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# Southern Africa and modern human origins

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## SUMMARY

This paper argues that southern Africa was a remote part of the Old World in the late Pleistocene (125–10 ka ago). Because of this isolated position there was continuity without significant replacement in the resident population. Isolation and the relatively recent spread of agriculture to the region has allowed a section of this population to survive into the present. They are the Bushmen (San). Studies of geographic patterning in conventional genetic markers and mitochondrial DNA indicate that the Bushman clade has a long evolutionary history in southern Africa. Estimates of more than 100 ka for the continued presence of this population in the region are supported in archaeological investigations of sites with long sequences such as Klasies River main site and Border Cave. Human remains dating to the earlier part of the late Pleistocene have been recovered from these sites and the samples form a morphological series with the Klasies River remains possibly 20 ka older than those from Border Cave. There is no fossil record for the later Pleistocene, however, at a period when selection for a gracile morphology may have been pronounced. The cultural associations in the earlier late Pleistocene are with the Middle Stone Age. Expressions of cultural 'style' and the occurrence of similar artefact design types in the Middle and Later Stone Ages can be interpreted with reference to the ethnographic present. Temporal continuity can be shown in the geographical distribution of stylistic markers and this suggests participation in a shared cognitive system. The inference is that the people in the earlier late Pleistocene had cognitive abilities that are comparable to those shown by their Holocene and modern descendants. The presence of the ancestors of a modern population in the earlier late Pleistocene in this region is perhaps expected if modern people had their origins in Africa.

## 1. INTRODUCTION

Southern Africa, in the sense used here, corresponds to a major ecological zone south of the Miombo woodlands of Central Africa. It is a region of shrublands and grasslands with a strong climatic gradient from sub-tropical in the east to hyper-arid in the west. It presents a different and more diverse range of habitats than is found in Central Africa (Cowling *et al.* 1989). The region has been peopled throughout the Pleistocene.

This paper considers the contribution which palaeontological and archaeological studies of the late Pleistocene in southern Africa make to understanding evolution in modern people. The information available from two long-sequence cave sites (figure 1, Klasies River main site and Border Cave) is described as both have provided human remains, claimed to be anatomically modern, in association with archaeological materials. Technical advances have made it possible to date these sequences with reasonable precision. The main human occupation deposits in both sites date to the earlier late Pleistocene, the period between some 60 and 130 ka ago. The archaeological record for the latter half of the late Pleistocene, however, is poor in the whole region (Deacon & Thackeray 1984) and is not well represented at these sites.

Comparisons can be made between the evidence from the earlier late Pleistocene and that from the

Holocene and the ethnographic present. The premise that underlies such comparisons is that the people resident in southern Africa in the earlier late Pleistocene were the direct ancestors of the Holocene and present-day Bushmen (the term Bushman is used in preference to San because the people themselves prefer to be called Bushmen (Guenther 1986)) hunter-gatherers. Genetic studies (Nurse *et al.* 1985; Vigilant *et al.* 1989, 1991) show that the Bushmen have a remote ancestry and they are a branch of humankind that evolved in isolation in southern Africa. The advent of agriculture in the last 2000 years (Thomas & Shaw 1991) has broken down the isolation, and replacement by different people has occurred in a large part of the former range. Only that section of the Bushman population, living in areas underlain by Kalahari sands and unsuitable for agriculture, has been able to maintain itself. It is a considerable advantage in the interpretation of the evidence to have an ethnographic as well as an archaeological record from the region.

## 2. SITES AND EVIDENCE

The archaeological evidence for past populations lies in the abundant traces of Stone Age people in the form of stone artefacts in the southern African landscape. The erosion of thin soil mantles and the

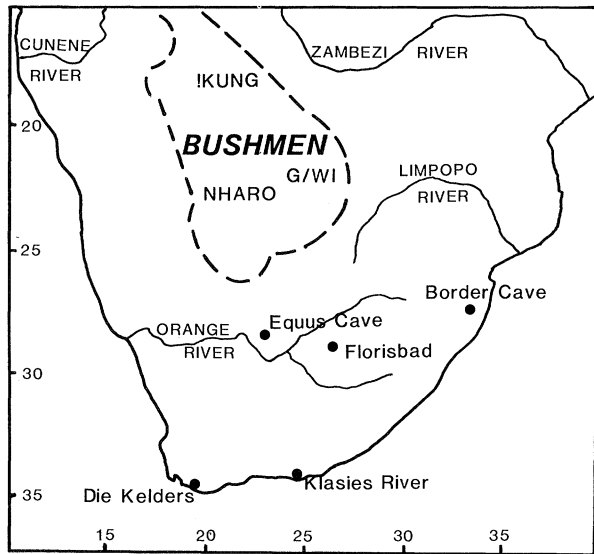


Figure 1. Map of southern Africa showing the location of sites mentioned in the text and the present distribution of the Bushmen.

durability and quantity of artefacts make these traces very obvious. Prominent on this landscape scale of archaeological visibility are artefacts with a distinctive Middle Stone Age ('MSA') typology that date to the late Pleistocene. Caves and rock shelters were frequently used as living sites in the late Pleistocene and there are long sequences that provide a stratigraphic and a chronological framework for the palaeontological and archaeological materials they contain. Although sites are numerous there are few that have yielded human fossils. There are isolated finds of human teeth from Die Kelders Cave (Grine *et al.* 1991) and Equus Cave (Grine & Klein 1985) that have been described as 'modern' in morphology. The sites that have produced the main evidence supporting a high antiquity of modern people in southern Africa are Border Cave and Klasies River main site (figure 1). The Border Cave (Beaumont 1980) human remains are a sample of four individuals. The associations and dating are less well established than the more fragmentary finds representing a larger number of individuals from Klasies River (Singer & Wymer 1982).

An older and possible Middle Pleistocene occurrence, Florisbad, is an open-air site where a human cranium with the puncture mark of a hyaena canine was found by Dreyer in 1932 (Brink 1987). A new reconstruction of this specimen shows it to be similar to the Ngaloba and Omo II finds from East Africa and intermediate in morphology between the archaic Kabwe and Saldanha specimens and those from the earlier late Pleistocene (Kuman & Clarke 1986).

A recent survey (Bräuer & Rösing 1989) has shown that there are no finds of human remains dated with certainty to the latter half of the late Pleistocene. There is a large number of specimens from Later Stone Age contexts dating to the end-Pleistocene and the Holocene, however (Rightmire 1978). Many of these are burials and, in the southern Cape in

particular, cave sites were used as cemeteries. These remains are not considered in detail but unlike the finds from Klasies River and Border Cave they are so recent in age that they are completely modern in morphology.

### 3. STRATIGRAPHY AND DATING

Techniques such as uranium–thorium disequilibrium (U/Th), electron spin resonance (ESR) and amino acid racemization (AAR) are being used to date the archaeological deposits in addition to radiocarbon. The most comprehensively dated sequence is the Klasies River main site. This is a 20 m thick cone of sediment resting against a cliff face and filling side caverns in the face. The deposits began to accumulate at the end of the Last Interglacial (130–118 ka ago) as sea levels dropped from their maximum height near to those of the present (Martinson *et al.* 1987). Sands intercalated with human occupation horizons that include shell and bone food remains, hearths and carbonized patches and artefacts, make up the well stratified sequence (Deacon & Geleijnse 1988).

The culture-stratigraphy at Klasies River mouth has been described by Singer & Wymer (1982) who recognized from the base upwards a Middle Stone Age (MSA) I, MSA II, Howiesons Poort and MSA III levels, with a further sub-stage IV in a wash in a channel (figure 2). Primary Middle Stone Age occu-

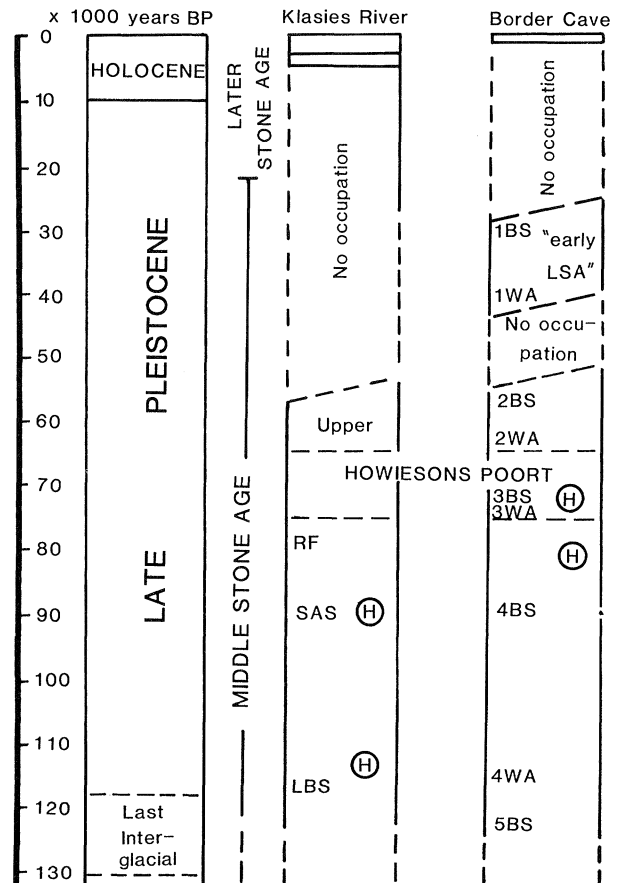


Figure 2. Diagrammatic representation of the dating and stratigraphy of Klasies River main site and Border Cave.

pation of the site ended more than 50 ka radiocarbon years ago with the deposition of the Upper stratigraphic member which contains the Howiesons Poort industry and the overlying MSA III. The Howiesons Poort is a distinctive horizon marker that can be assumed to be pene-contemporaneous at sites in southern Africa and to represent a limited time interval of some thousands rather than tens of thousands of years (Miller *et al.*, this symposium). In all long sequences with adequate radiocarbon dating, a minimum age of 50 ka has been obtained for this marker horizon. This gives a check on ages estimated by other methods.

The bulk of the human fossils come from two strata. Two maxillary fragments were found in the lowest stratum, the LBS (Light Brown Sand) member. An end-Last Interglacial age is supported by oxygen isotope measurements on shell (Shackleton 1982; Deacon *et al.* 1988), aspartic acid dating (Bada & Deems 1975) and U/Th dating (Deacon *et al.* 1988). The second stratum to which most of the finds made by Singer & Wymer (1982) in their excavations in 1967–8 can be referred, and from which a human ulna has been recovered since, is the lower part of the overlying SAS member. The age estimates available suggest a date of the order of 90 ka for this level (Bada & Deems 1975; Deacon *et al.* 1988; Grün *et al.* 1990*b*). The MSA I and II of Singer & Wymer (1982) are found in the SAS member (Thackeray & Kelly 1988).

The RF and Upper members in the Klasies River main site sequence are considered to be more than 60 ka old. There are few artefacts from the RF deposit but the Upper member includes the Howiesons Poort and MSA III cultural units and these layers have preserved isolated human teeth. The oxygen isotope profile suggests correlation of these members with isotope stages 5b to 4 (Deacon *et al.* 1988). Deacon (1989) has argued that an age centered on 70 ka years is the best estimate for the dating of the Howiesons Poort at Klasies River. This does not accord with the ESR dating of the Upper member by Grün (Grün *et al.* 1990*b*) to the 60 to 40 ka range. The minimum radiocarbon age suggests that these ESR results are an underestimate. The geochemistry of the ground water at Klasies River is complex and locally within the site the uptake of uranium may not fit the models used in age estimations.

Border Cave, high up in the Lebombo range of KwaZulu, is a large cave. The deposits, 4 m in thickness, consist of a series of white ash horizons separated by brown sands. In 1934 the first finds were made there and since 1970 excavations directed by Beaumont (1980) have been designed to establish the age and associations of the human remains. White ash layers are good stratigraphic markers in the sequence and have assisted in reconstructing the horizons from which the specimens were recovered (Beaumont *et al.* 1978). The BC 1 and 2 specimens, a cranium and a mandible, came from a guano pit and have no stratigraphic provenance. However, chemical analyses associate them with an infant skeleton that was excavated in 1942 from below the third white ash (3WA) layer. A further specimen, BC5, found in 1974,

came from the 3WA, the layer in which Howiesons Poort artefacts occur. Grün *et al.* (1990*a*) have dated a large series of bovid tooth enamel fragments and obtained estimates between 90 and 50 ka for the horizons from which the human remains came. Although the ESR dating of the Howiesons Poort to the 75–45 ka range is not in accord with the radiocarbon estimate of the minimum age for an overlying and younger horizon, it is probable that the age of the Howiesons Poort lies within the range estimated by ESR.

The dating of the Border Cave sequence to the earlier part of the late Pleistocene is acceptable on typological correlation with Klasies River. Any reservations regarding the association of the human fossils with these old strata can be resolved only by direct dating of the specimens themselves. They are clearly old, and as Beaumont (1980) has noted, BC1 cannot be younger than 33 ka, the age of the youngest Stone Age horizon. An age of 70 ka for the best provenanced find – the mandible BC5 from the 3WA layer – is not contentious and the other remains may be of similar age. An important consideration to emerge from this survey is that the Border Cave human fossils may be 20 ka younger than those from Klasies River and morphological differences can therefore be expected.

#### 4. HUMAN REMAINS AND TAPHONOMY

##### (a) *Taxonomic assessment*

The premise adopted in this paper that the resident population in southern Africa has evolved in isolation in the late Pleistocene implies that the fossil materials should represent modern people and should form part of the Bushman clade. What constitutes ‘modern’ morphology needs to be defined in terms of what is known of evolution in African populations. In recent surveys of the African fossil evidence from the Middle and late Pleistocene (Bräuer 1989; Rightmire 1989) the material from those sites is classified as anatomically modern.

The Klasies River main site material is fragmentary and consists mainly of cranial elements. These consist of upper and lower jaws, isolated teeth, a frontal bone and other cranial pieces. Postcranial remains are limited to an ulna, a vertebra and a clavicle. These remains pose challenges for taxonomic description because they are fragmentary. It is probable that more than ten individuals are represented in the two strata dated to between 120 and 90 ka old. Singer & Wymer (1982) stressed the modern attributes of the mandible (no. 41815) from the 1B part of the site and, more contentiously (Habgood 1989), pointed to features in this and other specimens that could indicate parallels with modern African groups. Rightmire & Deacon (1991) have provided a recent review of the fossil materials from the main site and conclude that the remains differ from those of Neanderthals and other archaic humans. In their assessment the sample shows a degree of robusticity and strong sexual dimorphism that is coupled to a modern morphology. Bräuer *et al.* (1992) have carried out a metrical



analysis of a maxilla from the LBS member, the oldest stratum at the Klasies River main site, and the specimen associates with modern and Holocene African populations and not with samples of archaic sapient forms like Kabwe or Omo II. This new study is an answer to the contention of Wolpoff & Caspari (1990) that the Klasies River remains can be associated with archaic rather than modern humans on metrical analysis.

The Border Cave sample has been found comparable to modern groups (de Villiers 1973, 1976; Rightmire 1979, 1989). There is less agreement on the linguistic or ethnic indigenous groups to which the specimens relate. For example, a study by de Villiers & Fatti (1982) used a multivariate statistical approach and concluded that the affinities of the specimens were with black Africans rather than Bushmen. The analytical procedures adopted in the study, however, have been criticized as inadequate to show any specific relationships (Habgood 1989).

The Klasies River specimens, in their robusticity and dimorphism, appear to define what the dominant morphology of the resident population was in the Last Interglacial *sensu lato*, and the Border Cave specimens that of the end of this period. In the later Pleistocene and Holocene there is evidence for large scale environmental changes and population fluxes in southern Africa (Deacon & Lancaster 1988). This suggests that there was marked selection in this period for the morphological traits that are found in the gracile Bushmen. The reduction in stature in the Bushmen appears to be a Holocene phenomenon and may relate to a known period of aridity (Deacon & Lancaster 1988). There is no series of human fossils available at present to document the progression of morphological changes in the latter part of the Pleistocene.

#### (b) *Taphonomy*

The human remains from these two South African sites contrast in their degree of completeness. Those from Klasies River main site are broken and burnt and they show cut marks and impact fractures. These finds are associated with domestic waste, bone and shell food remains, that have been discarded in middens. White (1987) has considered the possibility that cannibalism may be involved.

The two maxillary fragments in the LBS member come from the same horizon, a metre apart, but represent different individuals and probably sexes. The association of these specimens with a single horizon prompted re-examination of the context of the specimens recovered in the 1967–8 excavation at the site. The conclusion, detailed in Rightmire & Deacon (1991), is that the human remains excavated by Singer & Wymer (1982) from cave 1 are from the same stratigraphic horizon in the lower part of the SAS member. The direct association with a thin, 20 mm thick, layer with a number of hearths is being investigated further during current excavations. These human materials relate to two episodes in the history of occupation at the site when human materials were discarded.

The role of interpersonal violence seems to be implied by the occurrence of these remains because of the repeated, episodic nature of the occurrences and because individuals of different ages and sex were involved. A functional explanation that the reasons for interpersonal violence were dietary needs to be weighed up against the alternative explanation that interpersonal violence may have had a ritual basis. Ritual killings (Jones 1951; Evans 1992) that are linked to the activities of shamans and are more frequent in times of socio-political uncertainty or stress, still occur widely in southern Africa. The repetition of events is better explained if the practice of interpersonal violence were part of the cognitive system than if the events were a response to catastrophic circumstances.

None of the human remains from Klasies River main site in the late Pleistocene are from deliberate burials. However, at Border Cave the infant skeleton, BC3, is reported to be a burial and BC5 is reported to have been associated with a depression which may be a grave. The recovery of some postcranial material from the dump of the guano pit may be evidence that BC1 and BC2 were also burials. There are no other burials known in this time range in southern Africa and the next oldest are end-Pleistocene and Holocene in age.

#### 5. CULTURAL ASSOCIATIONS

The Klasies River and Border Cave human fossils are associated with Middle Stone Age artefacts. There are good general descriptions of the Middle Stone Age typology in the literature (e.g. Mason 1962; Volman 1984) and descriptions of the artefacts found specifically at Border Cave (Beaumont 1978) and Klasies River (Singer & Wymer 1982; Thackeray & Kelly 1988; Thackeray 1989). The stone artefacts of the Middle Stone Age are predominantly parallel-sided and more rarely convergent-sided flake blades and blades that have prominent dorsal ridges. The low frequency of flakes showing retouch is probably due to their manufacture from very hard materials. Flakes showing reduction of the base and unifacial or bifacial invasive flaking to form leaf-shaped points are a persistent but rare occurrence. There are elements which appear to show clear design 'style', but most notable is the use of backing or blunting, much like that on the blade of a penknife, to make the crescent- and trapeze-shaped pieces that are associated with the Howiesons Poort.

The backed artefacts that characterize the Howiesons Poort are interesting from several viewpoints. They represent design types, standardized in both shape and size, and intended for hafting as replaceable bits or inserts in composite tools. In Later Stone Age sites there are crescents and other backed tools like those found in the Howiesons Poort, but smaller in size. These smaller backed pieces served as armatures for arrows in the Later Stone Age (Clark 1977) and a comparable function, possibly as armatures for spears, can be suggested for the Howiesons Poort backed tools. The parallels with the Later Stone Age 'Wilton'

industries, which had a duration from about 8000 years ago until historic times, are quite striking, because crescent-shaped backed tools have a popularity in the middle period of the Wilton sequence much as the Howiesons Poort segments and trapezes have in the middle stages of the Middle Stone Age sequence. Another feature of the Howiesons Poort at Klasies River (Singer & Wymer 1982) and other sites in the region is the increased use of non-local raw materials. Backed pieces were made on local stone as well, but there appears to have been a conscious choice to select more distant materials for non-utilitarian reasons.

The dating of Howiesons Poort horizons with acceptable precision has proved difficult simply because they are too old to date by radiocarbon. However, as noted above, a dating centered on 70 ka for this horizon at various southern African sites is the current best estimate (Deacon 1989; Miller *et al.*, this symposium). At this date, the occurrence of backed inserts for composite tools is significant. In a European context these are the kind of artefacts that would be associated with much more recent Upper Palaeolithic-type industries and with anatomically modern populations. As Clark (1989) has pointed out, there are other regional industries in Africa, like the Aterian, which include unique design types for hafting that may date to the same time range. If the occurrence of design style of this kind can be taken as an indication of modern cognitive abilities, the evidence would be consistent with modern people being present in Africa in the earlier late Pleistocene.

The distinctive typology of the Howiesons Poort industries makes these assemblages a good regional marker. Occurrences of these industries are known only from southern Africa, south of the Zambezi. This bounded distribution is interesting because it defines the geographic limits of a shared concept of artefact style and therefore information exchange. The same geographic distribution is found in the design styles of Later Stone Age artefacts (Deacon 1984) and in rock art motifs that signify a pan-Bushman belief system (Lewis-Williams 1981). It is only by inferring a common cosmology that the maintenance of this regional integrity in the distribution of very specific styles and motifs can be explained. The continuity between the earlier late Pleistocene and modern times suggests not only that the same modern people were involved but also that they had similar cognitive abilities.

Contrary to the argument offered here, a number of researchers (Binford 1984; Klein 1989, 1992; Ambrose & Lorenz 1990) have reasoned that the behaviour of late Pleistocene Middle Stone Age people was not modern because they did not exploit their environment as efficiently as the Later Stone Age Holocene hunter-gatherers did. It is assumed that they were not capable of doing so because of inferior intelligence. However, arguments of this kind imply an innate motivation to optimize the use of resources rather than to satisfy needs. They also ignore differences in access to technology. Middle Stone Age groups, for example, may not have had snares or fish hooks and they did

not have the bow: all of which were available in the Holocene to Later Stone Age foragers. The latter in turn lacked boats, guns and other technology introduced by colonial settlers. Comparisons at this level may not be very informative as simpler life styles do not imply a lesser cognitive ability. Later Stone Age people cannot be judged to have been the intellectual inferiors of their Khoikhoi or colonial competitors. A shared cognitive system with their Middle Stone Age ancestors suggests that modern behavioural potentials were achieved at least by the beginning of the late Pleistocene.

## 6. WHENCE MODERN HUMANS?

Sites like Klasies River main site and Border Cave have attracted attention because the claims for the early dating of anatomically modern human fossils seemed to run counter to any accepted wisdom on modern human origins even a decade ago. The contribution of molecular biological studies has helped to focus attention on these African sites and to stimulate new investigations here and elsewhere.

Klasies River is as well dated as any late Pleistocene deposit and the context of the human fossils is also well documented. The question is whether these fossils are anatomically modern because, if so, they are among the oldest such remains known. Assessment as modern would provide support for an hypothesis of an African origin of modern people. Where, as in this case, there has been continuity rather than replacement in the population in the late Pleistocene, the diagnosis of 'modern' morphology is to some degree a question of definition. Selection has operated in the late Pleistocene to reduce dimorphism and robusticity. Klasies River documents the presence of a strongly dimorphic population in the Last Interglacial. The retention of some archaic characters (Smith, this symposium) in a non-Neanderthaloid and robust morphology would not rule out assessment of this sample as anatomically modern (Rightmire & Deacon 1991). The gracile specimens, presumed to be female, show characteristics in the area of the chin, frontal and teeth that are impressively modern. The robust male specimens have a more archaic appearance. The Border Cave material which is younger in age does not present the same problem for assessment as modern because of the progression of selection.

The human fossils from these sites are considered to represent the products of evolution in an isolated Late Pleistocene regional population. They can be grouped in a Bushman clade with the implication that the branching of this clade occurred before the beginning of the late Pleistocene. Further support for this contention comes from the genetic evidence that the Bushmen are a long-separate African population (Nurse *et al.* 1985; Vigilant 1989) and the cultural associations that show the region functioned as a bounded entity in the late Pleistocene. Southern Africa thus offers an example of regional continuity without population replacement: but only for the time range of the late Pleistocene. The evidence does not rule out the possibility that the initial evolution of

modern people occurred in a single centre, presumably located in sub-Saharan Africa as the early phase of dispersal would have had to include southern Africa. This would have been in the Middle Pleistocene, a period poorly researched in Africa, in part, because of difficulties in dating the evidence. The application of new dating techniques holds the prospect that this critical period of the Middle Pleistocene will soon become better known.

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