

A SMOOTHER HAS CHANGED OUR IMAGE OF THE SKILLS OF THE NEANDERTHALS

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Four fragments of bone implements that were a few centimeters long were uncovered in two caves in southwestern France, and these have fundamentally changed our image of the skills of Neanderthals and their role in evolution. The evidence found on these tools, which have been dated to be 50 thousand years old, has proven that they were specialized tools for working hides, bone smoothers made by grinding. According to our previous knowledge, we had believed that tools of this kind could only have been made by modern humans, Homo sapiens, who only appeared in Europe 40 thousand years ago.

As soon as their joint paper introducing this sensational find became available electronically in the journal of the National Academy of the Sciences of the USA (PNAS)¹, the institutes involved with the research, the INRAP² in Paris and the Max Planck Institute³ in Leipzig announced the news in a parallel press release on their own web sites as well.⁴

The four finds in question are the broken tips of bone tools made from the ribs of medium-sized ungulates (likely red deer or reindeer) (*Fig. 1*). The longest of them is just over 8 cm, while the other three are 2–3 cm. The tips were formed into a semicircular or oval shape by grinding them against coarse-grained stone, as

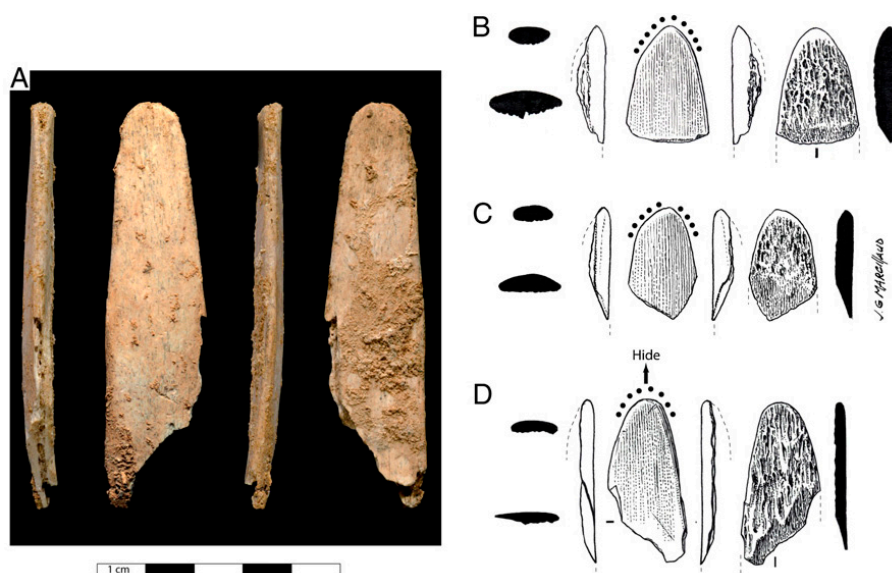


Fig. 1: The polishing bone fragments excavated at the Abri Peyrony rockshelter (A, B and C) and the Pech-de-l'Azé I cave (D) (after Marie Soressi et al. 2013, fig. 2)

¹ Soressi, Marie – McPherron, Shannon P. – Lenoir, Michel – Dogandžić, Tamara – Goldberg, Paul – Jacobs, Zenobia – Maigrot, Yolaine – Martisius, Naomi L. – Miller, Christopher E. – Rendu, William – Richards, Michael – Skinner, Matthew M. – Steele, Teresa E. – Talamo, Sahra – Texier, Jean-Pierre: Neandertals made the first specialized bone tools in Europe. *Proceedings of the National Academy of Sciences of the United States of America (PNAS)* 110/35 (August 27, 2013), 14186–14190. www.pnas.org/cgi/doi/10.1073/pnas.1302730110

² Institut National de Recherches Archéologiques Préventives

³ Max Planck Institute for Evolutionary Anthropology

⁴ The French language press release: <http://www.inrap.fr/archeologie-preventive/Actualites/Communiqués-de-presse/p-16235-Neandertal-a-fabrique-les-premiers-outils-specialises-en-os-d-Europe.htm>. The English language press release: http://www.mpg.de/7494657/_neandertals_leather_tools

shown by the striations on their surfaces that can be seen with a microscope. However, the microscopic analysis also showed evidence of use-wear, which may have occurred by rubbing them on a softer material. In the light of all these data, the researchers identified the pieces as fragments of bone smoothers (*lissoirs*).

This implement is one of the specialized tools for the processing of animal hides. Its rounded end is pushed against the hide and rubbed around evenly. This process creates softer, burnished, and more water resistant leather. The form of the implement was also standardized as a result of its use, it was generally made from a rib bone and its size only varied as a function of the type of animal the bone was taken from. This form fulfilled its role so optimally that from the early Upper Palaeolithic to the present day it has remained a part of the toolkit for this handicraft.

The uniqueness of the pieces that were uncovered now from two cave sites about 35 km from one another in southwestern France comes from the fact that they date from quite a while before the beginning of the Upper Palaeolithic. Three of the four were found in the Abri Peyrony rockshelter and one in the Pech-de-l'Azé I cave, all in Middle Palaeolithic layers that contained stone tools of the culture named Mousterian of Achelian tradition. The date of the layers may be placed at 50 thousand years ago on the basis of radiometric measurements. According to present knowledge, the Mousterian culture is related to Neanderthals. This human species developed about 300 thousand years ago in Europe, and it can be considered the sole creator and bearer of human culture on the continent until the appearance of modern humans (*Homo sapiens*) about 40 thousand years ago. In accordance with this, the bone tools in question may also have been made by Neanderthals.

However, up until now we thought that the technology for shaping bone as a raw material by grinding and polishing was discovered by modern humans, and they brought it with them when they settled Europe as evidenced by bone points of the Aurignacian culture.⁵ Worked bone finds from archeological sites of earlier periods, the Lower and Middle Palaeolithic, were formed by knapping, and their shapes recall similar types of stone tools.⁶ The most graphic example of this is the 14 cm handaxe knapped from mammoth bone that was found near Rhede in northern Germany (Westphalia) (*Fig. 2*).⁷ We know of polished bone awls attributed to the Neanderthals from sites of the Chatelperronian culture in France and the Uluzzian culture in Italy. However, the existence of these two cultures falls within the period of the Middle to Upper Palaeolithic transition, at the time when the first modern humans appeared in Europe. For this reason, some researchers believe that the Neanderthals might have adopted “modern” innovations such as blade production, polished bone manufacture and use of personal adornments from them, since they lived at the same place and time for a period.⁸ According to other opinions, the Neanderthals could have discovered these new behavior patterns by themselves. To underpin this theory, these researchers have been doing their best to show that the Aurignacian culture, which is linked to modern humans, arrived in the given region later. They are doing this through the differences in absolute dates.⁹

⁵ Bosinski, Gerhard: *Homo sapiens. L'histoire des chasseurs du Paléolithique supérieur en Europe (40 000 – 10 000 av. J.-C.)* (Paris: Editions Errance, 1990)

⁶ Jelínek, Jan: *Encyclopédie illustrée de l'Homme préhistorique* (Paris: Gründ, 1975), 185–207; Bolus, Michael – Schmitz, Ralf W.: *Der Neandertaler* (Ostfildern: Jan Thorbecke Verlag, 2006), 96–100; Mania, Ditrich – Mania, Ursula: Die Knochenartefakte des *Homo erectus* von Bilzingsleben. *Praehistoria* 7–8 (2006–2007), 9–89.

⁷ Tromnau, Gernot: Ein Mammutknochen-Faustkeil aus Rhede, Kreis Borken (Westfalen). *Archäologisches Korrespondenzblatt* 13 (1983), 287–289.

⁸ Mellars, Paul: Major Issues in the Emergence of Modern Humans. *Current Anthropology* 30/3 (1989), 349–385; Allsworth-Jones, Philip: *The Szeletian and the transition from Middle to Upper Palaeolithic in Central Europe* (Oxford: Clarendon Press, 1986)

⁹ d'Errico, Francesco – Zilhão, João – Julien, Michèle – Baffier, Dominique – Pelegrin, Jacques: Neanderthal acculturation in Western Europe? A critical review of the evidence and its interpretation. *Current Anthropology* 39/2 (1998), S1–S44; d'Errico, Francesco: The invisible frontier. A Multiple Species Model for the origin of behavioral modernity. *Evolutionary Anthropology* 12 (2003), 188–202. In relation to Hungary, András Markó argued that at four cave sites the bone points previously attributed to the Aurignacian culture belong in reality to the late Middle Palaeolithic. See Markó, András: A kései középső paleolitikum csontipara a Kárpát-medencében (Late Middle Paleolithic Bone Tool Production in the Carpathian Basin). *Archaeologiai Értesítő* 136 (2011), 95–113. However, this assumption is based only on insufficiently documented old excavations, and he himself considers it only a working hypothesis, since he can only exclude the presence of the Aurignacian culture at the given sites.

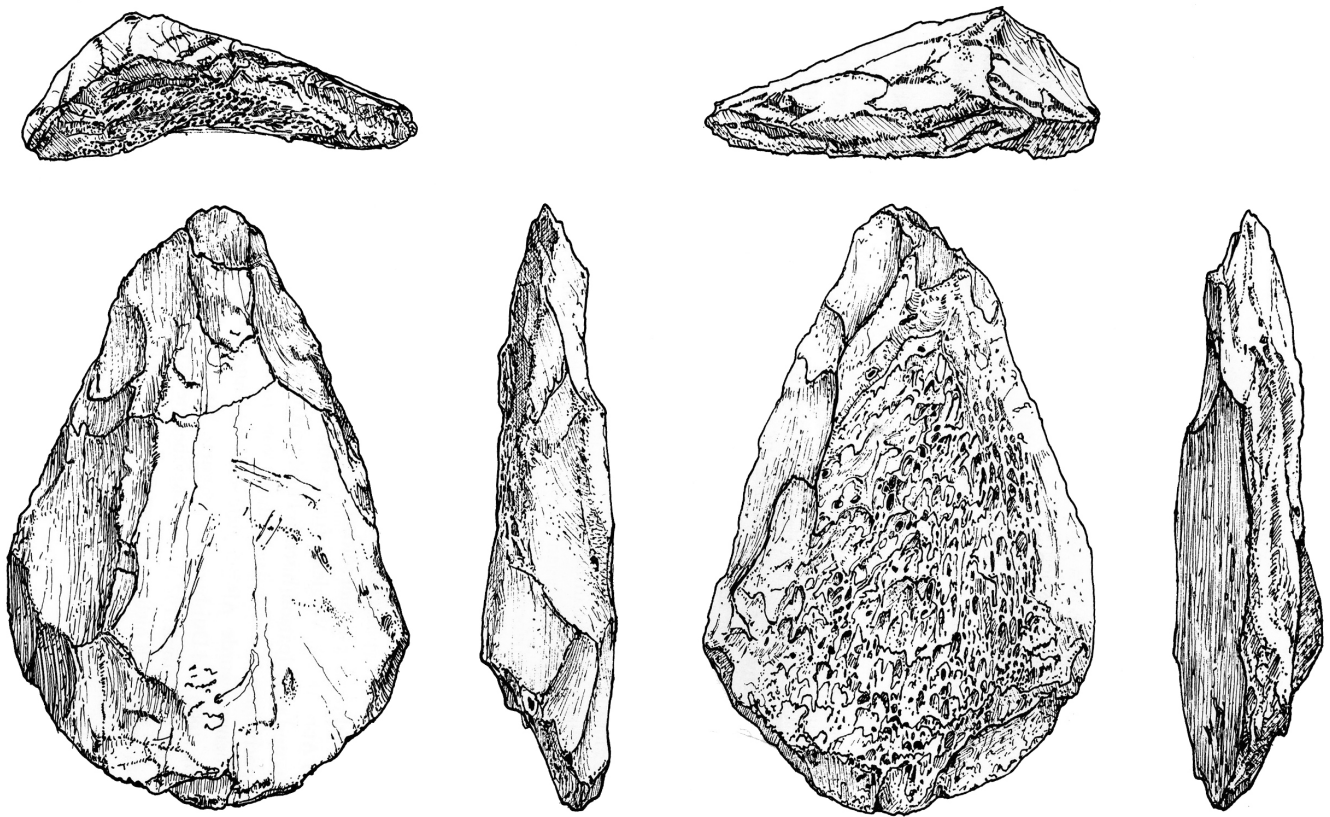


Fig. 2: Handaxe knapped from the femur of a mammoth, Rhede (Westphalia, Germany; after Gernot Tromnau 1983, Abb. 1)

The resolution to this problem is made more difficult by the fact that in Europe there is an almost complete lack of human remains from the period in question that have been discovered together with the tools of any archeological culture. Therefore, for certain cultures present here, the anthropological background – that is, which species could have been the vehicle for the culture – has been postulated on the basis of whether the given cultures have roots in the Middle Palaeolithic (thus, Neanderthals) or whether they appear without any Middle Palaeolithic antecedents (thus, modern humans). Since the Neanderthals disappeared (died out) about 30 thousand years ago, research has considered cultural features characteristic of the Upper Palaeolithic in Europe to be those of modern humans. Ever since the results of palaeogenetic examinations showed support for the Out-of-Africa model,¹⁰ researchers have increasingly tried to find the roots for these features in the Middle Palaeolithic cultures of Africa.¹¹ In the background of this research – explicitly or implicitly – the perception lurks that the evolutionary success and sole domination of the *Homo sapiens* species was due to the aforementioned “modern” behavioral patterns. From this, of course it would follow that the competitive disadvantage of their competitors, the Neanderthals, could be explained by the lack of all these features.

The aforementioned bone smoothers place this idea in an entirely new light. They further supplement the line of reasoning that is based on the analysis of archeological finds that show the mental capacity of Neanderthals to be equal to that of their contemporary modern humans. Alongside the burials, use of colors, specialized hunting strategies and complex processes for manufacturing stone tools that are evidence of complex abstract thought, the researchers can place the invention of a specialized bone tool manufacturing

¹⁰ Underhill, P. A. – Passarino, G. – Lin, A. A. – Shen, P. – Mirazón Lahr, M. – Foley, R. A. – Oefner, P. J. – Cavalli-Sforza, L. L.: The phylogeography of Y chromosome binary haplotypes and the origins of modern human populations. *Annals of Human Genetics* 65 (2001), 43–62.

¹¹ McBrearty, Sally – Brooks, Alison S.: The revolution that wasn't: a new interpretation of the origin of modern human behavior. *Journal of Human Evolution* 39 (2000), 453–563.

technology. All of this proves that Neanderthals reached not only on the same level as modern humans in terms of their brain size, but also in the complexity of their brain function. As was stressed in the title of Marylène Patou-Mathis's book, Neanderthals did not represent a lower rank of human evolution, just a different branch.¹²

The responsibility of scientific analysis also naturally impels us all to weigh the possibility of alternate conclusions. Presently it seems that Neanderthals were familiar with bone smoothers before modern humans, who only polished pointed bone tools at this same time. It is possible therefore, that the latter adopted the bone smoother from the former, while in the case of the bone awl this occurred in the opposite direction. The possibility of this acculturation, the adoption of the cultural achievements of others, sketches out an entirely different script in relation to the transitional period between the Middle and Upper Palaeolithic. It often occurs in archeology that following the recognition and publication of a new type of find, experts come across similar objects one after another. If this also occurs with these bone smoothers, then the archeological-chronological data from these new finds may completely restructure our knowledge related to this issue, and then we would also need to reexamine our conclusions. As a third possibility, we must not ignore the fact that if in the end the skeletal remains of humans belonging to the given cultures come to light, then this would show whether we were thinking correctly about which innovations were the work of which human species.

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¹² Patou-Mathis, Marylène: *Néanderthal. Une autre humanité* (Paris: Éditions Perrin, 2006)