Robert G. Bednarik 1990. About Pleistocene chert mining. *Sahara* 3: 113-115.

About: «Pleistocene chert mining»

In *Sahara 2*, Vermeersch, Paulissen and Van Peer (1989) present a fascinating summary of their work on Palaeolithic silica quarries on the Nile. Their findings are of great significance, not just because they illuminate the means by which this technologically important raw material was procured, but because the evidence provides a basis on which to speculate about the cognitive abilities of the miners. Their willingness to excavate shafts through sterile overburden at Nazlet Khater (Vermeersch *et al.*, 1984) demonstrates an ability of rationalizing about a concealed geological formation from observing its exposures tens of metres away – and of doing so with sufficient conviction to embark upon an initially unproductive course of action (Vermeersch and Paulissen, 1989: 36).

While I find the evidence from Nazlet Khater 4 site (early Upper Palaeolithic, about 33,000 years B.P.) generally convincing and well-documented, I would like to clarify certain points concerning the reports on the Nazlet Safaha quarrying pits, and dispel certain misconceptions. It is evident from the various publications by Vermeersch and colleagues that the dating of that site is based squarely on its lithic typology – and to be more specific, on the perceived differentiation of various Levallois technologies. On the basis of the current evidence it seems premature to provide an age estimate of around 50,000 years. Perhaps its validity can be demonstrated in the future, but at the present time alternative interpretations are possible.

One look at Figure 2 of the present article shows that so-called Middle Palaeolithic artifacts occur not only in the pit fill, but also in the most recent horizon, which consists of loose aeolian sands. How do the excavators account for this? The Levallois technique as such does not define a specific tool industry, or denote a discrete period of age; it occurs from the Lower Palaeolithic of France to the final Pleistocene of California, and can in fact be observed in all continents. Moreover, in Egypt the continuation of Levallois-mousteroid elements into the Upper Palaeolithic is particularly typical (Narr, 1966: 358; cf. Vermeersch *et al.*, 1985) and there is even an «Epilevalloisian» in the Mesolithic (Clark, 1965; Smith, 1965). Vermeersch *et al.* (1986) and Vermeersch and Paulissen (1989) both stress the similarity of this Levallois industry with the lithic typology of Nazlet Khater 2, where the Upper Palaeolithic burials were found. More relevant than the chronological implications of the use of the Levallois technique are two other considerations: firstly, the number of basic techniques available to decorticate a rounded, flat chert cobble is quite limited, and centripetal flaking will inevitably result in Levallois features. Secondly, it is amply evident from the excellent illustrations in the reports by Vermeersch and colleagues that the lithics of Nazlet Sabaha (as the site is called in Vermeersch *et al.*, 1986) include a distinct blade element, which is more relevant than the industry's archaic characteristics. I am therefore inclined to disregard the chronological implications of the «Levallois technique», regarding the site as undated at this stage. I look forward to the results of the foreshadowed radiocarbon and TL dating.

There are other problems with the interpretation of the site. The surface pavement is suggested to represent debris «left on the

surface by prehistoric man», and was previously described as «man made» (Vermeersch and Paulissen, 1989). Figure 3 of the present paper depicts a surface resembling a typical deflation product. Similarly, I doubt that the spoil material remained in the pits during quarrying, which «hampered or even prevented further extraction in depth». It seems to me that to excavate a pit the spoil has to be removed, even if it is only a few centimetres deep.

Citing Weisgerber (1980), Vermeersch and colleagues claim that «all chert mining sites reported until recently are younger than 12,000 years and date mostly from 6,000 to 4,000 years ago». An identical statement is in Vermeersch and Paulissen (1989), a paper entitled: «The oldest quarries known: Stone Age miners in Egypt». Generally, Vermeersch and colleagues assume that no evidence exists of early silica mining in other continents (e.g. Vermeersch *et al.*, 1986). I would like to correct this misconception: subterranean silica mining evidence of the Pleistocene has been reported from both Europe and Australia. The Australian evidence is by far the most extensive, and the first site was published over twenty years ago (Gallus, 1968, 1971; Wright, 1971). This has been mentioned in countless publications since then, and at present there are nine limestone caves known in Australia where chert or chalcedony seams have been mined extensively (Bednarik, 1985, 1986a, 1986b, 1986c; Aslin and Bednarik, 1984a, 1984b). In contrast to the mining traces in alluvial deposits on the Nile, the Australian evidence occurs in deep and dark caves, up to several hundred metres from che cave's entrance, and frequently in locations of difficult and hazardous access. I distinguish five basic mining methods at these sites. In one of them, wooden, probably fire-hardened, pointed stakes of over one metre length were driven into solid rock to expose the horizontal chert seam. Almost two tonnes of limestone rock were removed in one single location in Gran Gran Cave (South Australia) by this method, which resembles the methods used at the ochre mine of Wilgie Mia (Western Australia). That immense open cut mine is 20 m deep, and several thousand tonnes of rock were removed from it by prehistoric miners (Flood, 1983: 238-240).

We know that the Pleistocene chert miners of Australia possessed the technology, the scaffolds, tools and lighting to undertake systematic underground mining of various types, and that their quest for prized raw material involved considerably greater efforts and more complex methods and organisation than the excavation of small pits in a gravel deposit would entail. Most of the Australian evidence of underground chert mining is undated, but it is believed to be mostly or entirely a Pleistocene phenomenon. There is no evidence of a human presence in the Holocene in Koonalda Cave, where the mining traces date from up to well beyond 31,000 years B.P. (Gallus, 1971, 1986). Interestingly, Gallus has described bell-shaped mining pits from the floor of the vast clastics deposit in Koonalda, which bring to mind those described by Vermeersch *et al.* from Nazlet Safaha.

I have described chert mining evidence also from the French cave Bara Bahau (Dordogne), occurring among the Upper Palaeolithic engravings in that cave (considered to be very early), 90 m from the entrance (Bednarik, 1986a). Since this first evidence of Palaeolithic mining in Europe was recognized in 1981, Gáboriné-Csánk (1987) has described evidence of Mousterian flint mining with *pick axes* from near Budapest, Hungary.

Pleistocene chert mining has thus been described from Europe, Egypt and South Australia. On present indications the age of this evidence is of a similar order of magnitude in all three regions: perhaps between 20,000 and 50,000 years old. This evidence from three continents demonstrates the use of systematic extraction technologies to mine silica minerals; it indicates determination and resourcefulness, and the understanding of geological phenomena to correctly predict the occurrence of concealed stratified deposits that motivated these people to embark upon the laborious removal of sterile overburden or massive rock. The evidence provided by Vermeersch *et al.* needs to be seen in this context if we are to realize its full significance – and it needs to be seen as part of a global development of exploitative strategies of Pleistocene man.

I wish to take this opportunity to congratulate the chief editor, the editorial staff and the publishers of *Sahara*, on the very high standard of both the content and the presentation of this journal. The difficulties inherent in its multi-lingual and multi-disciplinary format are beautifully mastered, and the handsomely produced first two issues must have involved considerable subsidization of production costs. I sincerely hope that this magnificent journal is here to stay.

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