



## Dynamic from Day One

Our direct ancestors had the most variable physical features of all the hominids that lived in the last 1.8 million years.

200,000 years ago, the first ‘anatomically modern man’ appeared in Africa. From there he spread in the Late Pleistocene era to Asia and Europe. According to an established scenario, this is supposed to have happened in one wave of mass migration which generated the multitude of human races still found across the various continents.

A team of scientists, headed by Austrian anthropologist Gerhard Weber from the University of Vienna, has now shown that the diversity in statures must have been generated much earlier in the African continent itself. They reached this conclusion after comparing the fossils of skulls of the early modern man with the present-day men, the Neanderthals, the *Homo erectus* group and others.

Clearly, the highest variability

in skull form is seen in the early modern man—in the continent of Africa itself. Besides this, almost every one of the early skulls is comparable to another present day populace living in different geographical regions. In the case of Neanderthals and other archaic groups whose skulls are flatter, longer and with prominent brow ridges, there was no such concordance.

Overall, these findings show that there was not just one exodus out of Africa. On the contrary, there may have been several, overlapping waves of migration. According to Weber, “early modern man lived in Africa in several population groups, at times isolated from each other, before they migrated to Eurasia and possibly even returned. The pattern of distribution was far more dynamic than earlier assumed because the radius of

activity of early modern man was greater than their archaic predecessors. Incidentally, we think it is likely that they took more than one route, perhaps even the one via the Straits of Gibraltar.”

In its research, the team has employed virtual reconstruction techniques for the partially fragmented skull fossils. In addition to this, complex mathematical methods were used in order to compare around 500 measuring points of each of the 203 skulls on the computer.

“Such complex analyses are only possible by a numerical method,” says Phillip Gunz, one of the researchers who carried out the calculations. There is also another distinct advantage to this methodology: now digital copies of all the skulls are available for further measurements. ■

The form of each skull is compiled with the help of hundreds of measuring points (bottom right in the illustration above) and then compared with the other skulls by using complex algorithms (geometric morphometrics). Each of the over 200 individuals is represented by one of the small balls. The colours symbolise different groups. The diagram shows that the archaic forms like *Homo erectus* (orange) and the Neanderthal (green) are less variable (compare the size of the ellipsoid) than the ‘early modern *Homo sapiens*’ (red, each individual separately marked), ancestors from the Early Paleolithic (blue) and present-day man (light brown). In addition, the archaic and modern groups are separated at a considerable distance from each other.