groot, sentrale ashoop asook enkele volwassenes en 'n groot aantal kinders in die area aan die suidwestekant van die groot ashoop (Gardner 1963).

(f) Ouderdom van K2

In opgrawing Ts 1 in die ashoop teen die voet van Bambandyanalo (terrein-komponent 6) is 'n datering van 970 n.C. gekry, terwyl verskeie datums die vorming van die sentrale ashoop vanaf ongeveer 1 000 n.C. tot ongeveer 1100 n.C. dateer (vgl. hoofstuk 8). Die K2-mense het dus vir sowat 100 jaar of 'n bietjie later op die terrein gewoon.

(g) Identiteit : Interpretasie

Die fisieke en kulturele kenmerke van die K2-mense, asook hulle ouderdom, plaas die K2-mense binne die breë verband

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van die Leopard's Kopje kultuur-kompleks in suidwestelike Rhodesië. Die Leopard's Kopje-kompleks is deur Robinson geïdentifiseer en beskryf (Robinson 1959; 1965; 1966). Robinson verdeel die Leopard's Kopje-kompleks in drie op= eenvolgende fases, nl. fase I of "Zhizo", fase II of "Mambo Hill" en fase III of "Woolandale". K2 word deur Summers met die "Mambo Hill" fase (Leopard's Kopje 2) van die Leopard's Kopje-kompleks verbind (Summers 1970:161).

Hierdie indeling is later deur Huffman gewysig (Huffman 1974). Huffman beskou naamlik Robinson se fase 2 as die eerste werklike Leopard's Kopje fase, wat hy fase A noem. Volgens hom vertoon hierdie fase 'n noordelike vertakking wat hy Mambo ("Mambo facies") noem, en 'n suidelike vertakking wat hy Bambandyanalo ("Bambandyanalo facies") noem. ("Bambandya= nalo" is die naam wat deur vroeëre skrywers aan die terrein K2 gegee is, en Huffman het gevolglik die naam "Bambandyanalo" oorgeneem. Dit is egter nie korrek nie, aangesien Bambandya= nalo die rant aan die noordoostekant van K2 is. Vir die doeleindes van die huidige ondersoek word die korrekte be= naming "K2" gebruik). "Mambo" kom voor in die gebied vanaf Plumtree tot Bulawayo, en "Bambandyanalo" vanaf Gwanda tot in die Limpopovallei. Volgens Huffman verteenwoordig K2 die suidelike ("Bambandyanalo") vertakking van Leopard's Kopje fase A.

Die enigste Leopard's Kopje-terrein waarvan die argeologiese oorblyfsels in so 'n mate beskryf is dat die verskillende fisieke en kulturele kenmerke van die K2-mense daarmee verge= lyk kan word, is die "Main Kraal" van Leopard's Kopje naby Bulawayo, soos beskryf deur Huffman (Huffman 1974). Die ar= geologiese lae van die terrein wat, volgens Huffman, verteen= woordigend is van die noordelike ("Mambo") vertakking van fase A van die Leopard's Kopje-kultuurkompleks, is die sg. bewoningsvlakke ("occupations") B en C. 'n Vergelyking tussen K2 en bewoningsvlakke B en C sal die identiteit van K2 as 'n vertakking van fase A van die Leopard's Kopje-kultuurkompleks uitwys.

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(i) Fisieke tipe

Die fisieke tipe van Leopard's Kopje is as negroïed ge= identifiseer, d.w.s. dieselfde as dié van K2.

(ii) Ekonomiese lewe

Dit blyk dat die Leopard's Kopje-mense beeste aangehou het, asook bokke en skape. Dit is nie bekend watter spesies aangehou is nie. In teenstelling met K2, het die Leopard's Kopje-mense grootliks onvolwasse diere geëet.

Net soos die K2-mense was die Leopard's Kopje-mense ook akker= bouers, maar die plante wat deur hulle verbou is, was nie almal dieselfde as dié van K2 nie. By Leopard's Kopje is naamlik die volgende gewasse verbou: Eleusine corocana ("finger millet"), Sorghum bicolor, Vigna sinensis (V. unguiculata) en Voandzeia subterranea.

'n Verskeidenheid van wilde diere is deur die Leopard's Kopje-mense gejag maar dit is nie duidelik in watter mate die wilde diere die verbruik van gedomestikeerde diere aangevul het nie. Wilde plante is ook versamel.

Glaskrale is by Leopard's Kopje gevind, maar veel minder as by K2. Geen melding word gemaak van ivoor wat op die terrein gevind is nie.

(iii) Vestiging

Die Leopard's Kopje-bewoners het hutte van pale en klei gebou, maar daar is nie veel meer bekend oor hulle vestigingswyse nie.

(iv) Tegniese skeppinge

Boustrukture

Dit lyk nie of die hutstrukture van die Leopard's Kopje-mense presies dieselfde as dié van K2 was nie. Hut nr. 4 op

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Leopard's Kopje lyk in 'n mate na huttipe 4 op K2, maar daar is verskille in hulle planvorms. Ander hut-oorblyfsels, soos hut 8 op Leopard's Kopje, verskil van enige hut-oorblyf= sels wat tot dusver op K2 gevind is.

Metaalwerk

Die Leopard's Kopje-mense het min of meer dieselfde metaal= voorwerpe as die K2-mense besit, nl. pikke, pylpunte en ringe van yster en arm- of enkelbande van yster en koper. Die aanwesigheid van ysterslak dui op die verwerking van yster op die woonterrein.

Glaskrale

Benewens die handelskrale dui die aanwesigheid van 'n tuin= roller-glaskraal op die Leopard's Kopje-terrein daarop dat die terreinbewoners ook hierdie kraalsoort besit het. Geen kleivormpies vir die vervaardiging van die krale is egter gevind nie.

Artefakte van been, ivoor, skulp en eierdop

Huffman vermeld slegs krale wat gemaak is van volstruiseier= dop, varswatermossels en Achatina sp. skulpe. Halfvervaar= digde krale dui daarop dat die krale plaaslik gemaak is.

Klipartefakte

Huffman beskryf maalklippe wat betreklik soortgelyk is aan die klipartefaktipes 5.1 en 5.2 wat op K2 voorkom. Enkele spoelklippies en ander klipvoorwerpe kom ook voor. Klip= artefakte is egter nie volop nie.

Potwerk

Huffman beskryf 10 potwerkklasse wat op die terrein Leopard's Kopje voorkom. Drie van hierdie klasse, naamlik klasse 3, 7 en 9, stem onderskeidelik ooreen met die potwerktipes 1,

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4 en 3 in die K2-serie soos beskryf deur Meyer (vgl. hoofstuk 6). Die ander potwerk van Leopard's Kopje stem egter nie betekenisvol ooreen met dié van K2 nie. Die afleiding wat hieruit gemaak word, is dat die terrein K2 'n sekere mate van verwantskap met die "Mambo"-vertakking van Leopard's Kopje fase A vertoon, maar dat duidelike verskille ook voorkom.

'n Aantal K2-tipe terreine word tans deur E. Hanisch onder= soek. Volgens Hanisch stem die potwerk van daardie terreine in 'n groot mate ooreen met die K2-serie potwerk van die terrein K2 (Hanisch: pers. mededeling). Die terreine vorm deel van 'n kompleks wat in die samevloeiingsgebied van die Limpopo- en Shashirivier voorkom. Volgens die tipologiese ooreenstemminge van die potwerk is dit duidelik dat K2 deel van die kompleks uitmaak. In die huidige onder= soek word die kulturele oorblyfsels van hierdie kompleks die "K2-kultuur" genoem, met K2 as die verteenwoordigende "tipe"-terrein. Omdat die potwerk van die terreine tot dusver nog nie formeel beskryf is nie, kan dit nie met dié van K2 vergelyk word nie.

Diverse keramiek-voorwerpe

Talle mense-figuurtjies kom op Leopard's Kopje voor, maar hulle is nie presies dieselfde as dié van K2 nie. Figuurtjies van mak diere op Leopard's Kopje herinner sterk aan dié van K2, terwyl kleikrale ook op Leopard's Kopje gemaak is.

Grafte

Die grafte van die Leopard's Kopje-mense stem baie ooreen met dié van K2, d.w.s. die mense is in 'n saamgetrekte posisie op hulle sykante begrawe, met potwerk as grafgoedere.

Ouderdom

Hut-oorblyfsels van die Leopard's Kopje-bewoners is gedateer

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op 1 000 n.C en 1070 n.C., d.w.s. dieselfde ouderdom as K2. Hierdie oorblyfsels verteenwoordig Fase A van die Leopard's Kopje-kultuur.

9.2.2 LEWENSWYSE

In die beskrywing hierbo is die attribute van die K2-terrein aangedui om daardeur die identiteit van die K2-kultuur te bepaal. Vervolgens word die bogenoemde attribute beskryf as fasette of subsisteme van die kulturele sisteem van die K2-mense.

(a) Ekonomiese lewe

(i) Veeherdery

Die K2-mense het in 'n besondere mate gebruik gemaak van hulle vee as 'n bron van vleis (vgl. hoofstuk 7: tabelle 5.9-5.11). Tussen 96,6% en 98,6% van die totale gewig van vleis wat geëet is, was dié van gedomestikeerde diere. Tussen 70,7% en 76,5% van die totale vleisverbruik is dié van volwasse beeste en 13,1% tot 14,4% dié van onvolwasse beeste. Tussen 4,9% en 12,4% van die totale vleisverbruik was dié van volwasse bokke en skape, en 1,5% tot 2,4% dié van onvolwasse bokke en skape. Veediere is dus meestal toegelaat om aan te teel alvorens hulle geslag en geëet is. Voigt (hoofstuk 7) wys op die beklemtoning van spene aan kleifiguurtjies van koeie en kom na aanleiding daarvan tot die gevolgtrekking dat melk 'n betekenisvolle rol gespeel het in die dieet van die K2-mense.

Die aanwesigheid van twee veekrale in die onderste lae naby die woonhutte dui daarop dat die K2-mense aanvanklik die vee in krale na aan hulle woonplekke wou hou, vermoedelik as beskerming teen roofdiere. Die feit dat ashoop-afsettings later oor die kraallae gevorm het, dui aan dat die veekrale later verskuif is, maar dit is nie bekend waarheen nie.

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(ii) Akkerbou

Die aanwesigheid van graankorrels in meeste woonlae dui daarop dat graan gereeld verbou is. Boontjies is in een laag gevind. 'n Opvallende verskynsel is die feit dat daar slegs 'n paar klippe met holtes gevind is wat moontlik vir die maal of stamp van graan gebruik kon gewees het. Dit suggereer dat graan nie op groot skaal verbou is nie. Daarteenoor is daar etlike graanhutte gevind. 'n Ander moont= likheid is dat die graan heel gekook is of dat dit in 'n hout stampblok fyngemaak is, maar dit lyk onwaarskynlik.

(iii) Jag

Die jagbedryf het skynbaar 'n onbelangrike rol gespeel in die voorsiening van voedsel. Tussen 1,2% en 1,8% van die totale vleisverbruik is dié van grotere diere wat gejag is en tussen 0,15% en 2,3% is dié van kleinere wilde fauna. Die aanwesigheid van talle ivoorstukke op K2 dui daarop dat olifante gejag is om ivoor te bekom.

(iv) Versamel

Benewens die klein wilde diertjies wat gevang is, is die vrugte van 'n verskeidenheid wilde plante ingesamel. Die feit dat wilde sade en vrugte hoofsaaklik slegs in die somermaande beskikbaar was, nie soveel in die woonlae voor= kom as graan nie en ook nie opgeberg is soos graan nie, is 'n aanduiding dat die versamel van wilde plantkosse nie 'n groot rol gespeel het in die dieet van die K2-mense nie.

(v) Handel

Die talle klein glaskrale wat in alle lae oor die hele terrein voorkom, is 'n aanduiding van die belangrikheid van die krale. Mense is selfs met die krale as grafgoedere begrawe. Die krale was skynbaar van Arabiese oorsprong (vgl. hoofstuk 5: bylae 5/3) en dit dui daarop dat die K2-

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mense betrokke was in 'n ruilhandel met die Arabiere. Die enigste oorblyfsels van invoergoedere by K2 is die handels=krale en kauriskulpe. Geen tekstielware of ander invoer=goedere is tot dusver gevind nie.

Soos vroeër reeds gesê is, was ivoor die enigste materiaal wat die K2-mense in ruil vir die invoergoedere kon aanbied. Dit lyk of koper en ander materiale slegs vir plaaslik ver=bruik geproduseer is. Die ivoor is waarskynlik deur die K2-mense bekom deur gesamentlike jagpogings van 'n groep manspersone wat dan ook 'n gesamentlike aandeel moes gehad het in die invoergoedere. Op hierdie wyse het talle han=delskrale en skulpe hulle weg na die vrouens van die mans gevind en het hulle sodoende in die bewonings-oorblyfsels op die terrein beland.

(b) Vestiging

(i) Boustrukture

Die feit dat die bouwerke van die K2-mense beperk is tot eenvoudige paal-en-kleihutte is 'n aanduiding dat hulle nie besondere bouers was nie. Die hutpale was nie baie dik nie en is afgepleister met sanderige grond wat waarskynlik gou weer afgeval het. Dit het beteken dat die hutte òf gereeld afgepleister moes word, òf dikwels in 'n gehawende toestand verkeer het. Die hutte is minstens twee keer afgebrand en die bewoning van die terrein is daarna hervat. Dit is opvallend dat hutte of hutkomplekse dikwels gebou is op die oorblyfsels van vorige hutte. Dit lyk ook of hutte dig opmekaar gerangskik was (vgl. deel V: opgrawing Ts 4). Die groot omvang van die ashope asook die groot hoeveelhede bene en potskerwe dui daarop dat 'n groot getal mense die terrein moes bewoon het. Al hierdie faktore verklaar die omvangryke opbou van woonlae ten spyte van die feit dat die hutstrukture betreklik eenvoudig van aard was. 'n Opvallende verskynsel is dat daar feitlik geen materiële besittings

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was in die hutte wat afgebrand het nie.

Die medium-grootte hutte (huttipe 3) en groot hutte (huttipe 4) was waarskynlik slaaphutte vir die mans, vrouens en kinders, hoewel hierdie hutte in sommige gevalle ook vir ander aktiwiteite gebruik kon gewees het. Huttipe 3 byvoorbeeld, het waarskynlik soms ook as stoorhut gedien. Daar is egter nie voorwerpe in die hutte gevind wat inligting kan verskaf oor hulle funksies nie. Dit lyk of die kleinste hutjies (huttipes 1 en 2) normaalweg as graan-stoorhutjies gebruik is. Naby die hutte is dikwels vuur gemaak op die gruis-woonvloere en grond-oppervlaktes.

(ii) Ashope

Die besonder omvangryke ashope en groot hoeveelhede diere-bene daarin getuig daarvan dat groot hoeveelhede vuurmaakhout voortdurend versamel is vir die gaarmaak van vleis en plantaardige voedsel.
Die as, bene, potskerwe en ander afval is gewoonlik uit die woonhut-kompleks verwyder en buite-om die kompleks weggegooi.

(iii) Veekrale

Dit is moontlik dat die groot veekraal (komponent 1) as 'n beeskraal gebruik is en dat die tweede kraal (vgl. opgrawing Ts 6) 'n kleiner kraal vir bokke en skape was. Hierdie krale is egter later deur die groeiende ashope verswelg en is ander krale elders opgerig.

(c) Tegniese skeppinge

(i) Boustrukture

Die mure van hutte (insluitend die kleineres, nl. tipes 1 en 2) is opgerig deur 'n smal fondasiesloot gemiddeld 5 cm tot 15 cm wyd te grawe, waarna houtpale wat soms met ysterdissels afgewerk is, naby mekaar in die fondasiesloot ingeplant is.

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Die paalmure is daarna afgepleister met die sandgrond uit die omgewing, waarna die vloere tot teen die muur gelê is. Waar daar vloergruis gebruik is, is dit uit die nabygeleë skalie-afsetting gehaal. Die vlak holtes in die rotsbodem in opgrawings Ts 1 en Ts 2 is moontlik deur die uithaal van vloergruis veroorsaak. Dit is dan vasgestamp en glad afgewerk met stamp- of skuurklippe (klipartefak-tipes 5.1 en 5.2 : vgl. hoofstuk 5). Vloergruis is egter nie in alle gevalle gebruik nie. Die vloere van huttipe 2 wat op K2 gevind is gedurende die huidige opgrawings, is gemaak van gekompakteerde sand. Dit blyk ook duidelik uit die opgrawings dat die vloere van huttipe 3 op K2 gewoonlik van gekompakteerde sand gemaak is. Die opelug-vloere buite-om die hutte is wel van skaliegruis gemaak, maar is normaalweg nie so deeglik vasgestamp en afgewerk soos dié in die hutte nie.

Die hutdakke was waarskynlik van gras gemaak en het tot as verbrand tydens die afbrand van die hutte.

(ii) Metaalwerk

Daar is nog geen aanduidings gevind dat die K2-mense yster of koper op of naby hul woonterrein gesmelt het nie. Hulle het egter klein hoeveelhede ru-yster en -koper m.b.v. 'n warm smee-tegniek tot gebruiksartikels verwerk. Die slak-afval wat sodoende gevorm is, is op die omliggende ashope weggegooi. Die yster-pylpunte en -assegaailemme getuig van die pyl en boog en assegaai wat as jaggereedskap en militêre wapens gebruik is. Ysterpik-lemme moes vervaardig word vir die pikbou-aktiwiteite en ysterdissels was ook noodsaaklik vir die afwerking van hutpale en die vervaardiging van houtvoorwerpe. Sweetskrapers en ander persoonlike gereedskap is eweneens van warmgemaakte yster gesmee. Soliede koperringe is ook op hierdie wyse vervaardig en as ornamente gebruik. Arm- en enkelringe is ook gemaak van getrekte koper- en ysterdraad wat platgehamer is en spiraalvormig om plantvesels of dierehare gedraai is.

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(iii) Glaskrale

Glaskraletjies wat d.m.v. ruilhandel verkry is, was soveel in gebruik dat letterlik duisende daarvan in woonlae en op die ashope beland het. Kinders wat gesterf het, is ook met krale opgetooi. Die K2-mense het groot glaskrale , die sg. "tuinrollerkrale", vervaardig deur die klein handelskraletjies te verhit tot hulle smelt en die gesmelte glas dan in gebakte klei-vormpies in te werk en af te koel. Die klei-vormpies om die glaskraal is daarna weggebreek en meestal op die ashope weggegooi. Die feit dat die ashoop teen die helling van Bambandyanalo (terrein-komponent 6) heelwat meer kraal= vormpies oplewer as die ander komponente van die terrein, is 'n aanduiding dat die mense wat hoër op teen die helling van Bambandyanalo gewoon het op groter skaal tuinrollerkrale ge= maak het as die res van die K2-mense. ('n Persoonlike indruk, wat egter nog getoets moet word, is dat ook meer metaalslak teen Bambandyanalo voorkom as elders op die terrein).

(iv) Voorwerpe van been, ivoor, skulp en eierdop

Else en naalde is vervaardig van been en ivoor. Hulle is vermoedelik gebruik om dierevelle te verwerk tot kledingstuk= ke en velsakke. (Geen sodanige voorwerpe is egter gevind nie). Ivoor-armbande en beenkrale is ook vervaardig.

Groot hoeveelhede krale van skulp en volstruiseierdop is as liggaamsversierings gebruik, maar dit is nie duidelik of hierdie krale alles op K2 vervaardig is nie, aangesien ge= groefde klippe of iets soortgelyks waarop die krale rond= geslyp kon word nie geïdentifiseer kan word nie. Talle on= afgewerkte krale kom egter voor en is 'n aanduiding dat die krale op K2 nog in 'n proses van vervaardiging was en nooit voltooi is nie.

(v) Klipartefakte

Vyselklippe kom so min op K2 voor dat dit wil voorkom of die

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K2-mense nie veel behoefte gehad het aan die fynmaak van voedselsoorte of ander materiale nie. Skuur- en stampklippe (klipartefak-tipes 5.1 en 5.2: hoofstuk 5) kom so algemeen op die terrein voor, dat dit wil voorkom of heelwat materiaal daarmee gemaal, geskuur of fyngestamp is. Soos reeds vermeld, is hulle vermoedelik gebruik om vloere te maak, terwyl wilde sade soos maroelapitte waarskynlik gestamp is om die eetbare gedeeltes in die hande te kry. Die klein spoelklippies is moontlik in speletjies gebruik. Verder het die K2-mense nie veel van klip-artefakte gebruik gemaak nie.

(vi) Potwerk

Dit is opvallend dat die K2-mense groot hoeveelhede houers van gebakte klei vervaardig het en baie duisende potskerwe op die ashope weggegooi het. Volgens Meyer (pers. komm.) is pottipe 1 van die K2-serie potwerk (vgl. hoofstuk 6) dikwels aan die buitekant swart gebrand met 'n aanpaksel van roet of verkoolde materiaal op die oppervlakte. Hierdie pottipe is klaarblyklik algemeen gebruik om voedsel (vleis, graan en groente) daarin te kook. Grotere eksemplare van hierdie pottipe word ook in situ in die grond aangetref en is vermoedelik as stoorpotte gebruik.
Die tuite aan die bolvormige pottipe (tipe 3) en ook die algemene vorm van die bekers (pottipe 5) dui daarop dat vloeistowwe hierin gehanteer is. Diep bakke (pottipe 2) is die soort houer wat as voedselhouers gebruik kon gewees het. Bekers, bekerbakke en ander pottipes is dikwels ook as grafgoedere gebruik. Hulle is gebreek en om die oorledene in die graf gepak. Potwerk is ook gebruik by die sg. "dierebegrafnisse", soos beskryf deur Gardner (Gardner 1963).

(vii) Diverse keramiek-voorwerpe

Voorstellings van mense, mak diere en soms ook wilde diere is van klei gemaak. Dit is egter nie duidelik of hierdie voorstellings 'n rituele of 'n ander betekenis gehad het nie. Kleilepels is ook gemaak en kleikrale is as ornamente gebruik

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maar beide hierdie voorwerpe kom nie dikwels voor nie.

(d) Grafte

Die aanwesigheid van babagrafte in die hut-areas en die grafte van groter kinders in die ashope om die hut-areas dui daarop dat die K2-mense verkies het om hulle dooies naby hulle woonplekke te begrawe. Dit wil voorts voorkom of hierdie grafte gegrawe is op die plekke waar 'n kleinerige gat met min inspanning en gereedskap gegrawe kon word, nl. die ashope.

Gardner vermeld enkele grafte van volwasse persone in die sentrale ashoop. Afgesien hiervan is daar nog min oorblyfsels gevind van die geraamtes van die talle volwasse persone van verskeie generasies wat op K2 moes gesterf het nie. Mens kry die indruk dat meeste van die volwassenes elders begrawe is.

Die K2-mense het hulle dooies hoofsaaklik in 'n saamgetrekte houding op die sykante in 'n kleinerige gat geplaas sonder dat die gesigkant van die dooie in 'n spesifieke rigting georiën= teer is. Die ornamente, soos krale en enkelringe, wat saam met die oorledene begrawe is, was waarskynlik persoonlike besittings. Die doel van die doelbewus-gebreekte potwerk as grafgoedere is onbekend en waarskynlik ritueel van aard.

9.3 DIE SUIDELIKE TERRAS EN MAPUNGUBWEKOP

9.3.1 ALGEMEEN

Die kulturele vondste van die Suidelike Terras en Mapungubwe= kop word hieronder in vier fases ingedeel. Die identiteit en lewenswyse van elke fase word eers afsonderlik bespreek en daarna word 'n samevatting van hulle identiteit gemaak.

Uit die stratigrafie en die kulturele materiaal van die Suidelike Terras en Mapungubwekop kan twee duidelike aflei= dings gemaak word:

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(1) Die twee terreine is gelyktydig deur dieselfde gemeenskap bewoon want die argeologiese oorblyfsels van die terreine is dieselfde en hulle is ewe oud.

(2) Die twee terreine is agtereenvolgens deur gemeenskappe met verskillende lewenswyses bewoon. Op grond daarvan word die bewoning in vier bewoningsfases ingedeel.

Die bewoningsfases van die twee terreine is argeologies bepaal volgens die aard van die stratifikasie en kultuurgoedere. Die 6 hooflae, soos stratigrafies beskryf in hoofstuk 4, is in hoofstuk 6 vereenvoudig tot 4 lae en daaruit is op grond van verskillende kenmerke, wat later aangedui sal word, 4 fases afgelei. Die onderstaande diagrammatiese korrelasie van die hooflae en fases en die aanvullende aantekeninge stel dit duidelik.

1. STRATIGRAFIESE INDELING (hoofstuk 4)	2. VEREENVOUDIGDE HOOFLAAG-INDELING (hoofstuk 6)	3. BEWONINGSFASES (hoofstuk 9)
hooflaag 6	hooflaag 1	fase IV
hutpuin 5	2	
4		
hutpuin 3		III
hutpuin 2	3	
hutpuin 1	4	II
		I

Aanvullende aantekeninge

Kolom 1. In hoofstuk 4 is die strata van elke opgrawing saamgevat in hooflae. Die indeling van die hooflae is gebaseer op gebrande hutpuin-lae en die materiaal waarvan die vloere gemaak is.

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Kolom 2. Hoofstuk 6 se hooflaag-indeling is 'n vereenvou= diging van die 6 hooflae wat in hoofstuk 4 beskryf is. In die geval van lg. hooflae is die skeiding tussen hooflae 2 en 3, en dié tussen hooflae 4 en 5, minder prominent as in die geval van die ander hooflae en word daarom buite rekening gelaat in hoofstuk 6. Die genoemde 6 hooflae (vgl. kolom 1) is in hoofstuk 6 dus verminder tot 4 hooflae, soos aangedui in kolom 2.

Kolom 3. Die 6 hooflae wat later na 4 hooflae verminder is, het geblyk 4 kultuurhistoriese fases te verteenwoordig: hooflaag 4 (kolom 2) verteenwoordig 2 fases en hooflae 2 en 3 gesamentlik 1 fase. Dit sal uit die beskrywings hieronder blyk dat daar waarneembare verskille tussen hooflae 2 en 3 voorkom, maar desnieteenstaande vorm die 2 hooflae 'n kultuur= historiese eenheid wat hom van die voorafgaande en die daar= opvolgende fases onderskei en word dit as fase III aangedui.

9.3.2 FASE I

Hierdie is die vroegste bewoningsfase. Die enigste argeolo= giese oorblyfsels wat met die fase geassosieer word, is ver= skeie potskerwe wat in die basis van die afsettings op Mapungubwekop en op die Suidelike Terras aangetref is (m.a.w. in die basis van die Fase II-woonlaag). Die lipvorm en ver= sierings van die potskerwe stem in breë trekke ooreen met die potwerk van die Gokomere-tradisie van Noord-Transvaal en Rhodesië. Hulle is nie op K2 gevind nie. Die feit dat daar so min van hulle materiaal voorkom, dui daarop dat die "Gokomere-mense" slegs vir 'n kort rukkie op die Suidelike Terras en Mapungubwekop moes gewees het. Dit is nie bekend hoe oud die oorblyfsels is nie. Die "Gokomere-mense" was waarskynlik reeds weg toe die K2-mense hulle daar kom vestig het.

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9.3.3 FASE II

(1) Algemeen

Fase II word verteenwoordig deur die onderste woonlae op albei terreine (vgl. deel V, fig. 97). Die lae wat fase II verteenwoordig, is dun in verhouding tot die res van die afsettings en bevat oor die algemeen min argeologiese materiaal. Die lae word gesamentlik deur Meyer as "hooflaag 4" beskryf (vgl. hoofstuk 6). Hooflaag 4 bestaan op die Suidelike Terras uit lae 9 en 10 in blok F4, laag 6(iii) in blok H5 en lae 15, 16 en 17 in blok K8. Op Mapungubwekop bestaan hooflaag 4 uit laag 11 in opgrawing Mk 1.

(2) Identiteit

(a) Fisieke tipe

Geen menslike skeletmateriaal is in hierdie fase gevind nie.

(b) Ekonomiese lewe

(i) Veeherdery

Op die Suidelike Terras is die beendere van blok K8 ondersoek, maar die materiaal was te min om duidelike gevolgtrekkings te maak. Die Fase II-mense op die kop het beeste, bokke en skape aangehou. Ongeveer 93.8% van hulle vleisdieet is van gedomestikeerde diere verkry wat hoofsaaklik op volwasse ouderdom geslag is (vgl. hoofstuk 7). Geen verskil tussen hierdie veeteeltoorblyfsels en dié van K2 kon waargeneem word nie. In die oostelike deel van die Suidelike Terras is oorblyfsels van 'n veekraal gekry (vgl. hieronder).

(ii) Akkerbou

'n Klein hoeveelheid sorghum is op Mapungubwekop gevind. Daar is geen aanduidings gevind dat die akkerbou-bedrywighede van hierdie mense verskil het van dié van K2 nie.

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(iii) Jag

Op die Suidelike Terras (blok K8) is nie voldoende been=materiaal gekry vir identifikasie-doeleindes nie. Die wilde fauna wat deur die mense van Mapungubwekop in fase II gejag is, is dieselfde as dié wat in historiese tye nog in die ge=bied voorgekom het. Wilde fauna het slegs sowat 6,2% van die totale vleisdieet van die mense uitgemaak. Geen ivoor is gevind nie, maar afgesien hiervan het die jagbedryf dieselfde rol gespeel as in die geval van K2.

(iv) Versamel

Slegs klein hoeveelhede wilde sade is gevind. Die vrugte van wilde plante is versamel, veral dié van die Njalaboom (Xanthocercus zambesiaca), en dit lyk of die versamelbedryf hier dieselfde rol gespeel het as op K2.

(v) Handel

Die ingevoerde handels-glaskrale wat in fase II voorkom, is dieselfde as dié van K2. Geen moontlike uitvoergoedere is gevind nie.

(c) Vestiging

Weens die beperktheid van die opgrawings kon die vestigings=patroon nie vasgestel word nie. Voorbeelde van huttipes 3 en 4 is in hierdie fase gevind en is soortgelyk aan dié van K2. Geen ander oorblyfsels van vestiging is gevind nie, met uitsondering van veekraal-oorblyfsels in die onderste lae van opgrawing MST 1. Die verband van hierdie laag met die onderste lae van die ander blokke wat opgegrawe is, is egter nog nie duidelik vasgestel nie.

(d) Tegniese skeppinge

(i) Boustrukture

Huttipes 1 en 2 (vgl. hoofstuk 5) wat op K2 voorkom, is nie in fase II van die kop en die Suidelike Terras gevind nie.

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Huttipes 3 en 4 kom, soos reeds genoem, wel hier voor net soos op K2. Geen ander boustrukture is gevind nie.

(ii) Metaalwerk

Die klein hoeveelheid oorblyfsels van metaalwerk wat gevind is, verskil nie van dié van K2 nie.

(iii) Glaskrale

Geen tuinroller-krale of klei-kraalvormpies is gevind nie. Die handelskrale stem ooreen met dié van K2.

(iv) Artefakte van been, ivoor, skulp en eierdop

Feitlik net volstruiseierdop-krale is gevind. Een been-artefak kom op Mapungubwekop in die onderste laag voor, nl. tipe 529 (vgl. hoofstuk 7).

(v) Klipartefakte

Onder die woonhut-oorblyfsels van die oudste laag op Mapungubwekop, opgrawing Mk 1, is twee vyselholtes (klip= artefak-tipe 1.2) in die rotsbodem gevind (vgl. deel V:foto 93). Geen ander definitiewe klipartefakte is in fase II gevind nie. (Talle vyselholtes kom voor op die rotsplate van die kop en is deur vroeëre opgrawers blootgelê maar nie binne laagverband gedokumenteer nie. Dit is dus nie bekend hoeveel van dié vyselholtes tot fase II behoort nie).

(vi) Keramiek

Die potwerk wat in fase II op albei terreine gevind word, is in alle opsigte soortgelyk aan die K2-serie potwerk van K2 (vgl. hoofstuk 6). Verder is 'n fluit van gebakte klei (vgl. hoofstuk 6:bylae 6/1) op die kop gevind. Geen kleifiguurtjies of ander keramiekvoorwerpe is in fase II gevind nie.

(e) Grafte

Geen grafte is gevind nie.

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(f) Ouderdom

Volgens Vogel dui die C14-daterings daarop dat fase II bestaan het voor 1070 n.C. (vgl. bylae 8/3).

(3) Lewenswyse

Daar is min gegewens i.v.m. die lewenswyse wat spesifiek op die fase II-mense betrekking het. Die kenmerke van die potwerk, boustrukture en ander kultuurgoedere stem volkome ooreen met dié van K2 en dit is duidelik dat 'n K2-gemeenskap ook Mapungubwekop en die Suidelike Terras bewoon het. Die oorblyfsels van die veeherders- en akkerboubedryf soos bene en sade, asook die ingevoerde glaskrale, dui daarop dat die fase II-mense dieselfde ekonomiese lewenswyse gevoer het as die K2-mense. Geen waarneembare verskille is gevind tussen die tegniese skeppinge van fase II en dié van K2 nie.

Dit is egter opvallend dat slegs dun woon-afsettings met betreklik min kulturele materiaal gedurende die verloop van fase II op die Suidelike Terras en Mapungubwekop gevorm het. Daarteenoor het daar op K2 gedurende dieselfde bewoningstyd= perk omvangryke bewoningslae opgebou en het daar groot hoe= veelhede materiële goedere en talle mensegrafte in die af= settings bewaar gebly. Hierdie verskynsels skep 'n duidelike indruk dat die terreine Mapungubwekop en die Suidelike Terras minder intensief bewoon is as K2 gedurende die verloop van bewoningsfase II.

9.3.4 FASE III

(1) Algemeen

Op die laag van gebrande hutpuin waarmee fase II eindig, volg daar twee chronologiese hooflae, nl. hooflae 2 en 3, wat op grond van verskillende kulturele kenmerke 'n kultuur= historiese eenheid vorm, nl. fase III. Soos dit hieronder sal blyk, word fase III van fase II kultureel onderskei omdat

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die inhoud van die twee fases sekere verskille toon ten opsigte van potwerk en glaskrale asook die aanwesigheid van klip= strukture en goue voorwerpe in fase III.

Uit die beskrywings hieronder sal dit blyk dat daar verskille tussen die twee hooflae van fase III voorkom ten opsigte van potwerk, huttipes, vloere, klipstrukture en glaskrale, maar desnieteenstaande is daar 'n basiese ooreenstemming.
Die twee hooflae word geskei deur 'n laag gebrande hutpuin wat die einde van hooflaag 3 aandui. Duidelikheidshalwe kan ver= meld word dat hooflaag 3 uit die volgende lae bestaan (vgl. hoofstuk 6): lae 7(iii) tot 8(iv) in blok F4; lae 5(i) tot 6(ii) in blok H5; lae 9 tot 14 in blok K8; lae 9(i) tot 10 in opgrawing Mk 1. Hooflaag 3 word verdeel in 'n onderste en boonste gedeelte deur 'n gebrande hutpuin-laag (vgl. deel V: sketsfig. 98).

Hooflaag 2 bestaan uit lae 3 tot 7(ii) in blok F4; lae 3 tot 4(ii) in blok H5; lae 4 tot 8 in blok K8; lae 4 tot 8 in opgrawing Mk 1 (vgl. deel V: sketsfig. 98).

(2) Identiteit

(a) Fisieke tipe

Geen identifiseerbare menseskelette is gevind nie.

(b) Ekonomiese lewe

(i) Veeherdery

Die fase II-mense, soos hulle voorgangers, het hulle vleis oorwegend van hulle beeste, bokke en skape verkry. Sowat 98,4% van die totale vleisdieet was dié van gedomestikeerde diere op die Suidelike Terras en 94,8% op Mapungubwekop. Hulle veeherderspraktyke verskil nie merkbaar van dié van die K2-bewoners nie.

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(ii) Akkerbou

Sorghum is verbou. In hooflaag 3, d.w.s. die ouer gedeelte van fase III, is die graan opgeberg in klein graanhutte (huttipes 1 en 2). In hooflaag 2, d.w.s. die jonger gedeelte van fase III, bokant 'n brandpuinlaag, is daar nog geen tekens van graanhutte gevind nie, maar daar kom ruwe klipplatforms voor wat die staanplekke van graanhouers kon gewees het. Verder is die akkerbou-bedrywighede van die mense min of meer soortgelyk aan dié van die K2-bewoners.

(iii) Jag

Die jagbedryf het nie 'n belangrike rol gespeel nie. Slegs sowat 1,5% van die totale vleisdieet is dié van wilde fauna wat gejag is. Geen aanduidings van ivoor is gevind nie, maar afgesien hiervan lyk dit nie of die aard van die jagbedryf verskil het van dié van die K2-bewoners nie.

(iv) Versamel

Die soorte wilde vrugte wat versamel is, kom tans nog in die omgewing voor.

(v) Handel

Die fase III-mense het, net soos hulle voorgangers, heelwat glaskrale vanuit die buiteland gekry. Aanvanklik was die kraaltipes dieselfde as dié van K2, nl. hoofsaaklik die M1 Chemiese Groep. Teen die einde van fase III is hierdie krale egter verplaas deur die Mapungubwe Chemiese Groep I glaskrale, wat moontlik 'n verandering in direkte of indirekte handelskon= takte impliseer. Die aanwesigheid van 'n goue spiraaltjie wat op Mapungubwekop (opgrawing Mk 1) in fase III gevind is, dui daarop dat dié mense goud as 'n moontlike uitvoermateriaal gehad het.

(c) Vestiging

Fase III word gekenmerk deur 'n verandering in die aard van

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boustrukture. Twee soorte boustrukture kom voor, nl. hutte en klipstrukture. Die opgrawings was te beperk om spesifieke afleidings ten opsigte van vestigingswyse van die mense op die terreine vas te stel. Die aard van die hutte en klip= strukture word hieronder as tegniese skeppinge verder bespreek.

(d) Tegniese skeppinge

(i) Boustrukture

Al vier huttipes wat op K2 voorkom, d.w.s. huttipes 1 tot 4, is ook aanwesig in hooflaag 3 op Mapungubwekop en die Suide= like Terras, maar dit is opvallend dat slegs huttipe 4 tot dusver hoër op in hooflaag 2 aangetref is (vgl. deel V:skets= fig.98). Die hutte is op dieselfde wyse gebou as dié op K2.

Die vloere in hooflaag 3 en in die onderste gedeelte van hooflaag 2 is dieselfde as dié van K2, d.w.s. gekompakteerde rooi en liggeel skaliegruis. In hooflaag 2 vind egter ook 'n verandering plaas in die materiaal waarvan die vloere gemaak is, naamlik dat vloere van mosterdgeel dolerietbasalt hier en daar voorkom in die ouer gedeelte van hooflaag 2, en in die jonger gedeelte van hooflaag 2 vervang dit die skalievloere geheel en al. Aan die einde van fase III op albei terreine is die vloere dus uitsluitlik gemaak van die verweerde dole= rietbasalt wat in die omgewing van die terreine voorkom. Die hutvloere is vermoedelik op dieselfde wyse vasgestamp en glad afgewerk as dié van fase II en K2, maar geen spesifieke inlig= ting is in hierdie verband gevind nie.

Fase III word gekenmerk deur die verskyning van twee soorte klipstrukture, nl., eerstens, vyselklip-strukture en klip= platforms, en, tweedens, klipmure. In die onderste gedeelte van hooflaag 3, onder die brandpuinlaag wat die hooflaag in twee verdeel, is nog geen klipstrukture gevind nie. Bokant hierdie brandpuinlaag, d.w.s. in die boonste gedeelte van hooflaag 3, verskyn die vyselklip-strukture (klipstruktuur- tipes 1 en 2: vgl. hoofstuk 5) wat ook hoër op in hooflaag 2

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voorkom (vgl. deel V: sketsfig. 99). In hooflaag 2 kom die platform-agtige klipstrukture voor (klipstruktuur-tipe 3: vgl. hoofstuk 5; deel V: sketsfig. 99).

Vrystaande klipmure (klipstruktuur-tipe 5) en klip-terrasmure (klipstruktuur-tipe 6) is nie gedurende die huidige opgrawings gevind nie, maar word deur vorige navorsers beskryf (Fouché 1937). Die laagverband van hierdie strukture is nie bekend nie. Soos later verduidelik word, kom daar op die Suidelike Terras 'n vertikale opeenvolging van klipmure voor, wat van mekaar geskei word deur soliede dolerietbasalt-vloere, wat 'n aanduiding is dat minstens sommige van die klipmure verband kan hou met die einde van fase III toe die soliede dolerietbasalt-vloere gemaak is.

(ii) Metaalwerk

Die ystervoorwerpe is oor die algemeen dieselfde as dié van K2 en hulle is min of meer op dieselfde manier vervaardig, want 'n mikroskopiese ontleding het geen opvallende metallurgiese verskille aangedui nie. Die kopervoorwerpe is ook min of meer dieselfde as dié van K2, behalwe dat daar in laag 10 op Mapungubwekop 'n koperspiraal voorkom, waarvan die koper van 'n ander oorsprong afkomstig is as die ander kopervoorwerpe (vgl. bylae 5/2).

Gedurende die opgrawings het dit voorgekom of minder metaalslak in fase III op Mapungubwekop voorkom as in die ouer bewoningsfases; dit kan òf aan 'n afname in plaaslike metaalverwerking òf aan 'n verandering van die aktiwiteitsarea te wyte wees.

Dit is ook opvallend dat 'n goue spiraal voorkom in laag 8 in opgrawing Mk 1, d.w.s. aan die begin van hooflaag 2, net bokant die brandpuinlaag wat hooflaag 2 skei van hooflaag 3. Dit blyk dus dat die fase III-mense op hierdie stadium goue ornamente in hulle besit gehad het. Die wyse waarop die

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goue spiraal vervaardig is, is soortgelyk aan die vervaar= diging van koperspirale.

(iii) Glaskrale

Geen tuinroller-glaskrale is gevind en ook geen klei-kraal= vormpies nie.

In hooflaag 3, d.w.s. die ouer gedeelte van fase III, kom daar op die Suidelike Terras nie baie glaskrale voor nie, maar dié wat,wel voorkom, lyk na dié van K2. In dieselfde hooflaag op Mapungubwekop kom 'n ietwat groter verskeidenheid voor wat dieselfde as dié van K2 blyk te wees.

In hooflaag 2, d.w.s. die jonger gedeelte van fase III, vind 'n verandering in die kenmerke van die krale plaas. Op die Suidelike Terras kom krale wat voorheen skaars was, nou meer algemeen voor. Volgens Davison se beskrywing kom die Mapungubwe Chemiese Groep I in hierdie hooflaag prominent voor. Sy verwys in hierdie verband spesifiek na lae 4 tot 7 in blok K8 (vgl. bylae 5/3). Sy kom ook tot die gevolgtrekking dat die M1 Chemiese Groep, wat op K2 voorkom, eers in die meerderheid op die Suidelike Terras is maar dat dit later verminder sonder om heeltemal te verdwyn.

(iv) Artefakte van been, ivoor, skulp en eierdop

Heelwat volstruiseierdop-krale kom op albei terreine voor. 'n Klein aantal skulpkrale kom hoofsaaklik op die Suidelike Terras voor. Die ivoor-armbande en been-artefakte wat ken= merkend van K2 is, is egter nie in die huidige opgrawings in fase III gevind nie.

(v) Klipartefakte

Soos hierbo beskryf, word vyselklippe nou met ander klippe omring, die sg. klipstruktuur-tipe 2 wat in die boonste gedeelte van hooflaag 3 verskyn en tot aan die einde van

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fase III voorkom. Die ander klipartefaktipes wat in hoofstuk 5 beskryf word, kom verspreid in die woonlae van fase III voor en is min of meer dieselfde as dié van K2.

(vi) Keramiek

Twee potwerk-tradisies kom in fase III voor (vgl. hoofstuk 6). In hooflaag 3 op die Suidelike Terras behoort 63.9% van die potwerk tot die K2-tipes potwerk, nl. die "K2-serie"; 28.9% behoort tot 'n nuwe soort potwerk, nl. die "Mapungubwe-serie"; en 7.6% is nie-tipiese variasies. In hooflaag 2 verminder die K2-serie potwerk tot 13.1%; die Mapungubwe-serie vermeer= der tot 72.1%; en 14.9% is nie-tipiese variasies.

Dieselfde verskynsel vind op Mapungubwekop plaas. In hoof= laag 3 behoort 62.5% van die potwerk tot die K2-serie; 25.0% tot die nuwe Mapungubwe-serie; en 12.5% is nie-tipiese variasies. In hooflaag 2 verminder die K2-serie tot 10.0%; die Mapungubwe-serie vermeerder tot 84.8%; en 5.4% is nie-tipiese variasies (vgl. hoofstuk 6).
Ander keramiekvoorwerpe is beperk tot enkele voorstellings van skape (vgl. hoofstuk 7), koniese voorwerpe en abstrakte voorwerpe (vgl. foto's, hoofstuk 6).

(e) Grafte

Geen grafte is in fase III gevind nie.

(f) Ouderdom

In 'n vroeëre opgrawing op die Suidelike Terras, nl. blok E2, wat digby blok F4 geleë is en stratigrafies duidelik by F4 aansluit, is drie daterings vir fase III gekry, nl. 1110 n.C. vir die middel van hooflaag 3, 1130 vir die einde van hooflaag 3 en 1150 vir die einde van hooflaag 2 (vgl. bylae 8/3).
Fase III het, volgens Vogel, dus bestaan vanaf ongeveer die einde van die elfde tot ongeveer die middel van die twaalfde eeu.

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(3) Lewenswyse

(a) Ekonomiese lewe

Die ekonomiese lewe van die fase III-mense was basies die= selfde as dié van die K2-bewoners, maar daar was ook waar= neembare verskille. Vyselklip-strukture kom voor in die boonste gedeelte van hooflaag 3 tot in hooflaag 2 en is 'n aanduiding dat graan hier fyngestamp is. Dit is ook opvallend dat in hooflaag 2 geen graan-stoorhutte gevind is nie; en dat ruwe klipplatforms, wat staanplekke vir graanhouers kon wees, dikwels voorkom.

In die latere gedeelte van fase III kom daar 'n verandering in die aard van die handelskrale voor. Die Mapungubwe Chemiese Groep I, insluitende die afgeplatte krale ("oblate series"), verskyn in hooflaag 2 en dit dui ðf op 'n ander herkoms van die krale ðf ander handelskontakte. Die aan= wesigheid van die goue spiraal in hooflaag 2 kan 'n aandui= ding wees dat die buitelandse handelaars die glaskrale inge= voer het in ruil vir 'n nuwe uitvoerproduk op Greefswald, nl. goud. Die buitelandse handelaars was waarskynlik Arabiere wat in hierdie tyd aktief was aan die Ooskus.

(b) Vestiging

Hutte en vloere

Die boustrukture wat in hooflaag 3 voorkom, is dieselfde as dié van K2, maar in hooflaag 2 word die twee kleinere huttipes, nl. graanhutte, nêrens gevind nie. Dit wil voorkom of die mense aan die begin van fase III (hooflaag 3) hulle graan in stoor= hutjies opgeberg het, maar in die latere gedeelte van fase III (hooflaag 2) in ander soorte houers. Die grotere huttipe (huttipe 4) het in gebruik gebly totdat die hutkomplekse afge= brand en 'n einde aan fase III gebring is.

Die hutvloere en buitevloere was gedurende die grootste ge=

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deelte van fase III dieselfde as dié van K2, nl. prominente vloere van gekompakteerde skaliegruis. Aan die einde van fase III het die bewoners egter ontdek dat die doleriet-basalt 'n beter kwaliteit vloer lewer, veral as dit met klei gemeng word (vgl. bylae 5/1). Die laaste vloere wat in fase III gemaak is, was almal dolerietvloere.

Klipstrukture

Twee soorte klipstrukture kom in die jonger gedeelte van fase III voor, nl., eerstens, vyselklipstrukture en klip= platforms en, tweedens, klipmure. Die vyselklipstrukture is klaarblyklik gebruik om graan in fyn te maak, terwyl die klipplatforms waarskynlik die staanplekke was van graanhouers waarin graan opgeberg is. Dit is opvallend dat die verskyning van die klipplatforms in hooflaag 2 saamval met die verdwyning van graan-stoorhutte. Die vyselklip-strukture was alreeds in gebruik aan die einde van hooflaag 3.

Klipmure is nie in die huidige opgrawings gevind nie, maar die opgrawers van die dertigerjare het heelwat klipmure op die Suidelike Terras en op die kop gevind. Die stratigrafiese verband word egter nie vermeld nie (Fouché 1937). Volgens daardie beskrywings en n.a.v. waarnemings wat tydens die huidige navorsing gedoen is, blyk dit dat daar 'n verband tussen die klipmure en die dolerietbasalt-vloere bestaan. Daar is etlike gevalle opgemerk waar 'n dolerietbasalt-vloer bo-oor 'n klipmuur gelê is (vgl. ook Fouché 1937, diagram 3; plaat x, nos. 1,2) en dan weer waar 'n muur op so 'n vloer gebou is (vgl. ook Fouché, diagram 3; plaat viii, no. 2; plaat x, no. 2), m.a.w. klipmure kom soms onder en soms bo-op die vloere voor. Sommige van die mure is later weer bedek deur die jongste grondlae, d.w.s. die fase IV-grondlae (vgl. Fouché, plaat vii, no. 4; plaat x, nos. 3, 4). Die mure moet dus ouer as die fase IV-laag wees. Die getuienis is oor= tuigend genoeg om te kan aanvaar dat die klipmure verband hou met die dolerietbasalt-vloere en dat hulle tot die jonger

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gedeelte van fase III behoort. Dit is natuurlik nie bekend of die terreinbewoners voorheen reeds kennis gehad het van klip-terrasmure nie. Dit is egter duidelik dat die opeen= hopende woonafsettings dit noodsaaklik gemaak het om 'n metode te vind om die afsettings te stabiliseer en 'n gelyke woonvlak te voorsien. Terrasmure het aan die doel beantwoord. Die klipmure en trappe by die sg. "hoof-ingang" tussen die groot rotse het egter 'n ander doel gehad, nl. om 'n netjiese ingang te voorsien tot die woonhut-area tussen die rotse en die kop. Die bou van terras-klipmure kon 'n stimilus gewees het vir die bou van klipmure vir ander doeleindes. Oorblyfsels van klein, vrystaande muurtjies naby die buiterand van die kop kon nog nie met 'n spesifieke bewoningsfase verbind word nie.

(c) Tegniese skeppinge

(i) Boustrukture

Die hutstrukture en vloere was, soos hierbo aangedui, aan die begin van fase III dieselfde as dié van K2, maar teen die einde van fase III is daar begin om dolerietbasalt-gruis vir vloere te gebruik. Die klipplatforms is eenvoudig 'n aantal stutklippe met 'n "blad" van plat klippe bo-oor (vgl. hoofstuk 5). Vyselklippe is m.b.v. klein stutklippe in 'n gat gemonteer en 'n vyselklip-struktuur sodoende gemaak (hoofstuk 5). Die klipplatforms en vyselklip-strukture het eers later in fase III verskyn; hulle is nog glad nie in fase II of op K2 ge= vind nie.

(ii) Metaalwerk

Die yster- en kopervoorwerpe van die fase III-mense verskil in geen belangrike opsig van dié van hul voorgangers nie. Die enigste verskille wat vermelding verdien, is, eerstens, 'n koperspiraal waarvan die chemiese samestelling van die ander kopervoorwerpe verskil en vermoedelik van 'n ander bron afkomstig moet wees (vgl. bylae 5/2) en, tweedens, 'n goue spiraal in laag 8 van Mk 1. Die verwerking van goud is 'n

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nuwe verskynsel, dit is nie in fase II of op K2 waargeneem nie. Dit is natuurlik nie seker dat die verwerking van goud op Mapungubwe self plaasgevind het nie, trouens daar is geen aanduidings dat dit daar gebeur het nie.

(iii) Glaskrale

Die sg. tuinrollerkrale van K2 het finaal verdwyn want geen teken daarvan word in fase III gevind nie. Die handelskrale vertoon nou nuwe toevoegings wat moontlik aan nuwe handels= kontakte te wyte is. Die afwesigheid van ivoor en daarteen= oor die aanwesigheid van goud suggereer dat ivoor nou deur goud vervang is as 'n handelsartikel.

(iv) Artefakte van been, ivoor, skulp en eierdop

Die krale van volstruiseierdop en skulp word nog dikwels as liggaamsversierings gedra. Geen been- en ivoor-artefakte is geïdentifiseer nie.

(v) Keramiek

Hoewel daar twee potwerktradisies in fase III voorkom wat tipologies van mekaar verskil, nl. die K2-serie en die Mapungubwe-serie, is dit twyfelagtig of die funksies van die potwerk in die algemene lewenswyse van die mense veel verskil het van dié van die K2-bewoners.

Behalwe potwerk is daar so min keramiekvoorwerpe in fase III gevind dat daar nie afleidings in hierdie verband gemaak kan word nie.

9.3.5 FASE IV

(1) Algemeen

Fase IV is die jongste bewoningsfase en volg op die laaste brandpuinlaag, d.w.s. die brandpuinlaag wat fase III beëindig. Fase IV word verteenwoordig deur hooflaag 1 soos beskryf deur

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Meyer (vgl. hoofstuk 6). Op die Suidelike Terras bestaan hooflaag 1 uit lae 1 en 2 in blok F4, lae 1 en 2 in blok H5, lae 1 tot 3 in blok K8. Op Mapungubwekop bestaan hooflaag 1 uit lae 1 tot 3 in opgrawing Mk 1 en uit laag 1 tot ongeveer laag 5 in opgrawing Mk 3.

(2) Identiteit

(a) Fisieke tipes

Die grafte wat oënskynlik voorgekom het in die lae van fase IV, is gedurende vroeëre opgrawings verwyder sonder dat duidelike inligting verskaf is i.v.m. die aard en stratigrafiese verband daarvan. Die potwerk in die grafte stem tipologies ooreen met dié wat in fases III en IV aangetref word. Die skelette is deur Rightmire as negroïed geïdentifiseer (Rightmire 1970).

(b) Ekonomiese lewe

(i) Veeherdery

Die veeteelt van die fase IV-mense verskil in geen belangrike opsig van dié van die voorafgaande fases t.o.v. die tipes vee wat aangehou is of die verbruik van vleis nie. Op die kop is daar minder mak diere geslag, nl. 84.8% van die totale vleisverbruik, maar op die Suidelike Terras is byna net vleis van gedomestikeerde diere geëet, nl. 98.5% van die totale vleisverbruik.

(ii) Akkerbou

Baie min graan is in fase IV gevind en ook geen vyselklipstrukture of stoorplekke vir graan nie. Uit die argeologiese vondste wil dit voorkom of graan skaars was.

(iii) Jag

Op die Suidelike Terras is slegs 1,5% en op die kop 15,3% van die totale vleisdieet dié van wilde fauna wat gejag,

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in strikke gevang of versamel is. Ten spyte van die ietwat groter mate van wilde fauna in die vleisdieet op Mapungubwe=kop, lyk dit of die jagbedryf geen belangrike rol gespeel het nie. Geen aanduidings van ivoor is gevind nie, maar afgesien hiervan was die betekenis van die jagbedryf nie merkbaar verskillend van dié van K2 nie.

(iv) Versamel

Die wilde plantesade stem ooreen met dié op K2.

(v) Handel

Die fase IV-mense het 'n groter hoeveelheid ingevoerde handels=krale (hoofsaaklik van die Mapungubwe Chemiese Groep 1) be=sit as die vorige terreinbewoners.

'n Groot getal goue krale asook ander goue voorwerpe is in grafte op die kop gevind deur die opgrawers van die dertiger=jare. Die grafte het in die fase IV-afsetting voorgekom. Dit kan nie bo alle twyfel bewys word dat die grafte dié van fase IV-mense was nie, maar die vonds van 'n paar goue krale in fase IV tydens die huidige opgrawings lewer redelike bewys dat goud gedurende hierdie fase teenwoordig was. Indien wel, sou dit heelwaarskynlik as 'n handelsartikel aangewend gewees het.

Die groot hoeveelheid Boesmantipe-pylpunte en tussenskagte ("linkshafts") lyk op die oog af te veel vir die persoonlike gebruik van die Mapungubwe-bewoners en dit is moontlik dat hulle vervaardig is om aan jagtersgemeenskappe te verhandel.

(c) Vestiging

(i) Boustrukture

In teenstelling met die prominente hutte, vloere en klip=strukture van die voorafgaande fases, is geen sodanige struk=ture tot dusver in fase IV gevind nie. Die enigste tekens

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van bouwerke is dun en dikwels ongelyk, brokkelagtige dolerietgruis-vloere en selfs hulle is betreklik skaars. (Dit is natuurlik moontlik dat die werklike hutstrukture van die fase IV-mense nog nie gevind is nie omdat hulle elders op die terreine gebou is).

(ii) Ashope

Op Mapungubwe is geen ashope gevind nie - die as en ander afval is waarskynlik van die kop afgegooi. Op die Suidelike Terras is die afsetting egter baie as-agtig. Die woonvloere is sommer op die asgrond gemaak. Geen tekens kon gevind word dat die fase IV-mense hier 'n skeiding gemaak het tussen hulle woon-area en ashoop-area nie.

(d) Tegniese skeppinge

(i) Boustrukture

Die enigste boustrukture wat gevind is, is dun, mosterdgeel vloertjies wat nêrens 'n definitiewe planvorm vertoon nie. Hulle is gemaak van verweerde doleriet-basalt. Gewoonlik is die grondoppervlakte nie gelyk gemaak voordat die vloer daarop gelê is nie.

(ii) Metaalwerk

Na aanleiding van die verweerde yster- en kopervoorwerpe lyk dit of die metaalwerk min of meer dieselfde as dié van die ouer fases in K2 was, met uitsondering van die goudwerk wat in Fouché (1937) beskryf word. Daar is egter nog geen aan= duiding gevind dat die goue voorwerpe plaaslik vervaardig is nie.

(iii) Glaskrale

Die enigste glaskrale is die ingevoerde handelskrale, spesifiek die Mapungubwe Chemiese Groep I wat die afgeplatte reeks ("oblate series") insluit. Dit is die krale wat in die jongste gedeelte van fase III prominent verskyn.

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(iv) Artefakte van been, ivoor, skulp en eierdop

'n Aantal volstruiseierdopkrale kom voor, soortgelyk aan dié in die ouer bewoningsfases. 'n Opvallende kenmerk is egter die Boesmantipe-pylpunte en tussenskagte ("linkshafts") van been wat in groot getalle voorkom. Sommige pylpunte is van 'n plat ysterpunt voorsien (vgl. hoofstuk 7).

(v) Klipartefakte

Geen klipartefakte is in die fase IV-laag gevind nie.

(vi) Keramiek

Die potwerk is min of meer dieselfde as dié van fase III, met die verskil dat die Mapungubwe-serie in fase IV effens toegeneem het en die K2-serie effens afgeneem het. In fase IV op die Suidelike Terras is die K2-serie potwerk 10,5%, die Mapungubwe-serie is 83,0% en 6,4% is nie-tipiese vari= asies. Op Mapungubwekop is die K2-serie 7,9%, die Mapungubwe-serie is 84,8% en 7,1% is nie-tipiese variasies.

Behalwe die potwerk is geen voorbeelde van keramiek-voorwerpe gevind nie.

(e) Grafte

Die enigste grafte wat in die afsettings van fase IV gevind is, is in die dertigerjare opgegrawe, maar hulle is so on= volledig gedokumenteer dat feitlik niks oor hulle bekend is nie.

(f) Ouderdom

Op grond van drie daterings op die Suidelike Terras meen Vogel dat fase IV vanaf 1150 tot 1200 bestaan het.

(3) Lewenswyse

(a) Ekonomiese lewe

Voigt kom tot die gevolgtrekking dat die jagbedryf 'n groter

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rol as voorheen speel om die vleisdieet aan te vul. Volgens haar dui dit op 'n vermindering van die vee wat moontlik in verband staan met 'n afname in die belangrikheid van die Greefswald-mense weens die opkoms van die Zimbabwe-ryk (vgl. hoofstuk 7). Afgesien hiervan lyk dit nie of die aard van die veeherdersbedryf in fase IV veel verskil het van dié van K2 nie.

Dit is opvallend dat min tekens van graan tot dusver in fase IV gevind is en daar is ook geen tekens van vyselklippe of graan-bewaarplekke nie. Daaruit wil dit voorkom of die fase IV-mense nie baie aandag gegee het aan akkerbou nie. Tog lyk dit nie of wilde vrugte op groot skaal versamel is om verboude plantvoedsel aan te vul nie.

Die handelsbedrywighede van die fase IV-mense is alreeds hierbo vermeld.

(b) Vestiging

Die feit is hierbo genoem dat daar tot dusver nog geen tekens van boustrukture in fase IV gevind is nie. Dit beteken nie noodwendig dat die fase IV-mense nie permanente woonstrukture opgerig het nie. Die feit dat woonvloere van dolerietgruis gemaak is, al is hulle dunner en swakker vervaardig as dié van hul voorgangers, weerspieël 'n gevestigde gemeenskap. Die argeologiese getuienis in verskillende blokke wat op die Suidelike Terras en op die kop opgegrawe is, dui egter alles op 'n minder intensiewe vestiging en 'n swakker boutegniek as dié van die vroeëre fases. Die wit aanpaksel van kalsiumkarbonaat op die vloere kan beteken dat die vloere periodiek nie gebruik is nie en dit suggereer die moontlik= heid dat die terreine gedurende fase IV nie aaneenlopend bewoon is nie.

(c) Tegniese skeppinge

Die potwerk, glaskraal-tipes en metallurgiese skeppinge soos

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yster- en koperspirale van fase IV is soortgelyk aan dié van fase III en het waarskynlik dieselfde funksie in die alle= daagse lewe vervul. Daar is egter ook duidelike verskille tussen die twee fases, in besonder die groot aantal been-pylpunte en -tussenskagte wat uitsluitlik in fase IV voorkom en waarskynlik as jagwapens gebruik is. Verder is die digte opeenvolging van prominente gruisvloere, huttipes en klip= strukture, wat kenmerkend is van fase III, nog nie in fase IV gevind nie. Slegs dun, swakvervaardigde en ylverspreide vloere kom hier voor en geen klipstrukture nie. Dit lyk of daar 'n afname in boubedrywighede in fase IV plaasgevind het.

9.3.6 IDENTITEIT VAN DIE KULTURE VAN DIE SUIDELIKE TERRAS EN MAPUNGUBWEKOP: SAMEVATTING

(a) Fisieke tipe

Die enigste skeletmateriaal wat gevind is, is dié in 'n aantal grafte op Mapungubwekop. Dit het behoort tot fase IV, of kan later as fase IV wees, d.w.s. die skelette kan behoort tot 'n na-Mapungubwe periode, m.a.w. die dooies is om een of ander rede later op Mapungubwe begrawe. Die graf= goedere verbind die skelette egter met die Mapungubwe-kultuur= verband en hulle behoort waarskynlik tot die einde van fase IV. Rightmire se identifikasie van sekere eksemplare van die skelette as negroïed (Rightmire 1970) is in ooreenstemming met die identifikasies van die skelette van verwante terreine in Rhodesië (Huffman 1974).

(b) Ekonomiese lewe

In fase II is daar nie baie materiaal gevind nie vanweë die minder intensiewe bewoning van die terreine. Dit is egter duidelik dat die ekonomiese lewe van die mense in fase II op sowel Mapungubwekop as die Suidelike Terras met dié van K2 ooreenstem.

In fase III is Mapungubwekop en die Suidelike Terras albei intensief bewoon en het heelwat oorblyfsels van die ekonomiese

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lewe van die terreinbewoners in die woonlae bewaar gebly. Die veeteelt van die Mapungubwemense gedurende fase III stem ooreen met dié van die K2-mense. Die gebruike t.o.v. graan= produksie stem eweneens ooreen met dié van K2, met dié uit= sondering dat die fase III-mense by Mapungubwe die graan later in vyselklippe fyngemaak het en vermoedelik in ander tipes graanhouers opgeberg het as wat die geval op K2 was. Die jag- en versamel-aktiwiteite van fase III was nie van groot ekonomiese betekenis nie en het in hoofsaak ooreengestem met dié van K2. Die enigste uitsondering is dat die mense nie gejag het om ivoor te bekom nie. Ten opsigte van die handel het daar gedurende fase III veranderings ingetree. Die M1 Chemiese Groep handelskrale is gedeeltelik verplaas deur die Mapungubwe Chemiese Groep I, wat òf 'n ander bron vir die glaskrale aandui òf 'n verandering in die handelskontakte suggereer. Die vroeëre uitvoer van ivoor wat by K2 gebruiklik was, het moontlik nou plek gemaak vir 'n goudhandel met die buiteland.

In fase IV word geen noemenswaardige verandering in die vee= herdersbedryf opgemerk nie en dit geld ook vir jag en versamel. In verband met die akkerbou is dit egter opvallend dat daar weinig tekens van graanverbouing en van die berging en ver= werking van graan in fase IV gevind is.

Ten opsigte van goud op Mapungubwekop is daar aanduidings dat dit in groter hoeveelheid in die woonlae van fase IV voorkom as in fase III, hoewel die getuienis nie heeltemal oortuigend is nie. Goud was die enigste handelsartikel om glaskrale te bekom, en die verskyning van groter getalle handelskrale in fase IV suggereer dat daar meer goud beskikbaar moes gewees het.

Die handelsglaskrale in fase II is dieselfde as dié van K2. In fase III verskyn 'n nuwe reeks, die Mapungubwe Chemiese Groep I-reeks, wat saam met die ander reekse handelskrale bly voortbestaan tot aan die einde van fase IV.

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(c) Vestiging

In fase II en in die ouer gedeelte van fase III stem die algemene aard van die bouwerke op die Suidelike Terras en Mapungubwekop ooreen met dié van K2. In die latere gedeelte van fase III word vyselklip-strukture en klipplatforms deel van die boukomplekse. Dit val saam met die verdwyning van klein graan-stoorhutjies. Die groter huttipes kom egter nog voor. Die latere gedeelte van fase III word ook gekenmerk deur die oorskakeling van skaliegruisvloere na meer doeltreffende dolerietbasalt-gruisvloere tesame met die ontwikkeling van terras-klipmure. Die oprigting van verskillende soorte klipstrukture is 'n verskynsel wat nog nêrens op K2 of in die oudste woonlae op die kop en Suidelike Terras waargeneem is nie.

Die bewoningsafsettings in fase III is só diep en kompleks van aard dat die presiese vestigingswyse slegs met omvangryke sywaartse opgrawings bepaal kan word.

Die enigste bouwerk wat tot dusver in fase IV gevind is, is dun dolerietbasalt-vloere sonder enige definitiewe planvorms. Hierdie vloere is nie so dig gekonsentreer soos die vloere in die ouer fases nie. Dit is natuurlik moontlik dat meer indrukwekkende boustrukture wel in fase IV opgerig is maar nog nie m.b.v. die opgrawings gevind is nie. Die indruk wat mens daar kry, is egter dat daar 'n duidelike afname in boubedrywighede is.

(d) Tegniese skeppinge

(i) Boustrukture

Die boustrukture van fase II en die ouer gedeelte van fase III stem ooreen met dié van K2. Die gebruik van doleriet-basalt-vloere teen die einde van fase III is 'n verbetering op die ouer skaliegruis-vloere, maar dit is waarskynlik slegs 'n plaaslike ontwikkeling. Die ontwikkeling van klip-terrasmure

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en klip-ingangsmure aan die einde van fase III is waarskynlik die begin van 'n idee wat by Zimbabwe en ander terreine ook posgevat het en op daardie terreine tot die ontwikkeling van omvangryke klipbouwerke gelei het. Op Mapungubwe is die ontwikkeling van die bouwerke egter meteens beëindig deur die afbrand van die hutkompleks op die Suidelike Terras, waarna fase IV gekom het en, so ver vasgestel kon word, geen verdere klipmure of omvangryke hutstrukture opgerig is nie.

(ii) Metaalwerk

Die vervaardiging van yster- en kopervoorwerpe in die ver= skillende bewoningsfases op Mapungubwekop en die Suidelike Terras is min of meer dieselfde as dié van K2. Die goue voorwerpe wat gedurende fase III en IV voorkom, is miskien nie plaaslik geproduseer nie, maar daar kan min twyfel bestaan dat hulle integraal verbonde is aan die Mapungubwekultuur.

(iii) Glaskrale

Tuinroller-glaskrale is nie by Mapungubwe gevind nie en ook geen kleivormpies vir die vervaardiging van die krale nie.

(iv) Artefakte van been, ivoor, skulp en eierdop

Die enigste artefakte wat hier van belang is, is die talle been-pylpunte en tussenskagte in fase IV wat, sover bekend is, 'n unieke verskynsel is en nog nie tot dusver op ander ystertydperk-terreine waargeneem is nie.

(v) Klipartefakte

Met uitsondering van die vyselklippe in fase III speel klipartefakte nie 'n belangrike rol nie.

(vi) Potwerk

Die enigste materiaal wat in fase I gevind is, is die pot= werk wat tipologies ooreenkom met dié van die Gokomere-

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tradisie in Rhodesië en Noord-Transvaal gedurende die vierde en vyfde eeue n.C. Die potwerk van fase II stem tipologies volkome ooreen met die K2-serie van die terrein K2.
Gedurende die begin van fase III is die K2-potwerkserie nog in die meerderheid op Mapungubwekop en die Suidelike Terras, maar teen die einde van fase III het die Mapungubwe-serie die dominante tradisie geword.
Gedurende fase IV het die Mapungubwe-serie nog verder toege=neem in verhouding tot die K2-potwerk.

Om die breëre verband van die Mapungubwe-serie te bepaal, moet na die Leopard's Kopje-kompleks van Rhodesië verwys word. Soos reeds t.o.v. die potwerk van K2 vermeld is, het Robinson die Leopard's Kopje-kompleks ingedeel in drie op=eenvolgende fases, nl. Zhizo (fase 1), Mambo Hill (fase 2) en Woolandale (fase 3). Summers het Mapungubwe verbind met die Woolandale fase. Volgens hom het die vroeëre Mambo fase tesame met die middelfase van Zimbabwe ontwikkel tot die Woolandale-fase en dié het op sy beurt tesame met 'n vreemde invloed ontwikkel tot die Mapungubwe-variasie (Summers 1970).

Volgens Huffman (Huffman 1974) is Robinson se Leopard's Kopje fase 3, nl. die "Woolandale" fase, in werklikheid die tweede fase van die Leopard's Kopje-kompleks en hy noem dit Leopard's Kopje fase B. Volgens hom bestaan fase B uit 'n noordelike vertakking wat hy "Woolandale" ("Woolandale facies") noem, en 'n suidelike vertakking, wat hy die "Mapungubwe facies" noem. Die Woolandale-vertakking kom noord en noordwes van Gwanda voor in die omgewing van Plumtree en Bulawayo. Die Mapungubwe-variant kom vanaf Gwanda suidwaarts voor tot in die Limpopovallei. Vanselfsprekend beskou Huffman die terrein Mapungubwe as die verteenwoordigende terrein van die Mapungubwe "facies".

Huffman beskryf 'n terrein in Bulawayo, nl. die "Blue Jay/ Bunting Close" waarop 'n bewoningslaag ("occupation A") met Woolandale-potwerk voorkom. Omdat daar tot dusver nog geen

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volledige beskrywings gemaak is van die potwerk van ander Mapungubwe-tipe terreine nie, is die enigste terreine waarmee die potwerk van Mapungubwe self vergelyk kan word, dié van die Woolandale "facies" van Leopard's Kopje Fase B. Die pot= werk van die Blue Jay/Bunting Close-terrein word hier as voorbeeld geneem. Die potwerkklasse 2 en 4 van hierdie terrein, soos beskryf deur Huffman (Huffman 1974) stem in 'n mate ooreen met die potwerktipes 1 en 10 van die Mapungubwe-serie, soos beskryf deur Meyer (vgl. hoofstuk 6). Die ander potwerk van die twee terreine verskil egter van mekaar. Die afleiding word gevolglik gemaak dat daar 'n verwantskap bestaan tussen die Mapungubwe-vertakking van die Leopard's Kopje Fase B, soos verteenwoordig deur Mapungubwe self, en die Woolandale-vertakking, soos verteenwoordig deur "occupation A" van die Blue Jay/Bunting Close, maar daar is heelwat verskille.

9.4 VERLOOP VAN DIE GESKIEDENIS VAN GREEFSWALD

9.4.1 ALGEMEEN

Die oudste bekende oorblyfsels van menslike bewoning op Greefswald is klipartefakte uit die steentydperk. Daar is verder niks oor die steentydperk-mense bekend nie. Nadat die steentydperk-mense Mapungubwe verlaat het, is Greefswald bewoon deur 'n opeenvolging van ystertydperk-gemeenskappe. Die ystertydperk-geskiedenis van Greefswald is hierbo in vier op= eenvolgende bewoningsfases verdeel na aanleiding van die stratigrafie, ouderdom en kulturele inhoud van die drie hoof= terreine en in hierdie slotgedeelte word 'n rekonstruksie van die geskiedenis aangebied.

9.4.2 FASE I

Oor Fase I is daar feitlik niks bekend nie. Die fase word verteenwoordig deur slegs 'n klein aantal potskerwe wat tipo= logies kenmerkend is van die sg. Gokomere-tradisie van Rhodesië in Noord-Transvaal. Ander terreine met soortgelyke potwerk in Noord-Transvaal dateer uit die vierde en vyfde

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eeue n.C. Dit wil dus voorkom of 'n groepie Gokomere-mense teen die middel van die eerste millennium vir 'n kort rukkie op Mapungubwekop en die Suidelike Terras gewoon het. Hulle is egter reeds daar weg lank voordat die volgende mense daar kom woon het.

9.4.3 FASE II

(1) Agtergrond

Gedurende die tydperk van sowat 300 jaar tussen ongeveer 800 n.C. en 1100 n.C., het daar 2 ystertydperk-tradisies voorgekom in die suidoostelike gedeelte van Botswana en die aangrensende gedeeltes van suidwestelike Rhodesië en Noord-Transvaal. Die twee tradisies is deur Robinson geïdentifi=seer as opeenvolgende fases van die Leopard's Kopje-tradisie, nl. "Zhizo" of "Leopard's Kopje I"; en "Mambo Hill" of "Leopard's Kopje II". Greefswald is tydens Fase II van sy ystertydperkgeskiedenis bewoon deur "Leopard's Kopje II"-mense. Die kultuur van hierdie mense is later deur Huffman herdoop tot die "Bambandyanalo"-variant van "Leopard's Kopje A", maar tot dusver was die kenmerke van hierdie kultuur nog betreklik onbekend ten spyte van uitgebreide opgrawings op die Greefswald-terreine. Volgens Huffman bestaan daar 'n noordelike, kontemporêre variasie van "Leopards Kopje A", wat hy die "Mambo"-variant noem. K2 word vereenselwig met die "Bambandyanalo"-variant. Omdat daar meningsverskil en on=duidelikhede bestaan t.o.v. die verwantskap van die Leopard's Kopje-fases en hulle streeksvariasies, word die kultuur van die bewoners van die terrein K2 voorts bloot net die "K2-kultuur" genoem. Die mense wat met hierdie kultuur verbind word, word die "K2-mense" genoem. Op Mapungubwe en ander terreine waar kulturele oorblyfsels identies met dié van die terrein K2 voorkom, word hierdie oorblyfsels ook die "K2-kultuur" genoem.

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(2) Verloop van die geskiedenis van Fase II

Gedurende die 9de eeu n.C. het die K2-kultuur reeds sy verskyning gemaak in die geografiese gebied om die samevloeiing van die Shashi- en Limpoporiviere, maar eers teen ongeveer 950 n.C. het 'n groep van hierdie mense hulle op Greefswald gevestig en daarmee het Fase II van die ystertydperk-geskiedenis van Greefswald begin.

Die K2-mense het gedurende die tiende en elfde eeue gewoon op die Suidelike Terras, Mapungubwekop en K2. Die terrein K2 is intensief bewoon en gevolglik het omvangryke bewoningsafsettings daar gevorm. Daarteenoor was die ekonomiese en ander aktiwiteite op die Suidelike Terras en Mapungubwekop gedurende dieselfde tydperk minder omvangryk en die bewoningslae wat op hierdie terreine gevorm het, was dunner en armer as dié van K2. In die omgewing van Greefswald, veral na die westekant, kom ook K2-tipe terreine voor, almal kleiner en minder intensief bewoon as K2 self.

Mens kry dus die indruk dat die K2-bewoners vanaf ongeveer die middel van die tiende eeu tot in die tweede helfte van die elfde eeu die senior gemeenskap gevorm het van 'n bevolking wat in die gebied rondom die samevloeiing van die Shashi- en Limpoporiviere gevestig was. Die digte verspreiding van woonvloere, uitgebreide ashope met baie dierebeendere en die oorblyfsels van ivoor en talle glaskrale wat op 'n handelskontak met die ooskus dui, suggereer 'n ekonomiese en politieke leiersgroep. Die sodanige status van die gemeenskap op die K2-terrein word in besonder duidelik as hulle kulturele oorblyfsels vergelyk word met die minder indrukwekkende oorblyfsels op Mapungubwekop en die Suidelike Terras en ander K2-tipe terreine in die omgewing. Hierdie kontras word vertolk as 'n bewys dat die K2-bewoners, as 'n senior gemeenskap in die sosiale orde van die bevolking, politieke en ekonomiese seggenskap gehad het oor hulle buurgemeenskappe. Slegs onder daardie omstandighede kon die K2-bewoners met dieselfde bedryfsvorme en in

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dieselfde ekologiese omstandighede as hulle bure, tog nog ontwikkel tot 'n meer welvarende gemeenskap. Sowat 4 tot 6 kapteinsgenerasies moes op K2 gewoon het.

Op K2 het die vroegste bewoners hulle teen die middel van die tiende eeu teen die helling van Bambandyanalo gevestig. Dit is nie seker op watter stadium hulle na die res van die terrein uitgebrei het nie, maar dit moes reeds kort na hulle aankoms gewees het want teen 1000 n.C. het die vorming van die groot sentrale ashoop reeds 'n groot omvang aangeneem. Die vee is in 'n groot kraal naby die hutkompleks aangehou; waarskynlik is die kleinvee in 'n tweede, kleiner kraal naby die hutkompleks aangehou. Die krale is egter spoedig deur die steeds groeiende ashope oordek. Dit is nie bekend waar= heen die veekrale daarna verskuif is nie.

Oor die algemeen was die lewenswyse van die K2-mense betreklik eenvoudig en kan getipeer word as 'n boerderygemeenskap. Die klem het gelê op die veeherdery en akkerbou, wat dan ook in ooreenstemming was met die sosiale status van die K2-bewoners. Die jag- en versamelbedryf is op so 'n klein skaal beoefen dat dit geen noodsaaklikheid was vir die voorsiening van voedsel nie. Voor die koms van die K2-mense na K2 het hulle reeds met die ooskus handel gedryf (ongepub. inligting van E. Hanisch). Tydens hulle bewoning van Greefswald vir 'n tydperk van meer as 100 jaar het hulle die handel verder uitgebrei. Glaskrale en kauriskulpe is van die ooskus ontvang in ruil vir die ivoor wat die K2-mense m.b.v. georganiseerde jagtogte verkry het. (Die samevloeiingsgebied van die Limpopo-en Shashiriviere is vandag nog 'n gewilde tuiste van olifanttroppe).

Dit wil voorkom of die K2-mense op Greefswald 'n vreedsame, onveranderde bestaan gevoer het tot ongeveer 1070 n.C. Teen ongeveer 1070 n.C. het die koms van 'n nuwe groep, die "Mapungubwe-mense", die bewoning van K2 beëindig en sodoende fase III in die geskiedenis van Greefswald ingelui.

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9.4.4 FASE III

(1) Agtergrond

Hoewel die K2-mense vir meer as 100 jaar op Mapungubwe en die Suidelike Terras gewoon het, word die daaropvolgende "Mapungubwe-mense" as die eintlike bewoners van Mapungubwe beskou. Argeoloë huldig tans nog uiteenlopende standpunte oor die herkoms en kulturele verwantskap van die Mapungubwe-mense. Meeste skrywers beskou die Mapungubwe-oorblyfsels egter as 'n latere fase van die Leopard's Kopje-tradisie in suidwestelike Rhodesië. Die jongste uiteensetting in hierdie verband is dié van Huffman, nl. dat 'n ontwikkelde fase van die Leopard's Kopje-tradisie ("Leopard's Kopje B") bestaan uit 'n noordelike ("Woolandale")-variasie en 'n suidelike ("Mapungubwe")-variasie (Huffman 1974). Die kultuur van die Mapungubwe-mense verteenwoordig die suidelike of "Mapungubwe"-variasie. In die suidweste van Rhodesië en die aangrensende gebied van die Limpopovallei in Transvaal is 'n aantal woon=terreine met oorblyfsels van die Mapungubwe-variasie reeds gevind, maar met uitsondering van Mapungubwekop en die Suide=like Terras is geeneen van hierdie woonplekke duidelik beskryf nie.

Dit wil tans voorkom of die "Mapungubwe-kultuur" teen ongeveer 1070 n.C. sy verskyning gemaak het in die suidweste van Rhode=sië, met Mapungubwe op die suidwestelike rand van die ver=spreidingsgebied. Daarmee het fase III op Greefswald begin. Die verskyning van die lewenswyse wat argeologies (in die huidige verslag) die Mapungubwe-kultuur genoem word, kon òf die gevolg gewees het van die vestiging van nuwe intrekkers in die gebied òf van 'n interne sosio-ekonomiese verandering wat moontlik deur eksterne faktore beïnvloed kon gewees het sonder enige nuwe intrekkers. Dit is nie die doel om in die huidige grawingsverslag 'n ontleding van die verskillende moontlikhede te maak nie. Dit is egter tog nodig om 'n in=terpretasie te maak van die getuienis wat deur die opgrawings opgelewer is.

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Die nuwe verskynsels wat fase III van die K2-kultuur onderskei, word veral gesien in die potwerk, die verdwyning van ivoor en die verskyning van goud, die byvoegings in die handelsglas=krale en die verskyning van 'n klipboutegniek. Meeste van die veranderings kon verband gehou het met nuwe ekonomiese bedry=wighede soos die ontginning van goud in die suidweste van Rhodesië en die ontwikkeling van nuwe handelskontakte of die uitbreiding van bestaande kontakte. Dit kon die ontwikkeling van 'n meer gesofistikeerde lewenswyse tot gevolg gehad het asook die totstandkoming van 'n welvarende gemeenskap wat tot 'n politieke heersersgroep kon ontwikkel het. Dit is dus moontlik dat meeste van die veranderings verband gehou het met 'n interne sosio-ekonomiese ontwikkeling wat op sy beurt die gevolg van eksterne invloede kon gewees het. Dit kon egter eweveel die uitwerking van 'n immigrantegroep gewees het.

'n Verandering waarvoor net een verklaring, nl. immigrasie, gebied kan word, was dié t.o.v. die potwerk. Die verskyning van nuwe potwerk, die sg. Mapungubwe-serie, onmiddellik na die brandlaag wat fase II beëindig het, moes binne twee generasies, waarskynlik binne een generasie, plaasgevind het en dit suggereer die aankoms van nuwe mense. A.g.v. die gebrek aan gedetailleerde gegewens kan hierdie vreemde ele=ment nog nie geïdentifiseer word nie. Dit is baie moontlik dat hulle vanuit die noordooste sou gekom het. Dit is op=vallend dat die begin van fase III by Mapungubwe net effens vroeër is as die begin van Zimbabwe Periode III wat op 1100 gestel word (vgl. bylae 8/3) en.dat die verdwyning van die Mapungubwe-kultuur van Greefswald (die einde van fase IV) saam=val met die opbloei van Zimbabwe se Periode III vanaf 1200 n.C.

(2) Verloop van die geskiedenis van Fase III

Fase III word ingelui deur die aankoms van die Mapungubwe-mense op Greefswald waar die K2-mense nog gewoon het. Teen ongeveer 1070 n.C. is die hut-komplekse van die K2-mense op die Suidelike Terras en Mapungubwekop afgebrand, maar die K2-

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mense het nog op die terreine gewoon. Die Mapungubwe-mense het hulle nou ook op die terreine gevestig en 'n gemengde gemeenskap het sodoende tot stand gekom. Dit is opvallend dat die K2-terrein, wat die belangrikste woonterrein van die K2-mense op Greefswald was, nie ook afgebrand is nie. Geen aanduidings van 'n fisiese ramp teen die einde van die bewoning van K2 is gevind nie. Die enigste afleiding wat gemaak kan word, is dat die K2-mense om een of ander rede die terrein verlaat het. Daar bestaan egter geen feitelike gegewens met behulp waarvan die verlating van die terrein verklaar kan word nie.

Die K2-kultuur op Mapungubwekop en die Suidelike Terras was gedurende die begin van fase III nog die dominante lewens= wyse want meeste materiële kultuurgoedere wat in die onderste lae van fase III op die kop en die Suidelike Terras voorkom, is nog dié van die K2-kultuur.Die enigste identifiseerbare ver= andering is dié t.o.v. die potwerk, nl. die verskyning van die sg. Mapungubwe-serie. 'n Volgende verandering wat argeologies duidelik waargeneem kan word, vind ietwat later plaas onmiddel= lik bokant 'n brandlaag in die onderste gedeelte van die Fase III-afsetting. Die brandlaag is gedateer op 1110. Dit is ver= oorsaak deur die afbrand van die hutkompleks op Mapungubwekop en die Suidelike Terras. Die bewoning van die terreine is daarna voorgesit, maar 'n tegnologiese innovasie het nou inge= tree. Daar is naamlik oorgeskakel na die gebruik van vysel= klip-strukture vir die fynmaak van graan.

Teen ongeveer 1130, dus ongeveer twee generasies nadat die eerste Mapungubwe-mense daar aangekom het, het die twee terreine weer eens afgebrand, maar die hutkomplekse is weer opgebou en die bewoning is voortgesit. In die tydperk daarna het die K2-element steeds swakker geword en is die lewe van die Mapungubwe-mense gekenmerk deur 'n reeks kultuurelemente wat 'n beeld skep van 'n welvarende en vooruitstrewende gemeen= skap. Die potwerk behoort nou hoofsaaklik tot die "Mapungubwe"- tradisie. Die K2-tipe graanhutte word vervang met graanhouers

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op klipplatforms en die graan word op groot skaal in vysel= klippe fyngemaak. Dit is ook opvallend dat die ingevoerde glaskrale van 'n ander chemiese groep nou verskyn en in groter getalle voorkom as die handelskrale in die ouer bewoningsfase. Dit wil dus voorkom of nuwe handelsverbintenisse aangegaan is. Verder ook is die vroeëre handelsartikel, ivoor, nou deur goud vervang.

Tydens die vroeëre verloop van fase III het die Mapungubwe-mense hier en daar vloergedeeltes gemaak van dolerietbasalt-gruis en tot die ontdekking gekom dat 'n mengsel van doleriet= basalt en klei 'n maklik bewerkbare vloer van 'n beter kwali= teit verskaf as die skaliegruis wat tot dusver gebruik is. Teen die einde van fase III is daar toe oorgeskakel tot die uitsluitlike gebruik van dolerietbasalt-gruis vir die ver= vaardiging van vloere en trappe. Die kop en die Suidelike Terras is gedurende fase III besonder intensief bewoon en die vloere is kort-kort hernu, met die gevolg dat omvangryke bewoningslae opgebou het en die opeenhoping daarvan praktiese probleme geskep het. Die Mapungubwe-mense se oplossing hiervan was om keermure van klip te bou. By die sg. hoof-ingang het hulle die bou van klipmure verder gevoer en 'n mooi deurgang van klipmure en -trappe tussen die groot rotse gebou.

Die sosiale en politieke invloed van die Mapungubwe-gemeen= skap van fase III is nie argeologies bepaalbaar nie. As die ekonomiese lewe, die woonwyse en die algemene kulturele opset egter met dié van kontemporêre gemeenskappe vergelyk word en as daar verder ook gelet word op vergelykbare etno= grafiese kulture, kry mens die indruk van 'n metropolitaanse gemeenskap met politieke beheer oor die omliggende gebied vanwaar arbeid vir bouwerk en ander funksies verkry kan word en vanwaar skattings in die vorm van voedsel en goedere ont= vang is. Dit is veral sy aandeel in die handel wat hierdie gemeenskap se ekonomiese en politieke status verseker het.

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Volgens alle aanduidings het die lewe van die Mapungubwe-mense teen die middel van die twaalfde eeu nog normaalweg voortgegaan toe 'n ramp hulle getref het wat 'n einde aan hulle invloed gebring het. Daar het naamlik teen ongeveer 1150 n.C. 'n vernietigende brand plaasgevind en fase III is daardeur beëindig. 'n Eenvoudige, meer verarmde en ietwat veranderde lewe het by Mapungubwe begin (fase IV).

9.4.5 FASE IV

(1) Agtergrond

Vanaf die begin van die twaalfde eeu het daar by Zimbabwe (fase III) 'n gemeenskap ontwikkel wat die voorloper was van die kragtige Zimbabweryk wat in die daaropvolgende eeue tot stand sou kom. Wat die invloed van die opkomende Zimbabweryk gedurende die twaalfde eeu op die Mapungubwe-kultuur was, kan nie met sekerheid gesê word nie. Dit is egter opvallend dat die ekonomiese en politieke mag van Mapungubwe tot niet gegaan het in hierdie tydperk. Met die aanvang van die bloeitydperk van Zimbabwe teen ongeveer 1200 n.C. het die bewoning van Mapungubwe tot 'n einde gekom.

(2) Verloop van die geskiedenis van Fase IV

Daar is nog nie veel bekend oor die finale bewoningsfase van Mapungubwe, nl. fase IV, nie en die veranderinge wat ná die beëindiging van fase III ingetree het, kan nog nie bevredigend verklaar word nie.

Fase III is tot 'n einde gebring deur 'n brand wat, sover vasgestel kan word, die hutte en ander boustrukture op die Suidelike Terras vernietig het. Daarná het fase IV begin wat gekenmerk is deur 'n lewenswyse wat eenvoudiger en minder welvarend as dié van fase III was. Soos vroeër aangedui is, word die tydperk gekenmerk deur 'n afname in voedselproduksie, die verdwyning van klipstrukture, die bou van dunner en swakker woonvloere en die vervaardiging van beenpunte. Die

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potwerk was nog dieselfde as dié van fase III en dit wil voorkom of die handel in glaskrale en goud nie afgeneem het nie. In die lig van die potwerk word aanvaar dat die kop en die Suidelike Terras gedurende fase IV nog steeds deur die Mapungubwe-mense bewoon is.

Die verandering wat in die voedselverbouing en vestigings= wyse weerspieël word, het baie skielik plaasgevind. Daarom kan die verarming ten opsigte van die veeherders- en akkerboubedryf nie uitsluitlik aan verslegting van die kli= maat en die natuurlike omgewing toegeskryf word nie. Die enigste ander moontlikheid wat op hierdie stadium oorweeg kan word, is dat die vernietiging van die woonterreine aan die einde van fase III ook die vernietiging van die graan= saad-voorraad, maar veral 'n verandering in die sosiale struktuur van die Mapungubwe-samelewing tot gevolg gehad het. Die skielike afname in boubedrywighede en die agteruitgang in die kwaliteit van woonvloere dui op 'n afname in die arbeidsmag, wat beskikbaar was vir normale arbeidsverrigting. Die inkrimping van die arbeidsmag kan daarom te wyte wees dat die politieke struktuur sodanig verander het dat die sosiopolitieke leier op Mapungubwe nie meer oor die gesag beskik het om 'n arbeidsmag te organiseer nie. Die rela= tiewe daling in die eet van vee en die toename in jag-aktiwiteite, soos weerspieël in die vleisdieet, en die skielike verskyning van groot getalle been-pylpunte dui weer eens op 'n verandering in die ekonomiese aktiwiteite van manspersone. Die grootskaalse vervaardiging van Boesman-tipe pylpunte en -tussenskagte ("linkshafts") dui daarop dat daar 'n verstandhouding met Boesmantipe-jagters ontstaan het.

Die afname in die eet van vee kon ook verband gehou het met die feit dat die bydraes van vleis deur die omliggende onderhorige gemeenskappe afgeneem het.

Die skielike verarming en vereenvoudiging van die lewenswyse van die Mapungubwe-mense word basies dus verbind met 'n sosio-

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ekonomiese verandering wat voortgevloei het uit 'n verval van die politieke orde en 'n verlies aan sosiale status en politieke invloed. Dit is duidelik dat die doodsklok vir die opkomende Mapungubwe-gemeenskap op Greefswald gelui het met die vernietiging van die woonterreine aan die einde van fase III.

Die verdwyning van die Mapungubwe-kultuur moet gesien word teen die agtergrond van die reeds groeiende Zimbabweryk in hierdie tyd. Wanneer K2, Mapungubwe en Zimbabwe in perspektief teenoor mekaar gestel word, kom die verandering in die sosiale, ekonomiese en politieke patroon duideliker na vore.

(i) Die K2-bevolking het vanaf ongeveer 950 n.C. vir meer as 100 jaar 'n gemengde boerderybedryf gehad en ook 'n ivoorhandel met die buiteland beoefen. Die sosiopolitieke leiers op K2 het uit hoofde van hulle senioriteit aanspraak gemaak op veeherders- en akkerbouprodukte van hulle juniors en vanweë hulle status ook die meeste voordeel getrek uit die handel met die buiteland.

(ii) Teen ongeveer 1070 n.C. het die Mapungubwe-kultuur sy verskyning gemaak en binne twee kapteinsgenerasies die K2-kultuur oorheers. Alhoewel die Mapungubwe-mense net soos die K2-mense gemengde boere was, het hulle handel met die buiteland toegeneem en die ivoorhandel van die K2-mense is verplaas deur die goudhandel van die Mapungubwe-mense. Die stukrag agter die Mapungubwe-mense was hulle ekonomiese en sosiopolitieke senioriteit wat aanleiding gegee het tot hulle aanspraak op die boerderyprodukte, handelsgoedere en mannekrag van die omliggende bevolking. Vanweë die steeds groeiende bevolkingsgetalle, landbouproduksie en handel, het die sosiale en politieke senioriteit en die ekonomiese welvaart van die Mapungubwe-heersers toegeneem. Hierdie ontwikkeling het o.m. gelei tot die toenemende boubedrywighede op Mapungubwe deurdat voldoende mannekrag beskikbaar was vir die bou van groot hutte, soliede vloere en die oprigting van

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klipmure. 'n Soortgelyke ontwikkeling het intussen ook in oostelike Rhodesië plaasgevind en uiteindelik gelei tot die ontstaan van die Zimbabweryk.

(iii) Vanaf ongeveer 1100 n.C. het die ekonomiese ontwikkeling en die groeiende bevolkingsgetalle van Zimbabwe aanleiding gegee tot 'n styging in die sosio-politieke status en mag van die leiersgroep van daardie bevolking. Dit het gepaard gegaan met 'n toenemende seggenskap oor groterwordende mannekrag, ekonomiese welvaart en aandeel in die handel met die buiteland. Die ontwikkelende ekonomiese en politieke mag van die leiers het 'n Zimbabwe-koningskap laat ontstaan wat met behulp van die groot mannekrag deur militêre mag gehandhaaf kon word. Die status van die Zimbabwe-koning en die mannekrag wat tot sy beskikking was, word gesien in die bewoningsoorblyfsels van 'n groot gemeenskap wat vanaf ongeveer 1200 n.C. by Zimbabwe gevestig is, en die latere ontwikkeling van die groot klipbouwerke. Teen ongeveer 1150 n.C. is die ekonomiese en politieke mag van die Mapungubwe-heersers deur die Zimbabweryk tot 'n val gebring, maar die Mapungubwe-mense het vir nog 'n paar generasies daar aangebly en as onderhoriges van Zimbabwe 'n funksie verrig in die handelsaktiwiteite. Teen ongeveer 1200 is Mapungubwe finaal verlaat.

Die rekonstruksie van die lewe en geskiedenis van die bewoners van Greefswald vanaf die middel van die tiende tot die einde van die twaalfde eeu is hoofsaaklik gebaseer op feitemateriaal wat deur sistematiese opgrawings vanaf 1971 tot 1973 verkry is. Daar bestaan egter nog duidelike leemtes in ons gegewens, veral i.v.m. fase IV, wat hopelik deur verdere opgrawings verkry sal word. Die gebrek aan gegewens i.v.m. die vestigingspatroon en die materiële inhoud van elke fase van die bewoning van Greefswald sal aangevul word deur meer omvangryke sywaartse opgrawings as wat tot dusver

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gedoen is. Daar is alreeds 'n aanvang gemaak met die sy= sywaartse blootlegging van die afsetting wat met fase IV verband hou. Daarná sal die dieperliggende afsettings op dieselfde wyse ontsluit word.

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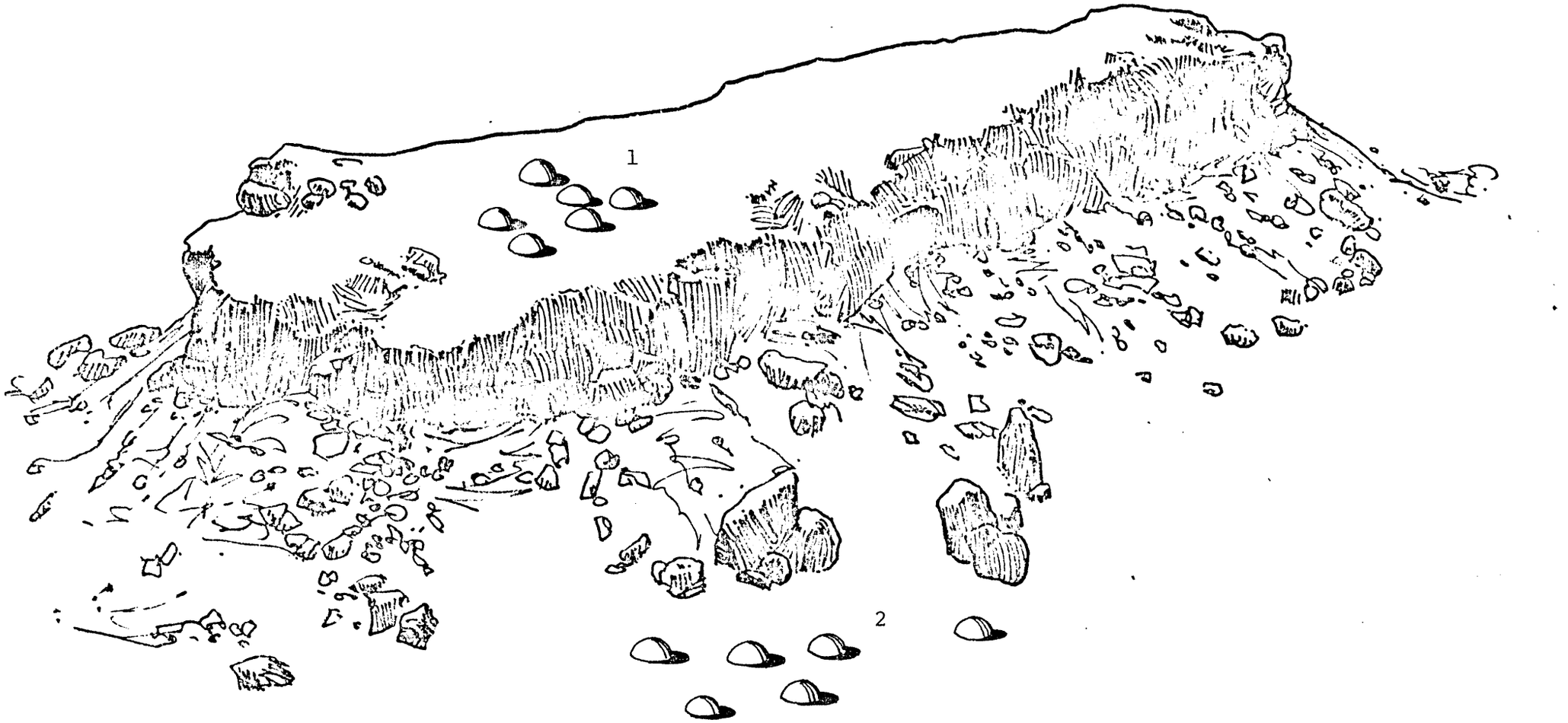

CHRONOLOGIE VAN DIE VESTIGING OP GREEFSWALD:
FASE I

1: Mapungbuwekop

2: Suidelike Terras

- hut

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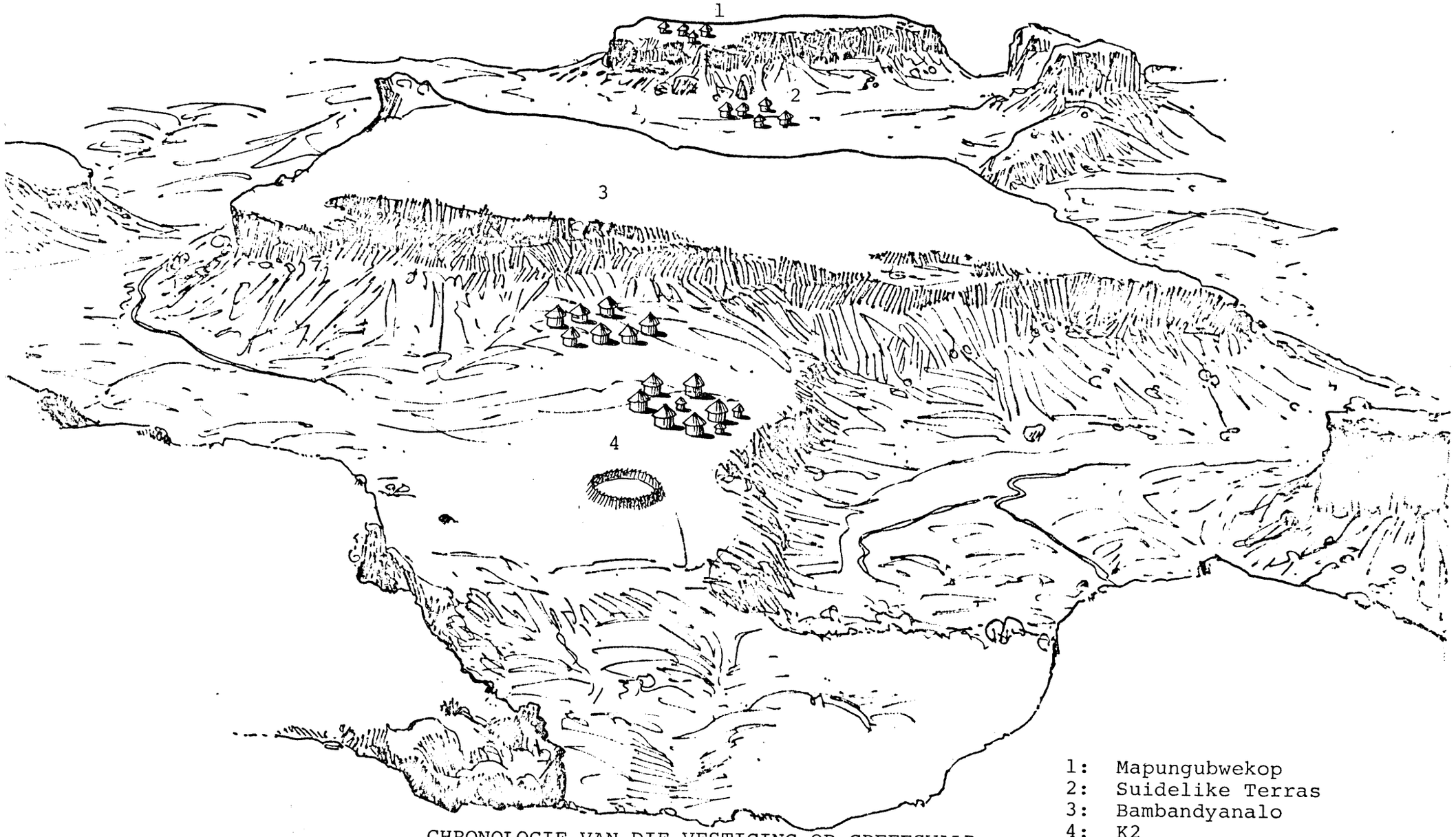

1: Mapungubwekop
2: Suidelike Terras
3: Bambandyanalo
4: K2

CHRONOLOGIE VAN DIE VESTIGING OP GREEFSWALD:
BEGIN VAN FASE II

- hut
- veekraal

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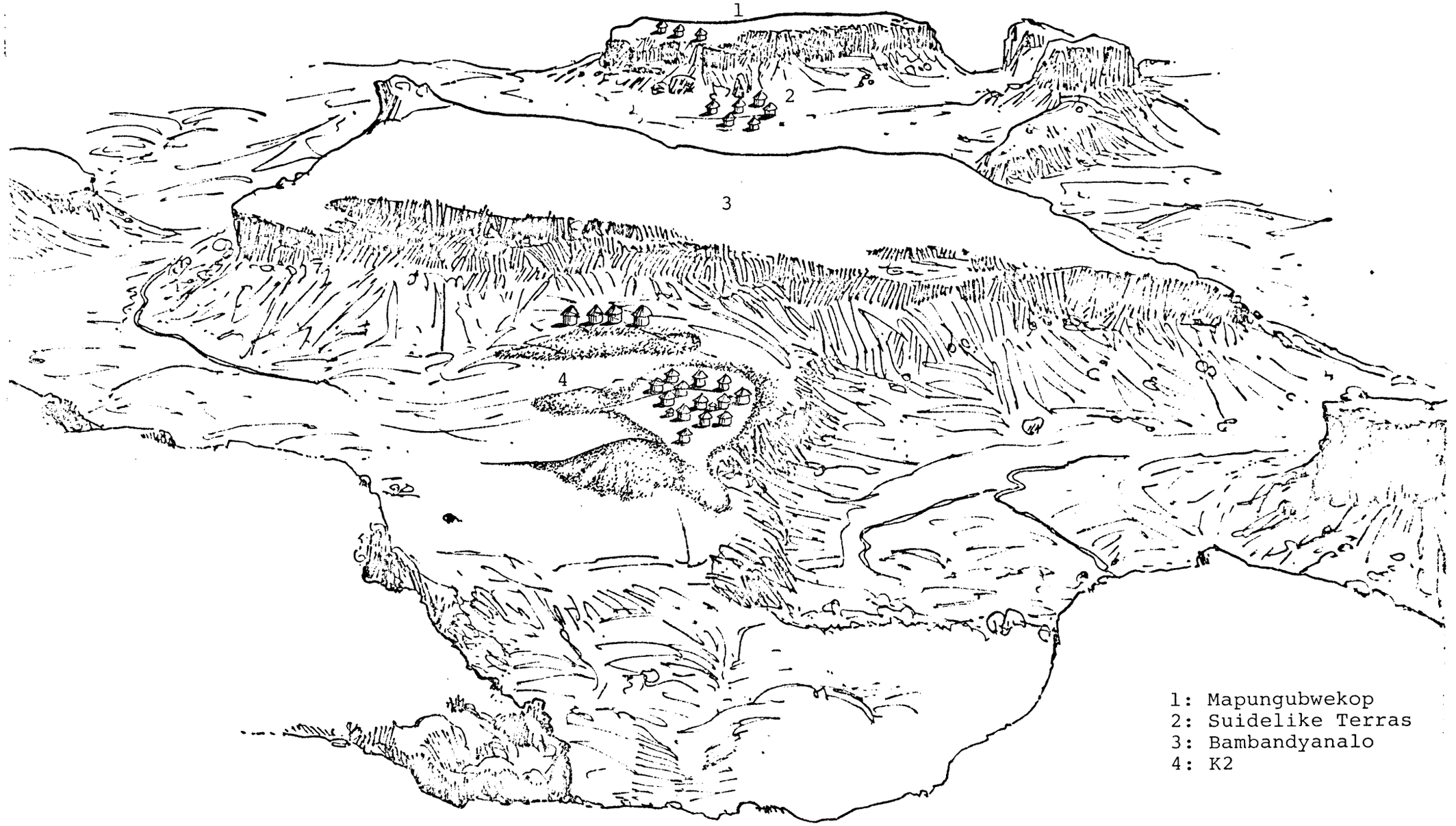

CHRONOLOGIE VAN DIE VESTIGING OP GREEFSWALD:
EINDE VAN FASE II

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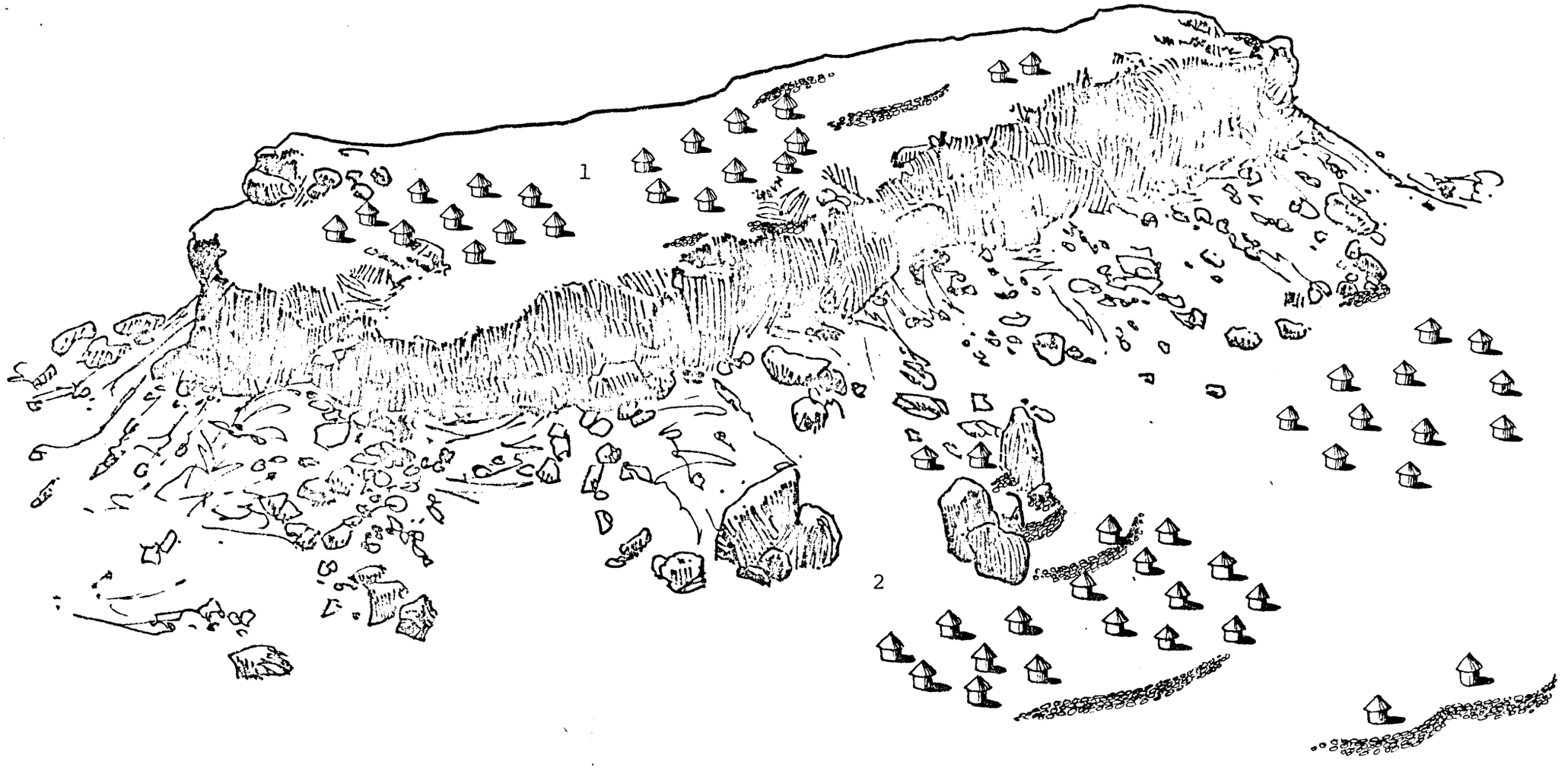

CHRONOLOGIE VAN DIE VESTIGING OP GREEFSWALD:
FASE III

1: Mapungubwekop
2: Suidelike Terras

- hut
- klipmuur

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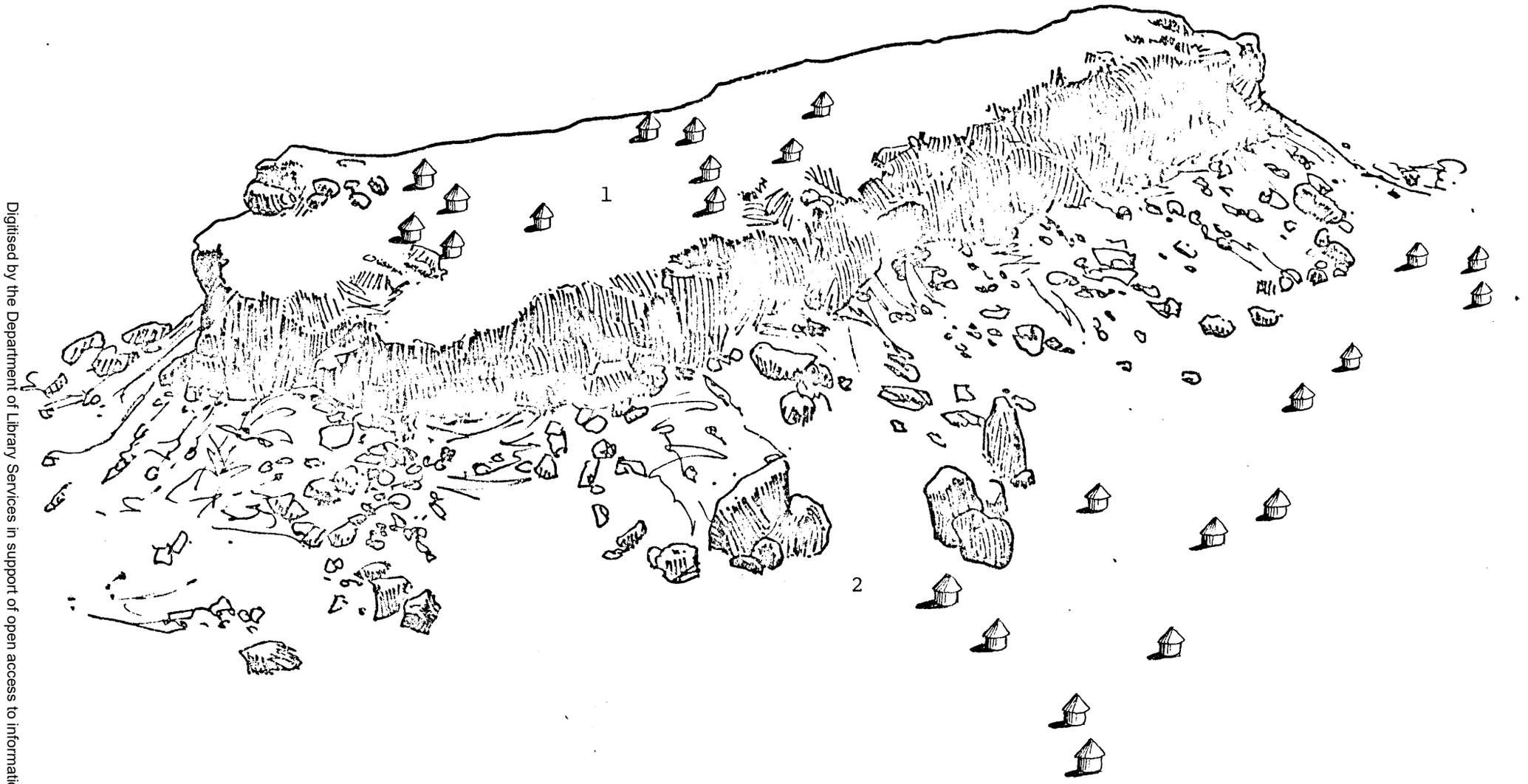

CHRONOLOGIE VAN DIE VESTIGING OP GREEFSWALD:
FASE IV

1: Mapungubwekop
2: Suidelike Terras

- hut

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