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Martin Oliva, *Pravěké hornictví v Krumlovském lese. Vznik a vývoj industriálně-sakrální krajiny na jižní Moravě – Prehistoric mining in the ‘Krumlovský les’ (Southern Moravia). Origin and development of an industrial-sacred landscape*, Brno 2010, 469 pp., 141 figs.; 190 photos (incl. 160 in colour); 10 maps; 16 graphs; 70 tables.

In 2010 the Moravian Museum in Brno (Czech Republic) published a monograph on the prehistoric mining complex ‘Krumlovský les’, in the series: ANTHROPOS studies in Anthropology, Paleontology and Quaternary Geology’ (Vol. 24/N.S. 24/2010). Its author is Martin Oliva, a well-known researcher of the Stone Age associated with the Moravian Museum, with 12 other researchers contributing complementary studies.

The book consists of 23 chapters divided into two parts. The first part, written by Oliva, begins with an introduction and ends with a conclusion, extensive literature review, and a substantial summary in English (pp. 352–383). The seven chapters in Part I include a description of the archaeological excavations and a presentation of the results with their interpretation. The second part of the book consists of 12 chapters containing the results of the specialized research (naturalist and archaeometric) conducted in conjunction with the excavations of the ‘Krumlovský les’ mining complex. Finally, there are 160 colour photographs illustrating the location of the archaeological site, its trenches and features, and some of the small finds.

The first chapter (pp. 9–11) describes the history of the archaeological excavations at the ‘Krumlovský les’ site. At the beginning of the 1970s, K. Valoch and V. Gebauer conducted a field survey in this region to investigate a site from the Middle Palaeolithic. In 1993 Martin Oliva began investigations in the eastern part of the site and recovered numerous concentrations of fragments of chipped hornstone. Excavations followed and this monograph is the final report on the project.

The second chapter describes the location and topography of the site (pp. 12–24). Although the area of the site was not defined then, Oliva divided the ‘Krumlovský les’ mining complex into nine zones. The chapter includes a map of the whole area and maps of each of the zones with the shafts and other features. There are numerous photographs and plans of the archaeological cuttings. Military topographical maps from the 18<sup>th</sup> and 19<sup>th</sup> centuries are also included. They are one of many examples of the author’s inquiring mind and his endeavours to utilize all the possible categories of information.

In the next brief chapter (III; pp. 25–28), the author outlines the history of the studies of the ‘Krumlovský les’ hornstone, from its first mention in 1669 up to the recent petrographic study undertaken recently by Antonín Přichystal.

The fourth, most extensive, chapter (pp. 29–266) presents information on the archaeological trenches, discovered shafts, and collected inventories, in chronological order. The material which could not be dated is also included. One of the issues considered is the rate at which the abandoned shafts were in-filled. Descriptions are supplemented by drawings of shafts and of some of the flint material, as well as diagrams with associated radiocarbon dates. All of the material analysed is presented in tables and graphs at the end of the chapter, along with a table listing all the <sup>14</sup>C dates obtained so far. As of this moment, ‘Krumlovský les’ is one of the most extensively ‘dated’ mining sites in Europe.

The mining at the ‘Krumlovský les’ complex started at the end of the Neolithic and beginning of the Eneolithic Ages. So far no evidence has been found of any mining activity by older communities, but the oldest radiocarbon date obtained (GrA 34410 8690±60 cal BC) confirms that the site was occupied, or visited by, some Mesolithic groups. Artefacts of ‘Krumlovský les’ hornstone have been found at sites dated to the Palaeolithic, Mesolithic and Early Neolithic, indicating that this raw material was exploited by such communities.

The earliest dated shafts should be associated with the Moravian Painted Ware culture. The fact that there is evidence of mining in the Late Neolithic, Eneolithic and in the metal ages (the most recent date is GrA-30370; 580±130 cal BC), came as a surprise even to the author of the research. Oliva is of the opinion that from the Eneolithic the ‘Krumlovský les’ mining complex functioned as a sacral-ritual centre.

The most interesting discovery comes from the Eneolithic. Shaft no. 4, dated to the period of Lengyel culture, revealed skeletons of two women, a newborn child and several animals. These are the oldest signs of ritual-sacral activity noted at the site.

Descriptions of the inventories dated to the metal ages are especially interesting. In Europe, flint mining sites dating to the Late Bronze and Early Iron Ages are rare (Weisgerber *et al.* 1980; Lech ed. 1995). The descriptions of the shafts discovered by Oliva and of the recovered flint material are therefore an extremely valuable source for the studies of late flint mining and allied industries.

The fifth chapter (pp. 267–289) describes changes in the way hornstone from ‘Krumlovský les’ was utilized through time. This is a very interesting and detailed depiction of how the raw material was distributed and exploited from the Early Neolithic to the beginnings of the Iron Age. The studies of the younger periods were especially difficult because, until recently, there was no information about flint working in Moravia during this time although some sound research on the subject has appeared recently (e.g. Kopacz and Šebela 2006). Oliva’s work on the use of siliceous raw materials by communities from the ages of metal is of special importance for the

development of research in this area. The last part of Chapter V describes the use of hornstone from the La Tène period up to the 19<sup>th</sup> century.

Investigations into the distribution of the exploited raw material posed a number of difficulties. Different types of Jurassic hornstone are very similar to those which occur in the 'Krumlovský les' area, so determining the place of origin is not always easy. An additional problem is the lack of a full petrographic analysis of the Jurassic raw materials. The 'Krumlovský les' hornstone, analysed by Antonin Přichystal (Ch. XII, pp. 385–392), was divided into three varieties: 'Krumlovský les' (I, II, III). Archaeological and petrographic studies have provided a consistent description of each individual type of this raw material. Determining the petrographic and technological features (Přichystal 2010: 387) made it possible, in some cases, to identify the provenance of artefacts recovered at archaeological sites located outside the area where the deposits of that particular hornstone occur.

The next two chapters (VI and VII) discuss the similarities and changes in the technology of working hornstone, beginning with the end of the Neolithic and Eneolithic ages, and the mining methods identified at the 'Krumlovský les' mining complex. The technology is especially interesting in the case of hornstone exploited in the Late Bronze and Early Iron Ages when there does not seem to be any clear-cut direction of working. No final products were distinguished. Numerous artefacts bear traits suggesting they were knapped without any specific objective in mind and have traces of deliberate destruction. Similar features were registered at the site of Wierzbica 'Zełe,' Radom district (Lech, Piotrowska and Werra 2015). It was also found that some of the shafts from the Late Bronze Age and Early Iron Age did not reach the layers of raw material.

Chapter VIII is concerned with the changes in mining and the mining landscape. This is the most interesting part of the book, which contains a detailed interpretation of the 'Krumlovský les' mining complex. The author points to the symbolic meaning of siliceous rocks and mining activities. The ritual and social meaning of flint and flint working is increasingly being noted in literature on the subject (Iwaniszewski 1997; H&J. Lech 1997; Stepniowski 1997; Piotrowska 2000; Högberg 2009). This chapter will be discussed in more detail later in this review.

The first part of the book ends with a conclusion, an extensive bibliography of over 700 items, and a lengthy summary in English.

The second part consists of 12 chapters containing the results of the interdisciplinary studies arising from the studies of the materials from the site: the characteristics of the hornstone from Krumlovský les, sedimentology of the site, pedology, charcoal analysis, analysis of bone remains: anthropologic, dental DNA analysis, analysis of strontium isotopes, analysis of animal bone remains and phosphorus content, petrographic pottery analysis, and analysis of fragments of bronze artefacts. The book closes with a report by the Commission which evaluated the archaeological excavations and the quality of the research carried out under the grant which funded the work.

This is a well-edited book: the figures are clear and well described. The thorough presentation of the obtained archaeological data is an undisputed asset of the work, but its most important part is the interpretation presented in Chapter VIII. This is worth a closer look.

The chapter begins with a subchapter entitled 'unwelcome knowledge' wherein the author writes that he is aware that, among some archaeologists, the interpretation he is about to advance may not find acceptance. In his enquiries the author refers to the results of the ethnological studies showing that flint mining and flint material had various meanings, and in mining it was not only the exploited raw material which was important. The fact that to procure it meant going down inside the earth, having contact with 'mother earth' was also significant.

According to the author, mining should be interpreted in terms of society and ritual. He describes the way its importance changed from the Palaeolithic to the final phase of the 'Krumlovský les' mining complex, considering such issues as specialization of labour, the beginnings of social organization and changes in the social structure of pre-historic communities. He identifies two stages in the functioning of the mine. The first, when procuring raw material was important, and the second, when the mining 'act' and the working of the raw material had the greatest significance. The change, in Oliva's view, took place in the Eneolithic and it was during this time that social and ritual meaning played the most important role. The most striking example cited in support of his position are the previously mentioned skeletons from Shaft 4, associated with the activity of the Lengyel culture communities. Moreover, in various features dated to the Eneolithic, traces of 'chipping for the sake of chipping,' without any production goals, were noted. Oliva gives numerous examples of features with remains of chipped hornstone. Their characteristic feature is the presence of material from all the stages of knapping, indicating that nothing was taken away. All the debitage produced during chipping, all waste and flakes remained. It seems that these conclusions should be supported in the future by a study of refits. It is known that in some cases only single artefacts were needed (see Wierzbica 'Zełe' in the Late Bronze Age; H&J Lech 1984, 1997). According to Martin Oliva, in the case of 'Krumlovský les' the act of chipping itself was most important, as it did not lead to obtaining any concrete artefact. The flint specimens which were recovered are, in his opinion, proof of 'chipping for the sake of chipping'. This type of activity is also known from the mine of chocolate flint of Wierzbica 'Zełe', Radom district (Lech, Piotrowska and Werra 2015). It could have had ritual functions, set the rhythm of life, motivated to further work, etc.

Apart from mining flint rocks, the author also addresses building as a ritual act. In the case of the 'Krumlovský les' mining complex he argues that these activities were performed in order to regulate and maintain the social equilibrium. And it is this activity, says Oliva, and not its material effect, that was the most important reason why the 'Krumlovský les' mining complex continued to function from the Eneolithic on.

Martin Oliva's monograph is a fine illustration of a holistic approach to studying and interpreting this intriguing site. An important part of the book is a detailed presentation of the excavations carried out there for over 20 years, a publication of numerous drawings of the profiles and flint artefacts, splendid photographs, and radiocarbon dates. A broad view is taken, showing changes in the way the local hornstone was procured, used, and distributed from the Mesolithic to the Iron Age. But the work is not limited to presenting the archaeological material. The author points out that our knowledge of the social and spiritual life of the prehistoric communities is as yet limited (see also Topping 1997; Topping and Lynott 2005; Högberg 2009).

The way in which the topic is approached and the innovative interpretations proposed make this one of the most important works in the area of mining and using of flint rocks in the ages of metal published in Europe in recent decades.

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