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Churchill *et al.* (1996) have recently described the proximal ulna from Middle Stone Age levels at Klasies River, South Africa, reconstructing its length and assessing its affinities on the basis of a canonical variates analysis (CVA), using three samples: (1) ‘archaic humans’, meaning the specimens commonly termed Neanderthals (both European and Middle Eastern), plus the Middle Pleistocene Baringo specimen; (2) ‘modern humans’, including Latest Pleistocene Jebel Sahaba, European Upper Palaeolithic, and Skhul and Qafzeh; and (3) the Klasies specimen, entered as a separate sample. They conclude that Klasies is much closer to ‘archaic humans’ than to ‘modern humans’, but that a few modern ulnae, especially from the ‘San’ (=Bushman) and Jebel Sahaba samples, fall at least as close to the ‘archaics’ as does the Klasies specimen. They consider it potentially significant that it is these groups, from foraging populations, that may show ‘archaic’ patterns.

one could then test whether some of them really were Klasies-like. As it is, the Bushman sample consists of just seven individuals, so separate entry would hardly have been feasible.

Principal components analysis (PCA) is a method of multivariate discrimination allied to CVA, but without allocating specimens to samples. Churchill *et al.* (1996; Table 4) give the mean values for the various groups which they combine into ‘modern’ and ‘archaic’ samples. If we are prepared to assume that the single specimens from Klasies or Baringo are fairly average examples of the populations from which they are drawn, and that four Australians and four Skhul/Qafzeh are nearly as likely to be representative of their respective populations as are 100 Black Americans, and if we are interested in comparing interrelationships between samples without worrying whether the samples overlap or by how much, we can take the mean values from such a Table and use them as the units of analysis. I have run a PCA on these data, using MVARch (Multivariate Analysis in Archaeology), copyright R. V. S. Wright (University of Sydney).

Three components were significant. As is usual in PCA, component 1 largely represents size: all the loadings are positive, though of varying weights; it accounts for 69.7% of the total variation. Only components 2 (13.6%) and 3 (11.0%) are therefore illustrated here. Figure 1 shows these two components plotted. Klasies, Neanderthal and Baringo are grouped in the top left of the diagram. Most other samples

<sup>1</sup>According to Prof. Richard Lee (Seminar at A.N.U. 1994), ‘San’ is a derogatory name; ‘Bushman’ is the preferred self-identification for the !Kung and allied people, at least in Botswana.

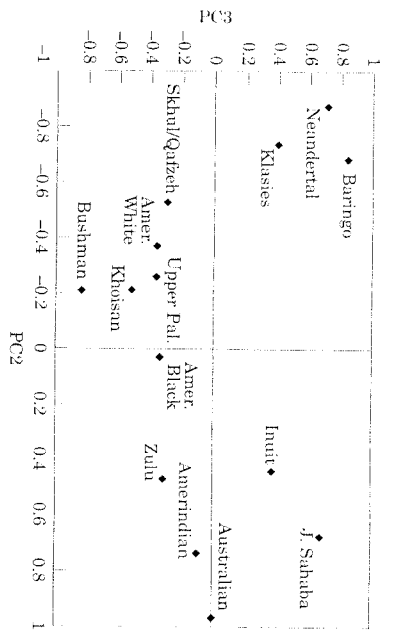


Figure 1. Principal components 2 (horizontal) and 3 (vertical), calculated from data in Churchill *et al.* (1996, Table 4).

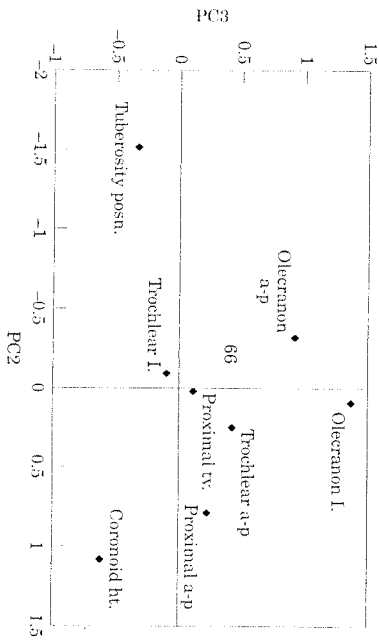


Figure 2. Variable loadings on Principal Components 2 (horizontal) and 3 (vertical).

tend to group geographically: European; Khoisan and Bushman (the Khoisan sample presumably includes some Bushman individuals); and Zulu and Black American. We may note that the Bushman fall well away from the 'archaics'.

Figure 2 shows the original variables plotted as they load on the principal components; the cross at the centre separates positive (above and right) from negative (below and left) loadings. The two figures can be laid over one another to show which

variables contribute most to the position of which OTU. The samples high on component 2 emphasize coronoid height and proximal anteroposterior diameter; those low on that component emphasize tuberosity position. The samples high on component 3 (mainly the archaics, together with Jebel Sahaba and the Inuit) emphasize length and anteroposterior diameter of olecranon.

A functional explanation for the results is elusive, but it is interesting to try to fit an

evolutionary model on to Figure 1. Archaic morphology is at top left, and modern Baringo-like position. A corollary of this would be that Skhul and Qafzeh would be seen not as generalized *Homo sapiens* but as Caucasoids. The parsimony of such a model cannot be taken for granted, however; note especially that the position of Jebel Sahaba

#### References

- Churchill, S. E., Pearson, O. M., Grine, F. E., Trinkaus, E. & Holliday, T. W. (1996). Morphological affinities of the proximal ulna from Klasies River main site: archaic or modern? *J. hum. Evol.* 31, 213–237.