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PLEISTOCENE ART OF THE WORLD
Short articles
SYMPOSIUM 3

PLEISTOCENE ART OF THE AMERICAS

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DATING OF ROCK PAINTINGS IN THE AMERICAS:

a Word of Caution

Marvin W. ROWE

Pictograph dating has been commonplace for two decades. Many good results have been obtained. But, verification needs to become more frequent in rock art dating studies – at least until a new dating method has been proven. Although I speak here only about pictographs, it applies to petroglyphs as well, perhaps even more so. How can we know we are getting accurate dates?

Standards are used to verify experimental techniques. However, there is only one American group of known-age pictographs that can be considered to be standards: Maya calendar dates written in paintings at Naj Tunich Cave, Guatemala. The drawings there utilized charcoal and hence test only dating of charcoal-pigmented pictographs. Interlaboratory comparisons, essential to test a new method, are almost non-existent in American pictograph dating studies. When they have been done, agreement has generally been found lacking. I discuss here one case where the Texas A&M University laboratory and a Brazilian laboratory were involved and there is total disagreement. Radiocarbon standards should be dated routinely, as should radiocarbon-free materials – standard procedure in radiocarbon laboratories. Blind tests help verify new techniques. Archaeological inferences can validate a new technique when inferences are strong chronologically. Finally, publication of experimental procedures should include enough details that other scientists can reproduce their experiments. Too often, however, few experimental details are included in pictograph dating publications.

Guidon and Arnaud wrote two decades ago: “The chronology of the earliest periods of occupation in the New World [Brazil] is a subject of intense controversy.” It is still true. Guidon et al. maintain that humans arrived in Brazil > 50000 years ago, but some argue that the stone “artifacts” that support the antiquity were altered by natural processes, not by human activity. That objection fails with pictographs. An enormous discrepancy occurs in an interlaboratory comparison at Toca do Serrote da Bastiana. Rowe and Steelman failed to confirm Watanabe et al.’s dates. Resolving this issue is crucial because of archaeological implications of the Brazilian ages. Additional independent studies are essential to solve this dilemma. Pessis and Guidon summarized Brazilian pictograph dating at Bastiana: The first date (17000 years ago) for a calcite layer covering two anthropomorphic images by Oswaldo Baffa (University of São Paulo) used electron paramagnetic resonance (EPR). That was followed by two EPR dates by Watanabe at 33000 and 35900 years and then, using thermoluminescence (TL) and EPR, 48286 and 39442 years. These techniques were new to rock art. EPR and TL are not independent of one another, being based on similar assumptions. Their conclusion: the calcite layer was > 35000 years old. This would confirm that human occupation of that area of Brazil occurred > 35000 years ago as argued by Guidon and her coworkers.
The red anthropomorphic image on the left was the focus of our radiocarbon project at Toca do Serrrota da Bastiana. The calcite layer also discussed is clearly visible on the left side of the figure as viewed, and originally covered the two central motifs.
Dr. Guidon invited us to date the same calcite layer dated by Watanabe et al. So we radiocarbon dated calcium oxalate in the calcite, a well-established technique. Assumptions involved in our technique are totally different from those of TL and EPR. We obtained ages of 2540 ± 60 and 2470 ± 40 BP.

Guidon also sent us a sample of a red anthropomorph covered by the calcite layer to date directly (left motif in figure). We have demonstrated that our technique works using all the tests mentioned above. We dated the pictograph at 3730 ± 90 BP by radiocarbon analysis. We collected samples of other nearby paintings, within the Bastiana shelter and from other shelters. Ocher-pigmented paintings dated to 2280 ± 110 BP at Bastiana; 2700 ± 110 BP at Sitio do Maio; and 3570 ± 50 BP at Extrema. All our ages are consistent with an age of the calcite covered pictograph being < 3820 BP.

We dated samples of charcoal paintings within Bastiana (3320 ± 50; 1880 ± 60; 2970 ± 300 BP) and from other shelters (1230 ± 50 BP at Extrema; 2120 ± 110 BP at Pedra Furada). Our charcoal pigment dates are consistent with < 3820 BP. Ten radiocarbon dates from these sites all dated < 3820 BP.

W. White wrote concerning ESR dating:
“An alternative [to well established U/Th dating] dating technique that also makes use of the uranium incorporated in speleothems [calcite layers]... [is] electron spin resonance (ESR) spectroscopy [also known as EPR]... Comparisons between ESR dates and U/Th dates are sparse but agreement between the methods has not been particularly good... No systematic evaluation of thermoluminescence dating seems to have been applied to speleothems [calcite].”

I think this situation cannot be resolved by additional dates from either of the two laboratories using the same techniques used before. As Guidon and Arnaud wrote in a broader context: “In the endless debate one might reflect that everything seems to have been said already. The situation does not change: each time there is a discovery, unfailingly the debate takes up again with the same arguments”. That describes the present situation. An independent technique, preferably from another laboratory, is necessary to resolve the discrepancy. We eagerly await such determinations. The age of the painting in Bastiana covered by the dated calcite layer is too important to leave unresolved. Probably the best method for dating calcite is U/Th dating, a well accepted technique.
THE EARLIEST ROCK ART
IN FAR WESTERN NORTH AMERICA

David S. WHITLEY, Ronald I. DORN

We have developed a suite of 67 chronometrically-dated rock engravings, based on 106 independent assays, from the Mojave Desert region of California, USA, including a series from the world renowned Coso Range. These ages have been obtained using the varnish microlamination (VML) and cation ratio (CR) dating techniques. We have evaluated this suite of ages by cross-checking, blind-testing, and re-sampling previous chronometric results, and through the preparation and independent analysis of VML samples by Tanzhuo Liu at Columbia University. Sixty of our sixty-seven dated engravings are interpreted as having reliable chronometric ages.

The most conservative interpretation of our results involves 16 engravings with fully concordant but independent CR and VML dates that were verified by two analysts. These indicate that the engraving sequence extends from 11 100 to 250 BP; that is, from Paleoindian to protohistoric times. Less certain evidence suggests that the tradition minimally may be 15 100 years in age. Fully 18% of our dates are greater than 9 000 years old (the Paleoindian period), indicating that the Native American rock art tradition extends back to the Terminal Pleistocene. The results for motif R96ST13 warrant special mention, as they provide plausible support for Pre-Clovis (> 12 000 BP) rock engravings. A blind-test identification of this motif, by a paleontologist specializing in Mojave Desert Pleistocene fauna, suggested that it is an extinct species of North American llama, thereby indicating that it should be early Holocene or earlier in age. The CR age on this engraving, 13 400 ± 2000 cal BP, is consistent with the VML date (17 150 cal BP) at two standard deviations, though one analyst qualified the VML readings as requiring additional sampling for full verification. An experimental AMS $^{14}$C age was obtained on a calcium oxalate layer interbedded in the rock varnish. This yielded an age of 11 860 ± 60 cal BP. It provides stratigraphic and chronological concordance to the minimum-limiting VML layer and age, and the CR results. Although additional sampling is required to verify this age with confidence, four lines of evidence support the possibility that it represents a Pre-Clovis aged petroglyph.

Two other observations concerning our early motifs are warranted. Three Pleistocene-dated representational motifs are present in this corpus, the llama, a bighorn, and a snake. Each of these species was present during the Pleistocene, although only the possible Pleistocene llama represents a species that suffered extinction during the Holocene. Bighorn engravings, in contrast, exhibit a temporal range that extends from 11 200 to 250 BP. The earliest art assemblage includes a mix of geometric and representational motif forms, and these are also represented in the later-dated motifs. This disproves claims for an evolution from abstract to iconic imagery in the region, and provides no evidence for significant stylistic change over time.

At the other end of the time scale, 45% of the ages are less than 3 000 years old, and 13% fall within the last 700 years, during the Numic phase (AD 1300-1850). These results confirm ethnographic accounts and evidence in the motif subject matter (horse and rider motifs) that indicate
that rock art production continued into the historical period. The dated Mojave Desert engravings can be compared to additional, early dated New World rock art corpora, including engravings from the northern Plains of North America, and cave paintings in Amazonian Brazil. This has three implications. By 10,000-11,000 BP, first, distinctive regional Paleoindian artistic styles had already developed across the Americas. Early rock art, in this case, provides evidence for regional cultural diversity that has been masked by undue emphasis on the analysis of projectile points types, as has characterized most Paleoindian archaeological research. Second, figurative and geometric art was being created even in this early period. Third, and finally, although the Mojave engraving dates demonstrate the depiction of Pleistocene fauna, there continues to no evidence for the illustration of now extinct Pleistocene megafaunal species, such as the Columbian mammoth, in the New World rock art, in contrast to other parts of the world, such as the Upper Paleolithic art of the Franco-Cantabrian region.
LATE PLEISTOCENE PETROGLYPH TRADITIONS
ON THE NORTH AMERICAN PLAINS

Alice M. Tratebas

Three well defined petroglyph traditions are present in the Late Pleistocene on the northwestern North American Plains. Two traditions, Early Hunting and Outline Animals, focus on Outline Pecked Animal images and likely belong to related, although geographically separate, cultural traditions. The third, the Hoofprint Tradition, predates them by several thousand years. It features completely different imagery made by abrading and incising, supplemented by some pecking. Although the latter tradition includes animal images, it also focuses on hoof prints, abraded grooves, vulvas, bear paws, and finely incised human heads shown in profile. The strong divergence between the Hoofprint tradition and the pecked animal traditions suggest that they belong to different cultural lineages or macro-traditions.

The evidence that these petroglyph traditions date from the Late Pleistocene is based on analyses of rock coatings, including both varnish and oxalate deposits. The most extensive experimental dating research for these early petroglyph traditions is on Early Hunting petroglyphs for which we have run dating assays on over 100 samples, along with limited tests of the methodology. Dating research on the Hoofprint tradition type site is still in progress, but the site shares the same sandstone and environment as the better researched Early Hunting sites. Two additional sites where pecked animal tradition glyphs have dating investigations are in western Wyoming, 400 km from the Early Hunting sites. Both sites are on sandstones that weather more rapidly than the sandstones in the Black Hills and fewer samples have been investigated for dating. Petroglyphs in all three traditions have varnish microlaminations that show Late Pleistocene varnish layers.

For the Early Hunting tradition dating research, we examined two thin sections of the varnish overlying several petroglyphs to check for consistency in laminations between subsamples. A wapiti image and a quadruped with large cloven hooves have the same lamination patterns on both subsamples, which show layers of orange varnish beneath a black layer that was deposited during the Younger Dryas. Another glyph, interpreted as a caribou because the antlers branch only at the tips, shows rapid varnish formation during the Late Pleistocene. None of the Early Hunting tradition glyphs identified by varnish microlaminations or experimental dating methods as Late Pleistocene depict extinct animals. The Early Hunting glyphs which date from the Late Pleistocene are the earliest in a long tradition that continued for 9000 or 10000 years, with gradual change through time in both motifs and style details. The theme of Early Hunting petroglyphs appears to focus on animal procurement or control and in Holocene panels becomes less symbolic and more narrative in depicting hunting situations and ceremonies.

The Outline Pecked Animal tradition also may begin near the end of the Pleistocene. Although some researchers have assumed that the Outline Pecked glyphs belong to the Early Hunting tradition, there are differences in the imagery. The two traditions are also geographically separated. A statistical comparison between Early Hunting and Outline Pecked glyphs shows no overlap in
Hoofprint tradition raised relief bear claw image superimposed by finely incised human head and abraded hoofprint.
a Discriminant Analysis. Key attributes that the statistics rely on to separate the two traditions are outline versus solid pecking, straight legs on Early Hunting versus bent legs on Outline Pecked animals, and bighorn sheep horns depicted in frontal view in Early Hunting versus in profile view for the Outline Pecked tradition. Even so there are similarities – such as the focus on animals and details like ball-shaped feet on cervids (even though they differ in being outlined versus solid pecked).

Both of these animal-focused traditions differ in motifs from the third Late Pleistocene tradition which predates them. Preliminary varnish microlamination studies suggest a date between 14,000 and 17,000 years ago. Petroglyphs on exposed surfaces at the site have heavy black rock coatings. More dating research is needed to develop a better understanding of the age and longevity of these petroglyphs. Although pecked images are present, abrading and incising are the dominant manufacturing methods for Hoofprint glyphs. A major theme focuses on abraded grooves, animal hoof prints, and vulvas. If control or procurement of animal resources or fertility and increase is the theme, depiction of the theme is radically different from how it is depicted in the pecked animal traditions. Hunting situations and methods appear in Early Hunting petroglyphs, while Outline Pecked glyphs show ranks of animals with few clues to symbolic meanings.

The Hoofprint tradition is the oldest rock art known for the study region. Later, it likely overlapped in time with the pecked animal traditions. Hoofprint imagery is so different from the pecked animal traditions that it must derive from a completely different cultural lineage. Post-Pleistocene sites with hoof prints are distributed widely within the historic territory of Algonquian and Siouan speaking tribes. In contrast, the pecked animal traditions resemble most closely rock art produced by Uto-Aztecan speakers who used solid pecking and often depicted animals and hunting situations. Not only do we have Late Pleistocene rock art on the northwestern Plains, but we have rock art likely made by different lineages of people. Clearly, multiple cultural traditions were already established in various regions of North America at the end of the Pleistocene.
THE HENSLER PETROGLYPH SITE (47 DO 461):
an Early Engraving Site in the North American Mid-Continent

Jack STEINBRING

The Hensler Petroglyph Site consists of 34 pecked images on a seam of andalusite schist, which lies between two domes of Waterloo Quartzite. The site is located in south-central Wisconsin in the southern part of Dodge County. The surrounding landscape was formed by the Wisconsinan glaciations which deposited extensive amounts of workable stone in the immediate vicinity of the site. While initial recording took place in 1986, the archaeological potential was not discovered until 2005 during a clearing effort to remove brush and low growth. Excavations commenced that year and have been continued since that time, on a modest voluntary level. The work has yielded several thousands of artifacts, most of them from the stratified deposits immediately adjacent to the engraved panel.

Two zones are identified in the stratigraphy. An upper zone of dark humic soil has radiocarbon dated contexts in the AD 900-1100 range. This level has yielded a series of stone objects termed “expedient imagery”. They consist of natural stones, some slightly modified, which resemble animals, and possibly, birds. These objects include a bison, a frog, a bird or reptile, and a possible phallus. The objects occur within the accumulations of site materials, mainly projectile point fragments, retouch flakes, burins, gravers, flake scrapers and blades.

The site materials are not ordinary domestic refuse. It appears that the preponderance of material is related to refurbishing lithic artifacts. There is no evidence of ordinary domestic activity such as cooking, butchering, hide preparation, storage, dwellings, and so forth. The excavated materials are viewed as associated with the ritual life of the rock art site.

The lower zone consists of very fine grained, tan aeolian deposits, or loess. This material is the lowest in the soil column and lies directly over the bedrock which contains the remains of deeply weathered peck marks. The diagnostically oldest material occurs in this zone. The large side-notched point tradition is present, as is a used blade of exotic Knife River Flint (from North Dakota). The weathered peck marks on the rock formation, covered with loess containing early lithic artifacts, suggest that this site is at least 10,000 years old. No radiocarbon dates are available for the lower loess zone, but regional geology shows clearly that the activity on the site would date to the close of glacial times – ca. 10,000 BP.

The morphology of the engraved panel supports the hypothesized timing. Two superposed lanceolate projectile point images on the engraved panel approximate the Eastern Clovis variations in both shape and size, especially those found at the Debert Site in Nova Scotia. These superposed images are oriented in opposite directions and are unprecedented in North American rock art.
imagery. Additionally, an exceptionally detailed atl-atl weight of the “butterfly variation” relates the symbolism to the Archaic Tradition, and specifically to the Jeffers Petroglyph Site in Southwestern Minnesota.

While the Hensler Site suggests substantial antiquity for petroglyphs in the deep continental interior, it also offers clues to the order of occupation. Both southern and northern ties are evident, with the older connections pointing to the north and northwest. The southern ties are to the Mississippi Valley, especially in the general direction of Missouri.

Another feature of the site is the presence of “phenomenal attributes”, special conditions which might affect site selection. There are numerous lightning strikes, acoustical properties, prominence with wide vistas, and a magnetic anomaly. The general shape of the formation, as well as the deep trough-like seam and other perceived shapes in the formation would count as attractions for site selection.

All in all, Hensler constitutes a remarkable opportunity to link standard archaeology with a body of rock art in a central continental context. At present, no more than 1% of the site has been excavated.
OLD PETROGLYPHS
ON THE NORTH AMERICAN HIGH PLAINS

Lawrence LOENDORF

Research on North America’s High Plains has been directed toward establishing the age of petroglyphs through relative methods. At several sites it has been possible to \(^{14}\)C date soil deposits that formerly buried petroglyph panels so it is possible to establish an age of Early Archaic petroglyphs at 4 500 BP. These old Archaic petroglyphs are pecked abstracts with distinctive forms. Fortunately they are so distinct that they can be recognized at other localities.

Using the age and form of the Early Archaic petroglyphs as a guide, we started a search for examples superimposed on other petroglyphs. We have located four sites where these Early Archaic pecked figures were superimposed on older petroglyphs. In all instances the older figures are abstract incised patterns rather than pecked figures. These incised figures are unquestionably the oldest petroglyphs at sites in northeastern New Mexico and southeastern Colorado.

Enough of these old incised figures have been found that it is possible to start to classify them into the following types.

- **Multiple parallel lines** – these are the most common of the old incised forms (figure a). They are incised lines with their long axis parallel to each other. Groups with three or four to ten or twelve are found in the parallel sets. They measure about ten centimeters in length with each group about two to three centimeters wide.

- **Parallel double lines** – the lines are distinctive because they appear to have been carefully made as a pair (figure b). Usually shorter than the multiple parallel lines, they measure 3 to 5 mm between the lines. Parallel double lines are often straight but they can be found in zigzags and cross hatch patterns, and they can also connect or intersect with other lines.

Old incised motifs indentified on the four known sites.
**Intersecting lines** – these lines are a simple example of two lines that cross one another at different angles (figure c). In some examples short lines cross a longer line at right angles while in others the lines intersect at odd angles. The intersections appear to be purposeful and not the result of an error in the stroke as seems to be the case with multiple parallel lines when they occasionally run into one another.

**Asterisks** – a series of incised lines that meet at a central point to form a starburst or asterisk form (figure d). The lines are usually single but the best known example also has a set of parallel double lines in it. The recorded examples are small covering about five centimeters across their maximum dimension.

**Cross hatch or grid patterns** – the figures are intersecting lines that meet at right angles to form a grid pattern of squares or rectangles between the lines (figure e). In some examples the lines meet at 45° angles to form open spaces of diamond shaped patterns. The diamond patterns might be called cross-hatch while rectangular patterns are referred to as grids. I have classed them together because the two types tend to blend into one another in some examples. The figures are variable in size with small ones less than 5 cm across and others nearly 1 m across.

**Bisected ovals** – the figures are oval forms with a straight line bisecting them (figure f). One end of the line is longer and extends beyond the oval for a greater distance than the other end. The figures resemble feathered arrows or an atlatl form. Some examples are small measuring 4 or Rcm across their maximum dimension while others can be as long as 50 or 60 cm.

**Points on lines** – these figures are lines that exhibit points at the ends of lines and angular lines attached on each side of the line so as to form triangular points (figure g). The points can be at the ends of the main line or along the sides. The only recorded examples are small with measurements of 5 to 10 cm.

**Zigzag patterns** – the two known examples of the motif are sets of parallel lines that are set with angles rather than rounded corners (figure h). They resemble a lightning motif. The examples are small with lengths of about 5 cm.

The question, of course, is how old are these incised motifs? They are clearly older than 4500 years and possibly much older. It is important to recognize that the oldest art in North America includes incised limestone tablets at Paleo-Indian sites on the High Plains. Excavations begun in 1998 in Clovis-age deposits at the Gault site in Williamson County, Texas have resulted in the discovery of several dozen stones and pebbles that exhibit incised abstract motifs. Although I have not analyzed the Gault site stones or other engraved stones from Clovis age sites, many of the designs appear to be similar to the old incised line motifs presented in this discussion. There are multiple parallel lines, double parallel motifs, bisected oval forms, and cross hatch and grid designs. A similar stone with incised patterns was recovered from the Folsom layer at the Blackwater Draw site in southeastern New Mexico. The inventory of stone artifacts incised with abstract figures also includes those from the 9 400 old Paleo-Archaic site at Barton Gulch, Montana, whose incised lines of differing depths formed cross-hatched designs.
Panglobally, all paleoart traditions, both portable and rupestrian, considered to be the earliest uniformly display a remarkable noniconicity. Believed to be attributable not to cultural diffusion but to an evolved, predisposing neurobiology shared by all human beings, this worldwide similarity of the most basic phosphene-like motif repertoires also holds for the Pleistocene-Holocene Transition period in the American West. The non-figurative, “geocentric” marking systems with which the arriving Paleoamericans and their descendants humanized the land, summarily labeled here Western Archaic Tradition, lasted for thousands of years until in very limited areas full-blown iconicity in the form of distinct “biocentric styles” set in by Mid-Holocene times.

Establishing a solid foundation for the existence of North American paleoart during Pleistocene-Holocene Transition times is difficult without the availability of credible direct dating strategies. As of today, no such chronometric technique has been developed to meet the scientific expectations of contemporary rock art research. Most currently applied dating methods, including the cation-ratio, varnish microlamination and X-ray fluorescence techniques, are still distinguished by large error parameters, and the rock art age determinations obtained by them have generally not been independently replicated by other experts. In the absence of reliable, direct chronometric dating, it therefore becomes necessary to rely on more traditional techniques such as differential repatination, extent of weathering, superimposition and image content. In particular, deeply carved and heavily revarnished designs on extremely weathering-resistant rock turn out to be strong indicators of archaic ages. A substyle based on such grooving depth, dubbed Carved Abstract Style, with its typesite at Long Lake, Oregon, where a petroglyph panel was found to extend below a volcanic ash layer some 7 700 years ago, occurs all over the American West and may constitute the oldest surviving rock art stratum in North America.

Rock art scholars convinced of a pre-Clovis colonization of the Americas have always assumed that Paleoamericans made art, both in rupestrian and mobiliary form. Definitive proof was expected to come in the depiction of Pleistocene megafaunal motifs, but until recently all claims for extinct specimens such as horse, camelid, or mastodon were based on fraudulent examples, the result of autosuggestion and mindsight, or subject to question due to poor dating results. The now scientifically verified mammoth engraving on fossil animal bone at Vero Beach, Florida, is indeed an unprecedented find in this respect. Equally notable is the authentic petroglyph portrayal of a Columbian mammoth along the San Juan River near Bluff, Utah. Nevertheless, considering the overwhelming evidence for geometric signature imagery with which Paleoamericans first artified their environment, both the Vero Beach and the San Juan depictions are seen as exceptional in the big picture of Pleistocene-Holocene Transition paleoart. Although at
Typical Western Archaic Tradition geometrics from a site near Kingman (Arizona).
this time there is no evidence that noniconic and iconic motifs were used throughout the entirety of image-making history in the Western US, it is possible, nevertheless, that an early iconic tradition, poorly understood at present, may come to the fore.

The developmental scheme proposed here for Western Archaic Tradition imagery – essentially a long-lasting macrotradition distinguished by predominantly abstract-geometric designs – comes to an end when a “representational revolution” is seen to begin around the Mid-Holocene. Whatever the reasons for this innovation, where before there was panregional homogeneity in the form of a noniconic artistic tradition, there is now heterogeneity manifested in a series of regionally varied styles that share an emphasis on life forms such as anthropomorphs and zoomorphs. Although geometric elements do not disappear, they are now more marginalized and usually integrated into the bodies of the animals and humans.

Leading up to this stage of iconicity a number of simple figurative designs can be observed that gradually occur in the mix of abstract-geometrics and may have functioned as “bridging” elements between noniconic and more fully developed representational art. For this reason, they may be regarded as proto-iconic precursors. Among the elements most frequently observed in this role are animal and bird tracks, and human hand and footprints. While constituting a hitherto unmade observation for the developmental path of Western Archaic Tradition rock art, due to the lack of absolute dating methods this “proto-iconic hypothesis” is currently not scientifically testable. For this reason it is offered here as a predictive model. When looking at the broad spectrum of Western Archaic Tradition rock art sites, a pattern with apparent evolutionary traits emerges: All earliest imagery seems characteristically devoid of iconic markings over a long time period. Within this framework of fundamentally stylistic continuity, a gradual emergence of proto-iconic motifs becomes apparent. This admixture of pre-figurative motifs can thus be regarded as an inceptive or transitory step towards fully developed, two-dimensional iconicity at the end of the Pleistocene-Holocene Tradition. Typically, all subsequent representational art, then, occurs coevally with abstract-geometric forms.

Whether this proto-iconic hypothesis is verifiable or falsifiable and whether it also holds for rock art corpora of Pleistocene-Holocene antiquity in other parts of the world will depend on the amount of attention that rock art researchers start paying to the observed phenomenon. A strong case for the early appearance of “tracks” can surely be made for Panaramitee and Karake Tradition imagery in Australia and the Pleistocene hunter-gatherer iconography found at Piedra Museo in the Patagonian landscape of South America.
EARLY ROCK ART OF THE AMERICAS AS REFLECTED IN THE NORTHEAST MEXICAN CORRIDOR

William Breen MURRAY

Although the Asian origin of the first Americans is now well established, the chronology and rapidity of population expansion as well as the routes taken are still uncertain. Likewise, it is a matter of speculation whether the early migrants brought a rock art tradition with them as part of their cultural baggage, or whether all New World rock art traditions are independent inventions or the product of later migrations. Early dates for South American rock art suggest considerable antiquity and the presence of world-wide abstract motifs suggests a possible Old World connection, but the evidence for rock art traditions in the Americas is meager and still does not allow a definitive answer.

However old the earliest rock art may be, the initial migrants most likely had to pass through the Mesoamerican corridor and the Central American isthmus as they moved southward. In particular, the northeastern corridor following the front range of Sierra Madre Oriental and adjoining the Gulf coastal plain is a likely place to find any early rock art because it connects with both the continental interior to the west through the Río Grande/Río Bravo drainage system as well as the Great Plains and eastern North America through the Mississippi river drainage and the natural configuration of the Gulf coastline.

More than 600 rock art sites are now identified in the Northeast Mexican states of Nuevo León and Coahuila which straddle this route, from small isolated figures to very extensive areas with thousands of images and provide a broad sample of rock art from many time periods. Initial human occupation in this region is now radiocarbon dated to at least 12,000 BP and rock art is associated with all of the earliest dated sites.

The largest sites are located at key points in the intermontane drainage system, where superposition of figures, differential rock wear, and stylistic and thematic variations identify multiple traditions of rock art production extending up to protohistoric times. In the absence of direct dating, we use these three features as indicators to identify the relative antiquity of the images.

While both paintings and petroglyphs are present, the earliest rock art is all petroglyphic. These figures are carved mainly on rocky crests at open sites with a panoramic view of the surrounding area, invariably near dependable water sources which were abandoned and reoccupied in different periods in response to climatic variations. Thus, rock art production appears to be episodic. Stylistic and motif similarities and reuse of the same sites do not indicate continuity of populations. Any similarities derive rather from the immediate spatial context and the conditions of the hunter/gatherer adaptation which characterized the region throughout prehistory.
Dot Configuration showing extensive fracturing and repatination (Boca de Potrerillos, Nuevo León, Mexico).
Using the chronological indicators mentioned, at least three broad episodes, or stages, of rock art production can be identified. The earliest consists exclusively of the so-called “universal” abstract motifs: elementary geometrical shapes including spiral and circular forms, curvilinear and rectilinear figures, dot configurations, tally or comb-like sequences of lines, and similar motifs. These often appear on heavily worn or fractured rock surfaces. No technical examination of the rock varnish has been attempted so far but the dark repatination suggests that they were made prior to at least one (or more) earlier humid episode.

At some later time, possibly in the Middle-Late Archaic, a representational hunting tradition appears which features atlatls, projectile points and other lithic tools, animal tracks, sheep horns, and deer antlers, among other motifs. Many are elaborately carved on a very large scale in a distinctive incised relief style at places which offer natural tactical advantages for hunters armed with atlatls.

While some of these representations are detailed and naturalistic, others show variations which transform the real object into an iconic symbol with additional attributes. Atlatls with exaggerated counterweights become symbols of power rather than just weapons, and deer antlers are transformed into the tally markers of a lunar calendar which records the gestation period of this key prey species. These later abstract motifs appear to be the most recent, although their separation in time from the hunting motifs may be minimal.

Configurated dot patterns are present at nearly all sites and appear to be one of the oldest motifs. They occur on both horizontal bedrock surfaces and vertical panels, and their configurations and carving techniques vary considerably, ranging in size from small cupules sculpted in high relief to more lightly pecked sequences ordered in regular patterns. Typically, they are vertical columns or horizontal rows, but long dot lines and other more complex configurations such as fan-shapes, cross-like figures, and concentric circle sequences also appear, varying in complexity from a simple row of a few dots to hundreds of dots arrayed in complex displays (figure).

In Mesoamerican iconography, the dot becomes a unit numerical symbol, and in some cases, the numerical ordering of the Northeast Mexican dot configurations agrees with lunar synodic sequences. However, the diversity of their contexts and configurations and the presence of unstructured dot clusters strongly suggest that no single explanation accounts for all its occurrences. Number is not the only possible meaning for the dot motif, nor is it necessarily its original meaning. Petroglyphic counting may well be the antecedent of Mesoamerican counting, but this may be a specific later development. A more complete view of the conceptual range and antiquity of configurated dots would require a closer look at its variations within a much broader sample.

Dot configurations similar to those of the Northeast Mexican corridor appear prominently at many rock art sites throughout the Americas, including some which appear to be very early; to the north, at sites such as Long Lake, Oregon, in the northern Great Basin; to the south, they are part of early rock art traditions from eastern Brazil to Argentinian Patagonia, with an especially prominent cluster on the coastal islands near Florianopolis, Brazil. A more systematic view of their occurrence and analysis of their cultural context and meaning in each case are beyond the scope of this paper, but as viewed from the northeast Mexican corridor, such a study may hold the key to one of the earliest rock art motifs in the Americas.
NORTH AMERICAN PETROFORMS:
Questions of the Chronological and Cultural Placement

Jack STEINBRING, Norman MULLER

The arrangement of stones on a flat surface constitutes one of the most fundamental symbolic acts among rock art traditions. It is worldwide and offers many variations. In North America, the practice is spread from coast to coast, and is expressed as anything from a few boulders laid out in the shape of a turtle to large and complex arrangements of many features linked together by stone lines as at the Tie Creek site. Uses of these features could range from individual acts by vision supplicants to major group activities with ritual stations reflecting institutional life.

Recently, research attention has been directed to boulder piling to form cairns of many variations. These too are found distributed from coast to coast, with remarkable densities in some areas. These cairns have puzzled investigators and many of these features, especially in New England, have been traditionally attributed to early pioneers of European ancestry despite the fact that no
Evidence of such an origin has been established. Instead, it has become clearer that many of these cairns can be attributed to aboriginal populations, mainly as human burial monuments. Hundreds of them are known in British Columbia where Darcy Mathews, a Ph.D. candidate of the University of Victoria, has undertaken years of research in their geographic and ethnological characteristics. Large sites, consisting of hundreds of these cairns in Vermont and Wisconsin have come to light, almost always contradicting the entrenched views that they are products of Euro-American ventures. In Vermont, the Abenaki have asserted their sacred character, stopping proposed government investigations.

Countless petroforms were commonly destroyed by land clearing, most of it for agriculture. Research today centers on areas remote to industrial and agricultural activity, with much of the research in protected lands like National Forests. Nonetheless, oak savannah remnants in the Midwest and in New England also contain these features usually in 100-200 years old oak stands which have escaped lumbering interests. Steep hills may often yield these features too since early farmers avoided the steepest ones.

Research at present shows concentrations in New England (Vermont, Connecticut, Maine, Rhode Island, Pennsylvania, and so forth), the Northern Plains, the Midwest (Wisconsin, Missouri), the Southeast (Georgia), and an appreciable locus in California, as well as British Columbia. The California features have been known for nearly a century, and have been reported by early archaeologists like Malcolm Rogers who linked them to specific archaeological cultures.

The substantial antiquity of petroforms is evidenced at the L’Anse Amour Site in Labrador, where a boulder cairn contained a human burial dated at 7,500 BP. In the Midwest, the erection of cairns on the bare surface of glacial kames dating to at least 14,000 years ago suggests the possibility that these simple stone features could have been made by the earliest Americans.
PATTERNS AND PROCESS:

Some Thoughts on the Incised Stones from the Gault Site (Central Texas, USA)

D. Clark WERNECKE, Michael B. COLLINS

Engraved stones have been a comparatively minor part of the reported prehistoric record of the Americas (figure). A chance discovery in 1990 of four engraved stones in an early context at the Gault Site in Central Texas (USA) led to increased interest in these objects, particularly those greater than 12,000 calendar years old. Continued investigations at Gault have documented more than 100 stones from this one site and determined affiliations ranging from Early Paleoindian (ca. 13,000-9,000 cal BP) to various periods in the Archaic (ca. 9,000-2,000 cal BP) and perhaps later.

The incisions on stones from the Gault site are made on smooth pebbles and cobbles of soft limestone (ca. 65 specimens) and on the cortex of pieces of chert, mostly flakes (ca. 35). The limestone examples are somewhat larger (up to the size of a human hand) and tend to exhibit relatively complete patterns whereas those on chert cortex tend to be smaller and, because the parent pieces of chert were flaked after being incised, the patterns are generally incomplete. Condition of the incising varies from clear and easily discerned to degraded and sometimes partly obscured by overlying deposits of pedogenic calcium carbonate. All stones were carefully examined visually and under magnification. This reveals that a strong, sharp object (chert flake?) was used to produce the lines most of which were evidently produced by long, single, very straight strokes.

These commonly occur in sets of parallel lines, often intersecting one or more such sets to produce geometric crosshatched patterns. Also common are zigzags and herringbone designs. The intent to create organized patterns is apparent in the more complete designs. When assessing smaller fragments, it is necessary to search for analogous details of line precision and remnants of patterning. A few stones exhibit what are tentatively judged to be representations of such things as a leaf, a group of plants, or multiple fletched darts.

Because Gault has a very large and unusually complex component of Clovis age (ca. 13 300 to 12 900 cal BP) and because art of this age in the Americas is scarce, particular note has been taken of the 8 incised stone specimens that can be confidently attributed to the Clovis component. Of these 8 stones, 6 are cortical chert flakes and 2 are tiny fragments of limestone pebbles. This suggests that whatever meaning engraving on the exterior of a mass of chert may have had, it was either fleeting or trivial because the designs were destroyed when the stone was flaked. This brings us to a critical caveat – we lack any declaration from contemporary participants in the Clovis culture as to the status of these objects as art and we have no contextual or other evidence for their meaning or meanings to those who produced them. The same is true for the later examples from the site as well.

Comparisons of the prehistoric Gault materials with those from elsewhere are discussed as art only on the basis of scholars’ views as non-participant observers. Incised stones and painted stones of similar characteristics with similar, non-representational designs are not unusual in the Archaic and Late Prehistoric intervals of Texas prehistory. Similar objects are also found throughout North and South America over a long span of prehistory.

Beyond the Western Hemisphere the practice of incising chippable stone before it was worked is seen in India, France, Spain, Italy, Russia, Northern Europe, and China. This practice may have extended as far back in time as 75000 to 100 000 years ago and lasted throughout the stone ages. This dispersion over time and space argues against a historical continuity and begs for explanation. Likely there are many explanations.

Geometric designs that were not destroyed in knapping pose another interpretive challenge. Many ideas have been put forward, ranging from doodling or graffiti to utilitarian to the realm of the spiritual and supernatural. Entopic phenomena have been suggested as one means of explaining similarities of designs separated by great distances and long intervals of time. Entopic phenomena are visual effects generated within the eye or the nervous system and may take geometric forms such as zigzags, grids, or lines. These do not require the use of psychoactive drugs. Carl Schuster has observed that a common biological basis inspiring certain design forms offers a parsimonious explanation for far-flung similarities in prehistoric art. Diverse meanings might be attached to the same designs by different peoples, clearly a cautionary factor to be considered when seeking historical connections or shared behaviors.

Incised stones from Gault have many counterparts around the world attributable to numerous different time periods. It may be tempting to impute common origins or shared behaviors to these similarities, and scholars often settle on a favorite interpretation of any given art form. We find the comparisons and suggested meanings of considerable interest, but believe that in all probability the extent of sound interpretation will be limited to knowing that the Gault specimens represent an example of humanity’s common heritage – patterns that connect all humans worldwide.
A CONTEXT FOR THE VERO BEACH ENGRAVED MAMMOTH

Barbara Olins ALPERT

In 2009 a realistic image of a mammoth engraved on mineralized bone was found by James Kennedy, an amateur fossil hunter. It was discovered in the fossil-rich former streambed of the Indian River in Vero Beach, Florida, in or near a place known as the Old Vero Early Man Site that had long yielded bones of late Pleistocene megafauna including mammoths, mastodons and giant sloths. The bone on which the image had been engraved is considered to be the fossilized remains of one of those three animals. Some human bones also found there had given the site its name.

Especially because of the striking realism of the mammoth image it was assumed that, if indeed prehistoric, it must have been engraved when proboscideans still roamed that area. Since paleontologists have estimated that the mammoths in North America became extinct about 12,000 to 13,000 years ago, the bone would have been engraved before that date. No other realistic images of comparable antiquity have been discovered and authenticated in North America. The existence of this artifact, therefore, challenges the chronology for rock art in North America and calls into question the belief contended by some researchers that the earliest Paleoindian rock art in North America is non-figurative.

Because this engraved figure is so unique, one way to understand it is to find its place in the context of other mammoth images previously discovered in North America. There have been a number. In fact, compelling pursuit of mammoth imagery has been, in some sense, like a search for the Holy Grail.

The five most significant and purportedly ancient mammoth images that have been found in North America include:
1. the sculpted sandstone mammoth shaped pipes from Iowa which were thought to be from the Mound Indian culture;
2. the engraved two-sided slate piece from Pennsylvania, called the Lenape Stone after the Indians who lived in that area;
3. the once famous Holly Oak mammoth engraved on shell from Delaware;
4. the engraved bone from Jacob’s Cavern, Missouri;
5. the engraving on a cliff in Utah known as the Moab Mammoth (as well as other parietal images in the Utah area).

I review the information about each discovery and find that the provenance of these artifacts seems extremely dubious at best. In terms of their graphic style, they are entirely different from one other. These mammoth images also differ from the Vero Beach image. These North American examples show no stylistic or apparent cultural continuity such as one finds in European and Asian examples.
A second line of investigation is comparison of the Vero engraving with the European and Asian mammoth images which were found beginning in the late 19th century. There are over 300 examples. Carved and modeled mammoth figurines have been found as well. Some of these are even more ancient than the drawn and painted examples. I do not include these in my research because only those art forms which attempted to translate a three dimensional form into a two dimensional representation were suitable for a specific comparison with the Vero mammoth engraving.

My first goal was to see how the individual European and Asian Pleistocene artists, who had worked over a vast chronological and geographic spread of time and space, had solved problems relating to perspective. Proboscidean images are unusually complicated when depicted in two dimensions. To this end I discuss in detail the use of foreshortening in these images as it relates to the depiction of mammoth tusks and trunk. I compare this range of solutions to that which was used by the engraver of the North American Vero mammoth. My conclusion is that the Vero mammoth is astonishingly skillful in the use of perspective.

For the authentication of the Vero mammoth, as for that of any art, one traditionally relies on two criteria. The first is scientific verification. Scientific tests have proved to be very convincing since the engraving has passed all of the tests to which it has been submitted. The second criterion is connoisseurship involving a broad art history approach, about which I am able to speak. The Vero mammoth image seems to fit well into the European opus but not so well that it can be called a copy of any particular example. In fact it has quite individual traits which seem to indicate that it is the work of a particular individual with unusual graphic gifts. But it is hard to believe that the artist could have accomplished this work without being part of a tradition.

If there was indeed a tradition it may be that artists worked on perishable material such as wood. But one can hope to find other examples on bone or stone. Further excavation of the Old Vero Beach Site with modern techniques, as is planned, may hold the key to this question. However, unless new scientific data or discoveries emerge to contradict what we now know, I believe that the Vero Beach Mammoth engraving should be considered authentic.
PALEOINDIAN PORTABLE ART FROM WYOMING (USA)

Danny N. WALKER, Michael T. BIES, Todd SUROVELL
George C. FRISON, Mark E. MILLER

The first researchers studying rock art in Wyoming did not realize how long the region had been occupied. David Gebhard created the first rock art chronology for Wyoming, a relative sequence of four styles based on superpositions. More recently, Ron Dorn, Julie Francis and Larry Loendorf published a chronology derived from radiometric dates, cation-ratio, and varnish micro-lamination which suggests considerable antiquity for a number of rock art panels in Wyoming. In the Bighorn Basin, the Legend Rock site, has petroglyphs that have minimum limiting age estimates between 11,000 and 10,000 years ago. A varnish micro-lamination sample from an outline pecked animal shows a black layer indicating deposition during the Younger Dryas. Other glyphs on the panel with similar stylistic characteristics may be the same age. None of the oldest animal images are from species that are now extinct.

Portable art in the form of worked and carved bone, antler and ivory objects has been excavated at Paleoindian campsites dating before 8,000 years. The most intriguing Paleoindian portable art piece from Wyoming is an incised segment of mammoth ivory, the Barnes Tusk, recovered not far from the Legend Rock site. We now have some reason to doubt the Pleistocene antiquity of the site where it was found, but we still believe the artifact is of at least Clovis age.

We believe the tusk to be mammoth ivory. The artifact was broken after it was incised, as all incisions meeting the break surface are clean breaks. The tusk fragment has a mass of 434 g, or close to one pound, and it is 14.9 cm in length. Just above the break, it is 4.8 cm in width and 14.6 cm in circumference. Secondary pedogenic carbonates have precipitated into the incisions and the break surface on one side of the tusk, eliminating the possibility that this is a modern forgery. Traces of red ochre can also be seen under magnification.

The incised design is comprised of a series of abstract geometric designs but the complete design is not present. The most prominent features are a series of bisected triangles and a webbing design, or a “ladder motif.” The bisected triangles and the ladder motif are known from Upper Paleolithic art. Carved and incised bone, antler, and ivory tools are known from Clovis contexts and may include both utilitarian and artistic markings. The artifacts most artistically similar to the Barnes tusk, recovered from Clovis contexts, are the incised limestone cobbles from the Gault site. They typically show abstract geometric designs. This supports the idea that the Barnes tusk is from early Paleoindian times.

The tusk was found on the ground surface at the base of an abandoned road cut into an alluvial terrace. A scatter of surface artifacts was observed on this same surface, and a single tool, a small biface fragment, was recovered. A distal fragment of a Clovis point was found on a higher terrace surface 300 m east of the site. At the site itself, we located a hearth feature in the terrace profile.
Incised mammoth musk, photograph and drawing of engravings.
just above where the tusk was found. The feature is a broad and shallow pit cut into underlying fluvial sands. We collected a small sample of the hearth fill for dating. Approximately 2 m west of the feature we dug a single auger hole. We augured through four meters of deposits to be sure we had dug through the layer from which the tusk was derived. In the auger test, we recovered a single sample of dateable charcoal from 205 to 219 cm in depth, a little more than one meter beneath the hearth sample.

With funding from the Wyoming Archaeological Foundation and the Office of Research at the University of Wyoming, we submitted the two charcoal samples for AMS radiocarbon dating to Beta Analytic. The charcoal sample from the hearth dates to 2400 ± 40 BP (Beta-247797). The sample from the auger hole dates to 4190 ± 40 BP (Beta-247797). The tusk appears to have been found on a late Holocene alluvial terrace containing what is a Late Archaic archaeological component.

We have several theories for the artifact, but we believe it was originally manufactured in early Paleoindian times. It was probably picked up by a Late Archaic person and discarded in the Barnes site. The tusk was recovered from fine-grained alluvial deposits, and the only large clasts present are artifacts. It seems almost certain that the agent of deposition for the Barnes tusk was a prehistoric human. A second argument can be made on stylistic grounds. While incised bone artifacts are known from the Plains later in prehistory, they are not common, and typically they show very simple designs. This artifact fits comfortably within an early Paleoindian or Upper Paleolithic assemblage, but it would be highly unusual in a late Plains Archaic site.
SYMPOSIUM 3

PLEISTOCENE ART OF THE AMERICAS

Chairmen

Alice TRATEBAS
(USA)

André PROUS
(Brazil)

María Mercedes PODESTÁ
(Argentina)

II

South America
CHRONOLOGY OF THE ROCK PAINTINGS IN
THE SERRA DA CAPIVARA NATIONAL PARK (BRAZIL)

Niède GUIDON, Gabriela MARTIN, Anne-Marie PESSIS

In 1973, sites with rock paintings were discovered in the southeastern part of the State of Piauí. In a very uneven terrain, a group of sandy plateaus overlooks a plain covering approximately 200 km² following a south-west / north-west direction. This is one of the poorest regions of Brazil. It is semi-arid, with a typical vegetal cover called “caatinga”, which is the Indian word for “white forest”.

Due to their archaeological importance, these sites have been classified by UNESCO as World Heritage Sites and by the Instituto do Patrimônio Histórico e Artístico Nacional (IPHAN) as National Heritage sites in Brazil.

Excavations at the rock art sites led to the discovery of bits of detached wall paintings buried in the archaeological layers. Fragments such as these, found in the layers of the site of Toca do Boqueirão da Pedra Furada, have been dated to 29 860 ± 650 BP (GIF 6651-1984).

In the Perna Valley, which is one of many that compose the national park, charcoal samples found in a fireplace during the first excavations of the site of Toca do Baixão do Perna I yielded a ¹⁴C date of 9 540 ± 170 BP (GIF 5414).

The continuation of excavations at this site resulted in a surprising and important discovery. On the wall, starting at 1.4 meters in depth and up to 2.4 meters below the current ground level, remarkably well preserved paintings were found on the wall. The lowest layer of sediment, which corresponds to the level of the paintings on the wall, was dated by a chronological sequence situated between 10 000 and 7 000 BP.

On the peripheral plane of the São Francisco River, opposite the Serra da Capivara National Park, there are limestone outcrops in which deep caves extend from long corridors that provide access down to the groundwater table. In the caves, we found a few lithic tools, a few charcoal pieces and many megafauna remains that survived in the region until around 6 000 years ago. In the rock shelters or near the entrances of the corridors and galleries, in areas lit by sunlight, we found paintings and engravings on the stone.

At the site of Toca da Bastiana, red painted figures were covered with layers of calcite first dated to 17 000 ± 2000 BP, while other samples were later dated to between 33 000 and 35 900 years ago.

In 2002, new paintings were discovered under a thick layer of calcite and in both cases the results obtained were respectively to 48 286 and 39 442 years ago.
Steelman, Rickman and Rowe obtained much more recent $^{14}$C dates (2002). To verify these results with other dating techniques, M. Rowe took a sample of the painting of one of the human figures and of the calcite that covered them. A sanitary evaluation, realized by F. Bousta and S. Touron permitted the identification of microbiological or mineral alteration processes and to specify the agents responsible for the imbalances observed in the sites. Organic materials continually accumulate on the wall and mix with older deposits, affecting the reliability of the $^{14}$C dates.

The biological agents covering the wall and paintings indicate the presence of factors that can cause uncontrollable errors in attempts to obtain radiocarbon dates. This phenomenon applies to the entire zone of archaeological sites.

Sample collection is problematic for EPR dating. The first samples were obtained by scratching the surface and the product was composed of a mixture of all the layers of deposits. It was naturally possible that the more ancient crystals, and even rock crystal, could be present in the sample. It is also possible that in the process of dilution of the calcite plaques and the later crystallization, older crystals could also have mixed in, and would thus distort the sample. Work is currently in progress to definitively define the age of the paintings.

Despite technical advances made by specialized laboratories, the chronology of the paintings is still imprecise. Nonetheless, dialog between archaeologists, physicists and other metrological disciplines has enabled these researchers to reduce the distance between their different results. This dialog contributes to the increasing reliability of their interpretations.
THE OLDEST ROCK ART IN CENTRAL BRAZIL:
Current Knowledge

André PROUS

There is clear evidence for human presence in central Brazil (States of Mato Grosso, Bahia, Minas Gerais and Goiás) starting at 12 000 BP, while large “Pleistocene” fauna survived until approximately 9 000 BP. Claims have been made for the identification of a mastodont, a toxodon, a smilodon, giant sloths, a flat-faced bear and American horses, though none of these interpretations have been substantiated.

Drips and trails of pigments have been observed on the occupation floors, dated to between 10 000 and 12 000 BP, of rock shelters with painted walls in the State of Minas Gerais (Gentio Cave, Santana do Riacho, Boquete and Dragão rock shelters). Unfortunately, we cannot be certain that these pigments are associated with the rock art. In the State of Mato Grosso, at Santa Elina, used pigments have been dated to between 8 000 and 11 000 BP, and between 5 500 and 7 000 BP. But once again, their association with the paintings visible on the walls is not certain.

A block that fell from the ceiling of the Boquete rock shelter 9 500 years ago was gradually buried. It is covered with engravings (incisions and cupules) starting at its base, indicating that they were made between 9 500 and 8 000 BP. A few pecked circles and a biomorph were found higher up and could be more recent, but older than 7 000 BP, the date at which they were completely covered. Unfortunately, these figures are atypical and cannot be attributed to any of the stylistic traditions well-represented in the site and the region.

At 200 km from the Boquete rock shelter, the oldest occupation of the Dragão rock shelter is dated to 11 000 BP. It was unfortunately not possible to verify this date due to a lack of time to extend the excavation.

The limestone floor of the Poseidon rock shelter, near Lapa do Dragão, was covered with nearly 5 000 pecked engravings (figure). A calcite crust containing quartz grains and covering the engravings was subject to EPR analyses. After elimination of the quartz, a date of 55 000 was obtained for the crystallization of the calcite. This result must be considered with great caution, however, because it is highly doubtful that humans were present in America at this time.

In the Lapa Vermelha IV rock shelter, near Lagoa Santa, a group of very faint lines were painted at the entrance to a small cave that was completely buried before the excavation in the back of the rock shelter. The minimum age is no more than 6 000 years ago (overlapping fireplace), but if these lines were made by a standing person, they could date to around 10 000 years ago, which is the age of the gravel at the base of the cavity. Recent excavations revealed an anthropomorphic engraving buried under a floor dated to more than 9 000 years ago.
Engravings at Poseidon (Montalvânia).

On the walls of the Lagoa Santa rock shelters, we observe interlocking stone flakes (fallen from the walls) among which we find paintings of different styles and with highly variable degrees of patina. We were thus able to establish a precise relative chronology based on the superimpositions, patinas and the layers of flaked stone. The oldest patinas appear to have formed during a very dry phase; we unfortunately do not know if this is the phase that occurred during the Final Pleistocene, or a shorter episode dated to approximately 7000 years ago.

What we can say is that the oldest graphic art in central Brazil was already regionally differentiated, reflecting populations with distinct preoccupations. In the northern part of the State of Minas Gerais, we first observe very rare, large anthropomorphic figures, which are succeeded during the Holocene by geometric figures and representations of weapons. In the center of this same state, nearly all of the oldest representations are of cervids and fish, which are sometimes surrounded by tiny, very schematic anthropomorphic figures.

It is possible that these figures were painted when the territories were already well-defined and there was a need to affirm the possession of them to neighbors and possible invaders. In effect, starting in 8000 BP, we observe the replacement of one biological, non-mongolized, population (called “Lagoa Santa”) by the ancestors of the modern indigenous groups.
EARLY ROCK ART IN NORTHERN URUGUAY

Leonel CABRERA PÉREZ

In the past 15 years, several important archaeological sites have been identified in northern Uruguay containing large amounts of previously undocumented rock art. They represent a very rich cultural heritage that includes thousands of petroglyphs composed of geometrical designs that incorporate a variety of different motifs, some of which are particularly recurrent. A long-term project that is currently in the development phase has been established to carry out comprehensive archaeological research and to ensure the subsequent management (conservation, restoration, and promotion) of the sites in question. At present, a systematic study has been carried out across an extensive area of over 14,000 km² in which the greatest number of sites have been reported. Given that the study is in its preliminary phases, available information for the sites remains limited, both in terms of the societies that made the rock art and its chronological framework. Excavations carried out at four sites, selected for their diagnostic interest, indicate that the petroglyphs were made by aceramic hunter-gatherer societies, however site formation processes, together with the characteristics of the physical environment, have made it difficult to establish a precise chronological framework. Sedimentological analyses appear to date them to at least the middle Holocene during which time the landscape was substantially different from the present one, and the environment was predominantly cold and dry.

The landscape in which the petroglyphs are found is one of flat basaltic plains with low hills and outcrops of silicified sandstone and basalt. The petroglyphs are located on these outcrops, particularly the silicified sandstone, and are found in both large groups of over 100 per site, and in smaller, isolated groups, with abstract geometric motifs that have been made by pecking and/or abrasion (scraping and polishing). The grooves and rectilinear designs present “V” and “U” shaped cross-sections. The rocks that they are found on vary significantly in size, ranging from over a meter to just a few centimetres. From a morphological point of view, there are designs that have been made with both simple and more complex motifs, created with a seemingly continuous line where all the lines or surfaces come together into a single motif. There are also simple composite motifs created by the repetition of simple figures or more complicated designs composed of “meandering” or grid motifs often made with little geometric precision. In many cases the designs have been accentuated by thicker or deeper lines, or by hollowing out the figures. Motifs with “bas relief” aspects, made using a range of different techniques, are also present.

At many of the sites, archaeological material was found on the surface and/or in layers. The lithic material includes both tools that appear to have been used to make the petroglyphs and some more general domestic tools, made using both percussion techniques and abrasion (bola stones and lenticular stones). Little evidence of on-site knapping activities was observed. The main raw material used was quartzite and, to a lesser extent, chalcedony, both of which often came from local quarries. Human occupation was principally noted in the areas closest to the outcrops (petroglyphs) and decreased rapidly away from them.
Despite the fact that local populations are largely unaware of the region’s many archaeological sites and despite their isolation, the sites have nonetheless suffered substantial damage in recent years that is seriously affecting the cultural heritage involved. Both vandalism and natural geophysical and geochemical factors, whether intentional or not, have damaged or destroyed some of the panels and even entire sites. Sandstone is also quite intensively mined at a number of quarries in the region, putting the region’s archaeological heritage at a significant risk. Although the project is still in its preliminary stages, and given the lack of even the most basic information concerning the sites, the current situation has led us to incorporate actions in the project to promote the sites. This includes designing an archaeological park and the analysis of possible strategies to raise awareness among communities by organizing events and setting up an exhibition which local public and private bodies would be involved in running. The project aims to gain a better understanding of prehistoric populations and their environment and in doing so to promote and preserve this archaeological heritage.
PLEISTOCENE / HOLOCENE ROCK ART
IN LA PUNA DE ATACAMA (JUJUY, ARGENTINA)

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Marta S. Maier, Mariana Rosenbusch, Cristina Vásquez
María Paz Catá

In this paper we present new findings from the Hornillos 2 site in La Puna de Atacama (Jujuy, Argentina) concerning early figurative rock art. In particular, we have tried to establish the methods used for preparing paints by identifying the raw materials employed and their likely sources. We then considered these results in the context of the surrounding area, investigating the use of local mineral resources and the distribution of different pictorial forms – both figurative and abstract – in other contemporaneous sites in the region.

Figurative representations (zoomorphs and anthropomorphs) have been found from southern Peru to northern Chile. While they vary significantly in chronological terms, the majority can be dated to the Late Holocene, with several other sites dating to the Middle Holocene. The Hornillos 2 site includes 28 painted motifs of camelids, five anthropomorphs, and a bird.

The site is at an overhang located at the base of an ignimbritic cliff that is 4020 m above sea level. An area of 12 m² has been excavated and 9 layers have been identified to a depth of 118 cm. During the Late Pleistocene / Early Holocene (11 650 cal BP and 10 230 cal BP) the site was repeatedly occupied with evidence of the general use of local raw materials. In contrast, occupations after the Early Holocene (9 410 cal BP to 6 990 cal BP) were more sporadic and were clearly greater and more extensive than during the earlier period, suggesting greater population densities.

Detail of the panel painted in ochres, reds, and black (the dotted lines indicate the areas where the rock has undergone significant amounts of exfoliation).
Our physico-chemical research involved analyzing micro-fragments of red and black pigments sampled from the wall, reddish pigments recovered during excavation, and red pigment found on a pestle. The analytical techniques used were X-ray diffraction (XRD), energy-dispersive X-ray spectroscopy (EDS), total reflection X-ray fluorescence (TXRF), Fourier transform infrared spectroscopy (FT-IR), and gas chromatography/mass spectrometry (GC-MS).

The results seem to indicate that the red and black paints were both prepared in the same way, by grinding and mixing at least three substances:
1. iron oxides and oxyhydroxides for the red paints, and probably iron and manganese oxide for the black paints (pigments);
2. gypsum (an extender);
3. ruminant animal fat (a binder). A fourth substance could also be included: apatite. Very low levels of this mineral were found in the paint, and while not detected by XRD, its essential elements (Ca and P) were detected by the EDS analysis in all the red and black paint samples including the red pigment that was on the pestle.

Paint was also usually made using other substances such as animal fats which came from domestic contexts. The pestle is a sign of this, as it was used for grinding pigments as well as breaking up gypsum and grinding bones. The skeletal remains in layer 6 are highly fragmented, indicating the intensive processing of bone marrow for food, but perhaps also as a paint binder.

It should be noted that the gypsum found in the paint on the wall had been completely blended with the pigments, unlike at other contemporary sites with abstract art on the Jujuy plateau (Inca Cueva 4) where the gypsum was found below the paintings like a “coat of plaster on the original wall”. The pigments and raw materials for preparing the paints are found within a radius of 50 to 80 km of Hornillos 2 and overlap geographically with the distribution of obsidian. Pigments could therefore be obtained within the radius of regular mobility west of the Jujuy Plateau on a main north–south axis. This seems logical given the distribution of the early figurative motifs which do not extend west of the Jujuy Plateau (Inca Cueva 4) nor to the south in Puna Salada (Quebrada Seca 2).

Can these practices and stylistic forms be linked to the movement of hunter-gatherer metapopulations? Some time ago it was suggested in reference to the end of the Middle Holocene that “the practice of rock art is a phenomenon that appears when different geographical and social spaces begin to interact.” The differences between the stylistic forms of Hornillos 2 and Inca Cueva 4 at the east of the Jujuy plateau suggest the use of different river basins by different groups of hunter-gatherers in the Early Holocene. As a result, the migration of these groups could have led to spatial diversity resulting in the appearance of different artistic forms.
EARLY EVIDENCE OF HUNTER-GATHERER ROCK ART IN LA PUNA (NORTHWEST OF ARGENTINA)

María Mercedes PODESTÁ, Carlos A. ASCHERO

The earliest evidence of hunter-gatherer rock art in the Argentine Puna comes from sites in two different archaeological areas: Inca Cueva and Antofagasta de la Sierra and involves rock paintings which, according to stratigraphic \(^{14}\)C dating, were first produced between 10 600 and 8 900 BP. We published papers on some of these sites between 1979 and 1985, however subsequent archaeological research and rock art surveys call for a new overview that takes into account the presence/absence and diversity of the rock art during the early Holocene (ca. 10 000 to 8 500 BP).

The rock art in both areas includes simple, abstract geometric motifs, such as horizontally-aligned vertical lines, dots that have been aligned or grouped together without forming discernible geometric figures, lines in the shape of a comb or inverted “U”, irregular figures made with cross-hatching or with a rectangular outline, and sets of finger flutings. The paintings are found on sandstone and ignimbritic overhangs, caves, and rock faces, which are exposed to natural light, accessible, easily visible, and located in areas with plenty of natural resources. It is precisely these resources (permanent water; natural pastures for wild camelids; plant species that can be used for firewood, food and medicine; grasses for covering floors and funerary purposes; and appropriate quality rocks for carving artefacts) together with the repeated occupation of the sites where the rock art shows the greatest range of motifs and superimpositions that indicates a close relationship between the location of these resources, the rock art, the areas that were occupied or where much activity took place, and other sites where no stratified evidence was found. The presence of sites with rock art, whether they were repeatedly occupied or unoccupied (but located within a practical distance of the occupied sites and also with available natural resources) has allowed us to establish a relationship between the sectors of economic importance, the location of the rock art, and the role of this rock art in the construction of a distinct hunter-gatherer landscape.

The sites that were repeatedly used should also be understood in terms of the control of resources – throughout the late Pleistocene/early Holocene in La Puna, they were located in “clusters” in relation to the surrounding desert (Inca Cueva) or extreme desert (Antofagasta de la Sierra) and at over 3 400 m above sea level. This simple geometric rock art can be understood to have been used as “markas” (in the Andean sense of the term) that denoted spaces used by specific family groups or lineages in the areas where the resources and topography favoured hunting and gathering activities. In this sense, as “markas” and regardless of the particular meaning of the paintings, the rock art denoted, emphasized and qualified these places and was a fundamental element in the hunter-gatherer landscape at that time.

In contrast with the simple geometric styles that are typical of the eastern part of the northern Argentine Puna (Inca Cueva) and the southern Puna (Antofagasta de la Sierra), an overhang has been located (Hornillos 2, near Susques) with rock art dating to 9 000/8 000 BP, which is
Inca Cueva 4, Eastern edge of the north Argentine Puna: geometrical paintings from the early Holocene.
primarily characterized by images of moving camelids and human figures, depicting hunting scenes or other activities involving men and camelids (Yacobaccio et al.). Similar rock art was also recently found in another stratified archaeological site (Alero Caído, Coranzuli), covered in archaeological sediment (Aschero et al.). These iconographic representations, which are very different from those described above, are located in the western part of the Jujuy Puna, and are contemporaneous with the former (non-iconic) paintings that were produced in the eastern sector of the northern Puna and in the southern Puna.

Moreover, the similarities between the simple geometric designs from the two sectors of the Argentine Puna imply repeated interactions and exchanges of information between the two areas. There also are marked similarities in the early Archaic Tuína–Inca Cueva lithic artefacts (11 000-8 500 BP) that were produced in the two areas, and which have been observed at sites to the east and northwest of Salar de Atacama (Chile), and in the Jujuy Puna and Antofagasta de la Sierra (Argentina). However, in the areas close to Salar de Atacama and the upper-middle Loa River (northern Chile) no evidence has been found of rock art from the early Archaic. This absence is striking and should be contrasted with the findings from the Argentine Puna. On the other hand, in the south of Peru, rock art sites have been found dating to the early Holocene, although their contextual framework is not entirely clear.

Given the evidence of the absence / presence and diversity of rock art on both sides of the central and southern Andes, it seems clear that the rock paintings from the early Archaic were used as a social diacritic and were a marker of differences or a marker of distinct areas of territorial control (between the western and eastern Puna, and between the western Puna and Salar de Atacama / Loa). Their similarities also imply constant interaction and little territorial rivalry between the eastern and southern Puna.
ENGRAVINGS FROM THE EARLY HOLOCENE IN CUEVA EPULLÁN GRANDE (NEUQUÉN PROVINCE, ARGENTINA):

Latest Research

Pablo ARIAS, Eduardo CRIVELLI MONTERO
Mabel M. FERNÁNDEZ, Luis César TEIRA MAYOLINI

The multi-component site of Cueva Epullán Grande is located in the south of Neuquén province (in the northwest of Patagonia, Argentina) and contains an archaeological sequence spanning the early Holocene to historical periods.

Initial research was carried out under the Rescate Arqueológico e Investigaciones Prehistóricas project in the Piedra del Águila area, following an agreement between the University of Buenos Aires and Hidronor S.A. In 2006, the area was incorporated into a binational project, following an agreement between the University of Buenos Aires (Argentina) and the University of Cantabria (Spain).

In this paper, we discuss the oldest engravings, which are found on the cave floor. These engravings were covered by a hearth, which has been dated using $^{14}$C to 10 000 BP. We also present the latest work carried out to obtain comprehensive records using the current available technology.

Location and description of the site

Epullán Grande is located near to Cañadón del Tordillo in the middle basin of the Limay River at latitude 40° 23’ 11” south and longitude 70° 11’ 47” west. The cave has been carved into a tuffaceous Collón Curá formation. We found three other sites with rock art in this formation: La Oquedad, Cueva Epullán Chica and Paredón Sur.

Epullán Grande contained about 45 m$^2$ of sediment, of which about 39 m$^2$ have been excavated. The engravings discussed in this paper appear to be the first sign of human activity at the site and date to before 9 200 cal BC, according to the dating of hearth #32, which partially covered them (9 970 ± 100 BP –LP-213; 9 860-9 220 cal BC). There are petroglyphs on the walls and roof of the cave, as well as on a tiny overhang located immediately to the west of the entrance, and all of them have been made in a style that is quite widespread in Patagonia, known as “de pisadas” (footprints). A stratigraphic level sealing the engravings indicates that some of them were made before 2 740 ± 50 BP (Beta-61146; 970-780 cal BC).
The engravings on the cave floor and their context

The incisions cover an area of around 16 m² on the floor of the cave, from about the centre of the cave to beyond the dripline and involve:

• Interior: a group that involves two types of incisions (figure):
  – to the south, there is a series of sub-parallel lines that lie on an approximately north-south axis and are 30 to 90 cm long and a maximum of 2.7 mm wide. Some of these lines branch at one end;
  – to the north there is a further series of short lines (on average about 20 cm long), which are narrower and which often intersect with each other.
• Mouth of the cave and antechamber: incisions similar to the latter.
• Interior: there is a small group of very thin, intersecting lines.

As well as these incisions, the bedrock has a series of hollows in it. Two of the largest of these had small amounts of burnt plant remains in them and six of the smaller ones appeared to have been made by burrowing animals. To contextualize the engravings, the oldest spatio-temporal approximation came from stratum #07. Hearth #32 was a part of this and covered the floor of the cave. It was formed between about 10 000 BP and 7060 BP, which is the date of the overlying stratum #106.

The most common lithic tools found were scrapers. There was also a bifacial stemmed projectile point without barbs, two racloirs, and a range of other tools including notches, knives, denticulates and flakes that had been retouched. The predominant raw material was silica, which could have been obtained within 5 km of the site. However, debitage indicates that two non-local raw
materials tended to be used for the bifacial tools: dacite (which was used for two of the fragmented bifacial tools) and obsidian. Although there is a dacite quarry about 40 km to the west-southwest on the other side of the Limay River, it appears that it could be obtained a shorter distance away in the form of fluvial gravel. The obsidian appears to have come from distant sources about 100 km to the west-northwest.

Discussion

The question stands as to whether the lines observed on the floor of Epullán Grande could have been caused by a geological phenomenon or the action of plants or animals. We do not know of any geological processes that could have made these kinds of marks inside a cave however, and this has been confirmed by specialists in this area. It cannot be attributed to the action of roots or a hypothetical animal (for example a large edentate) that may have occupied the cave either, as some of the incisions are thin and intertwined, forming cross-hatching, while four thicker lines branch at their respective ends.

A technical explanation could also be explored: that the tuffaceous surface was used to scrape a striking platform or to polish tools. However, several of the incisions are over 90 cm long, which is somewhat excessive for such a task. Furthermore, the incisions are numerous, while the archaeological remains found in the sediment that covered the bedrock are relatively scarce. Nor have any other observations been made in the local area of tuffaceous outcrops having been used to prepare artefacts through abrasion. On the basis of these arguments, and despite the absence of figurative motifs, symmetry or obvious signs of organization, we are inclined to view these incisions as man-made and deliberate, in other words as a form of graphic expression.
HUNTING SCENES AT CUEVA DE LAS MANOS:

a Regional Perspective (Santa Cruz, Argentina)

Carlos A. ASCHERO

Archaeological research on the relationship between rock art and human settlements in the area of the Pinturas River and the Andean lakes in the northwest of Santa Cruz, has supported the sequence that Gradin put forward for Cueva de Las Manos in the 1970’s. A more detailed definition of the scenes in stylistic groups “A” and “B” needs to be established however, so that clearer comparisons can be made between the sites. For this, we propose five successive styles of hunting scenes – A1 to A5 – in which the latter subsumes stylistic group B.

In terms of the earliest archaeological contexts of these rock art sites, faunal assemblages indicate that the main prey hunted was the guanaco (*Lama guanicoe*), followed by very small numbers of nandus (*Pterocnemia pennata*) and huemul (*Hipocamelus anticensis*), although the latter was only observed in the Andean sites. The marked predominance of the guanaco can be seen in the rock art scenes, however it is interesting to note that from the time of the scenes in black (style A2) some representations of huemules and then nandus were incorporated into the general scenes.

Cueva de las Manos was declared a World Heritage site in 1990 and involves a series of sites with rock art and stratified components – sites I to IV in the original classification by Gradin et al. (1976) – that are over 30 linear metres apart. Each hunting scene has been made in monochrome and reads from left to right. The scenes in black, which include a small number of guanacos that have all been painted in the same style but in a dark purple, and some of the other scenes in red and faded red horizontally cover 9 to 12 linear metres of wall, and are 0.80 to 3 metres high, which is above the reach of any person standing on foot. Our study also suggests that the different scenes in the black and dark purple series complement each other over the sites and represent an itinerant viewing space (sensu Leroi-Gourhan) in which the different activities of a hunt (herding, ambushing, intercepting the troop of guanacos / huemules and throwing projectiles, and capturing and / or slaughtering the guanacos) are shown using the accidental or natural relief of the rock surface to create a virtual topography. The weapons and projectiles depicted are simple bolas with “manijas”, “lasso-bolas” and darts thrown using a propulsion mechanism.

This use of monochrome not only originally served to highlight the relationship between the different elements within a scene, making them easier to view, but was later reused in subsequent styles that did not involve hunting scenes, possibly with the same intention of making it easier to view the representations that were part of the same “composition” (tonal set). The particular tones used in each of these monochrome sets was also a distinguishing element between superimposed scenes on areas of the wall that were repeatedly used. In the different sites at Cueva de las Manos there is a repeated order of superimposition: black on ochre or dark red, faded red or red on black, yellow on reds and blacks, and white on all of the above.
The chronology of the earliest hunting scenes at Cueva de las Manos was obtained using X-ray diffraction in which the composition of paint samples from the ochre series were compared with the mineral pigments and pigment mixtures from a lithic artefact that had been painted ochre, and which were all from the first level of occupation (layer 6), dated by $^{14}$C to 9320 ± 90 BP (CSIC-138) and 9300 ± 90 BP (CSIC-385). It is worth noting that hemihydrate gypsum had been added to the mineral pigments in the pigment mixtures used in the earliest hunting scenes from the ochre series, the pigment mixtures used for the lithic artefact, and the subsequent tonal series.

In our research we used the tonal sets, superimposition, design patterns for animal and human figures, compositions of scenes, locations of the paintings, and use of the microtopography of the walls on which they were painted to establish different styles within stylistic group “A” and to review the composition of group “B”. Our research, together with the archaeological records, indicate that the earliest hunting scenes at Cueva de las Manos (the ochre / dark red and black / dark purple tonal series from ca. 9300 BP) are exclusive to the site. In contrast, the tonal series that are superimposed on them (red, purple-red, and yellow and white) show greater spatial distribution and have been observed at sites located within a 135 km radius of Cueva de las Manos, allowing clear stylistic similarities to be established between sites situated on River Pinturas itself, in the current Perito Moreno national park on the eastern slopes of the Andes, and in the central highlands of Santa Cruz. The $^{14}$C datings of the Andean sites have also provided new data on the chronology of these series (dated between ca. 8000 and 6000 BP) and highlight the continuity of certain themes, motifs, and methods in later styles to those discussed here.
ROCK ART, MOBILITY, AND CLIMATE CHANGE
IN SOUTHERN PATAGONIA IN THE HOLOCENE

Why the Change?

Rafael A. GOÑI, Juan B. BELARDI

This paper argues that many of the changes observed over the course of time in southern Patagonian rock art can be explained not so much from an exclusively “cultural” perspective, but also in terms of changes in the systems of mobility and shelter in hunter-gatherer societies that resulted from the climatic and environmental shifts that took place in the Holocene.

The far south of Argentine Patagonia is characterized by a semi-desert of shrubland and grassland steppes and has always been occupied by hunter-gatherer populations. During the Holocene, a series of significant climatic changes took place in the region, particularly changes in the west winds (Southern Westerlies), which over time gradually lead to a drier climate and lower levels of humidity. This was most notable in the extreme droughts that were experienced in the late Holocene during the so-called Medieval Warm Period. The decreasing levels of humidity, which were particularly marked in the late Holocene, were an important factor in the need for greater mobility and expansion to new areas (plateaus), regardless of the location of permanent settlements and shelters. The increasingly dry regional climate resulted in a more extensive area of shrubland steppes and, together with the basaltic plateaus, they came to form a new regional landscape.

In this context, what factors can be considered to have caused the changes in techniques and designs (paintings) that had lasted throughout the previous millennia? Why did the remarkable diversity of painting that had existed in the early and middle Holocene disappear in later times? Was this simply a cultural shift? On the basis of a regional discussion on the evidence provided by rock art, we would suggest that such significant changes were the result of shifts in the movement of hunter-gatherer populations, arising from a combination of climatic and technological factors.

Rock art, in the form of both paintings and engravings, has always been characteristic of Patagonian hunter-gatherer populations. The techniques, styles, and spatial distribution of the art have varied however, in line with the climatic changes that occurred in the region during the Holocene. In the early and middle Holocene, the availability and location of caves and overhangs appears to have conditioned the movement of hunter-gatherers, serving as shelter and refuge at a time when environmental conditions were more extreme than in the late Holocene. Furthermore, the greatest quantities and diversity of rock art, particularly of paintings, has been found on the walls of these caves and overhangs. The aforementioned climate process can be considered to have subsequently increased hunter-gatherer mobility, resulting in expansion to new open areas in which the shrubs of the steppes were used to develop new techniques for open-air shelters, and which already at the time involved using animal hides as a form of “awning”. In this way, rock art extended to all available open areas, making particular use of the basalt rock
on the plateaus, which had become fully assimilated as a result of new conditions of mobility. At the same time, as caves and overhangs were no longer essential as shelters, conditions arose for alternatives to the cave paintings which, for millennia, and since the beginning of the Holocene, had dominated this type of regional rock art. In this way, the friable walls of the caves and overhangs ceased to be the main surfaces for the production of rock art, and the basalt rock faces and boulders found in open air sites – which lent themselves better to rock art – meant that engraving techniques became far more predominant than they had been earlier in the Holocene.

The information available on the macro-region (sensu Dincauze 2000), which includes the Meseta Central, the area around the Pinturas River, and the Meseta del Strobel and its surroundings (all in the province of Santa Cruz), opens this hypothesis up to discussion. In the first two areas, as a result of geological “mountain” formations characterized by large numbers of rock shelters, the majority of rock art is in caves and overhangs. In the “basaltic plateau” formations, such as at the Meseta del Strobel, the rock art mainly involves engravings. In other words, there is a relationship between the geological formations where the art was located and the techniques used (painting or engraving). In turn, this relationship coincides with the chronology of the rock art, in which painting techniques were predominant in the early and middle Holocene and engraving techniques in the late Holocene.

We believe that the arguments presented here can contribute to discussions about the factors that caused the changes and diversity in rock art over time in the Patagonian region.
PLEISTOCENE ROCK ART IN SANTA CRUZ
(PATAGONIA, ARGENTINA)

Rafael Sebastián PAUNERO

The Meseta Central in Santa Cruz lies between latitude 47° and 49° south and longitude 67° and 70° west and has provided us with important scientific information on the first hunter-gatherers to settle in Patagonia. Systematic excavations at the sites involved (caves and overhangs) have yielded evidence of a cultural sequence with initial radiocarbon and stratigraphic datings that corresponds to the late Pleistocene.

These sites involve the oldest rock art in Patagonia and some of the earliest in America. The collections of paintings identified at La María, El Ceibo, Cerro Tres Tetas, Los Toldos and La Evelina have been made using different techniques and unique designs and involve a wide range of motifs, some of the most prominent of which are hunting scenes, hand stencils, felids, and camelids.

Our research has involved studying superimpositions in each area, analysing techniques and mineral raw materials, and identifying the various designs and establishing their relationship with the different spaces, colours, and techniques used.

In several parts of the region we identified mineral outcrops of iron oxide and crystalline gypsum. As a result, we were able to carry out a pilot study using local materials to create a more accurate reconstruction of the painting process and gain a better understanding of the techniques, superimpositions, gestures, positions of the painters in front of the rocks, compositions, teaching/learning contexts, and movement of raw materials involved.

We have defined three stylistic groups with different characteristics and chronologies according to the way that the rock art was superimposed across the different areas. Group 1 comprises rock art made by the first hunter-gatherers to settle at the sites and dates back to the late Pleistocene–early Holocene. It is mainly characterized by figurative motifs, hand stencils of both adults and children, naturalistic hunting scenes, and groups of running guanacos, sometimes accompanied by dots and lines. The paintings have been made in a range of different shades of red, ochre, yellow, black, and light red. The different forms of group hunting practiced by these first hunter-gatherers have been illustrated in several caves at La María Quebrada and La María Bajo, in which both spears and bows and arrows have been depicted. While the hunting scenes are as dynamic as those found in the Pinturas River area, they have unique stylistic characteristics, and those at La María are comparable to the scenes observed at Cueva 1 in Cerro Tres Tetas at Estancia San Rafael and some of the scenes at Estancia La Evelina. It is important to note that in chronological terms, we have been able to infer the age of the rock art in Cerro Tres Tetas, as first human occupation dates back to the late Pleistocene and there is no evidence of human occupation in the early Holocene.
Rock art has a long tradition of hand stencils, and they are very common in Patagonia, where they have been made throughout the duration of human occupation. Hand stencils were made by blowing paint from the mouth around the hand and by using the hand as a stencil. It is worth noting that this may be the oldest universal form of painting a part of the human body and everyone clearly recognized their hand stencil as their own, even when they had made it a long time before. In rare cases the hand stencils have dots on them, which are always in a different colour. An example of this is at La María, where there are sets of red stencils with numerous black dots on them, which, due to the design and colours, give the paintings a certain feline aspect.

The regional rock art includes images of felids that have been painted in distinctive ways. A unique and striking case is the large polychrome felid at Cueva 6B in El Ceibo. It can be seen in the accompanying figure and is red with black spots on its coat and has a bristling spine and its claws drawn out. Cardich has identified this figure as a species of large jaguar that is now extinct, the Panthera onca mesembrina, which was found in the region more than 10 000 years ago. In this regard, it is worth mentioning that during recent excavations at Cueva Túnel in La Maria Quebrada we identified a tooth from this species of felid in conjunction with stratigraphic evidence of the first human groups to settle in the region.

Felids have almost always been present in the mythology of American cultures and have also been depicted in Patagonian rock art. They were a predator that was undoubtedly greatly admired, respected, and feared by the first hunter-gatherers in the region as they kept out of sight but left footprints and parts of their prey behind. For various reasons, we should not dismiss the idea that extinct felids, particularly jaguars, were highly symbolic to hunter-gatherers and were perpetuated in a mythical form in the region’s rock art for several millennia.
ROCK ART
IN THE PLEISTOCENE-HOLOCENE TRANSITION:
Evidence from the Meseta Central in Santa Cruz (Patagonia, Argentina)

Laura MIOTTI, Natalia CARDEN, Rocío BLANCO

Our research has involved studying rock art from the Pleistocene-Holocene transition (13,000-8,500 BP) and the early Holocene (8,500-7,500 BP) in the Meseta Central in Santa Cruz, in order to explore the role of rock art in a social context of low population density and high mobility. Social communication was probably of great importance when exploring and colonizing new environments, because of its potential to minimize the risks involved when settling in unknown areas. We have researched this hypothesis at a micro-regional level by examining the role of rock art as a vehicle for information in relation to three archaeological sites where early human occupation has been recorded (Los Toldos, Piedra Museo, and La Primavera).

The sites studied were caves and overhangs with stratigraphic sequences of human occupation spanning from the Pleistocene-Holocene transition to the Middle and Late Holocene. Large amounts of rock art have been found at all of these sites and include superimposed images. The stratigraphic evidence provided by the archaeological material and rock art indicates that these sites were popular focal points that were repeatedly used from the beginning of human occupation in the region. This complex situation, in which paintings and engravings were produced and other activities took place over multiple episodes of occupation, means that it is difficult to establish a chronological framework for the art. Below is a summary (see table) of the context surrounding the early production of rock art.

<table>
<thead>
<tr>
<th>Site</th>
<th>Production of rock art/painting</th>
<th>Estimated date and arguments</th>
<th>Function of the site</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cuevas 2 and 3 at Los Toldos</td>
<td>Residue of red paint and red negative handprints</td>
<td>At least ca. 8,750 BP • superimposition • signs of paint production and traces of pigments in the layers</td>
<td>Residential base</td>
</tr>
<tr>
<td>AEP-1 and AEG 2 at Piedra Museo</td>
<td>Production of red paint (for rock art or other activities)</td>
<td>ca. 12,890 to 10,925 BP • fragment of rock that had been dyed red (at basal levels in Unidad 6 AEP-1)</td>
<td>Place for initially slaughtering and cutting up animals</td>
</tr>
<tr>
<td>Cueva Mariepe de La Primavera</td>
<td>Production of red paint (for rock art or other activities)</td>
<td>ca. 8,333 BP • traces of red pigment at basal levels (tonality similar to that of older paints)</td>
<td>Processing and discarding prey, a workshop</td>
</tr>
</tbody>
</table>
Panel in Cueva 3 at Los Toldos in which white hand stencils can be seen on a red background. The red paint has been associated with the Pleistocene-Holocene transition.
Discussion

Although there is superimposition at the sites, indicating that the rock art may have been made over several different occasions, only a small number of the paintings can be assigned to the earliest human occupations. Both Cuevas 2 and 3 at Los Toldos and Cueva Maripe de La Primavera have red walls on which other motifs had been made, especially hand stencils. Although the findings at Piedra Museo have been very limited, involving a small piece of rock with red paint at the basal levels at site AEP-1, red paints may also have hypothetically been used at the site during the Pleistocene-Holocene transition. At site AEP-1 and Cueva Maripe, the early production of red paint may have been for the purpose of producing rock art, but other possibilities cannot be ruled out such as its use for painting leather, body parts, and other objects. The repeated use of red paint during the Pleistocene-Holocene transition may have been because this colour was selected for cultural reasons (symbolic, aesthetic, ...) or because it preserved better than others.

So far, the oldest paintings in the study area have been found at sites that show evidence of having been repeatedly used over time, but have not been found in unicomponent sites from the late Pleistocene. In this sense, the location of the rock art from the Pleistocene–Holocene transition appears to have influenced the location of the later motifs or at least did not prevent the successive practice of rock art in the same places. Although greater evidence of a social demarcation of the landscape is found in the rock art and other archaeological findings, such as human burials, from the Middle and Late Holocene, it is possible that this demarcation had its origins in the Pleistocene-Holocene transition, in which red paintings were produced in the places that were most frequently used on a daily basis. The earliest paintings in the study area differ from those that have been assigned to the Pleistocene-Holocene transition in other parts of the province of Santa Cruz, where different styles of animal motifs have been identified as the oldest images. The stylistic diversity and low quantities of the rock art makes sense given that there was high mobility at the time, and social interaction on an inter-regional scale was not yet very intense due to the low population density. In this context, the rock art at the Meseta Central, although limited, differs from the animal motifs as regards what we would expect to find in terms of early symbolic practices.