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# UNDERSTANDING THE MSA/LSA TRANSITION: THE PRE-20 000 BP ASSEMBLAGES FROM NEW EXCAVATIONS AT SEHONGHONG ROCK SHELTER, LESOTHO*

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## ABSTRACT

**The assemblages from the pre-20 000 BP layers of new excavations at Sehonghong rock shelter, Lesotho, are described and the results contrasted with previous interpretations of the Sehonghong sequence. The assemblages are considered to exhibit characteristics of both Middle and Later Stone Age technologies. Additional comparisons are drawn with other southern African sites of the same age, leading to an examination of their implications for our understanding of the MSA/LSA transition.**

## INTRODUCTION

Relative to the substantial archaeological investment made in the Holocene prehistory of South Africa or in the study of the emergence of anatomically modern people, comparatively little attention has been paid to the archaeology of the late Pleistocene, defined broadly as the period from 40 000 to 12 000 years ago (H.J. Deacon's (1979) work at Boomplaas being a notable exception here). In Lesotho, the potential of Sehonghong rock shelter for investigating this period was demonstrated by P. Carter's excavation in 1971, which uncovered a sequence of Middle and Later Stone Age assemblages extending back beyond 32 000 BP (Carter & Vogel 1974). Because this site was known to have good conditions for the preservation of organic remains and relatively accessible late Pleistocene deposits, it was re-excavated in 1992 as the first stage of a re-investigation of late Quaternary hunter-gatherer land-use patterns in eastern Lesotho, initial results of which are presented elsewhere (Mitchell 1993; Mitchell & Vogel in press). While future papers will consider other aspects of the archaeological and palaeoenvironmental assemblages recovered, this one deals with the pre-20 000 BP part of the 1992 sequence and discusses issues of wider relevance for understanding the MSA/LSA transition raised by their analysis.

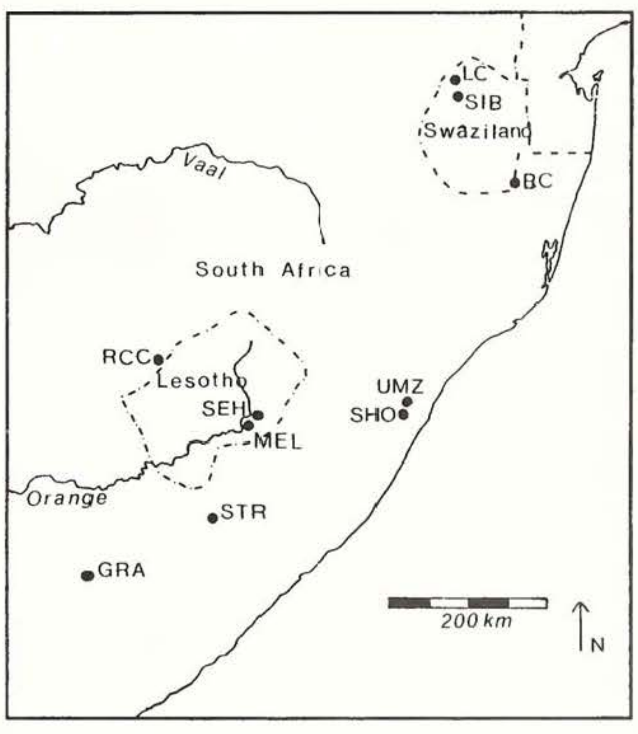


**Fig. 1. Location of Sehonghong and neighbouring sites in south-eastern southern Africa in the text. BC Border Cave; GRA Grassridge; LC Lion Cavern; MEL Melikane; RCC Rose Cottage Cave; SEH Sehonghong; SHO Shongweni; SIB Sibebe; SBD Sibudu; UMZ Umhlatuzana.**

## SITE LOCATION

Sehonghong (29.46S, 28.47E) is a large rock shelter on the south bank of the river of the same name, 3 km upstream of the latter's confluence with the Orange (Senqu) River in the Thaba Tseka district of eastern Lesotho (Fig. 1). It lies at 1800 m a.s.l. and faces west-northwest (290°). The vegetation of the surrounding area mainly comprises a short, dense *Themeda-Festuca* alpine grassland in which *Themeda triandra* is the dominant species, but shorter, less palatable grasses such as Festuca spp. become more common above 2130 m, particularly on south-facing slopes. The gorge of the Orange River and the valleys of its major tributaries have a *Themeda-Cymbopogon-Eragrostis* grassland within which a variety of trees and shrubs (including species of *Buddleia, Diospyros, Leucosidea* and *Rhus*) occurs. Survey of the surrounding area shows it to have been intensively used by both MSA and LSA people (Carter 1978; Mitchell *et al.* in prep.).

## EXCAVATION PROCEDURE

Excavation was carried out between 12 July and 6 September 1992 in a 6 m by 2 m wide trench extending towards the dripline from the rear wall of the shelter, 2 m to the south of, and exactly parallel to, the area excavated by Carter in 1971 (Fig. 2). The deposit was removed in natural stratigraphic units defined by changes in colour and sediment texture and all excavated material was dry-sieved through a 1,5 mm mesh before undergoing preliminary sorting on-site. Soil from MOS and RFS had first to be dried in the open air before it could be passed through the sieve, and wet-sieving (which was impossible in the drought conditions then prevailing) would have been needed had excavation continued below RFS. Bulk sediment samples were taken where plant remains were observed during excavation. At the excavation's end the unexcavated deposit below RFS was covered with plastic sheeting and the trench backfilled using earth and rock.

Pleistocene and Last Glacial Maximum origin, which correspond collectively to Layers IX and X of Carter's (1978) stratigraphy. The occurrences to be considered here come from the bottommost three layers in the 1992 excavation (Fig. 3). They are:

**Orange Sand (OS):** a thin, largely sterile orange sand (unit 127) with a high number of small sandstone roof spalls that may represent frost-shattering because of increased cold just before the Last Glacial Maximum. This layer was removed as three units, of which unit 129 is probably a hearth, while unit 128 represents a locally darker patch within 127. OS corresponds to Carter's Layer VIII and 22,5 buckets of deposit were removed.

**Mottled Orange Sand (MOS):** a series of brown to orange sandy units, some of which include small sandstone spalls, and have extensive black or darker brown mottling. The layer was removed in a total of 11 units, of which units 135, 137, 138, 155 and 156 are small, shallow hearths, while unit 140 represents a much larger feature close to the rear wall of the shelter in squares L12/M12. MOS is equivalent to Carter's Layer VII and a total of 61,4 buckets of deposit were removed from it in the 1992 excavation.

**Rockfall with Sand (RFS):** this layer (equivalent to Carter's Layer VI) represents a major episode of roof collapse associated with numerous, thin sandstone spalls and angular rocks, mostly <400 mm in maximum dimensions. Many of them are partially coated with a thin gypsum precipitate and small nodules of gypsum also occur; both comments apply to MOS and OS as well.

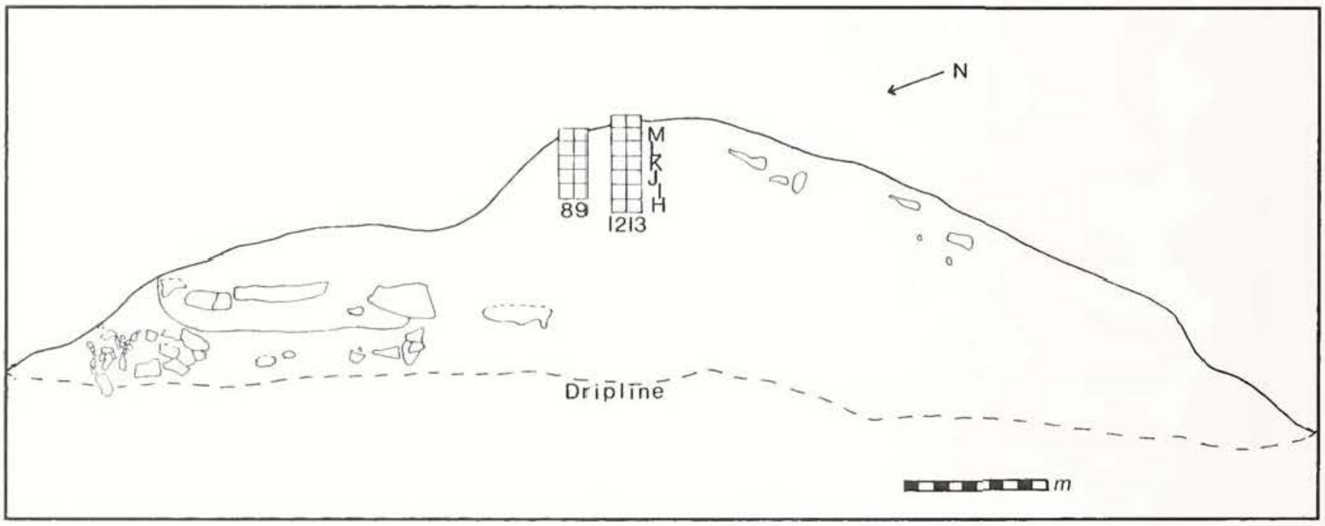


**Fig. 2. Sehonghong: site plan showing location of the 1971 (squares 8 & 9) and 1992 (squares 12 & 13) excavations.**

## STRATIGRAPHY

The natural stratigraphic units defined during excavation have been grouped for analytical purposes into a series of layers that represent successive pulses of occupation (Mitchell & Vogel in press). Below layers of recent, middle and early Holocene age are others of terminal

Carter (1976) has suggested that this rockfall may have been initiated by an intensification of cold conditions during the late Pleistocene, although other mechanisms, such as pressure-release, may also result in spalling and roof collapse episodes. Excavation ceased in 1992 in RFS, having removed the associated orange sand, but leaving the collapsed rocks in place to avoid

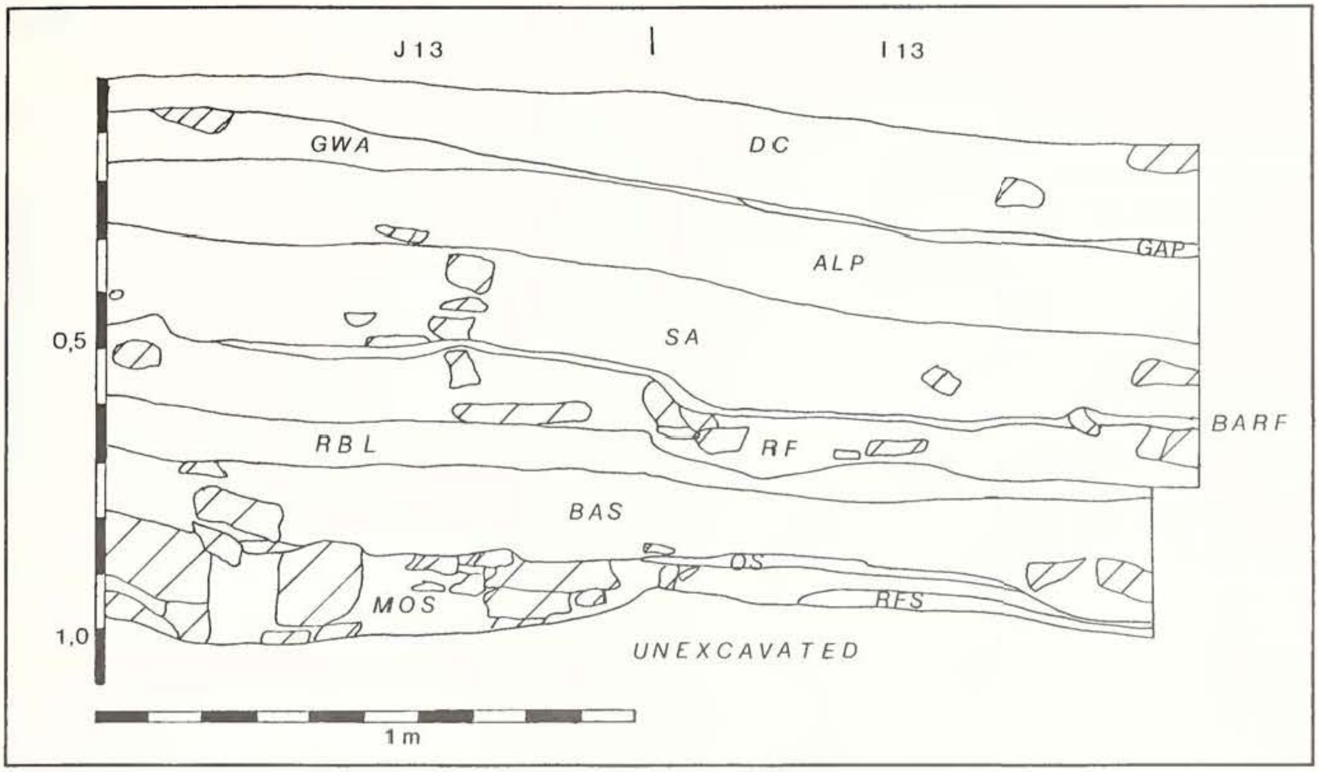


**Fig. 3. Sehonghong: partial section of the north wall in the 1992 excavation.**

damaging the underlying deposit. 34,2 buckets of deposit were removed.

## FEATURES

Most of the features present in these layers are small, shallow hearths, one in OS and five in MOS, the exception to this pattern being the large, 150 mm deep pit that constitutes unit 140 at the base of MOS. Other examples of much larger hearth-like features that form definite pits and are filled with charcoal, often in large pieces, occur in the late Pleistocene part of the Sehonghong sequence and seem to represent something other than the normal domestic (?) hearth, possibly a roasting pit or some other kind of special-purpose fire. This one, however, is unique in that it also contains what might be called a sub-feature within it (Fig. 4), consisting of an apparently deliberate arrangement of two basaltic manuports and one lower grindstone fragment that make up the sides of a 'box,' the 'lid' of which is formed by a large and broken lower grindstone, heavily coated with red ochre and with its ochred surface placed face-down. Grasses, and perhaps other uncarbonized plant remains, were present within this feature on discovery, but unfortunately did not survive their transportion to Cape Town intact. Close to this 'box,' and still within unit 140, a further manuport was found. It is a tabular piece of rippled sandstone, also heavily coated with red ochre, that is not native to the site, although an area of rippled sandstone was noted in a small shelter a few kilometres upstream. The association of these artefacts in a pit or hearth appears to have been deliberate, but its significance is unknown. Expanding the area of the excavation might show whether other such features exist and/or reveal other evidence of spatial patterning (*e.g.* in artefact or animal bone distribution) that would provide additional contextual information for it.

## DATING

The initial series of radiocarbon dates from Sehonghong (Carter & Vogel 1974) is complemented and extended by further determinations from the 1992 excavation (Table 1). The top of MOS is now dated to 20 500 ± 230 BP (Pta-6059), while the base of BAS, the layer that overlies OS, has a date of 20 200 ± 200 BP (Pta-6077). These two dates fit well with a date from Carter's excavation for a hearth at the top of MOS of 20 240 ± 230 BP (Pta-919), as well as with one of two dates (19 860 ± 220 BP, Pta-918) obtained from a level equivalent to a position near the base of BAS. A second date from this position in the 1971 excavation is stratigraphically inconsistent with the other two just mentioned (20 900 ± 270 BP, Pta-789), but still overlaps with Pta-919 at two standard deviations. A date for OS of *c.* 20 200 BP, with MOS ceasing to accumulate only a little before then, thus seems definite. Two determinations (26 000 ± 430 BP, Pta-6268 and 25 100 ± 300 BP, Pta-6271) have been obtained for unit 136 within the RFS layer and, overlapping considerably at two standard deviations, indicate that this rockfall event dates to ± 25 500 BP.

Three further dates from the 1971 excavation require mention. A determination of 28 870 ± 520 BP (Pta-920) from low down in Carter's Layer VII seems initially to

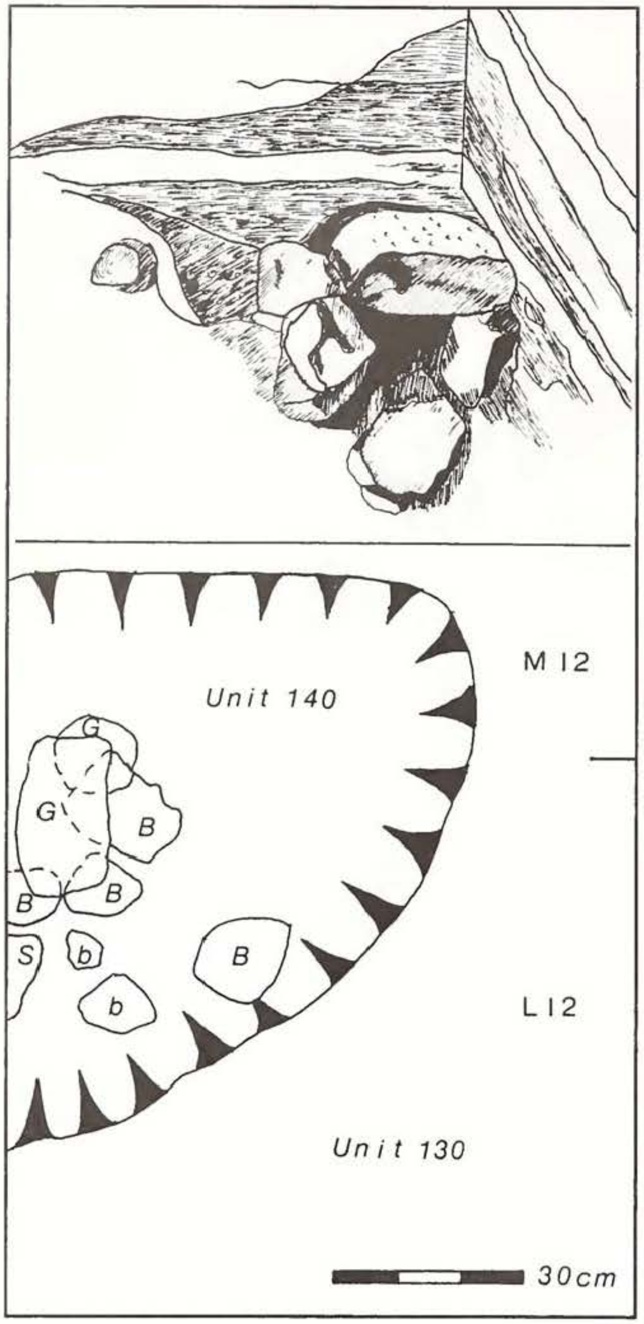


**Fig. 4. Sehonghong: drawing and plan of the 'stone box' in L/M12-140, MOS layer (redrawn after J. White). B whole basalt manuport; b broken basalt manuport; G grindstone; S sandstone manuport.**

point to MOS having accumulated over a very long span of time, but close examination of the relevant section drawings suggests that it may be unreliable as the charcoal dated comes from more than one stratigraphic unit. Further *termini post quos* for the rockfall episode represented by RFS are given by two dates from the top of the underlying Layer V of 30 900 ± 550 BP (Pta-787) and 32 150 ± 770 BP (Pta-785). Collectively, therefore, this series of radiocarbon dates neatly brackets the three assemblages discussed here to between 26 000 and 20 000 BP.

**Table 1. Sehonghong: radiocarbon dates of relevance for the OS, MOS and RFS layers.**

| Laboratory number | Layer (1992) | Layer (1971) | Unit (1992) | date (BP) |
|---|---|---|---|---|
| Pta-789 | BAS | IX | - | 20 900 ± 270 |
| Pta-918 | BAS | IX | - | 19 860 ± 220 |
| Pta-6281 | BAS | IX | 096A | 19 400 ± 200 |
| Pta-6077 | BAS | IX | 126 | 20 200 ± 200 |
| Pta-919 | MOS | VII | - | 20 240 ± 230 |
| Pta-6059 | MOS | VII | 137 | 20 500 ± 230 |
| Pta-6268 | RFS | VII | 136 | 26 000 ± 430 |
| Pta-6271 | RFS | VII | 136 | 25 100 ± 300 |
| Pta-787 | - | V | - | 30 900 ± 550 |
| Pta-785 | - | V | - | 32 150 ± 770 |

Note: All dates are uncalibrated and have been corrected for isotopic fractionation. All samples were pretreated with acid and alkali.

## STONE ARTEFACT ASSEMBLAGES

The Sehonghong lithic assemblages have been analysed using the typology devised by J. Deacon (1984a), as amended by Carter *et al.* (1988). Results are discussed following the now standard format, beginning with raw material usage.

Opalines (also known as crypto-crystalline silicas or CCS) are the dominant raw material throughout the upper part of the Sehonghong sequence (Carter *et al.* 1988) and in each of the assemblages discussed here (Table 2). In addition to an origin as river-borne nodules eroded out from higher-lying basalts, they occur as screes and in rare veins on the plateaux above the site, but the quality of these latter sources, as found so far, is poor. They account for >80% of the artefacts in each assemblage, with dolerite dyke material the second most commonly used material (5-10%) and hornfels in third place; RFS exhibits an enhanced use of dyke material compared with OS and MOS. Smaller amounts of tuff, siltstone/mudstone, quartz and basaltic rocks were also used, and a small quantity of calcite, which does not fracture isotropically, was introduced to the site as well. Quartz and calcite have a similar origin to opalines, while dyke material and hornfels derive from the dolerite dykes that crosscut the area.

Flaking technology shows little evidence for the use of prepared core techniques. The majority of cores are irregular (Table 3) and have either single or double platforms. Almost one-third of these cores in OS are bipolar, but bipolar irregular cores account for <8% of the total in MOS and RFS. Bipolar flaking is, however, more common than this would suggest as there is a regular component of both flat and small bladelet cores and core reduced pieces (almost all in opalines) in all three layers. Including the latter, half or more of the cores in these three assemblages are bipolar. Few artefacts exhibit prepared platforms (Table 4) and only

Table 2. Sehonghong: raw material usage in the OS, MOS and RFS layers.

| Number of artefacts | OS | | MOS | | RFS | |
|---|---|---|---|---|---|---|
| | n | % | n | % | n | % |
| Opalines | 1637 | 82,89 | 5849 | 85,86 | 2319 | 80,13 |
| Dyke material | 107 | 5,42 | 407 | 5,97 | 296 | 10,23 |
| Hornfels | 72 | 3,65 | 293 | 4,30 | 88 | 3,04 |
| Quartz | 46 | 2,33 | 97 | 1,42 | 83 | 2,87 |
| Calcite | 61 | 3,09 | 92 | 1,35 | 33 | 1,14 |
| Tuff | 46 | 2,33 | 37 | 0,54 | 55 | 1,90 |
| Siltstone/mudstone | 2 | 0,10 | 17 | 0,25 | 13 | 0,45 |
| Basaltic rocks | 1 | 0,05 | 19 | 0,28 | 6 | 0,21 |
| Baked siltstone | 2 | 0,10 | - | - | - | - |
| Sandstone | - | - | 1 | 0,01 | 1 | 0,03 |
| Baked sandstone | 1 | 0,05 | - | - | - | - |
| Total | 1975 | 99,99 | 6812 | 99,98 | 2894 | 100,00 |

Mass of flaked stone in gram (excluding calcite)

| | mass (g) | % | mass (g) | % | mass (g) | % |
|---|---|---|---|---|---|---|
| Opalines | 1695,1 | 63,81 | 5157,7 | 65,53 | 2233,6 | 54,25 |
| Dyke material | 443,6 | 16,70 | 1214,3 | 15,43 | 1049,1 | 25,48 |
| Hornfels | 368,2 | 13,86 | 1202,4 | 15,28 | 404,3 | 9,82 |
| Quartz | 21,7 | 0,82 | 33,0 | 0,42 | 23,9 | 0,58 |
| Tuff | 89,3 | 3,36 | 77,2 | 0,98 | 125,2 | 3,04 |
| Siltstone/mudstone | 20,9 | 0,79 | 123,2 | 1,5 | 135,8 | 3,30 |
| Basaltic rocks | 6,0 | 0,23 | 59,7 | 0,76 | 86,3 | 2,10 |
| Baked siltstone | 5,8 | 0,22 | - | - | - | - |
| Sandstone | - | - | 3,1 | 0,04 | 59,4 | 1,44 |
| Baked sandstone | 6,0 | 0,23 | - | - | - | - |
| Total | 2656,6 | 100,02 | 7870,6 | 100,00 | 4117,6 | 100,01 |

one of these is retouched. *Levallois* cores are absent and there is only one radial core (in RFS).

Although the proportion of blades and bladelets in the assemblages is less than in the Robberg occurrences overlying them, a definite blade/bladelet component is present and both bladelet cores and *lames à crête* occur. Blades and bladelets account for >4,73% of all unmodified flakes larger than 10 mm in OS, >4,26% in MOS and >3,47% in RFS. Their mean size is greater than in either the Robberg or Holocene LSA assemblages at Sehonghong. Although this may partly be a function of small sample size, it is paralleled by the mean sizes of unmodified opaline flakes (Table 4).

Macroscopic evidence of utilisation on the flaked artefacts is uncommon and generally slight, although a hornfels blade from OS has edge damage that begins to approximate that of a knife and a dyke material flake from MOS has utilisation on two converging edges that together form a point. Three lower grindstones were found in MOS, one of them heavily coated with red ochre, and basaltic cobbles that appear to be unmodified were introduced to the site as manuports, including several that occur within the RFS rockfall.

Few formally retouched artefacts are present and those found exhibit little obvious choice as to the blank on which they are made nor any standardization in size shape (Fig. 5). The single scraper from MOS appears to be an intrusive specimen of Woodlot-type (*sensu* Mitchell *et al*. in press) and the same may be true of one

Table 3. Sehonghong: stone artefacts from the OS, MOS and RFS layers.

| | OS | MOS | RFS |
|---|---|---|---|
| **UNMODIFIED** | | | |
| Chips | 69 | 151 | 92 |
| Chunk | 32 | 81 | 54 |
| Cores: | | | |
| flat bladelet | - | 10 | 4 |
| small bladelet | 1 | 5 | - |
| bladelet | 3 | - | 2 |
| radial | - | - | 1 |
| irregular | 18 | 41 | 16 |
| subtotal | 22 | 56 | 23 |
| Core-reduced pieces | 7 | 45 | 17 |
| Core-rejuvenation flakes | 3 | 4 | 2 |
| *Lames à crête* | 3 | 7 | 3 |
| Flakes (< and > 10 mm) | 1741 | 6244 | 2577 |
| Blades (> 25 mm) | 18 | 36 | 13 |
| Bladelets (< 25 mm) | 15 | 44 | 7 |
| Sections | 54 | 117 | 58 |
| **Total** | **1963** | **6785** | **2846** |
| **UTILISED** | | | |
| Flakes | 4 | 14 | 32 |
| Blades | 3 | 2 | 2 |
| Bladelets | - | 2 | - |
| Hammerstones | - | 1 | - |
| Upper grindstones | - | - | 1 |
| Lower grindstones | - | 3 | 4 |
| **Total** | **7** | **22** | **39** |
| **FORMALLY RETOUCHED** | | | |
| Scrapers | 1 | 1 | 3 |
| Miscellaneous retouched piece | - | - | 1 |
| MRP, MSA-type knife | 3 | 3 | 5 |
| Naturally backed knife | - | 1 | - |
| Truncated flake | 1 | - | - |
| **Total** | **5** | **5** | **9** |
| **Grand Total** | **1975** | **6812** | **2894** |
| Manuports, basalt, whole | - | 14 | 4 |
| basalt, fragments | - | 98 | 36 |
| dyke material, whole | - | 1 | - |
| sandstone, ochre-stained | - | 1 | - |

of those from OS. Those from RFS, on the other hand, are steeply and continuously retouched on flake blanks and two, along with a miscellaneously retouched piece, are in a highly distinctive green tuff that was not used for any of the unmodified artefacts in this layer, suggesting that these three tools may have been introduced to the

**Table 4. Sehonghong: frequency of prepared platforms and mean size of unmodified opaline artefacts from the OS, MOS and RFS layers.**

**Frequency of prepared platforms:**

| | OS | | MOS | | RFS | |
|---|---|---|---|---|---|---|
| Unmodified flakes | 4 | 5,48 | 3 | 3,00 | 3 | 3,45 |
| Unmodified blades, bladelets and proximal sections | 4 | 9,76 | 19 | 7,01 | 2 | 5,56 |

**Mean size of unmodified opaline flakes (mm)**

| | Length | Width | Thickness | n |
|---|---|---|---|---|
| OS | 23,34 ± 8,47 | 17,90 ± 6,52 | 4,58 ± 3,12 | 62 |
| MOS | 20,35 ± 7,63 | 17,32 ± 7,11 | 4,58 ± 2,95 | 100 |
| RFS | 22,03 ± 8,94 | 18,98 ± 7,41 | 5,58 ± 3,81 | 100 |

**Mean size of unmodified opaline blades (mm)**

| | Length | Width | Thickness | n |
|---|---|---|---|---|
| OS | 30,33 ± 10,96 | 11,93 ± 5,55 | 3,86 ± 2,05 | 30 |
| MOS | 29,36 ± 8,69 | 8,04 ± 4,24 | 4,18 ± 1,92 | 58 |
| RFS | 25,50 ± 6,69 | 9,56 ± 2,87 | 3,39 ± 1,21 | 18 |

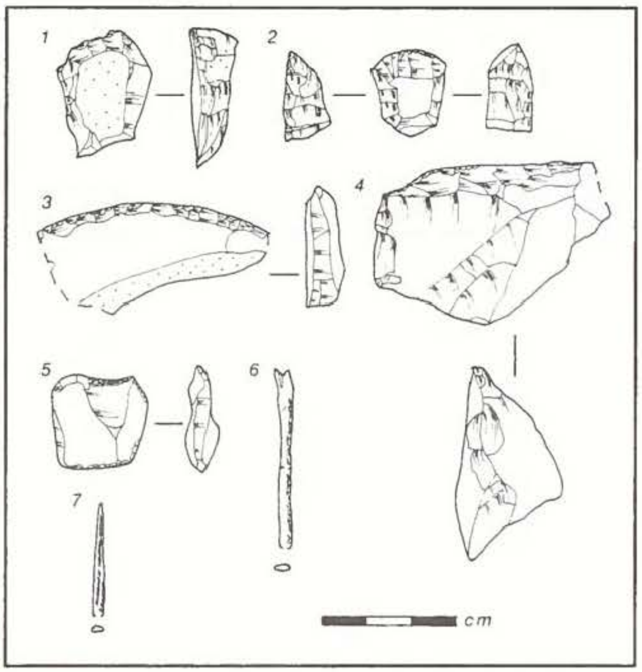


**Fig. 5. Sehonghong: formal stone tools (all in opalines unless otherwise stated) and worked bone. 1 scraper (OS); 2 scraper (MOS, but probably intrusive); 3 scraper (RFS, hornfels); 4 scraper (RFS, tuff); 5 truncated flake (OS); 6 polished bone shaft fragment (MOS); 7 tip of polished bone point (MOS).**

site ready-made. A single retouched flake from OS, steeply truncated across its distal end to give a concave edge in a manner common in the overlying BAS layer, was also found.

The remaining formal tools fall within the miscellaneous retouch class of Deacon (1984a) and

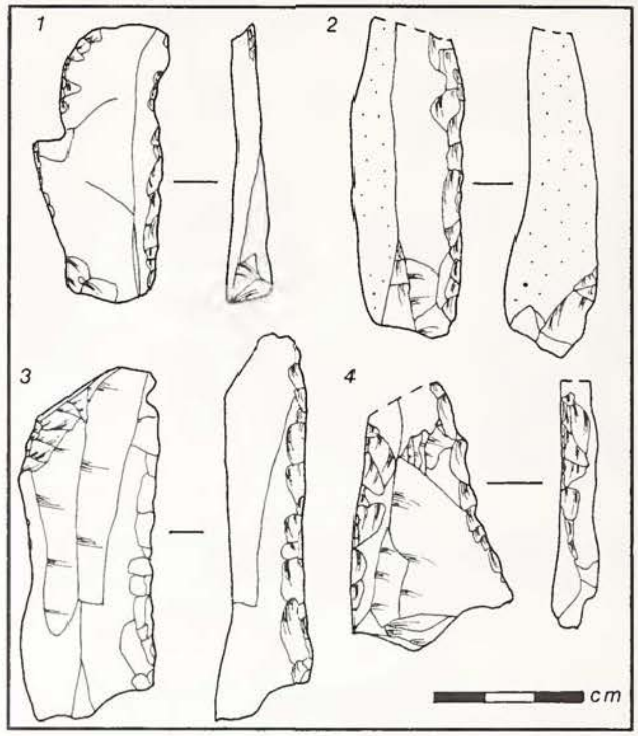


**Fig. 6. Sehonghong: knives. 1 OS (opaline); 2 MOS (opaline); 3 and 4 RFS (hornfels).**

mostly consist of blades or endstruck flakes in various materials (opalines, tuff, hornfels) with steep, continuous retouch along one lateral edge, normally on the dorsal surface (Fig. 6). In two cases from OS and three from RFS the opposite edge is also retouched, though usually less invasively, and one hornfels example from MOS has cortical backing. The latter specimen falls within the naturally backed knife class of Parkington (1984), which is also represented higher up in the Sehonghong sequence, but the others are better described as knives within the MSA typology of Wadley & Harper (1989), a point returned to below; none of these artefacts, or the other formal tools from these levels, shows signs of re-use.

## NON-STONE ARTEFACTS

Two bone artefacts were found in MOS (Fig. 5). One is the polished tip of a bone point that is remarkably thin (1 mm thick) and the other a 41 mm long polished fragment of the shaft of a bone implement that has a slight taper. These two artefacts comprise two-thirds of the worked bone known from the pre-12 500 BP part of the Sehonghong sequence, but there is no reason to believe them to have been intrusive from higher up in the deposit. The thinness of the first specimen suggests that it could not have been a functional projectile point nor an awl, but the function of neither item is known.

A small amount of ochre is present: 10,0 g in OS, 30,3 g in MOS and 3,8 g in RFS, but none is ground. One of the two lower grindstones and the piece of rippled sandstone found in unit 140 in MOS are both heavily coated with red-ochre.

## PLANT AND ANIMAL REMAINS

Bone is preserved in all three layers, although noticeably less well than in the terminal Pleistocene/Holocene part of the Sehonghong sequence, and the faunal assemblages recovered will be the subject of a specialist report by Dr I. Plug. Charcoal preservation was excellent, as in the overlying layers, and preliminary identifications by F. Prins include that of *Protea* sp., a genus whose presence here at this time-depth (F. Prins, pers. comm.), as at Rose Cottage Cave (Wadley *et al.* 1992), is indicative of the altitudinal depression of vegetation belts under the hypothermal conditions of the Upper Pleniglacial.

Uncarbonised remnants of what are presumed to have been grass bedding were observed under many of the rocks present in MOS and also occur under the rocks of the RFS rockfall at the top of Carter's Layer V, which has an age of >30 000 BP. Unfortunately, while bulk samples of this material were taken, the botanical remains did not survive their removal to the laboratory intact and could not therefore be identified. The possibility of identifying them through phytolith analysis (though not as far as species level) remains to be explored, and, if successful, may extend backwards in time observations on plant use obtained by Opperman & Heydenrych (1990) at Strathalan Cave B.

## DISCUSSION

Previous discussions of the Sehonghong sequence have been limited by the spit approach used in the 1971 excavation, although Carter *et al.* (1988) attempted to overcome this by using only those spit-square units derived from a single stratigraphic horizon. The stratigraphically excavated occurrences from OS, MOS and RFS provide a much larger and chronologically more tightly defined assemblage of the stone artefacts deposited by people using Sehonghong in the first part of the Upper Pleniglacial. This assemblage is microlithic in character, although with mean flake sizes slightly greater than those recorded for succeeding Sehonghong LSA assemblages. Like all of them, it is dominated by opalines, but RFS shows an enhanced use of dyke material. While bipolar flaking is a marked feature of all three occurrences, little use was made of the prepared core technique. A blade/bladelet component can be recognised, but these artefacts are not as regular nor as numerous as they are in the Robberg occurrences at Sehonghong, and some could have been accidentally produced. The formal tool sample is small and consists largely of steeply retouched endstruck flakes and blades that can best be described as knives, after Wadley & Harper (1989). This introduces the question of how best such assemblages should be described. I consider this issue in three parts, first comparing the OS/MOS/RFS assemblages with previous interpretations of the Sehonghong sequence, and then broadening the focus to include other recently excavated assemblages of approximately the same age in the south-eastern part of the sub-continent, before discussing some problems that bear on the MSA/LSA transition as a whole.

In the original discussion of the Sehonghong sequence, Carter (1978) suggested that a pattern of small/large/small blades could be identified in the MSA assemblages present, but remarked specifically only upon the presence of what he termed "Lesotho MSA Industry II," from which backed crescentic pieces (segments) were absent. Volman (1981) suggested subsequently that a Howieson's Poort-like occurrence at its base was followed by a more conventional MSA and then by an Early Later Stone Age (ELSA) assemblage in spits 7 to 9, which correspond to the lower part of BAS, OS and the upper part of MOS in the 1992 excavation. While accepting the first two of these suggestions, Carter *et al.* (1988) rejected the idea of an ELSA occurrence at Sehonghong, partly because of the mixing of stratigraphically distinct layers that Volman's analysis required and partly because they considered describing poorly defined assemblages as ELSA an unnecessary source of confusion in the literature. Instead, they suggested that the mean blade size of, and the presence of opposed platform cylindrical blade cores in, the assemblages equivalent to our RFS, MOS, OS and BAS indicated that they "are clearly MSA in character" (Carter *et al.* 1988:195). Rare formal tools of MSA type (such as the point illustrated in Carter *et al.* 1988: fig. 4:33 (4)) were also present in the assemblages which they informally referred to as MSA 9 (= BAS in the 1992 excavation) and MSA 6 (= MOS and RFS).

With Sehonghong now the subject of renewed, stratigraphic excavation it is possible to approach these interpretations afresh. The term Middle Stone Age cannot meaningfully be applied to any of the assemblages recovered from the 1992 excavation, although formal tools of MSA character occur as isolated artefacts in a very few of the Holocene and terminal Pleistocene units and, together with several large dyke material blades, adjacent to a hearth dug down into the top of the layer below RFS from the BAS layer (Mitchell in prep.). In all these cases it is clear that they did not form a regular part of the otherwise LSA toolkit in which they are found (*cf.* also Wadley 1987:52). The OS, MOS and RFS assemblages differ in that fully half of their small number of formal tools are knives of Middle Stone Age type and there is a low level of platform preparation, which is absent from assemblages higher up in the Sehonghong sequence. In several other respects, however, they are more similar to those later assemblages than to that described by Carter *et al.* (1988) from the two layers (IV and V) below them. Features that exemplify this include their microlithic character, the use of bipolar flaking, the predominance of opalines, the presence of a definite bladelet component and the extreme rarity of radial or Levallois cores. By contrast, Layers IV and V (which have a lower age limit of ± 30 000 BP) have a predominantly dyke material/hornfels assemblage with several prepared cores, larger flake-blades and flakes and increased frequencies of MSA formal tools. While

OS/MOS/RFS can therefore be seen as transitional between MSA and LSA technologies, long-term trends in raw material usage and mean artefact size are also evident at Sehonghong that transcend the differences between industries (Carter *et al.* 1988:237-238) and Wadley (pers. comm.) has drawn attention to the persistence of bladelets and microlithic flakes throughout the MSA at Rose Cottage Cave.

An additional point that requires comment here is the choice of typology to be used in analysing stone tool assemblages that span the shift from MSA to LSA technologies. Deacon (1984b:226) has argued that the two are so distinct that their description requires different typologies. But if this is so, how are we to deal with assemblages that span the transition between them? How are we to recognise them? As an example of the difficulties involved, the presence in the OS/MOS/RFS assemblages of several knives led to their reanalysis using Wadley & Harper's (1989) typology, with the result that their microlithic character was greatly downplayed and the significance of their bladelet component was not apparent. While accepting that different formal tools are characteristic of MSA and LSA assemblages, I am unconvinced that, at least where we wish to examine the shift from one technology to the other, different typologies should be used for analysing their unmodified artefacts and suggest that even with formally retouched artefacts we must remain alert as to how the same pieces would be described under both systems. We already run sufficient risk of introducing "artificially more marked differences between groups than need necessarily be the case" by the very act of grouping stratigraphic units together and comparing the entities that we thus create (Kaplan 1990:61), without the use of different typologies adding to the problem. In order to examine the shift from MSA to LSA technologies we should move beyond the application of contrasting typologies and towards examining how the organisational properties of the cultural systems that we are studying have changed. To this end we must begin to consider a variety of issues, such as raw material usage and procurement, patterns of retouch, utilisation, re-use and breakage of artefacts, strategies of core reduction, methods of animal carcase processing, the use of space within rock shelters and the placement of sites within the landscape, over the full length of the late Pleistocene and thereby forestall the obscuring of cultural process that results from too much of an emphasis on the essentially typological definition of MSA or LSA assemblages (*cf.* Inskeep 1967:571).

I now briefly review the published data on assemblages of similar age in the south-eastern part of southern Africa. Preliminary comments on new excavations at Rose Cottage Cave suggest that a pattern similar to that found at Sehonghong can be detected there. The layer G assemblage, dated to 20 600 ± 250 BP (Pta-5598), "lacks retouch and contains high frequencies of small irregular flakes" alongside "a few bladelets and single-platform bladelet cores" and some MSA pieces (Wadley & Vogel 1991), while the underlying layers, beginning with Ru, which is undated, and Dc (27 200 ± 350 BP, Pta-5596) "unequivocally contain(s) an MSA assemblage with triangular and irregular flakes, a few blades, knives, points, large scrapers and core reduced pieces" (Wadley 1991:128). All three of these layers, however, share a raw material signature in which opalines are greatly reduced compared to coarser-grained materials relative to the overlying LSA assemblages. Elsewhere in Lesotho, the as yet unpublished sequence from Melikane includes an opaline-dominated assemblage consisting of small, irregular flakes, without any apparent blade or bladelet component, that dates to ± 20 000 BP and is preceeded by a long MSA sequence, the post-Howiesons Poort part of which has dates ranging from >45 000 to 33 000 BP (Carter 1978; Vogel *et al.* 1986).

From Strathalan in the north-eastern Cape Opperman & Heydenrych (1990) have reported a predominantly hornfels assemblage in which convergent points and large flake-blades occur, indicating its MSA affiliation; several radiocarbon dates give an average age of 22 800 BP. A series of occupation floors below this layer date back to as far as 27 600 ± 420 BP (Pta-4642) and all are associated with MSA artefacts (Opperman 1992). Further to the west, but still within the north-eastern Cape, the MSA assemblage from Grassridge consists of hornfels flake-blades with some retouched points and knives and has a terminal age of ≤36 380 ± 870 BP (Pta-2714, Opperman 1988), while Wallsmith (1990) has obtained a thermoluminescene date of 26 300 ± 3000 years (Gd Tl 203) for the top of the MSA sequence at Driekoppen Shelter in the Seacow Valley.

Interpretation of the sequence from Umhlatuzana, the sixth site in the region with deposits of late Pleistocene age, is rendered difficult by the absence of dates for layers bracketed between 28 000 (layer 15) and 13 000 (layer 5) BP, as well as by doubts about possible assemblage mixing caused by rotational slipping within the deposit (Kaplan 1990:5, 33). However, layers 19 to 14 show well-pronounced shifts in raw material usage from a hornfels-dominated to a quartz-dominated pattern, the latter being characteristic of the LSA assemblages in the upper part of the sequence, as well as steady increases in bladelet and single platform core frequencies. Among formal tools, a pattern in layers 21 to 19 dominated by unifacial points and miscellaneous retouched pieces gives way to much more diverse samples. The assemblages from layers 21 to 19 (dating *c.* 40 to 35 000 BP) are characterised as "late MSA" and those from layers 18 to 14 as transitional between MSA and LSA technologies, specifically because they demonstrate "an increase in the frequency of bladelet production relative to the MSA, and a gradual shift away from traditional MSA flake production, specifically the prepared core technique" (Kaplan 1990:84). Further increases in bladelet and core-reduced piece frequency lead Kaplan (1990:41) to designate the succeeding occurrences, from Layers 13 to 4, as Robberg. The Umhlatuzana sequence suggests that the shifts in raw material usage and flaking technology that eventually end in a pattern that is recognisably LSA have a history going far back into the late Pleistocene.

On the Swaziland/Natal border Border Cave is a key site not only for the emergence of anatomically modern people, but also for examining the MSA/LSA transition (Beaumont 1978). The assemblage from 1BS.LR/1WA is microlithic and dominated by opalines and quartz, both of which were reduced by bipolar flaking, and core reduced pieces (*pièces esquillées* or scaled pieces) are common; blades and bladelets are rare. In all but one of these respects (frequency of scaled pieces) it differs markedly from the underlying post-Howiesons Poort assemblage in 2BS. As I have shown elsewhere (Mitchell 1988a:208), and as has also been argued by Kaplan (1990:82-84), few of the criteria advanced by Beaumont & Vogel (1972) for designating this assemblage as Early Later Stone Age hold water; some are based on extremely small sample sizes (*e.g.* scraper dominance of the formal tool category) while others are not exclusive to 1BS.LR/1WA (*e.g.* a high frequency of scaled pieces). Furthermore, the presence of both radial prepared cores and of flakes with formally faceted platforms suggest that 1BS.LR/1WA is transitional between MSA and LSA technologies (as has also been suggested by Barham (1989)), which is possible chronologically, and/or a situational response to a shift, for reasons that are unknown, towards using opalines and quartz, rather than rhyolite, as preferred raw materials. Renewed excavation of Border Cave has confirmed the age of 1BS.LR/1WA as ± 39-38 000 BP (Miller & Beaumont 1989; Grün *et al.* 1992; Miller *et al.* 1993) and this is therefore the oldest, well-documented context for ostrich eggshell beads, ground bone points and small bored stones in southern Africa.

Across the border in Swaziland itself MSA assemblages from Sibebe shelter that include both unifacial and bifacial points come from an excavated horizon dated to 31 400 ± 780 BP (Pta-3349, Vogel *et al.* 1986:1143), the stratigraphic associations of a younger determination of 22 850 ± 160 BP (GrN-3514, Price-Williams 1981) being doubtful (P. Beaumont, pers. comm.). Other MSA assemblages occur in colluvial deposits postdating 30 000 BP (Price-Williams *et al.* 1982), but the reliability of dates on calcrete is open to considerable question (Volman 1984:210). MSA assemblages have also been reported from Lion Cavern dating to between 43 200 ± 1350/-1200 BP (GrN-5313) and 22 280 ± 400 BP (Y-1827, Beaumont & Boshier 1972), but, as many of the details of these Swaziland assemblages remain to be published, they can add little to the regional picture. The same is true of the two caves at Shongweni, which seem to have been occupied very ephemerally both before and after the Last Glacial Maximum (Davies 1975; Vogel *et al.* 1986:1158-60), and Sibudu Shelter near Durban which has dates of 24 200 ± 290 BP (Pta-3767) and 26 000 ± 240 BP (Pta-3765) for an assemblage described as MSA (Vogel *et al.* 1986:1160).

The picture that emerges from this brief overview is complex, but several key points stand out. First, assemblages making some use of prepared core techniques and characterized by points and large blades are present at Sehonghong until *c.* 30 000 BP and at Rose Cottage until at least 27 000 BP, while they survive at Strathalan and perhaps in Swaziland until *c.* 22 000 BP. Second, assemblages that may be transitional between MSA and LSA technologies are found at both Sehonghong and Rose Cottage Cave in early Upper Pleniglacial contexts with dates of just before 20 000 BP. Third, where long sequences can be examined (as at Sehonghong and Umhlatuzana) certain features exhibited by LSA assemblages of post 20 000 BP date are clearly the expressions of longstanding trends (*e.g.* in raw material use and mean artefact size) that extend back well beyond 30 000 BP, as Parkington (1990a:48-49) has argued. Fourth, the stone artefact assemblage from Border Cave 1BS.LR/1WA is either transitional between MSA and LSA technologies or situationally specific, but to call it ELSA seems invalid on some of Beaumont & Vogel's (1972) own criteria, while other assemblages to which this term has been applied have poor dating controls (Jubilee and Cave James, Wadley (1987)) or are not yet fully published (Heuningneskrans, Beaumont (1981) or Volman's (1981) use of the term at Sehonghong). Wadley (1991:129) has shown that use of the term at Rose Cottage is also inappropriate and the best solution in present circumstances might be to avoid it completely, rather than redefining it at the risk of additional confusion.

Border Cave is of particular importance for late Pleistocene archaeology in southern Africa in that it shows ostrich eggshell beads and bone points to have already been in use some 39 000 years ago. This suggests that these items may have had a different context of origin from changes in lithic technology (Deacon 1990) and that different explanations for the different elements of the LSA "package" (*sensu* Deacon 1984b:221-222) are therefore required. The same point is made by the probable association of the Apollo 11 art with a terminal MSA assemblage dated to 26 000 BP (Wendt 1976). That a range of different processes is likely to have been involved in the shift from MSA to LSA technology is indeed also evident in the stone tool assemblages themselves. For example, the Layer G assemblage at Rose Cottage has a raw material signature similar to that of the underlying MSA at the same site, but is otherwise similar to the Sehonghong OS/MOS/RFS assemblages, which are already opaline dominated. Similarly, a bladelet component is already evident at Umhlatuzana and Sehonghong by 20 000 BP, but may be absent from the approximately contemporary occurrence at Melikane.

Enhanced recognition of these points and of the long-term nature of some of the trends noted in these assemblages casts some doubt on the model that I have previously advanced for the MSA/LSA transition (Mitchell 1988b), in which I tried to link the shift from MSA to LSA technology to conditions of decreasing ecological productivity at the onset of the Upper Pleniglacial. The merit of this model remains that it attempted to consider some of the processes that might have been at work, and the widespread cessation of MSA technology and appearance of unequivocally microlithic assemblages not much before 20 000 BP have still to be taken on board in future model-making, as does the subsequent shift to the much increased and more systematic bladelet production characteristic of the Robberg. What also requires consideration, however, is the possibility that the trajectories followed in the southern Drakensberg/Natal/Swaziland region may not have been the same as those that developed in, for example, the southern Cape, where there seems little sign in the Boomplaas sequence of any longterm trend within the site's MSA occurences towards the microlithic, quartz-dominated assemblages of the LP and LPC Members that date to ± 21 000 BP (Mitchell 1988a:63-68). A greater appreciation of local context and of inter-site variability within and between regions will be necessary in future studies of the MSA/LSA transition, as well as a focus on processes of change, rather than on contrasting artificially compartmentalised "MSA" and "LSA" entities (*cf.* Inskeep 1967:571; Parkington 1990b:222). Future work at Sehonghong and in eastern Lesotho as a whole will be continue to be directed at these goals.

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## REFERENCES

Barham, L.S. 1989. The Later Stone Age of Swaziland. Unpublished Ph.D. thesis: University of Pennsylvania.

Beaumont, P.B. 1978. Border Cave. Unpublished M.A. thesis: University of Cape Town.

Beaumont, P.B. 1981. Heuningneskrans. In: Voigt, E. (ed.) A guide to archaeological sites in the northern and eastern Transvaal: 132-145. Pretoria: Southern African Association of Archaeologists.

Beaumont, P.B. & Boshier, A.K. 1972. Mining in southern Africa and the emergence of modern man. Optima 22:2-15.

Beaumont, P.B. & Vogel, J.C. 1972. On a new radiocarbon chronology for Africa south of the Equator. Part 1. African Studies 31:66-89.

Carter, P.L. 1976. The effect of climatic change on settlement in eastern Lesotho during the Middle and Later Stone Age. World Archaeology 8:197-206.

Carter, P.L. 1978. The prehistory of eastern Lesotho. Unpublished Ph.D. thesis: University of Cambridge.

Carter, P.L. & Vogel, J.C. 1974. The dating of industrial assemblages from stratified sites in eastern Lesotho. Man 9:557-570.

Carter, P.L., Mitchell, P.J. & Vinnicombe, P. 1988. Sehonghong: the Middle and Later Stone Age industrial sequence from a Lesotho rock-shelter. Oxford: British Archaeological Reports.

Davies, O. 1975. Excavations at Shongweni South Cave. Annals of the Natal Museum 22:627-662.

Deacon, H.J. 1979. Excavations at Boomplaas Cave - a sequence through the Upper Pleistocene and Holocene in South Africa. World Archaeology 10:241-257.

Deacon, J. 1984a. The Later Stone Age of southernmost Africa. Oxford: British Archaeological Reports.

Deacon, J. 1984b. Later Stone Age people and their descendants in southern Africa. In: Klein, R.G. (ed.) Southern African prehistory and palaeoenvironments: 221-328. Rotterdam: Balkema.

Deacon, J. 1990. Changes in the archaeological record in South Africa at 18 000 BP. In: Gamble, C. & Soffer, O. (eds) The World at 18 000 BP, Vol. 2 Low latitudes: 170-188. London: Unwin Hyman.

Grün, R. , Beaumont, P.B. & Stringer, C.B. 1990. ESR dating evidence for early modern humans at Border Cave in South Africa. Nature 344:537-39.

Inskeep, R.R. 1967. The Late Stone Age in southern Africa. In: Bishop, W.W. & Clark, J.D. (eds) Background to evolution in Africa: 557-582. Chicago: University of Chicago Press.

Kaplan, J. 1990. The Umhlatuzana rock shelter sequence: 100,000 years of Stone Age history. Natal Museum Journal of Humanities 2:1-94.

Miller, G.F. & Beaumont, P.B. 1989. Dating the Middle Stone Age at Border Cave, South Africa, by the epimerization of isoleucine in ostrich eggshell. Geological Society of America, Abstracts with Programs 21:A235.

Miller, G.F., Beaumont, P.B., Jull, A.J.T. & Johnson, B. 1993. Pleistocene geochronology and palaeothermometry from protein diagenesis in ostrich eggshells: implications for the evolution of modern humans. In: Aitken, M.J., Stringer, C.B. & Mellars, P.A. (eds): 49-68. Princeton: Princeton University Press.

Mitchell, P.J. 1988a. The early microlithic assemblages of southern Africa. Oxford: British Archaeological Reports.

Mitchell, P.J. 1988b. Human adaptation in South Africa during the Last Glacial Maximum. In: Bower, J. & Lubell, L. (eds) Prehistoric cultures and environments in the late Quaternary of Africa: 163-196. Oxford: British Archaeological Reports.

Mitchell, P.J. 1993. Late Pleistocene hunter-gatherers in Lesotho: report on excavations at Sehonghong rock-shelter, July to September 1992. Nyame Akuma 39:43-49.

Mitchell, P.J., Parkington, J. & Yates, R. in press. Recent Holocene archaeology in western and southern Lesotho. South African Archaeological Bulletin.

Mitchell, P.J. & Vogel, J.C. in press. New radiocarbon dates from Sehonghong rock-shelter, Lesotho. South African Journal of Science.

Opperman, H. 1988. An excavation of a Middle Stone Age deposit in Grassridge rock shelter, Sterkstroom district, Cape Province. Fort Hare Papers 9:51-62.

Opperman, H. 1992. A report on the results of a test pit in Strathalan Cave B, Maclear district, north-eastern Cape. Southern African Field Archaeology 1:98-102.

Opperman, H. & Heydenrych, B. 1990. A 22 000 year-old Middle Stone Age camp site with plant food remains from the north-eastern Cape. South African Archaeological Bulletin 45:93-99.

Parkington, J.E. 1984. Changing views of the Later Stone Age of South Africa. Advances in World Archaeology 3:89-142.

Parkington, J.E. 1990a. A critique of the consensus view of the Howieson's Poort assemblages in South Africa. In: Mellars, P. (ed.) The emergence of modern humans: an archaeological perspective: 34-55. Edinburgh: Edinburgh University Press.

Parkington, J.E. 1990b. A view from the south: southern Africa before, during, and after the Last Glacial Maximum. In: Gamble, C. & Soffer, O. (eds) The World at 18 000 BP, Vol. 2 Low latitudes: 214-228. London: Unwin Hyman.

Price-Williams, D. 1981. A preliminary report on recent excavations of Middle and Late Stone Age levels at Sibebe Shelter, north-west Swaziland. South African Archaeological Bulletin 36:22-28.

Price-Williams, D., Watson, A. & Goudie, A.S. 1982. Quaternary colluvial stratigraphy, archaeological sequences and palaeoenvironments in Swaziland, southern Africa. Geographical Journal 148:50-67.

Vogel, J.C., Fuls, A. & Visser, E. 1986. Pretoria radiocarbon dates III. Radiocarbon 28:1133-1172.

Volman, T.P. 1981. The Middle Stone Age in the southern Cape. Unpublished Ph.D. thesis: University of Chicago.

Volman, T.P. 1984. The early prehistory of southern Africa. In: Klein, R.G. (ed.) Southern African prehistory and palaeoenvironments: 169-220. Rotterdam: Balkema.

Wadley, L. 1987. Later Stone Age hunters and gatherers of the southern Transvaal. Oxford: British Archaeological Reports.

Wadley, L. 1991. Rose Cottage Cave: background and a preliminary report on the recent excavations. South African Archaeological Bulletin 46:125-130.

Wadley, L. & Harper, P. 1989. Rose Cottage Cave revisited: Malan's Middle Stone Age collection. South African Archaeological Bulletin 44:23-32.

Wadley, L., Esterhuysen, A. & Jeannerat, C. 1992. Vegetation changes in the eastern Orange Free State: the Holocene and late Pleistocene evidence from charcoal studies at Rose Cottage Cave. South African Journal of Science 88:558-563.

Wadley, L. & Vogel, J.C. 1991. New dates from Rose Cottage Cave, Ladybrand, eastern Orange Free State. South African Journal of Science 87:605-608.

Wallsmith, D. 1990. Driekoppen: a Middle Stone Age rockshelter. Nyame Akuma 33:13-16.

Wendt, W.E. 1976. 'Art mobilier' from the Apollo 11 Cave, South West Africa: Africa's oldest dated works of art. South African Archaeological Bulletin 31:5-11.