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Myths About Rock Art

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Rather than addressing the myths or cosmologies supposedly expressed in rock art, this paper explores some of the myths that have been and are still being created about rock art. We know from the study of the last rock art-producing peoples in the world that outsiders of their cultures cannot interpret their rock art correctly, or even understand their cosmologies adequately. This is not surprising, in view of the neuroscientific understanding of the underlying differences. In a sound hermeneutical system, the normative nature of interpretation must be recognized and accounted for. The record shows that little hermeneutical restraint has been exercised in rock art research, and that the discipline's credibility demands the expulsion of the extensive myths that have been created by it. Some of the most prominent of these falsities are presented to illustrate the point.

Keywords: rock art, epistemology, interpretation, dating, extinct fauna, shamanism, neuropathology

Introduction

For over a century, ever since the French prehistorians grudgingly accepted the Pleistocene age of the Altamira cave art in Spain (Cartailhac, 1902) after first ruining the life of its discoverer, rock art has been subjected to interpretation by archaeologists, art historians, and others, and has been treated as art, essentially in the sense of modern Western perception of what art is. And yet, the producers of the world's rock art, from traditional or indigenous societies, have no concept of art in the Western sense, and the art-like productions of their societies, in some cases tens of millennia old, do not constitute art as we perceive it. They are not commodities, they have no "art histories", their makers were not professional artists, and they cannot be simplistically understood by alien commentators. Indeed, their makers referred to different constructs of reality.

The most pervasive human reaction to rock art, irrespective of the age, ethnicity, or conditioning of the beholder, is to try to figure out what it depicts and what it means. If adequate clues are spotted in a motif to invite "identification", it is considered to be figurative or iconographic, and it is then interpreted on that basis. Clearly, then, this process reflects the values, mental constructs and visual responses of the beholder rather than the producer of the rock art motif. It is an entirely subjective procedure that can only tell us about the cognition, perception, and mental world of the former; it tells us absolutely nothing about the mute maker of the object, his or her worldview or beliefs.

The main reason for the widespread belief among archaeologists to be able to understand paleoart production, even to communicate with the paleoartist (Mithen, 1998), appears to be the purported naturalism of some of the Franco-Cantabrian cave art in southwestern Europe. While it is true that some rock art traditions,

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such as those of the San/Bushmen of southern Africa, some of the pastoralists of the Sahara, or the Gwion paleoartists of the Australian Kimberley present high levels of realism in their imagery, the final Pleistocene palaeoart of Europe is particularly remote conceptually. The self-deception practiced by archaeologists is easily explained. The world's rock art was typically produced by illiterate people, whose brains differed significantly from those of literates in how they were organized, interconnected, and integrated (Helvenston, 2013). Those of non-literates operate largely through "magical thinking", whereas the operation by cause and effect reasoning is acquired ontologically. Therefore the most reliable modern interpreters of rock art should be infants, followed by illiterates. The least qualified are modern academic sophisticates (Bednarik, 2011, 2012, 2013a). The plasticity of the human brain facilitates its modification by ontogenic experience. Neuroscience has demonstrated that cultural activity modifies the chemistry and structure of the brain through affecting the flow of neurotransmitters and hormones (Smail, 2007) and the quantity of grey matter (Maguire et al., 2000; Draganski et al., 2004; Malafouris, 2008).

Moreover, most rock art traditions of the world are far from naturalistic in the modern European sense, but appear to be highly stylized, schematized, or conventionalized. Depending on the degree to which such cultural treatment departs from Eurocentric conventions, meaning tends to be inaccessible to the cultural outsider, including the modern scholar. The belief that there is an iconographic cut-off point up to which representational intent can be determined by the investigator is a falsity, besides being untestable and thus unscientific; it derives from purported authority and ethnocentric perception. The meaning of rock art for which an emic explanation is lacking is simply not accessible to the alien investigator.

Although this is already clear from purely rational considerations, there is also sound empirical evidence for this fundamental precept. It derives from the only "blind test" ever conducted in rock art interpretation. Macintosh was a distinguished professor of anatomy who "identified" the hundreds of painted biomorphs of Beswick Cave in the Northern Territory of Australia (Macintosh, 1952). Twenty years later, he discovered that the painters were still alive, so he took them to the site and asked them to explain the rock art imagery in detail, in order to test his own expert interpretations. He conceded that he had failed to diagnose correctly the individual painted items in 90% of the site's inventory, and he stated that "the mental code of the artists' schematization cannot be cracked without keys provided by highly initiated informants" (Macintosh, 1952, p. 197). This has also been my experience in working with indigenous rock artists. Since Macintosh's (1977) work was published, Australian rock art researchers have adopted the convention of always placing their "determinations" of motif meanings in quotation marks, a practice which their colleagues in the rest of the world have not yet espoused. This is of particular significance when it is remembered that Australia is the only country where *comprehensive* knowledge about the meaning of rock art has remained available to the present time. The onus is on those who interpret rock art to demonstrate what special ability they possess to do so correctly, and why anyone should take their contentions seriously. Here, we will review and analyze some of the mythologies rock art interpreters have created. This is such a rich source of relevant information that the present paper can only make minor inroads into this vast topic, which amounts to millions of false claims present in the published literature. It would need to be (and will be) followed by a book exploring this veritable mother-lode of published scholarly mistakes further.

Dating Rock Art Through Faunal Depictions

Notwithstanding the Australian reluctance of attempting etic interpretation of rock art, there are still numerous examples of such imprudence from that country. Many of them refer to endeavors of estimating the age of motifs by assuming that they are depictions of Pleistocene animals or their tracks. Such claims have been made throughout the 20th century and continue into the present century (Bednarik, 2013b). Basedow (1904, 1907, 1914), the first to recognize both the existence of Pleistocene rock art in Australia and the presence of humans in that period, first suggested that large bird track-like petroglyphs at Balparana could be of *Genyornis*, a giant bird that became extinct by 45 ka (45,000 years) ago. He later added the presumed tracks of *Diprotodon* at Yunta Springs and Wilkindinna. The lithology of the sites renders such great ages highly unlikely, and the petroglyphs do not resemble the tracks these species would presumably have made. More detailed was the claim that a complex petroglyph in the same region of South Australia, at Panaramitee North, depicts the head of a crocodile, *Crocodylus porosus* (Mountford, 1929). However, the nearest finds of the species are from 1,400 km north of the site, and no form of crocodile is known to have ever existed in the region in question. Moreover, the correct meaning of the motif was obtained in 1942 from a Ngadjuri elder: It depicts a *yarida* magic object, which represents the spirit body of a human being as well as other things (Berndt, 1987). Mountford (1928) also described a motif from Yunta Springs as a marine turtle, and Mountford and Edwards (1962, 1963) added to this a marine fish from Panaramitee North. On this basis, supported by the opinions of palaeontologists, they concluded that the sea must have been close to the site at the time the rock art was created. However, the last time the sea was anywhere near the site was in the Early Eocene transgression, 51 million years ago and long before humans first appeared (Bednarik, 2013b). Similarly, a large set of presumed tracks of *Genyornis* at Eucolo Creek is not remotely of the Pleistocene, as proposed by Tindale (1951), occurring as it does together with tracks of the dingo, a species that was introduced only in the mid-Holocene.

Murray and Chaloupka (1984) considered the possible depictions of several Pleistocene megafaunal species in the painted rock art of Arnhem Land, but failed to present any persuasive examples. These paintings occur in poorly protected sandstone shelters and nothing suggests that any of them could be more than a few millennia old. Also, none of the motifs considered by these authors exhibit any diagnostic features of the species concerned. That applies similarly to the proposition of Trezise (1993) that an image from Cape York Peninsula is of *Diprotodon*. The painting in question presents almost no anatomical feature attributed to that species and appears to be very recent, possibly being of a pig, an introduced animal. Even more absurd is the claims by Akerman (1998, 2009; Akerman & Willing, 2009) to have discovered three images of *Thylacoleo* at various times. That species is thought to have become extinct about 43 ka ago and there are no fossils known from the regions where Akerman purports to have found its images, Arnhem Land and Kimberley. The paintings he described are exposed to the rain, are certainly less than 2,000 years old, and feature no details reminiscent of *Thylacoleo* (Bednarik, 2013b). The most recent prominent contention of the depiction of an Ice Age species refers again to *Genyornis*. Gunn, Douglas, and Whear (2011) presented a water-damaged, poorly protected rock painting from a site in Arnhem Land that can at most be a couple of thousand years old. The extinction date of Genyornis is well known because of the many hundreds of dated fossil eggshell fragments that show that it disappeared rather abruptly at 50 ± 5 ka ago (Miller et al., 1999, as cited in Gillespie, 2004). Besides, its distribution was limited to southeastern Australia; its range never extended to the north of the continent.

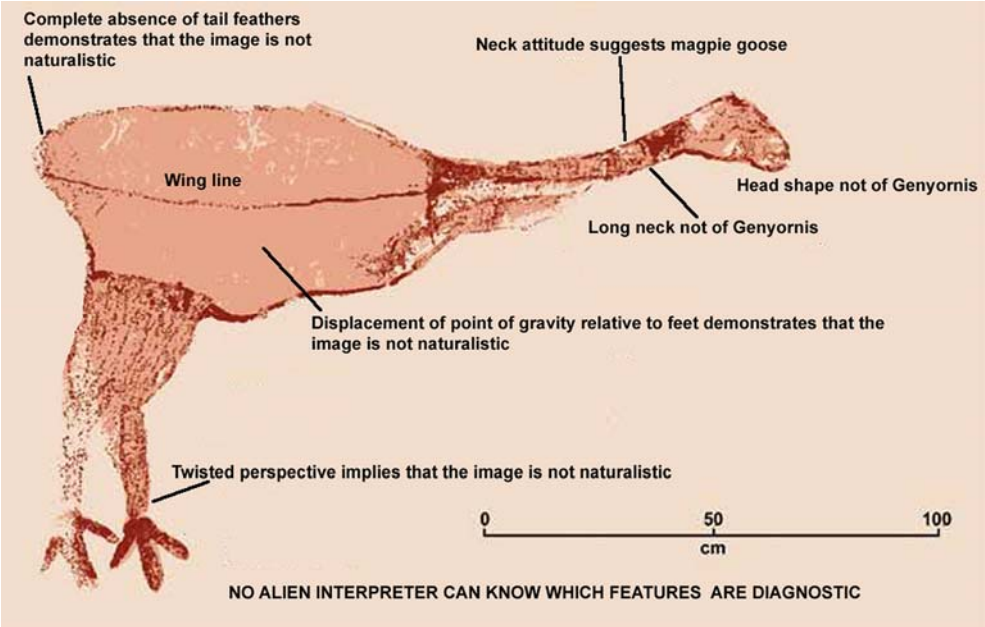

Figure 1. Gunn et al.'s recording of an aviform pictogram they interpret as *Genyornis*, indicating some of the diagnostic features they disregard.

Nevertheless, the last example illustrates well the epistemological derivation of these inclinations to see extinct animal species in recent rock art. The rock art image concerned is certainly not a naturalistic or realistic depiction of any animal (see Figure 1). The displacement of its point of gravity relative to what are seen as its feet implies that it would fall flat on its beak. The feet are shown in "twisted perspective," and the absence of any tail feathers, which are typical of all extant large birds, is unnatural. The long neck, head shape, and beak are not of *Genyornis*; and there is a line suggestive of either a wing (the species was flightless) or a digestive tract, which would imply x-ray depiction (a very recent stylistic treatment in Australia). In short, the process of the beholder convincing himself/herself that this is a depiction of any specific animal is completely subjective, in that confirming aspects are accepted and disconfirming ones are rejected to arrive at a preferred reading. The same applies to the thousands of other "identifications" of animal species in world rock art: they are based on pareidolia and autosuggestion. More importantly, the logic of using such "identifications" to establish the age of the rock art can lead to the most absurd deductions. For instance, some Chinese archaeologists recorded a group of petroglyphs in Inner Mongolia and defined them as images of giraffes (see Figure 2). Because giraffes became extinct in China during the Tertiary period, millions of years ago, they then concluded that the images must have been made in the Tertiary (i.e., before humans existed). Before this is seen as an extreme example it needs to be appreciated that there are numerous examples where it was claimed that rock art images are of dinosaurs, as we will later see. The importance of this is that there is no logical difference between the claim that an image of a group of giraffes proves its antiquity, and the claim that an image of any other zoomorph proves its age. Clearly in both cases the question is: What prompts the interpreter's belief to know the meaning inherent in patches of pigment or arrangements of anthropogenic depressions on rock? Neuroscientifically, rock art interpretation derives from processes involved in apophenia and pareidolia, which are Type 1 errors (false positive or alpha errors). The tendency to seek patterns in random information is fundamental to the ability of a species in processing sensory input. High levels of dopamine affect the propensity to find meaning, patterns, and

significance, even when there is none, and this proclivity is related to a tendency of receptivity for the paranormal (Leonard & Brugger, 1998). Alcock (1981) emphasized how evidence that should be rejected on a rational basis is instead accepted by default, and rationality changed to fit the perceived evidence (Alcock, Carment, & Sadava, 2005). He also noted how this is reinforced when believers listen to each other's stories.

Figure 2. Recording of "Tertiary giraffe" petroglyphs from northern China.

False Dating Claims for Rock Art

The above short list of Australian misidentifications of rock art is a reasonably comprehensive catalog of such errors from that country, whereas a corresponding inventory for the rest of the world would cite literally tens of thousands of examples. The myths created about rock art are far more numerous than the snippets of information about it that can be considered credible. In that sense rock art research provides the richest source of falsehoods in all of academic endeavor. While the invention of iconographic interpretations, for instance to derive age estimates, is very common, the opposite reasoning is just as frequent. This occurs when an age of rock art is determined arbitrarily, usually by some stylistic hunch, and the motifs are then interpreted on that basis. For instance there is a series of petroglyph sites in the Côa valley of northern Portugal whose contents are mostly of the last three or four centuries, but which also feature a small component dating from the late Holocene (Bednarik, 1995). For reasons best known to them, the Pleistocene archaeologists collectively and universally decided that this assemblage is of Paleolithic antiquity and in the order of 20 to 26 ka old (e.g., Zilhão, 1995; Bahn, 1995a, 1995b; Zilhão et al., 1997), and that its scientific dating (Watchman, 1995, 1996) is fraudulent. The imagery found on these sites consists of pictures of clocks, locomotives, bridges, crucifixion scenes, horses, Spanish fighting bulls, and a large contingent of engraved inscriptions. The latter include in many cases calendar dates, ranging from the present back to the 18th century. The earliest of these dates are so weathered that they can barely be deciphered, and they are clearly older than the zoomorphs defined as Paleolithic by the archaeologists. The Côa valley is deeply incised into the soft schist forming it; it is

geologically very young and none of the decorated rock exposures along the river could have existed during the final Pleistocene. Also, there are no Pleistocene sediments anywhere in the valley, all terraces being of the final Holocene. Therefore the extensive excavations at dozens of sites have only revealed Neolithic or later occupation levels, with ceramics extending right down to bedrock. This has not prevented the archaeologists from defining the images of bulls as "aurochs", and those of horses as Paleolithic, despite the occurrence of bridles on some of the latter depictions. In their fervent belief that this corpus is of the Pleistocene they even succeeded in hoodwinking UNESCO (United Nations Educational, Scientific, and Cultural Organization) to accept the site complex as Paleolithic, and list it as such on the World Heritage List.

Precisely the same applies at another site, only 50 km away but located in Spain. Like the Côa, the Agueda is a southern tributary of the Douro, rising in the granite region to the south and then plunging into the soft schists, where angular quartz sediments scour the soft rock and rapidly lower the river's thalweg. The Siega Verde site near Castillejo de Martin Viejo is dominated by the soaring masonry structure of a bridge, in whose vicinity occur hundreds of petroglyphs and inscriptions. To support the great weight of its central piers, platforms were carved from the bedrock, on which some of the rock art and writing were inscribed. These surfaces were created either in 1925, or immediately previously, and some zoomorphs were concealed by a pier. All of the petroglyphs, names, and dates occur within a zone of less than six meters above the normal river level, which is regularly flooded. They are then subjected to intensive fluvial sandblasting, and the duration of this process of erasure can be easily established from the dated inscriptions. The zoomorphic petroglyphs are exposed to precisely the same gradual obliteration. At the lower level both are worn beyond recognition in well under 200 years (Bednarik, 2009a), and even the highest lying of the rock art cannot possibly be twice that age, judging from the corresponding inscriptions. In fact the majority of the Siega Verde zoomorphs date from around 1925, when the bridge was built, and up to the 1950s. And yet all commenting archaeologists insist that this assemblage is of the Upper Paleolithic and around 20 ka old or older. Again, they see aurochs and Pleistocene horses, and they have even claimed that there is an image of megaloceros and another of a woolly rhinoceros. Of course, there is no such image at the site, nor has one ever been published. The archaeological innuendo was adequate justification, however, to inscribe Siega Verde also on the World Heritage List.

Thus the issue of the modernity of the Siega Verde rock art is not just an academic subject that can be debated in neutral terms and resolved by reasoned discussion and careful consideration of all the evidence. It is a politically charged issue. Despite the unambiguous statements of local residents of the nearby village that the petroglyphs are of recent times (Hansen, 1997), and the scientific opinion that there cannot be any Pleistocene rock art at the site, the fraudulent listing adds to the Eurocentric obsession with the importance of Paleolithic art. It serves a political purpose, reinforcing the established bias and skewed understanding of paleoart beginnings in which Europe is some kind of "cradle of art". The obsession with European Pleistocene rock art amounts to a powerful cultural icon, ignoring that Pleistocene rock art is far more numerous in other continents, and prejudicing the appreciation of Holocene rock art, thus impairing its protection and preservation.

These examples serve to illustrate a vast category of myths created about rock art by researchers. The linking of specific animal depictions to Pleistocene antiquity is a recurring theme in countless such claims. Two sites in the Austrian Alps, Stubwiesalm and Kienbachklamm, fall into this group (Kohl & Burgstaller, 1992). No justification at all exists for both claims, and in the second case some of the motifs are natural formations

(Bednarik, 2009b). There have been numerous cases of central European cave art falsely attributed to the Paleolithic period, including that of Kleines Schulerloch (Birkner, 1938, p. 13) and Kastlgänghöhle (Bohmers, 1939, p. 40), debunked by Bosinski (1982, p. 6) and Freund (1957, p. 55); Hohle Fels (Hahn, 1991; Conard & Uerpmann, 2000) and Geissenklösterle (Hahn, 1988), both refuted by Bednarik (2002); Mladeč Cave (Oliva, 1989), refuted by Bednarik (2006); and Bycí Skála, refuted by Svoboda, van der Plicht, and Balák (2005). There are numerous claims to have identified extinct fauna in Chinese rock art (e.g., YOU, 1984; GAI, 1986, pp. 415-424; LIU, 1991; CHEN, 1991, p. 126; LI, 1992) dating it to the Pleistocene which have been refuted (WANG, 1984; Bednarik & LI, 1991; Bednarik, 1993; TANG, 1993). A claim for Pleistocene petroglyphs based on the perceived identification of depicted fauna has also been made in South Korea (Sohn, 1981). Such contentions are commonly expressed also in Siberia (e.g., at Shishkino & Tal'ma, on the Lena river; Okladnikov, 1959, 1977; Okladnikov & Saporoshskaya, 1959, as cited in Bednarik & Devlet, 1992), in Mongolia, several of the central Asian republics, Japan, occasionally in India (as cited in Bednarik, 1993), Pakistan, Iran, and Azerbaijan. For instance it has been claimed that certain rock art in Arabia dates from the final Pleistocene (by a researcher who has never been there; Anati, 1968), but studies of the extensive rock art of Saudi Arabia have provided no support so far (Bednarik & Khan, 2002, 2005, 2009).

Even North America has yielded numerous propositions that extinct Pleistocene species have been depicted in its rock art. Particularly popular are designations as proboscideans, which have appeared throughout the 20th century and into the present. Both the Columbian mammoth and mastodon were certainly met by the early colonizers of the continent, but all proposals of their depiction could not so far be credibly substantiated. Some, such as the purported mastodon engraving on a pendant made of whelk shell from Holly Oak, Delaware, are clearly fakes. This object, supposedly found in 1864 (Kraft & Thomas, 1976), was eventually radiocarbon-dated to about 1,500 years BP (Griffin, Meltzer, Smith, & Sturtevant, 1988). Further unambiguous fakes are the two red elephant paintings at Birch Creek, Ferron, Utah (Malotki & Weaver, 2002, p. 192). The petroglyph of a mastodon near Moab, Utah was reported by Gould (1935), but has been partially destroyed by vandalism subsequently and more probably depicts a bear with a fish in its mouth (Malotki & Weaver, 2002, p. 200). An elephant-like image in Yellow Rock Canyon, Nevada (Tuohy, 1969; Clewlow & Uchitel, 2005) was probably made in the 1840s (Layton, 1976). A petroglyph at China Lake Naval Air Weapons Station presented as a possible proboscidean by Kaldenberg (2005) has been refuted by Malotki and Wallace (2011), as has been another from Hieroglyphic Canyon, Arizona, and one more from near Suwanee, New Mexico. Malotki and Wallace (2011) also discredited the elephantine status of a "mammoth" image at Manila, Utah (Thompson, 1993), and the "mastodon" at Craneman Hill near Mayer, Arizona. All of these images are thought to depict something other than proboscideans, and Malotki and Wallace (2011) correctly attribute these "identifications" to pareidolia.

The status of two elephantine petroglyphs at Track Rocks near Barnesville, Ohio, has remained uncertain until recently. Early descriptions of the site (e.g., Ward, 1872; Read & Whittlesey, 1877; Swauger, 1974) make no mention of them, but they are all significantly incomplete. A recent scientific investigation confirmed that they probably do depict elephants, but that they date from between 1910 and 1980, based on granular exfoliation calibrated by numerous engraved dates (Bednarik, 2013c). Two further arrangements high up on a cliff at Upper Sand Island near Bluff, Utah, have also been attributed to the Columbian mammoth (Malotki & Wallace, 2011). Intensive microscopic examination (Bednarik, 2013c) and geological study (Gillam &

Wakeley, 2013) have shown that a Pleistocene antiquity of the petroglyph panel is geologically not feasible, and that the groups of markings concerned are fortuitous arrangements of unrelated elements. By applying macro-wane analysis Bednarik has determined that the petroglyphs are less than 4000 years old, which falls significantly short of the presumed end-Pleistocene extinction date of the species (Faith & Surovell, 2009). This leaves just one more American paleoart depiction of a proboscidean, the engraving on a bone fragment from the Old Vero Site, Vero Beach, Florida. Purdy et al. (2001) have presented empirical evidence in favor of the marking's authenticity, but several aspects remain to be clarified further. Their case rests mostly on the continuity of mineralization across the indentations (Purdy et al., 2001, p. 2911), other indicators being essentially inconclusive (Bednarik, 2013c).

This long list of purported elephantine rock art motifs from the United States can be supplemented by a series of spurious claims for other Pleistocene faunal depictions in American rock art. Among them are Whitley's (1996) claimed that the extinct Western horse has been depicted at Legend Rock, Wyoming; and his contention that a partially patinated petroglyph at Surprise Tank, California, is of a camelid (Whitley, 1999). The second assertion cites the opinion of a paleontologist in support (Whitley, 2009), which is of no relevance. Above we have seen that the absurd claim concerning two supposed depictions of marine species backed by paleontologists led to the inference that the images would be of the Eocene. Paleontologists or zoologists are trained to identify species or their remains; they have no innate understanding whatsoever of alien paleoart imagery and their pronouncements about it are less relevant than those of illiterates or infants.

The Depiction of Dinosaurs in Rock Art

The practice of applying the conditioned alien perception of the modern beholder to the perceived iconographies of the rock artists always provides a seriously flawed epistemology. Typically authors select from a complex image a few aspects that support their preferred interpretation, claiming them to be diagnostic while ignoring those that overwhelmingly contradict it, or demonstrate that the image as a whole is not naturalistic. This becomes especially obvious when the proposed depictions of dinosaurs or pterosaurs in rock art are considered. In general these have found no support among archaeologists, for the obvious reason that such species became extinct some 65 million years before humans began creating pictures, but this has not prevented numerous such proposals from others. Some of these are seized upon by creationists (e.g., Niermann, 1994; Swift, 1997; Butt & Lyons, 2004; Lyons & Butt, 2008; Isaacs, 2010; Nelson, 2011) seeking to demonstrate that humans and dinosaurs coexisted.

Most of the assertions of this nature come again from the United States, also the only part of the world, apart from western Europe, where fakes of Pleistocene palaeoart are common (Bednarik, 2009b). The perhaps earliest claim concerns a pair of paintings first described by Marquette (1855) who saw them in 1673. It is the first published record of rock art north of Mexico (Bednarik, 2007, p. 8). By the early 19th century the images were rendered almost unrecognizable, and the cliff bearing them was quarried in the middle of that century. Only fanciful impressions of the images survive, and Armstrong (1887) saw them as depicting pterosaurs, as did Gibbons and Hovind (1999), among others. The most likely meaning of the motifs is that they depicted Underwater Panther or Mishipizhiw, a mythological creature of the Great Lakes region with horns, probably related to the horned serpent theme widespread in North American mythology.

Another such claim originates from members of the 1924 Doheny expedition into Havasupai Canyon, northern Arizona, who reported an image of *Diplodocus* (Hubbard, 1927), seen as *Edmontosaurus* by Taylor (1987). Since then, Beierle (1980) has described a second motif from the same panel and at a similar level as an unspecified dinosaur. Senter (2012) has examined both petroglyphs and considers the first to be of a bird, the second of a bighorn sheep (see Figure 3a and 3b). None of these explanations can be conclusively refuted, but the probability that these are images of dinosaurs is so extraordinarily small that it cannot be seriously considered. Nevertheless, many other such proposals have been presented. One of the most spectacular misidentifications is the alleged pterosaur painting in Black Dragon Canyon, Utah (Barnes & Pendleton, 1979, p. 201). J. S. Warner and J. E. Warner (1995) have analyzed the assemblage and determined that five separate pictograms, two anthropomorphs, and three zoomorphs, have been combined as one hypothetical motif. This has been confirmed by Senter (2012). Then there is the purported sauropod petroglyph at Kachina Bridge in the Natural Bridges National Monument, also in Utah (Swift, 1997; Taylor, 1999; Butt & Lyons, 2004; Lyons & Butt, 2008; Isaacs, 2010; Nelson, 2011). Senter and Cole (2011) had debunked this myth by showing that the "legs" of the perceived image are natural mineral stains and the body consists of a pair of sinuous, snakelike petroglyphs.

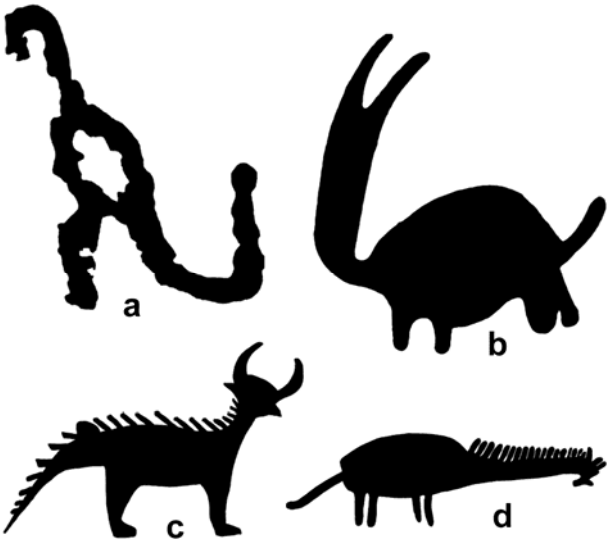

Figure 3. Rock art motifs interpreted as depicting dinosaurs: a and b—Havasupai Canyon (USA); c—Agawa Rock (Canada); and d—unspecified site (Tanzania).

Further afield we have one more claim by Gibbons and Hovind (1999) of a dragon or dinosaur, from the Agawa Rock site in Lake Superior Provincial Park, Ottawa (see Figure 3c). It occurs together with several other petroglyphs, the meaning of which is known from the testimony of Anishinaabe informant Chingwauk, given to geographer and ethnographer Henry Schoolcraft in the early 19th century (Dewdney & Kidd, 1967; Meurger & Gagnon, 1988). The group of pictograms depicts a lake crossing by a war party, and the horned creature represents Underwater Panther.

Implied sauropod rock art images have also been reported from various parts of Africa. Those from Tanzania and Zambia (Mackal, 1987) are of no great interest; the former are much more likely to depict giraffes (see Figure 3d), the latter are too vague to assign to any animal. However, the imagery in Mokhali Cave, Lesotho, is a great deal more interesting. It provides the only known instances of authentic depictions of dinosaurs by

paleoartists. Ichnologist and rock art recorder Paul Ellenberger (2005) had provided tracings of four Bushman/San paintings from this site. One is a reddish painting of a dinosaur footprint, fossilized examples of which are common in the region (Ellenberger had described 58 rock slabs bearing such fossil prints). But the artists, among the best trackers in the world, did not stop there. They apparently sought to reconstruct the animal that made these large tracks (Ellenberger, Mossman, Mossman, & Lockley, 2005). There are three graceful creatures of the ornithopod reconstructed by these ethnoscientists of pre-history, painted in black. Interestingly, in inferring the animal from its tracks, these traditional scientists outperformed palaeontologists: their three reconstructions (see Figure 4) as recorded by the young Ellenberger in 1930 are clearly superior to that of Sir Richard Owen of a quadrupedal ornithopod (who made other major mistakes in reconstructing extinct animals; as cited in Bednarik, 2013c).

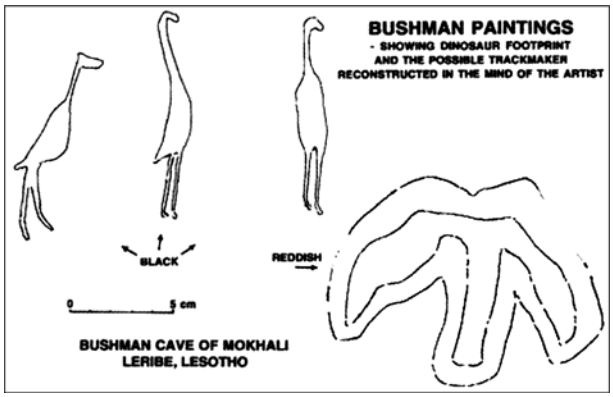

Figure 4. Paul Ellenberger's 1930 recording of ornithopod track painting and three reconstructions of the creature by paleoscientists.

Dinosaur tracks have been depicted in a number of cases in rock art: in Utah such a pictogram occurs close to sets of fossil dinosaur footprints; petroglyphs of them have been found in Arizona and Wyoming; in Algeria legends of a colossal bird relate to Cretaceous dinosaur tracks; while in Australia, the legend of Marella, the emu-man, derives from theropod tracks (Mayor & Sarjeant, 2001). The rather accurate depiction of a South African Mesozoic ornithopod is unique, demonstrating not that man and dinosaur coexisted, but that the scientific acumen of the paleoartists concerned was simply breathtaking.

Shamanism, Neuropathologies, and Rock Art

Mythologies created by rock art researchers and archaeologists are not limited to invented unlikely meanings, they also include vast numbers of "likely explanations". Unfortunately, plausibility of interpretations does not render them any more credible, in fact from the epistemological perspective the unlikely versions are preferable: they are easier to refute. There is a vast body of literature around the notion that rock artists were either shamans or suffered from mental illness. The popularity such entirely unfounded fantasies enjoy is certainly in need of an explanation. It would seem that scientifically based elucidation of rock art lacks public appeal. It also remains profoundly unknown at what point in human history the practices we define as shamanism were introduced, despite isolated claims for Holocene evidence (e.g., Porr & Alt, 2006). In the entire ethnographic world literature there is not a single report of a shaman having produced rock art. There are, however, numerous cases of rock art production having been observed and recorded or where the authors of the

"art" may be known to us (e.g., Haskovec & Sullivan, 1986; Bednarik, 1998, p. 26). In all such cases no shamans were involved, and the utilitarian or ceremonial purpose of the rock art, where it is known, lacks any connection with shamanism. One of the most obvious prerequisites for considering what the characteristics of shamanic art might be is a definition of its ethnographically demonstrated idiosyncrasies. In the absence of such an explicit index we lack any definitive way of identifying authentically shamanic art traditions. Moreover, most of the world's rock art occurs in regions from which no shamanic practices are known ethnographically. Although none of this demonstrates that no rock art was ever produced by shamans, the proposition that significant quantities of rock art are the work of shamans (Lewis-Williams & Dowson, 1988) is unwarranted by the empirical data, and it is of course untestable. Thus, the null hypothesis, that most rock art is not shamanic, has empirical support; the favored shamanic hypothesis has none.

Of particular concern are the endemic modes of polemic presented by the shamanists. Rather than citing ethnographic information they reinterpret the original texts creatively (Hromnik, 1991; Solomon, 1999, 2000; Le Quellec, 2006; Helvenston, 2012) and replace key terminology with their own preferred words. For instance, Lewis-Williams replaced the terms "sorcerer, witchdoctor, medicine man" or "healer" (and even "teacher") with his preferred word "shaman". But he believed that was what the ethnographers (e.g., Bleek, 1933, 1935, 1936; How, 1962; Katz, 1976, 1982; Katz & Biesele, 1986; Lee, 1967; Marshall, 1969; Orpen, 1874; Prins, 1990) meant when they wrote of sorcerers and medicine men, and that they were too ignorant to understand metaphors. He also mistranslates the word "medicine man" used by an old Xhosa or Mpondomise woman in relation to the rock art painters (Lewis-Williams 1986; as cited in Jolly, 1986). When she reported that medicine men went into a river to catch a snake whose fat they ate and rubbed on their bodies, Lewis-Williams interprets it as a metaphor for entering trance (the "manipulated evidence", as cited in Hromnik, 1991). He also conflates hallucinogen-induced trance with trance involving no drugs, confusing analogical effects with identical causes (Lewis-Williams, 2002). Similarly, he projects the ethnography of the Kalahari San, who produced no rock art, onto the extinct/Xam of the Northern Cape, who practiced very little rock painting, and applies his contrived interpretations to rock paintings elsewhere. Hromnik demonstrates that much of the rock art Lewis-Williams attributes to San is more likely the work of Hottentots or Khoisan. Just as Lewis-Williams "reinterpreted creatively" the early ethnographers of the/Xam, he ignored the more recent studies of the Ju/'hoansi by Katz (1982) and Katz and Biesele (1986), who found no justification for the use of the words shaman and trance.

Similarly, he continues to ignore the advice of those genuinely engaged in the study of authentic shamanism (Eliade, 1964; De Heusch, 1965; Rouget, 1980; Hamayon, 1982, 1990; Hultkrantz, 1993; Francfort et al., 2001), although he lacks first-hand knowledge of shamanism. Shamans are specialists, outsiders of society, who have undergone considerable training to attain their powers, often exercised in seclusion. The dances among the San Bushmen are communal affairs, with as many as half of the people present participating. There are very few parallels between genuine shamanism in Eurasia or the Americas, and the southern African practices Lewis-Williams and his many followers consistently misinterpret. None of these shamanists seem to have in fact ever met a shaman, or made any attempt to review the living profession, even though thousands of shamans exist today. The author has worked with and studied shamans in various parts of the world, and not a single one had ever produced rock art, or even seen any rock art. The author have never observed nosebleeds, and most of shamans do not "dance", although they might move in ways one might so interpret. However, the strange body

movements of shamans are not a form of "possession", as in trance, they are part of their performance. Trance is not necessarily a part of their technique, and in fact the most powerful among them (as best reflected in the degree of the respect they command in their community) neither dance or trance (Hamayon, 1995, p. 420), or conduct themselves in any ecstatic way resembling the reductionist view of shamanism Lewis-Williams and his followers have conjured up. But the author observed that their power and social influence can be so potent that they eclipse very strongly ingrained religious practice (see Figure 5). Helvenston (2012) most pertinently observed that "when faced with uncertainty and the unknown the San resort to supernatural powers, when faced with familiar tasks like gathering food, or building huts, their approach is scientific". Similarly when the members of a strictly Islamic society are faced with taking a life-threatening risk, they turn to the local shaman for protection. As Consens (1988) observed in his comment on the very first major paper proclaiming Lewis-Williams' simplistic shamanist explanation of rock art, "[t]his kind of paper clarifies the limits beyond which we fall into science fiction"—or, as Helvenston says, into pseudoscience.

Figure 5. The author (with back to camera) participating in an elaborate ceremony conducted by a female shaman, in which she implores the spirits to protect a crew of 12 on an impending dangerous mission. All other men are Moslems, but for this purpose the power of a shaman is decisively preferred.

Until the shamanists in rock art research present a credible account of what true shamanic art looks like, and especially what shamanic rock art looks like, they have presented no scientific case. The widespread unjustified references to shamanism in the rock art literature are as much a form of folklore as are the interpretations of motifs as dinosaurs. But the issue becomes even more intricate when the literature is considered that defines shamanism as a manifestation of mental illness, or the related literature defining rock art as the work of people suffering from a variety of neuropathologies. The altered states in (North American) shamanism were initially recognized by Oesterreich (1935, p. 295). Peters and Price-Williams (1980, p. 397) examined them across 42 cultures. Loeb (1924), Radin (1937), and Devereux (1961) defined shamans variously as epileptic, hysteric, or neurotic, whereas Silverman (1967) introduced the notion that shamanism is an acute form of schizophrenia. His hypothesis attracted immediate criticism (Handelman, 1968; Weakland, 1968; Boyer, 1969) and was followed by later authoritative work rejecting it (Lex, 1984; Noll, 1983), yet the notion that there

is a connection between shamanism and schizophrenia continued to be pursued in recent years (e.g., Polimeni & Reiss, 2002; El-Mallakha, 2006). Similarly, Whitley's (2009) attribution of shamanism to bipolar disorder is without basis, and none of the writers presenting these claims indicate evidence of significant understanding of the disorders concerned, of their etiologies, genetic nature, or effects. Most importantly, these neuropathologies had most probably not even been established in the human genome at the time the earliest palaeoart was created (Bednarik, 2011, 2012, 2013a, 2013d).

The human brain disease autism (Helvenston & Bednarik, 2011; Bednarik & Helvenston, 2012) has often been proposed to have been instrumental in introducing Pleistocene palaeoart (Kellman, 1998, 1999; Humphrey, 1998; Haworth, 2006; Spikins, 2009; Bogdashina, 2010, pp. 159-160; Marr, 1982; Treffert, 2010). Others have attributed the origins of "art" to Asperger's syndrome (Spikins, 2009), to schizophrenia or schizotypy (particularly via shamanism) and to bipolar disorder or cyclothymia. All of these proposals have been decisively refuted on the basis of the scientific and clinical literature (Bednarik, 2013d), but it has been recognized that the rubber hand illusion in schizophrenic patients (Peled et al., 2003) has implications for the notion of out-of-body experiences (Thakkar et al., 2011). It illustrates proprioceptive drift, which can even lead to out-of-body experiences, linking body "disownership", psychotic experiences, and a weakened sense of the self. This may be a factor in shamanic trance, but in every other respect these explanations of rock art production are essentially myths.

Conclusions

The professed purpose of this paper is to survey the multitude of false claims that have been made about rock art over the past one and a half centuries. It has failed abysmally in this, because it has only managed to consider a small segment of the material that needs to be reviewed in this context. There are vast aspects of the topic that have remained completely untouched here. Among them are the veritable fantasies archaeologists have concocted about a corpus of human figurines of the Upper Paleolithic of Eurasia, called "Venus figurines": all of its underlying assumptions have been challenged and are likely to be false. Or there is the fertile imagination of hundreds of archaeologists that has given rise to some of the over seventy published interpretations of cupules or cup-marks, the most common motif in rock art, most of which have no justification. Then there are the endless list of books and articles written about perceived writing systems in rock art, interpreting and even "deciphering" rock art motifs as the writing of peoples who have never been demonstrated to have been in the regions concerned. These exotic writings range from Ogham to Sumerian, from Chinese to Pharaonic Egyptian, and are said to occur in all continents except Antarctica. There simply seems no end to the profusion of claims about the world's rock art that have no credible basis but are often pursued with great enthusiasm, and the author has been much too optimistic in trying to deal with them meaningfully in this short article. Clearly, this topic should be the subject of a book—and a rather substantial book at that. Such a volume also needs to consider the etiology of these misidentifications, by involving neuroscience and the cognitive sciences, and the phenomena of pareidolia and autosuggestion, which are deeply implicated in these matters.

It should be clarified that many of these misinterpretations are not widely supported by archaeologists, but it is equally true that a disconcertingly large part of them has been proposed by archaeologists, as is the case in the majority of those presented here. But the most worrying factor in the present review is the realization that this

paper has only addressed cases that were readily refutable or lacked credibility. The question then arises: how many claims and interpretations published about rock art are not given such attention, because they seem reasonable or plausible? Reasonableness does not make them true, and bearing in mind that there are myriad falsifiable claims about rock art, is it not judicious to suspect that the number of reasonable but ultimately false claims is much greater?

That defines the issue: if rock art is to be studied credibly and scientifically, all falsities need to be purged from the discipline. That includes not only the types reviewed here, which were tested and rejected, but also those that are not tested because they seem reasonably in tune with the dominant dogmas. At this point it becomes apparent that the task of turning this pastime into a science is Sisyphean.

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