## NEWS AND VIEWS

# A Current Trend in Palaeoanthropology

TRENDS exist in many evolutionary lineages and just as these trends are never in straight, undeviating lines so too the trends in scientific thinking tend to travel a winding and sometimes circuitous route. One of the major trends today in palaeoanthropology, the study of fossil man, has been a decline in basically subjective typological reasoning and a move towards the use of more objective, comprehensive and, increasingly, statistical methods. The former method involves a feature by feature examination, often deeply involved with anatomical minutiae but just as often missing the larger morphological complexes; in other words, not seeing the beach for the sand. The latter method recognizes the analytical importance of trait complexes.

Le Gros Clark, one of the first to recognize the importance of the trait complex in this field of study, used the term "total morphological pattern" to describe the most significant morphological features characteristic of each major grade or group of fossil human populations; this approach has recently been increasingly quantified in various types of multivariate analyses. The implicit concept in the total morphological pattern is that the characteristic occurrence of trait syndromes should form the basic unit of study; discrete traits are not important as analytical units. Because of the fragmentary condition of most fossil remains the scope of the trait complex approach is of course limited; in most cases it is confined to the size and morphology of the cranial bones and teeth.

The continuing move away from the trait as the unit of study towards the trait complex has carried with it the necessity of multivariate analyses assisted by computer. The computer, already a basic tool in many fields, is now coming of age in several anthropological disciplines. Stone tools, ceramic potsherds, linguistic components, primate locomotion and even Neanderthal burial patterns are all recent computer fuel. In the field of physical anthropology the study of living groups has long been moving away from typological classifications and forming, in the process, the various mathematical models of population genetics. The statistical concepts of population genetics have much to offer the palaeoanthropologist. Primarily it allows him to consider his sample, however small, as part of a larger population, and to make the population, not the individual, the unit of study. That populations, not individuals, are the evolving units has been suggested by Mayr, Simpson, Dobzhansky and others. It is only with this kind of approach that typological thinking is avoided and a perspective more in line with modern evolutionary biology can be substituted. This wider view of a fossil specimen has perhaps been instrumental in the decline of the phylogenetic "tree" so treasured by an earlier generation of anthropologists. Today it is difficult to imagine *Homo erectus* evolving, as Carleton Coon once did, five different times in five different places into *Homo sapiens*. The current view involving a synthesis of thought from a number of fields visualizes *Homo erectus* as a widespread Old World group, interbreeding, migrating and slowly developing the genetic components of *sapiens* from those of *erectus*.

Although much work needs to be done in quantitatively expressing trait complexes and in describing their taxonomic implications some useful work has already been done in this direction. One of the first studies involving the description and analysis of a fossil hominid specimen using a multivariate technique was made by Weiner and Campbell on the Swanscombe cranial fragments (in *The Swanscombe Skull Report*, Occasional Paper No. 20, Royal Anthropological Institute, London; 1964). These remains, from a Thames River Valley deposit dated to about 250,000 BP, consist of an occiput and both parietals. They were subjected to a $D^2$ analysis based on seventeen measurements. The $D^2$ statistic, frequently used on living populations, is theoretically a measure of biological distance and evaluates the amount of morphological divergence between groups. Although Swanscombe had long been considered closely affiliated with modern *Homo sapiens* the multivariate analysis indicated a closer resemblance to the neanderthaloids. Other recent work has involved the quantification of the functional capabilities of a fossil specimen, and it is to be expected that clearer data about the functional nature of trait complexes will be of considerable importance in the definition of valid and useful taxonomic criteria.

As stated earlier, trends, both philosophical and evolutionary, seldom demonstrate strict orthogenetic tendencies. Although the trend in fossil man studies is clearly toward trait complex multivariate techniques, acceptance of this approach has been neither overwhelming nor entirely satisfactory. Admittedly some useful work has been done, but as with new methods in any field, problems are becoming apparent. In some cases statistical methods and theory have been accepted and applied too uncritically by workers schooled primarily in other disciplines. Also a curious sort of *deja vu* occasionally appears when a worker applies statistical methods to univariate or typological data.

Obviously all fossil material cannot usefully be submitted to a comprehensive statistical analysis; very fragmentary, severely eroded or pathological specimens should obviously be excluded. But most material can reveal more useful information through a multivariate examination than through more cursory methods. The "*Telanthropus*" remains discussed recently by Wolpoff (*Nature*, **230**, 398; 1971) are a case in point. The early man site at Swartkrans in South Africa had yielded only specimens of the robust type of australopithecine until the smaller hominid referred to as "*Telanthropus*" was found in the late 1940s. Although this taxon is now sunk, a widely accepted nomen has not replaced it. Modern man is highly polymorphic and there is every evidence that early man is at least as variable. Until reasonable levels of statistical confidence can be established regarding expected ranges of variability in early man, taxonomic dilettantism such as that surrounding "*Telanthropus*" will remain meaningless. Possibly the question of the taxonomic affiliation of this hominid and other controversial remains could be removed from the realm of erudite speculation with the more sophisticated analytical techniques increasingly available to the palaeoanthropologist.