Guest editorial essay

Cave art interpretation I
The venue for ECVP 2005, in A Coruña, afforded the possibility of visiting some of the caves in northern Spain in which paintings from prehistoric times were discovered in the late nineteenth and early twentieth centuries (see Graziosi 1960). The most famous is the cave at Altamira, with its impressive great hall in which bison, boars, deer, and horses are painted in four colours on protrusions of a ceiling (figure 1). These were the first Palaeolithic paintings to be discovered, in the late 1870s by Marcelino Sanz de Sautuola (1831–1888), and they were initially dismissed as a hoax: it was not thought that ancient peoples could have produced such exquisite images. Subsequently, after many more caves containing similar paintings had been explored, their authenticity was acknowledged.

Another famous site, discovered by accident in 1940, is Lascaux on the Dordogne. The caves at Altamira and Lascaux are no longer open to the public in order to avoid further deterioration of the paintings, and replicas of them have been made nearby. Fortunately, there are still many caves with Palaeolithic paintings that can be visited in both northern Spain and southern France. Several are in the same vicinity as Altamira and those at El Castillo are particularly impressive (see: http://www.muse.or.jp/spain/eng/cantabria/castillo/castillo_top.html). Radiocarbon dating of pigments has placed the paintings at Altamira and El Castillo at around 13 000–14 500 years ago (Valladas et al 2001).

Figure 1. Top, a copy of the plate published by Sautuola in 1880 of the polychrome paintings on the ceiling of the great hall at Altamira. Bottom, outline drawings of the animals made by Henri Breuil. (Both images derived from Cathelhac and Breuil 1906.)
It seems strange that such early examples of human perception have received relatively little attention in *Perception*. A notable exception is Halverson (1992). It is also of interest to note that the first heading for Art (as opposed to Paintings) in the subject index of *Perception* appeared in 2003! The Palaeolithic art works reflect non-verbal records of perception. It would, however, be inaccurate to consider that these are records of vision unsullied by cognition. From the earliest examples of pictorial representation it is likely that the artificiality of the enterprise was appreciated, and the marks made on walls deep in the caves have fascinated historians of art for over a century. Paradoxically, they have been given less consideration by students of the senses. Given the relative lack of knowledge about prehistoric art, which makes up about two-thirds of all art history, we are more than usually dependent on our perception in assessing it. At the same time, the lack of illumination from historical knowledge threatens to keep us in the dark if untestable hypotheses run unchecked. What can we say about cave art as vision scientists? One approach has been to place Palaeolithic art in an evolutionary perspective (see the article by Hodgson 2000, and the responses to it).

Despite the fact that the paintings were produced up to 30,000 years ago, we can readily recognise the animals portrayed. Even some extinct animals have been recorded with sufficient accuracy on the cave walls for them to be identified. Nonetheless, some of the drawings may seem to us unrealistic, stylised, or even poorly made. One interesting example is the ‘twisted perspective’ that combines a profile view of the body with details of the horns or face that could only have been seen from a frontal viewpoint. This has been characterised as a primitive trait by Henri Breuil (1877–1961, 1952), one of the great pioneer interpreters of Palaeolithic art. Rather than being poorly made, it may have been the most efficient way of depicting the relevant information in a single representation: it combined information about the shape of the back and the size of the body from the profile view along with details of the horns or antlers. There is some suggestion of creative and innovative use of some basic cues to depth. The ‘falling horse’ at Lascaux (figure 2, left) is painted around a rock, although it seems impossible that the artist would have been able to see the whole animal at once.

![Figure 2. Left, the ‘falling horse’ from a wall at Lascaux; right, geometrical symbols and dots from a ceiling at El Castillo (both after photographs in Breuil 1952).](image-url)
In spite of this, the appropriate proportions are still maintained. It has been claimed that the deliberate distortion of a representation, so that it can be recognised only from a single viewpoint, was also used. There are four red cows at the caves of Lascaux and a horse at Tito Bustillo (in northern Spain) that appear to have been painted so that they were stretched out on the surface for the artist, allowing them to look proportional from the likely viewing point of the observer.

Depictions of animals range from artistic elaboration of natural formations like rock protrusions (adding details such as horns or legs to make it look more like a particular animal), to outline paintings or etchings, to polychrome and highly detailed depictions that include relief (such as the bison in Altamira). Despite the fact that there are few contour lines in the real world, prehistoric artists made outline drawings of animals, often showing only part of the animal (see Halverson 1992). They sometimes prepared the surface by scratching or painting the background to give a greater contrast with the predominantly black or red outlines. Why do we exaggerate the contours around the edge of objects if they are not actually there? Outline drawings are surprisingly good at representing natural scenes (Hayes 1988; Kennedy and Silver 1974; Massironi 2002). One interpretation is that the visual system has evolved to detect edges and to use them to segregate figure from ground. Drawings that depict only the transition from figure to ground are compelling to our visual system.

In common with many prehistoric paintings, those at El Castillo are principally of animals represented from the side (in stereotypical or canonical view). They are mainly bison, horses, aurochs, deer, reindeer, and goats. The paintings are mostly in outline and there are many examples of overpainting, where the contours of one painted animal overlap those of another (figure 3). There is also a ‘Gallery of Hands’ in which numerous red stencilled hands are displayed on a wall; they were made by spraying paint over an outstretched hand, leaving a ‘negative’ when the hand was removed (figure 4). Again in common with many other caves, there are symbols made up of straight and curved lines, open and filled rectangles and dots (like those in figure 2, right, and at the left and right of figure 4).

**Figure 3.** A drawing of overlapping deer, bison, and handprints derived from cave paintings at El Castillo (after a drawing in Breuil 1952).
The interpretation of these marks remains the subject of much speculation. The dot patterns have been interpreted as representations of phosphenes induced by hallucinogenic drugs or trance states (Clottes and Lewis-Williams 1998), and also as prehistoric star maps (Hancock and Faiia 1998). The pattern of dots on the right hand side of figure 4 has been related to a particular constellation (the Northern Crown). The problem with such interpretations is that there are so many dot patterns that some can always be found to correspond to a particular configuration. It could be that only those patterns that are sought are seen or, at least, recorded.

The second part of this editorial essay will highlight further difficulties related to interpreting cave art, particularly those related to testing apparently plausible hypotheses of certain paintings.

Nicholas J Wade
University of Dundee, Dundee DD1 4HN; e-mail: n.j.wade@dundee.ac.uk

David Melcher
Oxford Brookes University, Oxford 0X3 0BP

References
Breuil H, 1952 *Four Hundred Centuries of Cave Art* translated by M E Boyle (Montignac, Dordogne: Centre d'Études et de Documentation Préhistoriques)
Cartailhac E, Breuil H, 1906 *La Caverne d'Altamira à Santillane près Santander (Espagne)* (Monaco: Imprimerie de Monaco)
Clottes J, Lewis-Williams D, 1998 *The Shamans of Prehistory* (New York: Abrams)
Gobierno de Cantabria, 2004 *Las Cuevas del Monte Castillo* (Gobierno de Cantabria)
Graziosi P, 1960 *Palaeolithic Art* (London: Faber and Faber)
Halverson J, 1992 “The first pictures: Perceptual foundations of Paleolithic art” *Perception* 21 389–404
Hancock G, Faiia S, 1998 *Heaven's Mirror: Quest for the Lost Civilization* (New York: Three Rivers Press)
Hayes A, 1988 “Identification of two-tone images; some implications for high- and low-spatial-frequency processes in human vision” *Perception* 17 429–436
Hodgson D, 2000 “Art, perception and information processing: an evolutionary approach” *Rock Art Research* 17 3–34
Kennedy J M, Silver J, 1974 “The surrogate functions of lines in visual perception: Evidence from antipodal rock and cave artwork sources” *Perception* 3 313–322
Massironi M, 2002 *The Psychology of Graphic Images. Seeing, Drawing, Communicating* translated by N Bruno (Mahwah, NJ: Lawrence Erlbaum Associates)
Valladas H, Tisnérat-Laborde N, Cachier H, Arnold M, De Quirós F B, Cabrera-Valdés V, Clottes J, Courtin J, Fortea-Pérez J J, Gonzáles-Sainz C, Moure-Romanillo A, 2001 “Radiocarbon AMS dates for paleolithic cave paintings” *Radiocarbon* 43 977–986