

## Manufacturing Evidence of Bone Tools From the Petralona Cave

**Dr Nickos A. POULIANO**

Greek Ministry of Culture, Dep. Palaeoanthropology-Spelaology, Ardittou 34b, Athens 11636 -  
Anthropological Association of Greece, Daphnomili 5, Athens 11471 – GREECE

### Abstract

The discovery of a widely applied, multiple method on the use of various bone tools from different animals lead to a new view upon the manufacturing, as well as social, achievements of Archanthropinae 700.000 years ago. By this work new evidence is presented on the subject, mainly concerning the comparative study of bone tools distribution and other findings into the layers of the Petralona cave.

The extended excavations at Petralona cave provided a large number of findings. Among them, hundred fossil taxa (man included) are recognized and several hundreds of stone tools, made on bauxite, quartz, limestone and stalagmitic row material (A. POULIANOS 1971, 2001, N. POULIANOS, 1995, 2000 - [www.aee.gr](http://www.aee.gr)). Some aspects on the bone tools have already been presented by the author (cf. above), but their complete study is in progress, since new evidence is still coming up.

Bones were mainly transported into the Petralona cave by prehistoric humans. Most of them, as well as the stone tools, are found between layers 2 and 18, i.e. of about 500.000 and 700.000 years ago. This is the span time when only few carnivores are traced in the cave and human activity prevails. On the contrary, among earlier layers (below 18), where most of carnivore fossils are found, the bones of herbivorous animals are very scarce and without signs of elaboration, indicating that after the formation of the 18<sup>th</sup> layer the main bulk of bone material was transported into the cave by the prehistoric hunters. This observation is reinforced by the discovery within the upper layers of peculiar findings, such as a rhino skull, an isolated elephant tusk fragment etc, which could have been transported inside the cavern only by humans.

A huge amount of thousands of bone fragments, concentrated on a few sq. meters (~100), also indicates that man had intentionally transported them. Besides their nutritional value, bones were useful for tool - manufacturing and rarely as firewood.

Most of the bone tools are not directly detected as such, since they have been altered by the cave microclimate and sinter covering. However, combined observations allow concluding that a certain process for their elaboration was followed. The diaphysis of the limb bones of various animals has often been longitudinally intersected and the so produced concave (half-tube) fragments were used as long knives or blades. After this treatment, their edges were immediately ready to cut. It is observed that during the use of these concave edges, their (tube-like) shape gradually turns to be flattened (or even slightly convex), until they become useful no more. Four main degrees (I-IV) of use are distinguished by the author and regard hundreds of such implements. Besides long knives, shorter ones and scrapers were also produced, when the diaphysis were broken in smaller pieces, presumably also in the case when the longitudinal intersection was not successful. In many cases the splinters produced during the above process were used as needles, a fact which is also evident from the four different degrees of use, mentioned above (see fig. 1-4).

Another, yet less widely applied, method of the Petralona prehistoric inhabitants, was that of selecting bones with useful shape in order to easily produce needles, borers and knives. The metapodials (metacarpal and metatarsal - II, III) of equids, by sharpening their distal part and maintaining the round proximal one for handling, produced perfect needles and borers, with only little elaboration (fig. 5-6). Similarly, the ulnas of mid-sized animals, with their natural olecranon - handle, were good for knives, blades or even "swords" (fig 7). Same is applied to elaborated scapulas, but only as borers (fig 8).

It is self-evident that for the bone tool manufacturing there was no need to elaborate by the traditional way used on the stone tools. However, among the Petralona findings, there is an exception to this norm, which regards a clearly flaked piece of diaphysis. It could represent an experiment concerning the resistance of the bone material upon flaking, or it may just be a result of playing (i.e. by young individuals). The fact that only one flaked bone fragment has been found, indicates that it was not a defused practice, but on the other hand this unique finding confirms once more the above general observations on bone tool manufacturing.

It is also worth mentioning that a bear and a hyena mandible were found among the upper layers and in a different way of those found in the lower ones. They miss only of their condyles and wings (ramus verticalis), so they could be useful as very strong scrapers, saws- along their teeth, or even as borers by their canines (fig.9-10).

The concentration of stone and bone tools has been discovered in different parts of the cave. Stone tools are mainly found near the ancient entrance, while bone tools in slightly deeper chambers, most probably indicating a division of labor.

The above remarks complete our views on the tool making technology of the Petralona man and suggest a highly developed social life during Lower-Middle Pleistocene.

*FIGURES 1-4: Bone tools - the four degrees of elaboration of diaphysis, referred in the text (size 1/2).*

*FIGURES 5-8: Bone tools from the Petralona cave, referred in the text (size 2/3)*

*FIGURES 9-10: Mandibles of a hyena and a bear, referred in the text (size 3/4).*

## Bibliography

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