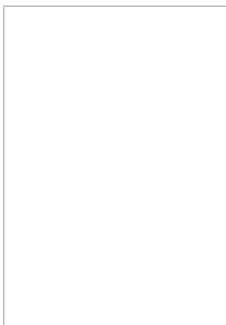
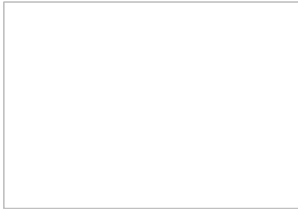


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The Neanderthals: human ancestors or aliens from outer time?



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João Zilhão, Professor in Palaeolithic Archaeology, puts the case for our badly misunderstood cousins.

Almost since their discovery in 1856 Neanderthals have suffered from a bad press, especially in the English-speaking world, where the term entered daily language as a widely used deprecating adjective. Nowadays, such views of Neanderthals as the archetypal cavemen are no longer found in academia; nevertheless, the predominant view still is that they should be construed as a side branch of humanity, a dead-end of evolution, both distinct from and somewhat inferior to sapiens people. Such a prevalence largely arose from the fact that mitochondrial (mt)DNA studies of present populations, coupled with mtDNA data extracted from Neanderthal fossils, have provided much support for the notion that today's humans descended entirely from a second out-of-Africa dispersal of evolved Homo sapiens that took place some time after 60,000 years ago. Upon arriving in Europe, where their earliest fossil representatives are now dated to between 40,000 and 42,000 years ago, the theory continues, these modern humans would have out-competed local populations as a result of being superior in cognition, culture and adaptation; for the Neanderthals extinction would have been swift, leaving no descendants.

Thanks to new insights and new finds during the past decade, this notion of the Neanderthals' fundamental 'otherness' is on the wane. Where the fossil record is concerned, it is now clear that all early European modern humans feature a diverse mix of skeletal features that are either diagnostic of Neanderthals, or that correspond to generically primitive traits that had been lost in the African lineage prior to dispersal into Eurasia. A case in point is the fossils from the Oase cave (Romania), which I excavated and study in collaboration with Erik Trinkaus (Washington University, St. Louis). A skull found there had the same proportions as modern human crania and shared a number of modern human features. However, there were some important differences, which included frontal flattening of the face, a large bone protuberance at the base of the skull and exceptionally large upper molars, all features found principally among Neanderthals.

This evidence suggests that the out-of-Africa expansion of modern humans involved interbreeding with the Neanderthals. Once closer and more intensive contact was established, the small, peripheral gene pool – Neanderthals – underwent assimilation, not extinction. Further support for this theory is found in the fact that in the many lineages of mammals for which fossil or molecular data are available, the minimum amount of time required for complete reproductive separation is some 350,000 generations or, in humans, seven million years. This is at least ten times more than is estimated for the Neanderthal/sapiens split (500,000 years, or 25,000 generations ago) and carries the implication that, at the time of contact in Europe, some 42,000 years ago, interbreeding would have resulted in viable, fertile offspring.

The out-of-Africa expansion of modern humans involved interbreeding with

Neanderthals

Data provided by important genetic studies published in November 2006 are also consistent with this suggestion of interbreeding. One study concluded that a variant of a gene involved in the control of brain size (microcephalin), and now found in 70% of today's humans, was introduced some 37,000 years ago into the sapiens lineage from an archaic lineage – most probably Neanderthals. The second study, from the Max Planck Institute in Germany, announced preliminary results from the Neanderthal genome project, which aims to sequence the entire nuclear DNA from extracts of a Neanderthal bone. Looking at sites in the DNA molecule where we can investigate how often the Neanderthal had the ancestral (that is, the chimpanzee) or the derived (that is, the human) variant, they found the derived one in 30% of cases. Given the estimated time of divergence between Neanderthals and modern humans, the team concluded that such a high percentage implied gene flux between the two lineages, due to interbreeding.

This conclusion is of great significance because the Neanderthal individual sequenced by the German team predates by many millennia the actual dispersal of modern humans into the European continent. The inescapable implication is that, despite geographical isolation and ensuing morphological differentiation, gene flux between Europe and Africa was never completely interrupted and, therefore, biologically, Neanderthals and modern humans must be construed as different populations of a single species, not as different species.

This new fossil and genetic evidence dovetails nicely with the rapidly increasing body of archaeological data showing that, at the time of contact between late European Neanderthals and immigrating modern humans, both lineages had attained comparable levels of cultural achievement. Over the past ten years, working in close partnership with Francesco d'Errico, in Bordeaux, and other French colleagues, I have been able to demonstrate that the Châtelperronian – an archaeological culture with sites extending from the Paris basin in the north to the Spanish Basque country in the south – is an independent Neanderthal development. The significance of this finding resides in the fact that, with its objects of personal ornamentation and decorated bone tools, the Châtelperronian has been widely recognised since the 1960s as the first stage of the artistic and symbolic 'revolution' of the European Upper Palaeolithic period.

At the same time, German colleagues were producing evidence for the sophisticated cognitive and intellectual capabilities of the Neanderthals derived from artefacts related to more mundane subsistence activities. Analysis of two fragments of birch bark pitch used for stone tool hafting recovered at the site of Königsau, on the margins of the Aschersleben paleolake, in Saxony-Anhalt, and directly dated to more than 50,000 years ago, showed that they had been produced through a smouldering process several hours long, that required a strict manufacture protocol: under exclusion of oxygen, and at tightly controlled temperatures (between 340 and 400°C). These items document the manufacture by Neanderthals of the first artificial raw material known in human history, a feat of chemistry that experimental archaeologists have so far been unable to replicate using Palaeolithic technology alone. Last year, the same kind of pitch was reported from a site in Italy dating to more than 120,000 years ago, giving extended time-depth to the evidence for advanced cognition in the Neanderthal lineage.

Neanderthals and immigrating modern humans attained comparable levels of cultural achievement

If one were to form an opinion on the basis of how Neanderthal-related scientific discoveries are reported to the public, one would hardly guess that this much-revised view of Neanderthals as a cognitively sophisticated, fully human part of our ancestry has already been endorsed by a significant number (if not a clear majority) of archaeologists and palaeoanthropologists directly involved with the research. Thus one of the most fascinating features of contemporary studies of the origins of modern humans lies in the continued popularity, particularly in the media and more conservative quarters of the academic world, of traditional views of the Neanderthals as aliens – not from outer space but from outer time. Although there are reasons to be found strictly in the domain of the scientific history of the subject, the particular role played by Neanderthals in late 19th-century debates over evolution goes a long way to explain such current attitudes.

At that time, Neanderthals were used as supporting ancillary evidence in mainstream ethnological views of the racial ladder, to which they added a temporal dimension. Today, ranking human races is no longer acceptable but, in western culture, the philosophical or religious need to place 'us' at the top of the ladder of life is still very prevalent and explains the continued search for images of what 'we' are not (or not anymore) that, by contrast, enhance the basics of what 'we' are. Thus, depending on different perceptions of the fundamental basis for the triumphant status of civilized society and industrial capitalism, so the tendency arose for Neanderthals to be represented as lacking in the corresponding behavioural features. For instance, to give but a few examples, the Enlightenment emphasised the power of reason, Adam Smith stressed the importance of the division of labour, and David Ricardo explained the role of international trade and comparative advantage. And, sure enough, explanations for the demise of the Neanderthals have variously postulated competitive inferiority caused by their lack of symbolic cognition, labour specialisation and long-distance circulation of raw materials.

The fact that such propositions are demonstrably in complete contradiction with the empirical record does not seem to deter their uninterrupted flow. This suggests that the Victorians were not completely wrong, Neanderthal studies do have the potential to bring

progress not only to the understanding of past humans as they were in the past but also to the understanding, through philosophy, sociology and the historiography of science, of present humans as we are in the present. Put another way, despite the apparent cacophony, the field of Neanderthal studies has at least one uncontroversial conclusion to offer: that Neanderthals should not be left to archaeologists and palaeoanthropologists alone.

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