CHAPTER 37

Columbian Mammoth and Ancient Bison: Paleoindian Petroglyphs along the San Juan River near Bluff, Utah, USA[1]

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The Multi-Cultural Rock Art Sequence at Sand Island

The San Juan River Corridor and environs between the towns of Bluff and Mexican Hat in southeastern Utah represent an "archaeological frontier" par excellence, based on a multitude of prominent archaeological remains, including a Clovis-era campsite, Basketmaker pithouses, and Puebloan cliff-dwellings. The region's great appeal to a succession of peoples, whether seasonal or longer-term inhabitants, is also evident in the many thousands of petroglyphs clustered in several major sites that adorn the prominent cliffs along both sides of the river. Two of the biggest rock art concentrations occur in the Sand Island Recreation Area some 6 km west of the town of Bluff (Fig. 37.1). Known as Lower and Upper Sand Island, the two massive galleries – 90 m and 1.3 km long, respectively – offer a large array of stylistically varied engravings (Phillips 2003; Grench 2014). They amply demonstrate that the 1.5 km-wide San Juan River valley with its wealth of resources at this location has been an agora for people of different cultural backgrounds for many millennia, ranging from Paleoamericans at the end of the Ice Age to Mormon settlers in the nineteenth century, and tourists, including river runners and rock art aficionados, today.

All of these people have left their unique graphic mementos on the vertical Navajo Sandstone cliff bordering the northern side of the extensive alluvial floodplain at Sand Island. Sadly, some 25% of the estimated 6,000 individual elements are the work of graffitists (Fig. 37.2) and vandals (Fig. 37.3) (Phillips 2003; Grench 2014). The remaining glyphs, in over one hundred separate pan-

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FIGURE 37.1 Location of the Sand Island Recreation Area west of Bluff, Utah, in the context of the surrounding landscape. Aerial photo by David "Doc" Searls.

els, can be attributed to distinct stylistic expressions such as Western Archaic Tradition (WAT), Glen Canyon Linear (GCL), Basketmaker (BM), Ancestral Puebloan, and (proto)historic Ute and Navajo iconography. All of them can be subjectively identified, with a good degree of certainty, on the basis of their classic morphological characteristics and certain key motifs. Still, there are many elements that are stylistically transitional or borderline, and quite a few, unidentifiable, can only assigned to an undetermined category (Phillips 2000).

WAT-type imagery, consisting of purely abstract-geometric designs of either curvilinear or rectilinear configuration – circles, spirals, dots, grids, lines, meanders, rakes, stars, and cross-hatchings – was the preferred graphic mode of expression with which Paleoamerican pioneers, upon entering a continent teeming with animals but empty of other humans, began to transform a natural landscape into a cultural one, that is, turn undefined, open spaces into specific, meaningful places. These archetypal abstract-geometric symbols, frequently termed non-figurative, non-representational, or non-iconic, were clearly the predominant elements of the paleoartists' repertoire, and can therefore be regarded as constituting the foundational iconography for all of North America (Malotki 2013).

Appearing relatively sparsely at Sand Island, WAT paleoart is usually deeply engraved and/or heavily patinated to the point that it matches the weathering or chemical alteration of the host rock. Among the noteworthy examples is a rectilinear meander, 3.5 m in height, 15 cm wide, and 2 cm deep

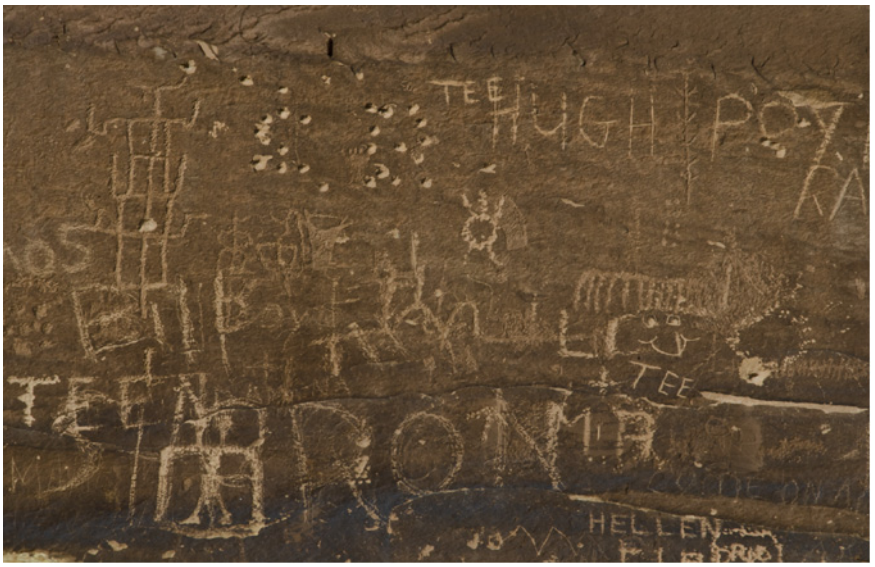

FIGURE 37.2 Graffiti obliterating ancient petroglyphs at Upper Sand Island.

FIGURE 37.3 A suite of anthropomorphs marred by bullet holes at Upper Sand Island.

FIGURE 37.4 Deeply carved rectilinear meander and sunburst design, typical of early Western Archaic Tradition rock art, at Lower Sand Island.

(Phillips 2000), at Lower Sand Island (Fig. 37.4), while the upstream gallery offers rare groupings of age-worn cupules on the vertical cliff face and a riverside boulder.

Spectacularly represented at both Upper and Lower Sand Island are GCL-style engravings. Indigenous to dozens of locations throughout portions of southern Utah and northern Arizona, the "biocentric" style primarily uses a vocabulary of life forms, anthropomorphs and zoomorphs, whose outline bodies

FIGURE 37.5 Anthropomorphic and zoomorphic motifs representing Glen Canyon Linear Style at Upper Sand Island.

are frequently patterned with geometric infill (Fig. 37.5). Hoofed quadrupeds such as bighorn sheep, deer, wapiti, and pronghorn populate the style's panels with uncanny regularity. At Upper Sand Island alone, over 110 anthropomorphs (20 of which are disembodied or "floating" heads) and some 65 zoomorphs are counted in numerous clusters (Grench 2014, Appendix C). With no reliable time frame available for their creation, the style remains essentially undated (Malotki 2007, 63), although 3,000 BCE is generally posited as a reasonable time for its onset (Cole 2009, 45).

Chronologically succeeding GCL petroglyphs is imagery ascribed to the Basketmaker culture, which archaeologists subdivide into an earlier, classic BM II

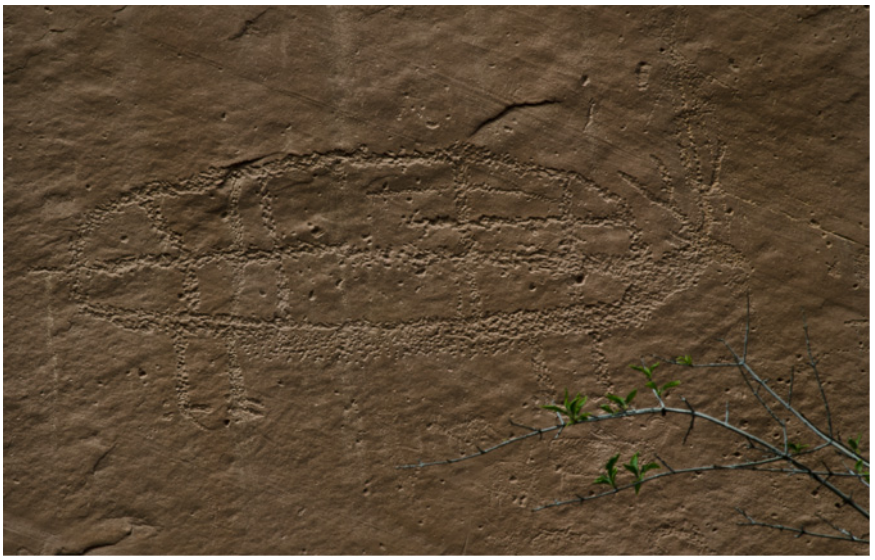

FIGURE 37.5 (Continued.)

phase, also known as San Juan Anthropomorphic Style (1,500/1,000 BCE–CE 400), and a more recent BM III phase (CE 400–750). BM II is readily recognized by majestic anthropomorphs with elaborate crescent-stacked headdresses (Fig. 37.6), whereas BM III, at both Sand Island sites, features meticulously executed straight-back flute players in an often exaggerated ithyphallic pose (Malotki 2000, Plate 26). Of the over 50 graven motifs, one, at the downstream gallery, is unique in that it is depicted as a bighorn sheep holding the flute with its front legs (Fig. 37.7). The same location also contains a number of disembodied heads, some of which are believed to represent flayed scalps, as suggested by a distinct loop at their top (Phillips 2003, 134f.).

Imagery datable to the Ancestral Puebloan era (post-CE 750–1,300) and archaeologically classified as Pueblo I, II, and III in this part of Utah (Winston Hurst pers. comm. 2014) is found in rather scattered fashion at Lower Sand Island; at Upper Sand Island it occurs in several concentrations above a lengthy berm (Fig. 37.8). Now cordoned off by a buck-and-rail fence to discourage visitors from entering the fragile area, the berm has yielded remnants of ground features, artifacts, including an assortment of datable ceramics, and other cultural evidence that it once was topped by prehistoric habitation structures (Grench 2014, 36–42 and 78).

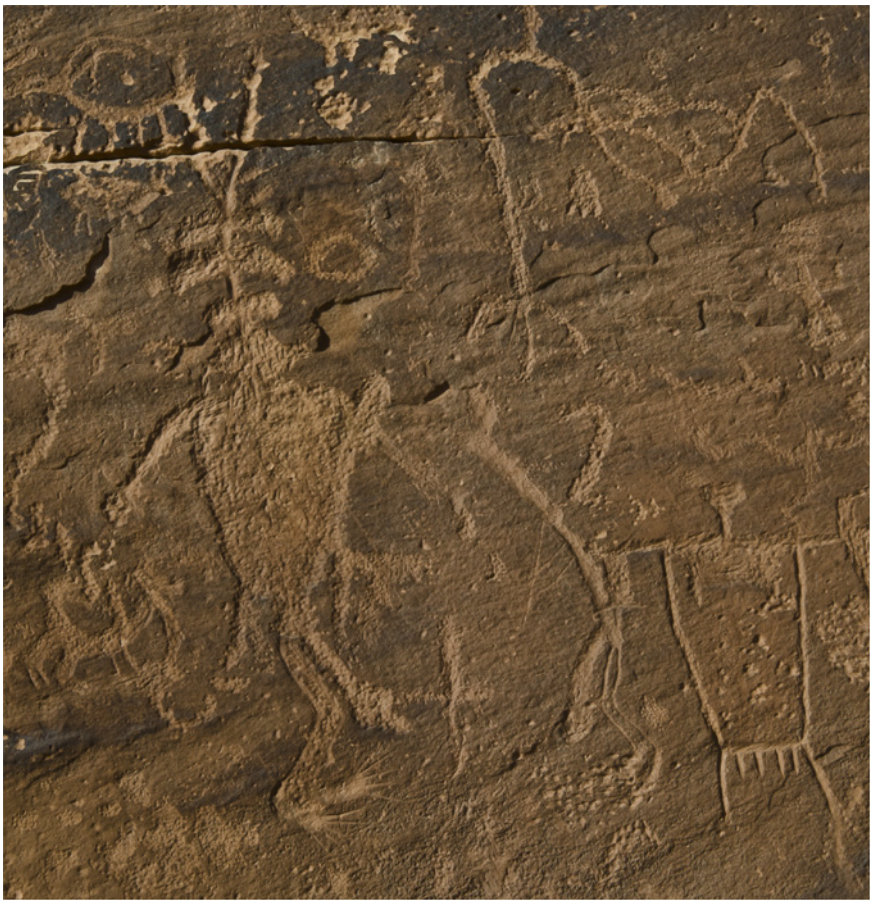

FIGURE 37.6 Anthropomorph with stacked-crescents headdress representative of the San Juan Anthropomorphic Style, at Lower Sand Island.

Historic-period iconography within the confines of the Sand Island rock art theater can be attributed primarily to arriving Ute and Navajo bands, although some Southern Paiutes may also have inscribed their mementos. Ute Indian Style rock art, dating to ca. CE 1640–1880 (Cole 1990), is amply attested in the form of equestrian motifs and realistic human heads in profile, clearly betraying Euro-American influence. Worthy of comment among the imagery created by Ute artists is a panel with two horse-and-rider motifs at the western tip of the Upper Sand Island gallery. As portrayed, the riders are standing on quadrupeds equipped with horns, apparently bighorn sheep, possibly a clue that at the time of their depiction the concept of the horse was not yet fully understood (Fig. 37.9). Similarly, aboriginal artists in Australia, after first

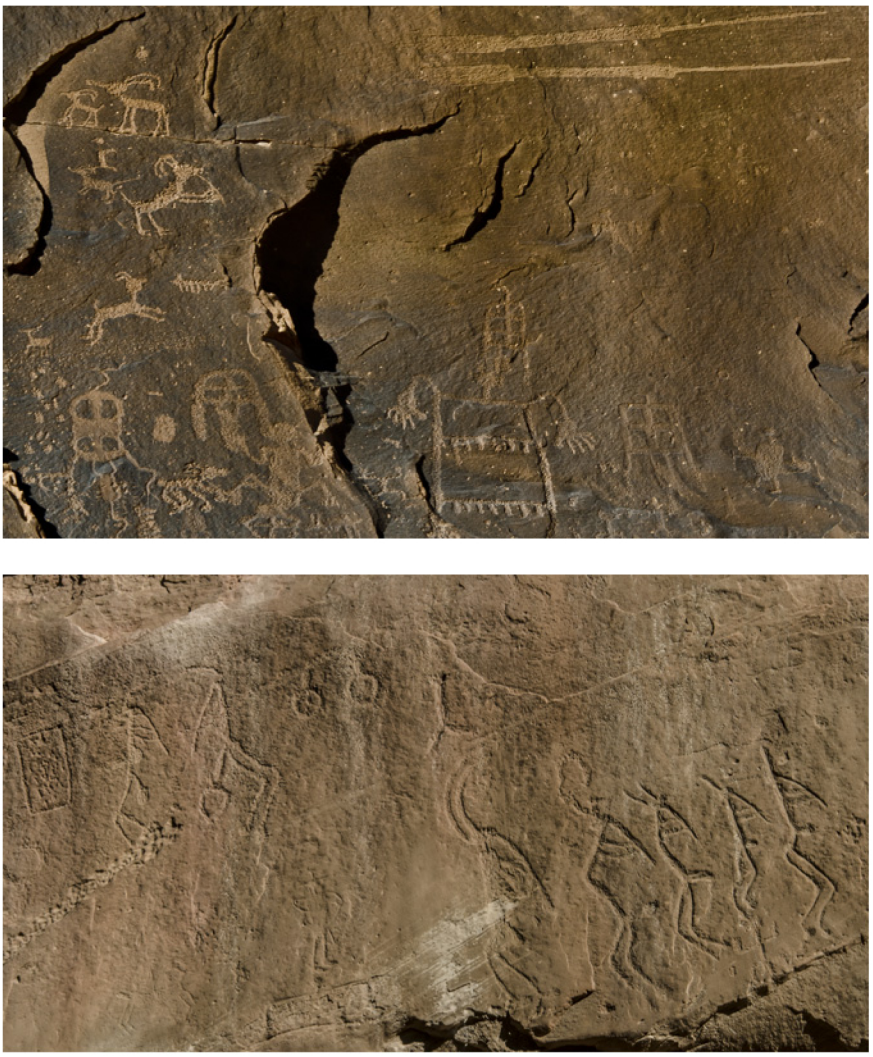

FIGURE 37.7 Flute-playing motifs of Basketmaker III affiliation, including an upright-standing bighorn sheep in the top image.

encountering Europeans on horses, drew them instead on top of kangaroos (Chaloupka 1993, 195).

Since Navajos were relative late-comers to the region around Bluff, most images created by them are believed to be post-1870s. Among them, at the Upper Sand Island gallery, is the portrayal of a moose (Cole and Lightfoot 1985), extremely rare in North American parietal art (Fig. 37.10).

FIGURE 37.8 Ancestral Puebloan anthropomorph in orant pose at Upper Sand Island.

Mammoth and Bison Images from the Pleistocene-Holocene Transition at Upper Sand Island

While the array of chrono-culturally interlocking rock art expressions described above makes the Sand Island locale one of the premier petroglyph-rich zones in the American Southwest, what indubitably sets it apart from all other parietal art in the Americas is an exceptional paleopanel with two tantalizing engravings that can be confidently identified as Columbian mammoths

FIGURE 37.9 Ute panel with riders on horned quadrupeds at Upper Sand Island.

FIGURE 37.10 Rare depiction of a moose, believed to be Navajo-made, at Upper Sand Island.

(*Mammuthus columbi*). Mammoth 1 (M1), 46 cm wide and partially overlain by a quadruped strongly reminiscent of a bison (Fig. 37.11), forms the centerpiece of the panel. Rendered in profile view that allows easy recognition, the overlapping megafaunal species measure 87 cm from the tips of the mammoth tusks to the end of the bison tail. They are best viewed with the sun striking them at an oblique angle, thereby causing the glyphs to cast shadows and create a natural 3D effect. Their location on the unscaleable cliff at a height of some 5 m above the alluvial (flood sediment) and colluvial (accumulated rockfall) remnants of the above-mentioned berm, which in turn rises 7 to 8 m above the current floodplain, illustrates the drastic geomorphic changes the landscape, shaped by the San Juan River, has undergone in post-glacial times.

Although known to some archaeologists and rock art enthusiasts from at least the mid-1980s, the paleoimagery had never been scientifically investigated because of its out-of-reach placement above ground level. A photograph of the mammoth-bison duo, which I published in 2002 (Malotki and Weaver 2002, Plate 1), did not arouse much interest, except that two years later archaeologists Larry Agenbroad and India Hesse (2004, Fig. 16.7) offered a rough outline drawing of the mammoth in isolation. Compared to the original, however, the drawing is not very faithfully rendered. It errs not only in the number of legs depicted (showing four instead of three) and vertical bars on the animal's torso (showing only three instead of four), but also by portraying it with a stubby, horizontally attached tail. No such tail is visible in the actual engraving because of the overlying bison glyph.

The bison motif clearly dominates the scene not only due to its size but also because its more deeply scored silhouette partially cuts into the dorsal ridge of the underlying pachyderm. Anatomically inaccurate, the bison's legs are engraved all the way to its back; however, they do correctly end in split or cloven hooves. Taphonomically, the mammoth's more smoothly worn engraved lines and overall softer rock wear indicate that it must have experienced considerably more weathering than the bison, consistent with an earlier date of creation. Determining the precise temporal difference between the two manufacturing episodes is impossible; based on the bison's grooving depth, however, the likelihood is small that it was made by contemporaries of the mammoth artist. Bison did not die out in the final Pleistocene but eventually evolved into the living species American bison (*Bison bison*) – popularly but inaccurately called buffalo. Nevertheless, a comparison with historic bison petroglyphs (see Fig. 37.13) makes for a strong case that the over-printed animal with its massive shoulder hump actually represents a Late-Pleistocene or Early Holocene Ancient Bison or *Bison antiquus* (Fig. 37.12).

FIGURE 37.11 Mammoth 1 with superimposed bison at Upper Sand Island. Digitally enhanced rendition by Julia Andratschke.

An alternative interpretation as musk ox, offered by archaeologist Winston Hurst (pers. comm. 2011), is plausible and cannot be ruled out pictorially, although no other bona fide depictions of this animal are currently known in the American West. Like the bison, *Ovibos moschatus* was a megaspecies that survived the Pleistocene extinction event in North America. Hurst bases his interpretation on the fact that the animal's legs don't project below the line of its belly. Evidently, a musk ox's mass of shaggy winter hair will drape over

FIGURE 37.12 Bison antiquus skeleton and horned skull from La Brea Tar Pits, Los Angeles. Courtesy of the Natural History Museum of Los Angeles/Karen Knauer.

its entire torso, thereby enlarging it to a point where only the hooves are visible.

If my interpretation of a *Bison antiquus* depiction is accepted, its creator may have been a Paleoindian hunter-gatherer of Folsom cultural affiliation. Named after the culture's type site near the town of Folsom, New Mexico – a kill and butchering site which clearly established an association with this extinct form of bison – the Folsom Complex is allocated an approximate age range of between 12,900–11,700 years ago. Folsom people, after the demise of mammoths at the beginning of the Younger Dryas, developed a new hunting focus that exploited bison with distinctive fully fluted spear points. Attached to darts that were delivered with atlatl throwing sticks, numerous of these projectile specimens have been found on the Colorado Plateau (Copeland and Fike 1988). A mere 2 km upstream from Sand Island, the broken base thought at the time of its discovery to be from a Folsom point, has been reported by Robert Neily (1982, pers. comm. Jack Oviatt 2016). Hurst (pers. comm. 2016) knows of isolated Folsom finds in the general vicinity of Bluff, for example in Recapture Wash northeast of the town, and also near White Mesa, the small community on the Ute Reservation to the north. A major Folsom base camp is reported from the Montgomery Site south of Green River, some 180 km north of Bluff (Copeland and Fike 1988, 21).

The well-known, universally valid observation that images attract images is clearly proven by the superimposed bison. One has to wonder, however, why the bison engraver chose to cut his work deep into the spinal ridge of

the mammoth considering that he had available to him a large segment of suitable blank rock "canvas" nearby. The act of superimposition was obviously deliberate, which begs the question of what could have motivated it. Most rock art scholars concur that any attempt of Western observers, conditioned by their own biases and conceptions, to arrive at the emic significance of deep-time "fossil art" (Guthrie 2005, 11) is a fruitless exercise. Nonetheless, some of the major hypotheses that have been advanced in search of the art's meaning – hunting magic, totemism, and shamanic belief – offer some seductive, if unverifiable, exegetic possibilities.

While an *ars-gratia-artis* explanation that the bison would have been chiseled into the rock divorced of any specific function can probably be ruled out, more reasonable is the idea that it represented the totem animal with which members of a group felt a strong affinity. Carefully executed, the bison shows no sign that it was intended to desecrate or disfigure the underlying image. In the context of the universal phenomenon of sympathetic or compulsive magic which, based on the principle that "like affects like" and, in the case of rock art, that an image can stand as a substitute for its subject, the mere act of depicting it would have meant gaining control over the represented animal, both in the form of facilitating hunting success or assuring fecundity of the envisaged prey. Also, by placing the bison over the mammoth, the former could have coopted the assumed supernatural potency of the latter. Perhaps the mammoth as a mythical beast, imbued with powerful magic, was still alive in the traditional narratives of the later Folsom hunters.

From a shamanistic point of view, the bison could be regarded as symbolic of an auxiliary spirit with whose assistance the shaman, as a broker between this reality and that of a perceived other-world, would have brought about blessings for his group. Ultimately, of course, we will never fathom what motivated the creation of the bison image. Still, since it is hard to explain its depiction from a natural or functional perspective, its *raison d'être* is most credibly linked with the realm of ritual and spirituality. After all, it was executed by a *Homo sapiens* member of the human species. Prehistoric art expert Jean Clottes (2016, 29), who finds the *sapiens* label as "really too optimistic," has recently proposed *Homo spiritualis* as a more fitting substitution. Spirituality, in Clottes' eyes (27), "can be regarded as the awakening of a thought that goes beyond the circumstances of everyday life, the mere adjustment to material necessities demanded by foraging, reproduction, and survival." He thus favors his new coinage over the long-established term of *Homo religiosus*, because spiritualty as a human universal precedes the phenomenon of religion, "the organization … of spirituality" (28).

While the precise identification of the overlying zoomorph – bison or musk ox – will have to remain undetermined, neither Winston Hurst nor I concur with rock art rock art specialist Polly Schaafsma's claim (2013, 182) that the quadruped stylistically echoes historic Ute bison renderings. As Schaafsma correctly remarks, most known bison represented in the parietal art of the region, apart from a few recent examples attributable to Navajo artists, are Ute in origin. However, they differ drastically from the contoured bison atop M1. As a compilation of bison petroglyphs (they also occur in painted form) from the wider Four Corners area shows (Fig. 37.13), nearly all are fully pecked, fresh-looking with barely any sign of patination, and conceptualized in a rather different manner. The nearest example is actually found just a couple of kilometers to the west at Lower Sand Island (Fig. 37.13(a)).

Since the mammalian herbivore *Bison antiquus* did not become extinct in the final Pleistocene, "self-dating" to determine its age of manufacture is not an option as in the case of the mammoth (see Section "Dating the Mammoth Images" below). In light of its pictorial co-occurrence with the mammoth the likelihood is great, however, that it is one of the rare zoomorphic depictions in the American West for which paleoarchaic (Pleistocene-Holocene Transition) age can be posited.

With respect to relevant proboscidean anatomy, several key diagnostic features unequivocally reveal the portrayal of M1 as belonging to the species *Mammuthus columbi*, signature animal of the Ice Age (Fig. 37.11). Facing left, the animal's dome-shaped head is marked by a solidly pecked cranial bump, which would be incompatible with the relatively flat body shape of *Mammut americanum* or American mastodon. The eyeless head sits on a rather elongated, oval-shaped torso compartmentalized into four segments by vertical bars. They may represent the artist's rudimentary attempt to depict the skeletal structure of the beast, thereby perhaps acknowledging that there is more to it than simply its exterior (Guthrie 2005, 146).

The two parallel tusks are relatively short and not recurved, a sign that the depiction may be that of a young or female animal (David Gillette pers. comm. 2010). It is also possible that all or most mammoths toward the end of the Ice Age had short tusks as a result of degeneration. This explanation is corroborated by short-tusked proboscidean incisings on slate plaquettes from Gönnersdorf, Germany, dating to the terminal phase of the Magdalenian, the last tradition of the European Upper Paleolithic (Züchner 2005, 106).

The engraved trunk incorporates, for much of its length, a pre-existing rock fissure that differs markedly from other natural cracks on the exposed sandstone cliff. It clearly shows signs of deliberate widening by abrasion, thereby giving it a distinct V-grooved appearance (Fig. 37.14). The incorporation of a

(a)

(b)

FIGURE 37.13 (Proto-)historic Ute bison depictions from the Four Corners area. Locations: (a) Lower Sand Island, (b) Courthouse Rock, (c) Willow Bend, (d) Montezuma Creek, (e) Nine Mile Canyon, and (f) Newspaper Rock State Historic Monument.

natural feature of the rock canvas into a petroglyph or pictograph is a widely observed practice of image-makers that neuroarchaeologist Derek Hodgson (2013, 407), in regard to its frequent occurrence in Upper Paleolithic parietal art, refers to as "seeing-in." In fact, at Upper Sand Island, the fissure, in simu-

(c)

(d)

FIGURE 37.13 (Continued.)

lating a defining proboscidean part, may have served as what Hodgson (2013, 408) calls the initial "trigger cue" for the creation of the mammoth. Belgian archaeologist Dirk Huyge (pers. comm. 2013) also regards the occurrence of this practice at Upper Sand Island as reflecting true "Paleolithic mentality."

(e)

(f)

FIGURE 37.13 (Continued.)

The extra-long depiction of the trunk may indicate that the artist was overly impressed by this anatomical feature. Striving for outspoken graphic mimetic realism, that is, biologically accurate, visually naturalistic representations, was not necessarily the main goal of a prehistoric image-maker. A comparative view of the European Upper Paleolithic record shows that departures

FIGURE 37.14 Front end of Mammoth 1 with V-grooved rock fissure for trunk.

from actual anatomy are easily seen in many proboscidean portrayals. Stylistically, woolly mammoth depictions can vary from the quite realistic to stylized-schematic and near-caricaturistic. Exaggerated rendering of certain diagnostic animal parts, as seen here on the mammoth's trunk, is a common practice in rock art iconography, and is frequently found in later rock art of the Four Corners region, as in the portrayal of oversize paws for bears, antlers for ungulates, and tails for mountain lions.

Only one of the animal's front legs is discernible. It as well as its two hind legs are pictured as rather rudimentary stumps.

Extending straight down from the profile head of the mammoth, the trunk is tipped with a distinctive V-shaped bifurcation that mammalogists call "fingers." As appendages of prehension, opposable fingers of varying length and proportions aid all proboscideans, whether herbivore grazer or browser, to grasp vegetation as they forage. For example, modern African elephants have two prehensile digits, while Asian elephants have only one finger-like pro-

(a)

FIGURE 37.15 Upper Paleolithic portrayals of woolly mammoth, clearly depicting one "finger" and one "thumb" at the tips of their trunks. Cave locations: (a) Rouffignac (photo by Frédéric Plassard), (b) La Baume-Latrone, and (c) Chauvet-Pont d'Arc (both photos by Jean Clottes).

jection on the tip of their trunk. The fingers shown in paintings of cold-adapted woolly mammoths (*Mammuthus primigenius*) at Old World Paleolithic cave sites such as Rouffignac, La Baume-Latrone, and Chauvet-Pont d'Arc (Fig. 37.15) all feature one long and one short projection, with the latter usually referred to as a thumb. This "hand-like" trunk tip (Guthrie 2005, 56) is clearly observable on the proboscis of Yuka, a young mummified woolly mammoth carcass that was discovered in the Siberian permafrost in 2010 (Malotki and McIntosh 2015, Fig. 7). The fingers of the Upper Sand Island specimens are of equal length. Whether this reflects actual anatomical accuracy for Columbian mammoths may never be known unless a mummy of this species preserving this soft-tissue part is found in North America.

It is unlikely that inter-generational tribal memory and/or second-hand oral tradition might have prompted the drawing. The unreliability and poor fidelity of oral transmission over even a short period of time is well document-

(b)

FIGURE 37.15 (Continued.)

ed in medieval elephant paintings that were clearly drawn on hearsay (Heck and Cordonnier 2012). An outstanding example that illustrates this point is a painting by Jacob van Maerlant in his *Der Naturen Bloeme*, published ca. 1350 (Fig. 37.16). The animal's corkscrew trunk and feet shaped like horse hooves are clearly the result of hearsay information, not personal observation by the artist. It is simply not reasonable to assume that specific anatomical features of an animal could have been reproduced thousands of years later by someone who had never seen it.

Albeit challenged by two rock art researchers (Schaafsma 2013 and Bednarik 2015), the proboscidean interpretation of the zoomorph underlying the bison is strongly confirmed by the presence of a second mammoth engraving (M2) in close proximity to M1. Unreported by any previous observer, it was first dis-

(c)

FIGURE 37.15 (Continued.)

covered as a result of the focused photographic documentation of the area adjacent to the mammoth-bison duo in 2010 (Malotki and Wallace 2011, 148f.). Forty-three centimeters wide and more realistically proportioned than M1, the frontal area of M2 exhibits an incontrovertible set of defining details that permit ready identification: an extremely pronounced topknot, paired tusks, and a distinctive trunk featuring two wide prehensile digits of equal length, further evidence that the artist had a very clear mental image of the behemoth (Fig. 37.17).

The static outline torso of M2 is more massive than that of its companion and is equipped with a distinct tail, but lacks any internal striping. Less telling features like legs have either weathered away or, because of a lack of interest in completing these anatomical parts, were never pecked. The characteristic topknot or high cranium once again leaves no doubt that the portrayed portion

FIGURE 37.16 Elephant painting by Jacob van Maerlant, ca. 1350 CE. Courtesy of Koninklijke Bibliotheek, National Library of the Netherlands, Den Haag (shelfmark KA 16).

shows the highly salient trait of *Mammuthus*. As keen hunters and trackers, Paleoamerican artists must have been intimately familiar with the behavior and appearance of every animal in their environment. One can certainly assume that they would have known the difference between a mammoth and a mastodon (which has no topknot) and were capable of rendering either one realistically enough with their species-specific characteristics that even a modern viewer can easily tell them apart. As it is, there is little evidence that mastodons were widely distributed on the Colorado Plateau.

A close examination of the paleopanel, attended by rock art specialists Jean Clottes of France and Robert Bednarik of Australia in May of 2013, was aided by the erection of scaffolding. It allowed for excellent observation of all the elements surrounding M1 and M2 under ever-varying lighting conditions and proved a great boon for visual analysis and photographic documentation (Fig. 37.18). Because many of the adjacent glyphs show the same pointillist pecking mode and share numerous morphological commonalities (Malotki 2012), they really form a complex of their own (Fig. 37.19). Most of them exhibit peculiar ovoid shapes with single or paired stick-like attachments suggestive of "legs," if indeed any of them actually do represent life forms. It is quite likely that they are the result of a single burst of creativity, and no attempt is undertaken here to interpret them. For this reason, I refer to them as "mys-

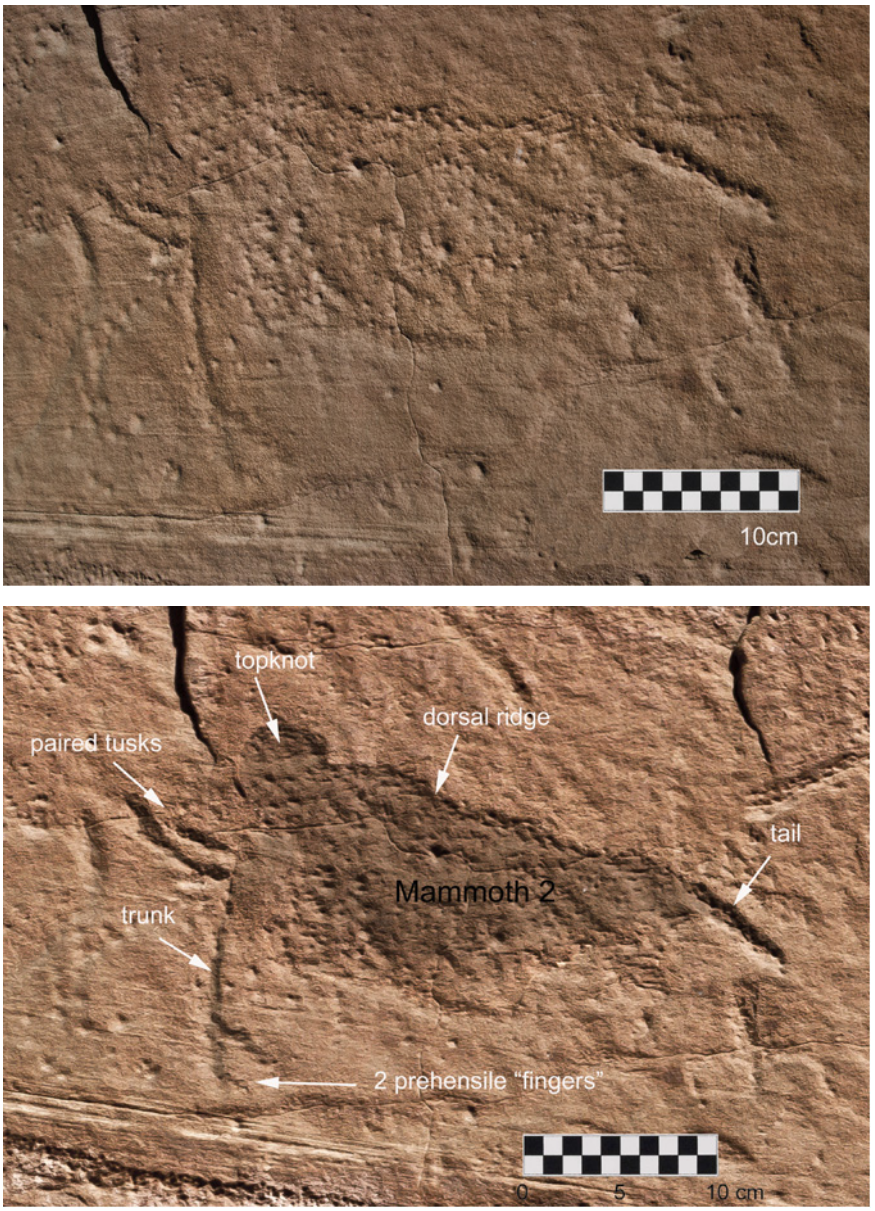

FIGURE 37.17 Mammoth 2 with distinct cranial bump, signature trait of *Mammuthus columbi*. Digitally enhanced rendition by Julia Andratschke.

FIGURE 37.18 Jean Clottes and author eyelevel with Mammoth 1 on scaffold at Upper Sand Island, May 2013. Photo by Ilona Anderson.

teriomorphs." To my knowledge, the entire assemblage anchored around the two mammoths shows no thematic or stylistic parallels with any other parietal imagery in the American West. Manifesting its very own unique graphic "personality," this most unusual paleotableau is thus best characterized as a *stylistic isolate* (Malotki and McIntosh 2015).

Consensus was quickly reached that the entire paleocomplex was genuine and not the work of hoaxers, and after three days of close-up study of its two proboscidean anchor motifs Clottes was fully convinced that they represent mammoths "without the slightest doubt" (Clottes 2013, 9). In his view, they exhibit all the salient features, in the right places, that characterize these megamammals: the domed head, spinal ridge, paired tusks, long trunk, and perhaps the anatomically most critical diagnostic detail, the fingers marking the tip of each trunk. While the fingers on M1 are easily seen in good side light, even from below, those on M2 are nearly effaced and for that reason had not been recognized before. Close-up photographs taken from the viewing platform under favourable early morning light unmistakably revealed their existence. Granted, they have suffered heavily from weathering, as has the entire underside of M2, but the inverted V-shaped bifurcation is clearly visible.

Of the estimated thirty-five genera of North American terrestrial megamammals (body mass over 44 kg) that disappeared at the end of the Ice Age,

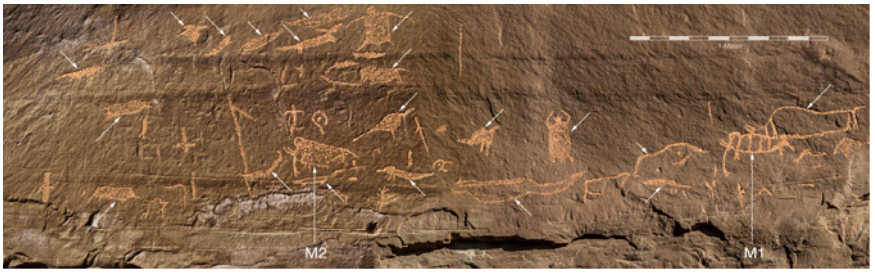

FIGURE 37.19 Paleocomplex with Mammoth 1 and 2 and additional "mysteriomorphs," digitally enhanced by Nick Newberry.

including horses, camels, saber-toothed cats, giant short-faced bears, lions, dire wolves, giant beavers and giant peccaries (Martin and Steadman 1999), probably none possess more readily recognizable traits than mammoths and mastodons. Their tusks and trunks make for unambiguous identification in graphic renditions. Both of these anatomical features are plainly visible in M1 and M2 and require no speculative interpretation. In addition to the "twinning" of the proboscidean motif, they constitute unquestionable evidence that the paleoartists who engraved them at Upper Sand Island were intimately familiar with the living beasts and most likely drew them fresh from memory.

Dating the Mammoth Images

Leaving aside the extreme challenge, if not impossibility, of establishing the meaning of paleoart, the difficulty of dating appears to be the most troubling issue facing the discipline of Rock Art Studies. It is well known that the current state of rupestrian chronometry is not very encouraging. In addition to the traditional archaeological methods of estimating rock art age – identification and classification of pictorial subject; association with archaeological evidence such as spatial proximity to occupation sites and/or diagnostic artifacts; grooving depth; degree of patination and weathering; superimposition; the use of style and manufacturing technique – in the last two to three decades a range of new and newly modified dating techniques have come on the scene. Some of these at first seemed promising but were later exposed as highly tenuous or false. Others still need to stand the test of time – for example, cosmogenic isotope analysis, uranium-thorium dating, or the novel approach of rock surface exposure luminescence dating.

Accelerator mass spectrometry (AMS) technology allows radiometric dating of extremely small organic samples on the order of a milligram. It has yielded relatively acceptable results in the dating of pigmented art, but the technique's application to accretionary deposits in petroglyphs has been recognized as a futile exercise. It was unanimously abandoned after it became obvious that the carbon system in rock substrates is not a closed system. Cation-ratio (CR) dating, relying on the analysis of the chemical composition of a given petroglyphic varnish sample, is equally suspect and still deemed experimental by the majority of dating specialists. Since error parameters are quite large, often on the order of several thousand years or more, the technique is generally not accepted as a viable instrument (Watchman 2000). A not dissimilar method for dating petroglyphs is X-ray fluorescence analysis (XRF). Focused on measuring the level of manganese that has accumulated in the varnish, the approach is still in its infancy and faces several scientific issues, most critical of which is developing a reliable calibration curve. Since calibration relies on geologically-dated rocks, it is likely to have error parameters and concerns similar to those involved in cation-ratio dating. Dating specialist Marvin Rowe, who took some preliminary measurements of manganese deposits near the paleopanel, found no apparent relationship with the presumed age of the mammoth images and in his own words deemed the approach "a bust" (Rowe pers. comm. 2012).

Perhaps the least controversial new varnish dating strategy that seems to have moved beyond the experimental stage is varnish microlamination dating (VML). For the use of VML, it is crucial that rock surfaces exhibit sufficiently solid varnish coatings to be capable of nanostratigraphic analysis, whether they are found on desert pavements, lava flows, stone tools, or petroglyphs. According to Tanzhuo Liu (pers. comm. 2012), chief developer of the technique and owner of a VML dating lab, the method works well only on rock types that provide stable surfaces for varnish accretion, such as igneous rocks – not on sandstone. After agreeing to examine a small darkly patinated rock fragment that I had collected on the lengthy talus berm below the cliff, he found the piece completely unsuited for his climate-based correlative age determination method.

Nor did Bednarik's very own microerosion (ME) dating method yield any meaningful results at Upper Sand Island. The purely optical technique, carried out by means of a specially adapted binocular microscope, aims at directly dating the production of the art. Based on the premise that a freshly engraved rock surface, such as that which results from hammering out a petroglyph, will undergo progressive rounding at a predictable rate, it allegedly is capable of measuring the degree of a fractured crystal's rounding process. The technique's application, however, is severely hampered in that it can be used only

on relatively erosion-resistant rock types, principally those comprising primary quartz showing original crystal faces. Sedimentary rock, on the other hand, such as that which forms the Navajo Sandstone cliff at Upper Sand Island, contains reworked or rounded quartz grains and is thus totally ill-suited for the technique. Crucially also, as Bednarik himself emphasizes, "two or more calibration curves from two or more minerals are desirable" (Bednarik 2002, 425) to obtain reliable ages. Yet in his investigation near Bluff he relied on only a single calibration point, although the lengthy cliff site offers petroglyphs from a number of different periods, even including dated graffiti in the form of names. There is therefore no indication that he was able to secure a scientifically meaningful calibration datum. It is obvious that the age estimate supposedly obtained by it for M1 – "well under 4000 years old" (Bednarik 2013, 5) – is completely untenable and runs counter to the well-established extinction threshold for Ice Age megafauna on the Colorado Plateau.

Solid evidence that the sandstone cliff existed when Paleoamericans sought the area out and allowed them to engrave the proboscidean designs was obtained by dating specialist Fred Phillips who employed the Chlorine-36 cosmogenic exposure method at the site. This approach, based on minute alterations in rock chemistry as a result of cosmic ray bombardment of Earth, provides information on the relative exposure age of the rock to radiation products from outer space, especially the isotope Chlorine-36. For a test sample from a large detached slab (Fig. 37.20) below the paleocomplex (Grench 2014, Appendix J) he obtained an exposure age of between 33,300 and 23,400 years, robust indication that the cliff had been stable since the Late Pleistocene (Malotki and McIntosh 2015), a fact that geologists Mary Gillam and Lillian Wakeley have repeatedly rejected (Gillam and Wakeley 2013; Gillam 2015).

In the absence of absolute dating methods for petroglyphs and the resultant impossibility of ascertaining exactly when the pachyderms were pounded into the cliff face, their accurate renditions with domed heads, paired tusks, trunks and, specifically, the prehensile "fingers" at the tips of the trunks, can be regarded as their own singular chronological markers. The presumed end-Pleistocene extinction time of mammoths thereby becomes the key indicator of their approximate age.

The images clearly "speak for themselves" and can therefore serve as primary evidence for "self-dating," a concept offered by German archaeologist Christian Züchner (2001). According to him, "rock art is self-dated when it shows a certain object, a certain symbol, or an extinct animal species whose age is known." Numerous other rock art investigators concur. Anne Solomon (2014, 131), for instance, believes that "images of animals known to have become extinct by a certain period may provide broad dates." Natalie Franklin

FIGURE 37.20 Detached cliff slab to left and below level of paleocomplex, yielding a cosmogenic exposure date of between 33,300 and 23,400 years.

(1993, 2), too, holds that a minimum age can be assigned to the depiction of a faunal species, based on the time the species is believed to have become extinct. Bona fide mammoth portrayals such as those at Upper Sand Island can therefore not be much younger than the generally accepted extinction time (*terminus ante quem*) for these megamammals. Considering that the established extinction threshold for *Mammuthus* in the American Southwest is around 13,000–12,500 years ago (Faith and Surovell 2009; Haynes 2013), this temporal window can also be assumed as a "best-estimate" for the creation of the engravings.

In addition to the iconographic content of the self-evident mammoth depictions with their relevant diagnostic details, archaeological and paleontological evidence from the general paleoenvironment of Upper Sand Island – findings in the form of 13,000 year-old Clovis artifacts and equally ancient proboscidean fossils – is seen as solid corroborating evidence for the Late-Pleistocene antiquity of the paleopanel. Archaeologically, this collateral evidence includes a Clovis-era campsite at Lime Ridge a mere 12 km west-southwest of the Upper Sand Island location. Significant among the surface material found there were two distinct bi-fluted basal fragments clearly identifiable as Clovis (Davis 1989: Figs. 4e and f), as well as two discarded Clovis projectile point tips (Vance 2011, Fig. 4.29). During a personal visit to the site in

FIGURE 37.21 Clovis spearpoint found in situ at the Lime Ridge site, ca. 12 km from the Upper Sand Island mammoth imagery.

2011, the serendipitous discovery by a colleague of a new Clovis point provided additional confirmation for its recognized Paleoindian antiquity (Fig. 37.21).

Relying on distribution patterns of isolated Clovis points and known sites in the American Southwest, it has been concluded that Clovis people primarily chose rivers as travel corridors. The fact that Lime Ridge is located near the San Juan River is consistent with this observation, supported by archaeologist William Davis's (1994, 5) speculation that the site was selected because riparian corridors in the area may have attracted large mammals in the otherwise arid landscape of the Late Pleistocene epoch. There is, of course, no absolute way of establishing whether authorship for their portrayals can be attributed to a hunter from the Lime Ridge camp.

Several other sites – Goodwin on Comb Ridge, Oak Creek Canyon, the Nunn site west of Cedar Mesa, and Valley of the Gods – featuring temporally diagnostic Clovis artifacts are officially known within a radius of 70 km of Upper Sand Island. There is thus ample archaeological evidence for Paleoamerican presence in the region surrounding Bluff and a strong likelihood that the paleoimagery was the work of Clovis hunters. It also nicely fits the paradigm that the extinction of proboscideans on mainland North America coincides with the main florescence of Clovis (Waters and Stafford 2007). Still, in light of the fact that Clovis-First is no longer the defining dogma for the peopling of the

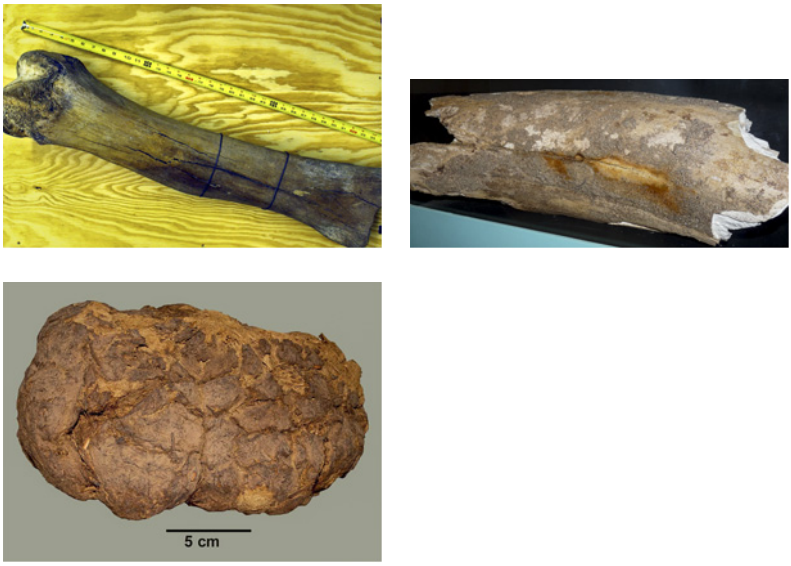

FIGURE 37.22 Proboscidean fossil finds from the Four Corners region. Top row, from left to right: femur from Butler Wash (photo by Stephen Czerkas), tusk fragment from Professor Valley (photo by Travis Schenk). Bottom row: bolus from Bechan Cave (photo by Sandy Swift).

Americas, the possibility cannot be ruled out that the engravings were made in pre-Clovis times.

Paleontologically, evidence that the region was a habitat for mammoths is provided by several fossil finds (complete skeleton, dung, tusk fragment and femur) on the southeast Utah portion of the Colorado Plateau, all dated to between ca. 13,800 and 12,200 calendar years old (Fig. 37.22). The combined weight of these evidentiary strands – iconographic content, Paleoamerican presence, and proboscidean fossil specimens – allows for a reasonable inference that the mammoth images at Upper Sand Island can be pronounced Terminal Pleistocene. Consistent with this "best explanation," an approximate age bracket of 13,300 to 12,500 years B.P. can confidently be posited for their creation.

Musings on the Meaning of the Mammoth Depictions

While we can certainly identify the two animal motifs as *Mammuthus* – given that the visual perception of the modern viewer can be assumed to be no dif-

ferent from that of the paleoartist – their meaning to their makers is beyond recovery to us at this immense remove in time. As culturally alien modern observers, we are not privy to the thought processes and ideological universe of the prehistoric artist. They will forever remain elusive and inscrutable to us. Endowed with worldviews radically different from ours, only the actual image-makers would have known what they intended to communicate with these engravings. For example, only they would be able to tell us whether their portrayals, free of any purpose, were mere "pastime graffiti" – the result of boredom or playful mood; whether, because mammoths were potential prey animals, they expressed homage to the beasts, or were meant as didactic field illustrations for newly initiated hunters; whether they were considered sacred to the people of that time; whether the images were regarded as symbols of power, strength, or longevity or were imbued with some other metaphorical meaning that eludes us; were connected to some tribal legend or myth; represented a clan's ancestral totem; or were a form of "picture magic" or "visual prayer" to secure access to vital resources. None of these interpretive musings are testable, and as such also not falsifiable.

Ethologist Ellen Dissanayake's concept of artification is pertinent here. In her view, all the arts (including mark-making) are examples of making ordinary reality extraordinary. Artification uses "proto"-aesthetic elements (formalization, repetition, exaggeration, elaboration, and manipulation of expectation) that inherently attract attention, sustain interest, and create and mold emotion (Dissanayake 2013). Humans have evolved over tens of millennia to artify when they care about something – an important place, person, or endeavor. As a depicted mammoth on a cliff face would have been unexpected and emotion-provoking, it was very likely considered important.

Small-scale societies of the recent past have artified primarily in the context of rituals that are intended to influence or control uncertain outcomes of biological or psychological importance – such as assuring food, safety, victory, health, fertility, and successful transitions through important life stages. Uncertainty is a source of anxiety; rituals, with their associated artifications (songs, dances, poetic speech, costumes, masks, and elaborated surroundings) have been found to have two important results: alleviating immediate anxiety and bringing members of the group together in common cause (Dissanayake 2012, 278).

Making marks on rock surfaces is likely to have been part of ritual ceremonial behavior as just described. It is thus conceivable that the creators of the mammoth images felt a connection with certain supernatural beings or forces during the course of their image-making. Viewed from this perspective, the activity of mark-making – whether abstract or depictional, crude or aestheti-

cally appealing to modern sensibilities – ultimately constitutes a strategically important gesture intended to affect basic human survival. An important part of Dissanayake's argument is that using the proto-aesthetic features actually *did* affect the survival of groups that engaged in them. It is now known that moving and experiencing an unusual event together in a coordinated fashion releases neuro-hormones that actually create feelings of unification, trust, and confidence in one another, as they simultaneously alleviate the deleterious effects of cortisol (a stress hormone), thereby relieving momentary anxiety.

Dissanayake's artification hypothesis makes a good case for mark-making being part of a broader multi-media activity that was beneficial to evolving humans from at least a quarter of a million years ago. Whether or not the mammoth images were part of such a scenario can be only speculative. Considering the generally polysemous nature of rock art, all we can really say, in addition to our purely descriptive observations, is that mark-making was one of a suite of modern behaviors that would have aided the Paleoamerican entrants as they spread out to occupy a strange continent, and that at least some of them knew how to draw figuratively.

However, whether the images are just the tip of the iconographic iceberg that has survived from the artification practices of Paleoamericans or a tantalizing exception in the large corpus of abstract-geometric paleoart remains to be seen. At the moment, we are forced to conclude that the two Upper Sand Island mammoth portrayals represent distinct regional innovations or anomalies in the big picture of earliest North American rock art, which is almost entirely non-iconic. Considering that Paleoamerican foraging and hunting bands lived with ground sloths, musk oxen, horses, tapirs, camels, giant short-faced bears, saber-toothed cats, and other such Pleistocene megamammals, one would expect to find a representative pictorial assortment of these large herbivores and their predators in the surviving paleoart. Yet to date, not a single depiction of these creatures has been unequivocally identified. They simply appear to be absent from the Paleoamerican iconographic "meme pool."

Across the American West, rock art sites bear silent witness that as Paleoamerican migrants arrived and began to stamp their identity onto the New World, abstract-geometrics were foremost on their mind. Why this should be so must remain an enigma for the time being (Malotki and Dissanayake 2018).

Significance of the Parietal Paleocomplex at Upper Sand Island

Considered among the keystone megamammals of the Pleistocene, the two *Mammuthus* engravings along the San Juan River represent a cultural trea-

FIGURE 37.23 Approximate location of paleocomplex on 20-m high Navajo Sandstone cliff at Upper Sand Island. Quadcopter aerial photo by Devlin Gandy.

sure par excellence (Fig. 37.23). Constituting an indisputable testament to the co-existence of early Paleoamericans – most likely of Clovis culture affiliation – with now-extinct Pleistocene megafauna, the bona fide proboscidean images establish the Upper Sand Island site as the only currently reported rock art location in North America with figurative motifs datable to the Ice Age. Estimated to be between ca. 13,300 to 12,500 calendar years old, they dramatically reset the accepted time-line and depth of the archaeological record for representational parietal art in the American West.

The significance of the paleocomplex with its two proboscidean anchors is further magnified by the possible depiction of a *Bison antiquus* engraved over the dorsal ridge of M1. Stylistically and technically differing drastically from historic Ute bisons, it was probably created by a Folsom hunter, member of a cultural group of Paleoamericans who as successors to the Clovis people began to emerge around 11,900 B.P.

Because of this unrivalled legacy, not just Lower Sand Island but the entire cultural landscape along the San Juan River corridor between the recreation area and the mouth of Butler Wash, with its evocative trove of spectacular petroglyphs testifying to visits and settlements by successive human groups over thirteen millennia, at least warrants listing on the National Register of Historic

Places. While the United States can boast a lengthy list of UNESCO World Heritage sites that have been recognized for their primarily natural values, a rock art location of prehistoric cultural singularity still awaits such consideration. As a deserving candidate, the Sand Island area with its priceless Paleoindian imagery certainly qualifies for worldwide recognition and for nomination to UNESCO World Heritage status.

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With respect to picture no. 16, we express our thanks to Den Haag, Koninklijke Bibliotheek, which has gratefully allowed us to use shelf mark (KA 16), showing an elephant from Jacob van Maerlant's Der Naturen Bloeme.

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