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LATER PLEISTOCENE HOMINIDS OF EASTERN AND SOUTHERN AFRICA[1]

The course of human evolution can be documented directly only from the fossil record, which is not very complete for most of the Pleistocene. Skeletal remains are coming to light at a modestly encouraging rate, however, and at some localities it is possible to obtain dates and paleoenvironmental information as well as traces of early cultural activities. Research along these lines is moving ahead rapidly in sub-Saharan Africa. My purpose in preparing this report is to review discoveries of fossil material made in eastern and southern Africa during the last six decades and to comment on patterns of change that are evident from study of the more important specimens. Coverage is not intended to be exhaustive, and a primary concern is to outline developments in the Upper Pleistocene. It is during the early part of this period that undoubtedly modern representatives of our own species occur in the African record, along with Middle Stone Age artifacts. In order to deal with these remains in proper perspective, it is best to expand the discussion to include later Middle Pleistocene hominids, some of which can be characterized as archaic *Homo sapiens*, recognizably distinct from modern humans. At the same time, some of the skeletons bearing on the questions of Bushman (San) origins and the history of other African groups are derived from Holocene localities, and I have touched briefly on these as well.

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MIDDLEPLEISTOCENE HOMINIDS

Skeletal remains attributed to early or archaic populations of *Homo sapiens* are known from several localities in southern and eastern Africa. The first fossils were recovered at Broken Hill in 1921, three years before the first australopithecine was discovered at Taung in 1924. This Broken Hill cranium is quite complete, and like the Taung child, has engendered a substantial measure of controversy over the course of human evolution. Unfortunately, only a handful of remains have come to light since, and none are as well preserved as the original Zambian specimen. New fossils from East Africa promise to be particularly important, however, and should be included in any discussion of early African *Homo sapiens*. The morphology and dating of individual specimens can be considered first, while questions of relationships between mid-Pleistocene populations and of continuity with later hominids are dealt with later.

SOUTHERN AFRICAN ASSEMBLAGES

In addition to the adult cranium, a partial maxilla, a parietal and postcranial remains including several fragmentary femora were recovered from cave fill at Broken Hill (now Kabwe), north of Lusaka in Zambia. According to Clark et al (1968), at least three and perhaps four individuals are represented by the femora alone. The stratigraphic provenance of these remains within the cave has been questioned, and it is still not clear whether the several individuals are contemporary. Attention has been

directed mainly toward the cranium, which is intact except for relatively minor damage to the temporal, parietal and occiput on the right side. No lower jaw was found. Despite the very heavy brows and low vault, most authorities have agreed that the Broken Hill skull represents primitive *Homo sapiens,* while a few (notably Coon) prefer to assign it to *Homo erectus.*

Dating of the hominids is a continuing problem. Radiometric methods are inappropriate at Broken Hill, and in any case the original cave deposits have long since been quarried away by mining operations. Faunal remains collected at the site provide evidence of considerable antiquity, however, and it now seems certain that a long accepted late Upper Pleistocene date is incorrect. Of at least 23 species of larger mammals identified, five are surely extinct, and this suggests a later Middle Pleistocene or earliest Upper Pleistocene age (Klein, 1973). Amino-acid racemization results reported by Bada et al. (1974) do not contradict this conclusion. Analysis of a bone sample taken from one of the Broken Hill femora yields a D/L aspartic acid ratio of 0.55, corresponding to a racemization age of approximately 110,000 years. Other hominid bone samples have produced slightly higher aspartic acid ratios, which may indicate even greater antiquity (Bada, unpublished). These findings are strictly preliminary, in part because radiocarbon dated bone from Mumbwa Cave, some 150 km from Kabwe, has been used to calibrate the racemization reaction for Broken Hill. Also, the adult cranium itself has not been subjected to racemization analysis and could be older (or younger) than the dated femur.

Evidence for a Middle Pleistocene age and association with Acheulian artifacts is somewhat stronger in the case of the Hopefield remains. Another partial cranium, closely resembling that from Broken Hill, and an (unassociated) mandibular fragment are known from the farm Elandsfontein, near Hopefield in the Cape Province, South Africa. Following discovery of the hominid fossils in 1953, extensive surface collecting was carried out at the site, and various components of the Elandsfontein fauna have been described. Systematic excavations were conducted in 1965—1966, and this work (Singer and Wymer, 1968) together with Butzer's (1973) re-study of the geology has clarified the association of most of the animal bones with Acheulian tools on or within a calcareous crust related to a former land surface. Whether one or possibly several such crust horizons are exposed as discontinuous "calcareous plains" has not been established with certainty, and there are still questions regarding the relationships of other MSA and LSA assemblages to younger stratigraphic levels at the site. Association of the hominids with the more ancient fauna and tools is also not definite but seems most probable, given the evidence available.

The bulk of the Elandsfontein fauna is likely to be as old or perhaps substantially older than the assemblage at Broken Hill. A faunal list prapared by Hendey (1974) contains approximately 50 species of larger mammals, at least 19 of which are extinct. Most of the extinct forms are unknown in earlier Upper Pleistocene assemblages from the southern and southwestern Cape (Klein, 1978). As a whole, the Elandsfontein fauna is very similar to that recovered from the Middle Pleistocene Cornelia Beds in the Orange Free State, though the latter may be slightly older (Butzer, Clark and Cooke, 1974). The paleobiological evidence is therefore best interpreted to mean that a majority of the Hopefield remains, presumably including the hominid cranium, are of Middle Pleistocene age (Howell, 1978).

Two other sites have yielded human remains which are usually linked with archaic *Homo sapiens.* One is Florisbad, where the provenance of the fossils within a sequence of sandy spring deposits is still questioned. Another is the Cave of Hearths on the farm Makapansgat in the Transvaal. In 1947, a fragment of human mandible was discovered in these cave breccias, in association with final Acheulian tools. No radiocarbon dates are available for the level in which the fossil was recovered, but the material may be quite ancient if current ideas regarding the age of the latest occurrence of Acheulian industries are correct (Vogel and Beaumont, 1972; Klein, 1977; Beaumont, de Villiers and Vogel, 1978; Szabo and Butzer, 1979). Fauna from the lower cave deposits is sparse and not particularly helpful. Only 18 species are recorded, and some of the archaic forms frequently found in other Acheulian assemblages are lacking. The hominid consists of the right half of a mandibular body, with P_3, M_1, and M_2 in place. This individual is juvenile and may represent a population similar to that sampled at Hopefield and Broken Hill (Tobias, 1971). However, because the fossil is so fragmentary and cannot be compared directly with the Middle Pleistocene crania, its significance is limited.

The history of Dreyer's 1932 discovery of a partial cranium at Florisbad is well known, although there is still no firm consensus as to how these remains fit into the later Pleistocene hominid succession in southern Africa. The human bones were found in a small spring eye which had penetrated the first (peat I) of several peat layers at the site before being sealed by deposits of hard green sand (Dreyer, 1938). Presumably the fossils are roughly contemporary with this first peat layer and older than the next (peat II) level which overlies the sand. Several dolerite flakes, cores and spheroids were later recovered from approximately the level of peat I, but much of this material described by Meiring in 1956 is said by Sampson (1974) to be useless. The industry represented has little in common with the Pietersburg (MSA) complex but shows a limited resemblance to the artifacts from the Cornelia Beds (Butzer, Clark and Cooke, 1974). Faunal remains collected at several levels in as well as above peat I and in the spring eye have apparently been mixed (Sampson, 1974), so the existing species lists are not likely to be very reliable. A substantial proportion of the taxa recorded are extinct.

A mid-Upper Pleistocene date is generally accepted for the Florisbad fossils, but a case for greater antiquity is equally compelling. Radiocarbon ages obtained more than 20 years ago are suspect besause of contamination problems, but there is little doubt that peat I at least is too old to be dated accurately. More recently, J. C. Vogel (pers. comm.) has extracted new samples from the higher peat layers, and peat II now gives a date of > 42,600 BP (Pta-1108). Peat I and probably also the hominid cranium can be shown to be a whole landscape cycle earlier than peat II (Butzer, Beaumont and Vogel, 1978), so an age of > 100,000 years is not unlikely.

RELATED HOMINIDS IN EAST AFRICA

Other important but still mostly fragmentary hominids are known from localities in Ethiopia, Kenya and Tanzania in eastern Africa. Some of this material is unequivocably of Middle Pleistocene age and associated with tools of the Acheulian Industrial Complex, while other specimens are derived from less certain chronological and cultural contexts. At Olduvai Gorge a partial mandible (O.H.23) was located *in situ* below the Norkilili Member in the Masek Beds in 1968. Large bifacial tools consisting entirely of handaxes are present at this site, and small scrapers are abundant (M. D. Leakey, 1975).

This fossil may represent *Homo erectus* but is so incomplete as to make identification virtually impossible. Another fragment, hardly more informative, is known from the Lower Ndutu Beds at Olduvai, which have an age in excess of 60,000 years (Hay, 1976). Olduvai hominid 11 is a piece of left maxilla, roughly comparable in size and robusticity to the maxilla of O.H.12 from Bed IV, lower in the stratigraphic sequence (Rightmire, 1980). A cranium from Lake Ndutu, near Olduvai in northern Tanzania, is fortunately in a better state of preservation. This has been described as *Homo erectus* by Clarke (1976), though the preliminary account makes it clear that there are important anatomical similarities to *Homo sapiens.* Dates are not firm, and stratigraphic correlations of the clay deposits containing the Ndutu hominid with the beds at Olduvai have not been fully resolved. An age comparable to that of the Masek Beds seems likely (Mturi, 1976).

Discovery in Kenya of a nearly complete hominid mandible associated with postcranial fragments and stone artifacts near Lake Baringo has been reported by M. Leakey et al. (1969). Deposits containing this assemblage have been designated as the Middle Silts and Gravels Member of the Kapthurin Formation, and an overlying tuff is dated at 0.23 or 0.24 million years (Tallon, 1978). The Baringo mandible is less robust than other East African mandibles referred to *Homo erectus* (eg O.H.22 from Beds III/IV), and there are differences in transverse torus formation and in contour of the chin region. What these differences signify and whether the jaw should be identified as *Homo erectus* or as archaic *Homo sapiens* is not clear. As with the Hearths material, it is difficult to specify the taxonomic affinities of a damaged mandible found without associated cranial remains.

Bones of other individuals more definitely representative of *Homo sapiens* have been unearthed in the Omo Basin, near the north end of Lake Rudolf in southwestern Ethiopia. Two broken crania have been described by Day (1969), while parts of a third skeleton are so fragmentary as to provide little information. Omo 2 is the more complete specimen, comprising most of a vault. All of the facial bones and part of the cranial base are missing. The supraorbital region is also damaged, but the rest of the broad, flattened frontal is intact, and the cranium is relatively long and low. The back of the occiput is strongly curved and bears a heavy, rounded torus. Omo 1 is less well preserved, although pieces of frontal and much of the rear of the braincase are available for study. Primarily because of occipital form, this individual is often considered to be fully modern in its anatomy, but at the same time there are resemblances to the more archaic skull of Omo 2. Varying interpretations placed on this material are described in the following section.

Although they were found at different localities, both Omo crania are considered to be of comparable stratigraphic age. A Th/U date of 130,000 years has been reported for shells from Member I of the Kibish Formation in which the material was located (Butzer, Brown and Thurber, 1969). This date is cited as "very reasonable" for the lowest Kibish member (Butzer and Isaac, 1975; Butzer, 1976), although there is still doubt concerning reliability of the Th/U method (Howell, 1978). Faunal remains occuring only with Omo 1 are not particularly helpful and do not independently confirm a late Middle Pleistocene age.

Another site in Ethiopia has yielded archaic human fossils quite recently. At Bodo D'Ar in the Awash River Valley, pieces of a cranium were recovered from the Upper Bodo Beds in 1976 and 1978, along with stone artifacts and a mammalian fauna (Conroy et al. 1978). The artifacts have not yet been described, but the presence of numerous hippopotamus remains suggests that this was a site at which carcasses were butchered. The palaeontological and archaeological evidence is also said to be consistent with a Middle Pleistocene age. The cranium has now been partially reconstructed from many small fragments and promises to provide important information. The facial skeleton is nearly complete on one side, and most of the frontal is preserved. Parts of both parietals and the occiput are also represented, along with the anterior portion of the cranial base. More cleaning is needed, but it is apparent that this individuál is large and ruggedly built. The Bodo face is strikingly massive in construction and shows some resemblance to Broken Hill.

RELATIONSHIPS OF SOUTH AND EAST AFRICAN HOMINIDS

Hominids of presumed mid-Pleistocene age are rare in southern and eastern Africa, and at many localities there are doubts concerning dating and stratigraphic provenance of the remains. The fossils considered here could be sampled from populations spanning several hundred thousand years of later Middle Pleistocene or earliest Upper Pleistocene time. Dealing with such scattered and often fragmentary material is frustrating, and the African remains are really not adequate to permit testing of phylogenetic hypotheses. Simply sorting the specimens into groups (taxa) on the basis of anatomical similarities is likely to be controversial, while reconstructing the history of the lineages recognized is extremely difficult. Information relating to the mode or pattern of human evolution during this time period is badly needed, however, and at present sub-Saharan Africa can provide as much or more important fossil evidence than can other regions in the Old World.

A basic issue is the number of distinct groups of early *Homo sapiens* which may be identified in the mid-Pleistocene record. Isolated lower jaws such as those from the Cave of Hearths, Baringo and the Masek Beds at Olduvai are not very informative, particularly as most are badly damaged. More basis for sorting is apparent in the case of the crania, some of which are rather well preserved. There is now general agreement that the Hopefield braincase shows a detailed resemblance to that from Broken Hill, as has been documented by Singer (1954, 1958) and many subsequent workers. Similarities are most marked in form of the supraorbital region and the frontal bone but seem clearly to extend to other aspects of cranial morphology as well. Both individuals are decidedly archaic in appearance and have occasionally been referred to the species *Homo erectus*. A more widely accepted view is that Broken Hill and Hopefield represent a distinct subspecies of *Homo sapiens*, properly designated as *Homo sapiens rhodesiensis*. Badly broken and insecurely dated fossils from Eyasi in Tanzania have also been assigned to this taxon, but the Eyasi material has never provided really solid evidence for the presence of a Broken Hill-like population in eastern Africa.

Perhaps a more convincing case for the distribution of *Homo sapiens rhodesiensis* into East Africa can now be based on the finds at Bodo D'Ar. The low Bodo frontal bone resembles that of Broken Hill, and postorbital constriction is marked in both specimens. A supratoral sulcus (ophryonic groove) is not present, and the brows are thick, although not quite so heavy as those of the Kabwe individual. Other points of similarity are noted by Conroy et al. (1978), but there are some differences also. The Bodo face is especially broad in its middle parts, with widely separated orbits and a low, broad nasal aperture. The zygomatic bones are deep and massively constructed. Upper facial height is about the same in the two skulls, however, so the contrast is primarily one of breadth and build of the midfacial region. The meaning of these differences is unclear, and it is too bad that the large *Homo erectus* cranium (O.H.9) from Bed II at Olduvai has no face with which the new specimen can also be compared.

Ties with *Homo sapiens* appear most reasonable from the evidence currently available, but the Bodo remains are among the most archaic in morphology to come to light so far.

The Omo crania, also from Ethiopia, pose further questions. Omo 2 does share some characters with Broken Hill and Hopefield, as I have emphasized (Rightmire, 1976). But this individual departs from the Broken Hill pattern in exhibiting greater breadth and flatness of the frontal, while a small surviving section of the supraorbital torus is not as thickened. Omo 2 and a reconstruction of Omo 1 are not generally very distant from one another when both are measured and subjected to multivariate statistical analysis (Stringer, 1974), although the Omo 1 vault is higher with a more rounded parietal profile from behind. These differences have prompted some workers to see the Omo skulls as representative of different populations, perhaps separated in time. Omo 2 is agreed to be archaic in appearance, while Omo 1 is said to be a plausible ancestor for more modern people to the north, at Skhul and Qafza (Stringer, 1974, 1978; Howell, 1978).

A new fossil bearing on this problem has recently been unearthed at East Turkana, Kenya, in deposits of the upper Guomde Formation. The age of the Guomde sediments has not been satisfactorily determined, but the hominid may date to the end of the Middle Pleistocene. Fragments of a cranium have been reconstructed by A. Walker, who has succeeded in rebuilding most of the back part of a braincase. Quite clearly, the skull is large and similar in many respects to that of Omo 2. Form of the frontal cannot be ascertained until more of the pieces are joined together, but fragments suggest that the brow ridge is thicker laterally than in the Omo individual. At the same time, the occiput is rounded and recalls the morphology of Omo 1. If this preliminary impression is confirmed by more detailed study, then there is less reason to emphasize the differences between the two Omo crania, which may better be treated together. Whether the Omo and Turkana fossils should also be grouped as *Homo sapiens rhodesiensis* is not certain, as there is now a firmer indication that populations differing in occipital as well as frontal features from Broken Hill (and Bodo?) were established in eastern Africa.

Here the lack of good dates is especially bothersome. The Broken Hill, Hopefield and Bodo localities may all be substantially older than the Omo Kibish sites, but this cannot be assumed without more information. Limited similarities, mainly relating to frontal breadth, of the Omo crania to Florisbad are again difficult to interpret in the absence of a reliable chronological framework.

CONTINUITY WITH UPPER PLEISTOCENE POPULATIONS

The origins of modern *Homo sapiens* have been debated extensively and for a long time, often with Europe and the Neanderthals as a primary focus. More attention is now being paid to Africa as well as to other areas of the Old World, and this shift in emphasis is certainly helpful. But the issues raised are complex, while the fossils are all too sparse, as noted in the previous section. At present, it is not easy to choose between a number of conflicting hypotheses, all of which bear on the question of continuity between late mid-Pleistocene populations and more modern Upper Pleistocene humans. Some of the more general, theoretical issues have been reviewed recently by Howells (1976), while Pilbeam (1975) and Howell (1978) have considered many of the available fossils. A further lengthy review is not needed here, and in this section, I propose to touch only on a few major themes, with particular reference to human evolution in the southern part of Africa.

One suggestion of long standing is that the heavier, more massive skulls from Broken Hill and Hopefield, possibly the Hearths mandible, and now presumably the Bodo fossils represent a branch of African Neanderthals. Such individuals are considered by Brose and Wolpoff (1971) as representatives of a Neanderthal population spread widely across the Old World — in effect a Neanderthal phase in later Pleistocene human evolution. Other workers have also used the terms Neanderthal or "Neanderthaloid" but have noted differences between the African fossils and "classic" skulls from western Europe (Singer, 1958; Tobias, 1968; L. S. B. Leakey, 1972; Mann and Trinkaus, 1973). In these instances, and in contrast to the Brose and Wolpoff point of view, there is usually strong sentiment against any direct ties of Broken Hill and the other robust specimens with anatomically modern *Homo sapiens*. Wells (1972) argues that the resemblances of Broken Hill to European Neanderthals are strictly superficial and points to the "fundamentally African" features of this Kabwe individual, which he feels may nevertheless be "specialized" and hence not ancestral to later populations. Something similar has been suggested by Protsch (1975), apparently on the basis of carbon dates of ca. 40,000 years obtained for samples of the Elandsfontein fauna. Protsch contends that the African Neanderthals are contemporaries of advanced *Homo sapiens* and must have died off without issue. But his position is weakened both by the weight of other evidence indicative of a Middle Pleistocene age for the material and by his analysis of the fossils themselves (Rightmire, 1979).

Other scholars have not drawn explicit parallels with the Neanderthals of Europe and have not ruled Broken Hill and comparable specimens irrevocably out of a lineage leading toward more modern humans. However, Stringer (1974, 1978), Beaumont, de Villiers and Vogel (1978) and others do point to the Omo people or to Florisbad as the more likely ancestors of recent *Homo sapiens*, and replacement of archaic Broken Hill-like populations is certainly implied. Stringer (1974) for example would tie the Omo fossils in with populations of the Near East, while Sampson (1974) sees Florisbad as an early user of Middle Stone Age culture and technology. Wells (1969) also views Florisbad as an anatomically more advanced though possibly pathological individual, perhaps related to finds from Border Cave and Springbok Flats.

Arguments concerning the fossils will no doubt continue, and I do not claim to offer any early solutions. However, my own observations, supported by those of Howells (1974, 1975) and Santa Luca (1978), suggest that none of the sub-Saharan fossils can meaningfully be referred to as Neanderthals. Large brows and low vaults do not prove that a "Neanderthaloid" phase or grade extended into southern Africa, and the Broken Hill cranium exhibits a number of features distinguishing it from European specimens (Rightmire, 1976). There also need not be in Africa any parallel with the large scale extinctions of archaic people supposed to have occurred in Europe prior to 35,000 years BP. For one thing, the Broken Hill and especially the Elandsfontein assemblages appear to be substantially older than the Würm Neanderthals. For another, the idea that the Florisbad cranium is modern anatomically is not supported by analysis of measurements. Instead, a general resemblance to Broken Hill in frontal form and torus development is upheld by multivariate statistics, and the Florisbad face is at most roughly intermediate between that of archaic *Homo sapiens* and recent humans (Rightmire, 1978a). Middle Stone Age cultural associations are far from firm, and it is quite unlikely that Florisbad represents a population comparable to any in Europe during the Upper Palaeolithic.

At the same time, it is difficult to relate any of the mid-Pleistocene hominids, including the Omo skulls, to others from later, Upper Pleistocene contexts. Florisbad shows no special links with living Bushman (San) or other Africans in discriminant analysis, and in fact there is no hard evidence for continuity of the archaic populations with more recent *Homo sapiens* of the same geographic regions. This seems to be true not only in southern Africa but also in other parts of the Old World (Howells, 1976). Whether modern humans evolved gradually in several different centers, including sub-Saharan Africa, or migrated outward relatively rapidly from a single source, sometime in the earlier Upper Pleistocene, is therefore still an open question. A few additional fossils from sites in southern Africa do bear on this issue and will be discussed in the next section.

UPPER PLEISTOCENE HOMINIDS

Human fossil remains dealt with so far can be placed in later Middle Pleistocene stratigraphic contexts with varying degrees of confidence, and it is probable that the sites span a considerable period

of time. Also uncertain, at least for the moment, is the nature of association of the fossils with lithic cultural material. Acheulian tools occur in abundance in the sands at Elandsfontein and in the Hearths breccias. No tools are known from some of the other sites, but it is possible that links with the Acheulian Industrial Complex will emerge at most of the localities where archaic *Homo sapiens* has been recovered, when the available artifactual material is described (Bodo D'Ar) or reassessed (e.g. at Florisbad).

Dates and cultural associations are fortunately somewhat better established at a few additional sites in southern Africa, where there is good evidence for human occupation in deposits of earlier Upper Pleistocene age. These assemblages contain Middle Stone Age (MSA) industries which lack handaxes and cleavers and which are characterized instead by the presence of flake tools such as points and scrapers. Spatial and temporal variability in tool types seems to be greater than for the preceeding Acheulian, and backed blades and segments represent a major lithic innovation which occurs in MSA sequences over much of southern Africa at approximately the same time. Fire was used at several of the MSA sites, including Klasies River Mouth, and on the Cape coast there is evidence for the systematic exploitation of marine resources (Klein, 1977a). Unfortunately, human remains from MSA contexts are generally scarce and badly fragmented. The few useful fossils known or suspected to date to Last Interclacial or early Last Glacial times are then followed by a long gap in the record. Sites containing stratified MSA sequences seem to have been abandoned for long intervals before the onset of typical Later Stone Age (LSA) traditions, some 20,000 to 15,000 years ago (Klein, 1977a; J. Deacon, 1978). Early post-MSA occupations are known for only a handful of localities, such as Boomplaas in the Cape (H. J. Deacon and Brooker, 1976), and no discoveries of significant human remains have been reported for this period. Only a decade or two ago, it was thought that a number of fossils could be linked with the "Middle Stone Age", but it now appears that there is very little material from southern Africa with which to chart the course of mid-Upper Pleistocene human evolution. Only with the coming of LSA industries in the terminal Pleistocene and Holocene is there any substantial increase in the inventory of human skeletons.

REMAINS ASSOCIATED WITH THE MIDDLE STONE AGE

One site which has yielded skeletal material in clear association with MSA artifacts is Klasies River Mouth, located on the southern Cape coast, some 130 km west of Port Elizabeth. Actually a complex of several caves, Klasies was excavated between 1966 and 1968, and a sumary of results has been published by Wymer and Singer (1972). At Klasies cave 1, the MSA occupation sequence starts at or near the beginning of the Last Interglacial, approximately 125,000 years ago. Butzer's (1978) analysis of sediments permits correlations between the record of sea level fluctuations at the site and the deep-sea oxygen isotope stratigraphy, and his results are consistent both with oxygen isotopic determinations carried out on shells and with aspartic acid racemization ages for bone, also for cave 1 (Bada and Deems, 1975). This work suggests that MSA people were present at Klasies until perhaps 60,000 BP, and the culture-stratigraphic sequence thus records more than 50,000 years of nearly continous occupation. During this time the MSA tradition persisted with few changes (Wymer, 1979). The Klasies MSA fauna has been studied by Klein (1976), who notes that only one genus and a small number of mammal species are extinct. This fauna is therefore quite distinct from that at Elandsfontein, which contains a whole series of archaic and extinct forms.

Hominid remains have been recovered mainly from the earlier Klasies levels, where the stone industries are termed MSA I and MSA II. Cranial, dental, and a scattering of postcranial pieces will be described in detail in a forthcoming monograph (Singer and Wymer, in preparation). I have been able to examine part of this collection and to make a few limited comparisons, particularly with the Florisbad face and with the crania of recent humans. All of the Klasies material is badly broken, and it is difficult to characterize the MSA population in more than very general fashion. However, most of the specimens, including at least some of the mandibular remains, appear to be anatomically modern. A zygomatic bone is large in comparison to that of recent Africans and is rather flat in facial aspect, but its morphology is not noticeably archaic. Also interesting is a piece of frontal which preserves the right supraorbital margin and the nasal root. The superciliary eminence is not especially prominent, although glabella is moderately projecting. The nasal bones are broad and flat, as in many modern individuals. This Klasies frontal is very different from that of Florisbad, in which glabella is more prominent and the supraorbital torus is quite thick (Rightmire, 1978a). Such evidence is not conclusive but certainly suggests that the Klasies people were more archaic in appearance than those represented by the Free State fossil.

Little additional information can be gained from Die Kelders, although the MSA sequence at this Cape coastal cave is characterized by excellent faunal preservation. Unfortunately the sample of human material recovered by Schweitzer (1970) is quite small, consisting only of isolated teeth. No signs of deliberate burials have turned up either in the earlier Die Kelders levels or at Klasies River Mouth, and at other coastal sites such as Nelson Bay Cave and Elands Bay, preservation of all bone in the MSA layers is relatively poor. Elsewhere, useful hominid remains in plausible association with MSA tools are known only from Border Cave, far to the north.

Border Cave, situated in the Lebombo Range on the border of Swaziland and Kwa-Zulu, has yielded lithic and skeletal material of considerable interest. Human bones were first recovered during the course of Horton's digging in 1940, but controlled excavations were not conducted until 1941 and 1942 (Cooke, Malan and Wells, 1945). Further work at Border Cave was initiated by Beaumont in 1970 (Beaumont and Boshier, 1972; Beaumont, 1973). The history of these excavations and new findings at the site have received a good deal of attention in the recent literature, and an extensive review is not required here. Lithostratigraphic and sedimentological studies, radiocarbon dates, microanalytical data for bone samples, and details of the cultural sequence are discussed by Beaumont, de Villiers and Vogel (1978) and by Butzer, Beaumont and Vogel (1978), while the fauna has been dealt with by Klein (1977b). Some of these results are controversial, but the evidence does indicate that MSA occupation began before the start of the Last Interglacial and continued until approximately 50,000 BP. The MSA inhabitants of Border Cave are represented by cranial and mandibular remains of three adult individuals, an infant skeleton, and perhaps by postcranial fragments of uncertain provenance. One of the mandibles was recovered in 1974 from deposits unquestionably containing MSA artifacts and dated by radiocarbon as > 49,000 BP.

The infant skeleton was excavated *in situ* by Cooke, Malan and Wells (1945) from a shallow burial cut into level 10 of Butzer, Beaumont and Vogel (1978) and is not likely to be younger than the overlying level 9. Pieces of an adult cranium were dug out of the cave by Horton, and the original position of this individual in the deposits was not directly verified. However, Cooke, Malan and Wells have argued that soil found attached to the cranium is best matched by that of level 10, identified by Butzer with deep-sea oxygen isotope stage 5d. If this is correct, then the cranium and infant burial should be approximately 115,000 years old, while the 1974 mandible is somewhat younger.

All of the Border Cave hominids are anatomically modern in morphology (de Villiers, 1973; 1976a), but there is some difference of opinion regarding the extent to which one or more of the specimens may resemble living African populations. Because of its rugged appearance and well developed superciliary eminences, the adult cranium has been compared to such other skulls as Florisbad and Springbok Flats, while ties with Negroes, Bushmen (San) or Hottentots (Khoi) have been viewed as fairly remote. Analysis of cranial measurements has led de Villiers (1973; also Beaumont, de Villiers and Vogel, 1978) to emphasize similarities of Border Cave to Springbok Flats and to assign both skulls the role of "undifferentiated" ancestors from which recent populations ultimately arose. My own multivariate statistical treatment of Border Cave measurements suggests a rather different conclusion. When 11 cranial dimensions are used in discriminant analysis, Border Cave approaches several modern populations and in fact lies closest to the Hottentot (Khoi) male centroid. This assignment should probably not be interpreted in a strict sense to exclude the fossil from all Bushman (San) populations, and the important point is that Border Cave is well within the range of recent African variation for the measurements employed (Rightmire, 1979).

If the adult cranium is actually associated with a MSA tradition of early Last Interglacial age, these statistical results have important implications. The cranium and the two mandibles argue for the presence of fully modern *Homo sapiens sapiens* in southern Africa at an unexpectedly early date, as noted by Beaumont, de Villiers and Vogel (1978). Further, one of the fossils can be linked at least tentatively with Hottentots (Khoi). This implies that Hottentots (Khoi) or large Bushman (San)-like people have inhabited southern Africa for a long time, as would be consistent with a phyletic view of human evolution. Although very limited, the evidence surely does not point toward any abrupt change in local populations during the Upper Pleistocene, and it is unlikely that this part of Africa witnessed any large scale replacement of one people by another shortly before 35,000 BP. (Rightmire, 1979).

However, the Border Cave and Klasies materials do not to my mind prove that modern humans evolved first in sub-Saharan Africa. Problems with the stratigraphic provenance of some of the Border Cave hominids have still to be unequivocably resolved, although this case for antiquity is certainly more convincing than any built around Boskop, Fish Hoek or Springbok Flats. Some authors, notably Protsch (1975), have claimed that the latter remains represent an early subspecies of *Homo sapiens* associated with MSA industries, but there are no dates for Boskop or Springbok Flats, and cultural associations are uncertain. The Florisbad fossil, which has also been advanced as a candidate for *Homo sapiens sapiens*, may well not qualify for reasons I have discussed previously. And even if all of the Border Cave individuals are accepted as ancient, the evidence does not permit us to disallow an equally early appearance of modern humans in other regions of the Old World. Some 16 skeletons have now been recovered from Mousterian levels at Qafza in Israel, for example, and some or all of this material is anatomically modern rather than Neanderthal-like. There are no good radiocarbon dates for Qafza, so the age for these individuals, which are presumed to be quite old, has not been reliably determined.

LATER UPPER PLEISTOCENE SKELETONS

Traces of early post-MSA occupation are generally rare in southern Africa, and at sites such as Boomplaas where these levels preserved, there are no human remains. If the Otjiseva skeleton from South West Africa (de Villiers, 1972) cannot be dated satisfactorily, and if fragmentary and poorly provenanced individuals from Boskop, Springbok Flats and Cape Flats are discounted, then the remaining Pleistocene skeletons are known mostly from sites

containing LSA industries. None of this material is likely to be much more than 20,000 to 15,000 years old.

Some human remains have been unearthed in eastern Africa, and a fragmentary cranium associated with LSA chipped stone tools at Lukenya Hill in Kenya has been described by Gramly and Rightmire (1973). This individual consists only of a part of a frontal bone and most of the left parietal. On one side, the orbital margin is intact, and pieces of both nasal bones and the maxillary frontal process are in place below glabella. While the brows are well developed and the forehead is receding by modern standards, most features of the Lukenya specimen can be matched in East or South African

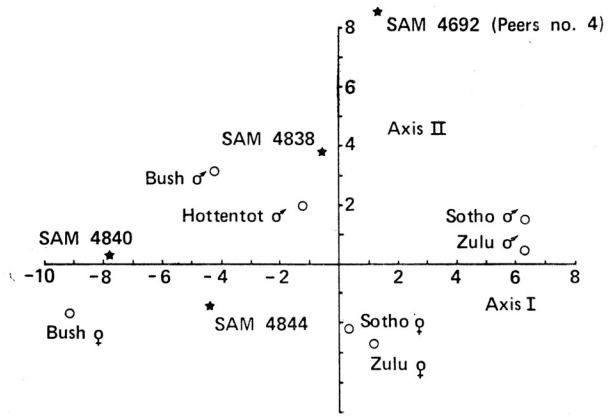

FIGURE 1. *Locations of centroids for seven African groups on the first two axes computed in discriminant analysis of 37 cranial measurements. Positions in this plane of four individuals from Peers Cave (SAM numbers) are also shown, and three of these crania lie closest to the Hottentot (Khoi) or Buschman (San) centroids. These affinities are confirmed when additional discriminant functions (not plotted) are considered. A fourth skull (no. 4) falls slightly outside of the Khoi range of variation.*

Negro crania. A similar conclusion seems to apply in the case of other Kenyan skeletons, most of which are of Holocene rather than Pleistocene Age. Excavations are continuing near Lake Turkana, and one site at Lowasera yielding remains of stone age fishermen has been investigated in detail by Phillipson (1977). At Koobi Fora, survey of the Galana Boi beds is underway, and several partial skeletons have been recovered. The Galana Boi deposits, rich in molluscan fauna, probably represent an early to mid-Holocene transgression of the lake and are dated by radiocarbon to a period between about 10,000 BP and 4000 BP. (Butzer et al, 1972; Findlater, 1978). Most of the human material has come from lacustrine oriented sites, while a very few specimens may be associated with early pastoralist activities. Elsewhere in the Eastern Rift, numerous burials have come to light in caves and rockshelters clustered in the Elmenteita, Nakuru and Naivasha Lake basins. Gamble's Cave and Bromhead's Site are among the earliest and best known of those Holocene localities, and their contents were first described by LSB Leakey in 1935. Leakey originally suggested that the skeletons showed Caucasoid affinities, but this interpretation has recently been questioned. It now appears that many of the East African burials associated with LSA or "Pastoral Neolithic" industries are better characterized as Negroid than as "Mediterranean" Caucasoid in morphology (Rightmire, 1975; Bräuer, 1978).

In Zambia, late Upper Pleistocene occupation has been documented at several rockshelters, including Mumbwa, Leopard's Hill Cave and Kalemba. The Mumbwa caves were excavated more then 40 years ago, and there has been considerable confusion about the number of skeletons recovered and their cultural associations. Some of the material has apparently been lost, and the skeletons now housed in the University of the Witwatersrand are in rather fragmentary condition. The cranium of Mumbwa 2 lacks all of its base and facial parts, while other sections of the vault are broken and slightly distorted. Number 3 has been heavily reconstructed with plaster, and Mumbwa 4 is also missing the facial skeleton. Given the state of these remains and other problems, it is difficult to extract from the assemblage much information about the Mumbwa population. The Leopard's Hill bones are also extremely fragmentary, but at Kalemba several individuals are associated with a long LSA succession. Most of the human material is not older than about 8,000 BP, but does display features which fall broadly within the range of variation of recent Negroes (de Villiers, 1976b).

This evidence relating to the evolution of LSA people in the terminal Pleistocene and early Holocene is extremely sketchy, and finds from this period in the interior of South Africa do not help a great deal. At Bushman Rock Shelter in the eastern Transvaal, a broken mandible was recovered in 1969 from levels apparently containing LSA artifacts. The jaw has been described by Protsch and de Villiers (1974) as that of a human infant between six and eight months of age, and all of the right half of the bone is preserved. The left ramus is missing and on this side the body has been broken just behind the socket for the second deciduous molar. Measurements do not distinguish the Bushman Rock Shelter mandible from those of South African Negroes of comparable age, while the specimen is said to share few anatomical features with the jaws of Bushmen (San). However, the number of infant mandibles available to Protsch and de Villiers (1974) for comparative purposes was small, and some caution in identifying the Transvaal individual as an early Negro is advised.

Fortunately many more skeletons have been exhumed in the southern Cape Province, particularly in caves located along the Cape coast. Extensive new excavations at several of these sites have been conducted during the last decade. Much of this work has been and continues to be multidisciplinary, and sedimentological studies, plant and faunal analyses in addition to reports on artifacts are increasingly important. Information concerning hunting strategies and food preferences is filling out our knowledge of the ecology of these coastal stone age people, and in some instances it is possible to relate major changes in artifact typology to shifts in climate and vegetation as inferred from faunal remains (J. Deacon, 1978). Human burials associated with LSA occupation at a number of caves and shelters are also informative, although the larger collections of skeletons have come mostly from earlier excavations, where the stratigraphic provenance of the material is frequently in doubt.

Such is the case, for example, with Peers Cave at Fish Hoek. This site was first visited in the 1920's, and as many as 11 skeletons were excavated by members of the Peers family. Most of these individuals were apparently found in the upper levels at the cave, in company with LSA tools and ornaments. However, one skeleton (No. 4) from a lower layer has been viewed as ancient and thought to be associated with a MSA ("Stillbay") industry. On the basis of radiocarbon dating of *Equus* bone presumed to have been found at the site, Protsch (1974) has claimed that the assemblage including the human skeleton may be more than 35,000 years old. This assertion rests on contemporaneity of the faunal sample with the hominid, and there is reason to doubt that the *Equus* bones can be associated with any of the human material. If they cannot, then the dates are of little value, and claims for great antiquity cannot be substantiated. A more likely conclusion is that Peers No. 4 was buried into the MSA deposits, probably late in the Pleistocene or early in the Holocene (Rightmire, 1978b).

When several of the Fish Hoek crania are measured and subjected to multivariate statistical analysis, ties with living African populations emerge quite clearly. Discriminant functions can be used to assign Peers No. 2 as Hotentot (Khoi), although the distance of this individual from the Bushman (San) male centroid is only slightly greater (Figure 1). The skull lies well beyond the .05 limits of all Negro groups included in the analysis, so membership in any of these populations is unlikely. Two other Peers individuals are also best classed as Khoi, on the basis of 37 measurements. The controversial No. 4 is more heavily constructed, with brows that are well developed in comparison to those of recent Africans. The facial skeleton is short, however, and the cranium can hardly be regarded as other than modern in its morphology. In this analysis, No. 4 is again closest to the Khoi centroid, although it falls slightly beyond the .01 limits of the Hottentot distribution. Previous work has also suggested that this Fish Hoek individual is similar to living San or Khoi (Howells, 1973; Rightmire, 1978b), and it is demonstrably more akin to these South African populations than to Negroes.

This question of resemblance to recent Africans is important. The fragmentary Border Cave cranium hints that large Bushman-like people may have inhabited southern Africa for a long time, but the evidence is not really very solid. In fact, the origins of San and Khoi populations are obscure, and it is not clear when the earliest Bushmen may have evolved. Tobias (1972, 1978) has noted that the San and Negroes are most probably derived from a common stock, but the time of splitting of these major groups has been placed between 15,000 and 25,000 years ago largely on archaeological grounds. Skeletons which settle this issue are not available. But Bushman-like individuals can certainly be identified in an early Cape coastal setting, not only at Fish Hoek but also at other shelters.

Material from LSA levels at Elands Bay and Nelson Bay Cave is of limited utility, as the skeletons are fragmentary and frequently subadult. Human remains from the famous shelter at Matjes River are better preserved in some cases, but the site

has been worked over a span of roughly 30 years by different investigators and this has led to problems in establishing the provenance of individual burials. A report published by Louw (1960) leaves many questions unanswered, and it is difficult to determine even how many skeletons were finally excavated. Some are associated with a Wilton industry, while material from the earlier part of the sequence can probably be linked to an Albany assemblage, characterized by the presence of large scrapers with few other formal tools. It is too bad that all of the "Wilton" skulls have suffered damage and that facial parts have been heavily reconstructed with plaster. Several individuals can still be measured, and braincases are a little larger than those of modern San. However, differences of this sort have surely been overemphasized in the past, and it would be surprising if the skulls actually lie outside of a Bushman or Hottentot range of variation. At Oakhurst, where some 30 burials were unearthed by Goodwin, the affinities of the more complete individuals can be described in similar fashion (Rightmire, 1970).

These remains from Matjes River, Oakhurst and other shelters seem to confirm the presence of a large Bushman-like people on the Cape coast in the terminal Pleistocene and early Holocene. There is little doubt of their association with a Wilton way of life, while some of the earliest burials may date to Albany times, 8,000 to 12,000 years ago. More than this is hard to say, and additional skeletons from carefully excavated contexts are urgently needed. It would be especially useful to have more material associated with MSA industries of the early Upper Pleistocene, in order to extend (or modify) hypotheses suggested by Border Cave and Klasies River Mouth. Holocene developments in southern Africa should also be explored further. Skeletal remains from coastal midden deposits and some inland regions are under study by Hausman (in preparation), and this work should shed light on associations between some stone age people and a pastoralist economy. These projects and others like them require that biological and archaeological research be conducted jointly, if a better understanding of Upper Pleistocene human evolution is to be obtained.

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