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A DISCOVERY OF POSSIBLE UPPER PALAEOLITHIC PARIETAL ART IN CATHOLE CAVE, GOWER PENINSULA, SOUTH WALES

by

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ABSTRACT

In September 2010 an engraving was discovered in Cathole Cave on the Gower peninsula in South Wales which has been interpreted as a possible representation of a cervid. Uranium series dating of calcite which overlays part of the engraving has been dated to approx. 12,500 BP suggesting a possible Upper Palaeolithic date for the figure.

INTRODUCTION

After the discovery of Late Upper Palaeolithic (LUP) engravings at Creswell Crags, in 2003 (Bahn and Pettitt, 2009), it has been clear that there is no theoretical reason why art of Palaeolithic age would not be found in other parts of the British Isles where human occupation can be evidenced from the archaeological record. In the light of this, one of the authors (GHN) and members of the Clifton Antiquarian Club, Bristol, Christopher Castle and Stephen Tofts, began to explore Cathole Cave in 2007, specifically to look for rock-art. The first visit resulted in the discovery of several European brown bear (*Ursus arctos*) claw scratches that were probably made following a hibernation event, and a possible engraved geometric pattern located within an antechamber, north of the main gallery. Despite optimism within the team, the general consensus was that the irregular patterning would be difficult to authenticate. This view has been supported by the opinion of other visitors to the cave in April 2011 and the marks are considered to be natural.

However, on September 18 2010, further exploration resulted in the discovery of an engraving on a vertical panel inside a small, almost hidden, niche northeast of the main gallery, approximately 10.5 m from the cave entrance. The nature and possible significance of this engraving are the subjects of this paper.

GEOMORPHOLOGICAL SETTING

Cathole Cave stands at about 30 m AOD on the northeast side of a dry limestone valley, approximately 2 km north of the present coastline (Figure 1). It comprises two principal components: a wide passage with an undulating roof and tall, narrow, joint-influenced rifts that rise several metres above the general roof level. In plan, the cave has two entrances: the southern entrance leads to a large low-roofed main gallery extending about 11 m to the east. To either side of the main gallery are side-chambers; the northern side-chamber diverts westwards to an antechamber and, beyond this, eventually, to an exit at Lower Cat Hole; some 20 m north of and 3-4 m lower than the main cave (Oldham 1978). To the east of the main gallery is a further gallery that extends an additional 8.3 m. This section of the cave is difficult to access and, as far as the authors are aware, has never been fully investigated (Figure 2).

The undulating surface of the roof suggests that the gallery was formed originally in a phreatic environment. The rock floor of the cave is concealed by sediment of an unknown depth and type. Discoloration of the lower part of the walls within the main gallery suggests that the excavations undertaken by Colonel Wood during the 19th century removed between 0.7 m and 1 m of this sediment fill. This observation is the basis for the two distinct floor levels shown in Figure 2.

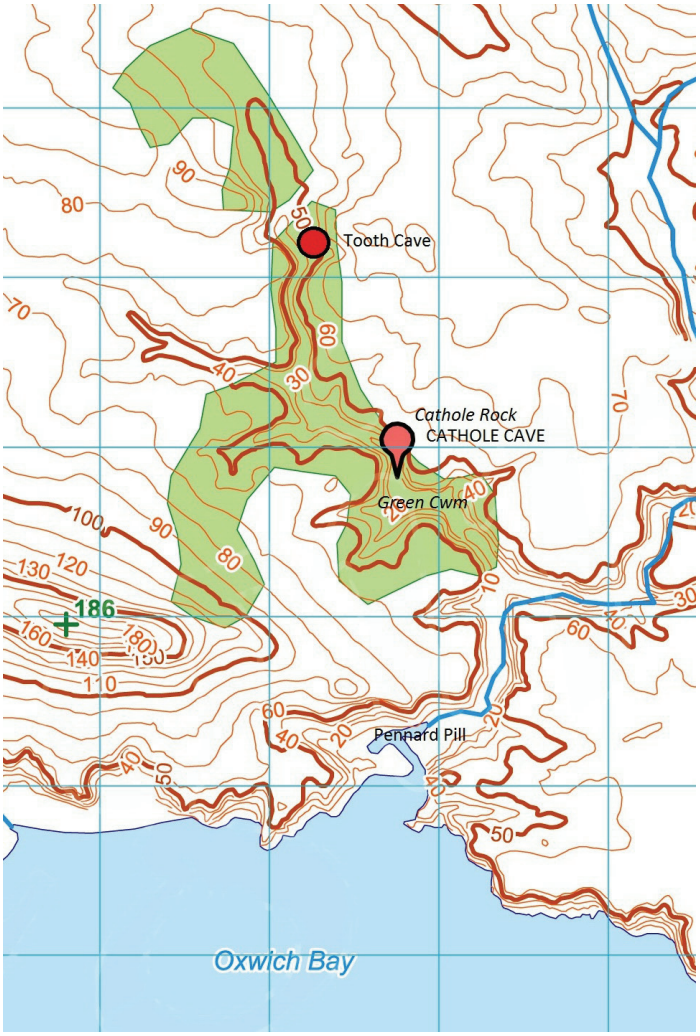

Figure 1. *Map showing the location of Cathole Cave, Gower.*

The cave today stands at about 15 m above the valley floor, with the present day phreas probably 5 m or more below this. Hence the cave appears to have formed in a landscape very different from what we see today. The V-shaped Parkmill Valley probably did not exist at that time, the valley floor being tens of metres higher than today and extending above the current roof level of the cave. It is possible that the various water-worn relict passages of the cave represent the remnants of a former subterranean river system or sub-valley drainage system that was in operation when the valley floor was higher. The subsequent incision of the valley to its present level may be the result of erosion by glacial meltwater runoff during periods when periglacial conditions prevented significant subterranean flow (Waltham *et al.* 1997). The stream originally flowed through the Parkmill Valley but now resurges at the southern end of the valley, close to the settlement of Parkmill, before reaching the sea. Amelioration of the climate, and lowering of the phreas, caused the surface flow to sink progressively further north in the valley. The present stream sinks at Llethrid Swallet, located to the north (Ede and Bull 1989). Under flood conditions this

swallet may be unable to accommodate the full flow, causing ponding and creating a surface stream that may continue a little further south to sink at older swallets a metre or two higher.

Based on the amount of frost-shattered stone both above and below[1] the surface, the cave entrance may perhaps have extended a further 3-5 m westwards towards a pronounced tongue formed by thermoclastic scree and, probably, spoil from the 19th century excavation.

DESCRIPTION AND DATING OF THE ENGRAVING

The figure, measuring approximately 15 x 11 cm, is inscribed into the surface of an area of botryoidal calcite flowstone of similar general character to that found within the rear section of the cave (Figure 3). This flowstone has a rather opaque, white, almost chalky appearance and little evidence for significant recent deposition. Individual flowstone bosses, or botryoids, are ~10-20 mm across and of low relief (<5 mm). Most of the inscribed lines fall into one of three distinct groupings of straight and sub-parallel lines, with each group at a significant angle to the others. All of the lines commence and terminate within the area of flowstone, cut across the botryoidal-textured surface with no apparent effect from it, and do not extend onto the limestone surface beneath it. The

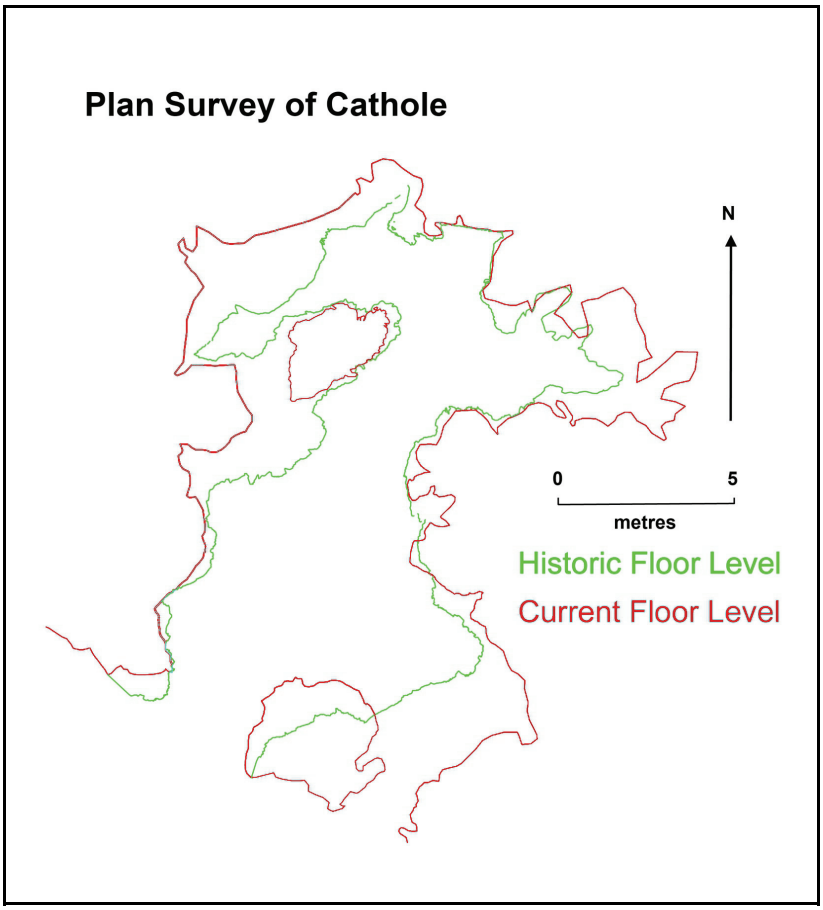

Figure 2. *Plan survey of the main chamber and immediate ramifications of Cathole Cave.*
Based on work by Oaks Surveys, Derbyshire.

[1] Based on photographs and a section drawing from the McBurney and Campbell excavations.

straightness of the lines and their confinement within the area of flowstone is particularly strong evidence for a non-natural origin. Any natural fractures, or etched lines, are likely to have been influenced by the botryoidal texture of the flowstone to at least some degree, but this does not appear to be the case with any of the lines that together form this figure. Secondly, all of the lines are very shallow and of fairly constant depth and width. Again, this is contrary to what might be expected for natural fractures or etched lines, as exemplified by the numerous small-scale fractures visible on limestone surfaces elsewhere in the cave. From field observations it is impossible to estimate the age of these inscribed lines except in the very broadest terms, but a few pertinent observations can be made. Firstly, the lines are no longer as sharp as if they had just been inscribed, but are encrusted with very fine crystals of calcite that must have been deposited by a very fine water film since the scratches were made. This same finely crystalline texture is also found across the unaltered surface of the flowstone into which the inscription has been made. The left-hand extremity has been partly covered by a fairly narrow, vertical strip of calcite that is subtly different from the flowstone beneath It has a smoother surface, lacking the fine crystals of the botryoidal flowstone beneath, and has a faint greyish tinge at the surface and a chocolate-brown layer beneath. This flowstone strip was slightly damp when observed and appears related to a drip point on the alcove roof immediately above, suggesting it may still be active. The two distinct layers suggest a significant change in percolation water chemistry during its growth, which could reflect a change in the extrinsic environment (if early- or pre-Holocene) or land use (if mid-Holocene or later).

Figure 3. *Image showing the main part of the engraving*.
Photo: George Nash.

Following discovery, the task of recording the figure was undertaken. Due to the fragility of the engraving and the surface on which it was engraved, no direct contact tracing was attempted. Furthermore, the confined space of the niche prevented conventional cameras

from being used and instead a series of overlapping images were taken and stitched together and a tracing made from these (Figure 4).

Figure 5 shows the detail of the stratigraphy on the engraved panel. In order to attempt to bracket the engraving, in April and July 2011, members of the NERC-Open University Uranium Series Facility took samples for Uranium series dating from both the chalky botryoidal calcite into which the engraving has been made and from the smooth grey calcite which overlays the 'muzzle' of the figure. The sample sites are shown in Figure 5.

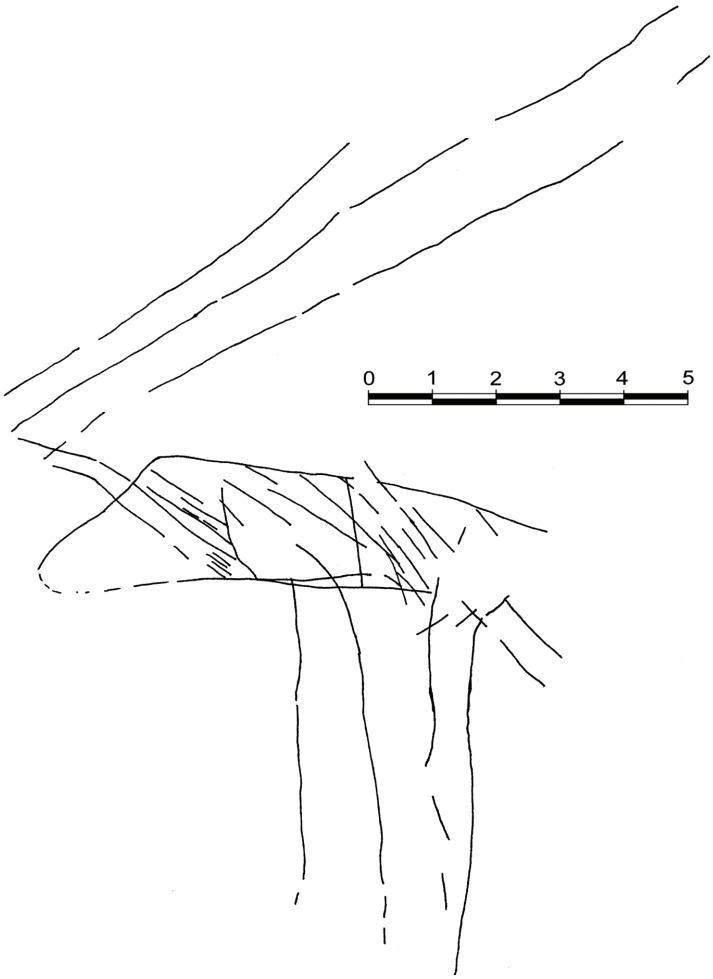

Figure 4. *Tracing of Cathole engraving, from stitched digital imagery*
Tracing: George Nash.

Uranium-series dating methods, as applied to these samples, is a radiometric method based on the decay of ^{234}U to ^{230}Th, with a half-life of 75.000 y, and can be applied to authigenic deposits, such as carbonate. The data have been determined using isotope dilution with a mixed ^{229}Th-^{236}U spike. Isotope ratios have been determined with a Nu Instruments multi-collector, inductively-coupled plasma mass spectrometer. The method is applicable up to ~5 half lifes of the ^{230}Th daughter isotope as it decays further to ^{226}Ra. Samples older than 350.000 y are in 'secular radioactive equilibrium' and this provides an internal consistency check of the methodology. U-series dating is 'absolute' in the sense that ages can be calculated solely from the radioactive decay constants with 'closed system' as the only proviso. The method also depends on the effective separation of uranium from thorium which is achieved because oxidised uranium is soluble in environmental water while thorium remains insoluble. The main

limitation is the inclusion in the authigenic phases of material, such as clay, loess or ash, with high Th and U concentration in secular equilibrium, and which therefore can contribute significant ^{230}Th. Corrections can be made but the added uncertainty may overwhelm the total uncertainty. Uncertainties can be a fraction of a percent depending on the uranium concentration and a small contribution of high Th/U material, but uncertainty is higher for very young samples (centuries old) because only very limited amounts of ^{230}Th will have accumulated, or for ages approaching the secular equilibrium status.

Sample two, from the overlying calcite yielded a date of 12,572 ± 660 years BP (GN-10 GHS2) and sample four, from the same layer gave a broadly similar age of 14,505 ± 560 years (CAT11#4). This correspondence, bearing in mind that these are bulk samples, taken from the full width of the overlying calcite layer, gives assurance that the samples are dating a coherent stratum, which includes the calcite overlying the 'muzzle' of the engraving and thus give us a *terminus ante quem* date of approximately 12,500 - 14,500 years BP for the engraving. Samples, one (GN-10 GHS1) and three (GN-10 GHS3) (Figure 5), from the underlying chalky botryoidal calcite, exhibited open system behavior owing to clay contamination, and did not yield ages so we cannot place a *terminus post quem* date on the engraving.

	GN CAT -10 GHS1	GN CAT -10 GHS2	GN CAT -10 GHS3	CAT11#4
^{238}U ppm	0.4127	0.0251	0.1842	0.0475
uncertainty	0.0015	0.0001	0.0003	0.0001
^{232}Th ppb	1,407.49	19.50	517.46	31.58
uncertainty	254.43	3.53	93.54	5.71
(^{230}Th/^{232}Th)	1.1326	1.4410	1.1818	1.5410
uncertainty	0.0494	0.0695	0.0857	0.0681
(^{230}Th/^{234}U)	1.4712	0.3154	1.2106	0.3121
uncertainty	0.0161	0.0049	0.0482	0.0036
(^{234}U/^{238}U)	0.8568	1.0720	0.8938	0.9906
uncertainty	0.0050	0.0047	0.0034	0.0045
Age ka	-62,590	12,572	-13,318	14,505
2 ůuncertainty	-2,591	659	-209	557
2 ůuncertainty	2,570	-661	195	-558

λ ^{238}U: 1.55125E-10, λ ^{232}Th: 4.9475E-11, λ ^{234}U: 2.82629E-06, λ ^{230}Th: 9.15771E-06,
^{232}Th/^{238}U detrital mol ratio: 3.21

Table 1. *U, Th concentrations and isotopic ratios of calcite samples from Cathole. For sampling sites, see Figure 5.*

ARCHAEOLOGICAL CONTEXT

This account of the excavations carried out at this site is based on published reports by McBurney (1959) and Campbell (1977) of their own field work and secondary accounts of Wood's 1864 excavation by Garrod (1926) and Roberts (1887). Wood excavated in the Upper Cave, although it is not certain where. McBurney excavated outside the main entrance,

discovering Wood's spoil heap amongst other things. Campbell's excavations took place adjacent to McBurney's and also in the second, southwest facing, entrance. The original finds, now in the Natural History Museum and the National Museum of Wales, have not been studied by us but it is clear from these accounts that the collection would benefit from a fresh assessment and one is shortly to be undertaken by Elizabeth Walker of the National Museum of Wales.

In the late nineteenth century, Lower Cat Hole was excavated by H. H. Vivian, later Lord Swansea. Animal and human remains were apparently found but the excavations were not properly recorded and the whereabouts of the finds are unknown (Oldham, 1978).

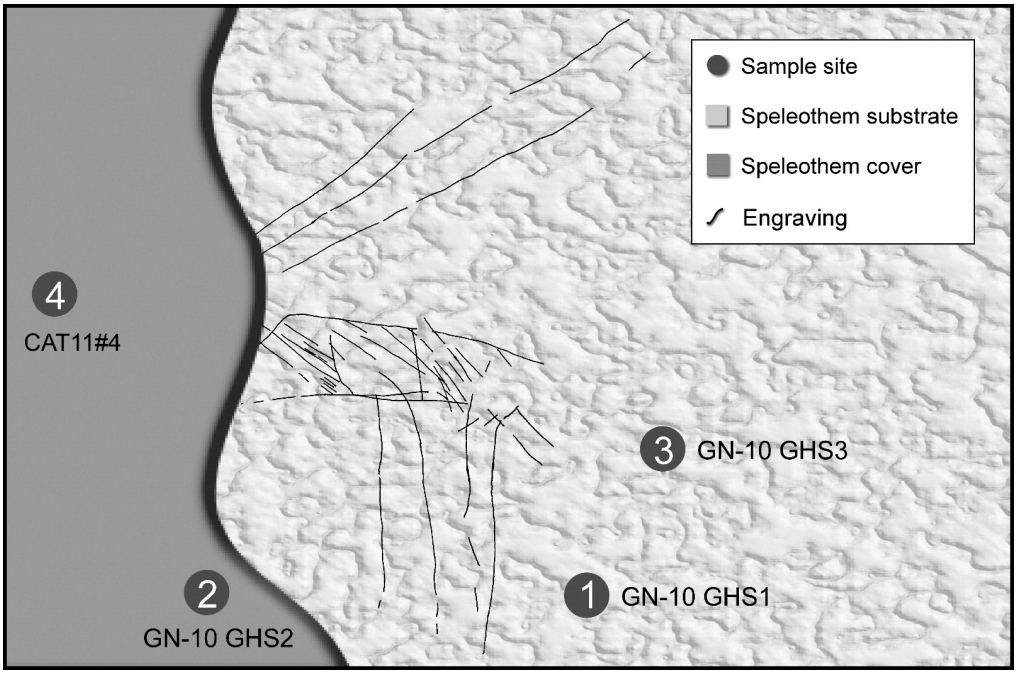

Figure 5. *Schematic diagram of the stratigraphy as found on the cave wall at the engraving site.*
Drawing: Abby George.

In essence, four periods of activity can be recognized from the various archaeological projects at this site:

Gravettian

The earliest period for which use of the site can be attested is the Gravettian (Early Upper Palaeolithic). The evidence for this is a small number, up to four, of Font-Robert points (Jacobi, 2007, 308). Unfortunately it is not certain which specimens he identified, although one at least did come from McBurney's excavation, and the two given this possible identification by Garrod (1926) do not come from a stratified context, so it is not possible to assign a date to this occupation. However, Jacobi *et al.* (2010) suggest that the British Gravettian dates to a slightly later period than the burial of the "Red Lady" from Goat's Hole, Paviland (34,000-33,300 cal

BP; Jacobi, and Higham, 2008) and is separated from the latter by the cold stage of GS-6 (Andersen, *et al.* 2006; Svensson, *et al.* 2006). This would give a tentative date to these finds of approximately 33-32,000 cal BP.

Late Upper Palaeolithic (Creswellian)

Both Garrod (1926) and McBurney (1959) attest to a Late Upper Palaeolithic occupation of the site and this is confirmed by Campbell (1977), though the latter questions the size of LUP assemblage described by McBurney, preferring to characterise many of the specimens as Mesolithic. However, the precise details of his argument are not relevant here, as we are simply interested in the presence of a given culture, not its extent. Campbell does however state that on stratigraphic grounds there may have been two separate periods of LUP occupation. Unfortunately he did not find any material suitable for radiocarbon dating at that time. LUP sites in Britain range from around 15,000 to 12,000 cal BP in date and doubtless these finds fall somewhere within that range.

Mesolithic

Campbell (1977) recognized a significant Mesolithic presence at this site and re-assigned many of McBurney's finds to this period. Although he only found a relatively few flints, compared with McBurney, Campbell noted distinct Mesolithic forms in his own excavations and considered a significant number of McBurney's finds to be from this later period both on typological and on stratigraphic grounds. Campbell does not tie down the cultural affinity of this part of the collection any more tightly than simply 'Mesolithic', though he does hint that there may have been either an extended or more than one occupation.

Bronze Age

The least well reported occupation of the cave is that dated to the Bronze Age, as most excavators have been mainly interested in the earlier periods of use. It is reported, by Garrod (*op cit*), that Wood found "a stone hammer, a bronze celt" and "fragments of pottery". He also found two human skulls and some other post-cranial human remains that were considered to represent "a late burial". This is confirmed by McBurney (*op cit*) who describes his layer E1 as containing "some scattered human remains and a sherd of impressed ware identified as of Early to Middle Bronze Age type and probably a fragment of Overhanging Rim Urn".

Thus it can be seen that Cathole Cave has seen an irregular human occupation spanning at least 30,000 years. Each one of these periods has produced rock art elsewhere in Europe, although Bronze Age parietal art is limited to only a handful of cave sites along the central coastal region of Norway (Sognnes, 1984). Therefore, the absolute dating is of fundamental importance in placing this engraving within its correct context.

INTERPRETATION AND CONCLUSIONS

While it is probable that the lines comprising the figure described here can be attributed to human workmanship, it is somewhat more difficult to interpret quite what it may represent. If it is a faunal representation it is clearly somewhat schematic. If it is an abstract form

then interpretation becomes next to impossible. It is frequently thought that abstract forms are more usually to be found in Mesolithic and later prehistoric contexts. The nearest find attributed to this date that can be reasonably placed in a secure archaeological context is the abstract pattern in Aveline's Hole, North Somerset (Mullan and Wilson, 2005) which is probably of Mesolithic date. However this is a misreading of the evidence, based on the fact that representational forms are more rarely found in Mesolithic contexts in, for example, France, as many examples of abstract forms can be found in Franco-Cantabrian Palaeolithic contexts, it is just that they are relatively rarely illustrated in the published accounts. It is fair to state, therefore, that interpretation is no guide to the age or the archaeological context of this figure. However, it can be stated that this is only the second site in Britain, after Church Hole at Creswell (Pike, *et al.* 2005) where a find of Palaeolithic parietal art has been confirmed by direct dating.

The authors' favoured interpretation is that the figure represents the head, torso and antlers of a reindeer, *Rangifer tarandus*, based on attributes such as the muzzle, the pedicle and brow tine (lower section of the antler set), and the shape of the torso. In the light of a *terminus ante quem* date of approximately 12,500 years BP it should be noted that reindeer were present in this area in both the Early and the Late Upper Palaeolithic, with finds being reported from this cave by both Wood and McBurney. It must be emphasised, however, that when dealing with a figure as simplistic as this that all interpretations can only be tentative. As yet, we have found no stylistically similar figures within the corpus of Palaeolithic art which would aid in assigning a cultural affinity to the Cathole figure. It does bear a greater resemblance to early Holocene figures from northern Scandinavia, but the dating evidence has to rule out any cultural affinity in that direction.

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