



# Digging Up Neandertals at Mujina Pećina?

## *A Mousterian Cave Site in Croatia*

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**N**EANDERTALS ARE EVERYONE'S favorite image of a classic "caveman." We know more about them than we do about any other fossil human population. They evolved from Europe's earliest inhabitants during the Paleolithic period about 200,000 years ago—the transition between the Lower and Middle Paleolithic in Europe—and later spread into parts of Western Asia, including the Middle East. While some scholars believe Neandertals were a separate species (*Homo neanderthalensis*) from our human ancestors (*Homo sapiens*), many consider them a subspecies of human (*Homo sapiens neanderthalensis*), believing that they interbred with anatomically modern humans when the latter first entered Europe between 40,000 and 35,000 years ago—the start of the Upper Paleolithic in Europe.

From top to bottom, the first year of excavation took place in 1995. An excavator uncovers an artifact. We screened the excavated sediment through a wire mesh to identify small artifacts that were unseen during excavation.



Mujina Pećina is located along Croatia's Dalmatian Coast.

The debate on their place in modern human origins is continually one of the central topics in paleoanthropology, particularly because they were so much like us in many respects. For example, they were the earliest people in the world to bury their dead. These burials sometimes contain goods and ornaments, providing evidence of symbolic behavior. Their skeletal remains, especially those of some physically handicapped but long-lived Neandertals, clearly show that they cared for their injured and sick. The tools they left behind indicate that they were capable hunters and further suggest that they may have exhibited many other behaviors similar to our own.

Our knowledge of Paleolithic populations, including Neandertals, their predecessors, their contemporaries, and their successors, comes solely from archaeological discoveries of their fossilized remains, artifacts (mostly of stone), and the traces of their daily activities. There are no written sources to inform us about their ancient lifestyles. The best-preserved evidence usually comes from cave deposits where stratigraphic layers of soil are better protected from geological, environmental, human, and other forces that tend to destroy archaeological remains.

Kaštela Bay can be seen from the cave's mouth.



I. Janković (top), I. Karavanić (bottom)

## MUJINA PEĆINA

The site of Mujina Pećina in Croatia is a small cave (*pećina* means “cave” in Croatian), about 10 m deep and 8 m wide, located on the slopes of a mountain range just west of Split on the Dalmatian Coast of the Adriatic Sea. The cave entrance is located to the southeast, about 100 m above a likely ancient riverbed, and it provides a clear view of Kaštela Bay and the Adriatic. In turn, the cave mouth can be clearly seen from the road that leads inland from Kaštela. Scarce vegetation now covers the terrain—mostly rocks, grasses, and sporadic bushes. During the Middle Paleolithic, however, the sea level was much lower, and prehistoric hunters standing at the cave’s mouth could have clearly seen animals grazing on the plain below where the bay is today.

The potential significance of the site was realized in the late 1970s when several stone artifacts were collected from the surface by the late prehistorian Mirko Malez and Nikša Petrić. A small test pit yielded further finds, and the stone tools were recognized as belonging to the Mousterian industry (named after the stone tools first identified at the site of Le Moustier, France). Although Mousterian artifacts were previously collected from several open-air sites in Dalmatia by prehistorian Šime Batović, no systematic excavations have taken place. As a result, Dalmatia’s Middle Paleolithic is poorly understood. This contrasts with the Zagorje region of northwest Croatia, where Mousterian sites, such as Krapina and Vindija Caves, are well known and have been studied on numerous occasions. At these sites, Neandertal bones have been found in association



Our excavations at Mujina Pećina also provided practical training for undergraduate and graduate students.

with Mousterian tools, supporting the interpretation that Mousterian artifacts were made by Neandertals.

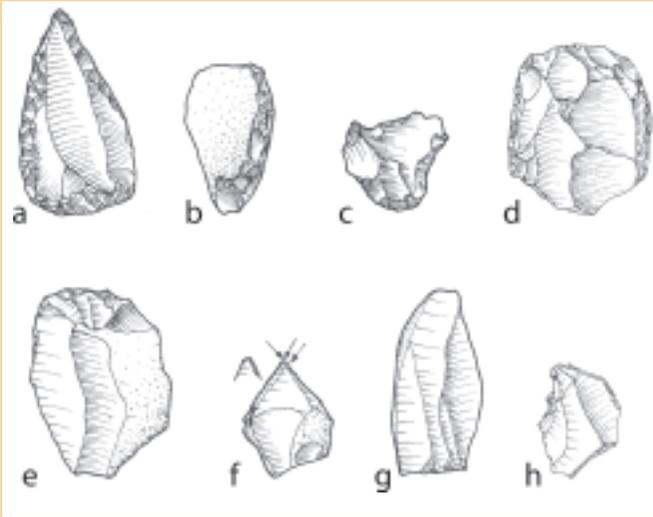
To further our understanding of Croatia's Middle Paleolithic occupation, from 1995 through 2003 we conducted systematic excavations of Mujina Pećina. This was a joint project of the Department of Archaeology at the University of Zagreb and the Kaštela City Museum, directed by Ivor Karavanić and Ivanka Bilich-Kamenjarin. Our goals were to obtain the first radiometric dates (and thus a time frame) for the Mousterian in this region, to compare this coastal site with inland sites, and to provide a glimpse into the lifestyles and adaptations of Mujina Pećina's prehistoric hunters, who were presumably Neandertals.

During our excavations we used standard archaeological methods and techniques. While digging, we followed the site's stratigraphy and recorded the position of every find measuring 2 cm or more. When we found large concentrations of stone debris, we noted the exact position of even smaller fragments. This debitage was found in all layers and suggests that stone tools were made in the cave. To collect even smaller fragments of stone, bone, and other materials, we sieved all the excavated soil and took sediment samples.

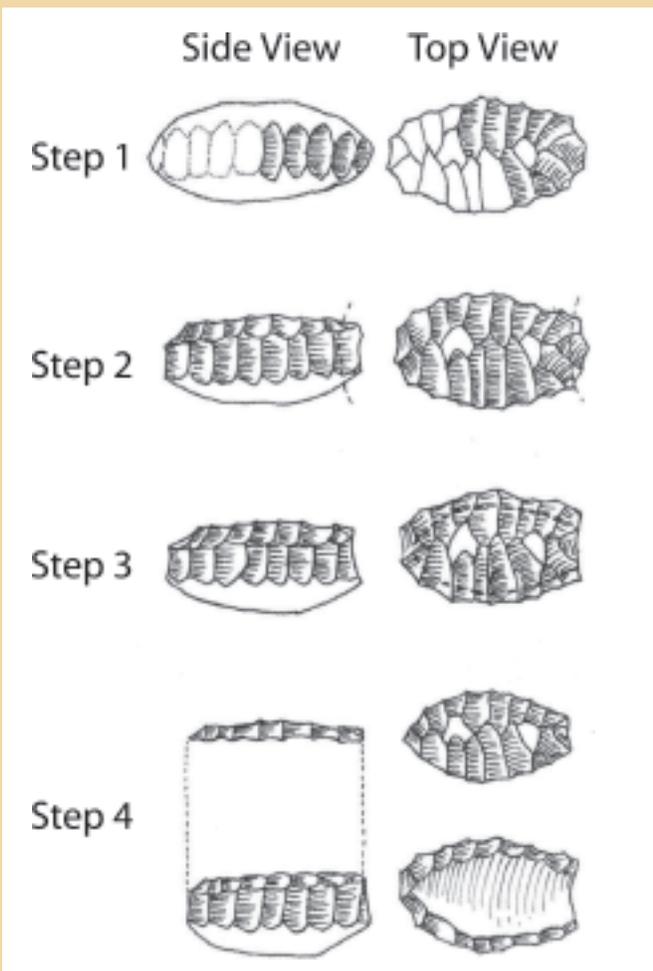
Later analyses of these samples identified pollen and charcoal, which helped us to reconstruct the Middle Paleolithic local ecology and climate. At the time Mousterian hunters



We found Mousterian tools at Mujina Pećina, a sidescraper (left) and a denticulated piece (right). Although both Neandertals and anatomically modern humans made Mousterian tools in the Levantine region of the Near East, so far only Neandertals have been found in association with Mousterian tools at European sites.



Typical Mousterian tools include: (a) Mousterian points; (b-d) sidescrapers; (e) endscrapers; (f) burins; (g) naturally backed knives; and (h) denticulates.



The Levallois technique involves removing flakes from a core in a particular pattern in order to produce a standardized blank that can then be retouched into a particular tool.

inhabited the cave, the climate was colder than it is today and the sea level was much lower.

Typological analyses of the stone tools confirmed that the industry was indeed Mousterian, albeit with some regional characteristics, such as the small size of most of the tools. Several small Levallois cores were found throughout the site, particularly in the lower (older) layers (D2 and D1). These layers also produced some larger stone tools alongside the more typical small ones. In contrast, the upper (younger) layers (C and B) had fewer large tools. This most likely reflects a change in the availability of local raw material over time. In other words, bigger nodules of better quality chert were probably used first to produce large tools, leaving smaller nodules for later tool makers to use.

Petrographic analyses of the stone tools indicated that the inhabitants of Mujina Pećina used local stone to make their tools—mostly in the form of small pebbles of poor quality. Our own experiments with this raw material showed that large flakes were very hard to produce, and that even when one was made, it tended to break while retouching it to make a particular tool.

Most of the tools were typical Mousterian artifacts, albeit with significant amounts of the stone's cortex still showing. These consisted of various types of partially retouched flakes, scrapers, denticulates, and notched pieces. Such tools would have been used for a number of activities, including meat cutting, hide preparation, and wood shaping. The use of the Levallois technique on such small pebbles indicates that the hunters from Mujina Pećina were skillful enough to adapt it to the locally available raw material.

We also found many animal bones at Mujina Pećina, including the remains of chamois, ibex, red deer, hare, bison, auroch, horse, and wild boar, as well as carnivores such as cave bear and wolf. While gnawing marks on most of the bones suggest that carnivores were responsible for much of the faunal accumulation, some of the bones clearly showed evidence of human modification. For example, cut-marks and breakage patterns on the remains of adult chamois, ibex, red deer, and large bovids indicate butchering, while burn marks suggest cooking. The discovery of charcoal in various layers and two places that showed intensive burning probably indicate actual fireplaces.

## THE PEOPLE OF MUJINA PEĆINA

Who were the people who lived at Mujina Pećina? Radiocarbon dates from several stratigraphic layers show the



Animal bones such as this jawbone of a deer were found *in situ*.

cave was occupied between 45,000 and 39,000 (un-calibrated) years ago. Although we found numerous Mousterian stone tools and animal bones, no Neandertal or modern human remains were recovered from the cave. Despite this, we are reasonably confident that these archaeological finds represent the presence of Neandertals, since radiometric dates at other sites have been recently revised to indicate that modern humans first appeared in Europe only later (e.g. at Peștera cu Oase in Romania around 35,000 years ago and at Mladeč in Moravia, the Czech Republic, around 31,000 years ago).

How did the Neandertals use the cave? Finds, especially in the upper layers, suggest that the cave was not a home base, where Neandertals stayed year round. Neandertals generally lived in small, mobile groups that moved often. While some Neandertal sites show long-term occupation, most served as camps where hunting parties stayed for several days to butcher their prey, make new tools, and rest before moving on. When the people left, carnivores would move in and use the cave, often feasting on the remains of Neandertal meals.

At Mujina Pećina, zooarchaeological analysis by Preston Miracle of the University of Cambridge indicates the cave was most likely used during the late autumn/early winter and sometimes during the spring. So where did the Mousterian hunters go after leaving Mujina Pećina? Where was their home base? Or did they move around from hunting site to hunting site all year around? What was their lifestyle like during the cold months of winter and warmer late Pleistocene summers? We hope to address such questions in the future with more archaeological work.

The systematic excavation of Mujina Pećina is a valuable addition to our understanding of Mousterian peoples in the

Adriatic region of Croatia. It has shown how these prehistoric people adapted to their environment by making the most of the available resources. 🏠

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The excavation team, left to right, F. H. Smith, T. Yokley, H. Kalafatić, I. Janković, S. Mihelić, I. Karavanić, and N. Vukosavljević (front).

#### For Further Reading

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