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figures as for Application

2nd Report on Work Completed at Spreeuwal and Proposed New Work (NMC 80/97/12/004/51 Dec. 1997)

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Introduction

Spreeuwal (SPW) is a new open site, with prolific well-preserved aquatic and terrestrial faunas and Middle Stone Age stone artefacts on a late Pleistocene lake (vlei or marsh) margin. SPW is an important addition to the small number of known well-preserved southern African Early (ESA) and Middle (MSA) Stone Age fossil and archaeological occurrences. Because of its locality at the time (near, but not coastal, not a cave or shelter), the stone artefacts and excellent preservation of fauna and other potential environmental proxy material, SPW has the potential to add new observations and to test hypotheses concerning MSA use of open air sites as opposed to caves/shelters, available resources and demography. Of particular interest is whether, like late ESA people (Klein *et al.*, 1999a), they were relatively limited in hunting ability, lived in small groups (Halkett *et al.*, 2003) and left relatively ephemeral 'footprints'.

Spreeuwal (literally "starling bank") is located in Saldanha Bay, about 100 km NNW of Cape Town (Figures 1 to 3). Its exposure within the intertidal zone (Figures 4 & 5) indicates formation during a period of lowered sea level. Protecting beach deposits are periodically removed by high wave energy, revealing a 2.5 m fossil-rich profile (Figures 6 to 10). Once exposed, the sediments are rapidly scoured and bones, which are fragile, are dispersed, abraded and destroyed in the swash unless collected immediately. As the hard calcrete capping is undercut and collapses more material is eroded. Collection to date has been in the form of salvage rather than systematic excavation, but this is unpredictable and the results do not meet the standards required to resolve questions relating to MSA land use and demography.

History

In 1994 J. Parkington, University of Cape Town, informed G. Avery of a report that hikers had observed fossil bones on the beach at Spreeuwal. In 1997 G. Avery and R.G. Klein, Stanford University, made the first collection of bones, assisted by staff of the West Coast National Park. The context of a stone artefact found on the calcrete capping was equivocal, in spite of the dark matrix adhering to it. In 2001 G. Avery and M. De Benedictis, Iziko Museums of Cape Town, met L. Kriedermann and J. Otto, who had collected bones from the swash and reported to P. Haarhoff, West Coast Fossil Park, that storms and spring tides had again exposed the occurrence. Re-sanding was already taking place, but a preliminary record of the sediments and profile was made (Figure 7) and sediment samples and bones, including heavily abraded pieces, were salvaged. A. Carnegie and D. van Schaikwyk also donated material they had salvaged. A sample of some 500 bones has been recovered. Three artefacts, with Middle Stone Age (MSA) characteristics (at least one from a humified horizon, although this was not observed by GA) were found. It has subsequently been noted that artefacts are sparsely distributed within the palaeosol, which overlies the calcrete duricrust.

Dating

The larger mammal component includes extinct species and others not recorded historically in the western Cape (Table 1), which are typical of other glacial samples from the region with grassier vegetation than is found in the local Fynbos/strandveld vegetation. This attracted grazers in particular (Grine & Klein, 1993; Klein, 1972; Klein, 1975b; Klein, 1983). This places

the occurrence within the last glacial (approx. 90 000 to 14 000 years ago), although the penultimate glacial (approx. 190 000 to 130 000 years ago) could not be ruled out (Brooks *et al.*, 1990; Hare *et al.*, 1992). A calcrete sample from the upper calcrete capping has yielded a preliminary U-Series date of 56 ky (J. Bischoff, US Geological Survey, *in Litt.*), which is consistent with a last glacial date for the fauna and the artefacts.

Faunal and Plant Remains

Taxa identified so far are listed in Table 1. All faunal elements and the surfaces of most bones are extremely well preserved indicating, for the most part, rapid covering. Bones are predominantly in the grey and black humified matrices, and relatively sparse within the upper 0.8 m of the profile. Bones of small mammals, birds, reptiles and amphibians occur in relatively high numbers, sometimes in small "clumps", containing several taxa, which almost certainly represent scats or pellets from a small carnivore or raptor. Hyaena gnawing and coprolites are present.

Although typical of glacial assemblages, the species composition and thus the inferred palaeoenvironment at Spreeuwal is, nevertheless, different to those commonly associated with the earlier part of the last glacial (approx. 85 ky) at Swartklip, Sea Harvest and Hoedjiespunt (Grine & Klein, 1993; Klein, 1975a; Klein, 1975b; Klein, 1983). Expected elements, like white rhinoceros and greater kudu and springbok are absent or, like southern reedbeek, poorly represented, whereas equids and black rhinoceros are relatively more common. In spite of the putative chronology, the Cape buffalo is also absent. Although tortoises are common in many archaeological sites they are relatively rare at Spreeuwal. SPW may, therefore, provide new information on regional habitat variability within glacial conditions in the western Cape or may reflect a period, which has not yet been sampled. The latter is implied by the date, but confirmation of this and larger samples are required. Plant remains will provide critical evidence. There are traces of sedge stems and their calcified root masses; phytoliths (L. Rossouw, National Museum, pers. com.) are prolific in the humified material; and pollens are likely to be recovered from the coprolites and humified lenses. Also not recorded previously for this period is the occurrence of dental hyperplasia in a bontebok, suggesting the existence of environmental/nutritional stress.

In apparent association with the bones are numerous shells of small freshwater gastropods and carapace valves, some still paired, of ostracods, which live in fresh to brackish vleis and pans. These will yield information on the nature of the water body and bank side.

The humified bands and dark grey aquatic sediments are thought to represent intercalated reed bed and sedge vegetation on a shallow lake or marsh margin and suggest periods of relative stability with intervening drier episodes, on an unknown scale (seasonal, etc.), during which animals and humans, attracted by water and prey, gained access to fluctuating banks. Sediments seem to have built up relatively rapidly in the aquatic context, which is capped by terrestrial sands (dunes?) with prolific mollusc fragments and sparse stone artefacts, adding another environmental dimension.

Human activity

The three artefacts, with Middle Stone Age (MSA) characteristics and a cut bovid rib provided the first clear evidence that some of the bones and artefacts were associated and confirmed the existence of an ephemeral human component at Spreeuwal. Subsequent observations also suggest that there is a relatively high density of stone artefacts in the uppermost 0.8 m of the sequence where bone density is low. This could be an artefact of visibility or patchiness, however, and it remains to be seen whether this observation will be upheld by systematic excavation and the recovery of more artefacts. It nevertheless appears

that SPW will offer the opportunity to examine more than one unit of human activity without the 'palimpsest' effect commonly encountered in caves and shelters.

Preliminary Conclusions & Issues

It appears that animals and people were attracted to a shallow palaeo-lake(s) during a period when the coast was some distance beyond the present due to a lowered sea level. The profile appears to represent 'continuous' siltation over time with intervals during which water levels fluctuated, possibly due to climatic variation, as sedimentation raised base levels.

The faunal composition at SPW differs from that in other last glacial hyaena accumulations, e.g., Swartklip, Sea Harvest, Hoedjiespunt (Grine & Klein, 1993; Klein, 1975b; Klein, 1983; Stynder *et al.*, 2001) and Middle and Late Pleistocene hyaena occurrences at Elandsfontein (Avery, 1989; Klein, 1983; Klein & Cruz-Uribe, 1991). However, in common with Elandsfontein (excluding the obvious nursery dens) and Duinefontein 2, the Spreeuwal accumulations do not represent hyaena dens—the remains found so far indicate the existence of a water body around which animal and human activity focused.

The Spreeuwal assemblage also appears to differ from local near-coast MSA occurrences in calccrete shelters, such as Sea Harvest, Hoedjiespunt and Ysterfontein (Halkett *et al.*, 2003; Stynder *et al.*, 2001; Volman, 1978), where artefact, marine shell and ostrich eggshell density is relatively high. The inclusion in the samples of well-preserved freshwater and terrestrial molluscs indicates that the lack of shellfish and other marine elements and the significantly smaller quantities of ostrich eggshell at SPW are not the result of preservation factors. SPW is 6.3 and 7.5 km from Hoedjiespunt and Sea Harvest respectively on the coast and the nearest significant rocky outcrop (with LSA middens) is 2.5 km away. During a lower sea level these distances could increase significantly, making it less likely that marine resources would have been brought to SPW. Finer resolution of the relationship of bones and artefacts through systematic excavation and taphonomic analysis will provide an opportunity to study open site activity, spatial and regional variation in the MSA. The SPW occurrence closely resembles the 300-400 ky ESA lake margin site of Duinefontein 2 (DFT2) (Cruz-Uribe *et al.*, 2003; Klein *et al.*, 1999a), although a potential problem at DFT2, which has a small marine bird element, is that shell may have been present, but not preserved. Both occurrences are directly associated with freshwater contexts, have aquatic elements, a range of terrestrial faunal components and elements of relatively ephemeral human activity represented by sparse stone artefacts and cut marks. Spreeuwal features are far better preserved, however. Stratigraphic separations and spatial distributions at these sites offer an opportunity for making comparisons in order to gain a greater understanding of the taphonomy of such occurrences and how ESA and MSA and people utilized non-cave settings within the landscape, both issues are critical to understanding human development.

The way forward

Given the age and nature of the occurrence and the association of faunal and artefactual elements in the context of a "well-preserved" palaeo-water body, Spreeuwal will provide important observations on Late Pleistocene fauna and environment as well as the use of such contexts by modern humans. Preservation of the sedimentary context is excellent and, together with the spatial distributions of bones and artefacts, it should be possible to determine the extent to which human versus other animal activity has shaped the assemblages.

Spreeuwal will provide observations for comparison with other Middle and/or Late Pleistocene faunal and MSA (Halkett *et al.*, 2003; Stynder *et al.*, 2001; Volman, 1978) occurrences in Saldanha Bay and elsewhere in the region, as well as with the Middle Pleistocene late ESA occurrences at Duinefontein (Klein *et al.*, 1999a) and Elandsfontein

(Avery, 1989; Klein, 1978; Klein & Cruz-Uribe, 1991). Comparisons will also be possible with well-known coastal cave sites such as Klasies River Mouth (Deacon, 1989), Blombos (Henshilwood *et al.*, 2001) and Die Kelders (Marean *et al.*, 2000) and the terrestrial MSA sequence being excavated at Diepkloof Cave by J. Parkington, C. Poggenpoel, J-P. Rigout and P-J. Texier. Further afield are sites like Boegoeberg (Klein *et al.*, 1999b), Florisbad (Brink & Henderson, 2001) and Oyster Bay (Carrion *et al.*, 2000).

The contribution of SPW itself, and through comparisons with other sites, to the palaeo-ecological and human history of this period will be significant. Salvage does not meet modern standards, however, and to maximize recovery of contextual and other information it is proposed to conduct a systematic excavation behind the fore dunes, using established archaeological methods and 3-dimensional recording to recover material and spatial information in a more controlled manner than has hitherto been possible. This will enlarge the faunal and artefactual samples and elucidate stratigraphic, sedimentary, contextual and palaeoenvironmental issues; the site will be dated and the results from Spreeuwal will be compared with other MSA and ESA occurrences in the region.

The larger mammals, micromammals and the birds, molluscs and ostracods will continue to be studied by Prof. R.G. Klein, Stanford University, by Dr D.M. Avery, Iziko Museums of Cape Town and G. Avery respectively. Pollens will be studied by Prof. L. Scott, University of the Free State, sediments by Dr J. Compton, University of Cape Town and amphibians by Mr E. van Dijk, Stellenbosch University. Mr L. Rousseau, National Museum, Bloemfontein, will study phytoliths and Prof. J. Lee-Thorpe, University of Cape Town, will establish whether the fauna can be used to provide palaeoenvironmental evidence from isotopes. The stone artefacts will be analysed by Prof. T.P. Volman, Cornell University and/or Mr R. Yates, Iziko: South African Museum.

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Table 1. Spreeuwal: Preliminary list of taxa.

		SPW	Historic
Mammals			
Soricidae indet.	shrew	X	X
Chrysochloridae indet.	golden mole	X	X
<i>Lepus saxatilis</i>	scrub hare	X	X
<i>Bathyergus suillus</i>	Cape dune mole rat	X	X
<i>Otomys saundersiae</i>	Saunders' vlei rat	X	X
<i>Gerbillurus cf paeba</i>	hairy-footed gerbil	X	X
Muridae, gen. et sp. indet.	mouse	X	X
<i>Hyaena brunnea</i>	Brown hyaena (coprolites)	X	X
<i>Diceros bicornis</i>	black rhinoceros	X	X
* <i>Equus capensis</i>	Cape zebra	X	
<i>Equus quagga</i>	quagga/Burchell's zebra	X	X
<i>Connochaetes gnou</i>	black wildebeest	X	
<i>Damaliscus dorcas</i>	bontebok	X	
* <i>Megalotragus priscus</i>	'giant' hartebeest	X	
<i>Raphicerus sp.</i>	steenbok/grysbok	X	X
* <i>Hippotragus leucophaeus</i>	blue antelope	X	
<i>Oryx gazella</i>	oryx	X	
* <i>Pelorovis antiquus</i>	long horned (giant) buffalo	X	
<i>Taurotragus oryx</i>	eland	X	X
<i>Redunca arindinum</i>	southern reedbuck	X	
Reptiles & Amphibians			
<i>Chersine angulata</i>	angulate tortoise	X	X
Squamata	snake(s)	X	X
Amphibia	frog(s)	X	X
Birds			
<i>Struthio camelus</i>	ostrich	X	X
<i>Francolinus capensis</i>	Cape francolin (spurfowl)	X	X
Charadriidae	wader	?	X
Passeriformes	small perching birds	X	X
*Molluscs			
<i>Tomichia sp.</i>	aquatic gastropod	X	X
<i>Assiminea cf ovata</i>	aquatic gastropod	?	X
<i>Succinea/Oxyloma sp.</i>	semi-aquatic gastropod	X	X
<i>Burmupia sp.</i>	aquatic gastropod	?	X
<i>Sphaerium cf capense</i>	aquatic bivalve	X	X
<i>Trachycystis capensis</i>	terrestrial gastropod	?	X
<i>Trigonephrus globulus</i>	Terrestrial gastropod	X	X
Crustaceans			
Ostrocooda	aquatic seed shrimps	X	X
Plants			
Stem, root trace fossils	"sedge"	X	X