CHAPTER 9

THE MIDDLE PALEOLITHIC SETTLEMENT OF CROATIA

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Abstract. *This paper summarizes the results of research on the Middle Paleolithic sites of Croatia. Northwestern and southern Croatia (Dalmatia), divided by the Dinarid Mountains, provided two different landscapes for the adaptation of Mousterian people and their settlement system. The sites in northwestern Croatia are caves while in Dalmatia, where the climate was milder, open-air sites are more frequent. Caves were usually occupied for short periods of time by mobile groups of people. Neanderthals from northwestern Croatia were successful hunters and they obtained the vast majority of their dietary protein from meat, largely obtained by hunting. Both in northwestern Croatia and in Dalmatia, Mousterian people modified their lithic technology to exploit effectively local raw material sources. Unfortunately, data related to settlements are rare.*

Résumé. *Cet article présente un aperçu sommaire des résultats de la recherche sur les sites du Paléolithique moyen en Croatie. Le Nord-Ouest et le Sud (Dalmatie) de la Croatie, séparés par la chaîne des Dinarides, sont deux paysages exigeant des modes d'adaptation et d'habitation différents de la part des hommes du Moustérien. Tandis qu'en Croatie du Nord-Ouest, les grottes sont les habitats courants, en Dalmatie, où le climat est plus doux, les habitats en plein-air sont nettement plus fréquents. Les grottes étaient habituellement occupées pendant une période assez courte par des groupes mobiles. Les Néandertaliens de la Croatie du Nord-Ouest étaient d'habiles chasseurs dont la nourriture consistait surtout en viande, obtenue en grande partie par la chasse. Dans les deux régions, les hommes du Moustérien ont modifié leur technologie lithique afin de pouvoir exploiter efficacement les matières premières locales. Malheureusement, les données relatives aux habitats sont rares.*

INTRODUCTION

The well-known site of Krapina, the first Paleolithic site discovered in Croatia, was excavated about a century ago. Although during the last hundred years Paleolithic research has not been very intensive, several sites have yielded important evidence for the evolution of the Upper Pleistocene hominids and their material cultures. The Middle Paleolithic sites of Croatia are located in two regions within different envi-

ronmental zones. The most famous sites, such as Krapina and Vindija, are situated in a continental zone, which distinguishes them geographically and ecologically from the Mediterranean sites situated farther south, on the Adriatic coast and its hinterland (fig. 1).

Research into Middle Paleolithic settlements has been much more extensive in northwestern Croatia, where all of the human fossil remains were recovered, than in Dalmatia, although several sites in Dalmatia have yielded Mousterian lithic remains. However, the sites from both regions, northwestern Croatia and Dalmatia, provide important evidence for interpreting human behavior and settlement systems of the Middle Paleolithic period of Europe. The main purpose of this paper is to report, compare and summarize results of the research on the Middle Paleolithic and to consider the implications of these data for reconstructing the settlement dynamics of the region.

LANDSCAPE

The physical geography of Croatia is shaped by the Dinarid Mountains and the Adriatic Sea. The Dinarides are a southeastern extension of the Alps running along the eastern Adriatic coast. While the highest mountains in northwestern Croatia reach about 1,000 m, the Dinarides, which are very steep and rugged on their western side, have an elevation up to 2,000 m. They act as a barrier that probably impeded migrations between the coast and continent during the Pleistocene. Although they are not glaciated today, they would have supported small isolated glaciers during the Pleistocene (Marjanac et al. 1990). Reconstructions of Pleistocene geography suggest the presence of two major landscapes in the Adriatic region, the exposed Adriatic plane and the karstic hinterland. However, the sea level and coastline repeatedly rose and subsided during the Pleistocene. During the last interglacial maximum, the sea level of the Adriatic was 1.7 m higher than now, while in the late glacial maximum the sea level was 96 m lower than it is today (Šegota 1982). It is important to note that part of the Pleistocene landscape and probably some important sites inhabited and controlled by the Paleolithic people have been covered by water due to rising sea levels since the end of the Pleistocene.

THE SITES

CAVES IN NORTHWESTERN CROATIA

The sites of northwestern Croatia are internationally well known because of important finds of Neanderthals and a Mousterian assemblage recovered there. The most important sites of the area are Krapina, Vindija, Velika Pećina and Veternica.

Krapina

The site of Krapina (fig. 1, no. 3) was the first investigated Paleolithic site in Croatia, excavated between 1899 and 1905 by Dragutin Gorjanović-Kramberger. During the

Fig. 1. *Important Middle Paleolithic Sites of Croatia: 1) Vindija, 2) Velika Pećina, 3) Krapina, 4) Veternica, 5) Veli Rat, 6) Ražanac, 7) Ljubač, 8) Mujina Pećina.*

excavation of the site more than 5,000 finds including 874 human remains (Radovčić et al. 1988) and 1,191 lithic artifacts (Simek and Smith 1997) were collected. Nine stratigraphic levels in the Krapina rockshelter, with deposits as deep as 11 m, were initially identified by Gorjanović-Kramberger (1899). The whole stratigraphic complex corresponds to the late Riss glacial or the Riss-Wurm interglacial (the end of Oxygen Isotope Stage 6 or beginning of 5e) and some of the levels were dated by

ESR to ca. 130 ka BP (Rink et al. 1995; Simek and Smith 1997). Technological and typological analysis of lithic assemblages from Krapina indicates that the site was occupied only by Mousterian people at least twice and that local river cobbles were used for tool production (Simek 1991; Simek and Smith 1997; Zupanič 1970). The raw material inventory is dominated by tuffs and silicified tuffs (65%) while chert amounts to 23% (Simek and Smith 1997: 566). Various sidescrapers dominate the Charentian Mousterian assemblages of the site. Only a small proportion of tools were brought into the site in finished form while most were produced *in situ* on diverse blanks. Though examples of various raw materials were uncovered from the earlier levels, high quality cherts and silicified tuffs were found exclusively in the later levels (Simek and Smith 1997). Both the Levallois method and the cobble wedge exploitation method were used. The small number of lithics in all levels and the presence of some non-local materials suggest a short occupation by mobile groups of people (Simek 1991), although long-term occupation at some occupation levels is also possible (Patou-Mathis 1997). In addition to being efficient tool makers, the Krapina Neanderthals appear to have been successful hunters of large game, including Merck's rhinoceros (Miracle 1999). Other identified species in the Krapina faunal assemblage include *Bos/Bison*, *Ursus spelaeus*, *Castor fiber*, and others (Patou-Mathis 1997).

Several authors have suggested that Neanderthals from Krapina were cannibals (e.g., Gorjanović-Kramberger 1906; Smith 1976; White 2001). However, this hypothesis is controversial because it is also possible that human bodies were defleshed with stone tools in preparation for secondary burial (Russell 1987), or buried by natural or human processes after death (Trinkaus 1985).

Vindija

Vindija Cave also yielded Neanderthal remains (Wolpoff 1996). The site is situated 2 km west of the village Donja Voća, and 20 km west of Varaždin (fig. 1, no. 1). Its entrance lies in a narrow gorge 275 m a.s.l. The cave is more than 50 m deep, up to 28 m wide and more than 10 m high. S. Vuković, who visited the site in 1928, excavated the cave for more than thirty years with some interruptions. M. Malez started systematic excavations at Vindija in 1974, and fieldwork continued there every year until 1986. During this period most of the lithic and faunal material, as well as all of the human fossil remains, were recovered. The stratigraphic profile, which is about 9 m high, comprises about twenty strata which, according to Malez and Rukavina (1979), covered the period from the onset of the Riss glaciation (oxygen isotope stage 6 or earlier) through the Holocene. One U-Th date on a bone from Level k of 114 ka BP suggests an age from the last interglacial for these deposits, while U-Th dates for older levels (L and M) are inconsistent and unreliable (Wild et al. 1987/88). Level G3, which contains Neanderthal remains associated with the late Mousterian industry, was dated to 42.4 ka BP by amino-acid racemization (Smith et al. 1985), and over 42 ka BP by AMS (Krings et al. 2000). The long bone of a cave bear from

level G1 yielded an AMS date of 33 ka BP (Karavanić 1995), while Neanderthal remains from the same level have recently been directly dated by AMS to 29 and 28 ka BP (Smith et al. 1999). Neanderthal remains from level G3 show distinct changes in facial morphology when compared to earlier Neanderthals (see Smith 1984; Wolpoff 1996). Among such changes is supraorbital tori with a shape somewhere between the Krapina Neanderthals and early modern Europeans (Karavanić and Smith 1998: 239). In the lower Mousterian levels, tools were found which were produced from local raw materials (Kurtanjek and Marci 1990; Blaser et al. 2002) using the Levallois method. In contrast, the Levallois method was not employed in Level G3, where local raw materials (chert, quartz, tuff, etc.) were also used. Level G3 yielded 350 lithic finds of which 60 (17.1%) are tools. The Late Mousterian industry from the same level is dominated by sidescrapers, notched pieces and denticulates, but also includes some Upper Paleolithic types (e.g., endscrapers). In addition to flake technology, Level G3 also includes evidence of bifacial and blade technology (Karavanić and Smith 1998).

As in Level G3, the mixture of Middle and Upper Paleolithic typological characteristics is also present in the stone tool assemblage from Level G1, where bone points and Neanderthal remains where found. Although this level includes a lithic industry of poor quality, the finds suggest a continuation of the Mousterian technological and typological tradition (excluding the Levallois method); bone tools from the same level are typical of the Upper Paleolithic. Although an unusual association of Neanderthal remains and Upper Paleolithic bone points in Level G1 can be explained as a result of mixing of these remains through different strata of origin (Zilhão and D'Errico 1999), it may well also represent a natural cultural assemblage (Karavanić and Smith 1998, 2000). However, the small archaeological assemblage from the level might suggest very short occupation by mobile groups of Neanderthal people. Direct AMS radiocarbon dates of 29 and 28 ka BP on Neanderthal bones from Vindija Level G1 establish the remains as being from individuals who were late survivors (Smith et al. 1999) and provide a temporal overlap between them and early modern people in central Europe (Karavanić and Smith 2000). According to the evidence from stable isotopes, these Neanderthals behaved as highly effective carnivores, fulfilling almost all of their dietary needs in animal sources (Richards et al. 2000). They were effective predators and possibly cannibals like the Krapina Neanderthals, who occupied the same area some 100 ka earlier (White 2001).

Velika Pećina

Velika Pećina, another important Paleolithic site in northwestern Croatia, is situated between the sites of Krapina and Vindija, near the village of Goranec on Ravna Gora (fig. 1, no. 2). The cave is 25 m deep. Excavations were conducted initially by M. Malez in 1948. Subsequent excavations began in 1957 and, with some interruptions, lasted until 1979. Stratigraphy consists of 16 defined levels, which are in some parts of the cave over 10 m deep, ranging from the end of the Riss glaciation (oxy-

gen isotope stage 6 or earlier) through the Holocene. The lower levels (levels p to k) yielded a Mousterian industry (Malez 1979). However, Malez (1967: 28) attributed the artifacts from the lower part of Level k to the Mousterian and those from the upper part tentatively to the proto-Aurignacian or to the Mousterian. Recent reanalysis of the artifacts from Level k did not provide any convincing reason to recognize two different industries (Karavanić and Smith 1998). It is likely that the lower part of Level k belongs to the Mousterian, and the upper part may contain only pseudo-tools. All tools are small and similar to the so-called Micromousterian. A small number of artifacts in all Mousterian levels of Velika Pećina suggests a very short occupation of the site during several episodes. The human frontal bone from Velika Pećina Level j, generally considered one of the earliest finds of early modern Europeans, has been recently directly dated by AMS radiocarbon to ca. 5 ka BP (Smith et al. 1999). This result removes the frontal bone from the list of finds of the early modern human record of Europe.

Veternica

Veternica Cave is located on the western outskirts of Zagreb, on the southwestern slope of the Medvednica Mountain (fig. 1, no. 4). The entrance of the cave is about 8 m wide and 4 m high, and the entrance chamber is about 15 m long and 7 m wide (Miracle and Brajković 1992). Excavations in Veternica were conducted initially by M. Malez in 1951 and, with several interruptions, lasted until 1971. The site produced abundant archaeological and paleonthological material that was published in several works (Malez 1963, 1981; Miracle and Brajković 1992). P. Miracle and D. Brajković (1992) revised the ungulate fauna and the Upper Pleistocene stratigraphy of the site, and attributed the lowest level (j) with palaeonthological or archaeological remains from oxygen isotope sub-stage 5c to 5a. M. Malez (1979: 269) described the Mousterian industry from the same level as "primitive," while he described the assemblage from the upper levels as "typical" and "developed." However, the "primitive" aspects of the industry reflects the type of raw material used (volcanic tuff, basalt, quartzite, jasper) which was available in gravel terraces of the River Sava and in other sites in the vicinity of the cave (Miracle and Brajković 1992). The Mousterian industry from Veternica requires undertaking a detailed reanalysis to explore the technological and typological characteristics and to enable a comparison with other Mousterian sites from this region and elsewhere.

M. Malez (1983) suggested that "the Cult of the Cave Bear" was practiced by Paleolithic people in Veternica, but it is not clear from which deposits (Middle or Upper Paleolithic) the majority of accumulated cave bear bones and skull originate. However, these accumulations in certain parts of the cave, including two "niches" (Malez 1983: fig. 1), can be explained by natural agencies rather than human activity, as is the case at some other European sites (see Chase 1987; Chase and Dibble 1987).

OPEN-AIR SITES IN DALMATIA

Most of the Mousterian finds from Dalmatia were collected on the surface of open-air sites and were often found in a mixed cultural context (Batović 1988). Collecting artifacts from the surface of these sites enabled a lithic analysis based on typology. The best known sites are Veli Rat on Dugi otok (fig. 1, no. 5) and Ražanac near Zadar (fig. 1, no. 6). Both names are used in the archaeological literature to mark wider areas (Ražanac is much wider than Veli Rat) that include several find spots of chert nodules and tools. The industries from these sites are similar, if not identical, to other Mousterian sites in the eastern Adriatic region. The tools are small, as with the so-called Micromousterian, and denticulates and notched pieces are frequent. Sidescrapers are also present. Some tools from the surfaces of Dalmatian open-air sites have been attributed to the Lower Paleolithic (Batović 1988). However, these finds are often found on the surfaces of the Middle Paleolithic sites together with Mousterian tools, and it is more likely that they represent a Mousterian, rather than a particular Lower Paleolithic industry.

Survey of Ravni Kotari, north of Zadar, resulted in locating 44 Paleolithic find-spots in two clusters: Mataci-Stoići Ride and the Bay of Ljubač (fig. 1, no. 7) (Chapman et al. 1996). Five per cent of the artifacts are retouched and these tools can all be attributed to the Middle Paleolithic. Local low-quality pebble flint and chert was exploited for tool production. Although remains were not found in 80 % of the surveyed area, Chapman et al. conclude: "Large areas of the Dalmatian lowlands would have been at least potential settlement zones for migratory hunter-gatherers (1996: 61)."

CAVES IN DALMATIA

Although the sediments from several caves in Dalmatia were attributed to the Middle Paleolithic period, the presence of the Mousterian assemblages was confirmed only by preliminary analysis for Mujina Pećina (Karavanić and Bilich-Kamenjarin 1997; Karavanić 2000). The cave is situated north of Trogir and west of Split in a hilly area (fig. 1, no. 8). It is about 10 m deep and 8 m wide, located at about 260 m a.s.l. Hilly terrain and Kaštela bay, which was dry land during the Mousterian occupations of the site, could have been observed nicely from the front of the cave (fig. 2). The finds were initially collected in 1977 from the surface inside and outside the cave (Malez 1979), and the first test excavation took place in 1978 (Petrić 1979). In 1995 a joint project of the Department of Archaeology at the University of Zagreb and the Kaštela City Museum launched systematic excavations that are still in progress. Following standard archaeological methodology for Paleolithic cave sites, all artifacts and ecofacts with dimensions of 2 cm or more in size have been recorded in three dimensions on site plans, and all sediments were sieved (fig. 3). The main stratigraphic profiles are only about 1.5 m deep (fig. 4) and they contain poorly sorted Quaternary sediments composed of large fragments of carbonate rock, gravel and sand grains, a little silt, and some clay (for stratigraphy

Fig. 2. *View from the area in front of Mujina Pećina. The landscape is marked by hilly terrain and the Kaštela Bay, which was dry land in the late Middle Paleolithic when the cave was occupied. Photo taken by I. Karavanić, 1996.*

of the site see Karavanić and Bilich-Kamenjarin 1997; Rink et al. 2002). The interface between Level E2 and E1 was dated by AMS to 45 ka BP, while the AMS age of overlying levels, calculated as the mean of 5 dates from these levels, is about 39 ka BP (for discussion on these and the ESR dates, see Rink et al. 2002).

Two localized areas of burning, probably representing open, unconstructed and unpaved Mousterian hearths, were found in the occupation Level D2. Anthracotomical analysis shows that *Juniperus sp*. was used for fuel on both hearths (M. Culiberg, personal communication). More than 110 lithics have been found in Level D2 and less than 100 in level D1, while Level B yielded more than 320 lithic finds. There is also evidence of animal bones processed by humans. Cut marks are visible on some bones. A small concentration of lithic finds in square D7 (level D1) was uncovered, as well as a small frequency of bones and lithics in the right portion of the cave (figs. 5, 6). P. T. Miracle (n.d.) carried out a preliminary analysis of the faunal material from complex D (levels D2 and D1) and Level C and B. Level B and D2 had assemblages similar in size (984 and 1,090 bone fragments), respectively. Only about 10% of the remains were identifiable to taxon. The total sample identifi-

Fig. 3. *Excavating in Mujina Pećina. Bedrock is visible in excavated squares in the middle of the cave. Photo taken by S. Burić, 1998.*

able to taxon is thus relatively small from each level, and the discussion that follows must be treated as preliminary. The dominant animal species represented in complex D is red deer, followed by chamois/ibex, birds and large bovids, while equids and carnivores are very rare. Some interesting changes between stratigraphic units in the relative representation of larger ungulates have been noted. From Complex D to Level B the frequency of red deer drops dramatically, while that of equids and small caprids rises significantly (Miracle n.d.). Miracle (n.d.) has also been able to demonstrate human activity as a factor (cutmarks, breakage patterns, and burnt bones) on the remains of chamois, ibex, deer, auroch and bison. The presence of adult animals (deer, chamois, ibex) with traces of butchering suggests that hunting played an important role at the site. On the other hand, the accumulation of animal bones such as equids and hare was most likely due to carnivore activity. Based on the fetal and neonatal faunal remains, Miracle (n.d.) was able to establish the exact seasons during which the site was occupied. During the period in which Layer B accumulated, most occupations took place during the fall, and possibly in the spring. Episodes of occupation in the spring were also likely during the formation of Layer D1. People were not present at the site during the summer or winter, when the cave served as a bear den.

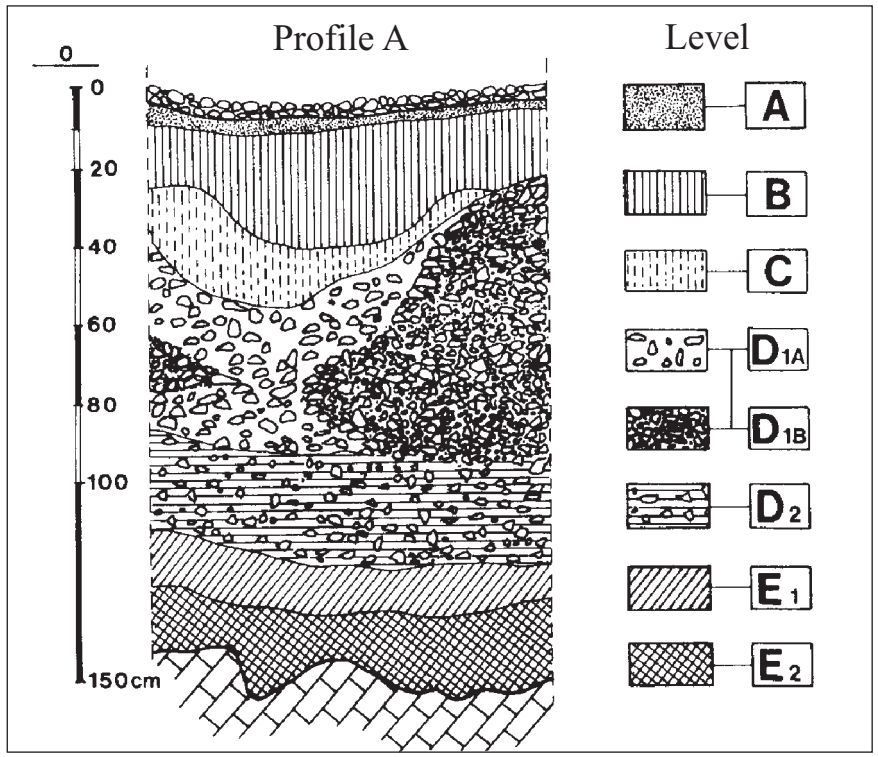

Fig. 4. *Stratigraphic profile "A" of Mujina Pećina (drawing by M. Bezić, modified after Karavanić and Bilich-Kamenjarin 1997): Level E2) dark reddish brown sandy clay sediment; Level E1) reddish brown sandy sediment; Level D2) cryoclastic stone debris with gravel and yellowish red sandy sediment; Level D1) stratigraphic unit D1A) cryoclastic stone debris with some gravel and yellowish red sandy sediment; Level D1) stratigraphic unit D1B) cryoclastic stone debris sporadically calcified with little or no fine sediment; Level C) strong brown sandy sediment with stone debris; Level B) strong brown sandy sediment with stone debris; Level A) dark brown humus.*

A significant presence of Levallois debitage, without Levallois cores, was found in levels D1 and D2 (about 20%). In contrast, the frequency of such finds in Level B is not so high. Small tools (as with the so-called Micromousterian) were found in different levels of Mujina Pećina along with "typical" Mousterian tools. Tool assemblage is dominated by retouched flakes, notched pieces and denticulates. These tools have been made on local chert pebbles and nodules which are often small. It seems more probable that unintentional use of small pebbles available near the cave, as

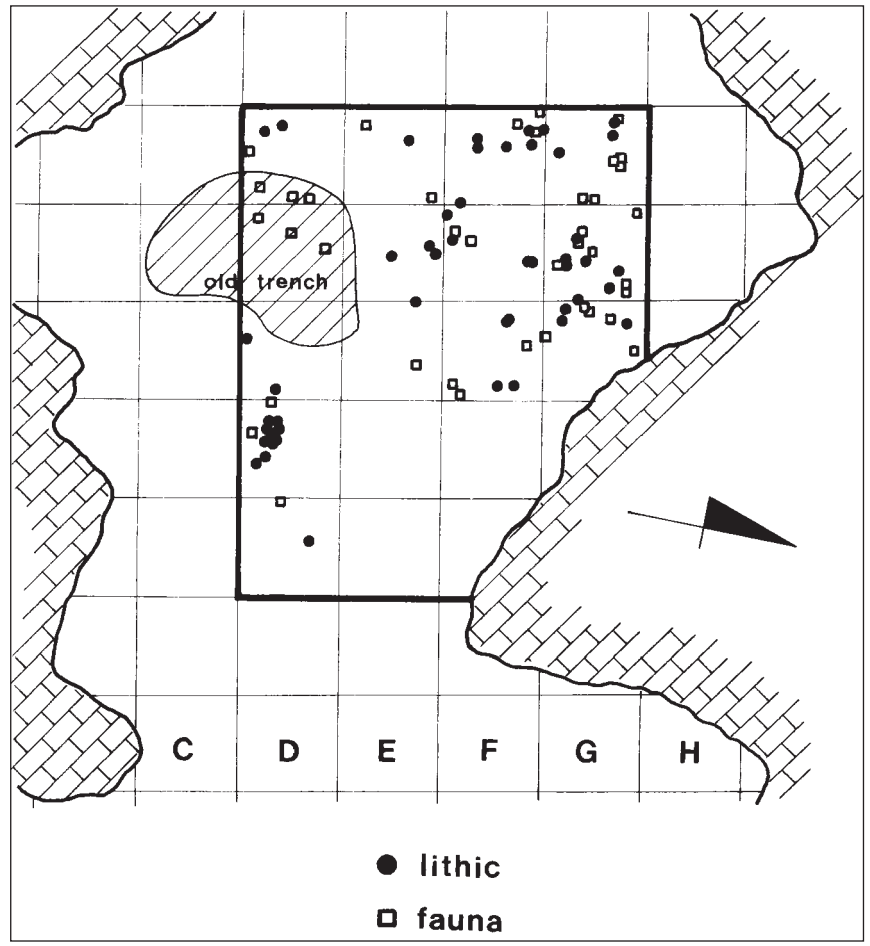

Fig. 5. *Horizontal distribution of finds from Mujina Pećina level D1.*

well as low flaking quality of larger pieces of some local cherts, limited tool size in the Mousterian of Dalmatia, rather than the intentional selection of small pebbles for production of small tools.

The oldest levels (E3, E2, E1) in Mujina Pećina are richest in finds, and they indicate much more intensive activity of humans than in more recent levels. The richest levels suggest long-term occupation (Karavanić 2000), but may also result from the repeated use of the site for brief occupations (see Conard 1996).

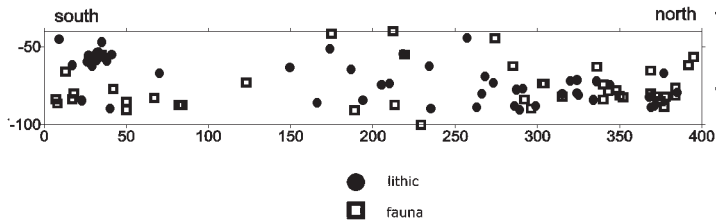

Fig. 6. *Vertical distribution of finds from Mujina Pećina level D1.*

DISCUSSION

Although the excavations of the Middle Paleolithic sites in Croatia were relatively rare during the twentieth century, several sites yielded important evidence for interpreting Neanderthal behavior and a corresponding settlement system.

All caves in northwestern Croatia with Mousterian remains are located in the same ecological zone which has been inhabited and controlled by a Neanderthal population during the Middle Paleolithic. Direct radiocarbon (AMS) dates of 29 and 28 ka BP on Neanderthal bones from Vindija Cave (Level G1) establish them as late survivors (Smith et al. 1999) and provide a temporal overlap between them and early modern humans in central Europe (Karavanić and Smith 2000). The faunal assemblages are dominated by cave bear. The concentration of these remains can be explained by carnivore denning, meaning that the human presence on the sites during the Middle Paleolithic was mainly sporadic and short (Miracle 1991). However, it has been strongly suggested that Neanderthals from northwestern Croatia were successful hunters on large animals such as Merck's rhinoceros (Miracle 1999) and that they obtained the vast majority of their dietary protein from meat which was largely obtained by hunting (Richards et al. 2000). Apart from animal meat, human meat was probably also eaten at Krapina, and about 100,000 years later in Vindija Cave, but it is not possible to make any firm conclusion about the reason for cannibalism at these sites (Patou-Mathis 2000; White 2001). However, it is possible that Krapina may have been a ritual site where human bones where accumulated after defleshing for a particular reason (Russell 1987). The claim that human remains representing about seventy individuals with an average age of thirteen, does not reflect a normal Neanderthal population which would be expected at a site (Wolpoff 1979). This may support the hypothesis of a ritual place.

It has also been suggested that Vindija (Malez 1985) and Veternica (Malez 1983) may have been ritual sites for Paleolithic people. However, there is no archaeological evidence suggesting ritual behavior at Vindija, while the majority of accumulated cave bear bones and skulls from Veternica can well be explained by natural agencies rather than human activity.

In southern Croatia (Dalmatia), where the climate was milder than in northwestern Croatia, the evidence of settlements come mainly from the open-air sites, although the caves there were also inhabited. Mousterian tool assemblages from Dalmatian sites are characterized by small tools, as with the so-called Micromousterian, and by the significant presence of denticulates and notched pieces. Although this manifestation is typical for a chronologically late Mousterian industry in the Eastern Adriatic region (Basler 1983; Rink et al. 2002), denticulates and notched pieces are also frequent in the late Mousterian of Vindija Cave in northwestern Croatia (Karavanić and Smith 1998). In contrast to the sites in the Eastern Adriatic region, sidescrapers are dominant at Pontinian sites from west-central Italy, where the tools are also small (Kuhn 1995). It is possible that these differences resulted from different functions of the sites in these two (Eastern Adriatic and Tyrrhenian) Mediterranean regions.

As in northwestern Croatia, the Middle Paleolithic people of Dalmatia modified their lithic technology to exploit effectively local raw material sources. Furthermore, it seems that populations from both regions (northwestern Croatia and Dalmatia) were successful hunters although they inhabited different environments, as opposed to the Neanderthals who inhabited northwestern Croatia (Rink et al. 2002). It also seems that subsistence behavior of the Mousterian people in Croatia was not strictly dependent on landscape, climate, raw materials and other characteristics of associated industry, as was the case with Neanderthals at many European sites (Patou-Mathis 2000).

Unfortunately, data related to the Middle Paleolithic settlements in Croatia are still rare. It is expected that, along with the review of old collections, current fieldwork will provide new evidence important for the interpretation of the Middle Paleolithic settlements in Croatia.

ACKNOWLEDGEMENTS

I am grateful to Nicholas Conard for encouraging me to write this paper as well as for his comments and editing. The paper also benefited from the comments of Michael Bolus. I am grateful to the following individuals for various forms of assistance relative to this paper: Preston T. Miracle, Hrvoje Potrebica, Ivan Radman-Livaja and Goran Skelac.

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