Southern African Field Archaeology 1:63-70.1992.

MAKING SENSE OF SPACE AT DUNEFIELD MIDDEN CAMPSITE, WESTERN CAPE, SOUTH AFRICA*

JOHN PARKINGTON, PETER NILSSEN, CLAIRE REELER & CHRIS HENSHILWOOD

Spatial Archaeology Research Unit,
Department of Archaeology,
University of Cape Town,
Rondebosch, 7700

* Accepted for publication October 1992

ABSTRACT

Presented here are the methodological approaches to and provisional results from, excavations at the Dunefield Midden site. We discuss the spatial patterning of features and material remains, showing that the site offers a rare opportunity to investigate the nature of domestic organisation of what we believe to be a hunter gatherer camp site.

INTRODUCTION

Since 1988 we have been excavating, mapping and analysing the remains of what we think are a series of very briefly occupied campsites from the late pre-colonial period (Nilssen 1989; Henshilwood 1990; Vermeulen 1990). These sites, which we refer to collectively as Dunefield Midden (DFM), are located some 2 km north of the mouth of the Verlorenvlei and about 600 m from the present shore (Fig. 1). There are, in fact, lots of shell scatters along the top and just below an abandoned coastal dune cordon which is a relict feature of a probably mid Holocene slightly higher sea level (Miller *et al.* in prep.). In the area where we are working the shells are partly exposed at the surface but mostly covered by up to 2 m of pale aeolian sand totally without archaeological content. The sites lie on an older yellow sand with quartz pebbles that is clearly waterlaid.

Our excavation strategy has been to expose as large a continuous area of occupied surface as possible by removing the aeolian overburden in metre squares, mapping as much of the debris as is possible and sieving all removed sand through a very fine (1,5 mm mesh) sieve. All shell, bone and artefactual material is then returned to the laboratory in Cape Town and sorted, weighed, measured and identified or classified. So far an area of 506 square metres has been excavated in a series of short visits, although not all materials from this area have been fully analysed. Because many of the ostrich eggshell beads and quartz chips are extremely small (less than 0,5 mm) the inventory of mapped items is better for bones, potsherds and anvils than it is for beads and chips. These latter are all provenanced to metre square. The map of hearths and other ashy features is complete.

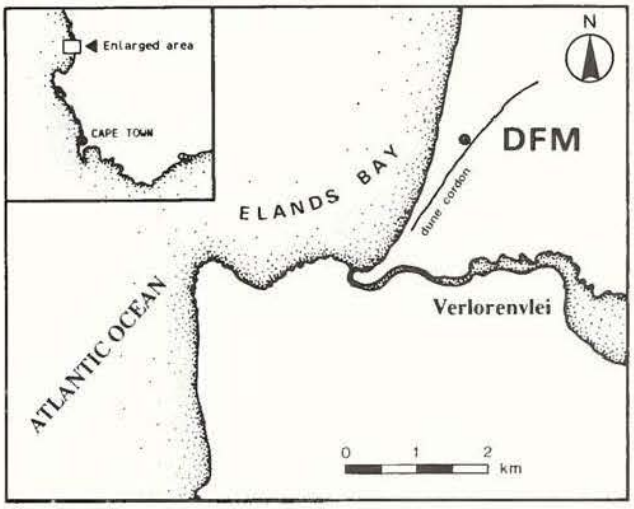

Fig. 1. Location of the Dunefield Midden (DFM) site.

Radiocarbon dates from DFM, all processed through John Vogel in Pretoria, are listed in Table 1. We have recognised that several partly overlapping but apparently quite brief visits to the area are reflected in the archaeological trace. We suggest that the northern part of our mapped surface reflects a single occupation about 650 years ago. We support the conclusion that the visit was brief by showing the coherence of patterning in a wide range of items and the ephemeral nature of the shell scatter over much of its area. We have tried to extend the excavation laterally so as to reach and then exceed the boundaries of reasonable scatter. Obviously radiocarbon dates with error margins of 30-50 years cannot demonstrate absolute contemporaneity but we are encouraged by the extent to which dates on charcoal and

Table 1. Radiocarbon dates from Dunefield Midden

DFM NORTHERN AREA				
UNIT	REFERENCE	DATE		MATERIAL
KIR 072	Pta 5277	600	± 40	charcoal
ELA 010	Pta 5276	620	± 50	charcoal
KIR 050	Pta 5062	640	± 40	charcoal
PET 027	Pta 5280	650	± 50	charcoal
ELA 043	Pta 4082	680	± 50	charcoal
KIR 026	Pta 4799	710	± 45	charcoal
FRA 052	Pta 5070	1130	± 40	shell
ELA 086	Pta 5011	1140	± 40	shell

DFM SOUTHERN AREA				
UNIT	REFERENCE	DATE		MATERIAL
FRA 030	Pta 5061	580	± 50	charcoal
SHA 033	Pta 4807	510	± 40	charcoal
FRA 026	Pta 5031	1240	± 40	shell
SHA 062	Pta 4801	1350	± 70	shell

search for a 'social' rather than an 'environmental' archaeology. In order to phrase our histories of pre-colonial people in more social terms we need methods that focus on social issues and processes. But the generation of method has been difficult because most archaeological sites are palimpsests, blurred overprinted images of repeated occupations. We suggest that social interpretations depend on our ability to resolve person as well as time and place; to see social groups as riven by internal divisions that provide the latent energy to initiate change with or without any associated change in environmental contexts. Excavations at DFM are an attempt to derive a resolved episode in the history of western Cape settlement. Many more such will clearly be required.

GENERAL PATTERNING

During the course of the excavation all ashy features were mapped and removed separately. From the field notes and a retrospective analysis of sizes it has been possible to divide these features into hearths; roasting pits; large *in situ* processing fires; and ashy patches that appeared to be secondary ash disposal heaps. The

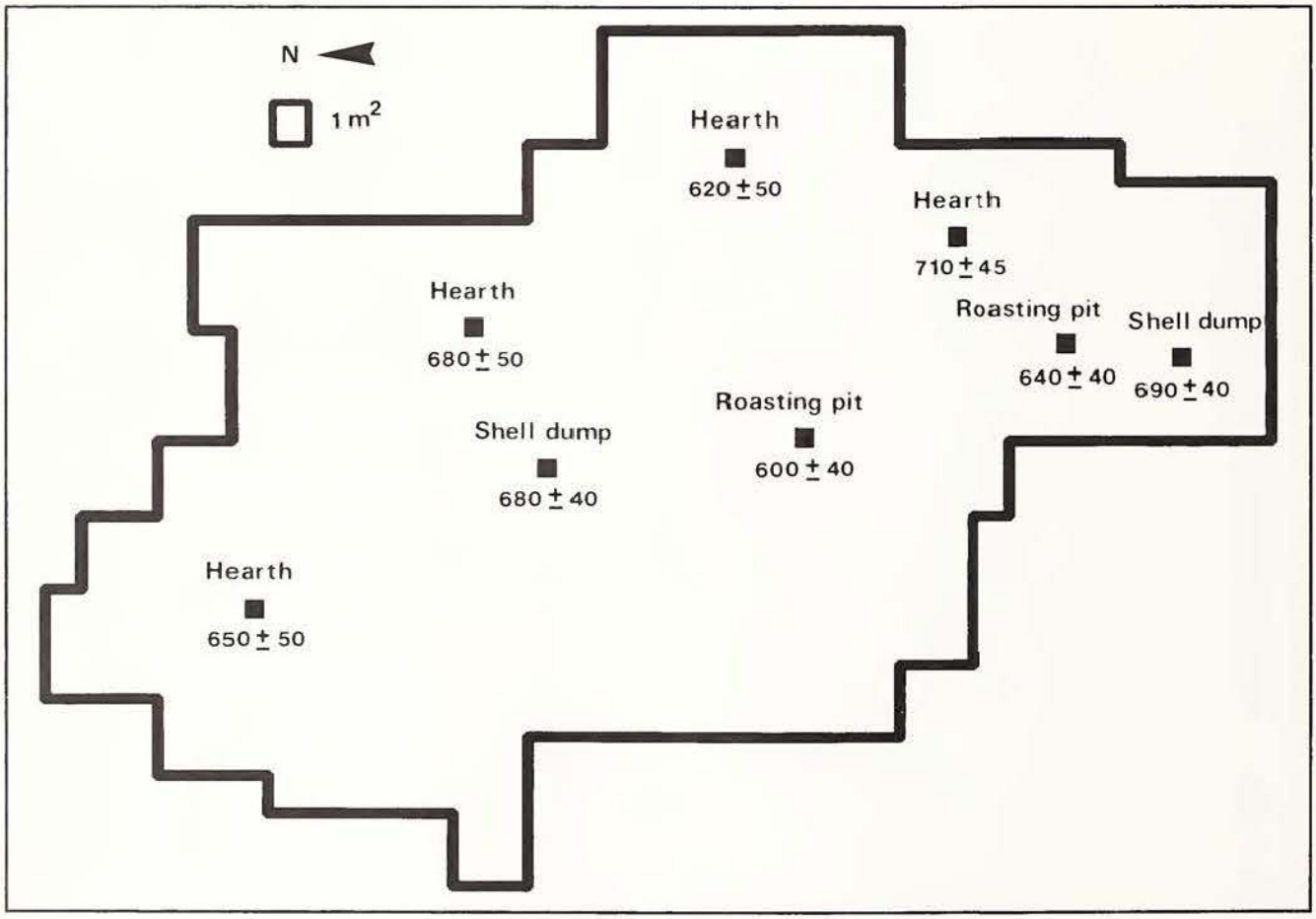

Fig. 2. Dunefield Midden (North): Radiocarbon dates. Shell dates corrected -450 years.

shell overlap so neatly (Fig. 2).

Our justification for expending so much time and energy in this exercise relates to the currently fashionable roasting pits have deep and extensive charcoal whilst the processing fires are large, crusted, ashy patches with white ash cores. None of these ashy features have much

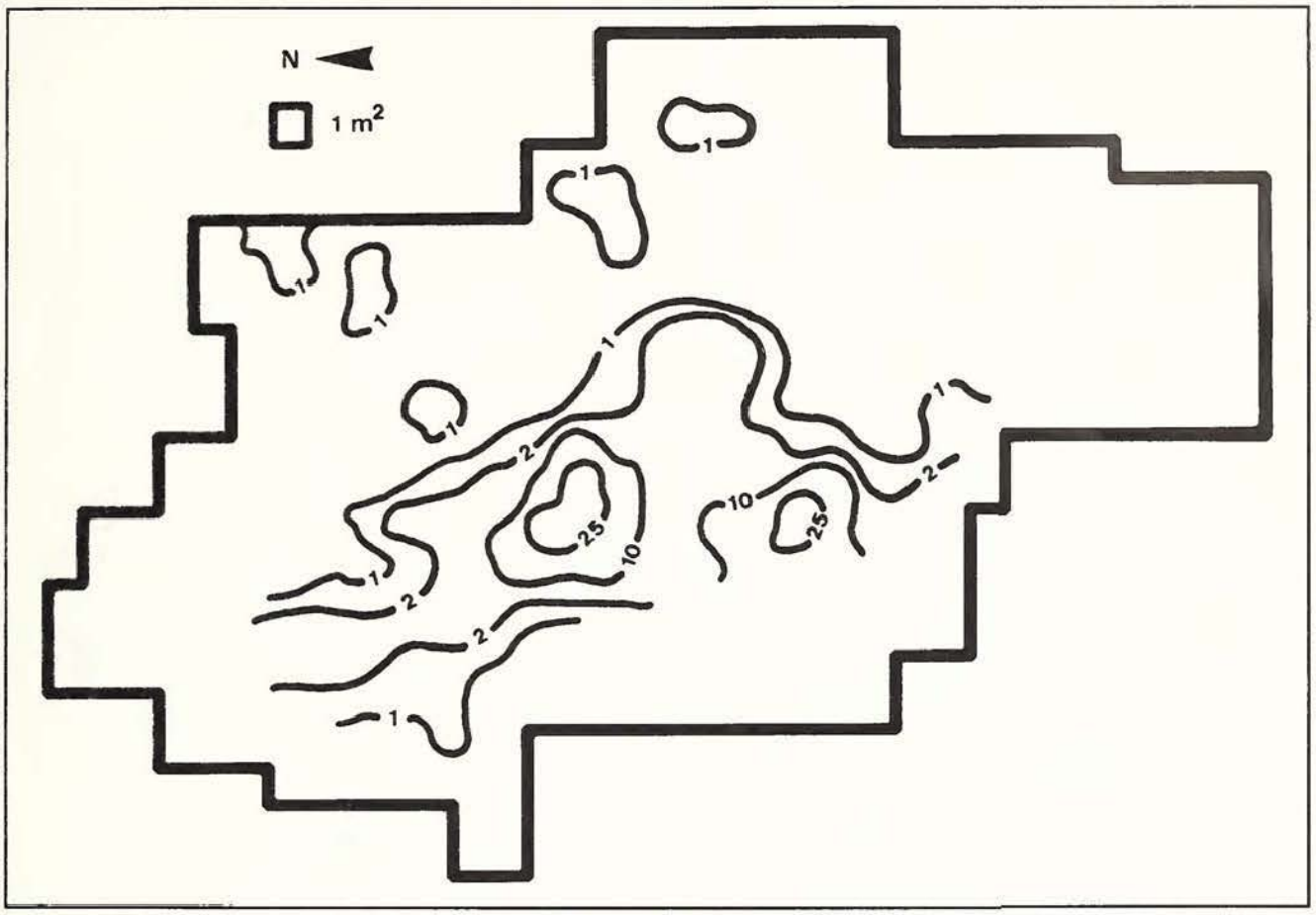

Fig. 3. Dunefield Midden (North): Distribution of marine shell. Contours in kilogram per square metre.

shell within them although there were also ashy dumps where various kinds of refuse, including both ash and foodwaste, were thrown.

Before considering the distribution of these ashy features, it is useful to note the general pattern of dumping at the site, best reflected in the most voluminous of the foodwaste, the shellfish remains (Fig. 3). Shells are very unevenly, and certainly not randomly distributed across the 426 square metres for which we have processed the figures. Looking only at the northern site it is clear that there is a massive contoured heap of shell running approximately S.E. to N.W. and about 25 m by 5 m in extent. Because about 80% of all shellfish waste is in this area, and because of the considerable ash and bone material mixed with it, we refer to this as a dump. We presume it to be a secondarily accumulated heap in a zone designated by the occupants as a dumping ground.

Ash features are drawn on Figure 4, which begins to reveal the general layout of this campsite. Hearths and ashy patches form a swathe approximately parallel to the long axis of the dump and about 5 m east of it. Roasting pits and processing areas are also roughly aligned along this dimension on the other side of the dump. These alignments give a rough linearity to the overall pattern, and suggest a structuring of the site for more detailed analyses. It is clear from recent maps of modern Kalahari hunter gatherer campsites that, although many approximate Yellen's ring model, others are linear or less easily defined (Yellen 1977; Kent & Vierich 1989; Bartram *et al.* 1991). We interpret this as revealing a widespread domestic front-back patterning organised around the hearth-windbreak nexus, but with considerable flexibility as to how the domestic units situate themselves as a set.

In pursuit of the edge of occupation, so as to be able to estimate camp size, we have in most areas reached shell densities of only a few grams or tens of grams per square metre. Additionally, on these edges the contribution of fragments of the white mussel, *Donax serra*, to the shellfish mass has increased dramatically. We know from inspection of the local landscape that these fragments are actually a component of the pebbly yellow sand that underlies the site. Using estimates for the areas where we are not yet at the edge we would give a figure of about 300-350 square metres for the size of the northern 650 year old camp.

ARTEFACT DISTRIBUTION PATTERNS

The stone artefact assemblage from DFM is respectably large (>5000 pieces) but remarkably limited in the range of behaviours reflected. Almost all of the flaked pieces are quartz (96%), almost all of the cores are bipolar (88%), small pitted anvils of quartzite are common and almost all of the retouched tools are tiny backed microliths (73%), scrapers being rare (9%) and adzes

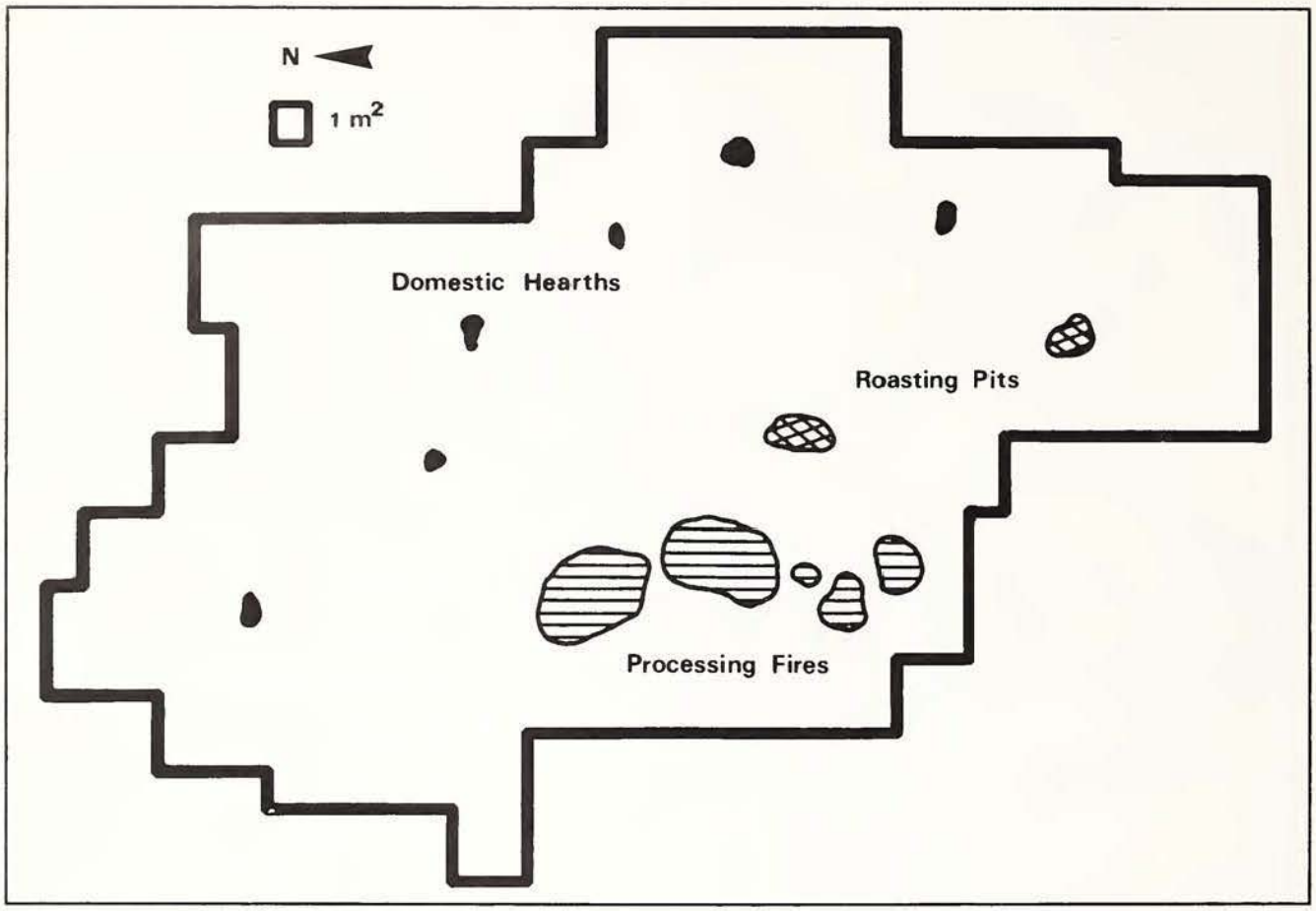

Fig. 4. Dunefield Midden (North): Distribution of ashy features.

completely absent. It is inescapable that the intention of toolmakers was the production of these tiny backed tools by bipolar technique, using anvils brought into the site and locally abundant quartz pebbles or crystals.

Because most of the quartz chips are extremely small (<5 mm) and would be virtually impossible to detect in soft sand, their spatial distribution probably pinpoints the location of toolmaking. There is little doubt (Fig. 5) that this took place next to hearths in the swathe of features that mark the domestic area of the site. Most of the chips and tiny bipolar cores came from within the ash or in the same square as an ashy hearth, suggesting a role for fire in the toolmaking process. As there is little value in pre-heating quartz, our view is that this reflects the heating of mastic mounts to replace small quartz inserts with newly made ones. There were at least three such episodes, probably four, in the course of the occupation, undertaken, we would suggest, more or less simultaneously by different toolmakers each at their own fireplace. These may not have been the only hearths in domestic ash-windbreak locations, but, rather, special purpose hearths.

Retouched pieces and anvil fragments are rather more widely dispersed than the tiny chips, which is to be expected given their potential for re-use or re-implementation in other contexts. Refitting of quartz has not been atttempted but anvil refits link the hearths across the site, at least circumstantially, into a single overall system. The absence of adzes, arguably digging stick maintenance tools, is consistent with the absence of grinding surfaces and woodshavings. Gathered foods appear not to have included underground plants.

Ceramics are not particularly common but rather neatly distributed in the dump and domestic areas (Fig. 6). In the latter the sherds appear as small 'puddles' near to but never in the hearths. Inspection of fabric and refitting reveal that the 'puddles' are essentially self-contained with some refitting between hearth and dump but almost never between hearth and hearth. Although orienting a 'puddle' to its proper hearth is obviously not simple, we note a clear tendency for ceramic hearths not to be quartz chip hearths.

Refitted sherds constitute a fairly high percentage of the total (61%) but never emerge as complete vessels. This, along with the observation that almost all of the 'puddled' sherds refit, makes us wonder whether broken but still useful pots were not kept and stored in the windbreaks between visits. This would make the puddles of potsherds the best evidence for windbreak location. There is also evidence on two of the refitted pots for use of sherds as scrapers rather than as vessels.

Ostrich eggshell fragments have also been refitted on a substantial scale and plotted here along with beads. Once again there is a tendency for neighbouring pieces to refit but the circumstantial end result is not easy to interpret. What is clear is that OES fragments smear

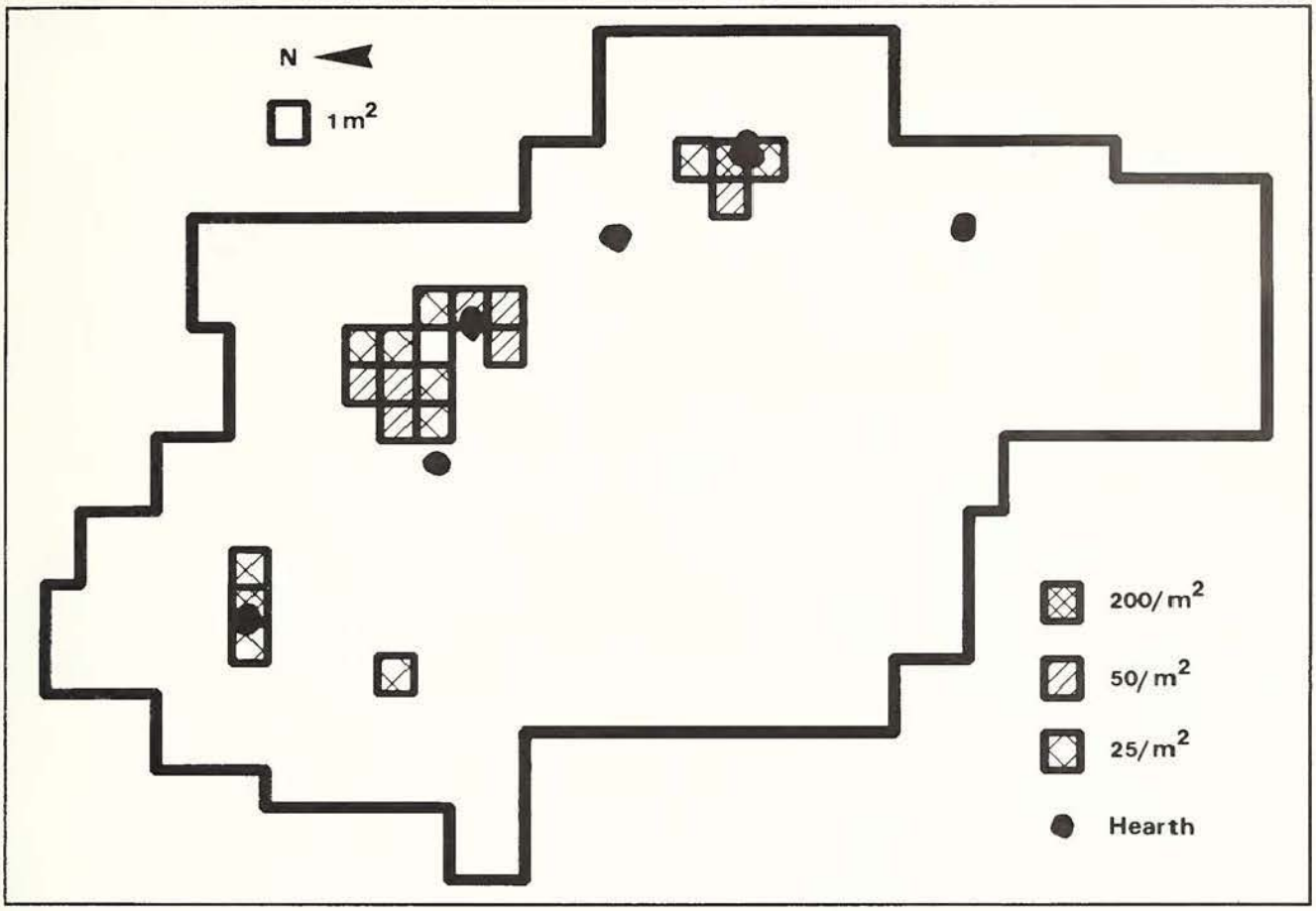

Fig. 5. Dunefield Midden (North): Distribution of quartz chips.

across from domestic to dump areas and are extremely rare in the rather bare zone between northern and southern camps. Unlike the potsherds, ostrich eggshell fragments show that whole eggs were present on the site.

SHELLFISH PATTERNING

The designation of the western half of the northern camp as a dump has already been mentioned. What shows up on the shellfish density map (Fig. 3) are a series of isolated patches of relatively high shellfish frequencies separated from the main dump and lying near to the domestic hearths. These are heaps of shell with associated bone that, perhaps because of their late accumulation in the life of the camp, were never relocated to the main dump. Fisher & Strickland (1989) noted in their description of Efe campsites that the pattern seen by archaeologists would be frozen in a frame representative of the final days of occupation. These satellite dumps at DFM lie among and to the back of the domestic 'nuclear areas'.

Shellfish gathering at the DFM sites was obviously focussed on the two common limpet species *Patella granatina*, the bigger of the two, and *Patella granularis*. These animals contributed more than 70% of the shellfish meat and must have been gathered some 2 km away south of the Verlorenvlei river mouth at the nearest rocky shore (Fig. 1). The mussels (*Choromytilus meridionalis*) tell a different tale, especially when viewed along with the barnacles (*Austromegabalanus maxillaris*), because they are not common even that close to the site. On many occasions barnacles were found still attached to mussel hosts, on almost all others the negative shapes of mussel shells are still clearly visible. Mussels of the size found at DFM (mean size >100 mm) and with large attached barnacles are never available in the intertidal, but live subtidally. Our suggestion is that the mussels and barnacles at DFM were gathered as washups after being wrenched from their subtidal environment by stormy seas. They could easily have been gathered, ironically, along the sandy shore opposite the site where mussel beds are massively represented offshore.

We have measured all whole limpet shells and feel that the pattern of sizes by metre square is not random and not homogeneous (Fig. 7). Patches of very large individuals of both species are common in the dump, particularly at the southern end, and are not characteristic of the satellite dumps. In these latter, by contrast, we have found some of the smallest mean sizes for both species in the site. Consistent with this pattern are differences in the relative proportions of the two limpet species. Some of the highest proportions of the smaller species, *P. granularis*, are found in the satellite dumps and some of the lowest in the main dump.

This circumstantial pattern of structured limpet disposal is not crystal clear and is complicated by the

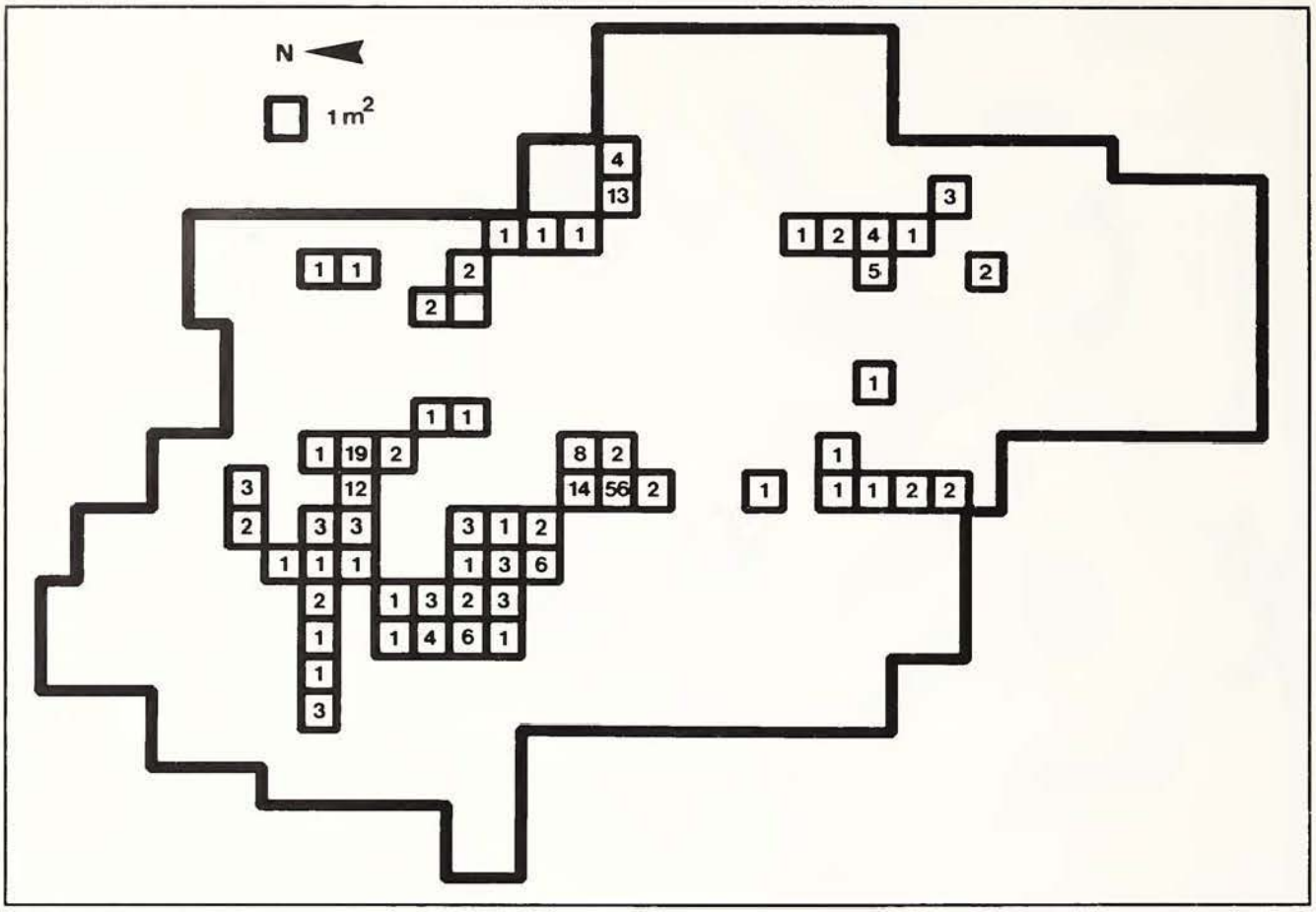

Fig. 6. Dunefield Midden (North): Distribution of potsherds.

most northerly end of the dump. We do not doubt, however, that there is a relationship between mean sizes of limpets and species proportions. We currently favour the view that the pattern of sizes and proportions reflect the time span of the visit, with larger animals and the larger species preferred in early collections and smaller animals gathered as the visit progressed and the shellfish population impacted. Such an interpretation supports the notion that the satellite dumps are phenomena of the final days of occupation in the sense referred to by Fisher & Strickland (1989).

Whelks and barnacles almost never make it to the satellite dumps. By contrast they are superabundant in the centre and to the west of the main dump very close to what we think are processing features. At the moment we have no strong evidence upon which to interpret the processing behaviour, but smears of burnt and fragmented whelk and barnacle shell on these *in situ* features may be of significance. We have the impression that the internal and external parts of barnacles are not similarly distributed and will investigate this further. The important question as to whether shellfish were processed collectively or not is still unresolved.

The calcareous mandibles of the rock lobster (*Jasus lalandii*, known locally as a crayfish) are very common at the site (n > 1500). These can be sided and measured (Grindley 1967) to give a good estimate of the numbers of animals and their sizes. Crayfish were almost certainly collected in the bay along with limpets, as previous analyses in the locality of Elands Bay have shown a strong correlation between the two (Buchanan 1988). Most animals are fairly small with a modal total mass of about 200 gm, interestingly about the same as in near contemporary assemblages from the Elands Bay Cave.

PATTERNING OF FAUNAL REMAINS

The bones of DFM are dominated numerically by those of seal, tortoise, small bovid, bird, eland, dassie, fish and microfauna in approximately that order (R.G. Klein pers. comm. 1991). Seal bones are substantially chewed, probably by either jackals or domestic dogs, but also by the brown hyena (*Hyaena brunnea*). Many of them may have been completely deleted from the assemblage. Small and large bovid bones, mostly the steenbok, *Raphicerus campestris*, and the eland, *Taurotragus oryx*, respectively, are less chewed and more frequently marked by impact fractures. These have presumably been processed for marrow and can be refitted and carcasses re-assembled. Tortoise skeletons have been dispersed through the consumption process but are frequently burnt, especially the plastron bones which probably lay directly on the coals. In the northern campsite there are virtually no bones of domestic animals (fewer than 12 bones out of a total of more than 1800 identified to species), allowing us to say with certainty that the vast

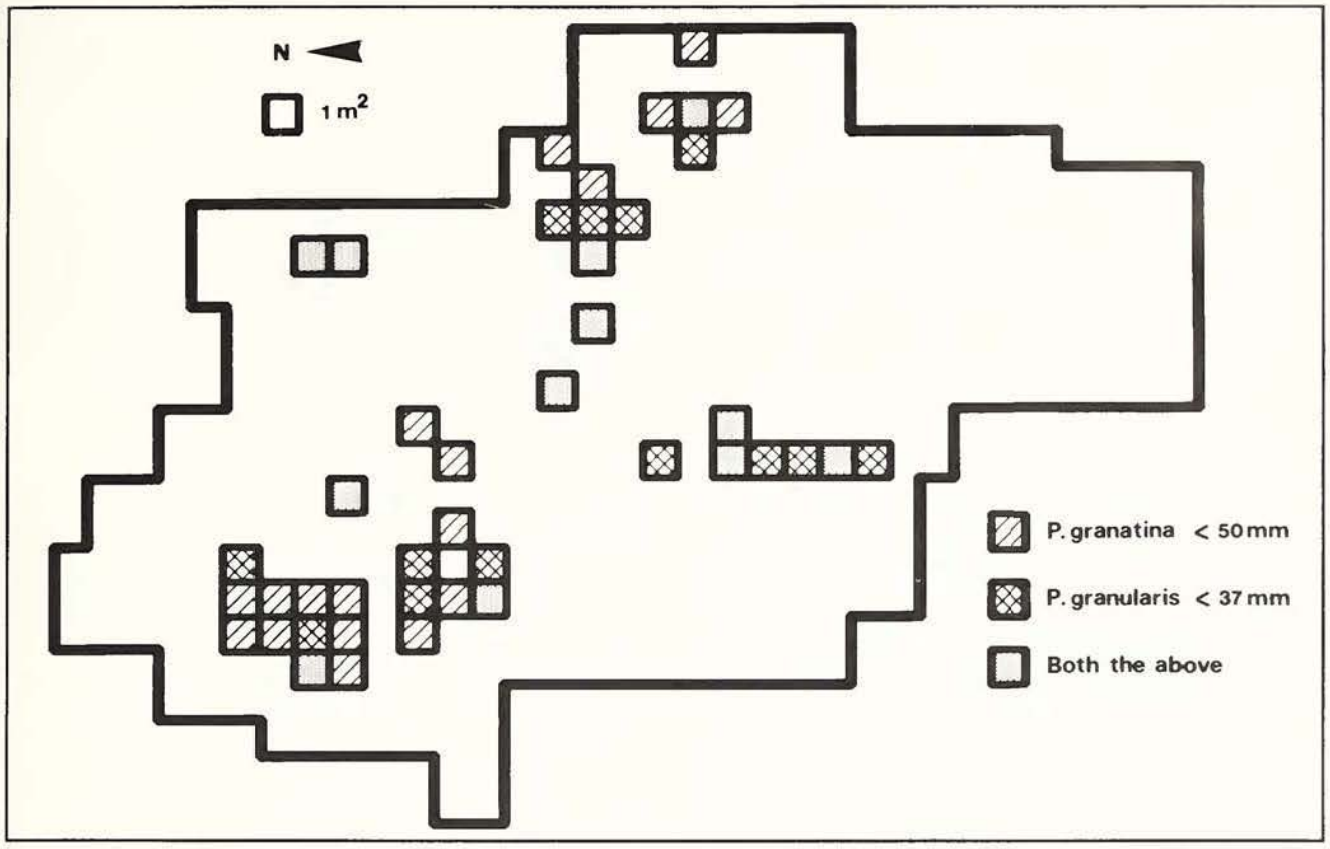

Fig. 7. Dunefield Midden (North): Distribution of small limpets.

bulk of the food came from wild species of plant and animals.

We have paid particular attention to the eland bones, being interested in the number of individuals represented as well as the processes of consumption, distribution and disposal. We have measured 23 modern eland in the South African Museum hoping to be able to assess the chances of any one archaeological eland bone belonging to the same individual as another (Nilssen 1989) by differences in measurement ratios between individuals. The value of such a procedure lies in its ability to predict which bones could not belong to the same animal. Similar work is in progress at the late Magdelenian site of Pincevent (Enloe & David, in press). Looking at the measurements on the eland from the DFM northern site, as well as the pattern of body part representation, we are sure that only one eland, an adult, is represented. As might be expected in the case of a large animal, body parts are widely distributed about the camp including rear satellite and main dump areas, a pattern we think relates partly to the distribution of meat but mostly to the disposal of bone already processed for marrow. We ascribe some considerable significance to the presence of an eland not only because by its size it is the equivalent of 50 steenbok or 20 seals, but also because as a meat parcel it would obviously have been obtained at one single moment. We make the assumption that hunters would not leave camp the day after obtaining such a large bounty. Informal inspection of other sites along the dune cordon shows that eland bones are found on most, if not all, sites. It may well be that a prime reason for occupying this piece of the landscape was the good chance of taking an eland.

Steenbok bones are fairly common and probably reflect about 12 or 15 individuals. We have measured 47 modern skeletons but are not yet in a position to 'refit' carcasses metrically. Our impression is that this might be difficult because most of the steenbok are adults of more or less the same size. Compared with the seal bones there is remarkably less chewing on either steenbok or eland bones, but more evidence of butchery and marrow processing probably because seal bones are spongy and do not have marrow cavities. As with the quartz chips, the tiny flakes detached in bone processing are probably a very good indicator of the location of this behaviour.

Seal bones are abundant at DFM, include all body parts and are remarkably heavily chewed. Although this could result from people it is probably more likely to be the scavenging of greasy bones either by domestic dogs during the occupation, or by jackals after people had left. The incidence of chewing is matched in our experience only by that at Kasteelberg (Klein & Cruz-Uribe 1989; Smith pers. comm.) The seals were clearly all first or second year animals and measurements of mandibles compared with modern animals of known age at death suggests to us a winter occupation at DFM.

What is interesting about the distribution of the tortoise bone is the concentration of plastron fragments and limb bones in the domestic area among the swathe of hearths. Carapace fragments are more often in the dump,

a distinction which may reflect the use of carapaces, but not plastrons, as bowls. We believe the patches of tortoise bones near to hearths are drop or 'drool' zones which have remained as debris from the consumption of tortoises. Tortoise bones do not seem to have been very attractive to dogs or jackals that roamed the site.

We are not sure yet whether the host of bones from small animals such as fish, frogs, snakes, small birds, rodents and shrews, are the result of human food consumption or the debris from disaggregated animal faeces. Collections of modern faeces from the area will help to solve this.

WHAT DOES THE PATTERNING MEAN?

At this early stage in the analysis we can only list the range of questions we have about the site and the kinds of issues that might be approachable from the results. Crucial to the whole enterprise will be our ability to demonstrate successfully the existence of a series of distinguishable briefly occupied campsites with resolved spatial patterning. We believe this is already apparent, although even partial overlaps are evident. In the long run overlaps will not be a serious obstacle, nor even will poorly established edges, because the repetition of features and associations will allow us to generalise about the location of behaviour and the regularity of patterning across different but comparable sites. The challenge beyond that is to find more of these sites from earlier time periods and other environmental contexts so that these behaviours and regularities can be set in regional and temporal perspective. Ultimately such observations will meld with others into regional histories.

We can at DFM already dimly discern issues such as the duration and season of occupation. Counting calories against the number of hearths, we find it hard to believe in a visit of less than 10 days or more than 2 months. This would be long enough to account for the suggested impact on shellfish, since some tens of thousands of animals would have been collected. At the same time the numbers of people would have ensured shellfish loads well within the bounds of ethnographic observation (Meehan 1982).

Our measurement of seal mandibles (Woodborne *et al.* in prep.) and analyses of dassie mandibles against modern eruption schedules lead us to believe the visit to the northern campsite was no earlier in the year than March and no later than October, almost certainly a winter visit coincident with the rough winter storms.

As for the reason for the visit we propose that it was based on the reasonable expectation of killing an eland at a seasonal water pan in the nearby high, active dunefield. The stone toolkit may well reflect a rather restricted range of tooling up behaviours as stone tipped arrows were primed for use. Other hunting and gathering was then wrapped around the consumption of the eland carcass which may well have attracted more people than the original occupants. Gathering at the site was focussed on shellfish, though after a month or so even the fat-rich diet derived from lots of seal meat may have palled. The site was, we suggest, a month in the lives of pre-colonial hunter gatherers, but a month in which we can discern some detail and of which we can ask rather specific questions.

ACKNOWLEDGEMENTS

We would like to thank Cedric Poggenpoel and a large number of the University of Cape Town Archaeology students for help in the field and laboratory. James Enloe, Graham Avery, Richard Klein and Royden Yates also made significant contributions to the research.

REFERENCES

Bartram, L.E., Kroll, E.M. & Bunn, H.T. 1991. Variability in camp structure and bone food refuse patterning at Kua San Hunter-Gatherer camps. In: Kroll, E.M. & Douglas Price, T. (eds) The interpretation of archaeological spatial patterning: 77-143. New York: Plenum Press.

Buchanan, W.F. 1988. Shellfish in prehistoric diet. Oxford: British Archaeological Reports International Series 455.

Enloe, J.G. & David, F. In prep. Food sharing in the Paleolithic: carcass refitting at Pincevent. Oxford: British Archaeological Reports International Series.

Fisher, Jr., J.W. & Strickland, H.C. 1989. Ethnoarchaeology among the Efe Pygmies, Zaire: spatial organisation of campsites. American Journal of Physical Anthropology 78:473-484.

Grindley, J.R. 1967. The Cape rock lobster *Jasus lalandii* from the Bonteberg excavation. South African Archaeological Bulletin 22:94-102.

Henshilwood, C.S. 1990. Home is where the hearth is. Unpublished Honours thesis: University of Cape Town.

Kent, S. & Vierich, H. 1989. The myth of ecological determinism: anticipated mobility and site organisation of space. In: Kent, S. (ed.) Farmers as hunters: the implications of sedentism: 97-130. Cambridge: Cambridge University Press.

Klein, R.G. & Cruz-Uribe, K. 1989. Faunal evidence for prehistoric herder-forager activities at Kasteelberg western Cape Province, South Africa. South African Archaeological Bulletin 44:82-97.

Meehan, B. 1982. Shell bed to shell midden. Canberra: Australian Institude for Aboriginal Studies. Globe Press.

Miller, D.E., & Yates, R.J., Parkington, J.E. & Vogel, J.C. In prep. Radiocarbon-dated evidence relating to a mid-Holocene relative high sea level on the southwestern Cape coast, South Africa.

Nilssen, P-J. 1989. Refitting pottery and eland body parts as a way of reconstructing hunter-gatherer behaviour: an example from the Later Stone Age at Verlorenvlei. Unpublished Honours thesis: University of Cape Town.

Vermeulen, C. 1990. Spatial patterning in the stone artefacts from Dunefield Midden. Unpublished Honours thesis: University of Cape Town.

Yellen, J.E. 1977. Archaeological approaches to the present: models for reconstructing the past. New York: Academic Press.

Woodborne, S.J., Parkington, J.E. & Hart, K. In prep. The seasonality of occupation at Dunefield Midden, western Cape, as measured by seal mandible sizes.