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Cave art and perceived abilities of the ancients

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The greatest single difficulty experienced in the archaeology of the Ice Ages has stemmed from its inability to accept the cultural, cognitive or technological sophistication of the people of the Pleistocene. This is well expressed in the history of the initial discovery of Palaeolithic cave art, particularly in the rejection of the palaeoart of Altamira, culminating in Emile Cartailhac's famous *mea culpa* in 1902. His steadfast scepticism is understandable, in the context of the late 19th century, and to some degree even justified, although the same cannot be said about his refusal to examine the evidence. Here I will explore the structural reasons for the reaction to Palaeolithic art, and I will propose that they determine the epistemology of the discipline still today just as much as they did then.

The existence of Palaeolithic cave art had long been known, probably always since the Ice Age (Pleistocene cave visitors often found rock art that had been created millennia previously, and many have recorded their reactions to it). In 1458 Pope Calixtus III decreed that the religious ceremonies held in 'the Spanish cave with the horse pictures' had to cease. We cannot know which cave he referred to, but it was almost certainly a cave with Palaeolithic art. However, while many people of the ten thousand years after the Pleistocene were probably familiar with the ancient art, nobody had told the archaeologists about it. This factor should have serious consequences for Don Marcelino Santiago Tomás Sanz de Sautuola (Fig. 1). In due course it would destroy his life.

In 1868 a hunter, Modesto Cubillas, opened up a hole on de Sautuola's property in northern Spain and found a large cavern. This was mentioned to the land's owner years later, in 1875, and he decided to explore the cave. He found a large quantity of split bone upon digging in its floor deposit, some of which he took to show a geologist friend, Juan Vilanova y Piera at Madrid University. Vilanova recognised the bones as being of extinct species, and that they had been fractured by humans. In 1878, de Sautuola visited the World Exhibition in Paris, which included an exhibit of stone tools and bones recently excavated in caves of the French Périgord. De Sautuola remembered his own cave, and in the spring of the following year began in earnest to excavate part of the Altamira cave. Mixed with the bones of animals and oyster shells, he found the typical stone blades of the Magdalenian period in large quantities. Deeper in the cave, a complete skeleton of a cave bear was encountered, and the explorer also observed black markings on the cave wall, but gave them no further thought at that time. It was his 12-year-old daughter Maria, who played in the cave as he was digging, who first noticed that there were animal pictures on

Figure 1. *Don Marcelino Santiago Tomás Sanz de Sautuola, 1831–1888.*

Figure 2. *De Sautuola's daughter Maria.*

the ceiling (Fig. 2). This was in November 1879, after he had worked in the cave for quite some months.

It was at once clear to de Sautuola that the incredible gallery of bison paintings he now began to see was probably the work of the same people whose debris he was digging up, partly because he had already observed seashells full of paint pigment, and some of their debris occurred right on top of the floor deposit. He reported this incredible discovery immediately to Vilanova, who came to inspect the find. Vilanova agreed with his friend that the many paintings were ancient. He gave a lecture in Santander, the discovery made headlines across Spain, and King Alfonso XII visited the Altamira cave. In 1880 de Sautuola produced a publication, describing the paintings and the occupation strata, but cautiously avoiding the claim that the two forms of evidence necessarily needed to belong to the same time. It was a sober treatise, entirely lacking in flamboyant claims. For the illustrations he employed a destitute and dumb French painter he had befriended earlier, and this turned out to be a fatal mistake.

The publication was greeted with considerable disapproval, which soon built up to ridicule and anger. The discipline decided collectively that de Sautuola was either a charlatan, or at the very least he had been severely duped. At the International Congress of Anthropology and Prehistory in Lisbon, Vilanova presented the discoveries in Altamira, strongly defending de Sautuola. One of the most influential French delegates, Professor Cartailhac, walked out in disgust, and later roundly declared the paintings to be a fraud, without even bothering to see them. In fact all other experts refused to examine the site initially, and the French decided that the whole affair was a plot by Spanish Jesuits to undermine the credibility of pre-History as it was emerging at the time. Eventually Édouard Harlé was chosen to examine de Sautuola's outrageous claims, and he promptly discovered the involvement of the dumb painter (who in the meantime had disappeared). No further investigation was needed, the case was clear enough to him.

Vilanova tried in vain to use his academic prestige to promote acceptance of the find, he was judged to have been the first to have been duped by the charlatan of Altamira, and unable to concede that. De Sautuola, for his part, did not respond to the accusations, but we know that he suffered greatly. He tried to present his case at a French conference in Algiers in 1882 and submitted a self-funded booklet to another conference, in Berlin, but both endeavours were ignored. Six years later he died at the age of fifty-seven, a broken and bitter man, in the full knowledge that he had made one of the greatest discoveries in the history of archaeology. He also knew that he had failed in effectively conveying this knowledge to a thoroughly hostile academic world. His death weighs heavily on archaeology, particularly as he was judged without trial.

A French schoolteacher, Léopold Chiron, had found engravings deep in the cave of Chabot already in 1878, i.e. the year before the discovery of the Altamira cave art, and in 1890 in another site, Figuier. In 1883 Francois Daleau excavated engravings on a wall in Pair-non-Pair that had been covered by Ice Age sediments (Fig. 4). In 1895, a bison engraving was discovered in the French cave La Mouthe, and

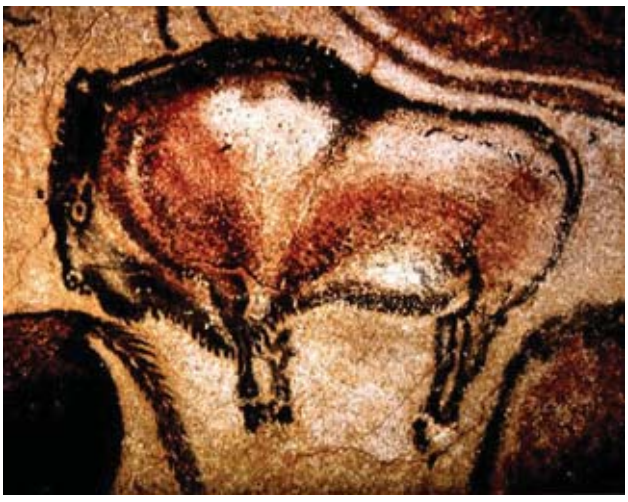

Figure 3. *Section of the ceiling of Altamira.*

Figure 4. *Engraving in Pair-non-Pair Cave.*

Emile Rivière, who had actually seen the Altamira paintings, found more rock art in La Mouthe, and four years later a Palaeolithic lamp. The evidence in favour of Palaeolithic rock art began to mount. In 1897 Cartailhac still refused to publish the report of a new discovery of cave art, but in 1902 he published his famous '*Mea culpa d'un sceptique*', in which he accepted that he had been monumentally wrong.

What had probably most influenced Cartailhac was that he could not imagine how people with a primitive stone tool culture could possibly have produced artistic masterworks. This conceptual encumbrance has been a persistent feature of Pleistocene archaeology right up to the present time, as has been the rejection of any other corrections by amateurs to ensure the continuation of its false dogmas. This trend began in the 1820s to 1840s, with the stone tools found by Jacques Boucher de Crèvecœur de Perthes (Fig. 5), Casimir Picard, Marcel-Jérôme Rigollot and Edmond Hébert in France, and by William Pengelly in England. As late as 1858, at an archaeology congress, the Acheulian stone tools were unanimously rejected as 'a worthless collection of randomly picked up pebbles'. Also rejected was the notion that humans had co-existed with Pleistocene fauna. This was both careless and embarrassing, because by that time, Scandinavians had already established the existence of a Stone Age in Europe, and British geologists Hugh Falconer and Joseph Prestwich had begun to validate Boucher de Perthes' claims. They published their findings in the following year, the year of Darwin's *Origin of the species*.

Figure 5. *Boucher de Perthes, 1788–1868.*

Figure 6. *Johann Carl Fuhlrott, 1803–1877.*

In that very same year, 1859, Johann Carl Fuhlrott reported the discovery of the remains of an extinct human in the Kleine Feldhofer Cave in the Neander valley of Germany (Fig. 6). With the notable exception of anatomist Hermann Schaaffhausen, every commentator rejected Fuhlrott's view that this was a Pleistocene human. The remains were variously attributed to a Mongolian Cossack, a Celt, a Dutchman, a Friesian, and an idiot. The bone architecture was attributed to various bone diseases, the curved leg bones to a life of riding horses. Even the discovery of similarly odd-looking mandibles in La Naulette Cave in France and Šipka Cave in Moravia were explained away. It took almost thirty years, and the discovery of two substantially complete human skeletons in a cave at Spy, near Namur, Belgium, to accept that all the experts of the time had been wrong. Found together with numerous stone tools and the bones of extinct animal species, even these specimens failed to change the dogma in Germany, where it took to 1901 to have the original Neanderthal remains accepted.

Eugène Dubois, a Dutch physician who had decided to look for the 'missing link' in Indonesia, fared no better (Fig. 7). He succeeded in excavating the first remains of *Homo erectus* in 1891, only to discover that they soon became the subject of a raging academic controversy. By 1928, no less than fifteen different interpretations of the hominin remains had been published. Moreover, they had become 'irrelevant', because in 1912, the remains of the 'real' intermediate form between ape and human were discovered in a Sussex gravel pit at Piltdown. Although it must be said that there were sceptical voices right from the start, they were easily drowned out by the believers, and the question of the cradle of humanity seemed solved at last. It took forty-one years to expose the fraud by scientific tests, which is truly amazing. After all, the forgery was so crude that it can hardly be called that, and almost certainly it was a hoax rather than a fraudulent attempt to mislead science. This is emphasised by the later planting of more 'finds', including a bone shaped into a cricket bat, clearly intended to show the discerning observer that this was simply a prank by a person with a great sense of humour, but was meant to be exposed.

Figure 7. *Eugène Dubois, 1858–1941.*

Unfortunately the gullibility of the experts was much too great, and this fake fossil overshadowed the genuine article. When Raymond Dart, yet another non-archaeologist, reported in 1924 the remains of a creature that seemed about half-way between ape and human, his report was greeted with scorn and contempt. European and especially British archaeologists and physical anthropologists were in no mood to seriously consider such a competing counter claim. The infant from Taung, in Bophuthatswana, was ignored for decades, in favour of the Piltdown hoax (Fig. 8). This same blundering pattern continued to the present. In the middle of the 20th century, the introduction of radiocarbon dating shook the very

Figure 8. *Raymond Dart with the skull of the Taung child.*

Figure 9. *Replication of sea crossing by* Homo erectus *in Indonesia about 850 000 years ago, conducted by the author in 2004.*

foundations of archaeology, because the chronological structures that had been built began to be tested by scientific methods. Many archaeologists objected to this vigorously, just as in recent years some archaeologists have vocally objected to attempts to estimate the ages of rock art by scientific means. This is well illustrated by the Côa controversy in Portugal in the late 1990s, which is in part concerned with the perception of some archaeologists that scientists 'are trying to take over archaeology'.

One of the most recent controversies shows that, as a discipline, we have learnt nothing from the mistakes made in the past. In 2004, the bones of a very small adult human were excavated in the cave Liang Bua in western Flores, Indonesia. Named *Homo floresiensis*, the tiny creature, only about a metre tall, immediately became the object of a controversy resembling so many similar previous ones. Interpretations of it ranged from microcephalic modern human to gibbon. What this extreme spectrum of opinions shows is that experts lack the ability of identifying human remains reliably at the species level. This is an all too familiar pattern, and the ability of the discipline to repeat previous mistakes is disconcerting.

This applies equally to the conceptual encumbrance of Cartailhac's contemporaries, of finding it impossible to attribute to Palaeolithic people the ability to create art. Having grudgingly accepted that Upper Palaeolithic people did produce sophisticated art, archaeologists now began emphasising how much the 'primitive' hominins of the earlier Middle and Lower Palaeolithic lacked such abilities. The new myth was that all advanced human abilities were restricted to 'anatomically modern' people, and that these people from Africa replaced all other humans by about 30 000 years ago. The subconscious driver of this model remains the same as it was in the 19th century: the fixation of humanity's dominant societies on emphasising the primitivism of other societies, be they of recent times or of the Pleistocene. This ethnocentrism finds many manifestations, for instance in diminishing cultural complexity of ethnographically studied groups, which in recent centuries justified colonialism and slavery; or in the current paradigm of replacement of the Neanderthals, which extols the virtues of competition and explains and rationalises genocide as a historical phenomenon and as an inevitable process. This ideology underpins Western hegemony, applying its models of reality and its self-conscious measures of sophistication, which in the case of the capabilities of humans of the distant past are determined by archaeology. When consistent evidence is presented that these hominin abilities were very significantly greater than archaeological dogma could possibly concede, that evidence is still today explained away or discredited, and its presenters are treated with precisely the same contempt as were the pioneers of Pleistocene archaeology, such as those listed above.

Let us consider some current examples of this phenomenon. There is a great body of data suggesting that seafaring was practised throughout the Middle and Late Pleistocene, in various parts of the world, and that it first emerged roughly one million years ago in what today is Indonesia (Fig. 9). Clearly, colonisation by navigating *Homo erectus* is as unacceptable to the dogma as cave painting was to Cartailhac, because it implies a cultural complexity that would annihilate the establishment dogma. Seafaring demands the use of reflective language, of planning ahead for at least several months, of technologies such as cordage, knots and the ability to carry drinking water at sea. And yet, the proof is irrefutable: at least twenty islands and one continent were colonised by maritime people with Lower or Middle Palaeolithic technologies. This new heresy has been

fended off by desperate endeavours to preserve the notional primitiveness of the human groups concerned. Recently it was argued that they must have crossed on land bridges at lower sea levels (in all cases considered, the landmasses concerned were never connected to others), that they could have floated across on naturally accumulated plant drifts (yet all the sea straits so crossed have strong transverse currents and cannot be crossed by floating; and this would not explain why only humans and elephants ever crossed in some cases), and one archaeologist even proposed that *Homo erectus* must have crossed by riding on swimming elephants.

This is already very reminiscent of the inane alternative explanations the above pioneers had to contend with, but the new origins myth of the replacement of Europeans 30 000 years ago offers an even better example. This myth first emerged in the 1980s, spawned by a series of datings of human remains by a German professor of archaeology. Recently it has emerged that all of his datings were fraudulent, and that many other human fossils had also been misdated. In fact it has now become evident that modern physical traits have only been dated back 27 700 years in Europe, but that the Upper Palaeolithic traditions began very much earlier (40 to 45 000 years ago). The Early Upper Palaeolithic period has only yielded human remains of robust people (Neanderthals and post-Neanderthals, their descendants). The most complex palaeoart of Pleistocene Europe, however, predates the earliest appearance of remotely 'modern' humans, and it now appears that the ultra-sophisticated rock art of Chauvet Cave (France, probably between 35 and 38 000 sidereal years old) or the figurines from Galgenberg (Austria) and Hohlenstein-Stadel (Germany) are all the work of Neanderthal-like people (see *CAR* 6, 2006). Moreover, the numerous intermediate humans, combining robust and gracile skeletal features, and the general trend towards gracility are not unique to Europe, they are found in all continents then settled. That trend occurs gradually over tens of thousands of years, and this gracilisation and the accompanying foetilisation of the human species are universal processes, occurring in Australia as much as in Europe. But in Australia, a Middle Palaeolithic mode of technology continues right up to the middle of the Holocene, and in Tasmania until European contact. Yet we know that these 'Middle Palaeolithic' Tasmanians were as intelligent as we are, and even though their material culture was primitive, their spiritual culture was more as advanced than ours. Only last year have we discovered that they had mountaintop ceremonial sites, which surely are not the sign of a primitive society. And let us remember that they had correctly deduced that humans descended from other animals, an observation it took an intellectual giant such as Darwin to rediscover for Europe. Primitiveness, certainly, is in the eye of the beholder. For all their material sophistication, Europeans have yet to discover what to replace their own primitive constructs of reality with — constructs relying on such false premises as those of time and space. It could well be the case that the constructs of reality of traditional and Pleistocene people were more valid than ours. If we were seriously interested in the human past, rather than in perpetuating false histories invented by archaeology, it would be useful to consider that technologies are not a measure of cognitive or intellectual competence. It would also be relevant to remember that humans created palaeoart hundreds of millennia ago. In India and Africa rock art was made in the Lower Palaeolithic, as were beads and pendants in Europe and Africa, and portable engravings in Europe. The Upper Palaeolithic cave art of France and Spain is the most spectacular of the Pleistocene, but certainly not the most numerous. In Australia alone, there are hundreds of thousands of petroglyphs of the Ice Age, and all of them were made by people with Middle Palaeolithic technologies. Indeed, there is far more Middle Palaeolithic art in the world than Upper Palaeolithic.

The archaeological dogma has thus been wrong most of the time in both the 19th and the 20th centuries; whether it can change in the current century remains to be seen. Its past performance inspires no confidence.

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The early cave art of central Europe

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Introduction

The question, is there Pleistocene rock art in the region of central Europe, has often been asked in the course of the twentieth century (Conard and Floss 1999), particularly since the 1930s. It cannot be answered here either. However, another question is clarified here: whether proof of a central European Ice Age parietal art has actually been presented. My own interest in this issue is merely theoretical, and caused by my long work with the taphonomy of rock art. As an Australian rock art scientist, I have no chauvinistic preferences or wishful ideas as to how to answer this question. I will gladly acknowledge the existence of 'Ice Age art' wherever it may become known. Nor do I wish to revisit the yearnings of rock art researchers to see Pleistocene art even where none exists (having described examples of this phenomenon from Austria, Spain and Portugal, and being aware of others), so I will address cases of well documented findings, and examples whose dating it is not my intent to question.

The significance of the question of Pleistocene rock art in Germany, and indeed in the whole of central Europe, lies in the probability of explaining an extremely rare occurrence as taphonomically determined. Primarily, destruction through frost is to be considered here. Whether that happened through gelifraction or regelation is inconsequential (Schmid 1958, 1963), but the distinctive deposits of Frostbruchschutt (gelifraction clasts) towards the end of the Pleistocene, in rockshelters as well as the entrance-near parts of limestone caves of the wider Alpine region, cannot be ignored (Bednarik 1970). I should confess that I have long suspected that the lack of Ice Age parietal rock art traditions in the region is a purely taphonomic phenomenon (Bednarik 1994a). The topic is therefore, besides its perhaps more popular-scientific aspects, of some theoretical significance as well.

We distinguish between two principal forms of Pleistocene palaeoart: mobiliary art, which appeared in many forms and could be transported easily by humans; and rock art, which was at least initially executed on bedrock or large boulders that were not intended for transport. There are certain borderline cases, pieces that were hard to carry, such as the cylcons of Australia, but in general this division is meaningful and clearly manifested. Rock or wall art can, however, become detached from its original location, in which case confusion can occur. The reasons for such misinterpretations can be much more diverse, however, than might be apparent at first. In the following essay this will be illustrated through examples.

The notably unequal geographical distribution of Pleistocene mobiliary and rock art in Europe has been the topic of discussions for a long time. In the south-west, in Spain and France, rock art has until now been found exclusively in limestone caves (notwithstanding other claims made since 1981, concerning open sites on schist), and portable art also occurs widely. In central and eastern Europe, however, only the latter is found. Consequently, the question emerged whether this really mirrors the historical absence of such rock art traditions, or whether weathering processes and other taphonomic factors have excluded the survival of such art forms. This question has not been examined, but it would be useful to find at least a few examples of central European Palaeolithic rock art. These could then be regarded as examples dating from the taphonomic lag-time of the phenomenon category of rock art (Bednarik 1994a).

The area of present-day Germany offers a unique example for study. Amply endowed with portable art of the Upper Palaeolithic, this country has also yielded some plausible examples of rock art claimed to date from the same cultural periods. The main concentration of mobiliary art of the early part of the Upper Palaeolithic is in the Jura of southern Germany and Switzerland. The region near Ulm has also delivered all credible examples of possible rock art of the same period. In all cases, this concerns exfoliated fragments of bedrock; rock art was never found in situ here. Such fragments may have flaked off through freezing of water in cracks, or through pressure caused by expansion of thawing water restricted by superficial ice; they can also be caused through Salzsprengung, the expansion of solved, transported and crystallised salts in a restricted zone, or through heating (e.g. above a camp fire). Even the '*Felsvorsprung*' in the Geißenklösterle, which was '*mit schwarzer Farbe dreieckig nachgezeichnet*' in the Aurignacian (Hahn 1991: 21), was not located, as one would assume from this description, on the rock-wall, but in fact in the floor sediment. The various best examples of possible proof of German Ice Age rock art are analysed individually in the following, beginning with the pigmented pieces, followed by the 'engravings' on exfoliated rock surfaces.

Figure 1. *The black-brown pigmented fragment from Geißenklösterle.*

The pigmented finds

The black-brown pigmented fragment from Geißenklösterle

This limestone piece comes from the lower Aurignacian layer IIIa and was described by Hahn (1988a) as a V-shaped fragment of a black painted motif (see also Hahn 1988b, 1988c, 1991; Richter et al. 2000). Conard and Uerpman (2000) warn, however, that the irregular nature of the black and brown colour could be the result of natural processes or accidental human intervention.

The rock fragment is approximately 122 mm long, 109 mm wide, a maximum 33 mm thick and comes from a wall projection (Fig. 1). Its slightly concave ventral surface bears hints of thermal stress, which may have led to the exfoliation. Although edge rounding of the fracture surface is evident, it is low under the given sedimentary circumstances. The moderately angular dorsal surface of the piece is partially coated with a dark-brown to black material of an even thickness of approximately 50 µms. This was so extensively modified by drying cracks that it now consists of pieces of about the same size as the layer's thickness. This fragmentation and the microscopically reflective surface nature of the material, together with the even thickness of the coating, suggest that it is a layer of plant resin precipitated on the cave wall after

Figure 2. *The black, yellow and red pigmented fragment from Geißenklösterle.*

incomplete combustion. This is underscored by the heat fracture. Hahn's (1989) opinion, that this at least partially organic substance is a mixture of bone-coal-ash, fat and clay, cannot be upheld. The microscopic analysis showed further that this coating was largely covered by a later deposited calcite skin of brownish-white colour. This has begun to flake off locally. The V-shape mentioned by Hahn is therefore not the result of the application of a colour, but of the random exfoliation of the light surface covering, exposing the resin layer beneath. An intentional application of pigment is therefore not evident.

The find is thus best viewed as a rock prominence that exfoliated through fire spalling, having previously been coated with a thin layer of resin. Palaeolithic hearths occur in the cave (Hahn 1989). It is especially important to note that in pictograms (rock paintings), the thickness of the paint remains is always highly variable, depending on the unevenness of the rock surface. Small depressions are filled with paint, while prominent surface aspects show very little deposition, as is to be expected from the wet application process.

The black, yellow and red pigmented fragment from Geißenklösterle

Specimen No. 445 from square 68 in the Geißenklösterle, layer IIb, is also from the Aurignacian (Hahn 1986; Müller-Beck and Albrecht 1987). This limestone fragment is 91 mm long, 62 mm wide and 43 mm thick, and became sequentially impregnated or coated first by yellow, then black and finally whitish materials (Fig. 2). The first colour, however, varies locally, from yellow to reddish and even violet hues. They were caused by iron oxides and hydroxides. The initially yellow precipitation (Munsell chart 7.5YR-8/6) is coloured red towards the edges of the object (about

Figure 3. *Outer surface of the painted rock fragment from Hohle Fels.*

10R-5/8), which may be attributable to conversion of goethite to haematite through heat and reduction. This deposit lacks the variations in thickness that is characteristic of paint application.

Later, the surface was partially coated by a blackish covering of uniform thickness, apparently also a natural deposit. This was followed by the local precipitation of a grey calcite accretion of highly variable thickness often exceeding 200 µm. It contains concentrations of small black spots, apparently of charcoal granules. After this surface alteration, the piece experienced considerable surface damage, particularly at edges, through abrasion and rounding. Finally, numerous microscopic traces indicate a colourful modern history and handling, including textile and paper fibres, as well as tiny remains of blue and red synthetic materials.

The presence of possible charcoal traces in the calcite deposit and the apparent reduction of the iron oxide coating could indicate that this piece may have lain in a hearth once. None of the colour traces presents typical indications of anthropogenic pigment application, although it remains possible that iron salts were applied but then became so much modified by taphonomy that certain identification is no longer possible. There is no evidence whatsoever that the object might be exfoliated rock art, it could at best be mobiliary art, but that is also unlikely.

The painted rock fragment from Hohle Fels

This 76 mm long, 58 mm wide and 18 mm thick limestone fragment was excavated only in 1998, in the geological horizon 1K, which contains Magdalenian occupation deposits (Conard and Floss 1999; Conard and Uerpmann 1999, 2000). As these authors report, it possesses a relatively smooth, painted surface on the outside, and a granular, angular inside. The latter is the spalling surface, along which it became separated from the cave wall or ceiling. This inside surface offers typical features of a frost or regelation fracture. In addition, the named authors have also recognised that one of the pictogram motifs surviving on the outside has been truncated by subsequent breakage of the plate. Both existing motifs consist of double rows of closely spaced oval dots of red colour that are typically about 6 mm long and 4 mm wide and were probably applied with fingertips. Their size ratio certainly corresponds to that yielded by human fingertips covered with paint. However, if the marks were stamped on with fingertips, as appears to be the case, they were almost certainly made by children aged perhaps 7–10 years. My replication experiments suggest that even slight contact with the index fingertips of very small adult modern females yields prints of 8–10 mm length and about 6 mm width. The fully preserved motif on the Hohle Fels specimen comprises twice seven such dots, while in the truncated motif twice four dots have been preserved (Fig. 3).

The edge rounding of 300–400 µm widths (at approximately right angles) shows not only that the plaque has been worn in the sediment after its exfoliation, but also that this wear occurred after the subsequent fracture of the plate, which separated part of a painted motif. Consequently, this motif already existed unequivocally when the piece broke and came to lie in the cave sediment. Besides the two named pictograms, the plaque bears many other traces of red pigment, particularly on its inside (Fig. 4). These appear as several hundred microscopically small remains, occurring in clear concentrations, individually in most cases measuring less than 10 µms. Occasionally, larger stains are evident, such as

Figure 4. *Inner surface of the painted rock fragment from Hohle Fels.*

one patch 130 μm long and 75 μms wide, of remains of 'dark-red' colour (Munsell 5R-3/8). Other pigment stains on the inside are of 'red' colour (10R-4/8), and these tiny remains are altogether morphologically typical for manually applied paint. They appear not only on the inside (exfoliation surface) of the plate but, to a lesser extent, also on the convex outside, particularly along two opposite edges, as if they had been occasioned when the piece was held in a paint-coated hand. The complete absence of microscopic paint remains on the younger fracture surfaces shows that these facets came into existence later than the application, be it intentionally or unintentionally, of paint.

In order to simplify the analysis of the find, I named the six surface-facets A to F, and examined them individually:

A: The original, convex and relatively smooth surface, the outside of the plaque. It bears the two painted motifs, as well as locally fine pigment remains.

B: The rough-grained fracture surface (inside) where the plaque became detached from the cave wall, on which pigment traces are widely dispersed. It must be younger than surface A.

C and D: Two adjacent, conchoidal impact fractures with radial stress-lines, which must be younger than A and B. The partially preserved dot motif is truncated by both surfaces D and E.

E: The main fracture along which the painted plaque broke, which like D contributed to the partial loss of a motif. It must be younger than A and B, and is likely of the same age as D, or of approximately similar age.

F: A flat further fracture scar, with radial stress-lines and step-fractures. Its age relative to C, D and E is unknown, but it must be younger than A and B.

Red colour traces occur exclusively on surfaces A and B. With the exception of the two obviously wet-applied motifs, they are not perceptible to the unaided eye. Their distribution relatively to the form of the object, e.g. close to the longitudinal edges of the convex outside, and their morphological appearance indicate that they were caused by paint-covered hands. The plaque was held and manipulated by them before surfaces C to F were formed (Fig. 5). At that stage, the plaque may have been approximately double its present size, and may have featured more than two double-rows of dots. Another site in the area (Kleine Scheuer, north of Hohle Fels) has yielded a flattish oval river cobble of 95 mm length, which I also examined microscopically. It was excavated by E. and W. Soergel in 1923 and carries three similar double-rows of paint dots (Hahn and von Koenigswald 1977; Müller-Beck et al. 2001: Pl. 23). In Obere Klause, further east, a partially preserved, 159-mm-long limestone plate was located. It bears three double-rows of seven red points in each set, and also resembles the Hohle Fels specimen closely (Obermaier 1914; Bosinski 1982). Altogether six painted mobiliary palaeoart objects were located in the Obere Klause (Floss and Conard 2001: 81).

After the painting and handling with paint-covered fingers, the stone plaque from Hohle Fels was broken with considerable force, either immediately or at some later time. Surface E emerged with this event,

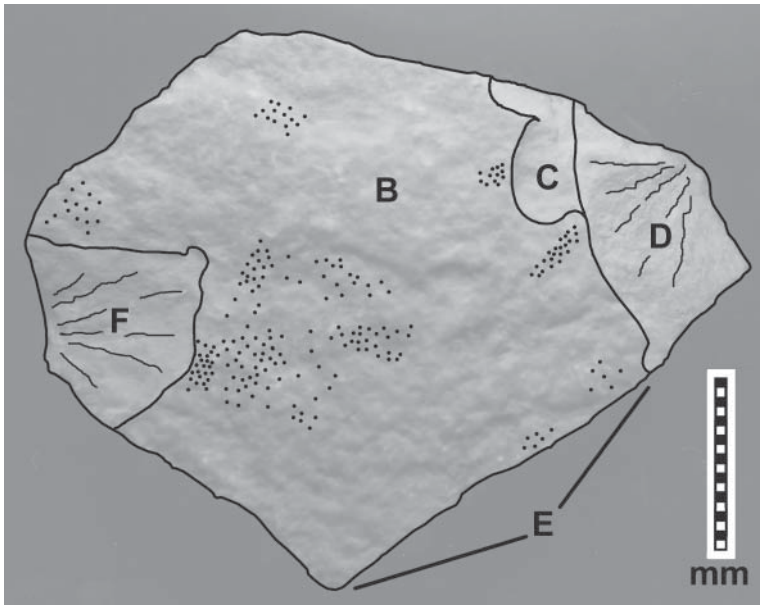

Figure 5. *Facets B – F, inner surface of the painted rock fragment from Hohle Fels. The distribution of the microscopic pigment traces is indicated.*

and C and D probably date from the same impact. The intentional fracture of Upper Palaeolithic mobiliary palaeoart is a widespread phenomenon found across Europe, from Russia to Spain, including in southern Germany. How surface F relates chronologically to C – E is unknown, but is inconsequential in terms of interpretation. The numerous paint remains on surface B, the surface where the plate had been separated from the cave wall, prove that no rock art is present. The plaque was unequivocally painted and handled after it had become separated from the rock. The piece is therefore mobiliary palaeoart that resembles other pieces of the same period and the same region. All edges of the plaque were subsequently rounded by taphonomic processes, with exception of a small part in the midsection of the surface E, where recent damage can be readily discerned.

The finds with incisions

About rock markings

The topic of taphonomic rock incisions and their differentiation from anthropogenic engravings is of obvious significance to the scientific study of palaeoart (Bednarik 2001). Nevertheless, is has been largely neglected in Europe until now, which also applies to the microscopic recognition of engravings produced with metal objects. Taphonomic rock markings are thousands times more frequent than those occasioned intentionally by humans, which they occasionally resemble. Numerous types are distinguished, and their identification presents no particular difficulties to the specialist (Bednarik 1994b, 2001: 15–35). In the archaeological world literature occur literally thousands of misinterpretations in which either natural incisions and other rock markings were recorded as anthropic, or vice versa. Similarly, natural surface colourings have been described by archaeologists as pictograms, and in two cases even 'directly dated' by them (in Utah and Northern Territory). In Europe there are also several cases when engravings made with metal tips were attributed to the Palaeolithic. All these forms of mistakes are avoidable.

While the most frequent natural rock markings in the open are clastic movement traces (according to systematic taxonomy of rock markings, type GK2; cf. Bednarik 1994b, 2001: 24), particularly clast striae on glacial polishes, in the case of the limestone caves of Europe incisions of type BA1 dominate (animal scratches). Among them those of Chiroptera are the most common, but those of cave bears (*Ursus spelaeus*) are obviously more conspicuous. Claw markings of these animals are widespread, they are located in hundreds of European caves, from Cantabria to the Urals (Bednarik 1993). In some large caves they can extend continuously over kilometres, and sometimes their extent indicates the former course of the cave floor (e.g. in Rouffignac, France). The claw marks of many other types of animals also appear frequently in caves, and I have examined them in over 1000 caves worldwide (Bednarik 1991, 2001: 27). The differentiation between them and human engravings, which has involved great difficulties for many archaeologists, is unproblematic today (Bednarik 1998).

Besides claw marks, many other cave markings occur that are of animal origin, and in the present context the so-called Bärenschliffe are relevant (type BA2, animal polish). They are found on the walls or on big boulders in the cave interior, particularly at heights from 0.4 m to 1.4 m above the former ground

(Bednarik 1993). Projecting parts of these surfaces, which can be found kilometres deep inside cave systems and may extend over many square metres, have been extensively abraded and may appear very polished, depending on the amount of bear traffic and other factors (Bachofen-Echt 1931: 712–714). They occur especially in narrow passages, where thousands of generations of cave bears followed the same path in the total darkness. Sediment matted into their shaggy fur, ranging from fine clay fraction to fine pebble granules, acted as abrasive. These grains were often significantly harder than the relatively soft limestone of the cave wall, particularly if they were of quartz sand, and led to the thorough and distinctive polish that has often survived to the present.

Another type of rock markings should also be mentioned here: type GK1 (taphonomic markings). Their formation and recognition has also been discussed in detail, and again the frequent misinterpretation by archaeologists is no longer necessary today (Bednarik 1994).

The incisions from Hohle Fels

Fragments of flaked-off surfaces of *Bärenschliff* have occasionally attracted attention during the various excavation campaigns in the Hohle Fels cave, particularly in the Gravettian horizons, more rarely in the Magdalenian. Mostly the *Bärenschliff* pieces lay in the sediment with the polished side downward. Hahn (1991, 1994; Scheer 1994) recognises them as the result of frost-caused exfoliation, and was able to reassemble a number of such fragments (Hahn 1991: Fig. 2). By 1990 Hahn had found more than ten *Bärenschliff* fragments, whose polish showed clear incised linear markings. He observed 'bundles of deeply incised lines, some of which connect at right angles'. One larger block, found in 1990, with partially preserved polish features numerous, relatively shallow incisions. Hahn excludes the possibility of a utilisation of the block as base for working with stone artefacts, and argues that the carved lines were occasioned before the stone fell from the wall. He observes no correlation between the surface morphology and the course of the incisions, and no figurative or schematic outlines in the seemingly indiscriminately arranged lines. For lack of a utilitarian interpretation of the obviously on the wall drawn line-bundles Hahn identifies them as engraved parietal art. Conard and Uerpmann (2000) concur with this opinion, and I have also mentioned this apparent 'cave art' occasionally. Holdermann et al. determined that animal claws or teeth can be excluded in the formation of the markings, and report:

> Es treten parallel gesetzte Linien, Strichbündel oder gekreuzte Linien auf. Es ist unklar, ob wir mit den geritzten Linien auf Bärenschliffen überhaupt Zeichen unserer paläolithischen Vorfahren vorliegen haben (Holdermann et al. 2001: 113).

Elsewhere, Holdermann et al. arrive at the following conclusion:

> [Es erscheint] unwahrscheinlich, daß diese Stücke als Schneideunterlagen gedeutet werden können. Wahrscheinlicher ist es, daß die glatt gescheuerten Wandpartien schon bearbeitet waren, als sie von den Wänden brachen und im Höhlenschutt weiter zerfielen. Letztendlich bleibt unklar, ob wir in diesen Linien überhaupt Zeichen sehen können, die eine innere Bedeutung tragen. Klärende systematische Untersuchungen hierzu stehen noch aus (Holdermann 2001: 70).

In the late 1990s, Miriam Noël Haidle began to subject this collection of incised and exfoliated stone plates to a systematic examination. She prepared approximately seventy microphotographs in order to find regularities in the incisions and to clarify their status. I have examined this material and the specimens and found among the numerous grooves none that are typical of stone tool points. The flattish fragments from the cave walls are indeed the result of freeze-and-thaw cycles, as implied by the nature of their fracture surfaces. These have experienced changes to their petrographic structure, which seems to exclude thermal stress exfoliation. In particular, the fragments lack the thinning towards the edges that is often a hallmark of thermal fracture of rock.

I subjected one of the fragments, HF 99 from Qu 75, III, to a particularly thorough microscopic analysis. This is a 70.4 mm long, 51.2 mm wide and approximately 19.8 mm thick fragment with distinctly convex outside, detached by gelifraction of the limestone wall (Fig. 6). This surface became strongly polished at a flat facet, but only beginning from the vertex of the camber (i.e. on the lower left facet in Fig. 6). The rest of the outside carries no polish. Consequently, only one part of the surface was subjected to rubbing by bears, and presumably the piece derives from the edge of a wall recess of some kind (i.e. the upper right half of the surface in Fig. 6 formed part of a depression). It bears numerous, mostly very straight incisions that are entirely restricted to the polished surface, which also applies to all other of these specimens from Hohle Fels. These lines show different directions, but the clearest are oriented sub-parallel. They are up to 600 μms wide, but most are not much over 200 μms, and their depths range up to 150 μms. Most of the grooves, however, possess far smaller dimensions, and many are so fine (often 10–20 μms) that it is difficult if not impossible to see them with the unaided eye. While the depths of the larger grooves often remain rather even, their widths are usually quite variable over distances of just a few centimetres. At several positions it is clear to see where the engraving object suddenly altered its position relative to the rock. In such cases it is easy to recognise that these objects were sand-grains that rotated occasionally as they were rubbed against the rock under considerable pressure. At such positions occur deep impressions along the groove edges, and clear variations in width or depth.

Whereas the lines between 200–600 μms are sub-parallel, thus conforming to a dominant direction, the finer incisions tend to be randomly oriented, and

Figure 6. *Rock fragment HF 99 from Hohle Fels, with taphonomic incisions caused by cave bears.*

changes of direction can be found in them occasionally. On the described specimen, none of the wide grooves is more than 30 mm long, but longer lines do occur on other pieces. In rare cases, one can discern the course of a second sand-grain following a furrow already carved by a previous grain. *Stries parasites* (d'Errico 1994) occur, but are rare. They show where a grain rotated slowly and another part of it made contact with the rock surface. Fortunately, the thoroughly examined specimen has not been cleaned, and considerable sediment remains were still attached to it. They contain well-rounded grains of up to 250 μm size, but it is very likely that the cave bears imported most of the sand-grains in their fur from elsewhere.

Rock incisions of the described type are also to be found on *Bärenschliffe* in situ at cave walls at other sites, but their groove widths are locally quite variable. They depend in principle on two factors: on the elevation of their site of occurrence, and on the hardness of the wall surface at the time the site was frequented by the animals. In my experience, the deeper incisions occur mainly in low-lying caves, i.e. near sandy river deposits. Such grooves are considerably finer in the high-montane cave bear hibernation caves of the Alps, or they have fallen victim to corrosion (Bednarik 1993). Concerning the distribution and orientation of these rock markings, the deepest engraved lines usually correspond to the main movement direction of the cave bears, relative to the wall, as they squeezed through narrow passages or passed obstructions in the dark. The less distinctively oriented lines may be attributable to one of the many behaviour patterns of the animals in caves, such as the establishment of hibernation pits, mating or fighting (concerning the behaviour of these animals in caves, see Bednarik 1991, 1993; Abel and Kyrle 1931; and the extensive literature on Alpine and other bear lairs, including the works of Bächler, Bayer, Brodar, Ehrenberg, Malez, Mottl, Vértes and Zotz).

Discussion

It follows from these considerations that no credible German evidence has so far been submitted for the existence of Palaeolithic rock art. The examples quoted and discussed above are the supposedly best-known proof for such an art tradition. Upon closer examination they prove to be merely natural phenomena of various types, as has already been demonstrated in respect of numerous other claims worldwide (Bednarik 1994b). The supposedly painted pieces of flaked-off rock plates from south-western German caves bear either naturally deposited mineral or organic precipitates, or anthropogenic paint-remains that were applied to already exfoliated plaques. Mobiliary art, however, has been amply demonstrated to occur in Germany, and it includes numerous painted stone plaques. For instance, the Magdalenian from the Hohle Fels has yielded no less than eight further cobbles and one bone fragment, bearing mostly dot and striped patterns of paint (Conard and Floss 1999: 310; Floss and Conard 2001: 79–80). The numerous 'engravings' so far presented from the same site are without exception of taphonomic nature. They consist largely if not exclusively of scrapes occasioned by sand-grains, particularly quartz grains. These had been brought into the caves by cave bears in their dense, shaggy fur, and had been rubbed against the soft limestone walls by the mighty bodies of these animals.

Naturally this does not prove in the least that no Palaeolithic rock art was created in Germany; it merely shows that so far no evidence for such a tradition has become available. The controversial representation of a 'stag' from Kleines Schulerloch, Bavaria (Birkner 1938: Pl. 13; Maringer and Bandi

1953: 23) and the engraving of an undetermined animal figure in the Kastlhänghöhle (Bohmers 1939: 40), both long attributed to the Palaeolithic, have now been rejected for decades as being of the Pleistocene (Bosinski 1982: 6; Freund 1957: 55). This conspicuous lack at proof applies largely to the rest of central Europe. In all other areas of this region, unambiguous signs for a Palaeolithic rock art remain just as elusive, and the examples submitted so far have either been insufficiently examined or refuted. Some refer to sweeping misidentifications, as for instance the claims of Kohl and Burgstaller (1992) concerning Austrian petroglyphs in two Alpine regions. They include the representations of seven animal heads at the Stubwieswipfel at the Warscheneck, and two purported mammoths, some stags and a 'reclining woman' in the Kienbachklamm near Bad Ischl, which I have examined and which are certainly not of the Pleistocene (Bednarik 1999). Some are of recent antiquity, and a few of these 'images' consist purely of natural depressions or grooves on rock panels.

A few engravings in the Hungarian cave Jenö Hillebrand have yet to be examined by a specialist (Kozlowski 1992: 41). One of the two sites proposed in the Czech Republic has been examined, and it was found that the sixteen red wall markings in Mladeč Cave (Oliva 1987, 1989; Kozlowski 1992) are apparently of the late 19th century (Bednarik 2006). In fact it is quite uncertain that the cave was ever occupied by humans. It appears more likely that the human remains and the few artefacts found in the cave entered through a chimney in the cave's roof, as did most of the faunal remains (Jelínek 1987; Svoboda 2000, 2001). Thus the cave entrance may have become blocked well before the Upper Palaeolithic. The second Czech site considered to feature Pleistocene rock art, Býci Skála, contains two painted motifs: a very faint, apparently cervid zoomorph on a highly reflective vertical panel and a much clearer black lattice (Oliva 1996: 120, 129, Fig. 2). The cave contains both Pleistocene and Hallstatt occupation evidence, and there is no evidence that its pictograms are of the Pleistocene. Finally, a series of incisions on the ceiling of a cave in the Rothaargebirge in Germany, apparently of anthropic origin, still needs to be examined by a cave art specialist.

The neglect of proper scientific investigation of Pleistocene rock art is, however, not restricted to central Europe; it is a near-universal feature. For example, the Palaeolithic age proposed for any rock art site in eastern Europe, such as Cuciulat, Badanj, Kapova or Ignatiev has not been demonstrated. Indeed, the only relevant data from any of these sites suggest a Holocene age for purported images of Pleistocene species at the last-mentioned site (Steelman et al. 2002). The substantial series of open-air petroglyph sites in various parts of the Iberian Peninsula, including one site in the French Pyrenees, alleged to be of Upper Palaeolithic age has not yielded any sound justification for such antiquity. These sites occur exclusively on schist and comprise mostly percussion petroglyphs, almost unheard of in authentic Pleistocene rock art of Europe, and they occur amidst similarly weathered inscriptions and dates less than 300 years old. Several of these sites, such as some of the Côa sites, Ocreza and Siega Verde, have yielded scientific evidence suggesting that most of their petroglyphs are of the most recent historic period. England, too, has a long history of false claims for Palaeolithic cave art, beginning in the early 20th century and including the controversies of the Wye Valley rock markings (Rogers 1981; cf. Sieveking 1982), those in Church Hole (Bahn et al. 2003; Ripoll et al. 2004, 2005; cf. Bednarik 2005) and, most recently, yet another 'mammoth engraving' that consists in fact of natural rock markings (Mullan et al. 2006). Asia has generated many claims of Upper Palaeolithic, Middle Palaeolithic, and in one case even Tertiary rock art. They are too numerous to list here, but essentially most are based on misidentifications or mistaken datings. For instance, the zoomorphs of Shishkino and Tal'ma in Siberia, long cited as examples of Ice Age rock art, were created in recent centuries (Bednarik and Devlet 1993). Numerous traditions in most parts of Asia are significantly younger than has been claimed, e.g. the 'most ancient rock art of central Asia' appears to be of the 19th century (Jasiewicz and Rozwadowsji 2002). Despite the extremely early petroglyphs of central India (Bednarik et al. 2003), hardly any other Asian rock art can be convincingly attributed to the Pleistocene. This also applies in Arabia, despite the high probability of rock art having been produced there very early (Bednarik and Khan 2002). In Africa, where the existence of Pleistocene rock art is also to be expected, no rock paintings have been credibly placed in that period (including claims made for Tanzania and Namibia), and the prospects are not much better for most petroglyphs. This is despite the evidence, as in India, of extremely early traditions in southern Africa (Laidler 1933; and Peter Beaumont's finds in the Korannaberg area of the southern Kalahari) and Sudan (Van Peer et al. 2003). Even in Australia, where surviving Pleistocene rock art is presumed to be more common than anywhere else, there are few credible dating attempts pointing to Pleistocene ages for petroglyphs, and none for paintings. In South America, we seem to have rock art from the very end of the Pleistocene, but more evidence is needed (Crivelli and Fernández 1996; Bednarik 2000).

Even in France itself the topic of Ice Age rock art is not as clear-cut as it may appear to be. For instance, the art in Lascaux is not, as often claimed, 17 000 years old, but is in fact undated. Sedimentary charcoal from the badly excavated cave is from 7000 to 17 000 years old, and the large purported aurochs figures, among the most recent in the site, cannot be from the Solutrean. If this is the animal they depict, it did not live in the Dordogne at that time, the peak of the last glacial maximum. A good proportion of the Lascaux rock art is in all likelihood from the Holocene. Since the

stylistic chronologies of the Palaeolithic rock art in the Franco-Cantabrian area were refuted (Bednarik 1995), the stylistic 'egofacts' (Consens 2000) of archaeologists have disintegrated. All questions concerning Eurasian rock art are in need of re-evaluation, and this certainly applies to all pre-Historic phases, not only the Palaeolithic. In the context of the deficiencies of global Pleistocene rock art research, the comparatively minor central European issues related here may be relatively insignificant, but for the sake of clarification they needed to be reviewed.

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