Southern Africa Field Archaeology **11 & 12**:4-63. 2002/2003.

ARCHAEOLOGICAL MITIGATION OF THE LETSIBOGO DAM: AGROPASTORALISM IN SOUTHEASTERN BOTSWANA

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ABSTRACT

The Letsibogo Dam basin incorporated over 120 Iron Age sites. Zhizo settlement, dating to between AD 700 and 1000, was well represented, but the area was unoccupied for the next 400 years. The emphasis on ivory during the K2 period supports the likelihood that Letsibogo may have been part of a hunting reserve at that time. Later, the concentration of 15th century Khami settlements shows that an entire chiefdom occupied the region. Khami commoners arranged their settlements according to the Central Cattle Pattern, depositing household refuse around grain bins at the back. Phytoliths, charcoal, faunal remains and numerous grain bins show that the climate was favourable to agriculture. Letsibogo Moloko, that is, 15th to 17th century Sotho-Tswana people, lived in the neighbourhood at about the same time. Generally, however, Letsibogo Moloko postdates Khami in the dam basin, and interaction was limited.

INTRODUCTION

The Department of Water Affairs of the Government of Botswana commissioned the construction of Letsibogo Dam on the Motloutse River to supply the greater Gaborone area. The dam wall itself was built about two kilometres downstream of the confluence of the Sedibe and Motloutse rivers, just upstream of Mmadinare village (Fig. 1). The impounded water reaches the 850 metre contour, flooding an area of about 18 km^2.

In recognition of the impact on cultural resources, Water Affairs required an archaeological investigation. Archaeological remains in Botswana are protected by the Monuments and Relics Act (1970) and may only be disturbed or destroyed after the Minister of Home Affairs grants a permit. The National Museum, in its capacity as the compliance agency, advises the Minister when the archaeological investigations are complete. These investigations normally follow a three-phase process: survey (Phase I), test excavations (Phase II) and full mitigation (Phase III) of particularly important sites. In the first Phase I survey of the reservoir area, Campbell (1988, 1991) located over 90 sites, and then later surveys (Hanisch *et al.* 1993) brought the total to 123 (Fig. 2).The purpose of these surveys was to identify archaeological sites, to assess their significance and then to recommend appropriate Phase II mitigation measures.

Most sites dated to the Iron Age, that is the last 2000 years, and they represented settlements of agropastoralists who spoke various Bantu dialects. Furthermore, most pottery corresponded to known culture-history facies and clusters in Botswana, Zimbabwe, and South Africa, and the significance of each site could be assessed in terms of the known sequence. Among other issues, Phase I work raised the possibility of a local origin of Moloko. To clarify this issue, as well as the general sequence, the assessment recommended that 48 sites receive further attention.

Phase II involved various test excavations (Campbell *et al.* 1995), and the results (Campbell *et al.* 1996) suggested that, (1) an internal origin for Moloko was unlikely, and

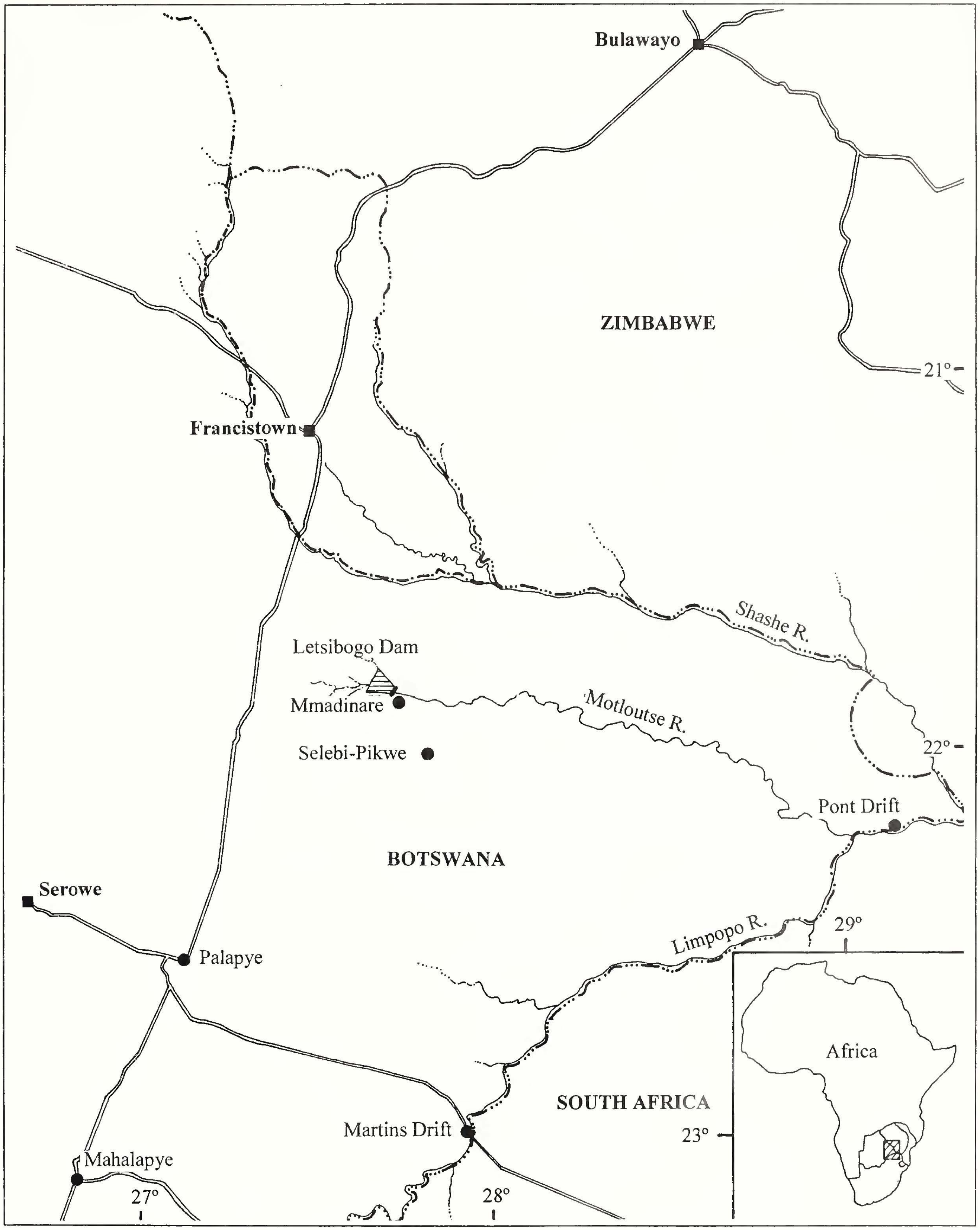


Fig. 1. Letsibogo Reservoir area in southeastern Botswana.

(2) there had been large-scale interaction between Khami (representing Shona speakers) and Moloko (Sotho-Tswana) populations.

This last interpretation needed further investigation, and there were still unresolved issues about subsistence, ceramic style, dating and environment. As a result, the

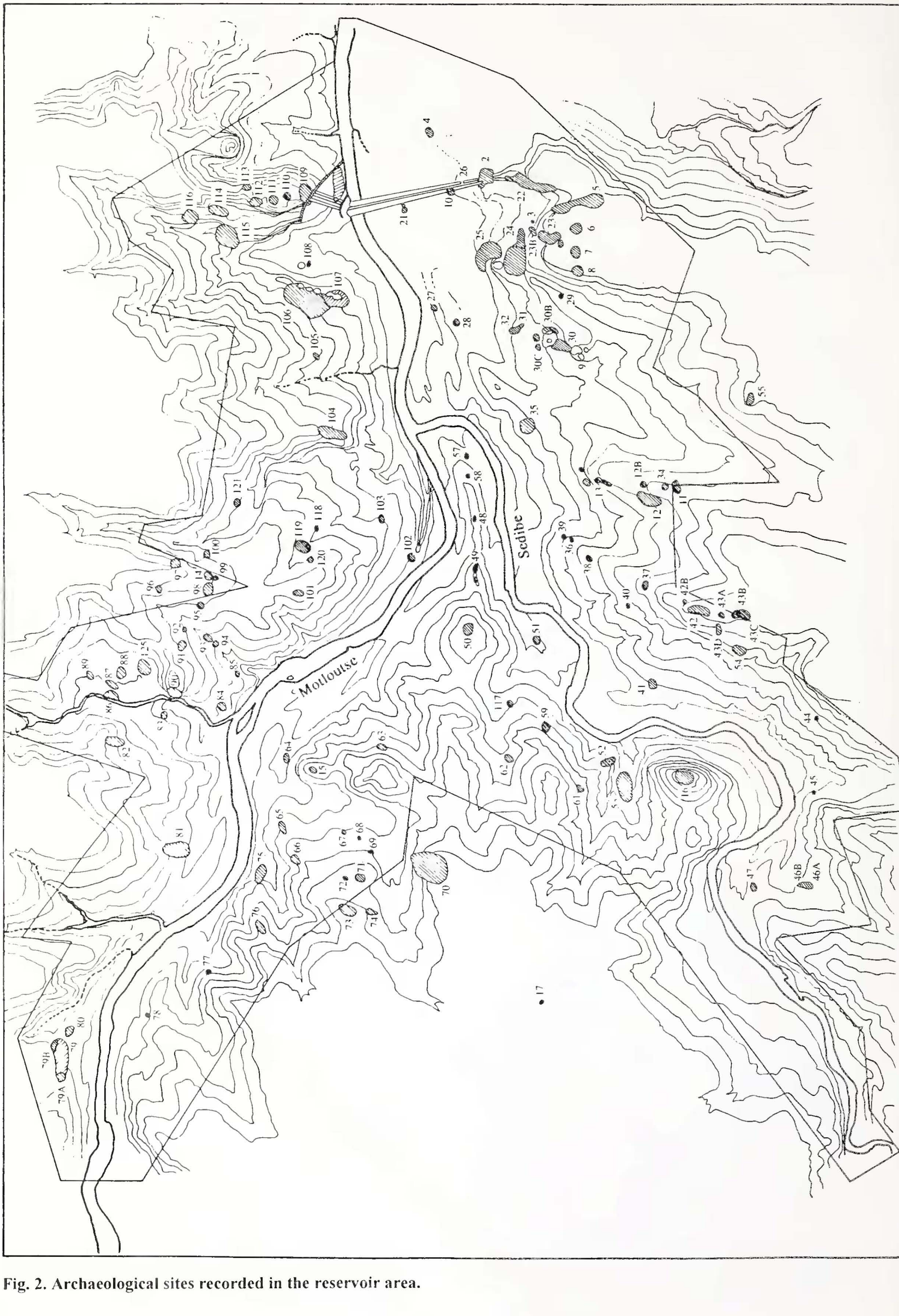


Fig. 2. Archaeological sites recorded in the reservoir area.

report recommended that 11 sites receive full mitigation, or at least further excavations.

Water Affairs appointed Environmental Consultants, a division of AquaTech Groundwater Consultants (Pty), Ltd., to carry out Phase III in 1998. Environmental Consultants divided the work among three sets of archaeologists: Team 1, Dr J. Kinahan (Quaternary Research Services); Team 2, Professor T.N. Huffman (Archaeological Resources Management with J.A. Calabrese, A.B. Esterhuysen & J. M. Smith) and Team 3, Professor R.J. Mason. Because of the relatively short time available, mitigation was to be sufficiently flexible so that each team could focus on the most productive sites.

Team 1 investigated Sites 30B (Zhizo), 38 (Khami) and 125 (Leopard's Kopje). Their fieldwork took place between June 8 and 27, 1998. Team 2 was responsible for Sites 46 (Moloko & Khami), 86 (Khami), 110 (Zhizo & Khami) and 119 (Moloko). They began on July 26 and ended on August 13. Team 3 was allocated Sites 13 (Moloko), 24 (Historic), 79A (Moloko) and 79B (Khami). Each team hired local labour, while four students from the University of Botswana helped Team 2. The dam wall is now complete, and archaeological sites below the high water line are gone.

As required under the Terms of Reference, full reports are on file at the National Museum and Art Gallery, Botswana (Huffman & Calabrese 1999; Kinahan 1999). Publication of final results is also required and some have already appeared (Kinahan 2000). Here we present the full results of Team 1 and Team 2.

METHODS

The approach of each team varied somewhat depending on the unresolved issues arising from Phases I and II. Team 1 concentrated on site formation processes and the environmental history of human settlement. Following the Terms of Reference, they placed special attention on soil composition and soil erosion. For granulometric analysis, they followed standard techniques (Selly 1976) that yielded indices of symmetry (skewness) and relative peakedness (kurtosis) of grain size distribution. Silt and clay particles were not separated. They also identified major mineral constituents and searched for grain surface polish, or surface 'frosting' (*cf.* Folk & Ward 1957; Friedman 1961; Musonda 1987).

Team 1 was also interested in an erosion gully on Site 30B. To calculate the erosion rate, they measured two trees, (1), *Colophospermum mopane* and (2), *Combretum apiculatum*, from the inflection point of the basal flare of the stem to indicate the maximum possible soil level (*cf.* Lamarche 1968). They then related this root exposure to the age of the trees based on growth rings, following Stocking (1984) and Schnabel (1994). Growth rings were counted at 10x magnification on three radii. Presumably, the root exposure rate was continuous throughout the age of the trees (*cf.* Lilly 1977).

Because of the unresolved issues surrounding the culture-history sequence, Team 2 concentrated on ceramic analyses. Considering the multiplicity of shapes, sizes, pastes, lip forms, designs and design organizations, an almost infinite number of variables could be classified. For culture-history purposes, it is particularly important to choose variables that truly represent groups of people.

A ceramic experiment some years ago identified the appropriate variables by applying different classifications schemes to the ceramics of known groups of people (Huffman 1980). As a premise, if a classification cannot correctly select known groups, then it has no reliability when the answers are unknown. Classifications with the lowest accuracy used fragments rather than whole vessels; and so, such variables as decoration technique and single motifs had priority. In contrast, classifications based on whole vessels were highly accurate because they incorporated motif combinations. The best procedure for culture-history purposes determines multidimensional types from the combination of variables of vessel profile, decoration position and decoration. This procedure can establish archaeological identity. By convention, we use the name of the pottery for the name of the people.

To understand the way of life of the entities established by ceramic style, all three teams concentrated on settlement organization. Models of settlement organization provide a framework for investigating relationships between features, and between features and artefacts. Two organizations could apply to the settlements in the Letsibogo area: the Zimbabwe Pattern and the Central Cattle Pattern (see Huffman 1986b, 1996b; Van Waarden 1989). The first pattern correlates with class distinction and sacred leadership. A stonewalled palace that provided ritual seclusion for a sacred leader characterized royal settlements. Ideally, the palace should be located at the east back of the settlement opposite the west front area designated for followers. A court where men resolved disputes stood to one side, opposite the royal wives' compound.

In contrast, Zimbabwe commoners organized their settlements according to the Central Cattle Pattern. This second pattern was associated with people who had a patrilineal ideology about procreation (*i.e.*, their blood came from their father), male hereditary leadership, a preference for bride wealth in cattle and a positive attitude about the role of ancestors in daily life (Kuper 1982). Settlements of these people comprised an inner zone that was the domain of men and an outer zone associated with married women. As a rule, the centre encompassed cattle kraals where men and other important people were buried, sunken grain pits or raised grain bins for long-term storage, a public smithing area and the men's court. The outer residential zone, the domain of women, incorporated the individual households of married women with their sleeping houses, kitchens, granaries and graves. Archaeologically, the location of cattle kraals in relation to other features is important in distinguishing between these two patterns (Huffman 2001).

To test for the presence of cattle kraals, Team 2 examined soil samples for their phytolith content. Phytoliths, or plant opal, are microscopic silica formations inside plants such as grasses, sedges and herbs which become incorporated in sediments when plants decay (Piperno 1988). By examining soil samples, it is possible to identify prehistoric dung deposits and sometimes to distinguish between large and small stock kraals. Because sheep and goats nibble their food, they break a large proportion of the phytoliths, especially when the soil is gritty, whereas cattle regularly pass undigested plant matter after chewing the cud, leaving clusters of phytoliths behind. As a rule, Iron Age people kraaled their stock, and so the phytolith content inside a kraal is considerably higher than outside. For present purposes, four categories derived from conservative estimates established the relative differences between samples: virtually none (0-10 phytoliths per 100 mg sample of soil under a standard cover slip), low (~100), medium (~300) and high (~1000). Dr E. Robinson, then with the Botany Department, University of the Witwatersrand, helped with the analyses.

Because of the sandy loam in the dam area, phytolith fragmentation may not be sufficient to discriminate between large and small stock kraals. To increase the probability of recognizing the difference, Teams 1 and 2 examined kraal deposits for spherulites, a calcium crystal produced in the intestines of sheep and sometimes goats, and occasionally in cattle (Brochier *et al.* 1992; Canti 1997). Team 2 established a reference using modern sheep dung, and both teams followed the procedure outlined by Brochier.

Furthermore, Team 1 analysed nutrient concentrations in soil samples, especially orthophosphate anomalies, to help identify and delineate kraal deposits. They also measured nitrate and nitrite anomalies by remission photometry to mark middens with wood ash.

Other laboratory analysis included charcoals. A.B. Esterhuysen in Team 2 examined samples microscopically to determine species. If a chronological sequence can be established, the species list could help to document climatic change.

A. Brown, University of the Witwatersrand, analysed faunal samples for Team 3 and confirmed the identification of teeth for Team 2. In all cases the various teams followed standard procedures established by Brain (1974), Klein & Cruz-Uribe (1984) and Walker (1985).

We turn now to a review of the existing archaeological and palaeoenvironmental knowledge of the region before the project began.

BACKGROUND

The Letsibogo area lies in the eastern hardveld, underlain by granite gneiss of the basement complex (Key 1976). Quartzites and calc silicates also occur. These rocks outcrop as inselbergs and small ranges. The Sedibe and Motloutse rivers and their tributaries flowing in between the ranges and inselbergs have laid down good alluvial soils suitable for cultivation.

This topography and geology support a mixed open tree savannah dominated by mopane with some terminalia. The hills often provide conditions suitable for various commiphora, kirkia and croton species, while riverine vegetation includes large specimens of *Combretum imberbe*, zizyphus, and acacia. Archaeological sites often occur as open patches within the mopane that contain thorn bush, especially *A. tortilis*, grewia thickets and isolated specimens of *Boscia albitrunca*.

Although it is today quite densely settled (10 persons per hectare in some places [Campbell 1990]), the population is unevenly distributed between towns and large villages on the one hand, and scattered farmsteads and cattle posts on the other.

Despite the substantial population, agricultural potential of the area is low. Indeed, the average annual precipitation of 350 mm or less is not sufficient for the cultivation of maize, sorghum and millet (FAO 1978). Dryland farming is nonetheless an important component of the subsistence economy. Sandy loams in this area are moderately fertile (Sims 1981, cited in Thomas & Shaw 1991:97), but limited, and they are probably the most important resource for agriculture. Another component includes vegetable gardens where reliable water supplies exist. In addition, farming emphasizes a mixture of small stock and cattle, which graze and browse in the dense bush. The shallow wells that herdsmen excavate in the riverbed today are probably the continuation of a practice that existed for the entire history of agropastoral settlement in this area.

This combination of marginal farming conditions and relatively high population density has not always existed in the Letsibogo area. Climatic variations over the last 2 000 years closely correspond with the distribution and intensity of agropastoral settlement (Tyson & Lindesay 1992; Huffman 1996a). Indeed, there have been marked fluctuations in population density throughout southern Africa since the first appearance of farming settlements. At the beginning of the Early Iron Age, from about AD 400 to 600, the climate appears to have been warmer and wetter than today in the summer rainfall region of eastern Botswana, southwestern Zimbabwe and northern South Africa. Within this wider region (Fig. 3), there is evidence for an early occupation of Happy Rest (in the Kalundu Tradition) and Gokomere people (in the Nkope Branch of the Urewe Tradition).

Facies of the next phase of each Tradition are better represented. Settlements of the Zhizo facies (derived from Gokomere) in particular occur throughout the wider area. The largest Zhizo settlement on record is at Schroda (Hanisch 1980) near the confluence of the Shashe and Limpopo rivers. Dating to between AD 900 and 1000, Schroda is also the first capital to form a link with the Indian Ocean ivory and gold trade. Glass beads from this trade have been found in a number of Zhizo sites (Hanisch 1980; Kiyaga-Mulindwa 1992;Calabrese 2000), including the Palapye area (Denbow 1982, 1983, 1986). Recent isotopic studies (J. Smith, pers. comm.) indicate that rainfall at this time was no better than today: and so, Zhizo people in the Shashe-Limpopo basin would have found it difficult to survive by subsistence agriculture alone. The distribution of sites, together with the ivory debris at Schroda, suggests that Zhizo people purposefully moved into the area to hunt elephant for the Indian Ocean trade.

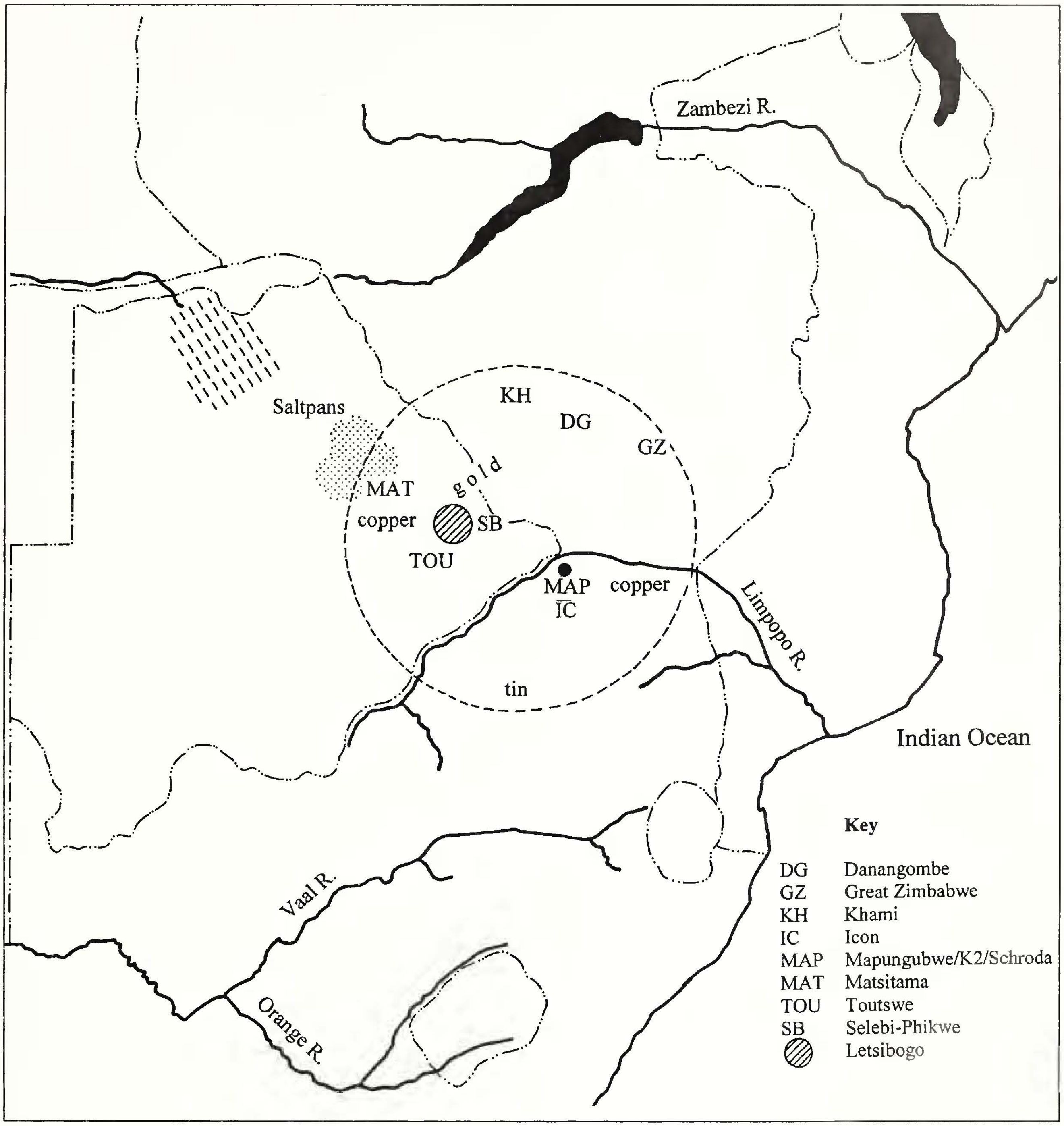


Fig. 3. Wider project region.

At about AD 1000, Leopard's Kopje people (derived from Happy Rest) moved into the Shashe-Limpopo Basin. Generally speaking, Zhizo people abandoned the Limpopo Valley, and established a new capital to the west at Toutswe, near Palapye. Some Zhizo people remained behind (Calabrese 2000), but nevertheless, Leopard's Kopje people controlled the region.

The defensive location of many Toutswe-phase settlements, including Toutswe itself, suggests that Toutswe and Leopard's Kopje people were in competition. For a while, the Motloutse River appears to have been a boundary between the two groups. In any case, Leopard's Kopje dominated the African link of the coastal trade from their capital at K2, and they accumulated an unprecedented amount of wealth. This extraordinary wealth, combined with intensive cultivation of the Shashe-Limpopo floodplains, contributed to internal social transformations that culminated in class distinctions and sacred leadership (Huffman 1982, 2000). These two features were defining characteristics of the Zimbabwe culture, first expressed at Mapungubwe when the Leopard's Kopje capital shifted there at about AD 1220. At this time, there were two spatial organisations, the new Zimbabwe Pattern at royal centres and the old Central Cattle Pattern at commoner settlements.

During the 13th century, Mapungubwe people traced the alluvial gold in the Shashe-Limpopo basin to its source in the Gwanda-West Nicholson greenstone belt of Zimbabwe. Mapungubwe pottery was found at the Macardon Claims, and the oldest known gold mines date to the Mapungubwe period (Summers 1969) inside the Mapungubwe cultural area.

The main Mapungubwe period came to an end at about AD 1300 with the start of the Little Ice Age. Cold conditions at that time made cereal cultivation impossible and the entire Shashe-Limpopo basin was abandoned. Some Mapungubwe people moved west beyond the Motloutse (see Lose pottery in Kiyaga-Mulindwa 1990). As a consequence, Great Zimbabwe became Mapungubwe's political, cultural and economic successor. A few Zimbabwe-phase settlements have been recorded in the wider region, but generally, settlement did not intensify until the succeeding Khami phase.

Khami, near present-day Bulawayo, succeeded Great Zimbabwe as the next major capital between AD 1420 and 1450. This shift in capitals coincided with a warm pulse during the Little Ice Age, and for about 200 years the greater project area was once again suitable for agropastoralism. Khami itself was the headquarters of an extensive state under the Torwa dynasty (Beach 1980) that probably extended west to the Makgadikgadi saltpans. According to some oral histories (Van Warden 1988, 1991), the Motloutse River formed the southwestern boundary.

Within the boundaries of this state the capital controlled a vast network of mining. A large copper mine near Matsitama has been radiocarbon dated to the Khami period, and associated commoner settlements near the mine contained typical Khami pottery (Huffman *et al.* 1995). Many other copper and gold workings are known around Francistown (Molyneaux & Reinecke 1983), and presumably they date to the same time. Mining stopped at Matsitama in the mid 17th century with the destruction of the Khami capital.

The Portuguese sacked Khami during a civil war in the 1640s, and 50 years later Danangombe (also called Dhlo-Dhlo) became the new capital under the Changamire Rozwi (Beach 1980). By this time, colder and drier conditions once again prevailed, and for this and other reasons Rozwi interests did not extend as far west as the Letsibogo area. Consequently, the many Khami-phase ruins near Selebi-Phikwe probably date to the period when the Torwa ruled from Khami.

This first appearance of Sotho-Tswana people is marked by the cluster of ceramic facies called Moloko (Evers 1981, 1988; Huffman 2002), and dates to the 14th century. The first ceramic phase, known as Icon (Hanisch 1979), occurs in northern South Africa immediately after the abandonment of Mapungubwe. A later merger of Icon and Khami pottery resulted in the Letaba style associated with Venda, and the ceramic sequence most probably reflects the creation of Venda as a language and new group identity (Loubser 1991).

Unfortunately, the 18th to 19th century history of the wider project area is not as archaeologically well known as the earlier periods. According to oral traditions, various Sotho-Tswana groups lived in the region by this time. The area between the Motloutse and Tati rivers, northeast of Letsibogo, was the overlapping boundary between the powerful Ngwato and Ndebele, and raiding by both groups was a possibility. From about 1853 to 1897, hunters, missionaries and traders traversed the project area on their way to Matabeleland (Campbell 1988, Appendix IV in Phase-I report). There were probably cattle posts in the Letsibogo area, but no substantial settlements until 1912 when Mmadinare was established.

Even this brief outline shows that the Letsibogo region was not isolated from events and developments elsewhere. Indeed, the significance of the Motloutse River to various political entities underscores the research potential of the Letsibogo project.

We present the results of the Phase III mitigation of Teams 1 and 2 in terms of the culture-history sequence, beginning with Zhizo. We introduce each period with a brief summary of the Phase I and II results and the research questions each site was expected to answer.

THE INVESTIGATIONS

ZHIZO

Ceramic groups need to be defined by their complete list of multidimensional types. Nevertheless, certain key features may be particularly useful in the field to identify assemblages. In the case of Zhizo, incised and stamped bands on the lower rim and a stamped line on the shoulder are diagnostic features (Huffman 1974; Robinson 1966).

The Phase I surveys found five sites with this pottery or other diagnostic artefacts, and six more were identified during Phase II (Fig. 4). One shelter also contained Zhizo pottery. Initially, five other sites were thought to be a variant, called Zhizo B, but they were later reclassified as Moloko (Campbell *et al.* 1955).

Of the 11 sites identified as Zhizo, four received Phase II mitigation, while one (Site 109) was extensively tested because of its proximity to the dam wall. Although charcoal was scarce, four sites could be radiocarbon dated.

Site	Lab No.	a.d.	Cal AD
19	Beta 29951	850±50	970-1020
30A	Beta 81196	730±50	790-950
106	Beta 80095	590±50	665-770
109	Beta 80984 (AMS)	730±60	790-950

Whatever the precise dating, the Phase I and II investigations revealed a fairly widespread Zhizo occupation. Although Zhizo settlements were fairly common, the Phase II testing produced only small amounts of pottery, no substantial middens and little bone. From this evidence, it would appear that short term shifting cultivation and a rather low population density characterised the Zhizo period.

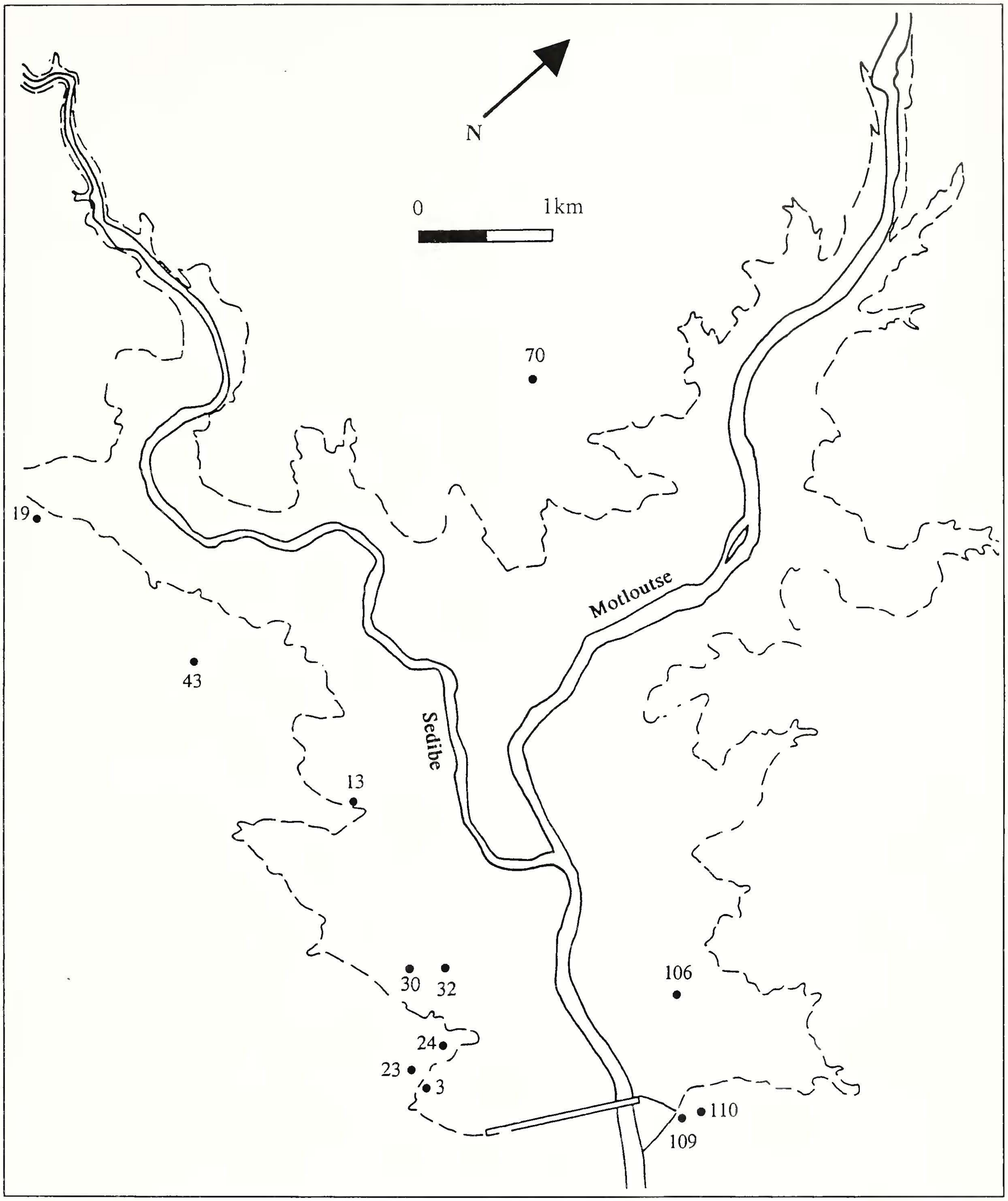


Fig. 4. Zhizo sites recorded in the project area.

The Zhizo sites within the project area were all located at the base of hills and set back at least 300 m from the Motloutse and Sedibe rivers. In addition to pottery, characteristic indications of Zhizo occupation included concentrations of pole-impressed daga. These rubble heaps were at first interpreted as huts, but excavations at Site 109 suggested that they were probably granaries. Following interpretations of similar Early Iron Age granaries elsewhere, the Phase II report suggested that the floors had been purposefully fired.

Despite the well-preserved daga concentrations, many of the sites were severely eroded. Whether or not this erosion

Fig. 5. Site 30B from hillside showing excavations in progress. Note daga concentration marked by arrow.

was a long-term consequence of the Zhizo occupation, it was clearly important to an understanding of the sites and their environmental history. Team 1 pursued this question at Site 30B where a large erosion gully bisected the archaeological remains.

In the case of Site 30B, previous investigations also noted an extensive group of stone granary platforms partly overlying the Zhizo occupation with both sealed and surface concentrations of daga. In addition to its erosion history, this site was selected for Phase III mitigation because of its potential for well-stratified pottery samples and organic remains. Team 1 spent four days at Site 30B, beginning on June 11.

SITE 30B (17DC30B)

The site (21.51.01S 27.42.07E) abutted the southeastern foot slopes of a low rocky hill, approximately 1 km due south of the Motloutse and Sedibe confluence. Site 30B was part of an extensive and more-or-less continuous distribution of archaeological remains encircling several hills.

The hills themselves form a northeast-trending alignment of porphyroblastic granite gneiss that extends for approximately 5 km on either side of the Motloutse River. Dense tree growth was concentrated on the more inaccessible slopes, while the mainly mopane woodland surrounding the hills showed evidence of severe coppicing and a well-developed browse line. Scrub and secondary mopane less than 5 m in height dominated the site (Fig. 5). Associated trees and shrubs included various acacias, as well as dichrostachys, grewia and combretum species. Sheet, rill and gully erosion had caused the exposure of tree roots and the isolation of stones and boulders on pedestals.

Figure 6 shows the topography of the site and the location of the archaeological features visible at surface. The granary foundations identified during the Phase II investigation had a somewhat irregular distribution and may belong to different occupations. Some, such as those at the southern end of the site, were contiguous with exposed daga floors that the Phase II investigation assigned to the initial Zhizo occupation.

These floors may belong to huts or granaries. Other stone granary foundations, including those at the foot of the hill, are possibly younger and could be associated with either the Moloko or Khami pottery recovered from the Phase II test pit. The erosion gully across the site was clearly younger than the daga floors although its relation to the more recent features was uncertain.

Method and Stratigraphy

Team 1 excavated a series of 1 x 3 m trenches along a 50 m transect and a series of random test pits (Fig. 6) to resolve the stratigraphic relationships of these different components, as well as to investigate the erosion history of the site.

Trench 7-19 had a surface cover of loose sand constituting an E horizon (layer 1) that appeared to be a skeletonized soil derived from the hill above. The sediment was pinkish-grey (7.5 YR 6/2) and comprised angular to sub-angular grains, mainly of quartz. The surface sloped away from the hill at 1:2, and the depth of the soil decreased from 50 to 40 cm below surface over the same distance.

A second layer of fine silty sand, similar in colour (7.5 YR 5/2 - 7/2) occurred in Trench 14-19 between 5 and 20 cm. This overlay a large concentration of daga rubble (layer 3) associated with Zhizo pottery lying between 20 and 40 cm. Small quantities of flaked stone, including pieces of hydrothermal vein quartz and silcrete, indicate a possible pre-Iron Age occupation of the same surface.

In Trench 14-19 layer 3 overlay an easily recognized sub-surface Cr horizon (layer 4) of light brown (7.5 YR 6/3 - 6/6) weathered gneiss. The smaller fraction ($\leq 125 \mu m \oslash$) of this material comprised sub-angular and sub-rounded grains of quartz and spar as well as some biotite. Clay particles adhered to grains in the size fraction $\leq 90 \mu m \oslash$, suggesting that the material as a whole was in primary pedogenic context rather than redeposited. The more mobile silt and clay fraction, however, could have been removed by sheet erosion.

This stratigraphy can be summarised as follows:

Layer 1: E-horizon, pinkish-grey (7.5YR 6/2) loose sand comprising angular to sub angular grains, mainly of quartz. It occurred in Trench 7-19 from 5 to 40 cm below surface;

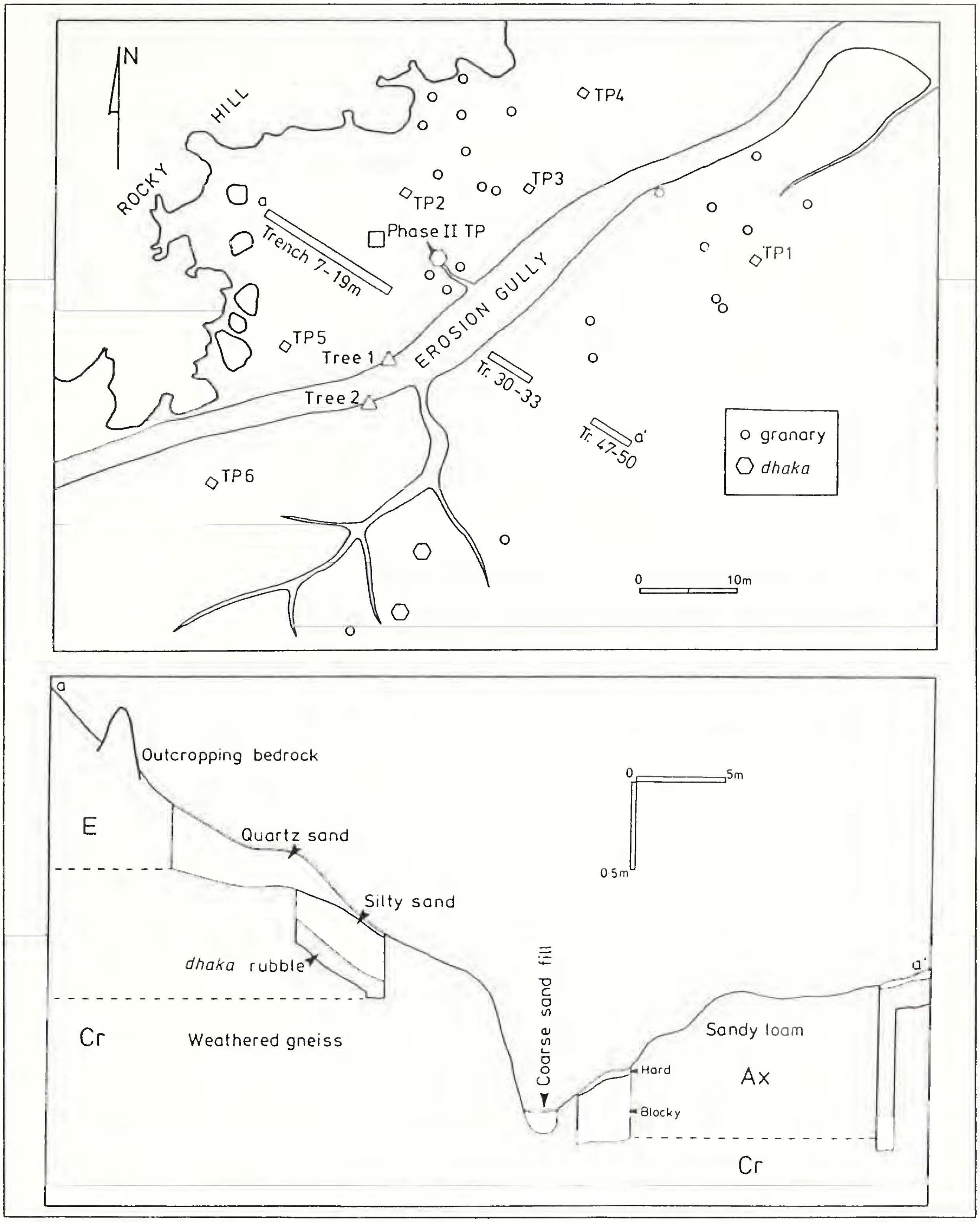


Fig. 6. Site 30B, map (redrawn from Phase II report) and profile of trench transect.

Layer 2: pinkish-grey (7.5YR 5/2-7/2) fine silty sand between 5 and 20 cm in Trench 14- 19;

Layer 3: daga rubble between 20 and 40 cm in Trench 14-19;

Layer 4: subsurface CR-horizon, light brown (7.5YR 6/3-6/6) weathered gneiss.

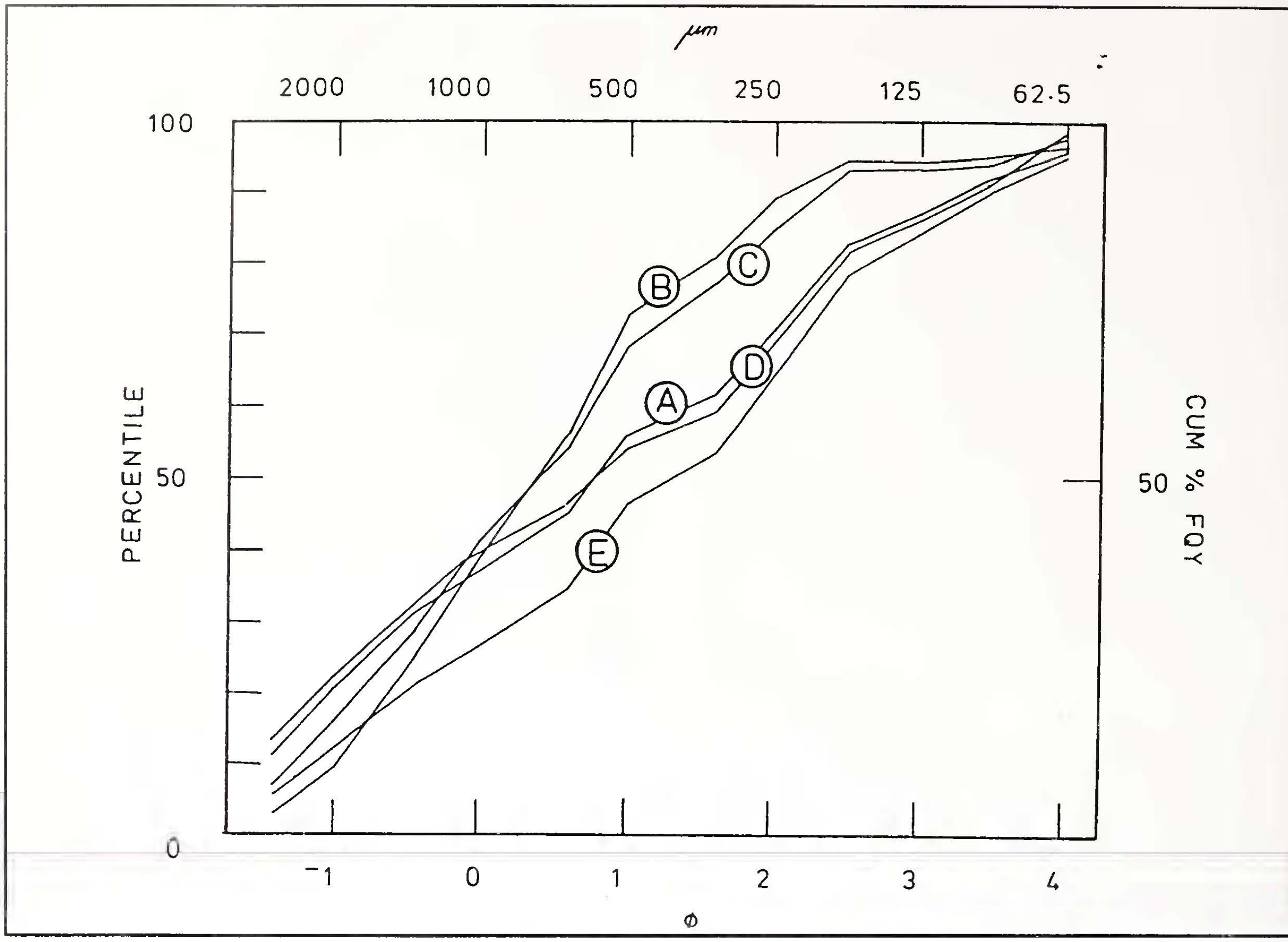


Fig. 7. Site 30B, granulometric analyses for Test Pit 2: Sample A = basal gneiss sand; Sample B = erosion gully fill; Sample C = sandy loam from Trench 47-50; Sample D = surface sand from hillside footslope; and Sample E = pinkish white sand from Test Pit 4.

Further down slope, the loose sandy overburden gave way to a hard surface of compacted sandy loam constituting an Ax horizon. This sandy loam represented the general soil conditions of the area as a whole. The upper 5 cm of the sandy loam was brown (7.5YR 5/2) and while relatively hard, it lacked the massive, blocky texture of the underlying material that was dark grey (7.5YR 4/1) and archaeologically sterile. The weathered gneiss Cr horizon appeared in Trench 47- 48 at 90 cm. The stone granary foundations and daga floors in the eastern and southern parts of the site were coeval with the upper 5 cm of the sandy loam. Given the evidence of sheet and gully erosion, it is likely that the surface of this horizon had been considerably reduced, and this probably accounts for the general paucity of archaeological remains.

The sandy loam horizon was deeply incised by an erosion gully in Trench 27-29, containing a loose fill of light brown (7.5YR 6/4) coarse sand with isolated crumbs of daga and small chips of silcrete and quartz, all presumably derived from the upstream erosion of archaeological deposits. Sub-rounded quartz grains showing some surface polish, as well as grains of biotite and calcrete, dominated the smaller fraction of the erosion gully fill ($\leq$ 125μm ⌀). The fill material resembles that of the weathered gneiss horizon, although it could equally well be derived from the sandy loam adjacent to the gully.

Test Pits 1, 3, 5 and 6 revealed grey sandy loam resting on reddish yellow (7.5YR 6/6) decomposing gneiss. The upper layer of Test Pits 2 (15-35 cm) and 4 (0-60 cm) contained the middle layer of pinkish-white sand noted in Trench 7-19.

The distribution of diagnostic pottery shows that Moloko occurred in layer 1 in Trench 7-19 above Zhizo in layer 3. Furthermore, an archaeologically sterile layer separated the two occupation horizons.

In Test Pit 2 the pinkish-grey soil 15 to 35 cm below surface appears to correspond to the 'ashy' soil described in the Phase II investigation. However, the Test Pit 2 soil had the same colour and sandy composition as the sterile interleaving horizon found in Trench 14-19. The material lacked any trace of charcoal flecking, and there was no evidence of oxidation due to burning. While the presence of an ashy component overlying the Zhizo occupation was therefore not confirmed, similar pinkish-white (7.5 YR 8/2) material comprised the upper 60 cm of the deposit in Test Pit 4. This too was lacking archaeological materials and seems to indicate a fairly extensive non-archaeological horizon separating the Zhizo and Moloko components. It is possible that this deposit was at least partly aeolian in origin.

Soil Analyses

The cumulative percentage frequency graphs (Fig. 7) present a granulometric analysis of five soil samples. In this diagram, Sample A, from the basal decomposed gneiss in Test Pit 2, has a similar profile to Sample D from the ground surface at the site datum. Thus, the parent materials and weathering processes were the same throughout the archaeological sequence. Likewise, Sample B, from the sandy fill of the erosion gully, has a similar profile to Sample C from the grey sandy loam in Trench 47-50. The gully fill was therefore probably derived from the same material as the sand fraction of the sandy loam that in turn was also derived from the decomposition of the gneiss parent material. On the other hand, Sample E, from the pinkish white sand in Test Pit 4, differs from the previous four. This material was ultimately derived from the same parent material as the others although aeolian processes may have reworked it.

Sample	Derivation	Skewness	Kurtosis
A	decomposed gneiss	0.0471	1.4954
B	gully fill	0.3224	1.5710
C	grey sandy loam	-0.3208	1.9312
D	surface sand	0.2803	2.3180
E	pinkish white sand	0.7498	2.8441

The negatively skewed distribution for Sample C reflects the presence of a fine fraction and indicates that the material had not been subject to fluvial reworking. Sample A similarly reflects a primary pedogenic deposit, whereas Samples B and D are more positively skewed, probably due to fluvial reworking. Sample E, the most positively skewed, appears to have been sorted in favour of fine sand between 125μm and 250μm ⌀, the general size range of aeolian transported sand.

Finds

Little archaeological material was present. This paucity of pottery and bone was probably the result of severe sheet erosion, particularly on the eastern side of the main erosion gully. On the western side, the ground sloped steeply away from the hill, and most surface material had probably been eroded away. As a consequence, the number of finds is too low for detailed analysis.

Bone

Animal bone came from four of the trenches and one of the test pits. Trench 10-13 at 0-20 cm yielded two cervical vertebrae (? C6), as well as a scapula and a longitudinally split medial tibia from a small antelope (size class I). Trench 13-16 at 0-30 cm yielded a small sample of undiagnostic bones, possibly bovid size class IV (*cf.* cattle), as did the 20-50 cm level in the same trench. Trench 16-19 at 15-30 cm produced fragments of a longitudinally split humerus, as well as fragments of miscellaneous vertebrae and a mandibular premolar, all of bovid size class IV (*cf.* cattle), together with the distal epiphysis of a metatarsal of bovid size class I. Trench 30-33 at 20-25 cm yielded a single upper molar (m1) of bovid size class IV (*cf.* cattle). Test Pit 2 yielded a small number of undiagnostic bones. A fragment of freshwater mussel shell came from Trench 13-16 at 35-40 cm.

The presence of cattle bone in association with both Moloko and Zhizo material is to be expected. The bones assigned to bovid size class I probably belong to small antelope such as bushbuck.

Stone Artefacts

The sample of stone artefacts from Trench 10-13 at 0-20 cm included one flake and one core reduction chunk in hydrothermal vein quartz, as well as one utilized flake in chalcedony (cryptocrystalline silicate). The same trench also yielded a single fragment of graphite schist that was probably used in pottery decoration. In Trench 13-16 at 0-30 cm stone artefacts included one flake, two core reduction chunks and one microlithic core in vein quartz, two microlithic core fragments in crystalline quartz and one MSA (?) artefact with LSA retouch. Artefacts from Trench 16-19 in the upper 5 cm included eight flakes, 18 core reduction chunks and five core fragments, all in vein quartz. At 5-15 cm there were 13 flakes, 21 core reduction chunks and five core fragments, all in vein quartz.

Ceramics

In the total excavation there were some 11 diagnostic Moloko and three Zhizo sherds, plus four undiagnostic rims and 345 undiagnostic body sherds (Table 1).

Fired Daga

The large quantities of daga plaster provided an opportunity to test the hypothesis that the floors were purposefully fire-hardened before use. Team 1 retained a sample of 29 daga fragments in a single compact layer from Trenches 13-16 and 16-19, at 20-50 cm and 15-30 cm respectively. The pieces were irregular, bearing impressions of thin poles in parallel or lattice pattern on one or both sides (Fig. 8). The fabric of the material was coarse and sandy, but well fired. Most pieces evidently came from walls that had been constructed as a light wooden framework and then thickly plastered. Some, however, were floor pieces.

The mean thickness of the plaster, measured from the outer surface of the pole impression to the outer surface of the plaster, was 24.48 mm (SD 6.45; n=29).The mean thickness of the poles, measured across the pole impression, was 31.89 mm (SD 9.46; n=29). The lack of a correlation between the thickness of the plaster and the thickness of the poles (r = 0.0224) suggests that the daga walls were relatively uniformly thick. This, together with the positioning of the structures close to the foot of the hill and the quantity of material, further suggests that these are the remains of granaries rather than huts.

The plaster was applied as puddled mud and therefore preserved good casts of the wooden framework. A number of pieces contain casts of *Colophospermum mopane* poles

Table 1. Distribution of ceramics at Site 30B.

Unit	depth (cm below surface)	undecorated	rims	Zhizo	Moloko
Trench 10-13	0-20	49	2	-	4
Trench 13-16	0-20 20-50	34 33	1 -	- 1	- -
Trench 16-19	0-5 5-15 15-30	- 28 55	- - -	- - -	- - 2 (?)
Trench 30-33	0-15 15-20 20-25	- 14 4	- - 1	- - -	- - -
Trench 47-50	0-5 5-10 10-15 15-20	1 2 - -	- - - -	- - - -	- - - -
Test Pit 2	0-20	62	-	-	1 (?)
Test Pit 3	0-20	17	-	-	3
Test Pit 5	30 cm	15	-	2	-
Test Pit 6	-	2	-	-	-
Total		345	4	3	11

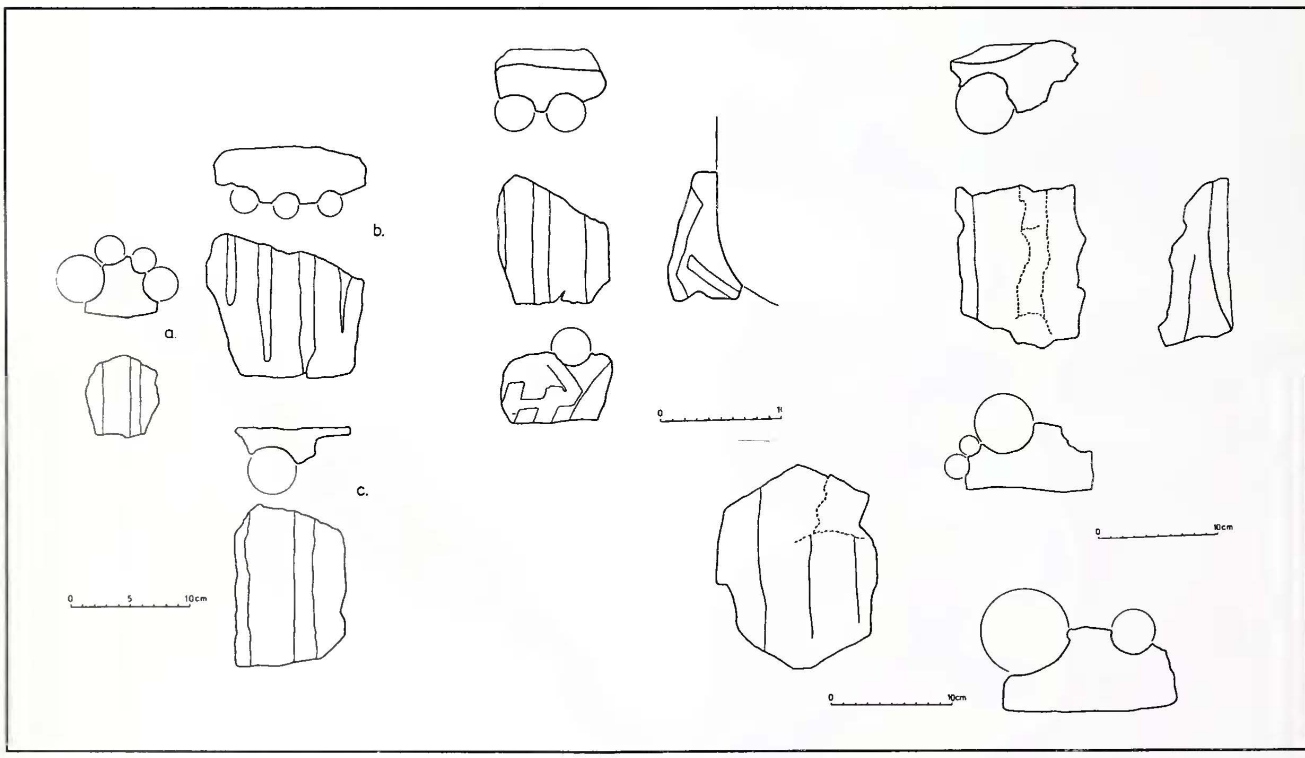


Fig. 8. Site 30B, fragments of daga: left, upper wall from Trench 16-19, 15-30 cm (a) and Trench 13-16, 20-50 cm (b and c); upper centre, lower wall from Trench 16-19, 15-30 cm, showing bark lashings; upper and lower right, lower wall or floor from Trench 13-16, 20-50 cm.

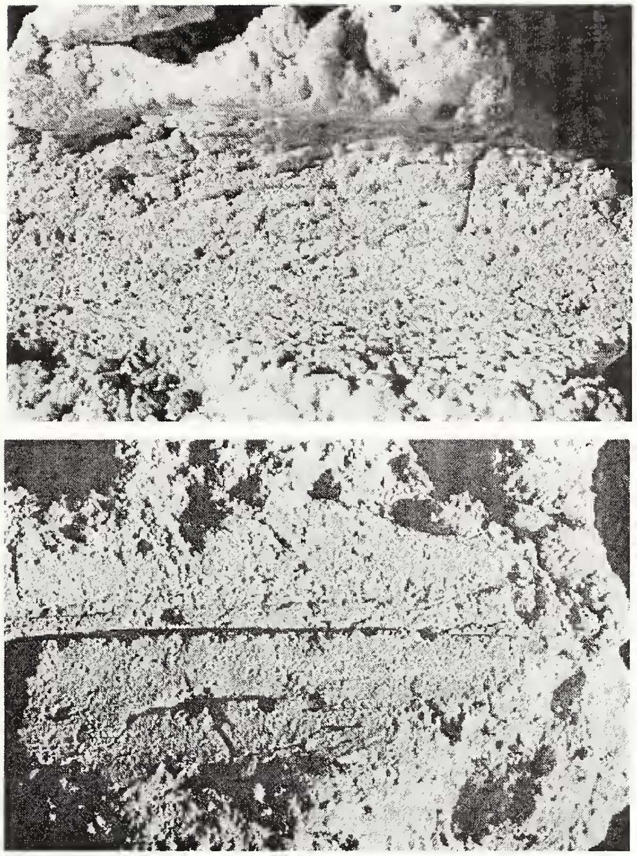


Fig. 9. Site 30B, impressions of mopane (above) and grewia (below) in daga fragments.

(Fig. 9). Under normal circumstances smooth bark with very small evenly spaced irregularities characterises first year mopane growth, while second year and older growth exhibits a characteristic pattern of short densely spaced longitudinal splits resulting from the increasing girth of the branch. With this criteria the mopane poles correspond to second year growth: coppiced trees near the settlement could have provided this material.

The other identifiable species is *Grewia flavescens* (Fig. 9): the bark has fluted ridges and the larger branches have roughly square sections (Coates-Palgrave 1977:571). *G. flavescens* is a large shrub that could not provide the right poles for hut construction, and this point further supports the identification of these structures as granaries. Casts showing long parallel grooves might not always belong to *G. flavescens*, however, for it is possible to produce the same effect by forcing a pole into wet plaster. There are several examples where this appears to have happened, presumably when the poles were too far apart to support the weight of the plaster on their own.

There is also evidence of a thin bark lattice. This would have been necessary to help hold the plaster and maintain the shape of the structure. This lattice, together with evidence of shrinkage cracks, further confirms that the plaster was applied as puddled mud (see Larsson & Larsson 1984 with reference to contemporary Tswana building practices).

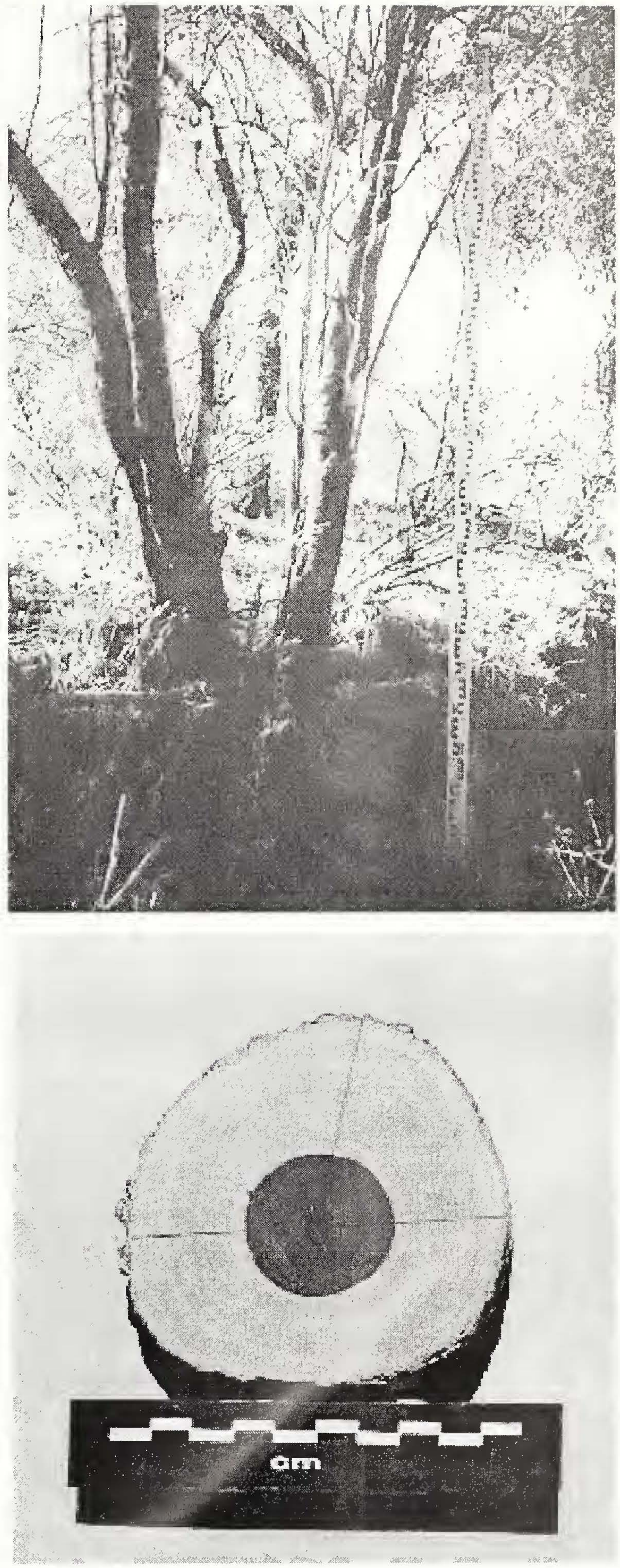


Fig. 10. Site 30B, *Colophospermum apiculatum* specimen showing root exposure (above) and stem section (below).

The previous investigators believed the granary floors were purposely fired to improve protection against insects and rodents. The evidence from the present excavation does not support this view. In particular, the plaster covering on

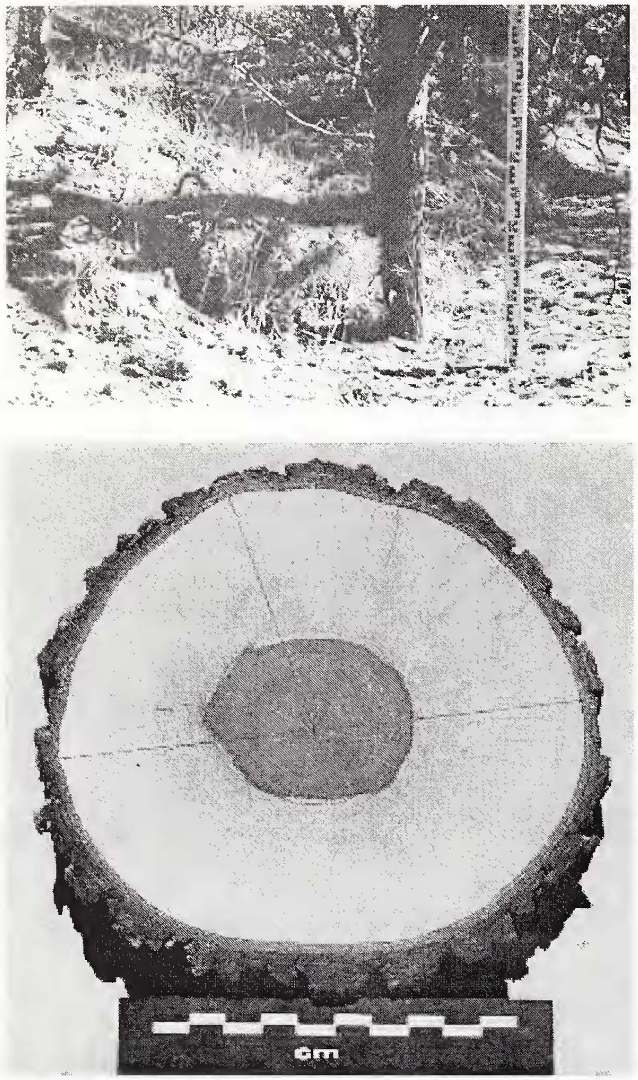


Fig. 11. Site 30B, *Colophospermum mopane* specimen showing root exposure (above) and stem section (below).

top of the framework would create a reducing atmosphere with visible blackening. As it is, the evidence indicates a rich oxidizing atmosphere (rosy pink colouration within the casts). The most likely way in which this could have occurred is by firing *after* the granaries had collapsed into a loose (and therefore well aerated) heap of dry poles, thatching material and rubble.

Erosion History

The two trees selected for dendrochronological analysis in the central gully both had acute root exposure. Tree 1- the *Combretum apiculatum* specimen (Fig. 10)-had a stem diameter of 88 mm (range 87 – 90 mm) just above the basal flare. Maximum root exposure was 500 mm. Growth rings represented a probable age of 19 years, with 11 growth rings confirmed for over 100° of circumference. This translates into an estimate of 26.3 mm/y^{-1} root exposure during the life of the specimen.

Tree 2, the *Colophospermum mopane* specimen (Fig. 11), had a stem diameter of 136 mm (range 129 – 143 mm) just above the basal flare. Maximum root exposure was 550 mm. Growth rings represented a probable age of 19 years, with eight growth rings confirmed for over 150° of circumference. This translates into an estimate of 28.9 mm/y^{-1} root exposure during the life of the specimen. Bearing in mind the inherent inaccuracies of the method and the unsuitability of the species, the estimate of less than 20 years of gully erosion is reasonable.

The rapid head-ward advance of this gully is well illustrated by the desiccated remains of an extensive algal mat some 150 m south. Such mats can only develop in shallow standing water, and once dried, the hooves of livestock obliterate them before the next rainy season. In this instance the gully head had cut through the algal mat within the year and advanced more than 30 m further.

Preliminary Discussion

Without independent dating, we assume that the Zhizo component of the site falls within the known range of dated Zhizo sites elsewhere. Furthermore, it is reasonable to suggest that the site was occupied at more or less the same time as Site 30A, and formed part of a cluster of homesteads grouped around the hills. According to the available dating and the known ceramic sequence, the homesteads would have been abandoned by the late 10th century AD.

The stratigraphic separation of the Zhizo and Moloko components of the site is clear. This hiatus may correspond to the cool/dry period that set in after AD 1300, and lasted until about AD 1425. Whether the suspected aeolian horizon marks this period of aridity cannot be asserted on the research results alone. Significantly, the intervening deposit is not ashy, as previously suggested, and does not represent an occupation horizon.

One reason for the stratigraphic uncertainty is the recent history of erosion.The present study distinguished the accumulation surface at the foot of the hill from the deflation surface on the eastern side of the erosion gully, where sheet erosion had washed away all except stone emplacements and daga floors. The development of the gully was quite recent. The gully has apparently developed on one of several cattle tracks running more-or-less parallel in the near vicinity; and so, the erosion probably corresponds with the major settlement expansion at Mmadinare.

It should be noted, however, that vegetation clearance within the reservoir basin for the dam itself had probably accelerated the advance of this and other gullies in the region. This advance will undoubtedly continue with the seasonal fluctuations of the water level, affecting other archaeological sites outside the study area.

The settlement hiatus after the Zhizo period is one of the interesting research results of the Letsibogo investigations. We turn now to the next period of settlement.

LEOPARD'S KOPJE AND KHAMI

The same ceramic types as the preceding Great Zimbabwe phase characterized Khami, with the addition of tall-necked jars decorated with contrasting black and red incised panels and bands (Robinson 1959, 1961). Previous investigations recorded some 45 sites with Khami pottery in the project area (Fig.12). Whatever else, this number shows that the area was highly suitable for agropastoralism during this period. These sites ranged from a district centre with a stonewalled palace (Site 70), to smaller platforms representing royal headmen (Sites 16 & 46) to commoner sites (*e.g.*, Sites 79B & 86).The Phase II teams test excavated 20 suspected Khami sites and radiocarbon dated five.

Site	Lab No.	a.d.	Calibrated AD
4	Beta 80979(AMS)	1470 ± 60	1425-1485
38	Beta 80980	1850 ± 50	1825-1935
79B	Beta 80982	1500 ± 50	1420-1505
86	Beta 80983	1400 ± 70	1400-1445
110	Beta 80985	1580 ± 90	1455-1660

Cattle kraals appeared to be concentrated at elite sites although in other respects the commoner settlements conformed to the Central Cattle Pattern. In terms of interaction the Khami sites appeared to be contemporaneous with Moloko, and two (Sites 79A and 79B) were close neighbours. Pottery samples also needed to be increased, and so nine Khami and Moloko sites were chosen for further mitigation. We report on Site 86, the 119 Complex and Site38.

Besides the Khami sites, Phase II archaeologists discovered Site 125. Preliminary investigations yielded a radiocarbon date of AD 1240 ± 60 (Beta 80986) calibrated to AD 1285 to 1390. The radiocarbon date led the Phase II teams to suspect that the site belonged to the Leopard's Kopje cluster and that it represented an isolated reoccupation of the area before the Khami period. A substantial cattle kraal and numerous granary bases increased the potential for meaningful data, and Team 1 selected Site 125 for further mitigation.

Site 125 (17DC125)

The site (21.48.57S; 27.43.07E) lay approximately 600 m east of the Motloutse. The layout consisted of a central stock enclosure surrounded by a rough arc of stone granary foundations on the slightly raised eastern side (Fig. 13). Preliminary Phase II work included mapping all surface indications and excavating two test pits. Furthermore, Phase II investigators recorded a total of 39 granary foundations. In both size and number these exceeded most other sites in the Letsibogo basin. While this evidence points to abundant harvests, such as would be expected at the time, the apparent isolation of the site required explanation.

A Phase II test pit in the stock enclosure indicated that it was at least 35 cm thick. There seemed to be some doubt, however, concerning the formation processes involved in this accumulation. The Phase II report suggested that particulate material resembling comminuted dung was in fact fine calcrete. A horizon of what appeared to be nodular calcrete lying beneath the dung deposit was thought to have resulted from the downward percolation of cattle urine.

Team 1 designed the Phase III investigation to clarify the stratigraphy and to better understand the formation processes involved in the accumulation of the livestock enclosure and other components of the deposit.

Description

Site 125 lay on the south side of a narrow tributary stream with high, thickly wooded banks. This strip of riparian bush was continuous with the denser, broader band of forest flanking the Motloutse itself. At the confluence of these two watercourses an outcrop of metaquartzites formed a natural weir running almost perpendicular to the Motloutse. As a result, large quantities of impounded water lay close to the surface, protected from evaporation by the overlying alluvial sand.

An outcrop of gneiss and calc silicate dominated the landscape west of the site (Fig.14). A few small shafts on the hilltop appear to have been mines (Site 90 in the Phase II report). Mineralisation was not obvious, however, and their dating context is entirely unknown. Nevertheless, they are worth noting because their existence influenced initial hypotheses about Site 125.

Several erosion gullies originated from this outcrop. From the outcrop towards the site, the ground surface was densely covered in stony rubble and incised by complex braided channels indicating advanced sheet erosion of an already skeletonized soil. This was in contrast to a slight doming of the surface towards the site which showed little sign of erosion: there were no incised channels; the archaeological features were relatively intact; and the soil surface showed some organic content in comparison to the leached and highly compacted surface of the surrounding soil.

Westward for about 60 m the soil shows progressively more severe sheet erosion and incision of braided drainage channels. The ground sloped gently at about 1:10 towards a shallow but well developed erosion gully. Evidently, the gully was quite mature because it had a rounded profile and supported a fringe of well-established trees and bushes. A horizon of nodular calcrete was exposed in the bank of the gully at 30 cm. About 50 m further to the west lay the narrow tributary stream. This major erosion feature had developed on a geological fault. Its banks were 4 to 5 m and almost vertical, indicating active erosion. This erosion had exposed a horizon of nodular calcrete at 2 m.

Considering the evidence of soil erosion in the immediate vicinity, it would appear that the survival of archaeological remains was mainly due to location and chance.

Method

Team 1 excavated a series of eight staggered 3 x 1m trenches in a transect across the site (Fig. 13). The first, easternmost trench was expanded to cover 4 x 3 m, while a 1 x 1 m test pit was excavated at the western end. Several more trench sets were excavated in parallel to these, and a further set ran at right angles to the transect on the western side. In addition, the team clarified the outlines of a few features.

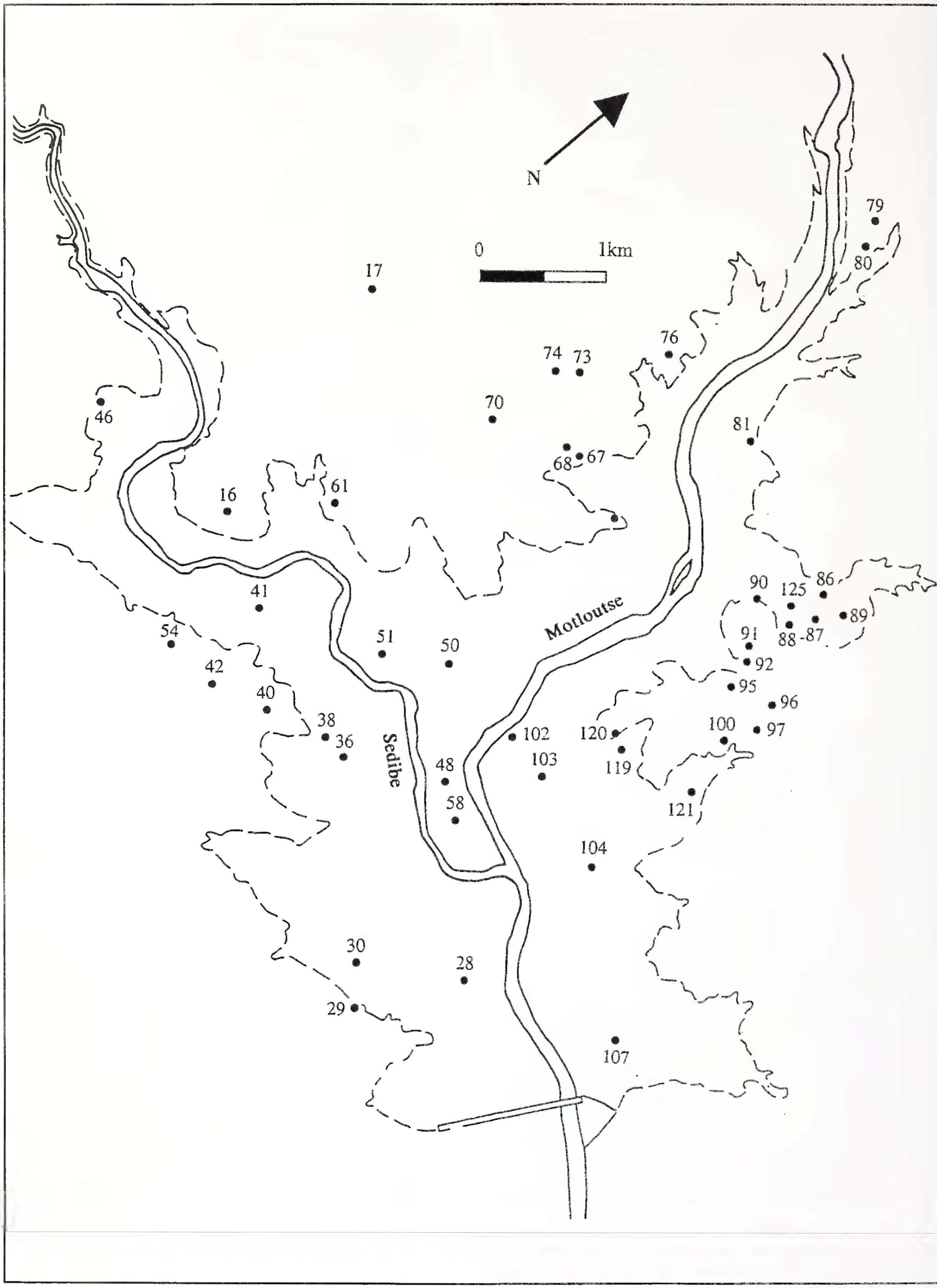


Fig. 12. Khami sites recorded in the project area. Note that Site 4 and 110 were later reassigned to Letsibogo Moloko.

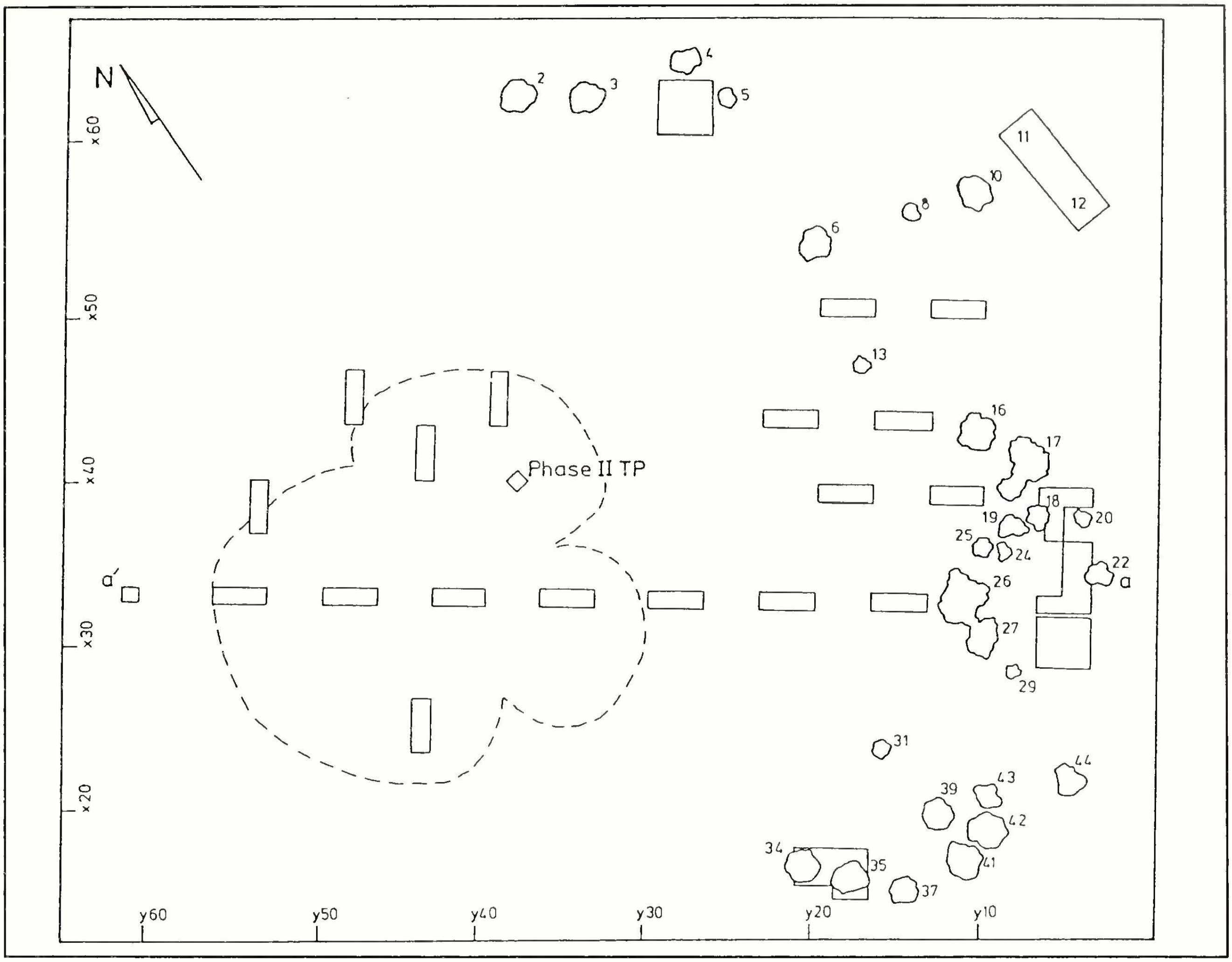


Fig. 13. Site 125, map: broken line marks kraal.

Stratigraphy

In Trench y30x34 the upper 5 cm, or Oi/Ec horizon (layer 1), graded almost imperceptibly into a brown (7.5 YR 5/3) coarse ashy sand (layer 2) with a slight reaction in 5% HCL. This material constituted an Ad horizon, with a consistent admixture of ashed plant material and comminuted dung, indicating a livestock enclosure (Fig. 15). At its easternmost extension in this trench the dung horizon overlay a primary layer of the sandy loam Ax horizon (layer 3) that in turn overlay a Bcn horizon of nodular calcrete at 80 cm (layer 4). This Bcn horizon was almost certainly continuous with the nodular calcrete found in the Phase II test pit and in the erosion gully.

Excavations in Trenches y42x34, y48x34 and y54x34 showed a steady decrease in the thickness of the Ec horizon (layer 1) and confirmed that it was dispersed from the slightly higher eastern end by sheet erosion. No rills were visible on the surface of this horizon. The Ec horizon overlay the Ad or dung horizon (layer 2), the lower limits of which varied between 30 cm and 50 cm, thus repeating the observations from the Phase II test pit.

Although the dung layer was not rich in artefact material, small quantities of bone and pottery appeared in all trenches. Bone from this layer showed a degree of rounding and abrasion consistent with trampling in a coarse matrix. The test pit at y61x34 revealed an undisturbed continuation of the Ax horizon, resting on nodular calcrete, and thus established the spatial limits of the dung layer.

Trench y9x34 was situated among stone granary foundations at the eastern end of the site. The upper 5 cm, comprising an Oi horizon (layer 1), was a strong brown (7.5 YR 4/6) loose sandy soil with some partly decomposed organic material. The soil colour remained the same beneath the surface, grading into a hard sandy loam Ax horizon (layer 3) rich in archaeological remains, but undisturbed beneath 12 cm. Thus Trench y9x34 had only two layers.

These basic soil conditions also characterized Trenches y18x34 and y24x34, with some variation in colour (7.5 YR 4/4 - 4/6) and texture, indicating a slightly skeletonized clayey sand, or Ec horizon (layer 1). The depth of soil containing archaeological remains (layer 3) increased to 30 cm, but the abundance of material decreased steadily over the 15 m covered by these three trenches.

The basic stratigraphic profile of the site (Fig. 15) was thus a superficial Oi horizon grading down slope into a

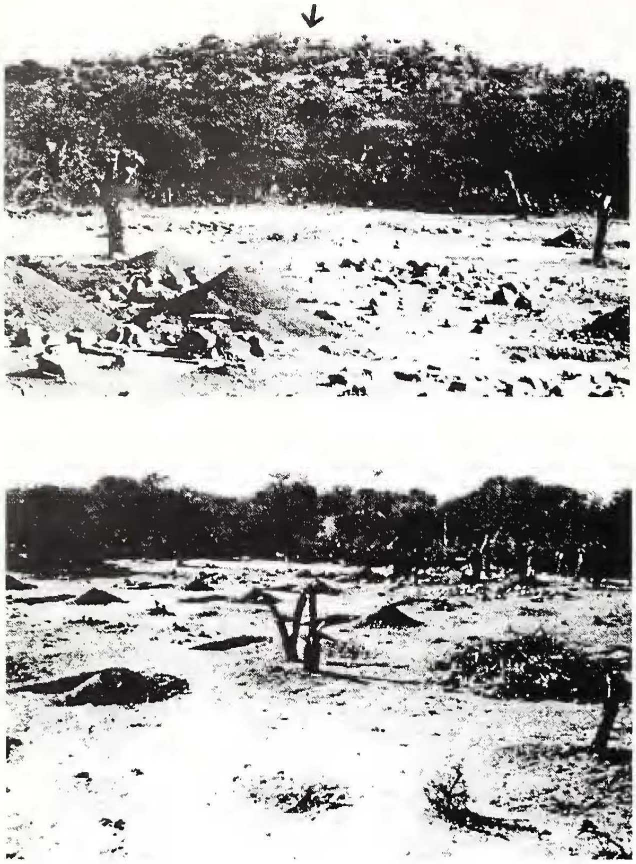


Fig. 14. Site 125, excavations in progress. Note approximate location of mine shaft (above) and kraal deposit (below in foreground).

slightly skeletonized Ec horizon (layer 1). This in turn tapered out at the lower end of the site where the surface material belonged to the Ax horizon (layer 3) which elsewhere underlay the Oi and Ec horizons. The stock enclosure deposit formed a discrete Ad horizon (layer 2) on top of the sandy loam. Underlying the Ax horizon (layer 3) throughout the site was the nodular calcrete Bcn horizon (layer 4).

Granary Area

The Phase II report described the 39 granaries. Charcoal from the new excavation has been radiocarbon dated to a.d. 1430 ± 40 (Pta-7774), which calibrates to AD 1420 to 1445. We return to the significance of this result in the preliminary discussion of the excavations.

The team also investigated two small arcs of upright stones (Fig. 16) in the granary area. In the Phase II report these arcs were considered as whimsical structures perhaps built by children. The excavations did not confirm this interpretation, but raised instead the possibility of furnaces. Although slag, ore or other evidence of metallurgy was not found in direct association, such evidence occurs on site. The ore suggests the villagers smelted copper here. The small amount of debris suggests these two features were secondary furnaces. Because these two features were similar in size, they may represent the optimum dimensions for use with a single bellows.

Hut Area

In terms of the normal spatial pattern associated with Late Iron Age sites, the granaries were positioned behind

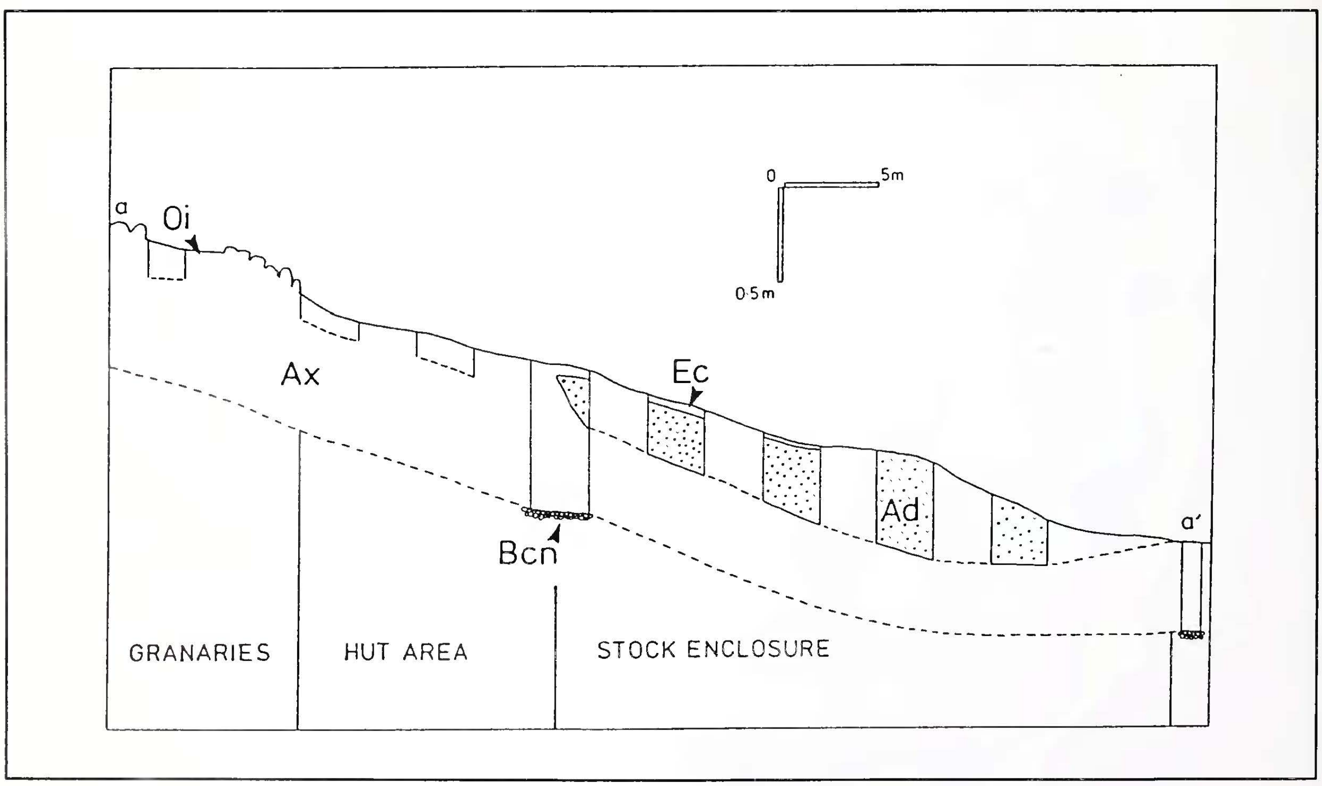


Fig. 15. Site 125, stratigraphic profile. Note reversed orientation compared to site plan.

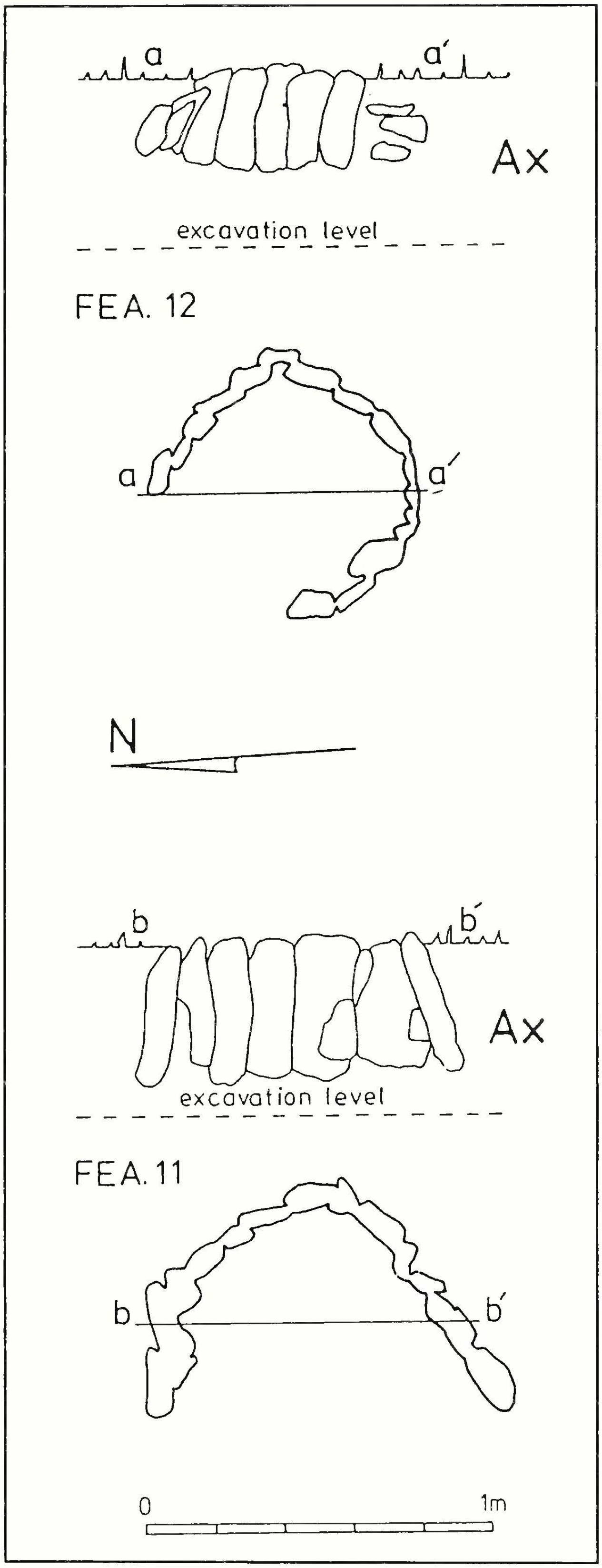


Fig. 16. Site 125, plan and profiles of Features 11 and 12.

the huts. On this site, however, the trench transect revealed no direct evidence of huts.To confirm these expected spatial relations, it was necessary to consider some additional lines of evidence.

Cumulative percentage frequency graphs present a granulometric analysis of five soil samples: three from the site and two comparative samples (Fig. 17).

A	offsite, 50 m east	0.4268	1.8833
B	suspected hut area	0.4718	2.1709
C	above stock encl.	0.1453	1.7852
D	stock enclosure	0.5094	2.5663
E	comparative daga	-0.4716	1.7066

Sample A differs markedly in its profile from Sample B, collected in the hypothetical hut area midway between the granaries and the stock enclosure. Sample C from the upslope limit of the stock enclosure and D from the centre of the stock enclosure both resemble the offsite sample (A) rather than the sample from the hypothetical hut area (B). There is, however, a close match between Sample B and Sample E, derived from a supply of fresh daga prepared by a local villager. Thus, while the hypothetical hut area yielded no conventional evidence of hut construction, the granulometric characteristics of the soil suggest that it probably consisted of desegregated daga from collapsed huts.

The distribution data further supports this interpretation. The only negatively skewed sample (E) reflects the presence of a fine fraction, including clay particles, such as would be desirable for building purposes. According to local practice, termite hills are the best source for making daga. The more positive skewing of the other samples probably reflects the loss of the fine fraction through sheet wash. In this regard it is noteworthy that Sample C shows the greatest negative skewness, from immediately down slope of the hypothetical hut area.

Kraal Area

The stock enclosure had a lobate rather than circular shape, suggesting to Phase II investigators that animals were kept in segregated compartments. Among the most likely reasons for such subdivisions is the separation of calves from lactating cows, and/or the separation of cattle from small stock. However, there were no traces of the enclosure fence, its entrance, or postholes. To clarify their function, the three lobes were sampled for spherulites.

The sediment sample from the largest, down slope lobe of the stock enclosure contained some phytoliths but no spherulites. Sediment samples from the remaining two lobes also contained some phytoliths, but the northern lobe (where the Phase II test pit was excavated) contained some spherulites. Since there were only a few, the possibility cannot be eliminated that cattle were kept there.

Soil Analyses

Soil nutrient measurements provide further data to support the spatial interpretation and to clarify the formation processes at the site.

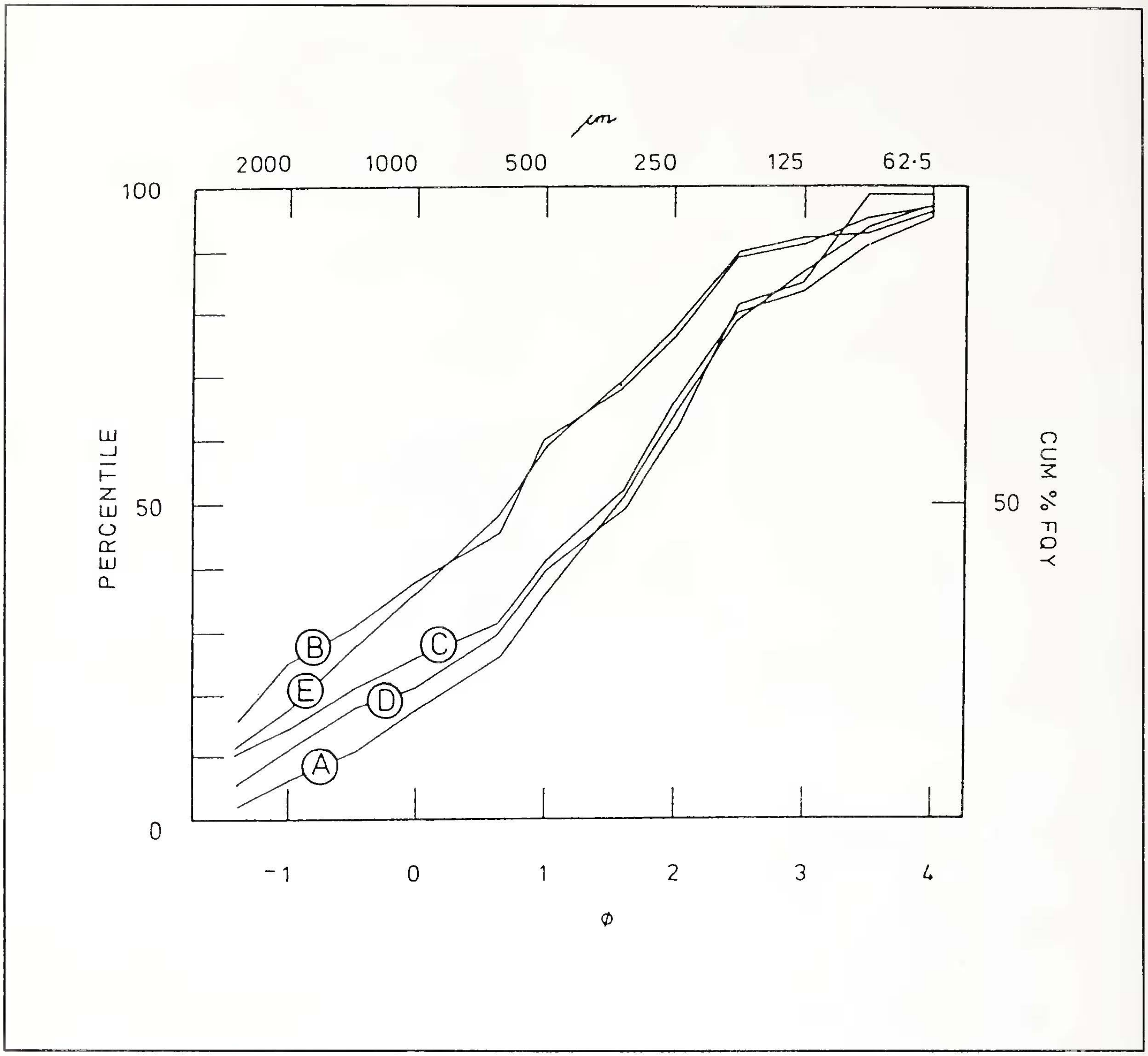


Fig. 17. Site 125, granulometric analyses: Samples A = sand from off site; Sample B = hut area; Sample C = between huts and kraal; Sample D = kraal; Sample E = daga plaster.

Sample point	PO_4 mg/l	NO_2 mg/l	NO_3 mg/l
y42x43	65	0.8	6.0
y45x57	4	0.7	11.0
y18x44	1	1.6	3.0
y45x41	69	1.0	7.0
y45x47	58	2.0	5.0
y22x20	45	1.5	12.0
y24x34	31	0.7	16.0
y36x34	70	0.8	7.0
y18x34	21	1.2	17.0
y61x34	13	1.2	12.0
y54x34	93	0.9	12.0
y9x34	12	1.1	13.0
y48x34	84	1.0	8.0
y30x34	79	0.7	7.0
offsite	5	0.8	5.0

Figure 18 presents the soil nutrient measurements for the trench transect line. The background orthophosphate PO_4 level is almost 20x lower than the level for the stock enclosure. This anomaly is also clearly limited, and it is therefore possible to define the limits of the enclosure on this basis alone. This anomaly is probably the result of a kraal fence. Orthophosphate levels up to 6x background up slope of the stock enclosure probably results from a number of factors, including the spillage of dung beyond the fence, as well as the use of cattle dung as a binding agent in daga, and the decomposition or burning of roofing thatch.

Furthermore, the distribution of soil nitrogen (NO_2 and NO_3) values contrast with the distribution of the orthophosphate. Whereas the stock enclosure is marked by a definite PO_4 anomaly, soil nitrogen levels within the same area are only slightly above background. Up slope however,

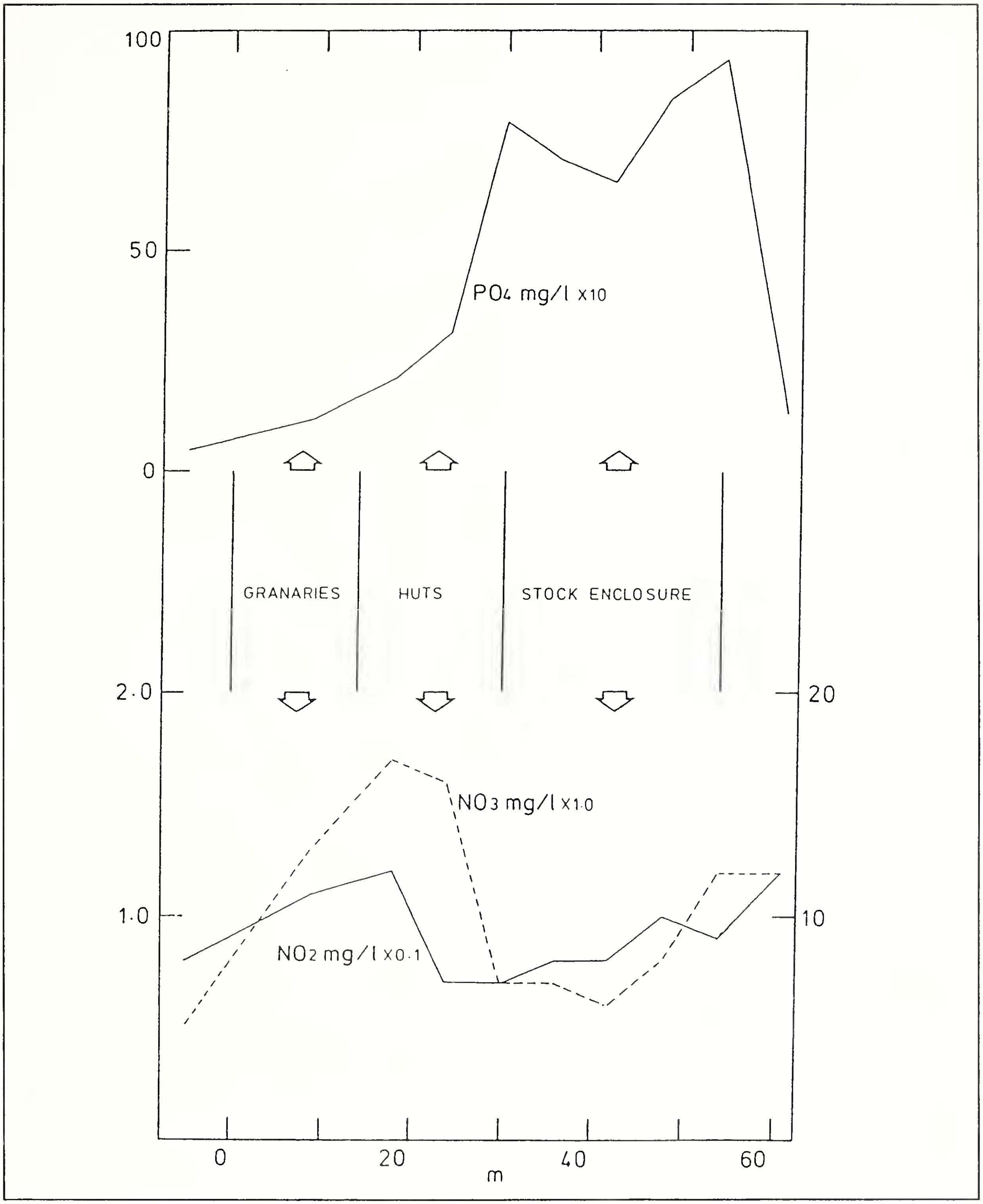
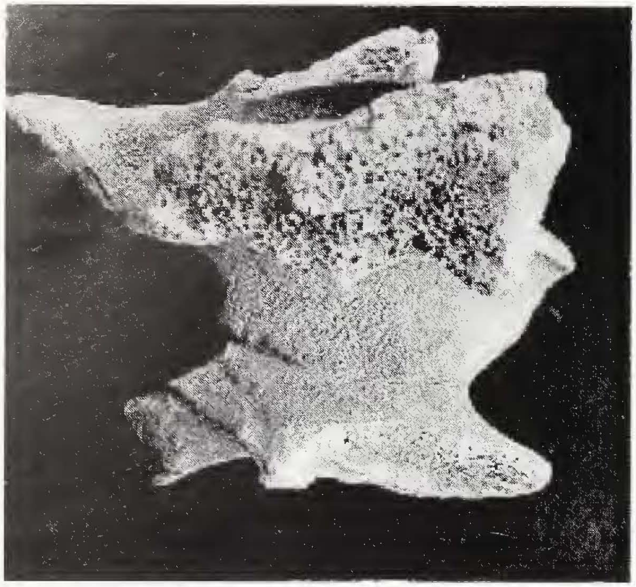


Fig. 18. Site 125, soil nutrient analyses from sample transect.

particularly in the suspected hut area, soil nitrogen levels are up to 5x the background. The soil nitrogen levels drop suddenly at the down slope limit of the hut area, although they increase once more at the down slope limit of the stock enclosure.

The high soil nitrogen levels in the hut area probably reflect the concentration of wood and thatch in the huts, as well as cooking fires.Thus, while the stock enclosure orthophosphate anomaly reflects the concentration of nutrients consumed from outside the settlement, the soil nitrogen



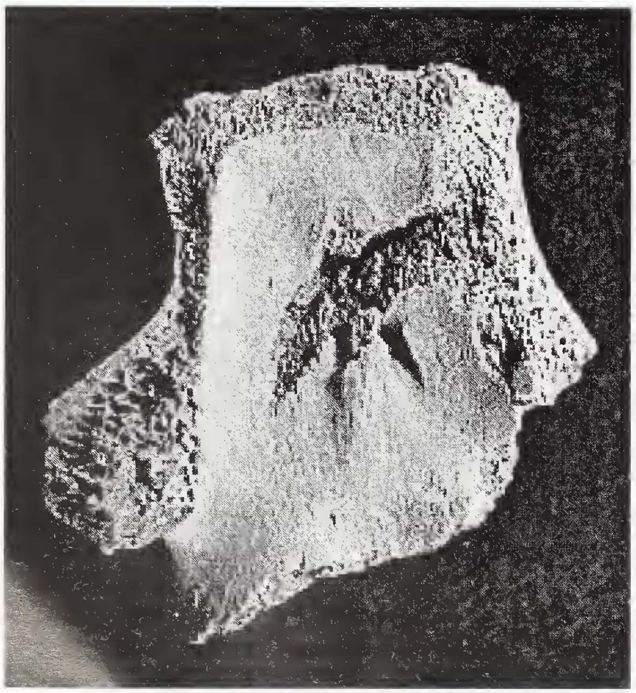


Figure 19A. Site 125, cattle vertebra showing axe marks.

anomalies reflect the concentration of plant material used inside.

On the basis of the evidence presented so far, the site can be divided into three basic spatial components: the the granary area (A), with 45m^2 of excavation[1]; the hut area (B), with 27m^2 of excavation[1]; and the stock enclosure (C), with 25m^2 of excavation[1]. These three spatial components form the contexts for the following descriptions.

Finds

Bone

Small quantities of fragmented animal bone came from all excavation trenches, with most from the granary area (A), followed by the stock enclosure (C) and then hut area (B). A total of 111 identifiable diagnostic bones came from four of the five trenches in the granary area, as well as five of the nine in the stock enclosure and three of the ten in the hut area. Table 2 presents the species list based on both NISP (number of identifiable specimens per taxon) and MNI (minimum number of individuals per taxon).

Table 2. Faunal taxa from Site 125, Areas A-C (NISP/MNI).

Taxa	A	B	C	Totals
Reptilia				
unid. Snake		1/1		1/1
tortoise cf. *Geochelone*			2/1	2/1
Aves				
unid. gamebird		1/1		
Mammalia				
unid. rodent	1/1			1/1
hare cf. *Lepus*		5/1		5/1
Procavia capensis	6/2	2/1		8/3
unid. Bovid size class I	1/1		1/1	2/2
Ovis aries/Capra hirca	3/2	2/1	3/1	8/4
Bos taurus	9/1	2/1	2/1	13/3
unid. Bovid size class IV	38/1	3/1	18/1	59/3

There was some exploitation of game animals, including tortoise, hare, hyrax, small antelope, and gamebirds. These hunted animals were all small species that were probably brought to the site intact. The consistently higher NISP values for the domestic bovids indicate that these animals were also probably butchered on site. Local butchery ensured the survival of the numerous bones lacking marrow (*e.g.,* carpals, tarsals, phalanges). In the case of bovids, species identifications were based on cranial material. Despite the small range of taxa, post-cranial elements were identified only as far as size classes. The likely presence of impala that could be confused with domestic sheep/goat requires such cautious identification. Certain skeletal elements (*e.g.,* calcaneus, metatarsus), however, are sufficiently different in size to be reliably diagnostic. In the case of the class IV material, it is similarly possible to confuse domestic cattle and buffalo. Table 3 lists specific identifications and shows that cattle were the main source of meat, with fairly heavy reliance on sheep/goat as well.

Most bone was recovered from the granary area (A). The representation of cattle was disproportionately high there, not in terms of MNI, but of NISP, thus indicating that the granary area was the primary locus of discard. The bone most probably came from the hut area where the meat was consumed. Significantly, a large proportion of the cattle bone clustered in one particular group of granaries at the highest point of the site.

The domestic animal bones provide some indication of butchery practices, not only in the distribution of skeletal elements, but through cut marks. Figures 19a & b show axe scars beneath the neural arch of the cervical vertebra, and most importantly, scars in the epiphyseal region of the

Table 3. Distribution of faunal skeletal elements, Site 125, Areas A-C.

	A	B	C
Ovis aries/Capra hircus	P_1, P_2, RM_1 P_1, P_2, P_3, RM_1 M^1	M^3dp, M^1, M^2 M frags.	M_1 (worn), M_2, M_3 M^3 P^3, P^4, M^1, M^2, M^3 (erupting)
	distal humerus	tibia, distal (breadth of epiphysis cf. *Aepyceros*)	tibia, distal
	proximal radius-ulna 1st phalange (length cf. *Aepyceros*) 2nd phalange, 2	3rd phalange, 1	astragalus (length cf. *Aepyceros*)
Bos taurus	P_2, M_1, M_2, M_3 M_1	M_1, M_2 M frags.	P_2dp, P_3, P_4, M_1dp, M_2dp, M_3dp M^3 (root?)
	P_3, M_1, M_2 P^3, P^4, M^1, M^2, M^3 P^3, P^4, M^1, M^2 P^3, P^4		
unidentified class IV	cranial fragments scapula, chopmarks pelvis, chopmarks femur, proximal femur, distal epiphysis radius-ulna, distal, 2 radius-ulna, proximal, 2 radius-ulna, proximal and medial tibia, distal 1st phalange, 4 2nd phalange, 5 3rd (terminal) phalange, 2 metacarpal, entire metacarpal, distal epiphysis carpals and tarsals: unciform, 2; scaphoid, 1; lunar, 3; navicular cuboid, 1 atlas vertebra cervical vertebra, chopmarks rib, mid-thoracic, proximal	scapula (chopmarks and tooth damage cf. dog) carpal/tarsal: navicular cuboid lumbar vertebra, neural arch/spine	cranial fragments occipital supraorbital arch scapula femur, distal radius, distal metapodial, proximal metapodial, entire metacarpal, proximal, 2 metacarpal, distal, chopmarks astragalus, chopmarks carpals and tarsals: navicular cuboid 2nd phalange 3rd (terminal) phalange, 3 thoracic vertebra, chopmarks lumbar vertebra

L=left, R=right, P=premolar, M=molar ^{x}=upper, ^{1}=upper

metatarsus. The butchery process thus reduced the faunal assemblage in two stages: by the disarticulation of the carcase, and by splitting long bones for the extraction of marrow.

The bone assemblage was also subject to several post-depositional processes that further reduced the quantity of material available for study. These processes favoured the more robust bones and particularly those without significant marrow. In addition some specimens bear superficial puncture marks that are consistent with canine incisors. Domestic dogs would not only reduce the assemblage by mechanical destruction but also by removing bones from

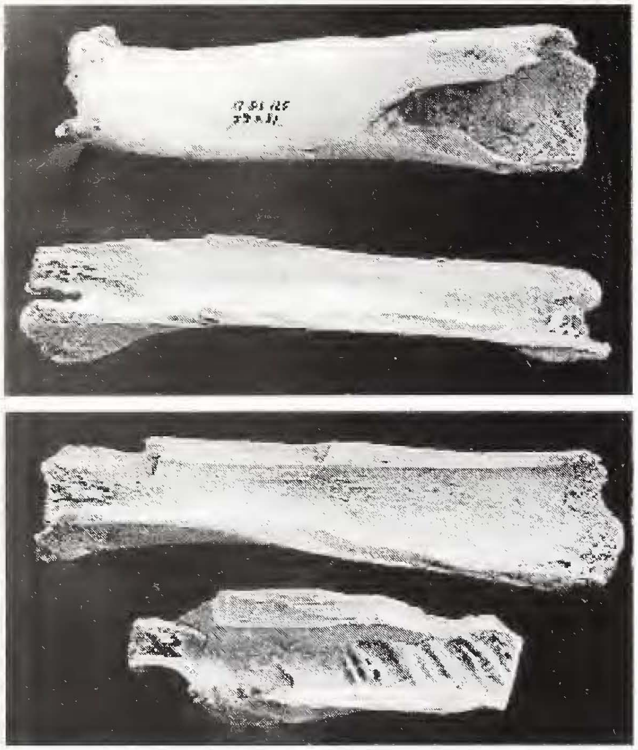


Fig. 19B. Site 125, cattle bones showing longitudinal splitting, spiral fracture and epiphyses removed.

the site. The same bone specimen also shows intricate surface etching from rootlets, indicative of a mildly acid soil. Although probably not sufficient to affect the overall character of the assemblage, there was a slight difference in soil pH, with the stock enclosure more alkaline than the granary and hut areas. Consequently, rootlet etching did not occur on the stock enclosure bones. Only a few specimens bear marks of rodent gnawing.

Metal Working

Tuyere end fragments, with some traces of surface glaze, as well as crucible fragments and what appears to be a small mortar came from the granary area. A small fragment of malachite ore was also found there. Slag, however, was scarce, and the only large piece was found at the down slope end of the stock enclosure. These objects were most likely associated with the two small furnaces.

Ceramics

Over 46 kg of pottery sherds were recovered, representing approximately 70 vessels. Most of the pottery was heavily fragmented, and little reconstruction was possible. The assemblage contains a preponderance of tapered rims, with some slightly flared or everted forms, as well as some examples of rim thickening (Figs 20 & 21). Semi-squared profiles also occur, and these appear to belong to exceptionally thick vessel bodies. Some vessels are jars with a clearly defined groove on the neck profile tends to be more strongly concave. Other rim profiles clearly belong to deep bowls. A total of 52 vessels could be assigned with reasonable confidence to specific shape categories (Table 4).

Table 4. Vessel shape distribution for Site 125, Areas A-C.

	A	B	C	D	E
vessel shape					
high-necked jar	21	1	1	23	44
globular pot	12	4	0	16	31
large storage pot	3	0	0	3	5.7
bowl	3	1	0	4	7.6
undetermined	6	0	0	6	11
totals	45	6	1	52	

The overall frequency of vessel shapes is biassed in favour of the most utilitarian classes, including jars for beer drinking and globular pots for cooking. The large vessels used for storing water would have been few in number and seldom moved, hence their relative scarcity in the assemblage. On the basis of vessel shape and the limited decoration, this assemblage belongs to Khami, rather than Leopard's Kopje as proposed in the Phase II report.

The vessel numbers clearly decrease from the granary area (A) through the hut area (B) to the stock enclosure (C). Because the team excavated fairly similar amounts of each spatial area, the bias is not due to sampling. It would appear that broken pottery, as well as other debris was discarded beneath the granaries. Phase II excavations supports this observation.

Several other artefacts show the same biassed distribution as the pottery. Spindle whorls, averaging 5 cm in diameter,indicate that cotton was spun here. Of the six examples found, five were from the granary area and one from the hut area.

Preliminary Discussion

A range of considerations, including access to reliable water supplies and arable soil, apparently determined the physical positioning of Site 125. Other advantages probably included wood for fuel and building timber, as well as ready access to suitable grazing. The near proximity of ancient workings would have also been a consideration.

The previous dating of the site supported the view that this was an isolated Leopard's Kopje settlement. However, our larger pottery sample shows that the assemblage belongs to the Zimbabwe/Khami cluster, and this is supported by the new 15th century radiocarbon date. Evidently, the older date is not associated with the site.

Apart from the new date and ceramic affinity, the orientation and layout of the major spatial components are significant, for they conform to the Central Cattle Pattern. The semi-concentric layout was based on the central position of the stock enclosure with an up slope arc of huts having a westward, down slope orientation. Behind the huts was an outer arc of granaries.

Our examination also provides some additional insights into the archaeological characteristics of this pattern at Site 125. For example, the visual identification of the stock enclosure was supported by high orthophosphate concentrations, and by the presence of plant phytoliths. The faunal

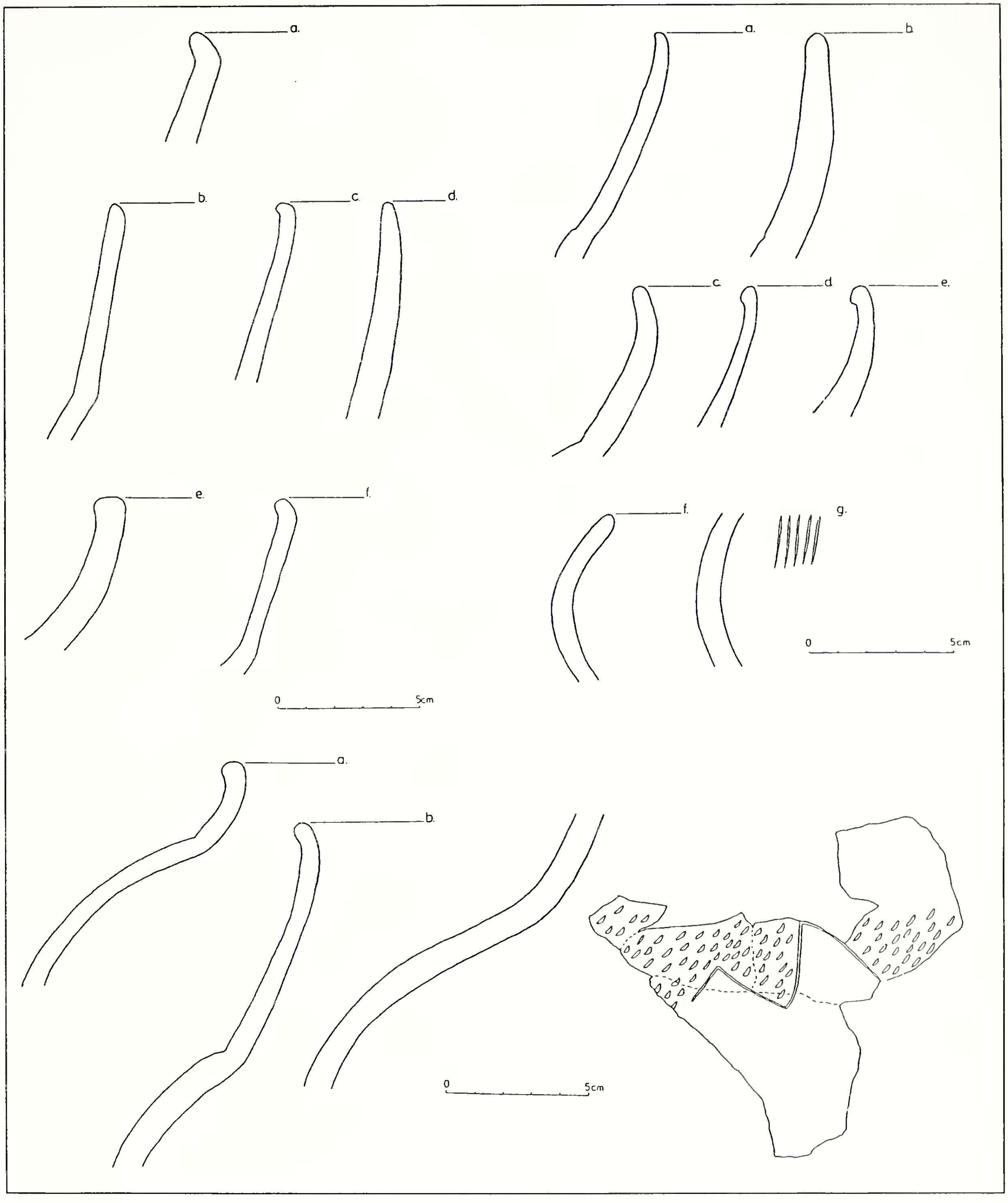


Fig. 20. Site 125, pottery: upper left from Trench y5x35, upper and lower right from y9x31, and lower left from y9x34.

evidence confirmed that both cattle and sheep/goats were kept in the settlement.

Furthermore, there was no visible evidence of huts. This situation was probably due to such factors as regular sweeping during the occupation of the settlement, the gradual removal of small mobile items by sheet wash and the lack of burning. Instead of burning, the huts disintegrated to form an anthropogenic soil horizon. This investigation shows that the position of huts can be confirmed by granulometric characteristics of the soil, as well as by soil nitrogen anomalies.

The distribution of artefacts and faunal remains cast

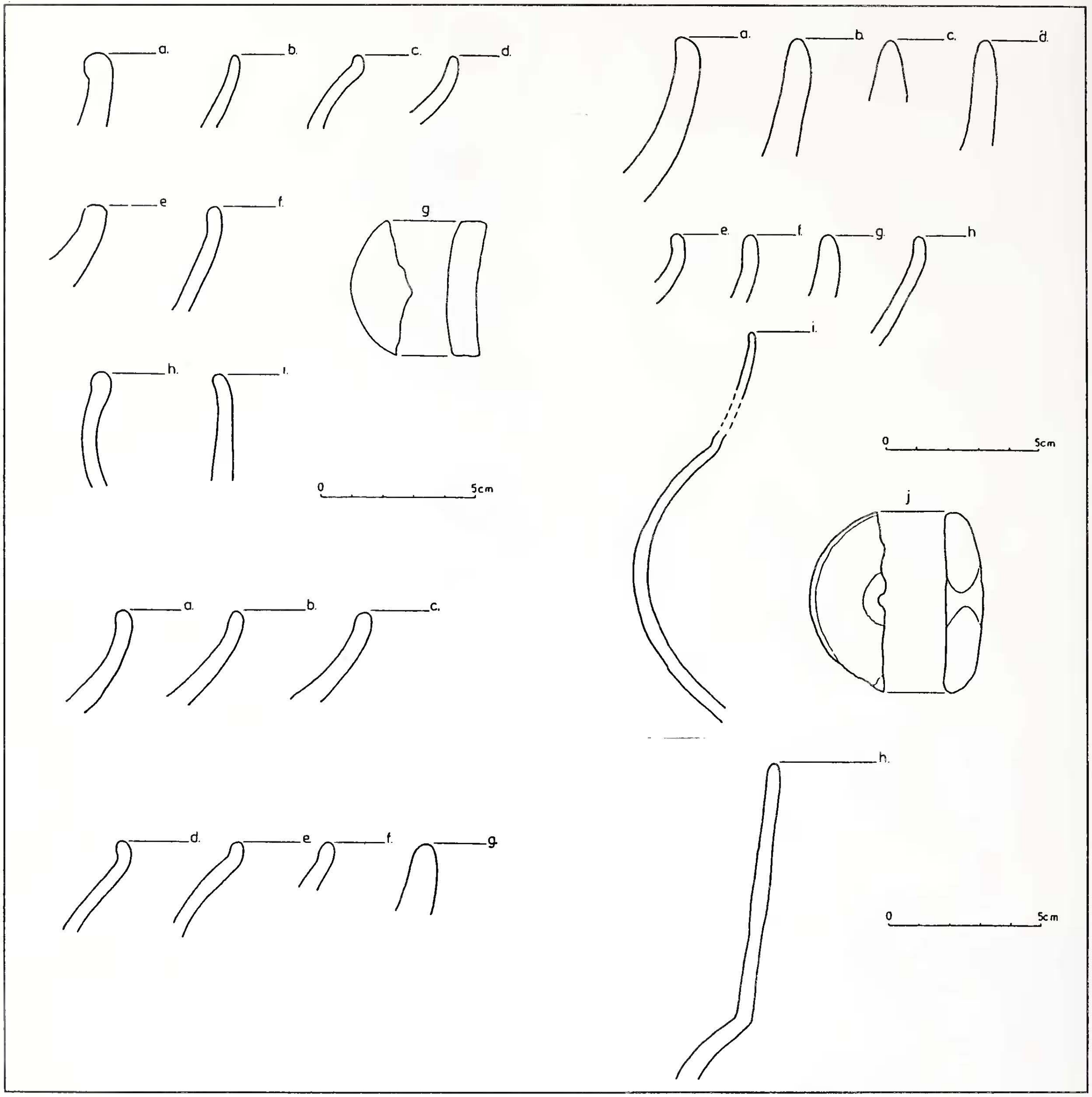


Fig. 21. Site 125, pottery: upper left various, upper right from y9x40 and lower left from y22x20.

further light on settlement organization. Pottery was heavily concentrated in the granary area, confirming that refuse from the hut area was deposited at the back of the site. The refuse accumulated around separate granaries, rather than in a communal midden. Despite the limited excavations, it is clear that the largest concentration lay at the highest point of the site in the middle of the granary arc; the only two decorated vessels came from this same area; most of the spindle whorls also occurred here; as were most of the evidence for metallurgy and most cattle bones. This uneven distribution of material probably reflects status differences among the inhabitants. More specifically, this was probably the refuse area for the homestead head

Now that we know Site 25 belongs in the Khami period, it can be meaningfully compared with other commoner sites. We now turn to Site 86.

SITE 86 (17DC86)

The remains of a highly eroded homestead (21.48.31S; 27.43.05E) lay on a narrow strip of land between two small tributaries about 300 m north of Site 125. Previous mitigation (Van Waarden) included the excavation of a shallow midden that produced a radiocarbon date of AD 1400 ± 70 (Beta 80983). Further mitigation included recording some granary platforms, stone by stone, and more general mapping of the main features, including granary bases, middens and a possible cattle kraal.

It was the task of Team 2 to finish the mapping (Fig. 22),

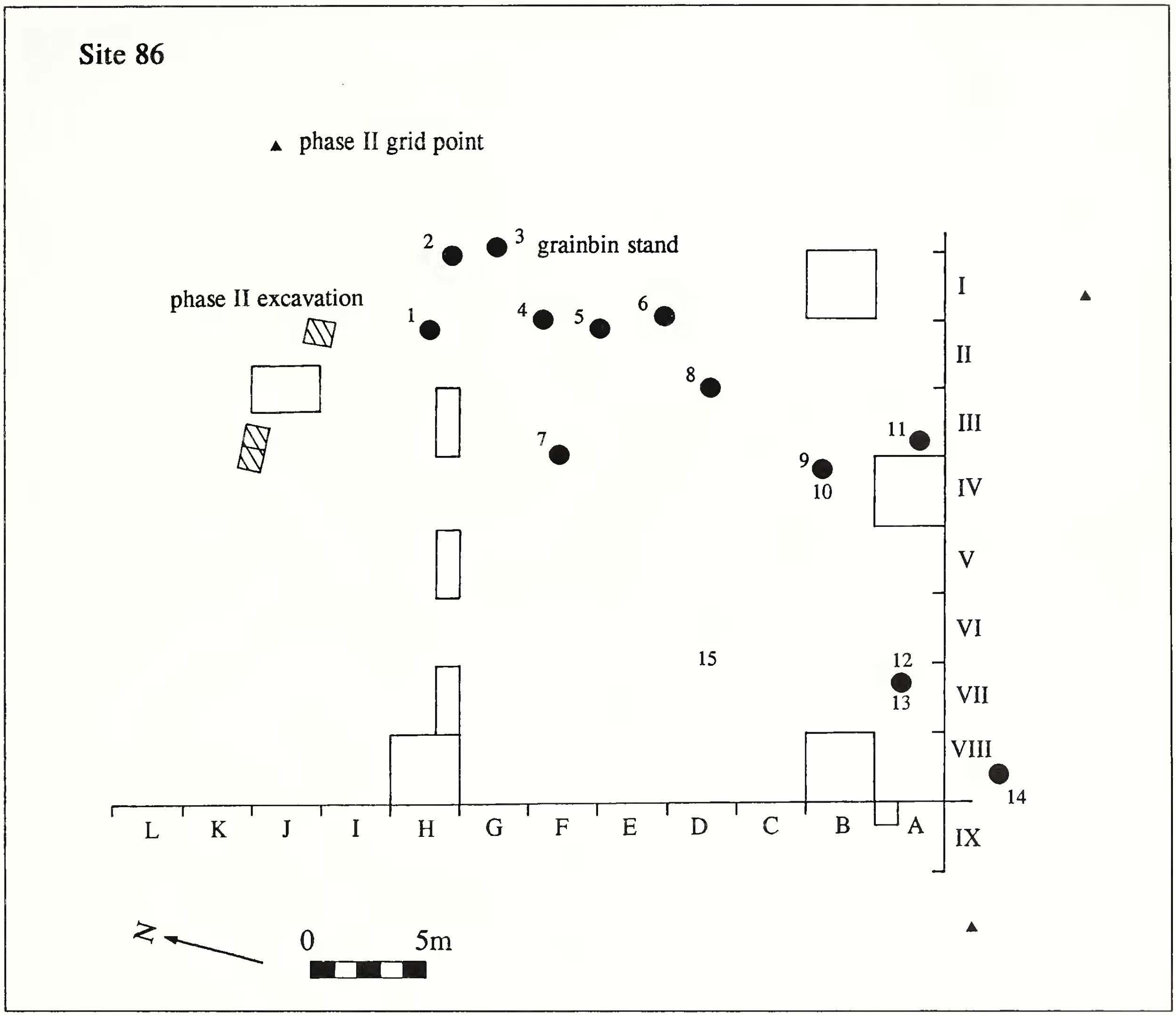


Fig. 22. Site 86, map.

test the possible cattle kraal, excavate where appropriate to acquire a ceramic reference collection and to examine the possibility of Khami interaction with Moloko. Investigations began on July 26 and lasted five days. University of Botswana students helped at this site.

Method

The team relocated the granary bases and other stone features originally recorded by Van Waarden (Fig. 23). Her numbering system was still intact, and it was continued. Students mapped the remaining features (5 to 15), stone by stone (Figs 24 & 25). A datum line went past features 13, 12 and 11, establishing a 3 x 3 m grid: Roman numerals divided the east-west line, while the alphabet divided the north-south line. Figure 22 shows the relationship between the two systems.

Middens

The team excavated a few 3 x 3 m squares in midden deposit behind the granary bases near feature 11 (I/B), feature 9 (IV/A), and near feature 13 (VIII/B). Another 2 x 3 m excavation (II and III/J) explored Van Waarden's dated midden. Because of the heavy erosion, most artefacts clustered in the top 1 to 3 cm. As an exception, a complete jar, eroded around the rim (Fig. 26), was buried below the present ground surface in IX/A. The base of another, smaller, jar lay under it. The middens also included bovid teeth and highly fragmented bone.

Possible Kraal Area

Another series of excavations in VIII/H (Fig. 27), VII/H and V/H explored the possible cattle kraal. A collapsed tree had afforded some protection against recent erosion, and so there was a greater depth of soil. The soil itself was softer than elsewhere and reworked by termites. The stratigraphy in this series of excavations was similar:

	VIII/H	VII/H	VI/H
Brownish wash	-	-	0-4
light brownish to pale brown	0-37	0-27	4-25
greyish brown	37-42	-	-

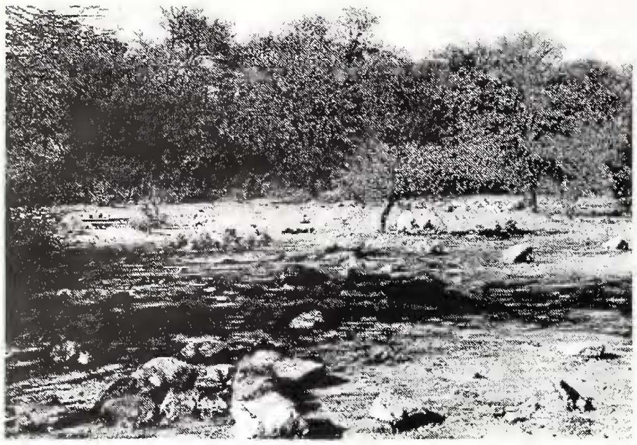


Fig. 23. Site 86, grain bin stands.

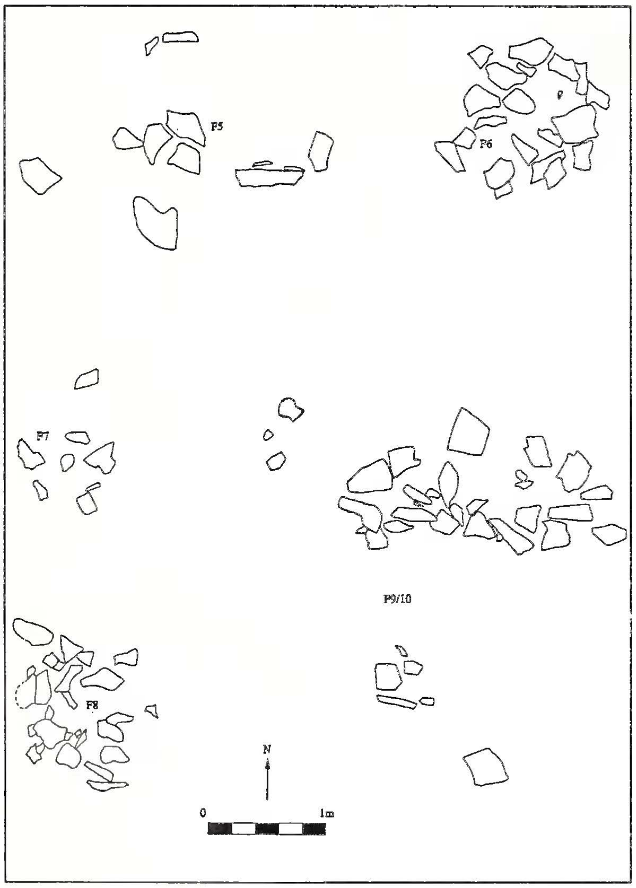


Fig. 24. Site 86, plan of grain bin stands 5 to10.

In most cases bone and other artefacts clustered in the top 10 cm (level 1). In V/H, however, artefacts did not occur below the surface.

Phytolith Analysis

As a datum for comparison, the team took samples from the visible dung in Kinahan's excavations at Site 125, and from below his feature 12. The sample from the central kraal had a high phytolith content. It included 'dumbbells' characteristic of Panicoid grasses, numerous short grass

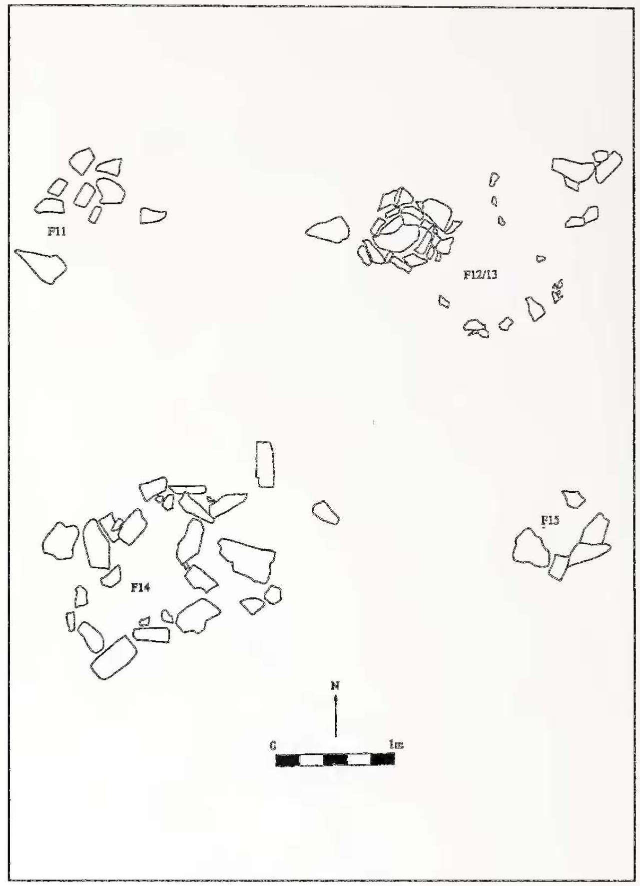


Fig. 25. Site 86, plan of grainbin stands 11 to 15.

hair-tips, Chloridoid types and a wide range of Arundidoid shapes and sizes (Fig. 28 show typical phytoliths in a modern sheep dung sample). The control sample was visibly different. First, the soil contained a greater amount and variety of crystals and crystal fragments of such minerals as feldspar. Secondly, the phytolith count was greatly reduced to a low frequency, and there were few, if any, Panicoid types or short hair tips. Finally, there were some Chloridoid and Arundidoid phytoliths. These data suggest that Chloridoid and Arundidoid phytoliths formed the background spectrum, that is the grasses around the settlement, while the short, grass-hair tips and Panicoid dumbbells characterized the cattle dung in the kraal.

The sample from the soft soil at Site 86 was not the same as either datum. It was more like the control sample except the frequency was higher, at medium, and Chloridoids and Arundidoids were about equal. There were some grass-hair tips, and very few, if any, Panicoids (Table 5).

Thus on the basis of the phytolith analysis, the softer grey soil was not a cattle kraal. It is best interpreted as a termitarium, or a remnant of the original village horizon that had been reworked by termites.

Finds

Bone

Because of severe erosion, bone and teeth were highly fragmented. Cattle dominated the tooth sample. Cattle teeth

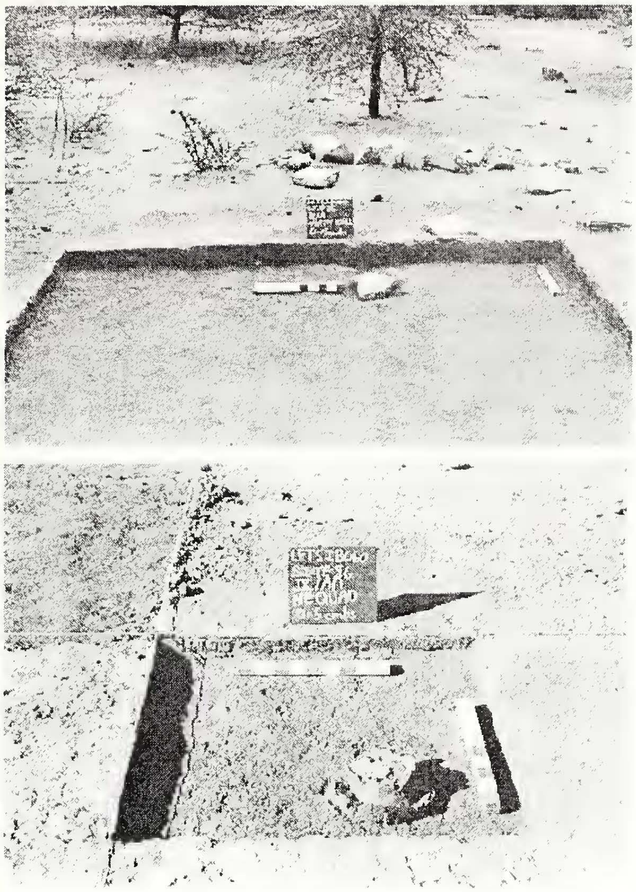


Fig. 26. Site 86: (above) Trench IV/A in shallow midden, Feature 9 in background; (below) buried jar in midden scatter in Trench IX/A.

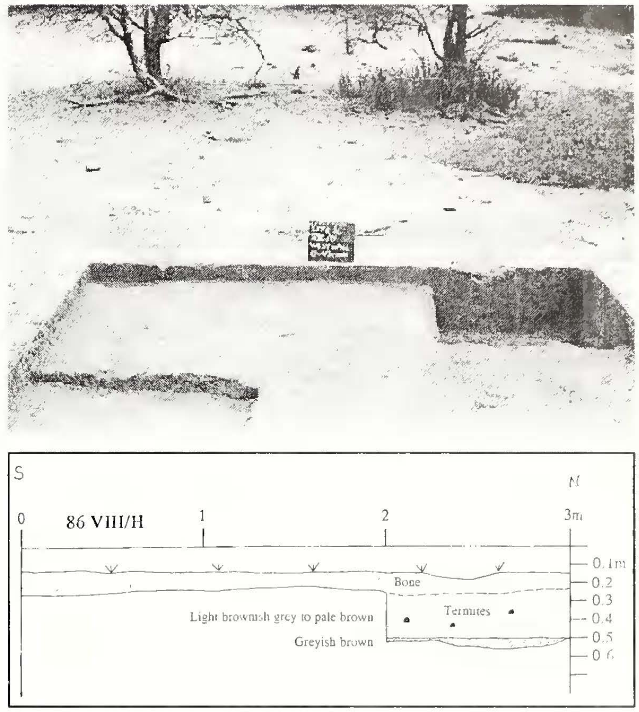


Fig. 27. Site 86: (above) Trench VIII/H in lighter soil area; (below) west section of Trench VIII/H.

Table 5. Phytolith Analysis for Site 86.

	Arundidoid	Chloridoid	Panicoid	Hair Tips	Total
Control Site 125					
F12	some	some	very few	-	low
Central Kraal	many	many	many	many	high
Site 86 VIII/H	several	several	very few	some	medium

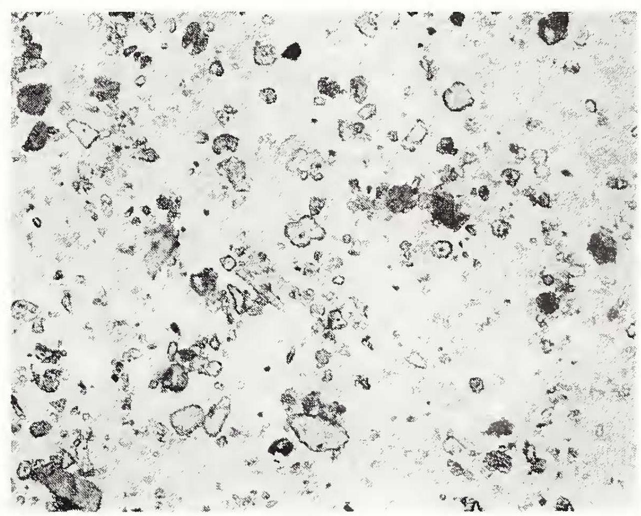


Fig. 28. Range of phytoliths of the central kraal in Sites 125 and 119. The 'dumbell' Panicoid in the centre measures 20 *u*m. Potograph taken at 200x magnification.

occurred in the edge of the termitarium in VII/H and the midden in IV/A. They varied from deciduous to erupting to permanent and show that more than one animal contributed to the sample. The midden also contained deciduous and permanent sheep/goat teeth as well as the remains of dassie, hare and a hartebeest-sized animal (Table 6).

Metal

One piece of slag came from the surface of the midden in I/B. Because of the severe erosion and lack of other pieces, it is unclear whether this piece was *in situ* or had washed in from elsewhere.

Ceramics

The ceramic assemblage was examined first for stylistic types. Because of weathering, it was difficult to distinguish between graphite and a dark burnish. Since the two apparently served the same purpose, they were counted together.There was only one profile in the assemblage and two simple stylistic types: (1) with graphite or dark burnish, and (2) plain:

Table 6. Identification of teeth from Site 86.

Unit	Cow (*Bos taurus*)	sheep/goat (ovicaprine)	Other
VII/H/1	LP_4	LM_3	-
IV/A/1	$RP^{3 \text{ or } 4}$ LP^3, LP^4 RM^1, RM^2, RM^3	RM^1 RM^1 RM^2 LM_2 cf LP_4 dp	dassie hare hartebeest-sized

L=left, R=right
P=premolar, M=molar
^{x}=upper, ^{1}=upper 1^{st}
dp=deciduous

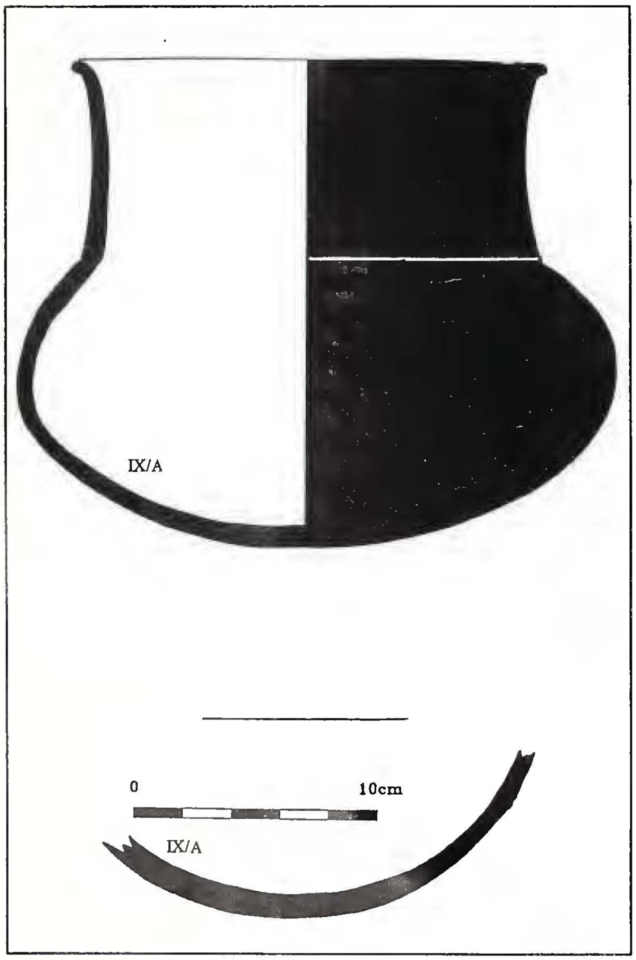


Fig. 29. Site 86, pottery: Type 1 jar and base buried together in Trench IX/A.

Type 1: recurved jar with beaded rim, straight to inward sloping neck, sharp neck/shoulder junction with a single line of incision, bellied body and graphite or dark burnish over the whole surface. The best example was the complete jar from IX/A (Fig. 29).

Type 2: recurved jar with or without beaded rim, straight to inward sloping neck, sharp neck/shoulder junction sometimes with a single line of incision but without the graphite or dark burnish (Fig. 30).

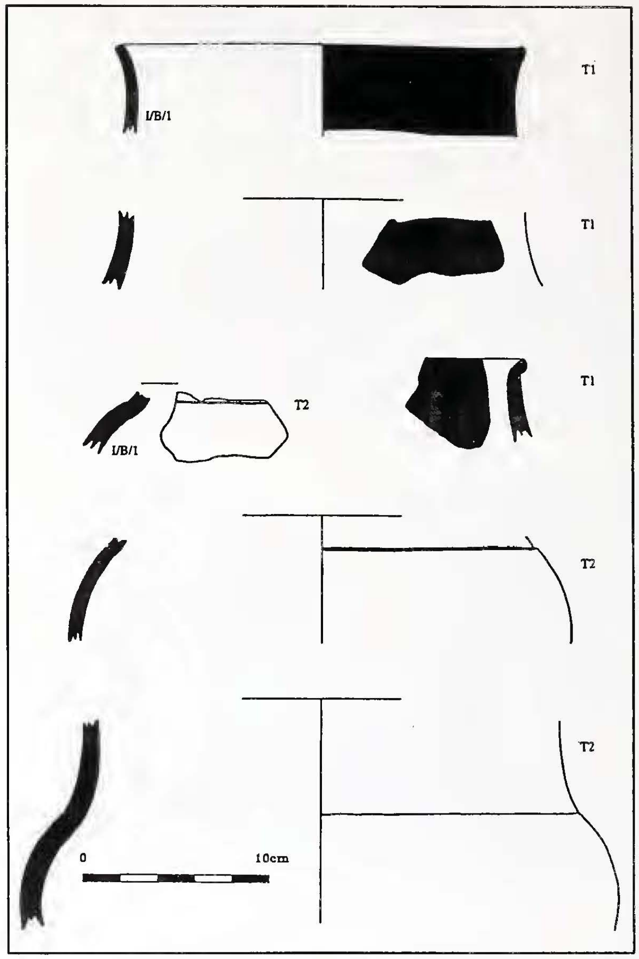


Fig. 30. Site 86, pottery: Type 1 and 2 jars.

Table 7 presents details of their stratigraphic distribution. Specific functions could not be associated with different activity areas because the majority of vessels came from middens. We know from other studies, however, that different sizes of the one shape would have served different purposes.

Preliminary Discussion

Site 86 represents the remains of a small homestead of Shona-speaking commoners. The restricted range of stylistic types is characteristic. But because of this restricted range, it is difficult to place the assemblage specifically into the Khami or Zimbabwe facies.The length of jar necks supports a Khami affinity, and this assemblage is most probably related to the ceramics at Site 125 nearby.

As with Site 125, the granaries at Site 86 mark the back of the settlement and conform to the Central Cattle Pattern.

Table 7. Site 86 Ceramics.

Unit	Level	Total	Decoration (body sherds)	Rims
Surface		326	9 Type 1 fragments 4 Type 2 fragments 27 gb/db	2 Type 1 12 gb/db rims, recurved jars 8 pl rims, recurved jars
I/B	1	465	1 Type 1 fragment 4 Type 2 fragments 53 gb/db	2 Type 1 1 Type 2 8 pl rims, recurved jars
III/H	1	15	1 gb/db	-
IV/A	1	174	7 gb/db	2 Type 1 1 Type 2 2 gb/db rims, recurved jars 1 pl rim, recurved jar
V/H	1	7	-	-
VII/H	1	12	5 gb/db	-
VII/H	2	1	-	-
VIII/B	1	170	2 Type 2 fragments 7 gb/db	4 pl rims, recurved jars 3 gb/db rims, recurved jars
VIII/H	1	42	1 Type 2 fragment 13 gb/db	1 gb/db rim, recurved jar
IX/A NE Corner	1	12 106 (vessel 1) 2 (vessel 2)	- - jar base	- 1 Type 1 (complete) -

gb/db=graphite burnish/dark burnish
pl=plain

These granaries were linked with houses to form a residential zone associated with married women. Despite the erosion, it is clear that household rubbish was dumped behind the houses near the grain bins.

The granaries form an arc that once surrounded the centre of the settlement. Although the lighter soil in Trench VIII is best interpreted as a termitarium, cattle were consumed in the settlement and presumably they had been kraaled somewhere in the centre.

Surface erosion was too severe to justify more specific interpretations. As a consequence, Team 2 moved to the 119 Complex where there was more intact deposit.

Site 119B (17DC119B)

The 119 Complex lies about 1.4 km due north of the Sedibe/Motloutse confluence on flat ground covered by mopane woodland. The Complex includes Sites 119, 119A and 119B (Fig. 31). Because of the problems of pinpointing sites in flat woodland with GPS instruments of varying accuracy, the Phase II team did not relocate Site 119. They concentrated instead on Site 119A. One daga feature was test excavated, yielding Moloko pottery and a bone collagen date of a.d.1840 ± 60 (Beta-80096). Further Phase II mitigation included large-scale mapping of some 40 grain bin stands at 119B, a short distance away. Less than 50 m southeast of 119B stood some wooden posts and dung deposits from a recently abandoned cattle kraal.

The first task was to test excavate Site 119B to obtain dating material and to investigate the *in situ* remains of a settlement thought to be Moloko because of its proximity to 119A. On the basis of visible dung deposits and arcs of grain bin stands, Site 119B comprised at least three separate

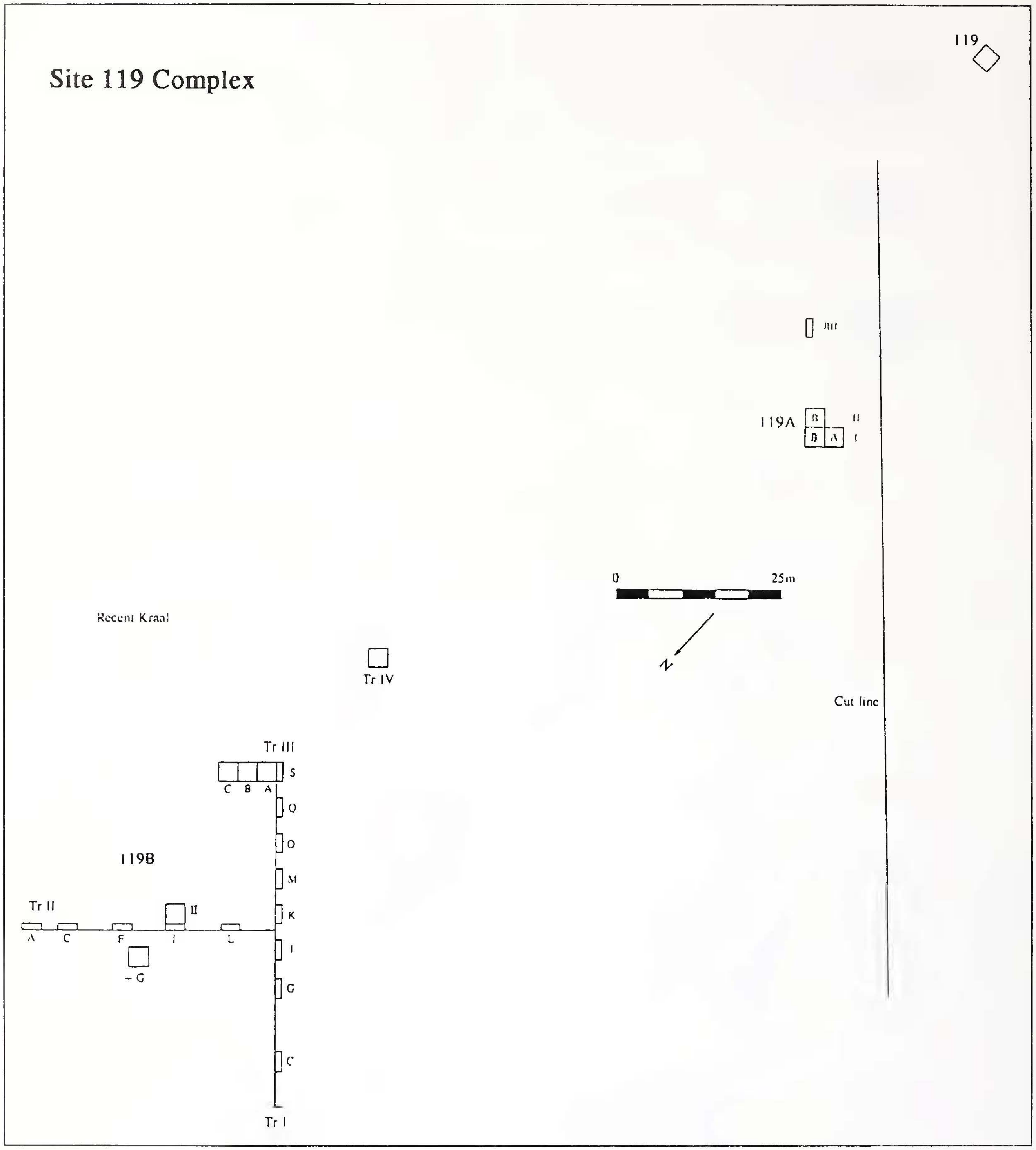


Fig. 31. Site 119 Complex, map.

homestead units. The team examined the most westerly one (21.49.27.5S 27.42.47E).

Method

The datum line for Trench I stretched from grain bin area to grain bin area, a distance of about 57 m (Fig. 32). Trench II was placed at right angles to Trench I, crossing at 29 m in the central kraal. A third trench extended at right angles from Trench I at 54 m (Fig. 33). A series of 1 x 3 m excavations followed the major trench lines, and a few 3 x 3 m squares exposed special features.

Stratigraphy

In excavations away from the central kraal, a light brown to red brown soil lay on top of a stoney base. Closer to the kraal a brownish grey wash from the kraal overlay the light to red brown layer. Softer light brownish grey material marked the kraal itself (Fig. 34).

	I/C	I/G	I/I	I/K	I/M	I/O	I/Q	II/F	II/H	II/L
Yellowish brown soil	-	- .	-	0-6/10	-	-	-	-	0-8/10	-
Brownish grey soil	0-2	-	-	-	0-12/15	-	-	0-10	-	-
Light brownish soil	-	0-16/19	0-18/20	0-18/20	0-12/15	-	-	-	8/10-17/18	0-18
Light to red brown soil	2-10	-	-	-	-	0-10	0-10	10-17	-	18-21
Stoney base	10-	19-	18/20-25	18/20-34	12/15-20	10-	10-	17-	17/18	21-

Midden areas near the grain bin stands produced a slightly different sequence:

	I/S	II/CC
light yellowish brown to yellowish brown midden 0	0-10/14	
light to red brown soil	8-18	10/14-14/16
stoney base	18-	14/16-

Middens

Midden deposit lay *in situ* between grain bin stands at the ends of Trenches I and III. Potsherds, bones and grindstones lying flat marked the original walking surface. This surface varied from 8 to 10 cm below present ground level in III/A and III/B and from 10 to 12 cm in III/C (Figs 35, 36). The original surface was designated level 2 and the deposit above level 1. The small amount of ash (noted only in I/S) suggests the midden was deflated. Some modern glass came from the upper half of level 1, but all the pottery below was characteristic of an older assemblage. The grain bin stands were associated with this older assemblage.

The team exposed another midden deposit in II/A-AA and II/C-CC (Fig. 37). The original walking surface (level 2) lay about 8 cm below present ground level in II/C and 9 to 11 cm in II/AA. A spindle whorl came from among the pottery in II/C/I and a ceramic disc in II/CC/1. This midden was associated with grain bin stands near the beginning of Trench II (Fig. 38). Three Achatina shells lay among the central rocks of the grain bin in II/CC, and a thin ash lens lay on the original surface to the east of the granary. Esterhuysen in Team 2 identified charcoal from this lens as a mixture of *Acacia sp.*, *A. tortillis* and *A. karroo/nilotica*. More *A. tortillis* occurred in the midden in II/AA.

House Areas

The team searched for house remains in II/-G between the grain bin stands and the central kraal. An original walking surface lay 6 to 9 cm below the present ground surface in red brown soil. A few cattle teeth and pottery lay on the surface in on the surface, but hut remains were not uncovered.

The remains of a recent structure stood on the surface in Trench IV (Fig. 39). A rough circle of upright stones about 2.7 m across marked the outside wall. A circular daga firebowl about 45 cm in diameter stood on a daga floor to the left of the doorway facing in. Charcoal in the fireplace was a mixture of *A. tortillis* and *A. karroo/nilotica*. The fireplace, along with the size, shape and type of wall indi-

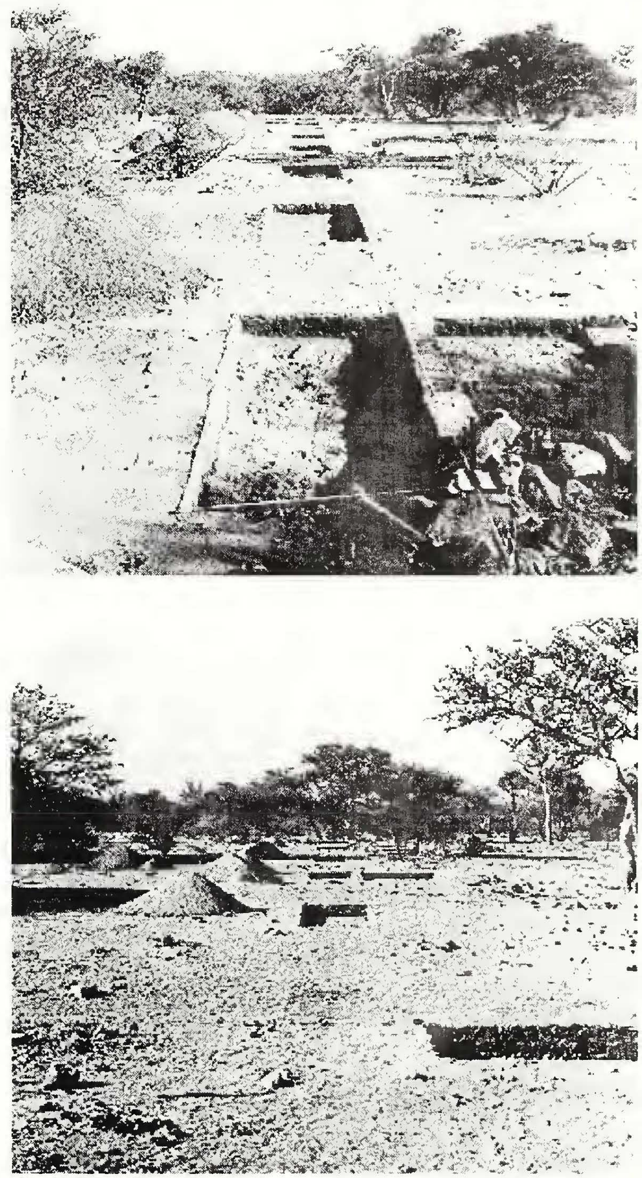


Fig. 32. Site 119B: (above) Trench I looking northwest, Trench III on right; (below) Trench II looking east.

cates that this building had been a kitchen.

The tang of an iron hoe came from about 5 cm below present surface inside the kitchen. Modern glass fragments lay on the surface outside in the general vicinity. A few potsherds below the kitchen in Trench IV at a depth of about 10 cm correlated with the older village level in Trench I. Consequently, this kitchen was most likely associated with the recent cattle kraal remains nearby.

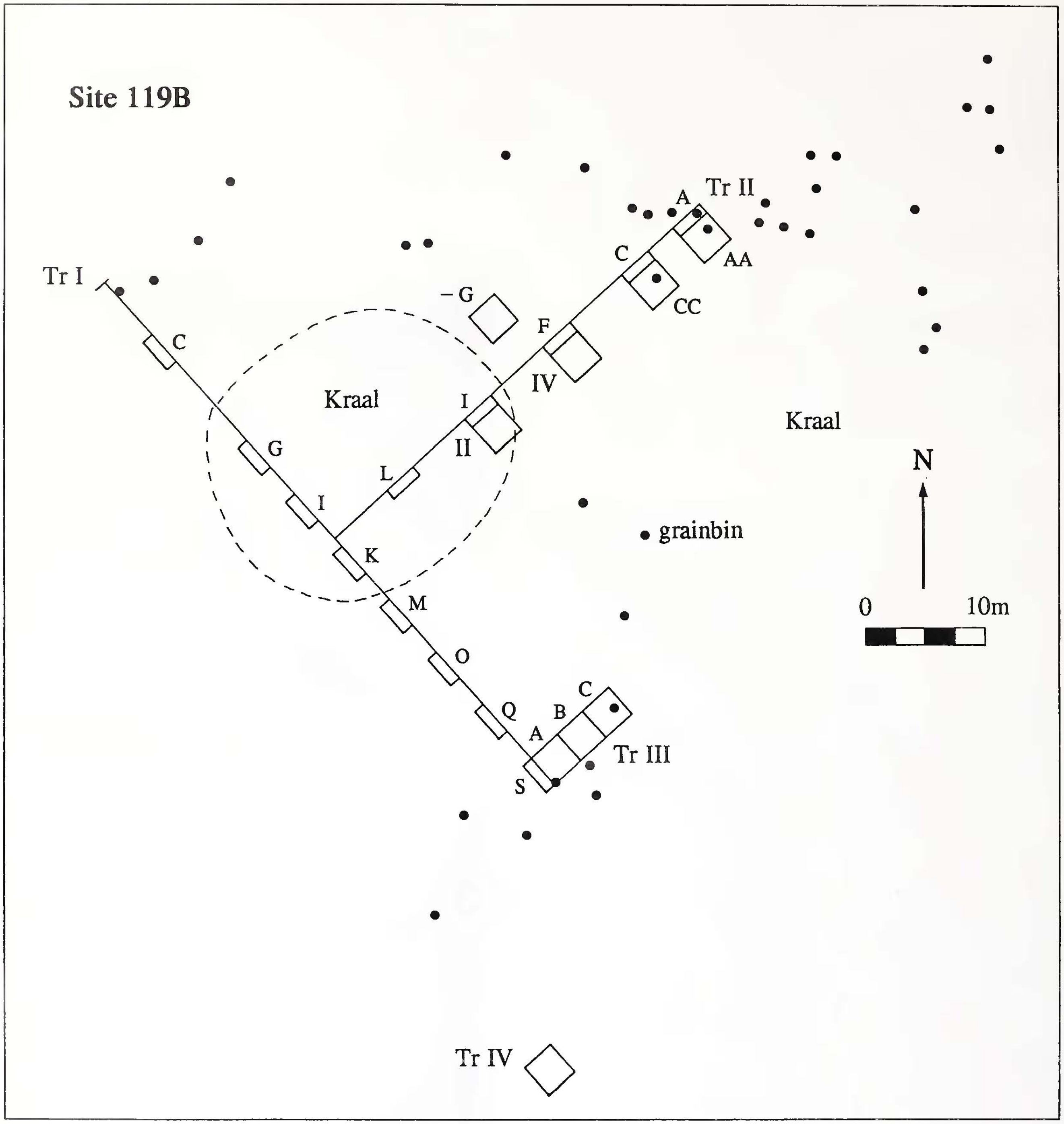


Fig. 33. Site 119 B, map.

Central Kraal Area

The soft grey kraal deposit in the centre extended from about 14 m to 34,6 m in Trench I and over to excavation I in Trench II. Thus the kraal was roughly 20 m in diameter. Termites had reworked the kraal deposit, particularly in I/K. A 60 cm deep hole (40 x 50 cm wide) had been dug into the stoney base of I/K and later filled with loose stone and grey soil (Fig. 34). This hole was probably the remains of a grain storage pit. The kraal deposit in II/I and II/II contained some pottery and bone. These objects may be the remains of a midden that accumulated next to the kraal fence, or alternatively, this part of the kraal may have been used as a midden.

Phytolith and Spherulite Analyses

The team analyzed the phytolith content of soil samples from the kraal deposits in I/I, II/I and II/L. Another sample from II/AA/2, below the main midden horizon, served as a control, along with a sample from the ash lens in II/CC/2. The control yielded a low count of background Arundinoid, while the midden ash had a medium count of background

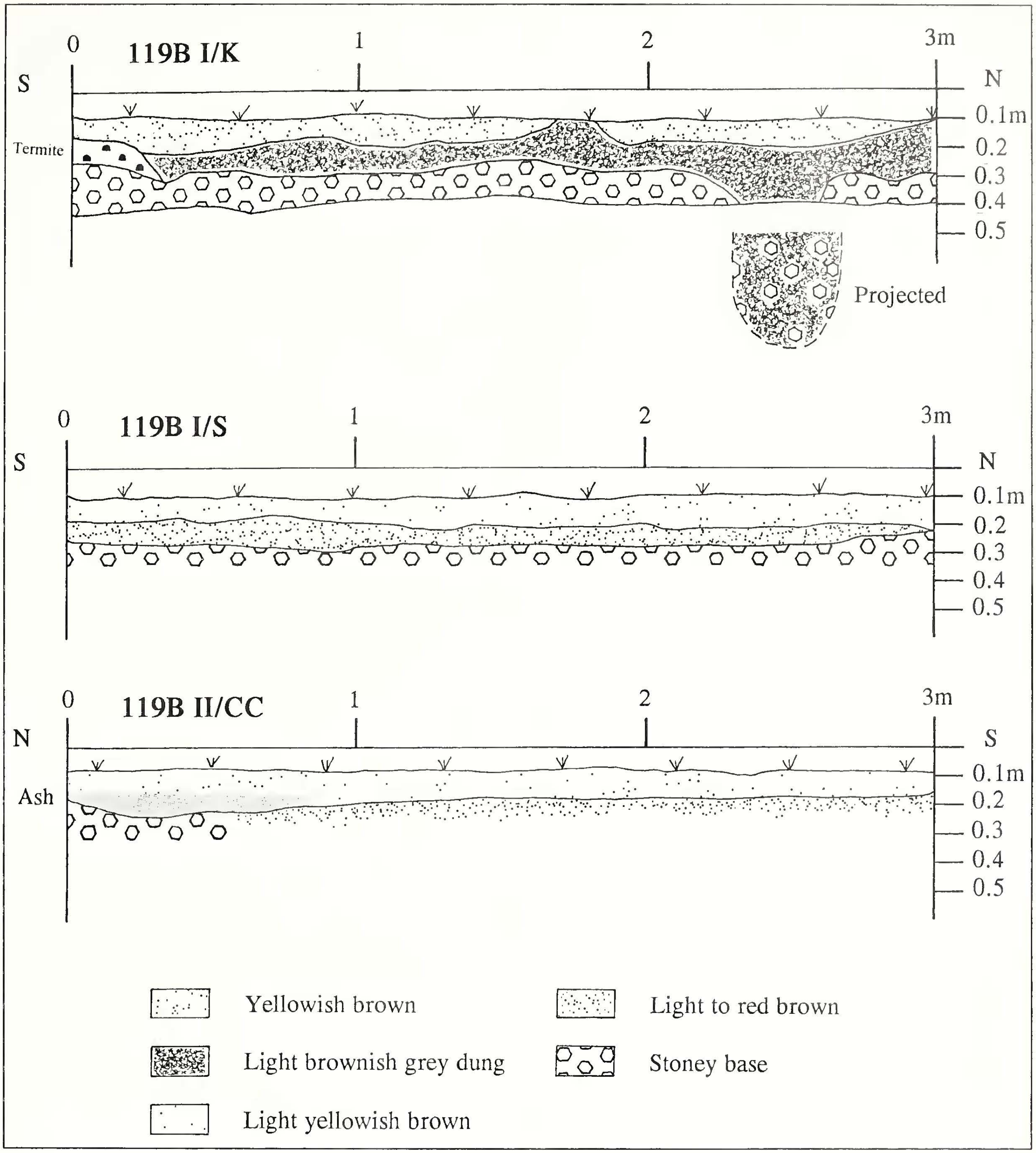


Fig. 34. Site 119B, sections of typical stratigraphic sequences.

types along with very few Panicoids and grass-hair tips. The three kraal deposits all contained high counts of all the major categories (Table 8).

To test for the possibility that the kraal deposit in II/I was derived from sheep and goat rather than cattle, we examined a sample for spherulites. We found none, and therefore conclude that cattle were responsible for all the excavated dung. Small stock, of course, could have been kept in an area not excavated.

Finds

Bone

In the sample of teeth cattle were most frequent (Table 9). Cattle teeth occurred in the midden in II/A and II/AA, as well as on the walking surface in II/-G. A deciduous lower premolar in II/K probably represented small stock. In addition to the teeth, the main midden areas yielded a considerable amount of diagnostic postcranial remains.

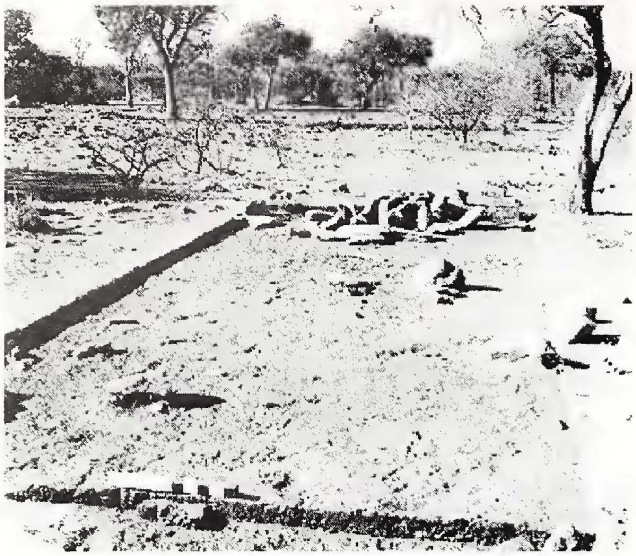


Fig. 35. Site 119B, original walking surface near grain bins in Trench III.

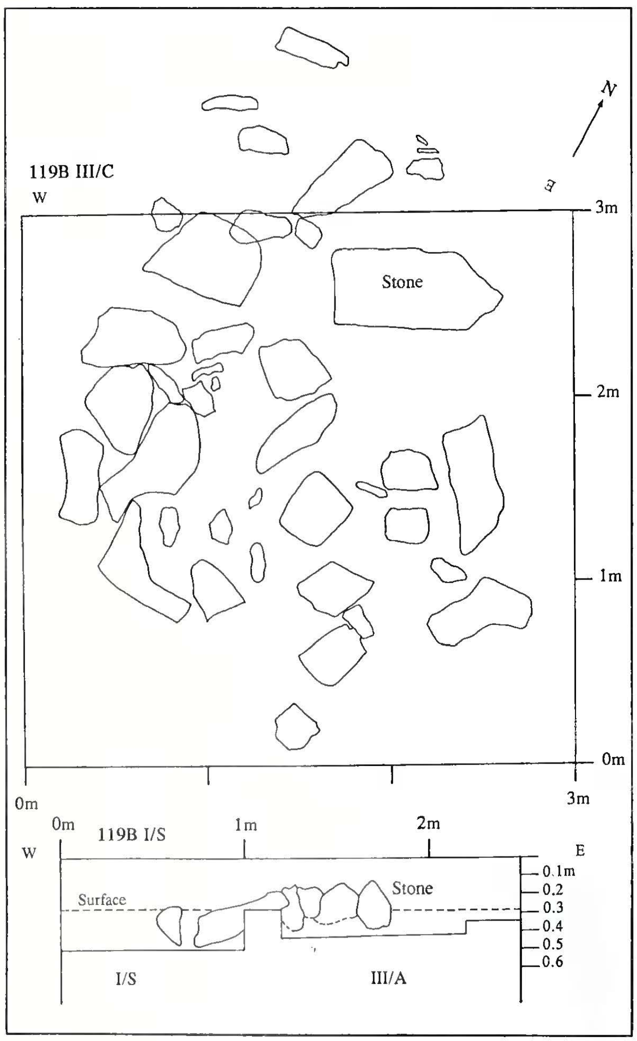


Fig. 36. Site 119B: (above) plan of grainbin stand in Trench III/C; (below) section through grain bin stand in Trench I/S and Trench III/A.

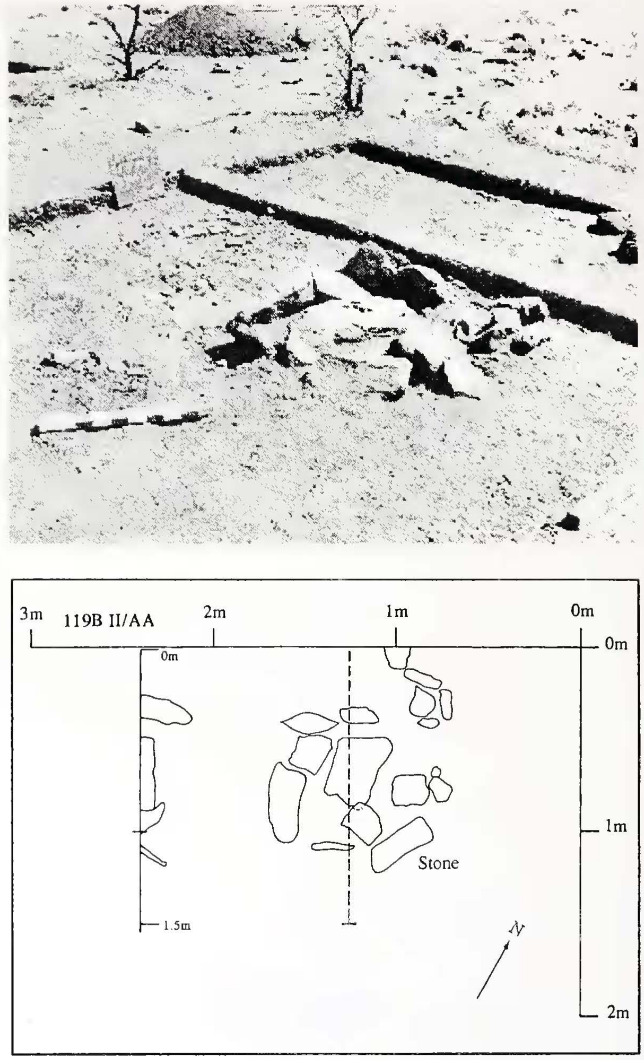


Fig. 37. Site 119B: (above) original walking surface around grain bins in Trench II/AA. Note bones lying flat in front of sign; (below) plan and section of grain bin stand in Trench II/AA.

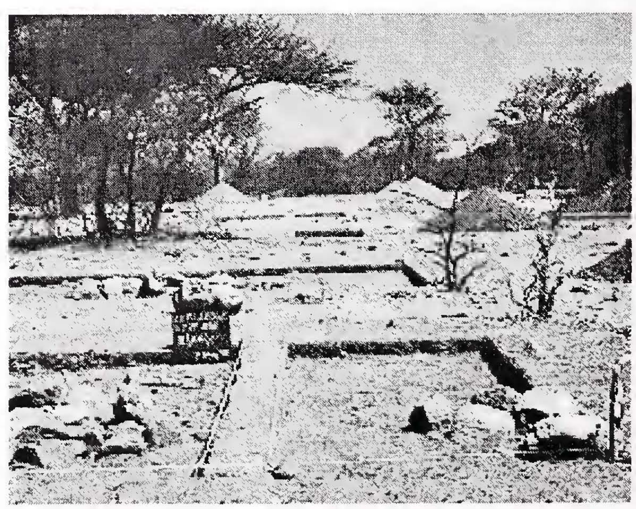


Fig. 38. Site 119B, midden area among grain bin stands at beginning of Trench II. Note kraal deposit in background.

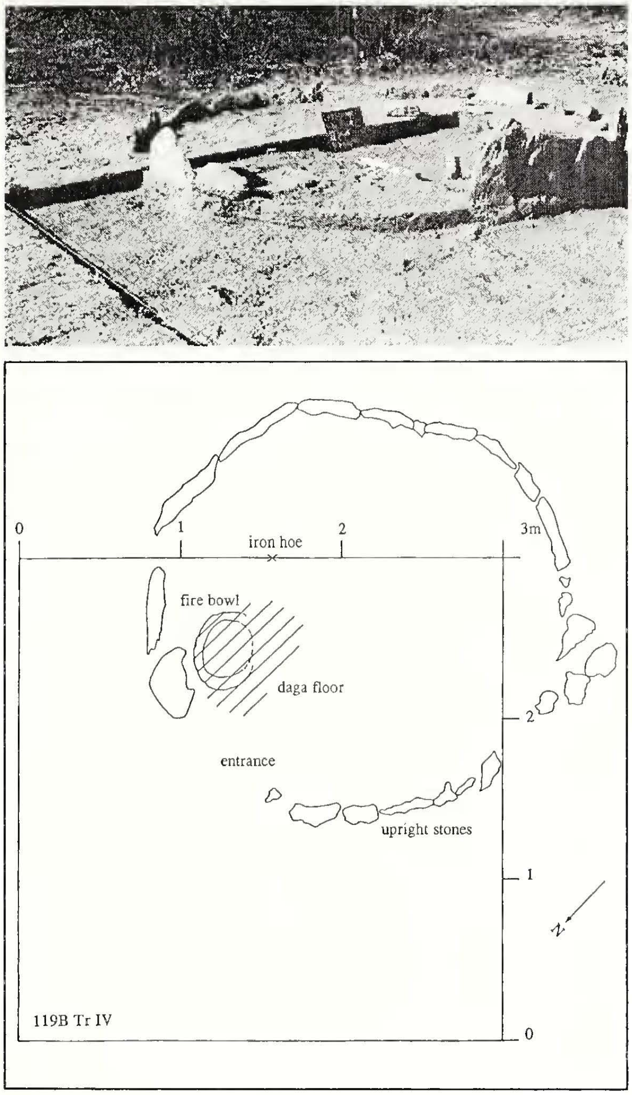


Fig. 39. Site 119B, house remains in Trench IV: (above) looking southeast; (below) plan.

lower premolar in II/K probably represented small stock. In addition to the teeth, the main midden areas yielded a considerable amount of diagnostic postcranial remains.

<u>Metal</u>

The iron hoe from the kitchen in Trench IV weighs 332 g. It includes the tang (141 mm long and 21 x 14 mm at its widest point) and part of the blade (108 mm wide). Another piece of iron came from the midden in II/AA/1. It has a rectangular cross section and is bent into a semicircle. Both pieces probably date to the Historic period

<u>Ceramics</u>

The assemblage yielded three shapes, a recurved jar, an incurved bowl and a necked bowl. The combinations of their profiles with decoration position and decoration formed two types previously found at Site 86 and two new ones:

Table 8. Phytolith Analysis for Site 119B.

	Arundin	Chlorid	Panicoi	Hair	Total
Control II/AA/2	some	some	very few	-	low
Midden II/CC/2	several	several	very few	very few	medium
Kraal II/II	many	many	several	many	high
Kraal II/L	many	many	many	many	high
Kraal I/I	many	many	many	many	high

Table 9. Identification of teeth from Site 119B.

Unit	Cow(*Bos taurus*)	Sheep/goat (ovicaprine)
II/AA/1	LP_3, LP_4, LM_1	
II/AA/2	LP^4dp, RP^3dp	
II/A/2	LM^2 young	
II/C/2		cf LP_4dp
II/-G/2	RP_2, RP_3, RM^1, RM^2, RP^3	

L=left, R=right
P=premolar, M=molar
^{x}=upper, ^{1}=upper 1st
dp=deciduous

Type 1: recurved jar with beaded rim, straight to inward sloping neck, sharp neck/shoulder junction with a single line of incision, bellied body and graphite or dark burnish over the whole surface (Fig. 40);

Type 2: recurved jar with or without beaded rim, straight to inward sloping neck, sharp neck/shoulder junction sometimes with single line of incision but without graphite (Figs 41 & 42);

Type 3: thin (4-6mm), incurved bowl well burnished (Fig. 42);

Type 4: necked bowl with graphite (Fig. 42).

Table 10 presents the distribution of these types in the excavations. They clearly form a single assemblage associated with the kraal and grain bin stands. This assemblage belongs to the Zimbabwe/Khami commoner cluster, and the neck length supports a Khami affiliation. One fragment bearing traces of red ochre and another fragment of a red and black bowl came from II/CC/2. These fragments can be identified as Moloko.

Preliminary Discussion

Site 119B was a small village encompassing a few organised according to the principles of the Central Cattle

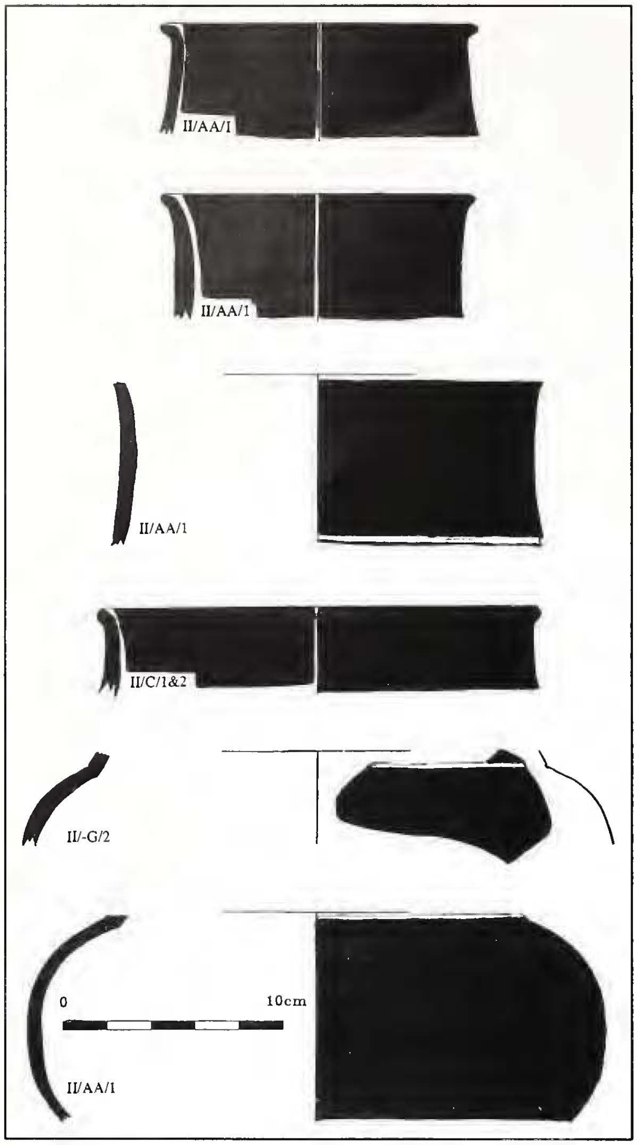


Fig. 40. Site 119B, pottery: Type 1 jars.

Pattern. Trench I bisected one such unit, exposing midden areas near the grain bins at the back of the residential zone. The grain bin stands in II/A, II/AA and II/CC may have belonged to a separate unit. Whatever the case, they too were associated with a midden.

The cattle kraal that may have been associated with the granaries in Trench II lay less than 30 m to the southeast. Present-day cattle had disturbed the deposit, and so the team did not excavate there. The kraal exposed in Trench I, however, was largely undisturbed, and its composition and size were typical. The pit in I/K is in keeping with storage facilities in the Central Cattle Pattern. Iron Age agriculturalists dug pits into cattle kraals in order to store such grains as sorghum and millets. The dung above hid the pits against raiding, while the dung inside the pit produced methane that helped to prevent insect infestation and fungus growth. As a result of the methane, it was possible to store food for several years, and the pits were an insurance against bad times. After their initial use, the pits often

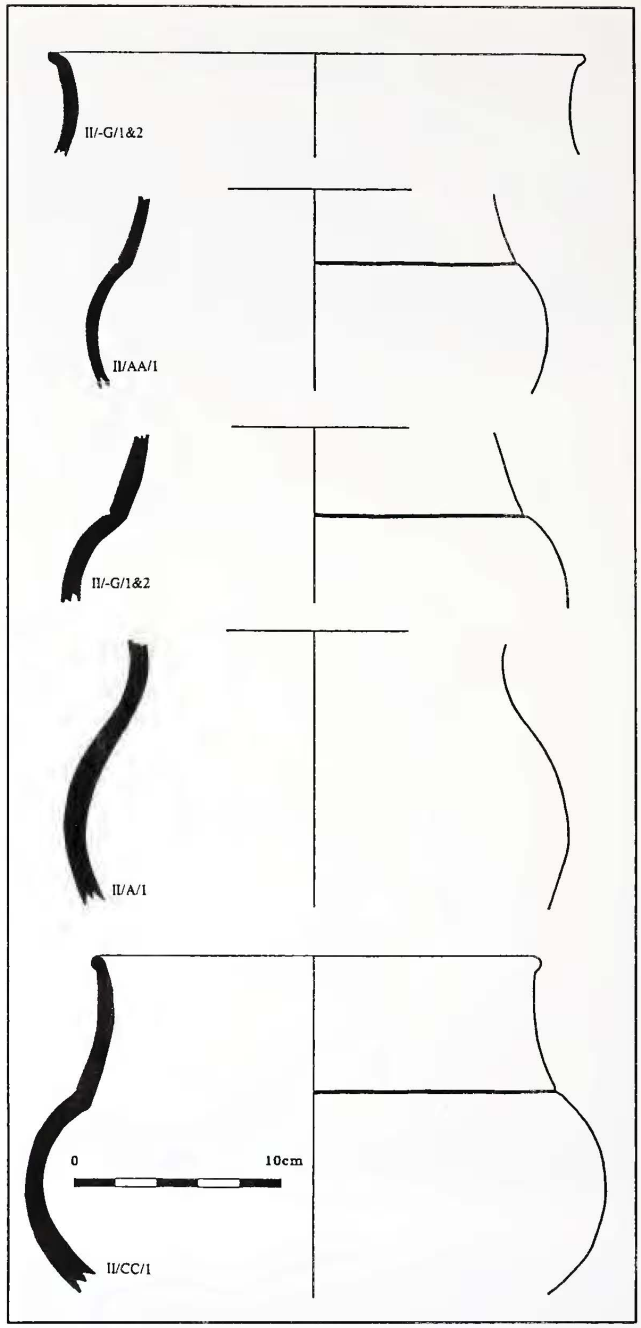


Fig. 41. Site 119B, pottery: Type 2 jars.

became rubbish dumps. Unfortunately, the pit in I/K was devoid of any cultural material.

The phytolith analysis was more productive. Even the crude procedure used here helped to categorize the differences between the control, midden and kraal samples. In addition the spherulite analysis showed that cattle were responsible for all the excavated kraal deposits.

The ceramic analysis shows that these kraals and grain bins were part of a Khami commoner village. Initially, however, the Phase II team had identified this site as Moloko. There is only minimal evidence for a Moloko presence and even that is ambiguous. The only structural remains linked to Sotho-Tswana people were the relatively recent cattle kraal, associated artefacts and kitchen circle in

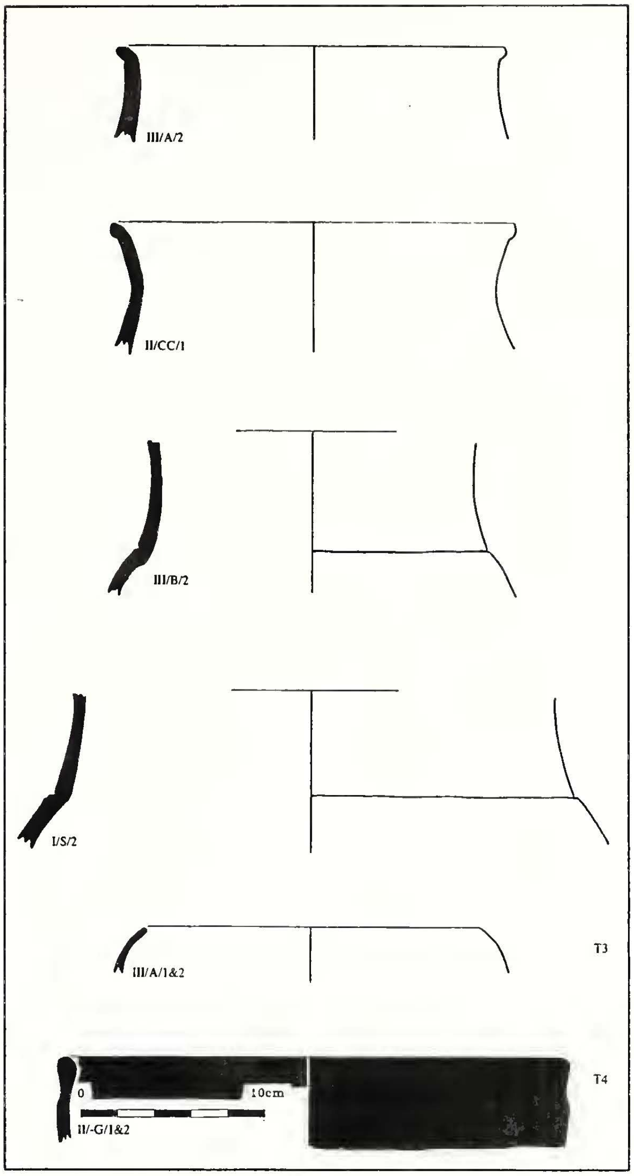


Fig. 42. Site 119B, pottery: Type 2 and Type 3 bowls.

Trench IV, stratified above the Khami village horizon.

More Moloko pottery occurred on the surface near Site 119A, where it had been recorded during Phase II investigations. Since a burnt daga structure also still remained - a rare feature on Late Iron Age sites in the Dam Basin - Team 2 decided to recover more data from there.

SITE 119A (17DC119A)

Method

Three 3 x 3 m squares were placed in an L-shape over the daga and grainbin stands (Fig. 43A). The stands in our I/B and II/A are probably the same as features 7 and 8, respectively, in the Phase II report, while the daga mound probably corresponds to feature 2. A third trench comprising a 1 x 3 m cutting explored an open area 12 m south.

Table 10. Site 119B Ceramics.

Unit	Level	Total	Decoration (body sherds)	Rims
I/C	1	5	1 gb/db	-
I/G	1	2	2 gb/db	-
I/I	1	1	1 gb/db	-
I/M	1	6	3 gb/db	-
I/Q	1	4	-	1 pottery disk
I/S	1	30	7 gb/db	-
I/S	2	16	1 Type 2 fragment 1 gb/db	1 pl rim, recurved jar
II/A	1	85	25 gb/db	1 Type 1 2 Type 2
II/A	2	2	1 gb/db	-
II/AA	1	387	7 Type 1 fragments 7 Type 2 fragments 108 gb/db	5 Type 1 4 Type 2 15 gb/db rims, recurved jars 12 pl rims, recurved jars
II/AA	2	48	21 gb/db	1 pl rim, recurved jar
II/C	1	174	2 Type 2 fragments 2 red ochre burnished fragments 46 gb/db plus 1 spindle whorl	1 Type 1 1 small cup, coarse 2 gb rims, recurved jars 2 pl rim, recurved jar
II/C	2	4	-	-
II /CC	1	153	1 Type 1 fragment 1 Type 2 fragment 38 gb/db plus 1 pottery disk	1 Type 2 3 gb/db rims, recurved jars 3 pl rims, recurved jars
II/CC	2	164	1 Type 2 fragment 59 gb/db 1 bl/r bowl 1 rob	2 Type 2 3 gb/db rims, recurved jars 3 pl rims, recurved jars
II/F	1	9	-	-
II/-G	1	149	1 Type 1 fragment 1 Type 2 fragment 28 gb/db	1 Type 1 1 Type 4 2 pl rims, recurved jars
II/-G	2	104	1 Type 1 fragment 1 Type 2 fragment 39 gb/db	2 pl rims, recurved jars
II/I	1	9	9 gb/db	-
II/II	2	3	1 gb/db	-
III/A	1	209	1 Type 1 fragment 21 gb/db	1 Type 1 1 Type 2 1 Type 3 6 pl rims, recurved jars
III/A	2	92	24 gb/db 3 Type 1 fragments 2 Type 2 fragment	2 Type 2 2 pl rims, recurved jars
III/B	2	68	1 Type 1 fragment 5 Type 2 fragments 21 gb/db	-
III/C	2	15	3 gb/db	-

bl/r=black and red
gb/db=graphite burnish/dark burnish
pl=plain
rob=red ochre burnish

Stratigraphy

The team exposed the daga lumps, labelling the soil above as level 1. This first level varied from 3 to 5 cm in depth. The daga lumps and the material between and under, varying from 5 to 7 cm in depth, belonged to level 2. The

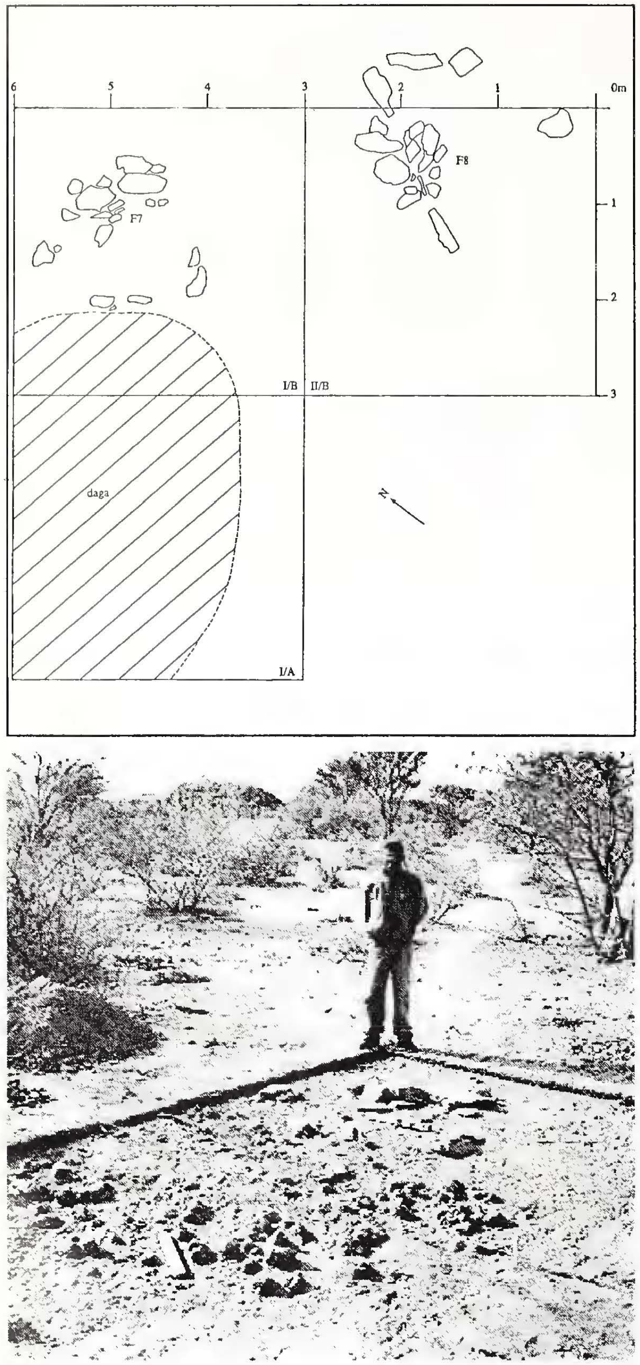


Fig. 43. Site 119A: (above) plan; (below) daga concentration looking east.

soil in both levels was dark greyish brown. The soil in Trench III was a lighter greyish brown.

Middens and Granaries

The daga lumps were mostly derived from the grainbins in the immediate vicinity, and they had therefore fallen on to the pots and bones (Fig. 43B). The artefacts themselves formed part of a deflated midden. The midden contained small bits of charcoal from *A. tortillis* and *A. karroo/ nilotica*. Level 1 was a mixture of the midden and more recent material washed on top.

Finds

Ceramics

The paste of some pots was a bright orange from a second firing when the daga structure burnt down. A spindle whorl lay among the daga in I/A/2, while trench III was devoid of artefacts.

The small sample contained Types 1 to 3 found at 119B and two new ones (Fig. 44):

Type 5: (fragmentary): open bowl with black and red colour separated by fingernail incision;

Type 6: jar with short inward sloping neck.

Although fragmentary, Type 5 is diagnostic of Moloko, and Type 6 probably also belongs to Moloko. Types 1 and 2 are characteristic of Khami commoner assemblages, but some Type 2, especially incomplete jars lacking beaded rims or single line incision, could be confused with Moloko vessels. To help resolve this ambiguity, we separated undecorated Types 2 and 6 by comparing various proportions of shape (Fig. 45). Typically, the height of Khami jars is equal or less than mouth diameter, whereas height is usually greater in Moloko. Furthermore, neck length is about 40% and the widest body diameter about 60% of height on Khami jars. In contrast, Moloko jars have shorter necks, about 20% of height, and longer bodies with the widest diameter less than half of height, around 40%.

Table 11 presents the stratigraphic distribution of all types. As the table shows, Moloko vessels and associated fragments clustered in level 1, above the larger Khami assemblage.

Preliminary Discussion

The concentration of Moloko pottery in level 1, and on the surface in the near vicinity, indicates that there was a Moloko occupation in this area after the Khami settlements were abandoned. The previous Phase II excavations do not contradict this interpretation, for Moloko pottery only occurred on the surface and in the top 5 cm of the daga mound of feature 1 (Campbell *et al.* 1995:342). The lower horizon at 119A was therefore probably contemporaneous with 119B.

The association of midden and granaries at 119A and 119B is the same, and presumably the overall settlement organization was also similar. In this case features 1-5 and 7-13 at 119A, encompassing our Trenches I and II, probably formed the outer boundary of a residential zone that arced to the east, where the terrain is still flat. Site 119A may have been 60 m across, like 119B, and it was therefore probably not as small as previously thought. The new size of 119A probably overlaps with the original area designated as Site 119. The remains of the later Moloko occupation were not obvious. Nevertheless, the 19th century collagen date (Beta 80096), recovered during Phase II, is unlikely to apply to the Moloko pottery from here. It is more likely to apply to Site 119.

Table 11. Site 119A Ceramics.

Unit	Level	Total	Decoration (body sherds)	Rims
I/A	1	64	1 Type 1 fragment 1 Type 2 fragment 15 gb/db	1 gb/db rim, recurved jar
I/A	2	18	6 gb	-
I/B	1	257	1 Type 1 fragment 1 Type 2 fragment 57 gb/db 2 rob	1 Type 1 1 Type 6 4 gb/db rims, recurved jars 3 pl rims, recurved jars
I/B	2	20	13 gb/db	1 Type 3
II/B	1	42	12 gb/db 1 Type 5 1 rob	-
II/B	2	7	5 gb/db	-

gb=graphite burnished/dark burnished
pl=plain
rob=red ochre burnished

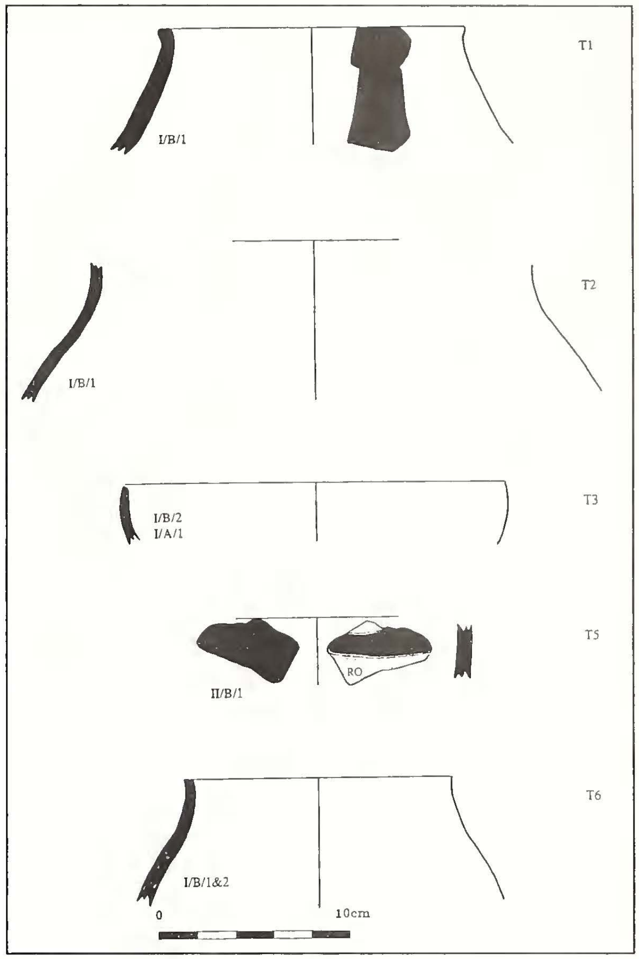


Fig. 44. Site 119A, pottery: Types 1 to 6.

SITE 119 (17DC119)

Team 2 excavated a 3 x 3 m square into a midden on the edge of the slope about 50 m south of 119A. The midden deposit varied from 10 to 20 cm in depth and contained fragmented bone, ostrich eggshell and some pottery. The pottery lacks diagnostic types (Table 12), but its surface finish suggests that it probably dates to the last 200 years.

SITE 38 (17DC38)

The site sat (21.50.44S 27.42.00E) on a slight rise about 650 m northeast of the Kurumela hills, approximately 650 m south of the Sedibe River and 200 m north of a small stream.

The archaeology is well described in the Phase II report and here it is only necessary to summarize those findings to introduce the additional Phase III tasks. Briefly, the site consisted of 13 stone granary foundations in an arc with a single larger stone feature at the northern end. The Phase II team thought this was a house platform and excavated the outer perimeter to test this function. They also excavated a shallow midden at the southern end of the site that yielded carbonised seeds, Khami pottery and an early 19th century date that was thought to correspond to the collapse of the Khami state. In this context, the house platform could have been associated with a person of high status.

Following a Kalanga analogy, the Phase 2 team thought the headman would have occupied the stone platform, while his wives would have lived to the southeast, between the stone platform and the grain bins. The distribution of granary foundations further suggests that grain bins directly behind the headman's house served his personal needs. Other clusters indicate the likely positions of wives' huts and possibly low status dependents near the midden at the southern periphery of the site. An isolated granary foundation to the southwest might marked the men's meeting place.

This interpretation is based on two key assumptions: first, the main stone feature is a Khami-period house platform associated with the granary foundations, rather than a more recent burial cairn; and secondly, the site did not have a livestock enclosure because cattle were kept at higher status sites.

The terms of reference for the Phase III investigation required Team 1 to excavate the platform, and to analyse soil samples to detect livestock enclosures. Team 1 was also charged with increasing the samples of pottery and seeds from the midden.

Method and Stratigraphy

The suspected house platform was drawn in detail and photographed before a 1 x 4 m trench bisected it from east to west (Fig. 46). All loose stone was removed from the

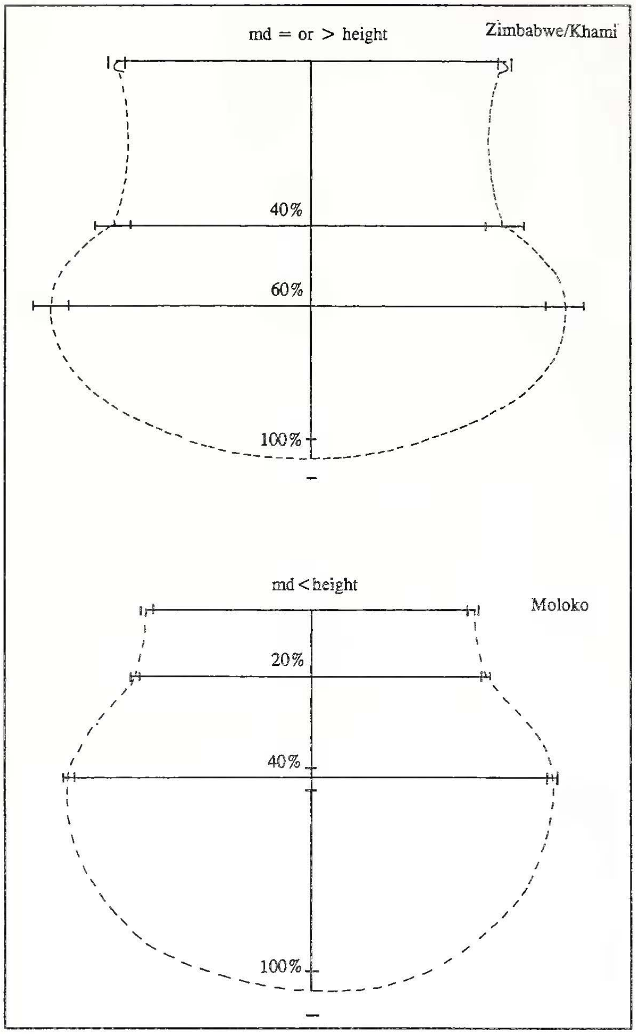


Fig. 45. Typical proportions of Zimbabwe/Khami and Moloko jars.

trench line to expose the underlying soil that was then excavated to 50 cm. The underlying soil was a light brown (7.5 YR 6/3 - 6/6), weathered gneiss, forming a well-developed Cr horizon. There was no evidence of a previous disturbance, and this feature was not a grave cairn.

Two transects were laid out across the site at right angles, centring on the house platform. Soil samples were collected at 10 m intervals and analysed for orthophosphate PO_4. The results are as follows:

Transect N - S m	PO_4 mg/l	Transect W - E m	PO_4 mg/l
0	10	0	11
10	7	10	7
20	9	20	12
30	9	30	20
50	17	50	26
60	23	60	24
70	22	70	55
80	7	80	20

Table 12. Site 119 ceramics.

Unit	Level	Total	Decoration (body sherds)	Rims
I/A	1	129	-	3 pl rims, recurved jars
I/A	2	45	-	3 pl rims, recurved jars

pl=plain

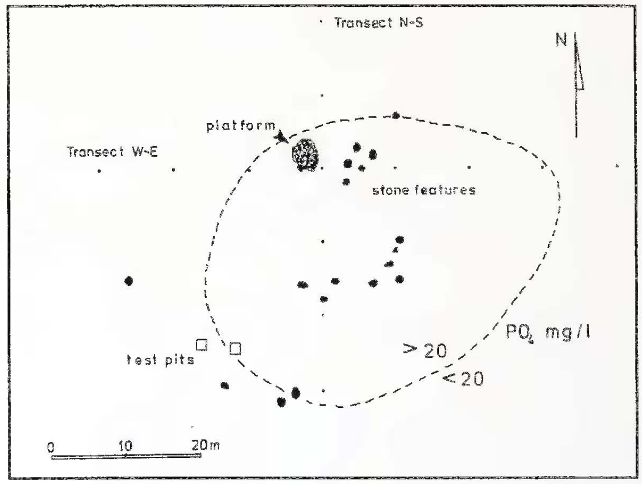


Fig. 46 Site 3, platform feature.

These values show that the central area, encompassing the house platform and most of the granary foundations, had a general PO_4 level of 10 – 15 mg/l above background (10 mg/l), consistent with a nutrient concentration resulting from livestock. Figure 47 shows the spatial extent of this anomaly.

For the third task, to increase the artefact sample, we enlarged the Phase II excavation from 1 m^2 to 4 m^2. A second 4 m^2 test pit was also excavated nearby. Burnt vegetation and termite tunnel casts (also noted previously) implied that some of the debris might have been introduced by bushfires. Our new excavations did not yield any identifiable plant remains.

Finds

The house platform yielded two artefacts. One was a small globular pot with a high, slightly flared neck profile and a groove at the neck/body junction (Fig. 48). The pot was slightly burnished, but was otherwise undecorated. Although single vessels can be ambiguous, this vessel probably belongs to the Khami facies.

The second artefact was a deeply worn grindstone of coarse-grained quartzitic gneiss, measuring 165 mm long, 90 mm wide and 72 mm high. The grindstone was worn to a depth of 40 mm in a narrow, deeply curved channel. The pattern of wear showed elongated striations over the entire length of the channel, suggesting that the stone was used to

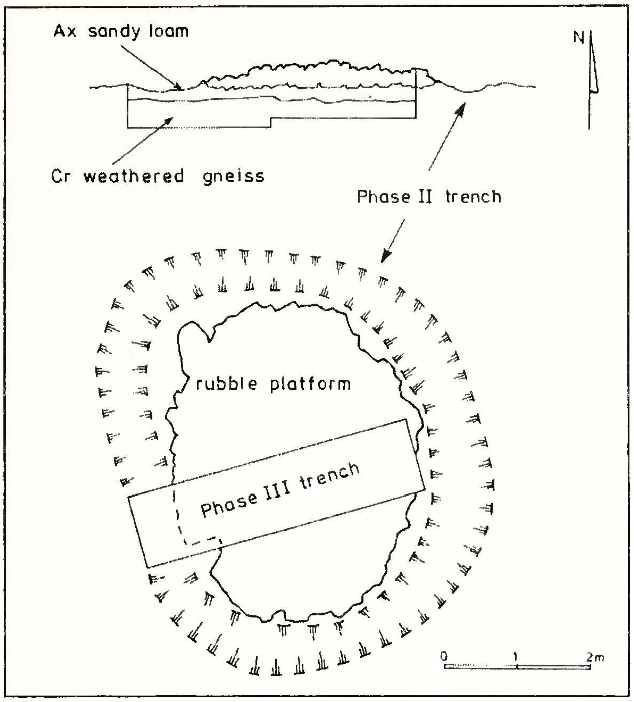


Fig. 47. Site 38, map.

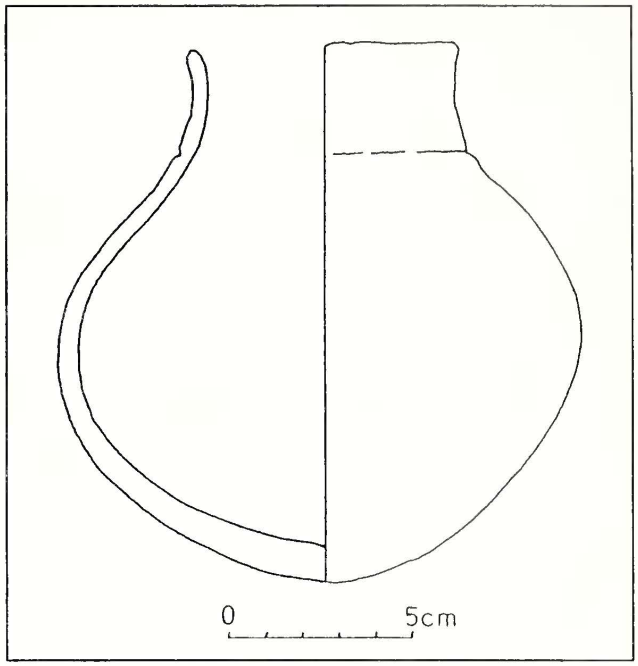


Fig. 48. Site 38, reconstructed pot from house platform rubble.

sharpen metal blades rather than grinding grain. It was too small for grain in any case. Although the shape of the hollow precludes sharpening long blades, such as spears or large knives, it would be adequate for the short, slightly convex cutting edge of an axe.

Several fragments of bone attributable to bovid class IV (*cf.* cattle) also came from the platform rubble. These, together with the soil orthophosphate anomaly, confirm the presence of livestock in the settlement.

Preliminary Discussion

The dating evidence for Site 38 is somewhat problematic. First, the pottery is unlikely to date to the 19th century. Pottery of that late date in the wider region is characterised by globular forms with rough surface treatment (*e.g.*, Garlake 1967), not tall necks and graphite burnish. Secondly, the Khami period state was smaller at the beginning of the 18th century than before, and there is no evidence that it extended as far west as the Motloutse at this time. Thus, either the date derives from recent carbon, or the pottery does not belong to the Khami facies. The weight of present evidence indicates that Site 38 is the remains of a Khami occupation and that the radiocarbon date is not associated.

Our observations agree with the conclusions of the Phase II team in that the house platform and granaries formed an integrated layout. Although it is reasonable to interpret the house platform as the residence of a local headman, their detailed interpretation of the site layout is speculative.

Soil orthophosphate analyses indicate dung, but the values are low in comparison to those for livestock enclosures in other sites in the project area. The close match between the boundaries of the phosphate anomaly and the granary foundations may therefore indicate a cluster of huts with a dung admixture in the plaster, rather than a central livestock enclosure. This finding provides some support for the site layout proposed in the Phase II report.

Repeated and sustained occupation of the same general area in the last one hundred years by cattle posts of Mmadinare village makes it difficult to relate the vegetation and soil context of the site to the Khami occupation. However, Khami homesteads were appreciably larger than the more recent cattleposts and involved some considerable clearing to establish fields. It is therefore possible that nutrient loss through cereal cultivation reduced soil fertility to the point that thornbush became established within a short time. In this case, the present vegetation might well have started during the occupation of Site 38.

SITE 110 (17DC110)

The next site, Site 110, was tentatively identified as late Khami and thought to be contemporaneous with Moloko. Previous investigations recognized a Zhizo horizon, marked by burnt daga structures. Surface features comprised another horizon attributed to late Khami because of a 16th century radiocarbon date (Beta 80985) and graphite pottery. Diagnostic Khami ceramics, however, were not retrieved.

Team 2 examined the site and reassessed its archaeological affinities. First, the lapa walls on the surface place the upper horizon in the Historic period. Secondly, the pottery previously described from the test pit is most likely Moloko. And, thirdly, characteristic Zhizo pottery occurred in association with buried daga structures, as the Phase II investigations predicted. Thus Site 110 probably has three components, and the 16th century radiocarbon date

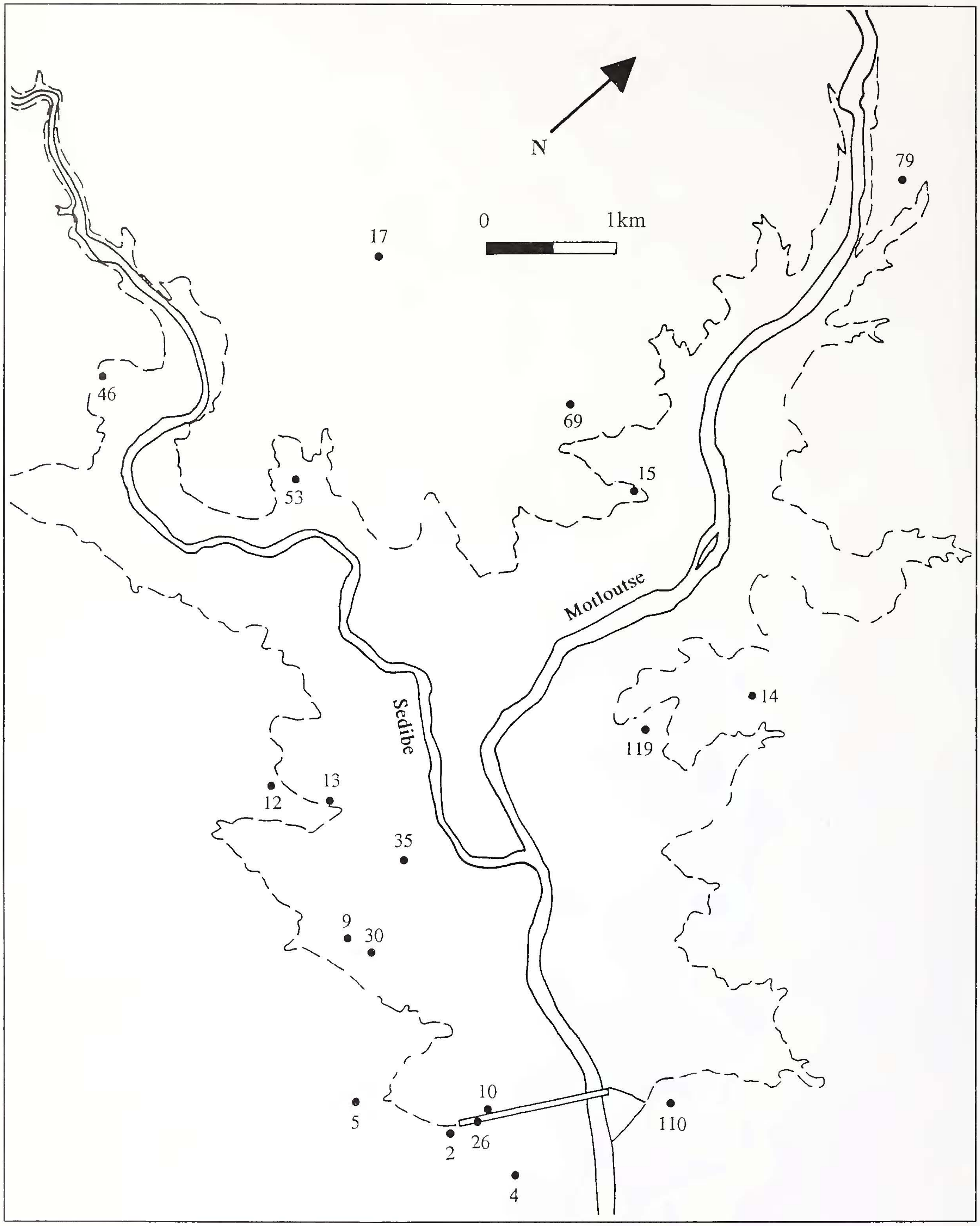


Fig. 49. Moloko sites recorded in the project area.

components, and the 16th century radiocarbon date probably refers to a middle, Moloko, occupation. We turn now to Moloko.

MOLOKO

Early facies of the Moloko cluster can be recognised in the field by bowls with alternating bands of colour separated by lines of textured designs made by such techniques as incision and punctation. Dragged punctates in particular characterise the Moloko pottery found in the Phase I and II surveys. Some 17 sites contained this pottery. Of these 11 received Phase II mitigation, and six were radiocarbon dated. Two other sites, originally classified as Khami (4 & 110), should be reassigned to Moloko, bringing the number to 19 (Fig. 49).

The date from Site 46 is an AMS reading of bone collagen, but there is little reason to question the result. The date from Site 119 was placed in context in the preceding Khami section: it is probably associated with a date from Site 119 was placed in context in the preceding Khami section: it is probably associated with a 19th or 20th century occupation.The remaining dates are sufficiently close to Khami period sites to make the Phase II investigators wonder if Moloko and Khami settlements were contemporaneous. Investigating this possibility at Site 46 was a prime task of Team 2. Another priority was to increase the ceramic samples.

Natural Terraces

Trench I/C, 1 x 3 m, reached bedrock at 9 to 12 cm. Excavated in 5cm levels, only three sherds were found in level 1.

Trench II/B, 1 x 3 m, was excavated on the natural terrace southwest of the midden (Fig. 52). Some 5 cm of light greyish brown hill wash lay on top of a darker greyish brown village horizon that was 8 to 14 cm thick. Underneath was a thin lens of brown soil on top of a rubble substratum.

This stratigraphic sequence was excavated in 5 cm levels except that level 3 in the village horizon was 10 cm thick. Daga lumps, bone, a zebra tooth and Moloko pottery came from this horizon.

We placed Trench III/A on a higher terrace to the west near a previous Phase II excavation. Ultimately, only a 1 m square was excavated. About 8 cm of light greyish brown hill wash lay on top of a darker grey brown soil 9 to 14 cm thick. The rocky substratum then began, 17 to 22 cm below present ground level. We excavated the square in 5 cm levels.

Site	**Lab No.**	**a.d.**	**Calibrated AD**
2	Beta 80092	1590±70	1475-1655
26	Beta 81225	1670±70	1640-1680/1805
46	Beta 80093 (AMS)	1670±100	1515-1695/1815
79A	Beta 80094	1550±70	1450-1645
119	Beta 80096	1840±60	1695-1725/1935
127	Beta 81224	1590±70	1475-1655
reassigned			
4	Beta 80979 (AMS)	1470±60	1425-1485
110	Beta 80985	1580±90	1455-1660

Site 46 (17DC46)

This site (21.50.23S; 27.40.10E) centred on a bare granite gneiss outcrop (Fig. 50) south and west of a bend in the Sedibe River. A Khami-type terrace platform stood on the north side, while Moloko pottery occured to the south. Numerous grain bin foundations, terrace plat-forms and probable hut areas encircled the kopje.Two small excavations in the Moloko deposits con-ducted during Phase II produced the bone collagen AMS date (Beta 80093) of the 17th century. It was Team 2's task to study this Moloko occupation and the relationship between Khami and Moloko. Excavations began on August 11 and ended on the 13th.

Method

We laid out a north/south datum line across the saddle in order to connect a midden deposit with a possible residential terrace (Fig. 51).

Midden

Trench I/A, a 2 x 3 m excavation, exposed dark midden soil that had formed on top of a bare rock dome and in rock cracks. The midden reached a depth of 17 cm. Excavated as a unit, the midden yielded much bone, warthog teeth and diagnostic Moloko pottery.

Finds

Bone and Shell

One mandibular tooth from a zebra came from the village horizon in Trench II/B/3. The midden in I/A yielded some eight warthog teeth, probably from the same animal. There was also one premolar that may be from small stock. In addition, *Achatina* sp. (land snail) was also incorporated in the midden. The edge of one large fragment was worn smooth, and it had probably been used for scraping.

Ceramics

Most pottery sherds came from Trench I in the midden, although II/B and III/A yielded a few more. The total collection contains six types (Figs 53 & 54):

> Type 2: recurved jar with or without beaded rim, straight to inward sloping neck, sharp neck/shoulder junction sometimes with a single line of incision but without the graphite or dark burnish;

> Type 5: bowl with bands of alternating colour separated by dragged punctates, stamping or bangle impression;

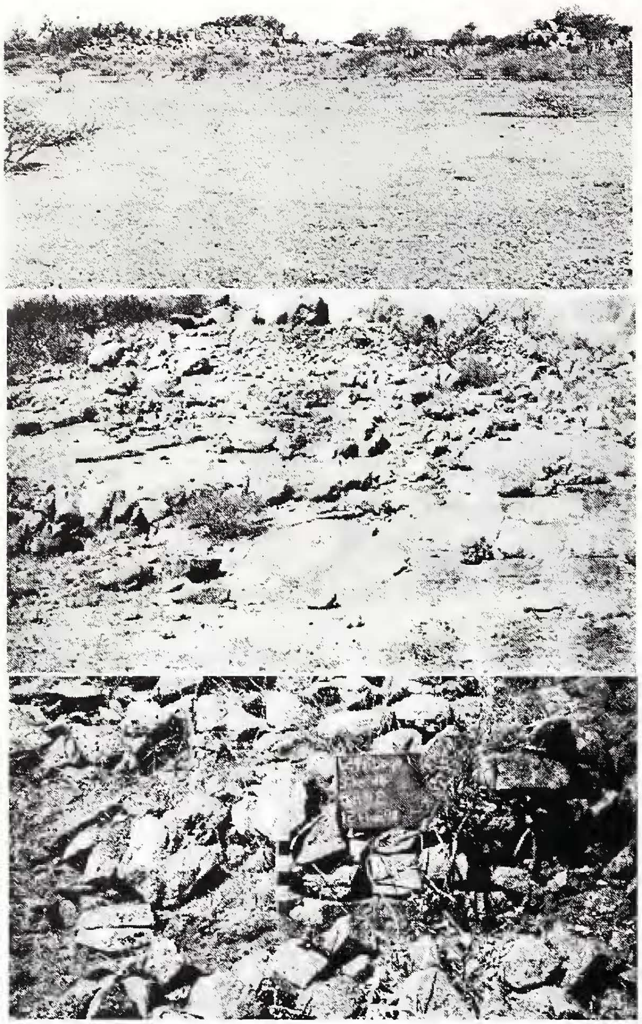


Fig. 50. Site 46: (above) outcrop form south; (middle) Khami-phase platform on north side of outcrop; (lower) remnants of coursing on platform.

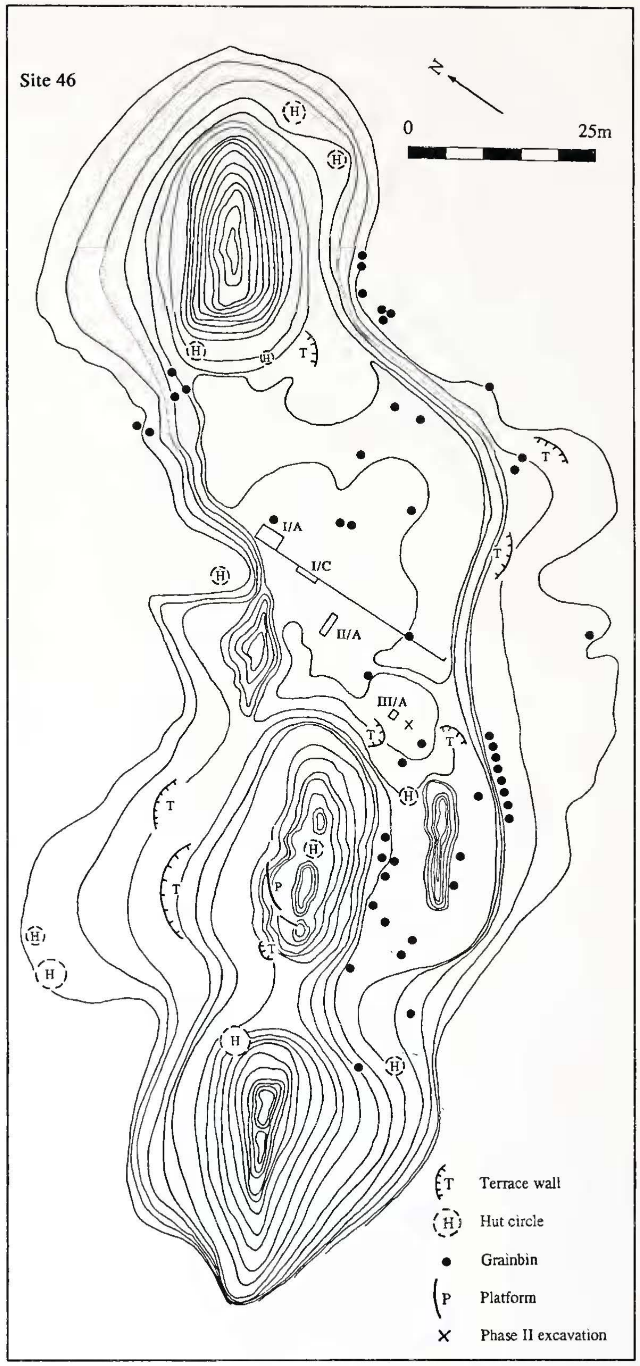


Fig. 51. Site 46, map.

Type 6: recurved jar with short inward sloping neck;

Type 7 (fragmentary type): recurved jar with short neck and decoration on upper shoulder with band of punctuates;

Type 8: thick (7-10 mm) open to incurved bowls.

In addition there are a few sherds with fragmentary decoration similar to that found on Type 5. These sherds and Types 5 to 8 form a Moloko assemblage. There is only one example of Type 2, diagnostic of the Zimbabwe/Khami cluster. This one vessel came from the bottom of Trench III, underneath Moloko pottery (Table 13).

Preliminary Discussion

The evidence, although slight, indicates that the Khami occupation preceded Moloko. Both ceramics and settlement organization support this interpretation. First, the one clear Zimbabwe/Khami vessel lay below Moloko in Trench III. Secondly, the Khami platform faces out to the north, and it was probably approached from the west. The excavated area therefore lies behind. In the Zimbabwe Pattern, the front platform would have marked the office of the leader, while the back area was reserved for ritual activities and the private residence of the leader's youngest wife. Because of this organization, if the Khami and Moloko occupations were contemporaneous, then the midden in Trench I would have contained Khami as well as Moloko pottery.

The later Moloko settlement should have followed the Central Cattle Pattern. If this was the case, then the midden and associated grain bin stands were located at the back, and the settlement faced southeasterly. This orientation is opposite to the earlier Khami settlement, and the difference emphasizes the distinctive character of the two occupations.

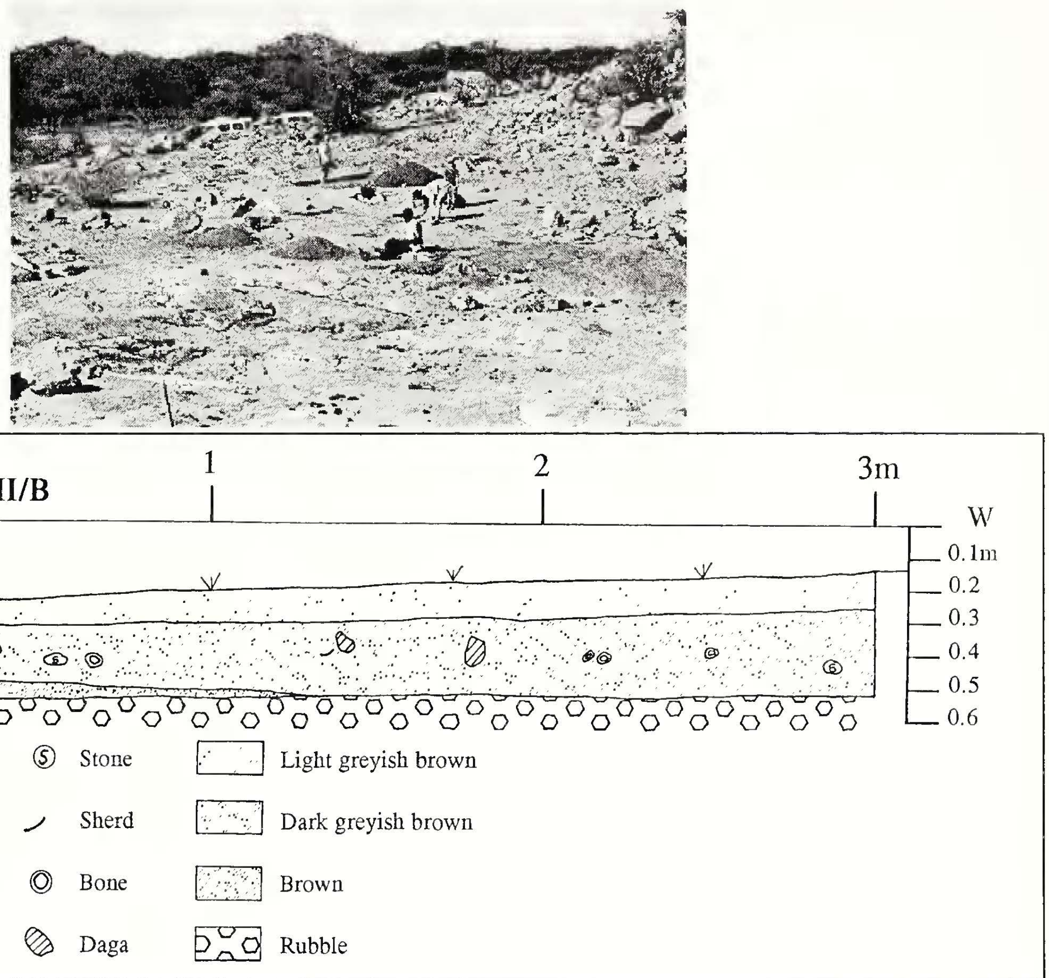


Fig. 52. Site 46: (above) view from the north; (below) section of south wall of Trench II/B.

Table 13. Site 46 Ceramics.

Unit	Level	Total	Decoration (body sherds)	Rims
Surface		34	2 Type 5 1 punctate fragment	1 Type 8 1 punctate fragment 1 sp fragment 3 pl rims, recurved jars 1 pl. bowl fragment
I/A	1	318	2 Type 5 1 Type 7	1 Type 5 8 Type 8 9 Type 6 2 gb jar fragments
I/C	1	3	-	-
II/B	1	-	-	-
II/B	2	33	-	1 Type 6 1 pl bowl fragment
II/B	3	86	1 Type 7	1 Type 5 1 Type 8 1 Type 6 1 pl rim, recurved jar
II/B	4	24	1 Type 5	1 Type 6
IIIA	1	23	-	1 Type 6
IIIA	2	29	-	1 Type 6
III/A	3	32	1 Type 5 fragment	1 Type 2 1 Type 6

gb=graphite burnish pl=plain sp=stabbed punctuate

DISCUSSION

The mitigation programme resolved various issues of culture history and lifeways. The first concerns the Zhizo phase. The calibrated radiocarbon dates from Zhizo sites at Letsibogo fall within the range established for the wider region.

Project area

Letsibogo Site 19	970-1020
Letsibogo Site 30A	790-950
Letsibogo Site 109	790-950

Wider region

Doddiburn	895-1020
Glennel	895-1015
Pont Drift 1	960-1015
Pont Drift 2	890-1000
Schroda	890-970
	885-990
	895-1000
	960-1015
	1005-1020
Taukome	690-895
	715-960

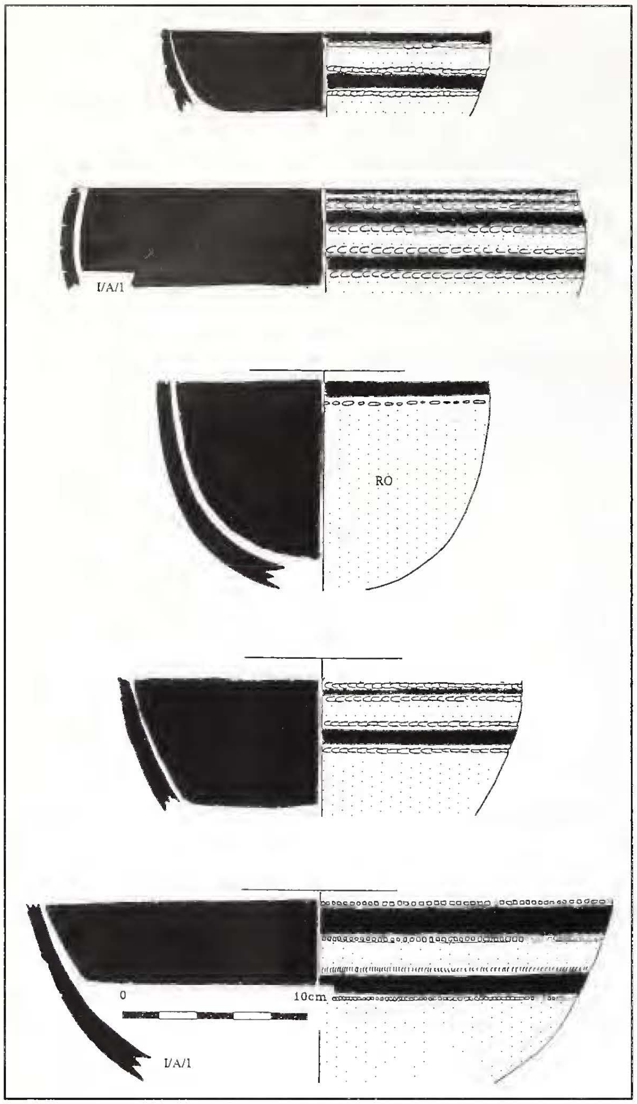


Fig. 53. Site 46, pottery: Type 5.

Unfortunately, this evidence does not allow us to date more precisely the Zhizo occupation in the project area. All Zhizo settlements here may have formed neighbouring groups, but without precise dating this point cannot be confirmed. If those settlements were contemporaneous, then they probably dated to between AD 900 and 1000.

Neither the Phase I, II nor III investigations established the precise organisation of a Zhizo settlement.Team 1's research at Site 30B, however, clarified the construction, and destruction, of a typical feature. Previous investigators thought that Zhizo villagers had purposefully fire-hardened their grain bin floors. Team 1, however, showed that the burning was later. Although this study does not resolve the same question about other Early Iron Age granaries, it does establish the appropriate methodology.

After the Zhizo population left the area, Letsibogo remained unoccupied for some 400 years, at least by farming communities. This is one of the important results of the previous investigations. The redating and reclassification of Site 125 emphasizes the hiatus even further.

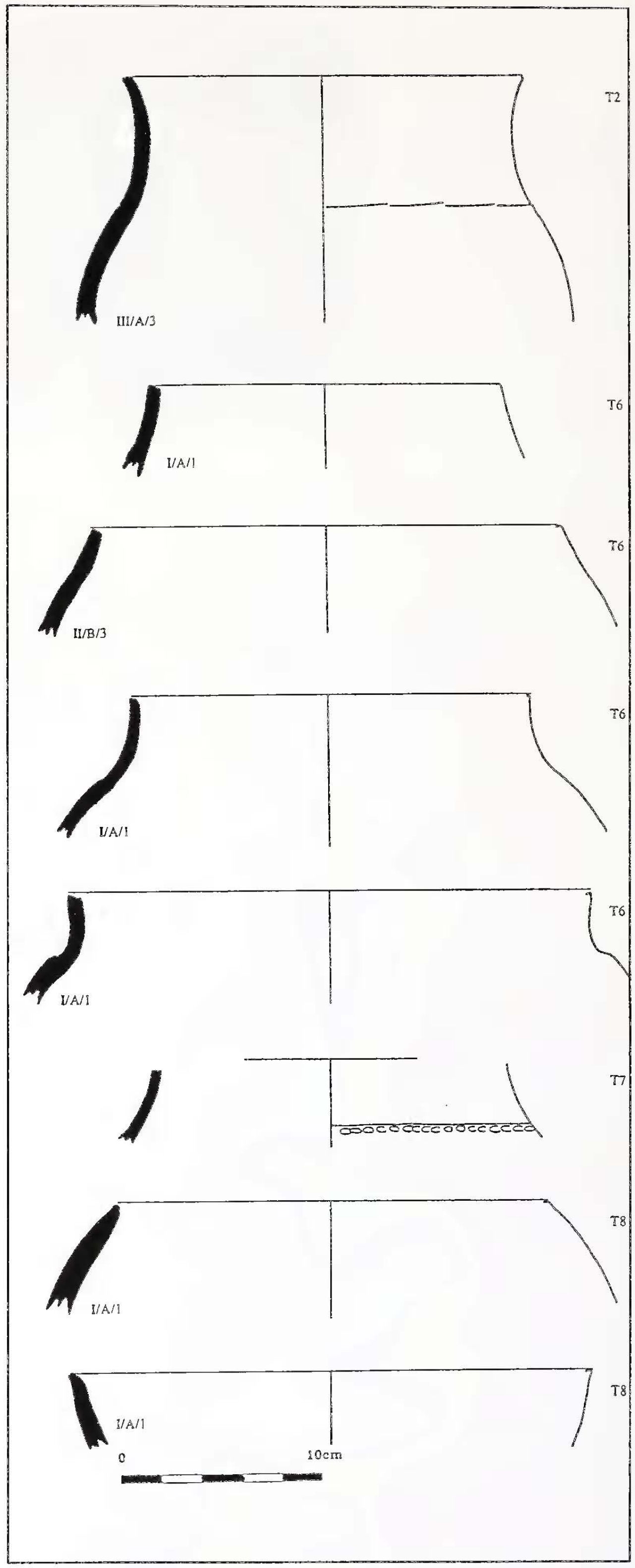


Fig. 54. Site 46, pottery: Type 2 to 8.

Ceramic sequences in the wider area place the hiatus into perspective. The successors to Zhizo in Botswana, the Toutswe facies, clustered in the Palapye area (Denbow 1983), but a few sites were found about 30 km south of Letsibogo during the survey for the North-South Carrier (Reid 1996). All these sites date from about AD 1000 to

1300. This same period encompasses the Leopard's Kopje cluster in the Shashe-Limpopo basin. A Leopard's Kopje site is on record near Bobonong (Kinahan *et al.* 1998), but neither Leopard's Kopje nor Toutswe people inhabited the project area.

Environmentally, this period was suitable for agriculture elsewhere, for example the Shashe-Limpopo Valley. Perhaps the Letsibogo area harboured tsetse fly. On the other hand, the cause may have been political, and Letsibogo may have been a 'no-man's-land' or a royal hunting area. Such areas are well known in southern Africa. Today, for example, the Swazi monarch maintains a wilderness reserve in the mountainous country next to the Komati River, while in early historic times, Lobengula kept a hilly area along the Khame River west of Bulawayo as his private preserve (Robinson 1959:2).

In north eastern Namibia the 19th century chief of the Mbukushu maintained an exclusive hunting preserve near Mohembo, an area marked by an abrupt break in the distribution of archaeological remains from that period (Kinahan 1986).

To assess the likelihood of a wilderness around Letsibogo, one should consider events in the Shashe-Limpopo Valley. There, ivory dominated the trade economy throughout the Zhizo period and into K2 times. After some 200 years of hunting, however, elephants would have been eliminated, or they would have moved away. By about AD 1100, large numbers of K2 farmers had moved to the edge of the floodplains to cultivate the rich agricultural land (Huffman 2000). By this time, then, few elephants could have survived in the immediate region, yet the ivory trade appears to have remained important (Voigt 1983: 79). Thus, some river systems that were optima elephant country, such as the Motloutse, may have been purposefully kept as wilderness.

Later, as the reclassification of Site 125 makes clear, Shona-speaking people from Zimbabwe reoccupied Letsibogo. The ceramic assemblage at Site 125 is the same as those at 86 and the 119 Complex reported here, and many others documented in the earlier investigations (Fig. 55). The three dated sites span a relatively short period.

Site 79B	1420-1505
Site 86	1400-1445
Site 125	1420-1445

This short period dates to the end of Great Zimbabwe and the transfer of political power to Khami. On dating alone, then, it is not clear whether the Letsibogo settlements belong to the Zimbabwe or Khami phase.

The style of walling at Sites 70 and 46 appears to be more typical of Khami than Zimbabwe. Certainly, one ceramic vessel from Site 30B belongs to Khami, and the excavated assemblages reported here are more Khami than Zimbabwe. Together the ceramic and walling evidence suggest the settlements date to the beginning of the Khami phase. Thus they date to between AD 1420 and 1450, or at the most to between AD 1400 and 1500.

The distribution of these Khami settlements suggests they belonged to a single chiefdom. This is another important result of the Phase III investigations. As neighbours, Sites 125, 86 and 119 formed a community of commoners under the political influence of a royal leader. In the Zimbabwe culture, and indeed throughout southern Africa, the unequal distribution of wealth was one of the pillars of leadership (Huffman 1986a). As a consequence, leaders were the wealthiest people, and they had the largest settlements. At Letsibogo this was Site 70, above the confluence of the Sedibe and Motloutse rivers. Royal settlements such as this functioned as administrative centres, and Site 70 was most likely the capital of a petty chief. Smaller sites with similar walling, such as Sites 16 and 48, were probably the homesteads of royal headmen. Their placement on different sides of the Sedibe is also typical of neighbourhood divisions within a chiefdom. The chief's capital itself is usually located near poor agricultural land, leaving the best for the commoners to cultivate. Site 70 fits this pattern. This small capital may have been independent. If not, one of the larger stonewalled settlements near Selebi-Phikwe was probably the district centre.

According to the ethnographic literature, the settlement of a petty chief, such as Site 70, typically sheltered 300 to 500 people, while the settlements of headmen and commoners housed 60 to 100 people, half of them children (Huffman 1986a). On this basis there were probably some 2700 to 4700 people living in the Letsibogo area during the Khami period.

It was possible for this population to live at Letsibogo because of a warm pulse during the Little Ice Age (Tyson & Lindesay 1992). Our phytolith analyses provide partial support for this wetter climate. The phytolith concentrations in the dung at Sites 119B and 125 demonstrate that there had been an extensive grass cover for an extended period. For such a cover, the average rainfall needs to be higher than today. Furthermore, clayey soils, such as those in the reservoir area, need higher rainfall than sandy soils to release their nutrients. The grass composition also has environmental significance, but unfortunately phytolith analyses can identify tribes of grasses but seldom species. Within the Arundinoideae two genera, *Aristida* and *Stipagrostis*, probably account for most of the background phytoliths. *Aristida* species are mostly unpalatable, and often dominate pastures under severe grazing pressure. However, some *Stipagrostis* species are important fodder in semi-arid areas. Within the Chloridoideae, three genera are wide-spread, palatable and common in the area now: *Chloris*, *Cynodon* and *Eragrostis*.The Panicoid grasses of importance today include *Panicum* and *Cenchrus*. *Cenchrus* is a pioneer species that prefers disturbed and enriched soils, such as abandoned kraals, and archaeologists use it as an ecological indicator of Iron Age sites (Denbow 1979). *Cenchrus* and other pioneer species grow in areas that are seasonally overgrazed; this situation probably applied to the entire reservoir area during the Khami occupation.

The charcoal results are compatible with this interpre-

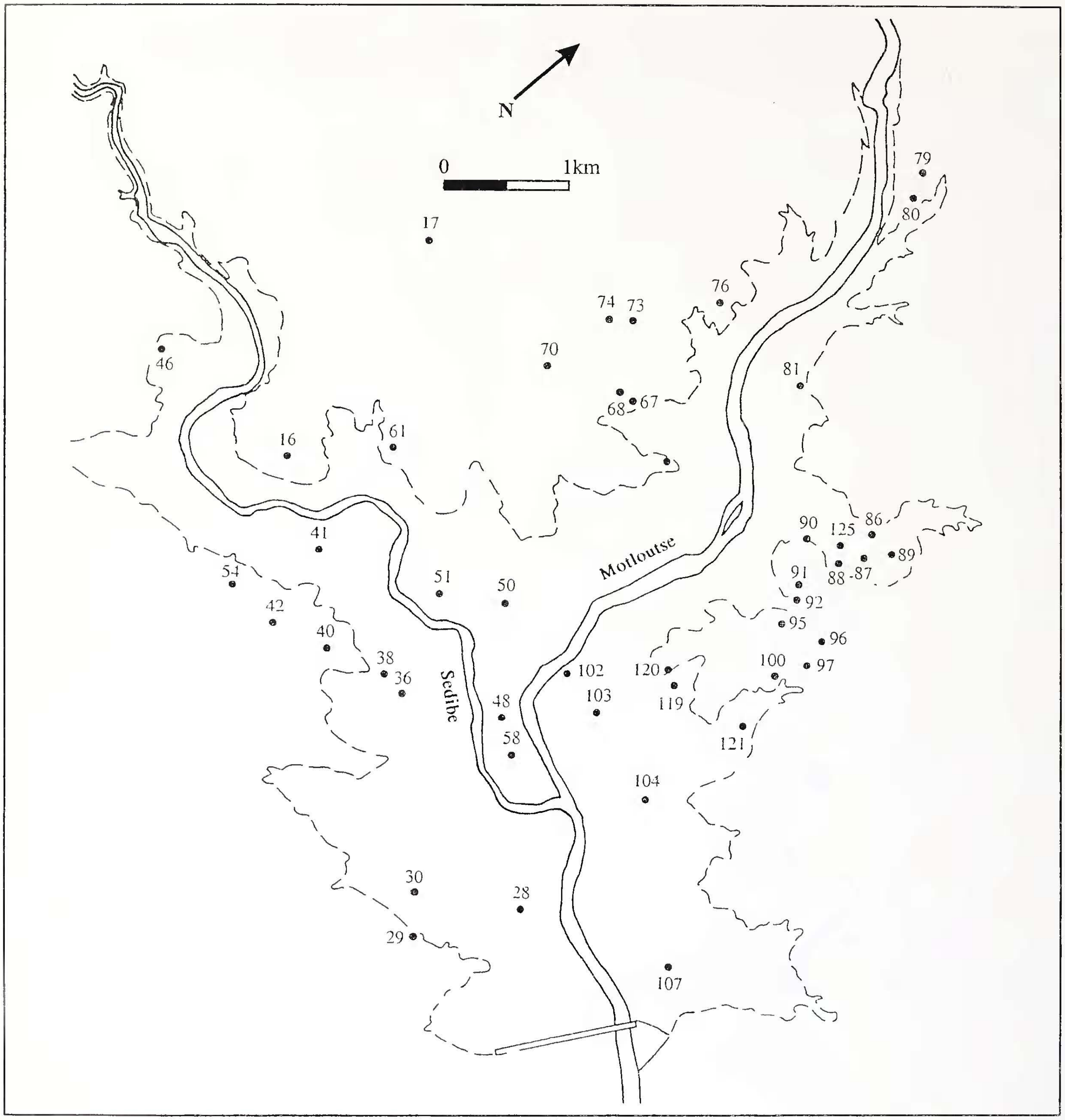


Fig. 55. All Khami sites recorded in the project area.

tation. The *Acacia* species reflect clayey soils and disturbed habitats. *A. karroo*, in particular, is not only a pioneer species but contributes to bush encroachment around fields, waterholes and homesteads where pastures are degraded and viable reserves of soil nutrients are too deep for the roots of most grasses. For herds to prosper in an overgrazed area, seasonal rainfall must be sufficiently regular to regenerate grass growth and sufficiently widespread to permit resting of pasture reserves during the growing period.

The faunal remains provide a third line of evidence. The species list from Site 79B (excavated by Mason and analysized by Brown) includes reedbuck that prefer riparian grassland and hippo that require at least standing pools (Smithers 1986). Even if one removes the impact of present day farming and urban centres, conditions would have to be wetter to support these species.

The numerous grain bins on the sites in the reservoir area provide a fourth line of evidence for higher rainfall. The common domestic grains include sorghum and two millets, *Pennisetum* and *Eleusine*. They have varying requirements, but if grown together, the fields need a minimum of 350 mm of rain in the summer growing season (Doggett 1976; Purseglove 1976). Essentially, they cannot grow with less than about 3 mm of water a day: 50 days for the millets and 75 days for sorghum. To meet these requirements, the minimum annual rainfall needs to be about 500 mm. This amount is about 100 mm more than the Letsibogo area receives today. Whatever the actual amount, one can be confident that the Khami occupation could have only taken place if successful agriculture was possible. The numerous grain bin foundations at Sites 86, 119B and 125, to note a few, suggest that harvests were abundant.

Excavations of the commoner sites uncovered other data pertaining to lifeways. In particular, cattle kraals were more typical than previously thought. The apparent absence of kraals in other commoner sites is probably due to sampling and post-depositional processes. The location of the kraals and grain bins in turn shows that the commoner sites were organized according to the principles of the Central Cattle Pattern. This conclusion parallels results from other excavations outside the reservoir area (*e.g.*, Van Waarden 1989). We can therefore be confident that the cattle kraals belonged to the domain of men, while grain bins and middens were part of the residential zone associated with women. Virtually every excavation of commoner sites uncovered middens among the grain bins. The separate nature of many middens suggests they were formed from the domestic rubbish of individual households. This association is not the case in all settlements with the Central Cattle Pattern, and it may represent a minor but regular variation in social organization.

Another aspect of this pattern concerns metalworking. As is well known, iron smelting took place in seclusion, usually outside the settlement, while smithing was a public activity conducted in the men's area. Recent archaeological data show that metal workers smelted copper at the back of settlements. For example, Feature 28 was a small furnace in the Zhizo level at Leopard's Kopje Main Kraal (Huffman 1974), copper was worked in the residential zone of K2 (Murimbika, pers. comm. 2002) and at least two 17th century Moloko settlements in the Madikwe Game Reserve contained copper furnaces behind the houses (Huffman, *et al.* 1997). Now in some areas today, African societies associate iron with men and copper with women for such reasons as malleability and colour (Herbert 1984). The two furnaces at Site 125, then, are part of a widespread pattern that archaeologists are only now beginning to recognize.

Moloko sherds in one midden at Site 119B and a few Khami sherds at Site 79A lead us to the next main issue of the mitigation programme, the relationship between Khami and Moloko. We begin with identification and origins.

The Phase I report hypothesized that the Early Iron Age Zhizo style evolved into Moloko. The proposed transitional style contained contrasting black and red colouring separated by combstamping that later became stabbed punctates. The investigators tested this hypothesis during Phase II excavations and then withdrew it once radiocarbon dates placed Moloko some 500 years after Zhizo.

For methodological purposes it is worth noting that this hypothesis is not possible for ceramic reasons, regardless of the dating. First, the transitional phase is based on isolated features and pottery fragments, rather than multidimensional types and whole vessels. Secondly, analyses based on accurate procedures demonstrate that Zhizo itself was derived from Gokomere (Huffman 1974; Robinson 1966).

It then developed into Toutswe in Botswana (Denbow 1982, 1983; Huffman 1984) and into Leokwe in the Shashe-Limpopo basin (Calabrese 2000). These neighbouring sequences establish the direction that ceramic change took over a 500-year period (Fig. 56). Significantly, sequences in related branches in the Harare and Victoria Falls areas demonstrate parallel directions of change (Huffman 1989). These parallel sequences provide empirical justification for the principle that ceramic change is conditioned by the previous style: tradition affects the future. Thus, ceramic change over time is not random.

For this reason it is not possible for the Gokomere-Zhizo sequence to have evolved into Toutswe and Leowke, and also into Moloko: Moloko has markedly different motif combinations and stylistic types and therefore belongs to a separate stylistic tradition.

The Moloko sequence is now better documented. Now known as Letsibogo, the Moloko pottery at Site 46 is similar to a dated assemblage from Millbank in the Makabeng of South Africa (Van Schalkwyk 2001). These assemblages belong to the second phase of Moloko (Fig. 57), derived directly from Icon (Huffman 2002). The earliest phase occurs (Fig. 58) in the Limpopo Province of South Africa (Evers & Van der Merwe 1987; Fish 1999; Hanisch 1979; Loubser 1991).

Phase 1 Moloko

Icon	1310-1415
Matoks	1400-1435
Tavhatshena	1290-1415
Nkgaru	1325-1425
Nagome 3	1295-1400
Ficus	1435-1495
	1470-1640

Second phase pottery in the project area is associated with 15th to 17th centuries calibrated dates (Fig. 59).

Phase 2 Moloko

Letsibogo	
2	1475-1655
4	1425-1485
26	1640-1680
46	1520-1690
79A	1450-1690
110	1455-1660
127	1475-1655
Millbank	1505-1635
	1650-1675
	1650-1680

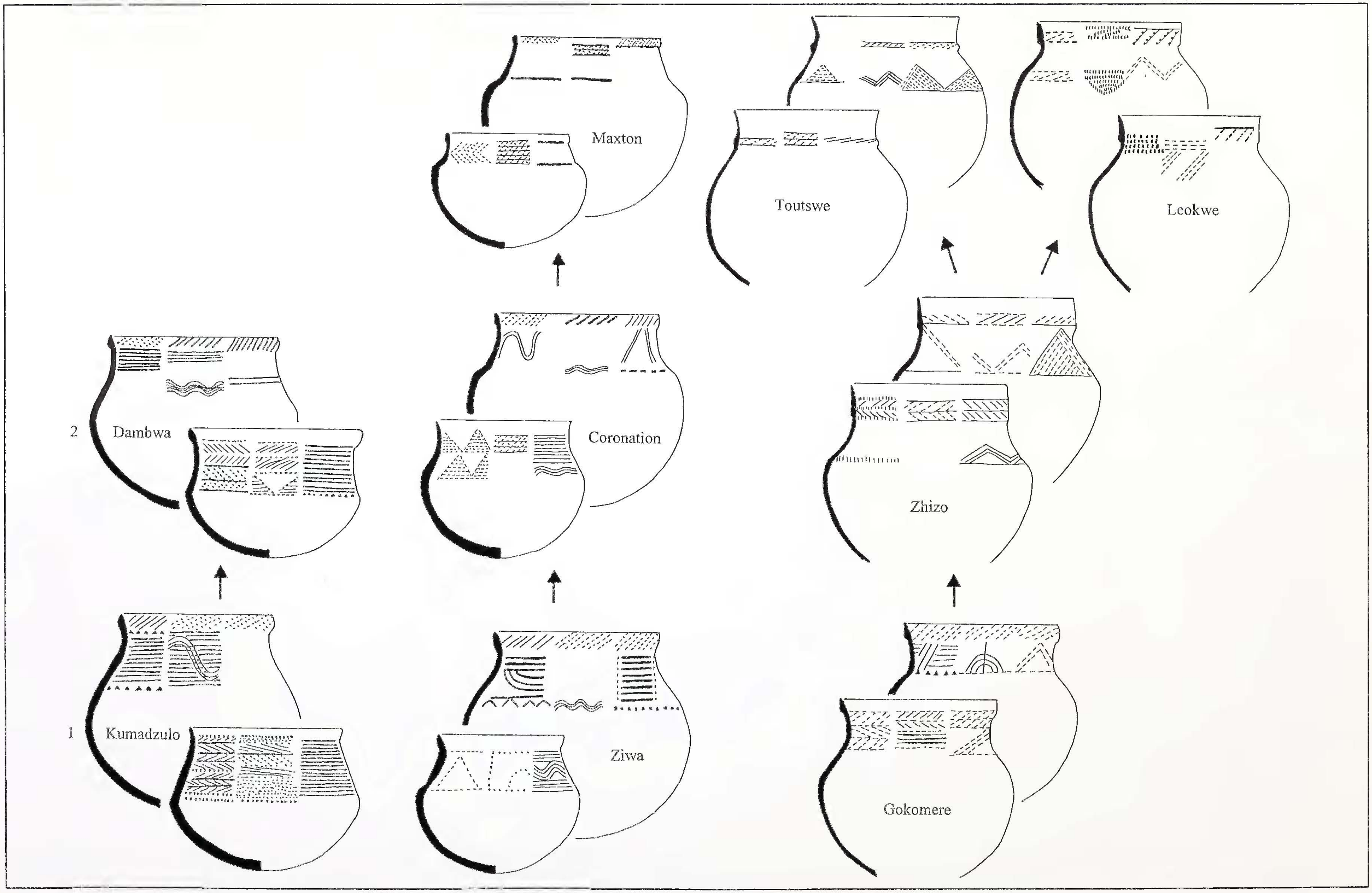


Fig. 57. Sequence of ceramic facies in the Moloko cluster (after Huffman 2002).

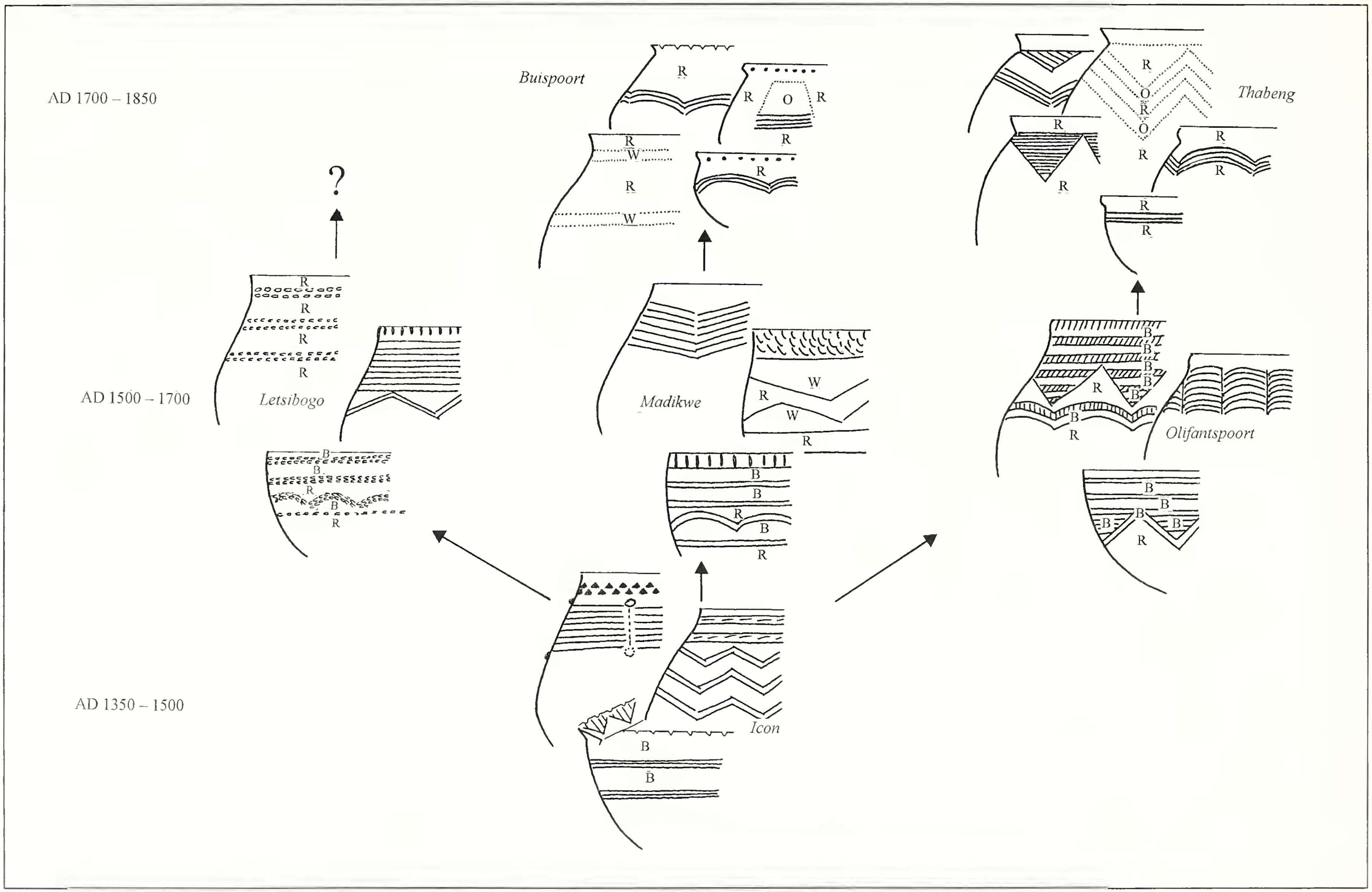


Fig. 56. Sequence of ceramic facies in neighbouring sub-branches in the Nkope Branch of the Urewe Tradition. Note the continuity in motifs and design layout.

For culture history purposes the time span of the Letsibogo facies is important to establish. Historic Sotho-Tswana pottery in the collection of the National Museum, Monuments and Art Gallery of Botswana differs from Letsibogo in that alternating bands of contrasting colour are absent. In fact, on present evidence Letsibogo cannot be connected to any historic Sotho-Tswana style, and Letsibogo appears to have been absorbed by another tradition. The upper limits of the calibrated radiocarbon dates from Letsibogo and Millbank, minus 19th to 20th century segments, are probably a reasonable estimate of the end of the facies. The small gap between the earlier Icon phase and the oldest Letsibogo dates provides an estimate for the beginning. On this basis then, Letsibogo Moloko probably dates from about AD 1500 to 1700 (Fig. 60).

Now that we know the range of dates for Letsibogo, we can better understand Khami-Moloko interaction in the region. Other than the AMS bone date from Site 4, the Phase 2 dates are slightly more recent than the Khami settlements. When one considers the variability between radiocarbon laboratories, these dates probably represent a later occupation of the Letsibogo area.This conclusion is supported by the stratigraphic evidence at Site 119A and Site 46 (as well as Site 79A and Site 79B excavated by Team 3), where in all cases Moloko pottery overlay Khami. The few Moloko sherds at 119B, on the other hand, support the complementary conclusion that Moloko people could have lived in the general region when Khami people occupied Letsibogo. Indeed, at the Majande Ruins near Bobonong less than 50 kilometres south (Tsheboeng 1990), the stratigraphy suggests that the Khami walling was built on top of a Letsibogo occupation. In neither case, however, is there evidence for prolonged interaction. Finally, it is important to remember that the amalgamation in the Soutpansberg that led to the new Venda style (Loubser 1992) occurred during the earlier Icon phase. The interaction in the Letsibogo area, whatever it may have been, was later and certainly less intense.

In addition to culture history and lifeways, our investigations considered post-depositional processes and the relevance of Iron Age settlements as benchmarks of environmental history.

Until now, local and regional culture histories have been the main purpose of most archaeological mitigations in southern Africa. There is a compelling reason to broaden the scope of such enquiries. Countries such as Botswana, depending on natural forage supported by erratic rainfall, are often accused of hastening environmental degradation through agropastoralism (*cf.* Abel 1993; Bienart 1996; Biot 1993).

Critics of this conventional view, on the other hand, call for reliable long-term data (*eg.*, Leach & Mearns 1996). Archaeological studies can obviously improve our understanding of the environmental impact of agropastoral practices, but the terms of reference for impact studies and mitigation need to be broadened. In particular, there is a need to move from site-specific to broad area-based studies, since subsistence agropastoralism is an extensive land use system. Ideally, Phase I and Phase II studies need to identify clusters of farming settlements that can be simultaneously investigated during Phase III.

An integrated approach (see Stromquist *et al.* 2000) should estimate intensity, duration, productivity and impact of agropastoral settlement. The first of these requires systematic survey data, such as the Letsibogo project produced for the Khami period. The second requires not only firm dating, but also some estimation of settlement duration, taking into account post-depositional processes that reduce the quantity of archaeological material. Productivity estimates should consider soil fertility, granary numbers and numbers of stock. And finally, impact estimates require that archaeological data should be integrated with evidence of soil erosion and vegetation change. At present, the results of archaeological research are seldom used to their full potential.

End notes

1. Area a comprises Trenches y9x31x, y9x40, y7.5x35, y22x20, y9x34, y30x60, y15x40.
2. Area b comprises Trenches y18x34, y21x40, y15x40, y15x50, y30x34, y22x44, y21x50, y24x34, y18x44, y24x44, y21x50, y15x50.
3. Area c comprises Trenches y39x44, y42x34, y39x44, y36x34,y52x37, y45x43, y48x34, y54x34, y61x34.

ACKNOWLEDGEMENTS

We thank the four archaeological students from the University of Botswana and our local labour. John Calabrese, Mandy Esterhuysen and Jeannette Smith supervised them at various times. We also thank Andy Brown and Earl Robinson for their help with the analyses, and the National Museum and Art Gallery for their cooperation and support. Paul Larkin of Aqua Tech Groundwater Consultants directed the overall project.

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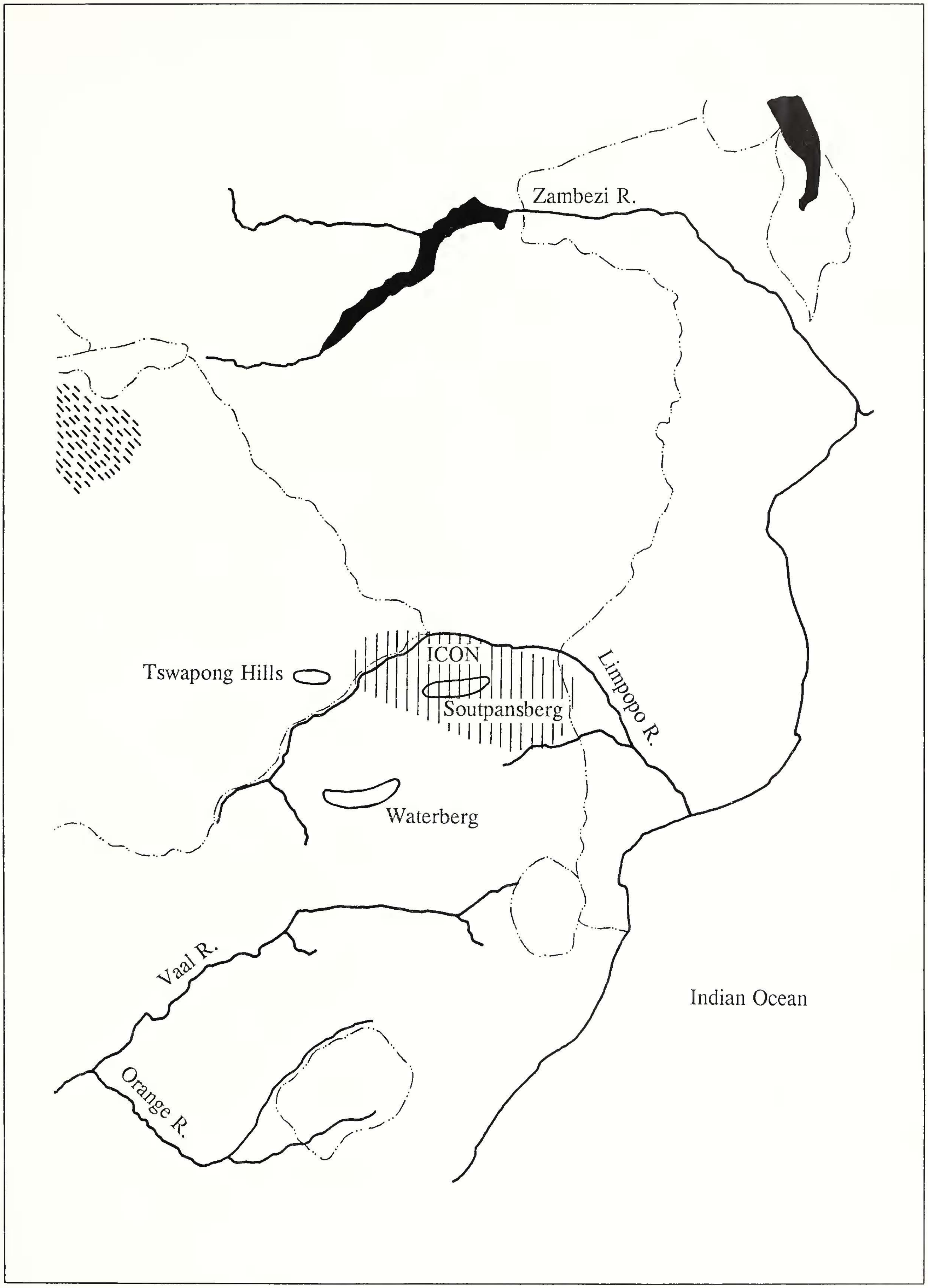

Fig. 58. Known distribution of the Icon facies of Moloko (after Huffman 2002).

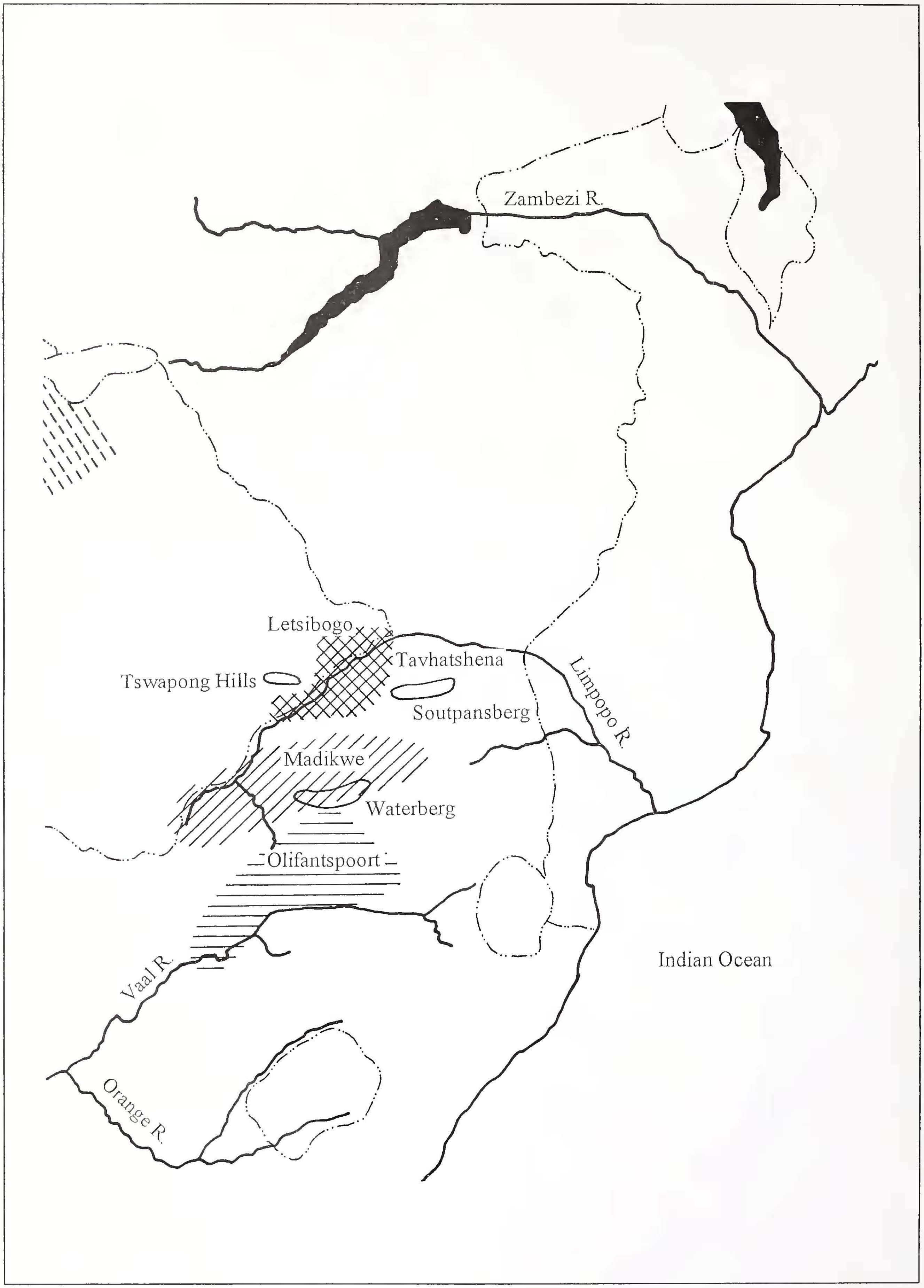

Fig. 59. Known distribution of the Letsibogo, Madikwe and Olifantspoort facies of Moloko (after Huffman 2002).

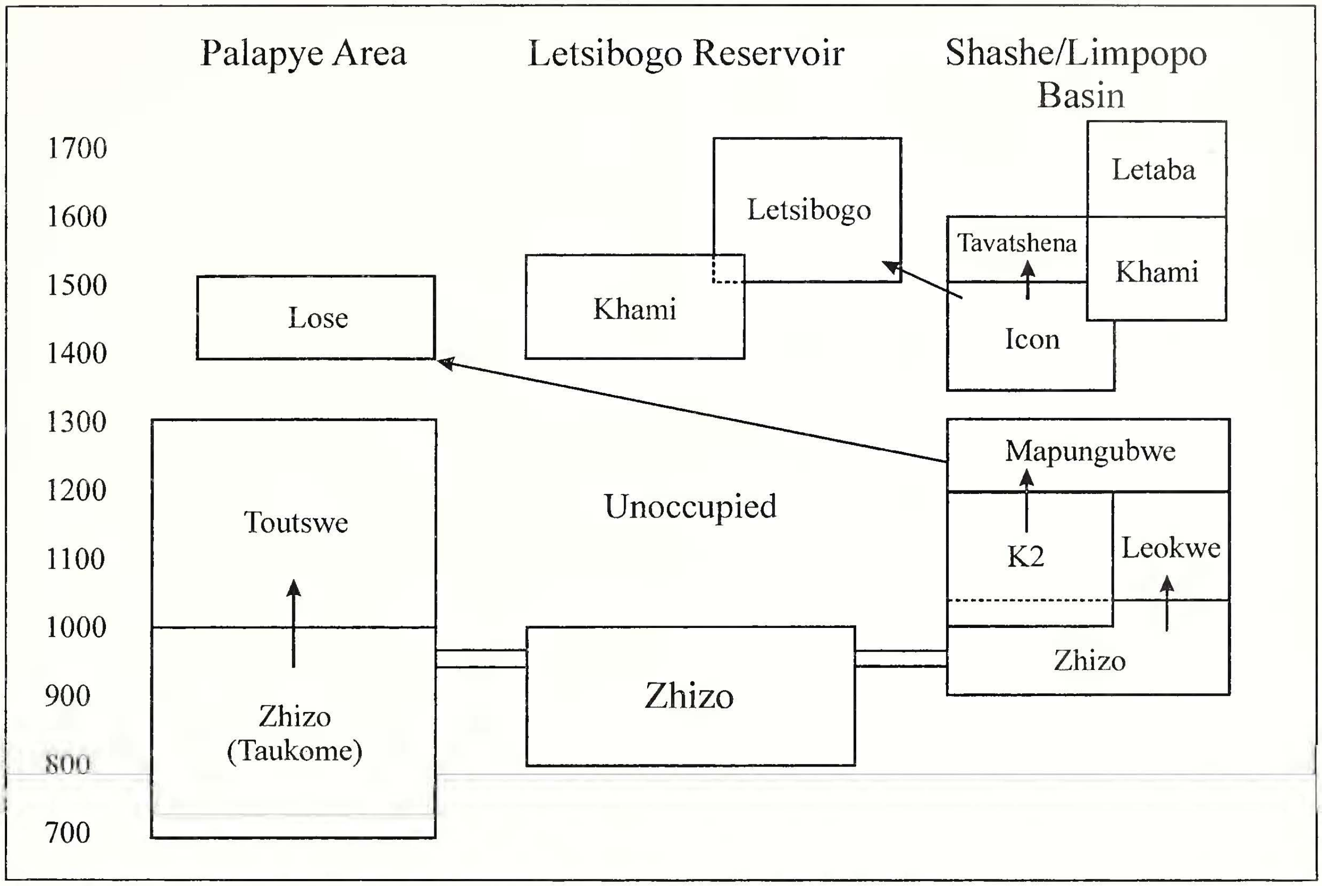

Fig. 60. Culture-history sequence in Letsibogo and neighbouring areas.

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