

Florisbad and Human Population Succession in Southern Africa

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ABSTRACT The human cranium recovered at Florisbad in 1932 is compared with other Sub-Saharan African hominid remains from Broken Hill, the Omo and Klasies River Mouth. The Florisbad frontal is very broad, but despite this breadth and differences in zygomatic form, there is a definite resemblance to archaic *Homo sapiens* from Broken Hill. There is also some similarity to both Omo I and Omo II, while fragmentary remains from Klasies River are more lightly built and hence more modern in appearance. These impressions are strengthened by measurement and statistical analysis, which demonstrates that Florisbad and Broken Hill are distant from recent African populations. Even if Florisbad is less archaic than the earlier (Middle Pleistocene?) hominid, it is not noticeably Bushman-like. New dates suggestive of early Upper Pleistocene antiquity also place Florisbad securely in a lineage containing Broken Hill, and there is no evidence to support special ties with any one group of living Africans.

Since its recovery from spring deposits in the Free State in 1932, the Florisbad cranium has been a source of controversy. The fossils themselves have been subject to several different interpretations, and there is still no firm consensus as to how Florisbad fits into the later Pleistocene hominid succession of southern Africa. There is also uncertainty over just where in the sequence of deposits the cranium was originally located. Dreyer ('38) states that the discovery was made in the debris of one of several small spring eyes uncovered in the western part of the site, but the precise relationship of this eye and its contents to adjacent undisturbed sand and peat layers is not known. Stone artifacts, faunal remains and even wood were recovered along with the human material, but Dreyer's descriptions, and also those of Meiring ('56) who participated in later work at Florisbad, are not very helpful. The stone assemblage is usually referred to the "Hagenstadt" variation of the "Middle Stone Age" (Oakley, '54), though Sampson ('74) suggests that the available artifact sample is too small to permit any useful discussion of cultural affinities.

The Florisbad fossil remains consist of a frontal bone, parts of both parietals, and the incomplete right side of a face. No teeth are left in the maxillary fragment, but a human molar was also recovered from the deposits and can presumably be assigned to the same individual. The several parts were reconstructed by Dreyer ('35), who noted the "primitive" appearance of the specimen, particularly the great width and relative flatness of the frontal. Dreyer provided his discovery with a new name, *Homo (Africanthropus) helmei*, but emphasized its proximity to modern humans, particularly the Bushmen. In a later paper, Dreyer's ('47) views on this point are clear, and he assigns Florisbad the role of Bushman ancestor. Shortly after these initial reports were published, a second rather different interpretation was advanced by Drennan in Cape Town. Noting pronounced degrees of supraorbital projection and post-orbital constriction, as well as "primitive" aspects of brain morphology supposedly revealed by an endocast, Drennan ('37) argued a case for African Neanderthal status. Middle Stone Age cultural associations as well as numerous

skeletal features were said to point toward the Mousterian and Neanderthals of Europe, while ties with modern man were seen as distant.

Generally, some version of Dreyer's view has prevailed in the more recent literature, though his species designation has long since gone out of circulation. Analysis of non-metric features of the skull convinced Galloway ('37) that Florisbad has more in common with modern Australians than with European Neanderthals, but an ancestral relationship with the "Boskop type" is also mentioned. At the time, this implied at least some resemblance to living Bushmen, who were held by Galloway and others to have evolved from "Boskopoids" via a process of dwarfing or infantilization. Wells ('69) also seems to favor Florisbad as a likely early Bushman or as an undifferentiated ancestor perhaps equally allied with modern Negro Africans. But for Wells ('72) another possibility that this broad and flattened frontal bone is the result of pathology cannot be ruled completely out. Special ties with one or another of the living races are not emphasized by Singer ('58), who has compared Florisbad with the remains from Broken Hill and Hopefield (Elandsfontein). Here some agreement with the earlier ('37) opinions of Drennan is expressed, and Singer would certainly link the Free State cranium with the robust Rhodesian group of fossils, which he terms African Neanderthals. However, the frontal region is described as higher and more rounded, and Florisbad is therefore classed as more modern in overall appearance.

That there is a division of opinion concerning the archaeological and biological significance of Florisbad is thus apparent. The cranium has been viewed as essentially modern anatomically, at least in facial aspect, and Bushman features have been unhesitatingly identified. Alternatively, the remains are said to be archaic, more like those of Rhodesian man, or even pathological. Apart from the fragmentary nature of the actual fossils, several factors contributing to this confusion may be listed. One is the sort of theoretical approach that has usually been taken to the material, a view which emphasizes individual differences at the expense of population thinking. Another related problem is the lack of recent attention to the original specimen. This is all the more serious because of the dubious accuracy of Dreyer's early reconstruction, casts of which have been widely dis-

tributed. There has been dissatisfaction particularly with the reconstructed facial parts, and this has surely hindered measurement. Finally, an uncertain provenance for the fossils and lingering doubt as to the reliability of radiocarbon dates for the Florisbad peat layers have fostered speculation about the correct age of the material. Coon ('63) for example, argues that the cranium may be only 7,000 to 9,000 years old, though an early Upper Pleistocene date is more likely. Recent efforts to obtain radiocarbon and/or racemisation ages directly from Florisbad as well as other southern African bone specimens have not settled this issue.

The present report seeks to shed light on these questions by means of fresh work on the original fossils. The Florisbad remains have now been restudied and measured as part of a comparative survey of many sub-Saharan African later Pleistocene hominids, including those from Broken Hill, Hopefield, the Omo and some from Klasies River Mouth. The frontal and separate facial bones are available in the National Museum, Bloemfontein, and a new set of casts kindly provided by the museum has allowed further reconstructive work to be carried out in Cape Town during 1975-76. Results suggest that neither Florisbad nor other archaic Africans are much like the Neanderthals of Europe and also that the Free State individual is far from fully modern in morphology.

COMPARISONS WITH OTHER AFRICAN REMAINS

The Florisbad fossils include a frontal which is nearly complete, though the left supraorbital portion is missing. Glabella is intact, and the right side of the bone is undamaged (fig. 1). Posteriorly, bregma is present, and parts of both parietals are preserved near the midline. A damaged right zygomatic bone is also available, though there is no good contact either with the frontal or with the remaining fragment of maxillary frontal process from the right side. The upper portions of both nasal bones were recovered but later sent to the British Museum for dating, and casts have since been substituted. Fortunately these nasal and maxillary pieces can be fitted to the frontal with some accuracy, but there is no join with the broken maxillary alveolar process, which includes the floor of the nasal cavity. Proper positioning of the nasal floor and palate is thus difficult, and there is no certain-



Fig. 1 Views of Florisbad cranial remains. The frontal (above) is shown without accompanying parietal pieces. The face (below) includes frontal, nasal and maxillary parts. Separate zygomatic and palatal fragments are not pictured.

ty about the original contour of the wall below the orbit. Plaster from Dreyer's earlier reconstruction still adheres to several facial bones, and this also hampers attempts to realign the pieces.

More information can be obtained from the new set of Florisbad casts, all of which have been checked against the original specimens in Bloemfontein. These casts have been set in modelling clay so as to produce a reconstruction which can be modified without subjecting the actual fossils to further stress or damage. Here there has been no attempt to create an entire face or to reproduce more of the orbital and nasal architecture than can confidently be filled in between adjacent bony parts. Even so, there is room for experiment, particularly in the positioning of the zygomatic bone and palate, as suggested earlier.

This face differs modestly from that fashioned by Dreyer, and orbit shape is affected most. This is now a little wider and definitely higher than before, and outward flare of the lateral border is reduced. The way in which this "malar flange" projected outward and back "almost as in baboons" had been noted as peculiar by Dreyer ('35) and also by Drennan, and both saw an approximation to this condition in certain Bushman crania. Depth and angularity of the canine fossa is also a striking feature of the earlier reconstruction, but the infraorbital region exhibits only shallow hollowing in the present work. When the palatal fragment is fitted onto the new face, subnasal prognathism is also less noticeable, and the long protruding maxillary alveolar process which characterizes older Florisbad casts is surely overdone.

Using this reconstruction together with the individual craniofacial fossil parts, the position of Florisbad with respect to other sub-Saharan hominids may now be re-examined. The remains from Broken Hill and Hopefield are frequently mentioned in discussions of the Free State material, as these also were recovered in the southern part of Africa. The two crania are similar, and both seem to represent populations of archaic *Homo sapiens* sampled in the earliest Upper Pleistocene or more probably from late Middle Pleistocene deposits, if current ideas of dating are correct (Butzer, '73; Klein, '73). These fossils are usually linked broadly with Neanderthals, though in fact they exhibit features which set them well apart from the archaic men of Europe (Howells, '74; Rightmire, '76). Orien-

tation of the Florisbad frontal for comparison with Broken Hill presents some difficulty, but Singer ('58) rightly states that the Free State profile is slightly higher and hence more modern in appearance. Frontal chord length is the same in these two specimens (slightly less in Hopefield), but the Florisbad bone is substantially broader. Despite this exceptional breadth and a more domed look, Florisbad still resembles the archaic hominids in frontal morphology, especially in the supraorbital region. Brow ridges are well developed, and overall shape of the torus is similar to that of Broken Hill or Hopefield even if the bone is not as thick.

In breadth across the orbits, the Florisbad face must be nearly a match for Broken Hill, and it is unfortunate that facial height cannot also be measured on the reconstruction. The Florisbad orbit is a little lower and wider, but differences are not marked. More contrast is provided by the form of the zygomatic itself, which suggests some hollowing of the wall below the orbit and therefore some difference from the Broken Hill face, which lacks a canine fossa altogether. Along with the higher frontal profile, this hollowing may be counted as a less archaic feature.

The Omo remains from Ethiopia are also available for comparison but neither of the more complete specimens possesses a face, and the occipital parts that are preserved have no counterpart in Florisbad. Omo I and II appear on geological evidence to be contemporary with one another and perhaps as much as 130,000 years in age (Butzer et al., '69), though Omo I has been described as more modern anatomically (Day, '69). The Omo I frontal consists of two large fragments, one of which includes glabella and a little of the supraorbital torus on either side. These principal pieces do not seem quite to fit together, though there cannot be much separation between them, and there is no join to the parietal vault behind. Two smaller bits of supraorbital rim from opposite sides suggest that the torus is not massively developed and apparently comparable to that of Omo II.

The frontal portion of Omo II is complete posteriorly, though there has been some surface erosion of the bone. Glabella has been broken away as has all of the right side above the orbit. This bone is broader than those of Broken Hill or Hopefield and quite flat, despite some keeling in the midline. Certainly there is some likeness of both (?) Omo speci-

mens to Florisbad, which exceeds even Omo II in frontal breadth, and torus size must be roughly the same in all three individuals, given the limited evidence available. But the Florisbad forehead is not so flat, and there is substantial outcurving of the anterior temporal lines to accompany a lateral extension of the torus. This accentuates temporal fossa depth (post-orbital constriction) and together with other details of torus *form* provides rather more resemblance to the archaic hominid from Broken Hill.

Remains from Klasies River Mouth are unfortunately still less complete than the Omo skulls, though there is increasingly strong evidence for their antiquity. These materials have been recovered from a series of caves on the southern Cape coast, where they are firmly associated with a lengthy Middle Stone Age occupation (Wymer and Singer, '72). Available geological and faunal evidence suggests that the earlier part of the Klasies River sequence was deposited in Last Interglacial times (Klein, '74), and this is in accord with racemisation dates recently reported for bone sampled at several Middle Stone Age levels in cave 1 (Bada and Deems, '75). Most of the human skeletal material is also from this cave, where it may be 70,000 to 120,000 years old or more (Butzer, in preparation).

Although the Klasies hominids have not yet been described, a preliminary note indicates that there is substantial variation in the morphology of the dental mandibular remains. At least one mandible is said to show "primitive" features, whereas another is characterized as gracile with small teeth, and these differences may denote the presence of two populations (Singer and Smith, '69). Additional cranial and a very few postcranial fragments have been recovered, and presumably this issue will be pursued in the forthcoming site report (Singer and Wymer, in preparation). At present only brief comments on those Klasies fragments which can be compared directly with the Florisbad fossils are in order.

Two specimens housed in the South African Museum are of special interest. One is a piece of frontal bone on which glabella and part of the right orbital margin are preserved and to which the upper ends of both nasal bones are still attached. Supraorbital development is slight, and the nasal root is broad and flat, as in the crania of many modern Africans. In the Free State face, glabella is projecting and the torus is heavy in comparison with the lightly

built Klasies structure. This difference in robusticity is striking.

A zygomatic bone which, like the frontal, is associated with the earlier part of the Middle Stone Age sequence (MSA II of Singer and Wymer, in preparation) is also modern in appearance. This specimen is broken along its border with the maxilla, and most of the temporal process is missing, so that comparison with the Florisbad bone is difficult. The Klasies fragment, which is large in modern terms, seems relatively less robust, and probably the surface of the cheek is flatter than in the heavier Florisbad individual. Real differences are small, however, and neither specimen suggests recognizably archaic morphology in this part of the facial skeleton.

Such limited observations indicate that in frontal form at least, Florisbad is appreciably less modern than the hominids from Klasies River Mouth. This is surprising, given the dates for cave 1 but fits with what has already been said concerning resemblances to Broken Hill and Hopefield. In other respects, the Free State fossils are not so easily distinguished from the Klasies material and recent *Homo sapiens*. But even if Florisbad is less archaic than the earlier (Middle Pleistocene?) hominids, it is not noticeably Bushman-like, and there is no evidence to support special ties with any one group of living Africans.

MEASUREMENTS AND STATISTICAL ANALYSIS

Anatomical study provides a general impression of how the Florisbad cranium may relate to other recent and archaic men, but comparative treatment would be incomplete without recourse to measurement. Although the specimen is fragmentary, eleven dimensions registering frontal curvature and breadth, supraorbital development, orbit size, malar height and projection of the nasal root can be obtained from the fossils when these are reconstructed to form a partial face. Measurements were first taken on the original material in the National Museum and later checked on a more complete reconstruction done with casts in Cape Town.

These measurements were also recorded for Broken Hill, and both fossils can be compared with samples of modern African crania in a multivariate statistical approach which utilizes all of the dimensions simultaneously (table 1). In particular, multiple discriminant analysis can be employed to construct a framework maximizing between-group sep-

TABLE 1

Eleven measurements for Florisbad and Broken Hill used in multiple discriminant analysis. Means for eight groups of recent African crania are included for comparison

Measurement	Florisbad	Broken Hill	Bushman male	Bushman female	Zulu male	Zulu female	Rwanda male	Rwanda female	Egypt male	Egypt female
3. Supraorbital projection	10	16	6.72	5.52	6.20	5.56	6.10	5.20	6.65	5.37
9. Max. frontal breadth	132	118	109.90	106.41	115.32	114.37	112.97	110.66	115.92	111.90
18. Biorbital chord	124	125	97.86	93.52	101.87	98.37	99.77	96.20	97.22	92.37
19. Nasion subtense	21?	26	16.36	15.52	17.57	15.68	17.90	17.66	19.12	17.95
20. Nasion angle	19?	23	18.22	18.17	19.00	17.53	19.67	20.13	21.40	21.22
23. Malar height	24	29	19.45	17.05	19.85	18.56	19.37	17.60	21.15	18.97
24. Frontal sag. chord	120	120	110.54	105.47	112.35	110.56	110.37	106.13	112.00	107.25
25. Frontal subtense	23	21	29.36	29.41	27.72	28.34	27.70	27.06	25.52	25.17
26. Frontal angle	23	18	31.09	33.11	30.17	30.87	30.32	30.73	26.97	27.60
30. Orbit breadth	51	48	39.40	37.70	38.97	39.03	39.95	38.26	38.87	37.72
31. Orbit height	36	38	31.18	31.41	33.55	33.53	34.67	33.33	33.12	33.07

Measurements are in mm. or degrees. Measurement numbers refer to a complete listing in Rightmire, '75.

aration relative to dispersion within samples representing selected African populations. Here eight modern groups are used, including Bushmen, South African Negroes (Zulu), East African Negroes (Rwanda) and Egyptians, where males and females are treated separately. These materials are drawn from earlier studies (Rightmire, '70, '75), wherein particulars of sample size and source, measurement definitions and discussion of method are set out at length. Another highly useful study is that of Howells ('73), which provides more complete justification for the discriminant approach to analysis of variation in human crania. Where proper care is taken with data collection and when the individuals to be classified do not differ greatly from the specimens included in the initial calculations, there is little doubt that the technique is valuable, even given all of the formal parametric criteria which must theoretically be met in the application of multivariate statistics.

In the present study, discriminant analysis is employed to assess relationships of Florisbad and Broken Hill to each other and to modern Africans. Both fossil faces are in fact different from those of extant *Homo sapiens*, and there is not much likelihood of squeezing either into any of the test populations. From the outset, simple assignment is not wholly the purpose of the exercise, and it is rather the behavior of the fossils in the discriminant space which is of interest. If the functions themselves do what is expected of them, by outlining the important directions of between-group variation as a set of coordinate axes, susceptible to interpretation, then the position of a fossil on these axes should also be interpretable, even if the individual lies outside

of the groups on which the analysis is based. The approach can be abused of course, and Corruccini ('75) and Oxnard ('72) have recently pointed out a number of difficulties which can crop up, especially where diverse test materials (e.g. different primate genera) are handled uncritically. Corruccini suggests that simpler numerical treatment is preferable to multivariate analysis in many instances. But choice of technique must ultimately depend on the nature of one's data and the questions asked of it; where measurements are complete for all individuals, sample size is adequate, and the populations being compared are all closely related (members of one species), then multivariate methods can yield much useful information.

Application of multiple discriminant analysis yields seven axes, each a linear compound of the eleven original measurements. These functions are successively less important, however, and the first five actually account for slightly more than 99% of total group separation. Within this five-dimensional framework, individual crania are assigned to the correct group in approximately 67% of cases, while 80 of the 246 specimens are misassigned to some group other than their own. The correct assignments increase to 78% with only 54 mistakes if simple errors of sex are discounted. This suggests that the functions are biologically reasonable, to the extent that Bushman, Negro and Egyptian differences are specified even with the restricted frontal and facial information available.

Group centroids on the first two axes, together contributing about 76.5% of total discrimination, are shown in figure 2. Function I opposes the Egyptians of both sexes at one end

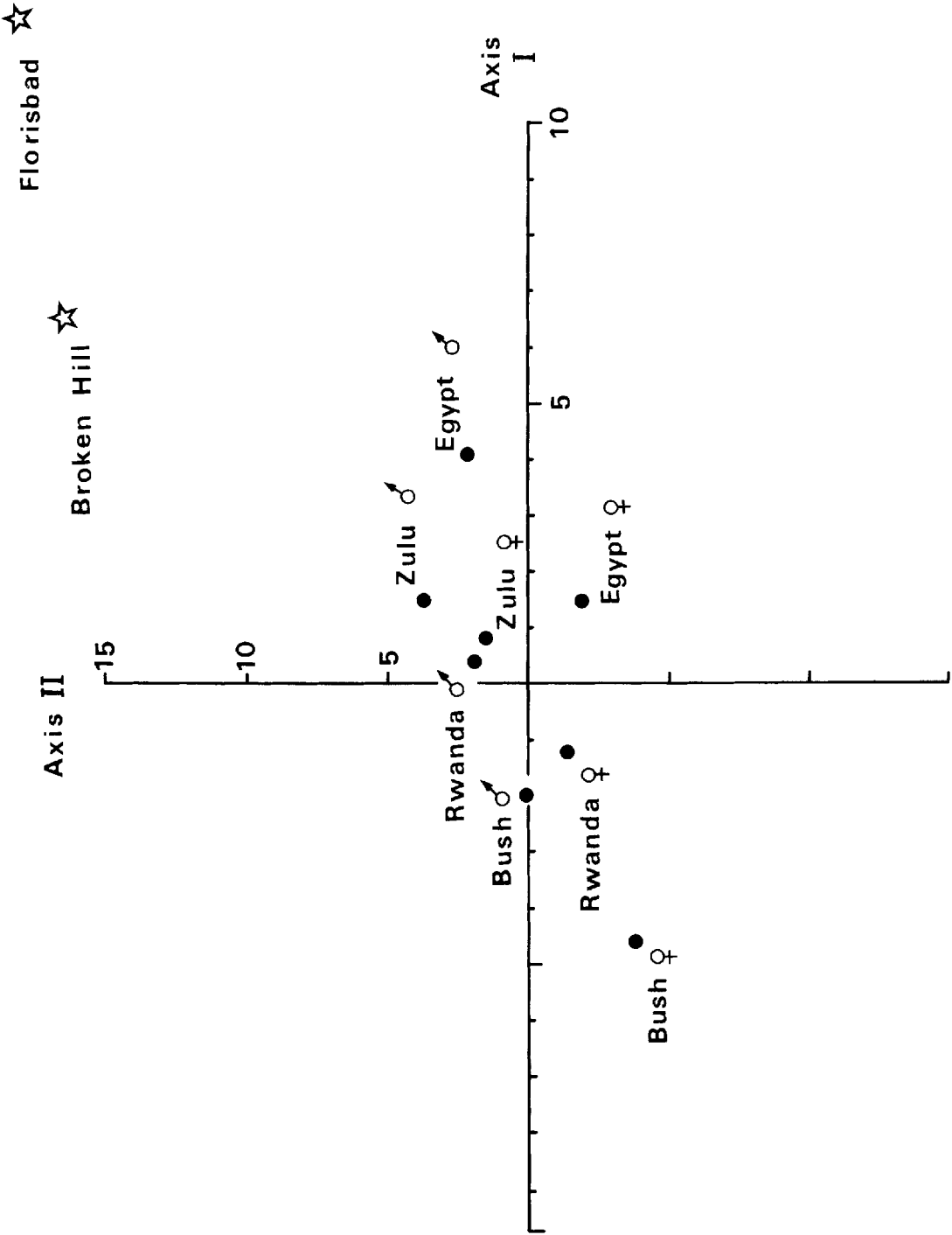


Fig. 2 Centroids for eight groups of recent Africans plotted on the first two discriminant functions computed from eleven cranial measurements. The positions of Broken Hill and Florisbad are also indicated, and both fossils are in fact beyond the expected (0.01) limits of all modern distributions.

of the scale to Bushmen at the other, while the South and East African Negroes are roughly intermediate. Separation particularly of Egyptians from the sub-Saharan Africans is not so clear as in another analysis, employing up to 34 measurements on the same materials (Rightmire, '75). But ordering of the groups on the function is otherwise similar, and this also holds for axis II. This second function was identified as primarily a sex discriminant in the larger study, and that interpretation seems to apply here as well. Male crania from all populations receive consistently higher scores than females, though there is no further clarification of relationships between Bushmen and Negroes, and no separation of Egyptians from these other Africans.

Positions of the fossils on these two axes are also indicated in the figure, and it is obvious that both Florisbad and Broken Hill lie well away from all of the extant populations studied. This is confirmed by values of chi-square relating each fossil to each group, as both hominids are in fact excluded from membership in even their closest neighbors' distribution at probabilities exceeding 0.99. For Broken Hill, this result is not unexpected, as the skull exhibits numerous features differentiating it from modern humans. But Florisbad has been claimed as more sapient, even Bushman-like in certain traits, so its distance from all centroids is worth noting. This individual is more remote on function I than even Broken Hill, and this hardly suggests ties with Bushmen, which are antipodal. At least some of this separation must depend on maximum frontal breadth, which is a large measurement for Florisbad and which also contributes heavily to discrimination on this axis. On function II, the Free State frontal is again extreme, and other variables such as frontal chord and subtense seem here to be important. So Florisbad differs from the modern crania in these respects also, and its position in the plane of axes I and II is not due to size alone.

Relationships of the fossils are not determined solely by these first functions, as of course the other higher dimensions may also provide information, even if these have marginal statistical significance. In order to display the positions of the test groups for five rather than only two axes, mean scores can be combined in a sine cosine function which is then plotted as a separate curve for each population (Andrews, '72). This method preserves distances, so that centroids which are close to

one another in the discriminant space will appear as closely grouped curves, while outlying points will correspond to more distant configurations. The concept of variance is also maintained, and tests of significance of difference between the plots can be constructed.

Figure 3 shows that the curves for modern Africans lie together, and this reflects comparability of scores for all groups on the remaining discriminant axes. As expected, most of the separation between Bushmen, Negroes and Egyptians is accomplished by the first, most important functions (fig. 2), while dispersion in the higher dimensions is slight. The curve for Broken Hill has a similar shape but lies mainly outside of the envelope of plots representing recent humans. Distinctiveness of the fossil is apparent, and in fact the scores which Broken Hill receives on the later discriminants do differ widely from the modern means.

Florisbad does not behave in quite this fashion, and the curve follows a separate path, parallel with but apart from the living Africans over much of the plotted range. This suggests that figure 2 may be misleading, to the extent that the extreme positions which the fossil takes on axes I and II do not recur for the remaining functions of the battery. However, for the higher positive values of t , Florisbad departs abruptly from modern company, and the plot lies well beyond Broken Hill rather than in an intermediate position. Precise translation of these graphic relationships into biological terms is difficult, and the entire analysis is of course limited by the original measurements, which relate to part of the cranium only. But when all (5) discriminant axes are considered, the Florisbad face is at best roughly intermediate between archaic man and recent *Homo sapiens*. There is evidence particularly from the first two functions that the fossil differs substantially from modern African specimens, even if it is not so extreme as Broken Hill.

IMPLICATIONS FOR POPULATION SUCCESSION IN THE LATER PLEISTOCENE

Statistical and comparative anatomical results can all be read to favour firmer links for Florisbad with the archaic hominids of sub-Saharan Africa. A general resemblance to Rhodesian man in frontal form and torus development is supported by the measurements,

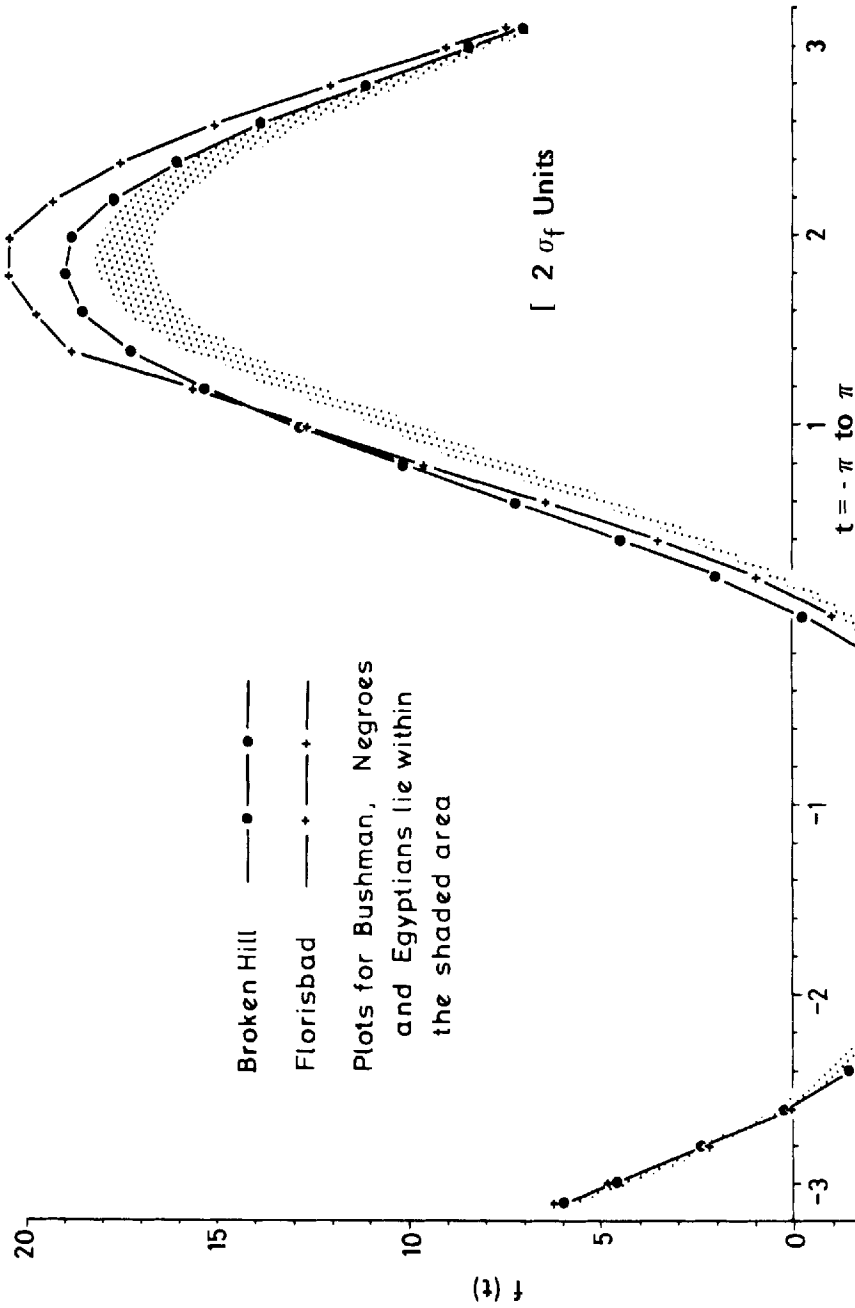


Fig. 3 Plots displaying the positions of Broken Hill, Florisbad and modern Africans on the first five discriminants computed from eleven cranial measurements. Mean scores (x_1, \dots, x_5) for each group are entered into the function $f(t) = x_1/\sqrt{2} + x_2 \sin t + x_3 \cos t + x_4 \sin 2t + x_5 \cos 2t$ which is evaluated over the range $t = -\pi$ to $+\pi$. Results indicate that the curve for Broken Hill follows a separate course throughout this range, while Florisbad occupies an extreme position only for the higher, positive t values.

which suggest that both fossils are emphatically different from recent Africans, including Bushmen. Unfortunately the Omo remains are too incomplete to be entered into the statistical analysis, though in frontal width and certain other features the Florisbad morphology does seem to point (less strongly?) in this direction also. Only in the infraorbital region, which is difficult to reconstruct and measure, is there any solid indication of more modern form, and some hollowing of the maxillary wall does contrast with the flatter cheek of Broken Hill. The Klasies River zygomatic bone is a little smaller but otherwise not dissimilar to Florisbad's, while the Klasies frontal fragment exhibits features which are less robust than those of the other Pleistocene materials examined.

To a degree, these are new findings, which bear on the question of population succession in the southern part of Africa. The Florisbad fossils have not received a lot of attention in the recent literature, but where they are discussed, an impression of anatomically modern status is usually conveyed. Dreyer's attempts to tie the cranium into the ancestry of the Bushmen may be viewed as extreme (except by Coon), though Florisbad is always considered to share more features with *Homo sapiens sapiens* than with the likes of Broken Hill. Cultural evidence has also been cited, for example by Sampson ('74), who places Florisbad in the center of a proposed focus of the "Pietersburg Complex" south of the Limpopo basin. This "blade and burin" technology is said to differ from the preceding Acheulian, which may have persisted along the Cape coast and also (as the Sangoan) in the northern woodland-savannah zone of Rhodesia and Zambia. If Florisbad is associated with the Pietersburg, and if Broken Hill and Hopefield are linked with the Acheulian and related industries, then it is tempting to suggest replacement of the more archaic hominids with Acheulian tools by new populations of blade-using *Homo sapiens*.

This obvious parallel with Europe and the Neanderthals is misleading, however. It is now apparent that the archaic men of the sub-Saharan are not simply African Neanderthals, despite the presence of large brow ridges on a flattened vault (Rightmire, '76). The African fossils are also older, probably late Middle Pleistocene in age, so they cannot easily be grouped with European specimens in a Nean-

derthal grade or stage postulated for Last Glacial times. The dating and cultural associations of Florisbad are far from firm, and Sampson himself points out that Pietersburg (or other Middle Stone Age) ties cannot really be established from the crude stone work available. Finally, biometric evidence indicates that any casual appraisal of the cranium as anatomically modern may be in error.

Dating is especially important, if the relationships of Florisbad to other African remains are to be clarified. The human bones were recovered from a small spring eye which had penetrated the first peat layer (peat I) at the site before being sealed by deposits of hard green sand (Dreyer, '38). Presumably the fossils are therefore roughly contemporary with this first peat layer and certainly older than the next (peat II) level which overlies the sand. Because of contamination problems, radiocarbon determinations done on these peat deposits have been viewed with skepticism, though there is little doubt that peat I at least is too old to be dated accurately. Minimum ages for this level range from >35,000 BP (L-271B) to >48,900 BP (GrN-4208), while peat II is younger at 28,450 BP (L-271C). A more recent attempt to date bone from the Florisbad deposits has been reported by Protsch ('73), who gives $38,680 \pm 2,000$ BP (UCLA-1745B) as the age for a hippopotamus mandible. The stratigraphic provenance for this bone is unknown, though Protsch claims contemporaneity with the hominid on the basis of nitrogen and fluorine microanalysis.

These results point toward a mid-Upper Pleistocene date for the Florisbad assemblage, which should then be quite a lot younger than the remains at Hopefield and Broken Hill. If this is correct, then the Florisbad fossil can be viewed as a more modern descendant of the archaic Acheulian populations of the same region, as suggested *inter alia* by Howells ('74). There is no need to speculate about replacement of Neanderthal-like peoples by contemporary groups of culturally and physically distinct *Homo sapiens sapiens*.

However, this interpretation still assumes Florisbad to be essentially modern, and this is not strictly correct. The present evidence seems to align the fossil most closely with Broken Hill or possibly with archaic East Africans, and in fact there is support for this in the form of fresh dates. J. C. Vogel (personal communication) has extracted new samples

from the higher peat layers at Florisbad, and his preliminary results conflict with the earlier radiocarbon determinations, most of which were processed before 1960. Peat II now gives an age of >42,600 BP (Pta-1108), and the human remains must surely be older than this, even if they are not contemporary with peat I, which has always been questionable. A more precise date for the fossils cannot be given, but most probably they exceed the Klasies hominids in age. This order of antiquity should not be surprising in light of the more robust features of Florisbad, which set it apart from the few Klasies fragments available.

All of this places Florisbad more squarely in a lineage also containing the archaic hominids of southern Africa. These are among the most ancient representatives of *Homo sapiens*, if a Middle Pleistocene age is accepted for Broken Hill and Hopefield. It is tempting to suggest that these archaic humans evolved in southern Africa, perhaps well before unequivocally sapient populations appear in North Africa or elsewhere in the Old World. This region presumably contained peripheral groups of *Homo erectus* in the Middle Pleistocene, and it is in just such a setting (an isolated part of the parent species' geographic range) that *Homo sapiens rhodesiensis* might emerge, giving the tenants of the allopatric speciation theory (Eldredge and Gould, '72). Seen in this light, the Florisbad cranium may document some further evolutionary change in the South, while the Omo fossils are sampled after entry of the archaic stock into East Africa, prior to the onset of the Upper Pleistocene. As does Florisbad, the Omo skulls (especially Omo I) display a few traits which are not matched in earlier *Homo sapiens rhodesiensis* materials, but there is broad resemblance among all of the later Pleistocene specimens. More specific phylogenetic hypotheses concerning these earlier African populations cannot be tested with the evidence available.

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