ARCHAEOLOGICAL SURVEY & EXCAVATIONS OF THE RICHARDS BAY MINERALS ZULTI NORTH & TISAND MINING LEASES

For Richards Bay Minerals

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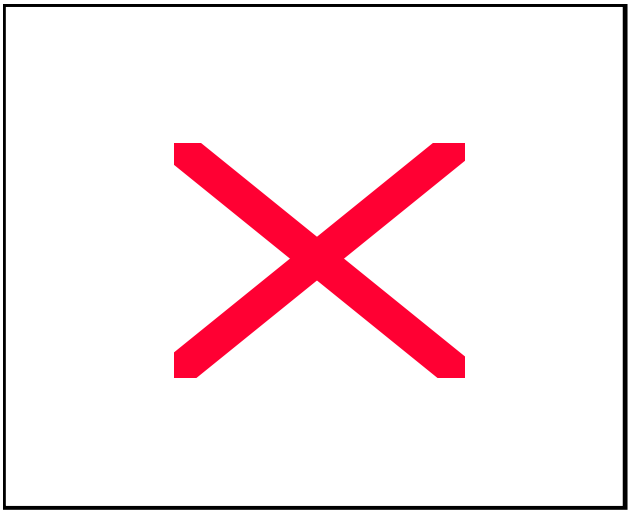

INTRODUCTION

The archaeological survey of the Zulti North and Tisand mining lease areas began near the end of 1994. The survey program emerged from recommendations by Whitelaw (1993) after a Richards Bay Minerals initiative for a systematic archaeological survey ahead of dune mining activity. Both the initial and current survey form part of Richards Bay Minerals Integrated Environmental Management Program for dune mining. This report serves to consolidate the results of the archaeological surveys and excavations undertaken by the Institute for Cultural Resource Management (ICRM) between 1996 and 1999.

A total of ±137 archaeological sites have been recorded so far in the vicinity of the mining lease. Most of these sites have been sampled and 20 have been excavated. Four of these sites have been radiocarbon dated and the results are discussed below.

The terms of reference for this project are :

- to undertake an archaeological survey of the Zulti North and TiSand Lease area;
- to record archaeological sites and undertake appropriate mitigation; and,
- to write up the results in an annual report.

The empahasis in the Terms of Reference for this contract is on salvage and mitigation, and not research. The survey and mitigation is performed in accordance with requirements contained in national and provincial heritage legilsation.

THE ENVIRONMENT

The area consists of a flat coastal plain interspersed with large sand dunes, often greater than 150m in height, near the sea. These dune cordons were formed during the Late Pleistocene as the sea retreated (Hobday and Orme 1974). This marine transgression resulted in several lakes being formed, often being estuarine, and the rivers were deflected so as to run parallel with the coastline. The KwaZulu-Natal coastal plains have been described by Moll (1976) as Coastal Dune Forest. Present day vegetation tends towards grasses along the flatter plains, although in the past they were probably Coastal Dune Forest. These changes in vegetation are probably partly a result of Iron Age farmers' slash-and-burn methods for clearing plots of land (see Hall 1981). The dunes tend to be high and there are 3 – 4 dune cordons between the coast and the Lake.

The soil tends to have a low nutrient status, although exceptions do exist. This is probably a result of the soil consisting of weathered marine deposits formed during the Cretaceous Period (King 1972). This is in contrast to the soils in the hinterland which are mainly formed on the Karoo Formations. The impact of nearly 2000 years of agriculture may have affected the nutritious value of the soil as well.

METHODOLOGY

The archaeological survey entails a foot survey of areas affected by the mining process. In the initial surveys we realised that the dense forest vegetation resulted in poor archaeological visibility, since many sites were approximately 20 - 30cm below the surface. These surveys were conducted along fire breaks, dune slumps and roads, where the topsoil had been

removed, thus making the sites visible. It soon became apparent that more sites were to be found beneath the soil of the coastal forest. The new strategy was to co-ordinate the surveys after bush-clearance had taken place, but before dune mining began. This interim period in the mining process allows for the sites to be exposed.

During the course of this year's survey several shell middens have been recorded. These middens contain several kilograms of shell remains, in addition to faunal remains, pottery, etc.. It would be unproductive to excavate the whole shell midden and examine all of the shellfish remains, in terms of a curation perspective. For this reason each shell midden is selectively sampled as a representation of the site as a whole. These samples tend to be 1 m x 1 m squares. On occasion half of the site may be excavated, such as MPE10.

Each scatter of artefacts is usually regarded as a site. This allows me to create a finer resolution of pottery styles and thus reduces problems with multicomponent sites. All sites have been grouped according to low, medium and high significance. Sites of low significance have no diagnostic artefacts. Sites of medium significance have diagnostic artefacts and these are sampled. Sampling includes the collection of artefacts for future analysis. All diagnostic pottery, such as rims, lips and decorated sherds are sampled, while bone, stone and shell are mostly noted. Sampling usually occurs on most sites. Sites of high significance are excavated and/or extensively sampled. The sites that are extensively sampled have high research potential, yet poor preservation of features.

Significance is generally determined by several factors. However, in this survey, a wider definition of significance is adopted since the aim of the survey is to gather as much information as possible from every site. This strategy allows for an analysis of every site in some detail, without resorting to excavation. I use this type of sampling since dune mining destroys all evidence of a site.

Defining significance

Archaeological sites vary according to significance and several different criteria relate to each type of site. However, there are several criteria that allow for a general significance rating of archaeological sites. These criteria have been modified for the RBM contract.

These criteria are:

1. **State of preservation of:**
   - 1.1. Organic remains:
     - 1.1.1. Faunal
     - 1.1.2. Botanical
   - 1.2. Presence of a cultural deposit
   - 1.3. Features:
     - 1.3.1. Ash Features
     - 1.3.2. Graves
     - 1.3.3. Middens
     - 1.3.4. Cattle pens
2. **Spatial arrangements:**
   - 2.1. Internal housing arrangements
   - 2.2. Intra-site settlement patterns
   - 2.3. Inter-site settlement patterns

3. **Features of the site:**
   3.1. Are there any unusual, unique or rare artefacts at the site?
   3.2. Is it a type site?
   3.3. Does the site have a very good example of a specific time period, feature, or artefact?
4. **Research:**
   4.1. Providing information on current research projects
   4.2. Salvaging information for potential future research projects
5. **Inter- and intra-site variability**
   5.1. Can this particular site yield information regarding intra-site variability, i.e. spatial relationships between various features and/or artefacts?
   5.2. Can this particular site yield information about a community's social relationships within itself, or between other communities.
6. **Archaeological Experience:**
   6.1. The personal experience and expertise of the CRM practitioner should not be ignored. Experience can indicate sites that have potentially significant aspects, but need to be tested prior to any conclusions.
7. **Educational:**
   7.1. The educational value of a site can only be fully determined after initial test-pit excavations and/or full excavations.
   7.2. Educational value is in terms of display at an Heritage institution

The more a site can fulfill the above criteria, the more significant it becomes. Test-pit excavations are used to test the full potential of an archaeological deposit. These test-pit excavations may require further excavations if the site is of high significance. Sites may also be mapped and/or have artefacts sampled as a form of mitigation. Sampling normally occurs when the artefacts may be good examples of their type, but are not in a primary archaeological context. Mapping records the spatial relationship between features and artefacts.

RADIOCARBON DATES

Four samples, from excavated *Perna perna* (brown mussel), were sent for radiocarbon dating in December 1998. The samples were selected as they were associated with diagnostic features in the ceramics that were previously undated. These dates are summarised below.

Nat. No.	Local Name	Pottery Group	Pottery Decoration.	Provenance	BP date	Calibrated date (AD)
KZ96/29	MPD32	Group 6	Circular and square impressions, lip notching and incisions	Sq. 1 Lens 1	1095±20	1295 (1303) 1312
KZ96/37	MPD40	Group 7	Shell impressed and comb stamped decorations in rectangular and triangular decorations; lip notching and	Sq. 13 Lens 1	985±20	1388 (1401) 1412

			incisions			
KZ98/ 11	MPE4	Group 5	Finger nail impressions, lip notching	Sq. 5, Spit 5	890±20	1441 (1451) 1461
KZ97/9	MPE2	Group 9C	Undecorated, everted rims, thin lip incisions	Sq. 1 Lens 1	790±20	1499 (1515) 1529

These dates are important since they are approximately 300 – 400 years earlier than what I had expected. Previous reports to RBM stated that the early Late Iron Age sequence was "missing" in the dunes, and that there appeared to be an hiatus of 400 years between the two Iron Age occupations. The radiocarbon dates have changed the interpretation of the local are history. The sites, with the radiocarbon dates, are integral in the Iron Age debate (see main discussion below).

SMALL FINDS

The small finds described in this section refer mainly to the 1998 – 1999 archaeological survey, with the exception of the ceramics. Table 1 summarises the result of all sites recorded in the mining lease.

Pottery

Many pottery fragments have been sampled and these include pots, bowls and lids. Pottery decorations are varied and form the main basis for classifying different phases of the Iron Age. This allows for several sites to be grouped together, even if separate sites do not initially appear to have the same stylistic decoration. It is easier to identify specific phases in the EIA sites than for the LIA and Historical periods. However, this is due to the emphasis on Early Iron Age research in KwaZulu-Natal in the past - much of the LIA remains under researched. This pattern is now changing after more sites have been excavated along the coastal plains of KwaZulu-Natal (especially north of Richards Bay) and some of these have been radiocarbon dated. Pottery categories are according to the 1995 – 1997 survey pottery categories, but have been re-assessed in terms of more data and the radiocarbon dates.

The ceramic classifications can be divided into nine groups. Some sites have been placed in several groups since they contain elements of two or more groups. This could represent the evolutionary nature of ceramic decorations or a site with several occupation horizons. Appendix A gives a more detailed description of each pottery category. Below is a summary of these groupings for all recorded sites.

Group 1 pottery decorations occur mostly on the rim and neck, although some vessels have body decorations. Group 1 sherds are referred to the Matola Phase of the EIA. Group 1 sherds were recovered at MAP2, MPD13a, MPD4, MPD5, MPD6, MPC13, MPE1 and MPD50.

Group 2 pottery decoration occurs on the rim, neck, shoulder and body of the vessel, and is thus more varied than the Group 1 decorations. Group 2 sherds are referred to as the Msuluzi Phase of the EIA. Group 2 sherds were recovered at MAP2, MPD5, MPA10, MPC30, MPC31, and MPE1.

Group 3 pottery sherds are decorated mostly along the rim-neck junction. Group 3 sherds are referred to as the Ndondondwane Phase of the EIA. Group 3 sherds were recovered at MPB7, and MPE1

Group 4 pottery decoration occurs mainly on the neck of the vessel and to a lesser degree on the rim and body. Group 4 sherds are referred to as the Nthshekane Phase of the EIA. Group 4 sherds were recovered at MAP2, MPC 99/5, MPC 99/6, MPD 99/4, MPA10, NDO1, and MPE1.

The upper ceramic groupings all belong to the EIA. The ceramic groupings below date to the Late Iron Age and Historical period. I have arranged these groupings chronologically, and not according to ceramic group number. That is, the ceramic grouping number does not imply a chronological sequence. Once this sequence is more refined I intend to give these groupings specific names.

Group 6 pottery is characterised by circular impression on the shoulder, neck or body of the pot. Rims are slightly everted and may have lip notching or incisions. Group 6 sherds were recorded at MPE10, MPE 99/6, MPD 99/4, MPC 99/5, MPC 99/6, MPC 99/8, MPA11, MPA17, MPA22, MPD13a, MPAC1, MPB20, MPB22, MPB30a-b; MPD30, MPD31, **MPD32** [1], and MPD53.

Group 7 and 8 have been subsumed into one group. This pottery is characterised by shell-impressed decorations, *iiSumpa* ('warts'), notched lip impressions and rectangular impressions on the shoulder or body of the vessel, circular to square notching on the rim, shoulder and/or body of the vessel. Group 7 sherds were recorded at MPE 10, MPE 99/6, MPE 99/7, MPD 99/4, MPC 99/5, MPC 99/8, MPD13, MPD16, Mananga 2, Mananga 3, MPA1, MPA13b, MPC30, MPC31, **MPD40**, MPB52 MPC56, MPAC1, MPC7, MPC11 and MPX1, .

Group 5 pottery is characterised by fingernail impressions. Group 5 sherds were recorded at MPE10, MPE 99/6, MPD 99/4, MPC 99/5, MPC 99/8, MPB 99/1, MPA10, MPB25a-g and RBM002a-d, and **MPE4**.

Group 9 pottery is characterised by impressions on the lip, while rim, shoulder and body decorations are rare, with the exception of two sherds at Mananga 4. Group 9a, 9b and 9d are probably related in time. They are characterised by elongated notches on the lip that extend from the inner to outer lip, but mostly on the outer lip. In group 9d the notching extends over the whole lip. Group 9c pottery has small oblique incisions on the lip. Group 9e sites are characterised by small scatters of sherds with undecorated rims and lips, suggesting a more recent age. Group 9e sherds are from sites where I cannot place them in a specific group, and it should be considered as a indeterminate group.

Group 9a sherds at MPA10, MPA13, MPA21, MPB6, MPB9 and MPD21, MPB40 and MPD56

Group 9b sherds at MPD11, MPDX5, MPD13a, MPA10, E1, E2, MPB40 and MPD56

[1] Site names in bold mean refer tos ites that have been radiocarbon dated.

Group 9c sherds at MPC60, MPB7, MPC55, and **MPE2.**

Group 9d sherds at MPB40 and MPD56

Group 9e sherds at MPD19, MPD18, MPC12, MPB5, MF1, MPD1, E1, MPD22, MPA16, MPA24, MPB30, MPB31, MPB50, MPB51, MPC40, MPC41, MPC50, MPC51, MPC52a-b, MPC57a-b, MPC99/6, MPC99/1, MPC65A/B, MPC99/7, MPC99/8, MPC99/2, MPD50, MPD52, MPD55, MPD56, MPD57, MPD99/2, MPE3, and MPE6.

In general, group 9 pottery may reflect either temporal or spatial variation within a pottery style. I have not presented these subgroups in a chronological order, and these divisions will probably change as more sites are assessed. For example, Group 9c (and before) may relate to the occupation of the area by northern Nguni, that is a Tsonga language, while the others from Group 9 may well relate to the Zulu-Nguni occupations of the area.

Utilised Stone

Upper and lower grindstones occur at most of the sites. The upper grindstones tend to be beach pebbles that have been systematically utilised forming the standard wear patterns associated with these artefacts.

The lower grindstones tend to be made from white beach sandstone, are dish-shaped, and vary in size. The average size of these grindstones is 60cm x 30cm x 10cm. These grindstones are associated with all types of sites.

Whetstones were probably used for sharpening metal artefacts. They are made mostly on the coarse white beach sandstone, although a few beach pebbles have been used. Whetstones occur at all sites.

I use the term palettes to describe stones that are approximately 20cm in diameter and 10 cm – 5 cm wide, and are made on quartzite pebbles. They show signs of utilisation in the form of being rubbed smooth on one or more sides and tend to be flat in shape. Their use is unknown or it may be a multi-purpose artefact. Palettes were found only on LIA and Historical sites.

Hammer stones are pebbles that have been used to break other pieces of stone, or used as pounders or mortars (i*zigqulo)*. They have characteristic impact marks along the edges of the pebble. These artefacts were recorded at all sites. Mortars were recovered at MPE 99/6 and MPE 99/7.

Metallurgy

The ore is ‘bog-iron’ (ferruginised ore), and high iron bearing rock. Iron ore was found at all sites in varying quantities.

Slag occurs at all sites in various quantities, but mainly in the lower horizons of MPD 99/4, MPE1 and MPE 99/9.

MPE 99/9 is a furnace site that includes tuyéres, glass, furnace fragments, slag, bloom and iron ore. The site is described below

Faunal Remains

While a large range of animals were eaten, poor preservation has made it difficult to identify fragmentary bones to the genus and/or species level in the past. With the excavations of several sites, the samples of faunal remains have increased, e.g. in shell middens that enhance the preservation of organic remains. It is for this reason that I have increased the excavation and/or sampling of shell middens in the affected area.These remains have not been formally identified; however, they can be summarised as follows:

- Large bovid (e.g. cattle, buffalo)
- Small bovid (e.g. sheep/goat, small antelope)
- Aquatic mammals (e.g. hippopotamus and/or dolphin)
- Birds
- Fish (marine and/or freshwater, including shark)
- Tortoise

Human remains

Very few archaeological sites in KwaZulu-Natal have human remains, and the excavation of these can yield valuable information regarding religious behaviour, human demography and subsistence. Six individual human skeletal remains were recovered in 19999 survey. Three of these were still in graves, three had slumped with the dune, and one was mostly incomplete. These skeletal remains date mostly to the LIA. That is, they predate the arrival of the Mbonambi and Sokhulu people. The human skeletal remains from the 1999 survey are discussed below, while those from previous surveys have been discussed in previous reports. To date, however a total of **xx** human skeletal remains have been recovered from the RBM area (see Appendix B for a description of some of these remains).

MPC 99/5

The skeletal remains from this site were located at the top of the second dune (from the west). A bulldozer had cleared the top soil off the site, and did not impact on the burial. No grave goods were associated with the grave, and only one diagnostic sherd, with Ntshekane decorations, was found in the vicinity.

The burial was in sitting position with the cranium facing south south-west (or facing sunset). The legs were flexed with the pelvis resting on the heels of the feet. The arms were positioned above the legs and flexed towards the rib cage, while the hands were in front of the face.

The skeleton is well preserved and but fragile. Several of the bones were broken (*post mortem*) and root activity was evident in the remains.

I tentatively date the skeleton to the LIA, however, the occurrence of the Ntshekane sherd near the burial is interesting. The people from this time period tended to live in the valleys of the dunes, while LIA people lived on the upper parts of the dunes. This skeleton will be radiocarbon dated as it has important.

MPD 99/7

Three separate skeletal remains were recovered from this site, and are associated with Group 5 and 7 pottery. The first skeleton was very fragmentary and a few remains were recovered as it had been dispersed by a bulldozer. The second skeleton had slumped with the dune and recovered for future physical analyses.

The third skeleton was mostly undisturbed, however rootlets had damaged the skeletal remains, causing the bones to be fragile and deteriorated. The burial was in a semi-seated position, however the vertebral column and pelvis were on its side. The forelimbs and hands were positioned towards the chest and above the legs. The legs were in a crouched position and in front of the pelvis. The cranium faced southwest, or towards sunset. The skeleton may have collapsed with bulldozer activity, hence its semi reclining position. No artefacts were directly associated with the grave, nor was there a visible outline of the grave. However, this skeleton, as with the other two, were situated near shell middens that I have associated with the periphery of the site. This skeleton needs to be analysed and dated.

MAP1

I was informed of the burial by RBM personnel and members of the Richards Bay Geological Society. The excavation of the human remains formed part of this society's outing.

The skeletal remains were located north of the mining lease, near a rock outcrop besides the beach. The skeletal remains were located north of the mining lease, near a rock outcrop, ± 5 m from and above the high tide mark. The main site was an extensive shell midden ±50m long and 15 cm – 25 cm deep. Four smaller middens were observed above the main midden.

The initial onsite inspection suggested that human remains may be *in situ*. However, further excavations only recovered the tibia and fibula; the rest of the skeletal remains having fallen into the sea.

Marine shell

Several marine shell species have been recorded and are the remains of shell middens (rubbish dumps), often in association with identifiable domestic areas. The middens are roughly circular in shape and vary in size and depth. I have not yet completed any detailed analyses of sites, however, the contents are probably similar to those sites previously analysed. Table 2 lists species so far identified in the RBM area in general.

My current strategy for shell middens is to sample as many as middens as possible. These samples are mostly in the form of small excavation, often a quarter of the midden. Larger excavation occur in sites where deep sequences are available. In this way I can compare small individual and larger long-term occupations within and between sites.Shell middens give information about resource exploitation, changing sea temperatures (by means of oxygen isotope analyses) and thus also chanign environments.

In addition to this, I am trying to understand patterns of refuse discard as this may be related to the location of individual and/or communal dumps. If the former, then I may be able to locate individual houses and thus infer intrasite spatial patterns, e.g. MPE 99/7. The only problem with this is that house floor remains do not preserve as well as other remains, and I have as yet, only excavated one confirmed house floor (MPD32) – see the 1997 report.

Glass beads

Several glass beads were recovered from MPE99/6 and MPE 99/7. These beads are probably originally from the Mediterranean region, however further specialised analyses is still required[2]. The beads from MPE99/7 are summarised below:

Site	Square	Colour	Internal Bore (mm)	Width (mm)	Length (mm)
MPE99/7	2	Pink	0.74	2.08	2.47
MPE99/7	2	Black on red	1.12	2.57	4.25
MPE99/7	2	White	0.94	1.77	2.59
MPE99/7	2	Red on white	1.28	2.85	3.25
MPE99/7	2	Red on white	0.51	2.07	2.34
MPE99/7	2	White	1.1	2.61	3.67
MPE99/7	15.3	Oyster white	3.46	15.43	16.32
MPE99/7	15.3	Red on pink	2.43	8.56	8.76
MPE99/7	15.3	Indian red on green	0.85	2.41	2.7
MPE99/7	15.3	Navy blue	0.91	1.37	2.68
MPE99/7	15.3	Black	1.35	1.72	3.42
MPE99/7	15.3	Black	1.37	1.73	3.4
MPE99/7	15.3	Pink	0.44	1.21	1.66
MPE99/7	15.3	White	0.63	1.44	2.22
MPE99/7	15.3	White	0.77	1.41	2.06

DESCRIPTION OF EXCAVATIONS & FEATURES

MPE10

The site was excavated over a six week period and these excavations concentrated on the shell midden. I considered MPE10 to be of high archaeological significance as it is the first deep cultural sequence recorded in the mining lease. The site had the possibility to yield decorated pottery, datable material and a range of faunal remains not normally seen in the smaller sites in a stratigraphic sequence.

[2] Dr Sharma Saitowitz, a glass bead expert, has expressed interest in analysing these beads and will contact me once she is in South Africa.

MPE10 is situated near the top of the second dune cordon from the sea. There is a flat valley between the two dunes and a rock outcrop on the coast. The midden had been exposed by a bulldozer cutting that may have removed ± 2m of the midden. Twenty 1 m x 1 m squares were excavated down to a sterile light brown sand. These squares constituted half of the site (fig 1).

Certain squares were bulk sampled. In other words, all material from that square was kept as a sample of the site. Squares that were not bulked, were sorted for pottery, faunal remains, beads, charcoal, special finds and certain *Perna perna*. categories The *P. perna* categories are: measurables and countables (discussed below).

Stratigraphy

The site was excavated stratigraphically according to shell lens deposits. A total of twelve main lenses, with various subdivisions, were excavated (fig. 2). The main lenses were on average 2m in diameter and ranged from 5 cm to 15 cm in depth. In many cases these shell lenses peeled off according to the way in which they were deposited. Several of the larger lenses were divided in to sub-lenses. These subdivisions a followed the same pattern of deposition. These subdivisions are characterised by a fragmetned upper lens, a fragmented lens in brown sand and a basal lens in black sand with a mostly unfragmented shell lens. A light brown sand occurrs underneath these and is a sterile layer. This lower lens tends to form a shallow basin lined with whole *Perna perna.* Small fire pits were recorded and these were located at the lower part of the site (in Squares 6 and 8).

Part of the site had been effected by root activity and or rodent burrows. These burrows also formed nests and they were characterised by areas of very fragmented shells. The nests and roots resulted in parts of the deposit collapsing.

Artefacts

The site is still in the process of being analysed. Below is a brief summary of the finds.

Ceramics

Several fragments may be reconstructed, suggesting that some of the pots were still (near) complete when they were deposited. In addition to this three complete pots were removed. Unfortunately, none of the (near) complete pots were decorated. One of these pots was used for maas: it is a deep pot with a perforated hole at the base.

One sherd has a Matola (Group 1) decoration. This sherd is at the base of the excavation and in association with faunal remains. These are the first faunal remains in the mining lease to date to this time period. Other sherds had various types of lip decorations, but most are undecorated. Those that are decorated tend to be Group 6, 7 and 5 pottery. This means that part of the site dates from the late 14th century AD, and possibly the lower quarter may date to the from the 3rd century AD. The radiocarbon dates from this site should be interesting, since the RBM sample is still missing the earliest part of the LIA, i.e. AD 1100 to AD 1250, and this site may have these occupations.

Stone

Several fragments of upper and lower grindstones were recovered. The former tend to be on beach pebbles, while the latter are on white beach sandstone.

Bone

A range of faunal remains were recovered. These included wild and domestic bovids, a high density of fish bones, avian remains, aquatic mammals and two shark teeth. This is important, since I can now generate a sequence of fish species through time, that may give information on palaeoenvironments, amongst other things

Shell Adornments

Several shell species have been used for adornments; these include *Nassarius kraussianus* and *Tivela spp*..

Marine Shell

Many marine shell species were recovered. While these species still need to be identified, they appear to be similar to those found at other sites (Table). *P. perna* is the most common species in all shell lenses. These shells are located at rocky outcrops on the beaches - the nearest outcrop to MPE10 is Dawsons Rock.

I am currently analysing *P. perna* to determine if there is an overexploitation of this resource through time. Alternatively, the change in sizes may relate to palaeoenvironmental changes, which in turn may have affected human settlement patterns in the dune cordon. The results of this study are important since if changes (social and/or environmental) do occur then they may occur at the introduction of the LIA into the area.

All excavated *P. perna* are being measured - so far ±20 000 measurements have been made. This large data base has two important uses. First, no other sites have been specifically excavated in KwaZulu-Natal to specifically analyse shellfish exploitation patterns through time. Second, many *P. perna* are inadvertently broken during excavation, and are thus not measurable. However, Hall (1980) has correlated the internal scar measurements with the total width of the shell (fig. 3). Hall's results indicate that there is a clear correlation between the two measurements. However, Hall's sample size (n=168) is too small to make clear inferences. A more precise inference can be made with the sample size from MPE10. In addition to this, the site has the advantage of a chronological sequence that may introduce another variable, such as sea temperature changes effecting mean size through time (see Gerardino 1998 xx).

Correlations between internal and external measurements

Pearson Correlations were used to determine if there is a correlation between the internal scar and total length of *P. perna*. At first all shell were grouped together for a general correlation (Table 3). Second, each excavated lens was compared to see if there is a change in time. The general correlation indicates there is a strong correlation between the internal and external measurements. However, there is variation in individual shell lenses. This means that one may not be able to use Hall's original data and that the measurements, or there inferences are no longer valid. The next stage of the analyses is to understand the meaning for these variations, e.g. oxygen isotope analyses may show changes in sea temperatures which are related to environmental changes. More data still needs to be

captured and analysed, and I currently have ±17000 measurements in total to assess (these are mostly internal scar measurements).

This site is important since it has yielded a long sequence covering (presumably) most of the Iron Age - radiocarbon dates need to confirm this. This is the first site in the RBM mining lease that has a long well stratified sequence with such well preserved remains[3]. More importantly, the lower lenses, i.e. Lens 10-12 have been only partially excavated. These lenses contain material with faunal remains which are rare on EIA sites in the dunes. The occurrence of possible domestic remains is improtant to EIA subsistence ecology and this is discussed below.

The upper part of the site contains the living areas. The edges of these deposits were visible in the Square 1 and 2 areas. This upper area is important since, two different occupations occur here and are important to the interpreation of the site. Those occupations from Lenses 1 - 3 are on the right hand side of the site, while those of the G20 and AL3C Lens series are on the left hand side. These two lens series (called units) are from different time periods and it would interesting to compare the use of domestic space between the two time periods. More excavations may be needed in Squares 1, 2, 6 and 8 after the initial analyses has been completed.

MPE 99/7

MPE 99/7 is situated at the top of the first dune cordon facing Lake Nhlabane and extends for ±150 m x 50 m. Dune clearance had exposed several artefact concentrations and scattered several shell middens down the slope of the dune, indicating that much of the site still existed beneath the current surface. The site was excavated over a 5 week period. In retrospect, this site is one of the most significant sites so far recorded and excavated in the mining lease.

Excavation methodology

A total of 27 squares were excavated: 11 were 2m X 2m, and 16 were 3m X 3m (fig. 4). I began the excavations on the periphery of the site where high densities of shell and/or pottery occurred. The excavations were extended when an extensive deposit was located. Areas with few artefacts were considered to be archaeologically sterile. The excavations then progressed into the center of the site. The site was excavated since it appeared to have a well preserved archaeological deposit, and to test whether or not a the Central Cattle Pattern exists at the site.

The site was excavated in 10cm spits unless an obvious stratigraphy was visible.

Stratigraphy

The site consisted of a yellow topsoil that was mostly aeolian sand. This varied in depth according to its location in the site. Below this, was a dark brown-black sand (DBS) between

[3] I stopped excavations due to budgetary constraints.

10cm and 70 cm in depth. Most of the artefacts and features were located in this layer. The southeastern part of the site had less DBS and consisted more of a reddish-brown sand below the DBS. These latter two deposits lay above the sterile yellow sand. The shell middens on the periphery of the site tended to be thin layers, however, the bulldozers had damaged many of this middens.

Features

Several features were recordered during the course of the excavation.
These included:

1. a central area
1.1. shell midden in the central area
1.2. hearths in the central area
2. shell middens
3. human burials
4. a possible granary area

Central Area

I concentrated the excavations on a central area after excavating the periphery. These excavations extended over an area of 12m X 9 m (Squares 4.1 – 4.12 and 5.1 – 5.2). Just over half of the central area was excavated, since it has the highest overall density of artefacts and faunal remains, and appears to have minimal post depositional disturbance. The central area varied between 15cm and 70cm in depth and was dish-shaped: the center being the deepest with the ends tapering to a shallow deposit.

The differentiation between the main deposit (DBS) and the outer sand was clearly demarcated. The DBS was mostly a humic, dark brown-black sand, surrounded by a Light Brown Sand (LBS). LBS tends to be the sterile sand.

In the center of the pen were several shell middens. These middens consisted of a main midden (±3m in diameter and 30cm – 50cm in depth), and smaller scatters of shell on the outskirts. For example, Shell Midden 2 (SM2) is a small cluster of shells and had a density of 9 buckets, while the main midden (Lenses SM, SM3, and SM4 had a total density of 203.5 buckets). Smaller pockets of shell were located throughout the pen. These smaller scatters are mostly pockets of shell dispersed by roots or rodents.

Bulk samples of each midden were taken and are still to be analysed. These middens consist of mostly black mussel (*Perna perna*), with some oyster and limpets (*Patella concolar)*. Other shell species do occur in these middens however they were probably attached to the above shells when they were harvested (e.g. barnacles, *Fissurelideae spp*. , or they were used as adornments (e.g. *Nassarius kraussianus*). Two human bones (1 molar and 1 tibia) were located near the center of these excavations. Several bone concentrations were located in the Central Area as well. Some of these remains were burnt.

The main shell midden (consisting of three lenses: SM, SM3 and SM4) in Squares 4.9 and 4.12 had a well stratified sequence and was ±3 m in diameter. The humic sand from the central area surrounded the midden. SM was the upper shell lens and was more fragmented and compacted than the other lenses. Below this was Brown Sand 1 (BS1), followed by SM3. SM3 consisted of near complete *P. perna* intermixed with Brown Sand. BS2 was below SM3

and consisted of slightly darker and ashy sand. SM4 is the lowest lens and consisted of near complete *P. Perna* intermixed with BS2. Below SM4 was the sterile LBS. All middens were basin-shaped, i.e. they were ephemeral near the edges and increased in volume towards the center. Each shell lens was not directly above the other; rather, partly overlapping each other at various places. Group 7 pottery was found in SM4, and Group 5 Pottery in SM2 and SM3. The middens also contained a lot of fish bone.

Two small hearths were located in the upper spits and along the periphery of the sides of the Central Area. The first was a small ashy patch ±70cm x 40cm. The second “hearth” was identified by my assistants as an *udengezi.* An *udengezi* is a Zulu word related to the pot in which *muti* (medicine) is made and taken. The *muti* was placed in a shallow bowl, heated from below, and then tasted. A soil sample of the inside of the bowl was taken as well as from below the bowl. These will be analysed at a later stage. The *udengezi* was located at the southwesten perimeter of the central area.

This central area is different to other features in terms of size, volume, type of artefacts, and smaller features. Soil samples were taken and this would confirm whether or not the central area is a cattle pen. Phytoliths are species specific and a high concentration of grass phytoliths is associated with the dung of cattle pens. Many near complete pots were located in this central area, and there is also a higher density of faunal remains and decorated sherds in this area as opposed to the periphery excavations. If this is not the remains of a cattle pen, then it would be at least a large house of a high status person. However, given the high density of faunal remains, of which several are burnt, the density of pottery, smoking pipes and beads. I believe this is at least a central community area, if not a cattle pen.

Shell middens

Apart from the shell middens in the central area, several other middens were located throughout the site. Most of these middens had been disturbed as they were situated at the edge of the dune, and had thus slumped when the area was cleared by the bulldozers. It appears as if these middens were the locations of individual houses. While the excavations failed to recover any definite hut floors, these middens were associated with a high concentration of pottery sherds, and in two instances, human burials. This suggests that there is a strong possibility that houses were located in these areas.

The 1996 excavations at MPD42 showed a similar pattern. The shell midden was located at the edge of the dune, while the hut floor was directly behind the midden. Neither MPD42, nor MPE99/7, had daga associated with hut floors. This is either a preservation factor or daga floors were not used for house floors. Daga associated with granary bins was recovered at MPE99/7, and thus preservation may not be a factor.

The highest concentration of middens was on the western side, facing Lake Nhlabane, while the eastern side had only two small middens. If this is correct, then the houses did not form a circle around the central area, but were situated in two rows along the western edge of the site, forming a semi-arch.

Human burials

Three human skeletons were recovered from this site. Two were situated along the western edge of the dune, while the third was located at the northern part of the site. These

remains have been discussed above. I do not consider the two human remains (tibia and molar) from the central area as being the remains of a burial.

Granary area

Two 2m x 2m excavations (Squares 10 and 11) were placed between two shell middens along the western edge of the dune. Square 10 was 130cm deep while Square 10 was taken down to 50cm. The stratigraphy of these two squares is similar to that of the central area (LBS, followed by Brown-black sand), however, below this was a sequence of red-brown, ashy-brown, and dark brown sand, with LBS at the base. Square 11 however did not have the latter brown layers, and the Brown-black sand sloped down into Square 10. Unfortunately heavy rains had collapsed these squares, and further work was not possible.

Pottery sherds, two complete pots and daga with grain and/or pole impressions were located in this area. The daga fragments were large and rough, and different to that of the daga used in hut floors (that tend to be smoothed on one side). Few faunal remains were recovered, as opposed to excavations in the central area and shell middens.

Artefacts

Ceramics

This site had a high density of decorated ceramics which tended to be concentrated in the Central Area. The sherds belong to Group 5 and 7 pottery styles. In other words the site has a minimum/maximum date of AD 1388 to AD 1461.

Four smoking pipes were recovered from the upper levels of the Central Area. These pipes were undecorated, and two were near complete. The pipes are small bowl shaped with the wide neck and stem.

Stone

Various types of utilised stone were recovered. These included upper and lower grindstones, hammer stones, and heat spalls from hearths. These pieces of utilised stone were made on white beach sandstone and/or quartzite pebbles.

Bone

The central area has the highest density of animal bones, many of which are well preserved. Several bone concentrations were recovered throughout the Central Area. Thesefs bones are mostly those of cattle-sized bovids, several of which appeared to be juveniles. Other species were small antelope, sheep/goats, and a marine mammal (either dolphin or hippopotamus). The shell middens had a high concentration of fish bones (mussel cracker(?) and shark teeth). Further analyses is required for these faunal remains to be identified.

Marine Shell

The main shell species in the middens is *Perna perna* (black mussel), with some *Patella concolar* (limpets), and Oyster. Other species do occur in smaller quantities and these include *Cypria spp.* (cowrie), various species of whelk, *Nassarius kraussianus*, and *Tivela spp*. These latter species are probably used for adornments.

Beads

Several glass beads were recovered from this site (described above). These were mostly recovered in the Central Area, and four were recovered from the granary area.

Metallurgy

Most of the evidence for metalworking (slag and iron ore) was located in the Central Area. The Central Area had the larger pieces of slag, whereas smaller fragments were located in shell middens

Discussion

This site appears to be a settlement dating between AD 1390 and AD1460. The sequence of decorated ceramics in the stratified middens correlate with dates from other sites. Since the the two shell middens are not separated by much sand, the time difference between these two lesnes may not be large. This suggests a conitinual occuaption of the site.

The spatial patterning at the site is one of the more important features. There is a clear separation between various activity areas at the site. The Central Area is the communal area which appears to have much activity associated with social gatherings. It is this area that has the high frequency of (burnt) animal bones, the smoking pipes, *muti* artefacts, decorated pottery, human teeth and shells, suggests that this area had seen a lot of activity through time. This is in contrast to the smaller, and peripheral areas of the sites which included some decorated pottery, but fewer artefacts and large features. Admittedly bulldozer activity may have damaged these areas more since they are on the edge of the dune. However, the content of those remaining sites still suggests different features. I believe that the settlement consists of several houses arching around the central meeting place, which would probably have been the cattle byre. Moreover, this Central Area does not appear to have changed over 50 years as observed in the location of the shell midden lenses. I still need to correlate the domestic/peripheral areas to that of the central area since not all of these areas are necessary built at the same time, which in turn needs to be linked to the human burials.

MPE 99/6

This site is located alongside the beach road amongst the dunes. It is on the edge of the first dune facing Lake Nhlabane. The dune is a long and wide dune, with several archaeological sites nearby each other. It appears as if these may be individual houses belonging to a larger settlement. The excavated part of the site is ±50 m site is in diameter, however the whole site, or complex of smaller sites is ±200 m in diameter. The excavations were placed on the south-western part the site. I excavated the site to determine the state of preservation of the remains and to detect spatial patterns and features. If there was good preservation of remains and features, then I could excavate the rest of the site as a whole. The decorated pottery from the site is that of Group 7 pottery. In the initial recordings of this site I noticed that the deposit may be deep and may yield Group 6 pottery, if not the elusive Blackburn ceramics.

Excavation methodology

I placed a 1m x 17 m transect along an old track, and removed the topsoil down to the first recognisable archaeological deposit/layer, i.e. I excavated spatially (fig. 5). A clear spatial pattern was visible after I exposed the first living horizon: shell middens to the southwest and a black humic soil to the northwest. I then placed intersecting squared at each end of the first transect, forming an H-shaped excavation. I did this to further expose the archaeological deposit that appeared in the initial transect. In this way a large area of the site can be initially exposed to determine where features and cultural horizons are located without resorting to large excavations. The aim was to locate a cattle pen and house floors.

Stratigraphy and Features

The site can be divided into two main areas: a possible cattle pen (an area with black humic soil) and shell middens. The black humic soil (BHS) is 8 m x 7 m in diameter and ranges between 15 cm and 30 cm in depth. This feature sloped slightly downwards towards the center, where four ‘pits’ were located. The ‘pits’ are at the base of BHS and between 15 cm - 25 cm in depth and 20 cm – 30 cm wide. Inside these ‘pits’ were fragments of burnt bone, burnt shell, pottery and charcoal.

To the southeast of BHS is a sterile area of light brown sand. Further southeast are several shell middens. Three of these middens were excavated, and were similar in size and depth (2 m x 2 m x 0.2 m). Each midden has four to five lenses and appears to be small individual dumping episodes. Each midden is thicker in the center and tapers towards the ends where they overlap with other middens on occasion (fig. 6). Each lens is a small thin lens of shell with a sandy layer below it. These sandy layers are brown to black in colour and separate each midden. These sandy lenses are thicker along the edges and very thin in the middle of each midden.

The shell middens and the BHS do not overlap in any square and thus their direct association with each other is difficult to determine. However, the similarities in decorated pottery suggest that these two areas are of a similar time period. Furthermore, the eastern and northeastern parts of the site still need to be excavated and I may be able to correlate the features in this area.

Artefacts

As with other sites, this site is still in the process of being analysed, and below is a general description of the material found.

Ceramics

The ceramics from this site belong to Group 7 pottery. No complete pots were recovered.

Stone

Upper and lower grindstone were recovered. The lower grindstone were made on white beach sandstone, while the upper grindstones were made from quartzite pebbles. The upper grindstones tend to be located near the middens.

Bone

Most of the faunal remains consist of fish and bovid bone. The fish remains are concentrated in the shell middens, while the bovid bones were located in the BHS area. These faunal remains were well preserved.

Marine Shell

In general the marine shell is similar to that of other middens.

Glass Beads:

Three glass beads were recovered from this excavation. All cam form the surface of the various shell middens. Two were white in colour and one was a yellow-green colour.

Metal Working:

Most of the metal working debris (slag and iron ore) came from the BHS area. The metal debris consisted of small fragments.

Discussion and Mitigation

The features and artefactual material at the site is well preserved and several samples were taken from various activity areas. This indicates that the rest of the site will be well preserved. At the moment there is a suggestion of an individual household, with several dumping episodes. Much of the site still requires further test pit excavations, since the area of the hut floors was not located, nor were most of the shell middens adequately sampled.

The rest of the site is ±1 m underneath the current sand. That is the current beach road is over the site and little work can be undertaken until this road has been rerouted for the mining process. The track is in the center of the site and this would make correlating different features difficult if each side of the track was only excavated. I have briefly surveyed the area on the other side of the track and I believe that the rest of the site will yield as well preserved features and artefactual remains. Furthermore this site may be a complete village settlement in which I may be able to map the spatial layout of the site. Lastly, there is a large iron working area (smelting and/or smithying) to the north of this site and the two may be related.

Any further work at this site will only be possible once RBM has closed this road for the mining process.

MPE 99/9

This site is located on a small dune facing Lake Nhlabane, and on the next dune northeast of MPE99/7. The site is small in comparison to other excavated sites, however, this is the first time complete iron smelting furnaces have been located – in this case two furnaces.

The furnace area itself is surrounded by two small dunes, ±1 m in height. These small dunes may be a more recent phenomenon, however, most of the iron working debris runs down a gentle gradient towards the east (seawards), and not down the steeper slope facing the hinterland. One is left with the impression that these smaller dunes existed when this furnace was in use.

Excavation methodology

The site was originally excavated to determine the state of preservation of the furnaces and then to map these features. One furnace (the one least well preserved) was sectioned and drawn. However, as the excavation progressed, I decided that it would be best to remove these furnaces and complete their analyses at the museum. The complete furnace was collared with plaster of paris, however it collapsed while we were removing it. The remains are stored at the museum and I may reconstruct it at a later stage. The information is not lost, since both furnaces were identical and the maps and photographs show their design and partial excavations showed their content.

Stratigraphy

The cultural horizon is between 5 cm – 10 cm deep, with the exception of the furnace itself. Those areas closest to the furnace are grey to black in colour, while the aeolian light yellow-brown sand encompasses the features. Small fragments of slag, iron ore, bloom, tuyéres and burnt clay were scattered in a radius from the northeast to the southeast.

The least well preserved furnace was sectioned and drawn (fig. 7). This furnace was surprisingly deep in contrast to ones I have observed in the Tugela River Valley. However, the RBM furnaces appear to have been covered, and may be better preserved than the Tugela furnaces. The furnace was 50 cm deep and 50 cm – 70 cm wide. The furnace walls were 15 cm – 20 cm wide. It was oval in shape with two funnels/grooves at each node. The exterior base of the furnace was filled with fine white-grey ash (15 cm – 25 cm thick), but contained little charcoal. The interior of the furnace was coated with slag, especially near the base, while the rest was a mixture of fragments of slag, ash, some charcoal and sand. The total weight of the furnace was ±150kg.

Artefacts

Ceramics:

Several rims and one decorated sherd werer ecovered from the site. The decorated sherd belongs to Group 6 or 7 pottery (the decorations could be belon to either Group), and may relate to part of the occupation at MPE10.

Metal Working:

The artefacts associated with the furnace are those normally associated with metal working areas. These are : slag, bloom, iron ore (crushed and uncrushed), tuyéres, glass (often coating the tuyéres), and furnace fragments. Given the size of the two furnaces, and slag, there were surprisingly few tuyére and iron-ore fragments. Tuyéres tend to be frequently discarded as they become congested with slag. This may indicate that the site was not used over a long period, that the tuyéres were discarded elsewhere (which is against the norm for other sites), or that the furnaces were relatively recent before they were abandoned.

Discussion

This site is significant for several reasons. It is the first complete furnace recorded in the RBM mining lease. It is also the first furnace of this time period to be excavated in KwaZulu-Natal. A reconstruction of this furnace and its use is shown in figure 8.

The relationship this site has to MPE10 is important in terms of the Central Cattle Pattern (CCP). According to the CCP, iron smelting should occur outside the main cattle pen in a secluded area. This is the case for MPE99/9, where the ceramic Groups are similar to MPE99/6 and MPE99/7and there is also a spatial separation. If this site is related to MPE10 in time then it is a clear indication that there was a separation in the iron working process between the domestic and 'sacred' areas. Several Iron Age communities in Africa have certain taboos and rituals associated with metal working, specifically smelting, and these areas tend to be in socially separated places. Iron smithying, or forging, however, may occur on domestic site since the main ritual, of iron processing, has been completed. This would explain why small fragments of slag and metal artefacts occur on sites such as MPE99/6 and MPE99/7. The differences and/or similarities between this site and the, as yet, unrecorded metal working site near MPE 99/6 should yield interesting information.

MPD 99/2

This site is located along a large flat area behind the last dune cordon, i.e. the dune closest to Lake Nhlabane. The excavated site consists of a small shell midden ±4 m in diameter, and appears to be a single cultural horizon. Some areas of the midden have been affected by rootlets, however, much of the midden is in tact. Apart from the midden, no other features were visible, and this is probably an affect of bulldozer activity. Nonetheless, the midden was a well contained dumping episode with little, if any, intrusions from other sites.

Excavation methodology

I excavated the site for a representative sample of a single occupation site. This allowed me to contrast small shell middens with larger middens such as MPE10. My aim is to see if there are different subsistence exploitation patterns between different types of sites. An advantage of single occupation sites is that they are well defined sample of a single households consumption over a short time period. Furthermore, there is less chance of artefacts, and or deposit being mixed with upper and lower lenses.

The excavation started in the southern quadrant of the midden. Each square is 1 m x 1 m and the site was excavated stratigraphically down to the sterile yellow sand. I began excavations in an area without shell and then into the main lens. This allowed me to crate a cross section of the site, without having to excavate the whole site. Square 6 appeared to be the most representative square of the site and it was bulk sampled, that is all material has been kept for later analyses.

Stratigraphy

The first layer is a black humic soil that had fragments of shell. Below this is a thin shell lens ± 10 cm – 15 cm. The midden was tapered at the edges, while the center was more dense, creating a basin-shape The upper part of the lens was fragmented, the middle was more consolidated and the lower parts were mostly complete *P. perna*. This type of fragmentation is consistent with other middens in the RBM area. Below the shell midden was a sterile yellow sand. A total of 307.5 litres of deposit were excavated

Artefacts

This site is still in the process of being analysed. The material remains are similar to those from MPD99/4.

MPD 99/4

This site is located near the top of the last dune cordon and is ± 30 m southwest and downslope from MPE 99/7. I have kept it separate from the main site as it does not appear to be stratigraphically and spatially related to MPE99/7. Other artefact scatters were recorded in the vicinity of this site, including a layer of slag ±3 m below the current topsoil. This slag layer is ±5 cm – 10 cm in depth, and ± 5 m long. Ntshekhane ceramics are in direct association with this slag layer.

Excavation methodology

The main part of the excavated site is a small shell midden with a singlecultural horizon. The midden was ±2 m in diameter, and I placed a 1 m x 1 m excavation that covered the edge and center of the midden. It is similar to MPD 99/2.

Stratigraphy

The midden is covered with yellow aeolian sand, with a thin layer of black humic soil below. The midden itself is 5 – 10 cm in depth and is basin-shaped. Below the midden is a yellow-brown sterile sand.

Artefacts

Ceramics

The main find from this site is a sherd with a previously unrecorded decoration. The rim is everted with a grey burnish. The lip is flat with horizontal incisions on the outer part of the lip. At the rim-neck interface is a single horizontal band of shell impressed decorations. On the shoulder are shell impressed decorations forming, at least, a double row of triangular decorations and a possible *iiSumpa*. The shoulder has a red burnish. Other Group 7 sherds are associated with this site.

One half of a smoking pipe was recovered.

Stone

The stones recovered from the site included upper grindstones, white beach sandstone fragments, and smaller stone fragments.

Bone

The faunal remains included fish and bovid.

Marine Shell

The marine shell recovered from this excavation are similar to those from other sites. These included mussels, oysters, limpets and whelks.

Discussion

This site, as a whole is important for several reasons. First, the terminal EIA, i.e. Ntshekane Phase, was located near the top of the dune (±3 m below the current surface). The site itself is ±500 m away from MPE1, a large EIA settlement excavated in 1998 that covered the whole EIA. It appears as if the Ntshekane Phase of MPE99/4 is related strictly to iron working, whereas at MPE1 it is in more of a domestic context. Unfortunately, more work at MPE99/4 was not possible due to the depth of the site (which had other occupations above it) and MPE mining activity.

MPC 99/9

This site is situated near the top of the last dune, and ±200 m north-west from MPC99/5. The site has been bulldozed and part of a shell midden still remains.

Excavation methodology

I placed a 1 m x 1 m square near the highest concentration of shell. The aim was to determine the depth and size of the deposit. Unfortunately, the bulldozer had disturbed to much of the site, and the midden was only a concentration of shell in a secondary context. I sampled this concentration

Artefacts

Ceramics

The ceramics associated with this site belong to both Group 4 and Group 6. That is, both the EIA (Ntshekane Period) and the early Late Iron Age are represented at the site. The former were more represented than the latter.

Stone

Several upper grindstones, hammer stone fragments and white beach sandstone fragments were observed at this site.

Marine Shell

Perna perna dominates the shell species, with some Oyster and limpet (*Patella concolar)*.

Discussion

The site is interesting in that Ntshekane sherds were observed at the top of the dune. This is the third instance where these terminal EIA sherds are located near the top of dunes, as opposed to the valley floors. Furthermore, the early LIA sherds are also associated with this site. The transition between the EIA and LIA is debated in the literature (see Maggs 1996 for an overview). One side of the debate argue that the introduction of the LIA was due to a new group of people with a new language and cosmology. The counter arguments state that the changes between the EIA and LIA are a result of changes within the society and external factors, such as human migrations, did not occur.

It is for this reason that Ntshekane sites located at the top of dunes are important since they should occur in the vallies between the dunes. The skeleton from MPC 99/5 (±100 m to

the east) is also crucial in the understanding of this debate and needs to be dated. Other sites related to this debate are MPE1, MPE10, MPE99/6, MPE99/7. While some of these are not necessarily EIA sites they do form part of the transition period and their information is thus important.

DISCUSSION

The emphasis on site recording over the last two years has been more on the analysis and excavation of materials than actual recordings. While surveys have continued as usual, the information resulting from this data has allowed me to determine sites of significance and those which require further mitigation.

The radiocarbon dates have raised the importance of the RBM material. Previously, I thought that the early LIA material was "missing" from the area. I had used results from previous excavations and the local oral history to form a relative chronological framework. While the sequence was left "hanging" the radiocarbon dates have now firmly placed certain sites into a more defined sequence. The sequence is important in that the RBM material can contribute to the current main debates in the Iron Age.

This debate has several facets:

1. Archaeologists largely agree that a Central Cattle Pattern exists in the LIA. The CCP includes
    - 1.1. a central byre with individual households arranged in an arch around the byre;
    - 1.2. a men's court in the byre
    - 1.3. an elite burial in centre of byre
    - 1.4. communal grain pits in the byre
    - 1.5. Entrance to the byre is located opposite the senior household members house.
    - 1.6. Houses are arranged according to seniority
    - 1.7. The settlement and interior of each household is divided along a certain axis – Left/Right:Male/Female:Sacred/Secular
2. Did the people of the LIA come from outside southern Africa (in other words, a migration of new people), or were the changes a result from internal developments within the EIA? That is, the degree of cultural continuity between the EIA and LIA people is debated.
3. One side (see Maggs 1994; Hall 1994)[4] argues that the CCP does not exist in the EIA. They argue that the original EIA people did not have sufficient, if any, cattle to sustain a CCP, nor do we know the centrality of the cattle byres. Furthermore, metallurgy occurs in the living areas of the EIA people, whereas this is not the case for the LIA people. Lastly, there is a difference in settlement location between the two Iron Age groups. Smaller differences relate to ritual activities such as tooth mutilation and ceramic figurines in byres.
4. The other side (see Whitelaw 1994; Huffman 1994) argue that the CCP did indeed exist in the EIA and that it is part of a larger cognitive framework of the Eastern Bantu-speaking people. Thus while the languages differ between the two Iron Age groups,

[4] I cite these references, and not the orignal references for each argument, as they are from a single journal that briefly summarises each persons position

their cognitive mind-set has the same origins. They argue that there is a continuity of ceramic styles from the East African sites that can be followed archaeologically through southern Africa, at two different time periods. These arguments argue and show archaeologically and linguistically that the criticisms of above are not as clear cut and that the CCP can be seen in many EIA sites.

The above sets context of the RBM material into the larger debate. (Figures 9 and 10) show the proposed movements of people in the Iron Age. The important point of these maps is that between St Lucia and Richards Bay is one of these “contact” areas. This makes the archaeological information from the RBM area highly significant. The discussions below should be seen in this context.

Pottery

The use of pottery sequences to date archaeological sites with similar pottery styles is an established procedure in Iron Age studies. These sequences are related to other sites that have been radiocarbon dated. In addition to using the established sequences, the more recent sites are dated by means of oral histories (*amasiko*), historical ethnographies (from the late nineteenth century, such as James Stuart and Bryant archives), and associated artefacts. I discuss groups according to the EIA, LIA and Historical phases. The EIA has been systematically studied and dated in KwaZulu-Natal, while the LIA and Historical periods have received less attention. EIA material is thus placed in the chronology with greater certainty, while the LIA and Historical sites are placed with less certainty. Groups with uncertain relative dates are noted.

The survey methodology adopted for this project was to record each scatter of artefacts as a separate site, unless several scatters were directly associated - I subdivided the associated scatters. This allows for a tighter control over pottery styles, and decreases the amount of intersite contamination.

Early Iron Age

Group 1

This group is associated with the Matola Phase and dates from AD 400 to AD 630. Matola sites are large village settlements - often greater than eight hectares in extent. Cattle byres have been located in the centre of these settlements. MPE1 is of high significance in that there is at Matola occupation, followed by an occupation that has both Matola-Msuluzi elements (G. Whitelaw pers. Comm.), and then a Msuluzi occupation. This middle occupation is an incorporation phase and thus one of interaction between the Matola people who first arrived in the area, and that of the Msuluzi people who arrived thereafter (or the Kwale and then Kalundu Traditions in fig. 9). There is currently a gap between the Matola and Msuluzi phases and these possible transition phases may cover this gap. I have undertaken a topographical survey of the area still to be mined and similar vallies exist ahead of dune mining (the new mining pond, MPE, started on exact same place as MPE1). Further mitigation at similar sites would be necessary.

Group 2

This group is associated with the Msuluzi phase and dates from AD 630 to AD 750 in the Tugela River Valley (Maggs 1980) - calibrated radiocarbon dates place this period between

AD 615 to AD 879. Msuluzi sites are probably village settlements, often greater than eight hectares in extent. Cattle byres have been located in the centre of these settlements. The pottery decoration is distinct from the Matola pottery, although continuities in several motifs exist.

As with the Matola sites, few Msuluzi Phase sites exist in the RBM area. I believe that this is more of a recording phenomenon as these sites tend to be at least one meter below the current surface. Several test pits in vallies ahead of dune mining ought to occur in the future in order to determine whether these EIA sites exist, and the to assess the time frame required for these excavations.

Group 3

The pottery in this group is associated with the Ndondondwane period, which dates from AD 700 to AD 950. Only two Ndondondwane sites have been recorded in the mining lease. This Phase of the EIA appears to be very under-represented in the RBM area (only ± 5 sherds have been identified). This is not the norm for other sites of this time period (see Maggs 1984; van Schalkwyk 1995). A key issue for further work is to understand why this Phase is under-represented in the RBM area, alternatively, to find sites that have a good representation of this Phase.

Group 4

The pottery in this group is associated with the Ntshekane period, which dates from AD 950 to AD 1150. As with the Ndondondwane sites, few have been recorded in the mining lease. More Ntshekane sites have been recorded at the top of the sand dunes than in the vallies and this may or may not have to do with changing climates (for mosquitoes), social patterns and/or site function. Further research into this pattern is needed.

The Early Iron Age sites in the RBM mining lease are under-represented (in comparison to the LIA sites) for several possible reasons:

1. There are fewer EIA sites than LIA sites, since EIA sites are large villages while LIA sites are more numerous households. Both may have the same population numbers, but the density in the number of LIA sites may be higher than that of the EIA sites in a given area.
2. The EIA sites are concentrated along the valleys between the dunes, whereas the LIA sites are located on top of the (more numerous) hills. The mining activity has concentrated on these hills *vis-à-vis* valleys for the last three years. Hence, the predominance of recorded archaeological sites
3. I have not systematically checked the larger valleys ahead of dune mining. If I do, it may allow me more time to excavate one of these village sites in more detail. This may allow for demographic issues to be answered.

Late Iron Age

The allocation of ceramic groups in my previous reports needs to be re-organised. First, I had previously subsumed Group 5 and Group 6, and these are clearly not of similar ages. Second, Group 7 pottery is not necessarily that of Tsonga-speakers as I previously believed. Third, many of the Historic Period ceramic groupings now fall into the LIA periods. As more sites are dated, I will be able to delineate the groupings more clearly.

Group 6

Circular and square impressions appear to characterise the Group 6 ceramics. The decorations and radiocarbon date is very similar to the excavated site of Blackburn (Davies 1974). This type of pottery is called Moor Park and dates from AD 1266 to AD 1440 at the site of Moor Park, 15km southwest of Estcourt. The RBM sample has a more precise date of AD 1295 – AD 1312. It is interesting that the decorative style is held over such a wide area, yet the topography, environment and method of building houses (stone-walling in Estcourt) is very different. A more detailed analyses of Group 6 sites may yield interesting comparisons with the Moor Park site itself.

Group 7

Shell impressed and comb stamped decorations occur along the KwaZulu-Natal coast, southern Maputaland (Len van Schalkwyk, pers. comm.) and southern Mozambique (Morais and Da Silva 1975). Similar decorations have been recorded at the excavated site of Enkwazini near St Lucia (Hall 1979, 1982). The shell-impressed pottery at Enkwazini has been radiocarbon dated, and calibrated to between AD 1650 and AD 1800. The radiocarbon date from RBM is significantly earlier and dates to *c*. AD 1401. Moreover, some of the Blackburn decorations have similar decorative styles to the RBM samples. I believe the Enkwazini date may be inaccurate, especially since other decorative motifs occur after the Group 7 motifs.

This pottery has been associated with Tsonga-speakers in the past, however this may not be necessarily the case, since this pottery is located down the north coast up to +20 km north of Durban.

Group 8

I tentatively place this group with the Group 7. However, few sherds of this group have been recorded. It remains in a separate category until further data is obtained.

Group 5

Ceramics with fingernail impressions occur at Mgoduyanuka, in the Bergville district (Maggs 1982a), and at Mpambanyoni (Robey 1980). However the former dates to the late 18^{th} – early 19^{th} century and the latter dates to the 11^{th} – mid-13^{th} centuries. Clearly there is little similarity in these dates, in comparison with the RBM dates of early to mid-15^{th} century. The decorative motifs from Mpambanyoni are also very different to those sites with similar dates in the KwaZulu-Natal north coast and Midlands. How these group five ceramics fit into the rest of the sequence requires further investigation.

The most important aspect of this study is that no Blackburn-type ceramics, i.e.. AD 1050 to AD 1250, have yet been recovered in the RBM dunes. This is intriguing since according to Huffman (1994) the Blackburn people were supposed to have come through this area, as did the EIA people. MPE10 may yield radiocarbon dates for this time period, however, as yet no ceramics have been identified. The location of these Blackburn sites is integral to the EIA debate. Huffman (1989) would argue that the LIA people came through this region *c.* AD 1100. However, no material, nor radiocarbon dates support this argument yet. If these site do not occur in the region, then those arguing for internal change (see the work by Maggs) may have more validity to their argument. Deep sequence sites such as MPE10 are thus important.

Group 9c

This site has no major decorated pottery, except on the lips, and follows closely after Group 5. This material from this site came from a small excavation that did not yield as much material as I thought it would. More sites of similar time periods would be needed before further assessments can be made.

Historical Period

The historical period is as yet undated. Similarly until the sites, or contemporary sites, have been dated many of these may belong to the LIA and/or Historical Period. As more sites are dated, a more precise sequence will be constructed.

Group 9

The pottery from this group may be associated with the Mbonambi and Sokhulu chiefdoms, thus dating these sites to within the last 250 years for this area. Forced government removals dates the sites prior to 1950. While oral histories indicate that people still collected marine resources after 1950, and that these forays occurred through the afforested areas, these sites have too many sherds to be the result of single and brief occupations. Mananga 4 dates to approximately 100 years ago.

I have divided this group into several sub-groups, based on slight variations in the pottery decorations. Although most of these decorations include rim notching, other features suggest that changes may be temporal as well. If decorated sherds are observed at these sites, they tend to be EIA sherds. This is in accordance with Bryant's (1947) observations that Zulu pots were primarily undecorated from the mid-nineteenth century onwards.

The next stage for the pottery decorations is to reanalyse the LIA and Historical decorations/sites in light of the new dates and groupings, and to assess the degree of design incorporation between the Matola and Msuluzi Phases at MPE1. In addition to this the distinction between pre-Zulu and Zulu pottery needs to be identified and studied.

Food resources

Perna perna

The shell lengths from several *Perna perna* were measured to determine if there was a difference in sizes exploited throughout time. In order to do this I have measured the internal and external scar measurements to determine if a correlations exists xxx xxx xxx xxx xxx

While I have not presented all of the data above, there is no suggestion, so far, that these mussels were overexploited. That is there is no real decrease in mean size through time or across space. Further statistical analyses still needs top be undertaken.

The mussels also appear to have been brought back and processed at the settlements, as opposed to being processed at the beach. If it was a case of the latter , then there would not be similar frequencies of left and right hinges, nor would there be a high incidence of those shells associated with mussels in rock pools, e.g. whelk, barnacle. Furthermore, there would

be less waterworn stone and shell in these middens - these are attached to the byssus (small bristles) of a mussel. Shellfish processing did not occur in these middens either, since there is a lack of ash and charcoal in the deposit.

General exploitation

Brown mussels were the most exploited shellfish at all sites, followed by limpets and/or oysters. However, evidence suggests that the sandy beaches and even the estuarine areas were exploited for certain species (Table 2). The emphasis does however appear to be on marine resources. The identification of the fish bone would be of interest, since freshwater, estuarine or salt water fish may have been eaten.

Shellfish are exploited mostly along the intertidal zones, and are thus probably removed on a daily basis.

Other species had no nutritional value, but were probably picked up from the beach and used as adornments, e.g. *Glycymerus spp., Nassarius kraussiarius, Sunetta contempta, Venus verrucosa,* and *Conus Spp.*.

Faunal remains

The faunal remains from the excavated shell middens still require identification. Primary analyses indicates that both wild and domestic animals were eaten. Domestic animals included cattle and sheep/goats and possible chickens (although this may be marine bird as well). Wild animals were small bovids the size of *Raphicerus spp.* The fish bones are unidentified, however a mussel cracker and shark tooth have been identified.

The identification of the faunal remains, especially at EIA sites, is crucial in understanding the origins of Iron Age farming in KwaZulu-Natal and their subsistence economy. Many sites along the coast have poor preservation of faunal remains. This may have resulted in an under-representation of domestic stock in the socio-economy of the EIA people. Alternatively, the first farmers did not arrive with large herds, and these herds came later. This has implications for the type of Iron Age 'package' that arrived in southern Africa. Sites such as MPE10 that have EIA material in direct assocaiton with faunal remains are thus significant.

CONCLUSION

Several archaeological sites have been surveyed in the Zulti North/Tisand mining lease. We have evidence for EIA occupation along the dune cordon, as well as increased human occupation over the last 400 years. These changes are seen in diachronic pottery styles and settlement patterns. It is envisioned that with a large data base we will be able to place these changes into a more precise chronological order.

The bulk of material returned to the museum from excavations and surveys need systematic sorting and curating. I employed someone to sort the shell samples from the shell middens and to identify the shells[5]. We have not completed the sorting, measuring and identification of all of the material – only that described above. We have however, managed to take reliable samples from excavated sited for radiocarbon dating. These dates have given

[5] Dr R. Kilburn, Natal Museum, assisted in the primary identifications.

the RBM material a more secure position in the Iron Age in general, and have specifically palced these sites in the center of current Iron Age research.

The archaeological survey of the mining lease has been undertaken for four years. To date ±110 sites have been recorded, of which most were sampled, and four have been excavated, with a further three sites identified as requiring excavation. While there initially appears to be a decrease in the number of new sites recorded, there is however an increase in the frequency of sites of high archaeological significance. The commencement of Mining Pond E (MPE) in the near future may yield more sites, especially along the higher dunes –I know of two that require some form of excavation.

The timing of the excavations at MPE4 were fortuitous. We began the excavations four days before a series of telephone poles were to be placed through parts of the site. Had we not been there, this site would have been damaged. My concern is that I need to be informed prior to the construction of these lines so that I can survey the servitudes as well as mitigate where necessary. A greater awareness amongst construction workers and contractors also needs to be created so that archaeological material is not removed from sites, something which happened at MPE4.

The question that needs to be answered is whether archaeologists will gain further academic knowledge by continuing to monitor the impact of mining on archaeological sites. MPD is in an afforested area that is unlikely to yield many archaeological sites in primary context. Furthermore, we have already documented many archaeological sites dating to the Historical Period. However, there are still more sites within the mining path that warrant mitigation. Several areas are known to have archaeological sites which cannot be recorded until the bulldozers have cleared the area, or until an opportunity arises for their excavations. These areas are located at MPB and MPC, some of MPD and MPE – I refer to current locations/areas of the mining path, and not future paths.

I suggest that the archaeological survey continues for the duration of 1998 -1999, whereupon the contract would need to be reassessed.

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Appendix

Description of diagnostic sherds in the RBM lease

Group 1

1. Flat lip; band of horizontal hatching on tapering rim.
2. Round lip; four bands of horizontal hatching and a band of triangles on rim.
3. Round lip; three bands of horizontal hatching on rim.
4. Round lip; oblique hatching on an everted rim.
5. Flat lip; horizontal incision below lip; discontinuous horizontal rows of five hatching, and two vertical hatching on rim.
6. Bevelled lip; horizontal hatching on everted rim.
7. Oblique hatching on rim with two wide and shallow impressions on ?neck and a horizontal row of circular impressions below.
8. Flat lip with oblique hatching on an everted rim.
9. Bevelled lip with single horizontal incision on rim.
10. Spaced oblique hatching on shoulder.
11. Four bands of horizontal hatches on ?rim with triangular hatch below.
12. Bowl with bevelled lip and oblique incisions on rim.
13. Internally bevelled lip; everted rim with continuous rows of horizontal hatching and spaced 'cross' motif'.
14. Tapered lip; two rows of oblique hatching separated by a space on an everted rim.
15. Round lip with horizontal incision along rim.
16. Flat lip with horizontal incision on an everted rim.
17. Round rim; band of oblique hatches on rim with discontinuous band of horizontal hatches below.

Group 2

1. Everted rim with band of triangles on neck.
2. Opposed hatching on neck.
3. Round lip; chevron hatching on rim with four bands of horizontal hatching at the base.
4. Flat lip; band of opposed hatching on everted rim; spaced pendant motifs on upper shoulder with horizontal hatching and a band of hatched triangles on lower shoulder
5. Flat lip; opposed hatching on everted rim.

6. “Flat lip; cross-hatching on rim.
7. ?Round lip; chevron hatching on rim; band of alternate triangles on neck.
8. Alternate triangles or blocks and parallel lines.
9. Alternating blocks with flat lip.
10. Five bands of horizontal hatches with triangles below.
11. Round lip; everted rim with chevron hatches; double row of horizontal hatches on neck.
12. Concave bowl with round lip.
13. ?Round lip; everted rim; fine cross-hatching on neck.
14. Ceramic sculpture.
15. Round lip; everted rim with small oblique incisions.

Group 3

1. ?Everted rim; four bands of alternating oblique hatching on neck.

Group 4

1. Alternating bands of oblique hatching.

Group 5

1. Flat lip; fingernail impressions on rim.
2. Round notched lip; everted rim.
3. Flat lip; tapering rim.
4. Tapering lip; horizontal incision on base of rim.
5. Flat rim; horizontal and vertical rows of fingernail impressions on neck.
6. Round notched lip; everted rim.
7. Flat lip.
8. Flat notched lip.
9. Round lip; everted rim.
10. Round lip; horizontal incision at base of everted rim.
11. Round lip.
12. Everted rim with circular-square impressions on lip and rim.
13. Fingernail impressions.
14. Round-flat lip and rim.

Group 6

1. Horizontal rows (7+) of circular impressions intercepted by two concave rows of circular impressions.
2. Tapering lip; everted rim.
3. Flat lip; everted rim.
4. Round lip; two rows of horizontal hatching on rim.
5. Round lip; everted rim.
6. Flat lip.
7. Tapering lip with circular impression on lip.
8. ?Round lip; horizontal rows (5+) of circular impressions.
9. Round lip.
10. Round lip; oblique incision across rim.
11. Internally bevelled lip; brown burnish.
12. Horizontal rows (14+) of circular impressions.
13. Internally and externally bevelled lip.
14. Three discontinuous horizontal rows of circular impressions.
15. Flat rectangular notched lip; everted rim.
16. Round lip; horizontal row of circular impressions on everted rim.
17. Flat lip with oval notches; everted rim.

Group 7

1. ?Round lip; horizontal row of oval impressions on neck.
2. Round lip with square notching in centre; everted rim.
3. Oblique and vertical bands of shell-impressed notching.
4. Internally bevelled lip with circular notches; everted rim.
5. Tapered lip - ?bowl
6. Flat lip.
7. Round lip with circular notches on lip; everted rim.
8. Horizontal row of elongated notches on ?rim or ?neck; two horizontal incisions on ?neck with vertical bands of shell-impressed notching between the incisions; thin oblique hatching occur between each row of horizontal hatching.
9. Internally bevelled lip; everted rim.

10. Round lip; two horizontal rows of shell-impressed notching between oblique rows of shell-impressed notches.
11. Round lip; everted rim.
12. Concave body and neck with pierced lug.
13. Internally bevelled, externally round lip with U-shaped notches; everted rim; vertical row of shell-impressed notching on neck.
14. Two single horizontal incisions with two vertical rows of shell-impressed notches between the incisions.
15. Flat lip; tapering rim.
16. Round lip; two oblique depressions along rim.
17. Flat lip; everted rim.
18. Concave vessel; horizontal row of rectangular impressions near ?rim; six rows of continuous U-shaped notches on ?body
19. Several (5+) horizontal rows of rectangular impressions.
20. *iSumpafa*
21. Everted rim with internally bevelled lip.
22. Everted rim with round lip.
23. Round lip with circular impressions at base of neck.
24. Bevelled flat lip with horizontal depressions below rim.
25. Round lip with everted rim.

Group 8

1. Flat lip; everted rim.
2. Flat lip.
3. Horizontal row of circular impressions and two oblique hatchings.
4. Horizontal row of four hatchings.
5. *iSumpa* on body.
6. Flat lip; everted rim; horizontal row of rectangular impressions on neck.
7. Bevelled lip; everted rim.
8. Tapering lip with circular notches.
9. Round lip; everted rim with rectangular impressions on lip.
10. Tapering lip; everted rim.
11. Flat lip; indented rim.

12. Round lip with thin rectangular impressions on rim-lip; everted rim; horizontal row of U-shaped impressions on neck.
13. Bevelled lip; glossy red burnish.
14. Round lip; (internally) convex rim.

Group 9a

1. Tapered lip - ?bowl
2. Bevelled lip; two horizontal incisions on everted rim.
3. Round lip; everted rim; perforation on neck.
4. Flat lip.
5. Round lip with rectangular notches; everted rim.
6. Bevelled lip; everted rim.
7. Flat lip with two rows of rectangular notches.
8. Internal bevelled lip; everted rim.
9. Internal bevelled lip.
10. Bevelled lip with square notching.
11. Round lip; concave rim, neck and body - ?bowl
12. Flat rim with rectangular notches extending onto an everted rim.
13. Row of 5+ horizontal hatchings.
14. Tapered lip - ?bowl
15. Tapered lip; everted rim.
16. Round lip; everted rim.
17. Flat lip; everted rim.
18. Round lip; elongated notches on everted rim.
19. Tapering lip.

Group 9b

1. Flat lip with circular notches that extend to the everted rim.
2. Flat lip.
3. Internally bevelled lip; everted rim.
4. Bevelled flat lip with elongated oval notches; everted rim.
5. Square lip.
6. Round lip.

7. Round lip with elongated oval notches; everted rim.
8. Round lip; everted rim.
9. Tapered lip.
10. Round lip with large elongated oval notches; everted rim; lip and rim are "wavy".
11. Flat lip; everted rim.
12. Bevelled lip; everted rim.
13. Flat lip with elongated notches.
14. Round lip with circular notches; everted rim.
15. Bevelled lip with slanted elongated notches.
16. Bevelled lip with elongated notches.
17. Bevelled lip.
18. Bevelled lip with rectangular notches; everted rim.
19. Square lip with red burnish on inside of rim.
20. Tapered lip with inverted rim.

Group 9c

1. Bevelled lip; everted rim; inverted neck.
2. Tapered lip with occasional incisions; everted rim.
3. Bevelled lip; everted rim with indentation at its base.
4. Bevelled lip; everted rim.
5. Round lip with thin incisions; tapered rim.
6. Flat lip; tapered rim.
7. Round lip with circular notch; everted rim.

Group 9d

1. Round lip; everted rim.
2. Chevron decorations on ?rim or ?neck
3. Round lip with circular notches; everted rim.
4. Round lip with square notches; square notches on slightly everted rim.
5. *Intsumpa* on neck or body.
6. Round rim with circular notches; everted rim.
7. Round lip; with rectangular notches; everted rim; convex ?neck

Group 9e - Miscellaneous sherds aa

These are single sherds without decorations, and are thus not easily placed in the relative sequence.

1. MPD19: Bevelled lip; everted rim.
2. MPD18: Flat lip.
3. MPC12: Bevelled lip; everted rim; perforation at base of rim.
4. MPB5: Bevelled lip; everted rim.
   Round lip.
5. MF1: Tapered lip.
   Tapered lip; everted rim.
6. MPD1: Bevelled lip; everted rim.
7. E1: Round lip; everted rim.
8. MPD22: Tapered lip - bowl.
9. MPA16: Round lip.
10. MPA24: Internally bevelled lip.