



Bay Area Rock Art News

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Style 7 Petroglyphs at Donner Pass

Paul Freeman Memorial Sierra Trip

by Taylor Bennett

What follows is an update regarding the Style 7 petroglyphs at Donner Pass we visited during the Paul Freeman Memorial Sierra Trip, June 21-23, 2013. Those who attended this trip might recall that Jon Harman successfully applied his in-camera version of DStretch software (see note below) to enhance images of the pecked glyphs on the pink granite at Donner Pass. This article describes a technique called photogrammetry to construct a digital 3D model of the petroglyphs at the site, combined with DStretch to make the petroglyphs more easily visible..



Figure 1b. Style 7 petroglyphs near Donner Pass, CA-NEV-4, enhanced

The abundant petroglyphs at this site represent a variety of abstract geometric patterns, bear claws, and designs incorporating rock features, such as fractures and gray-colored inclusions within the pink granite. Because of their proximity to the highway and the popularity of the historic site due to the adjacent transcontinental railroad, the petroglyphs at this location are vulnerable to inadvertent damage from hikers, mountain bikers, rock climbers and other visitors. When we visited the site in 2013, there was significant scarring of the rocks adjacent to the petroglyphs, which had been used for staging heavy road construction equipment, and we observed several hikers walking across the petroglyphs who were oblivious to their presence.

Before the 2013 trip it had been assumed that DStretch wasn't effective for petroglyphs and would only work on rock art panels made with pigments. For the Style 7 petroglyphs at Donner Pass, however, the contrast between the pecked

petroglyphs and the weathered pink rock is sufficient to allow DStretch to enhance the contrasts. The exposed rock at the site has a distinctive salmon pink color and glacially polished surface, with many darker gray inclusions. For those of a geologic bent, it is mapped as the Lake Mary tonalite (K1m) on the California Geologic Survey Map Sheet 60 (2012), a subdivision of the Cretaceous Rattlesnake Creek pluton (dated to roughly 95-120 million years before present).

Photogrammetry uses a series of overlapping images taken from different positions to reconstruct the 3D geometry of objects, terrain, or structures. Photogrammetry provides the capability to make a very accurate model and allows measurements to be taken for monitoring purposes, for example. It also allows very high-resolution photographs to be produced without the effects of lens distortion, called ortho-rectified images or orthophotos. Until recently, this technique was primarily ap-

Figure 1a. Style 7 petroglyphs near Donner Pass, CA-NEV- (detail below)



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Detail of above image in the yellow box: unenhanced vs. enhanced

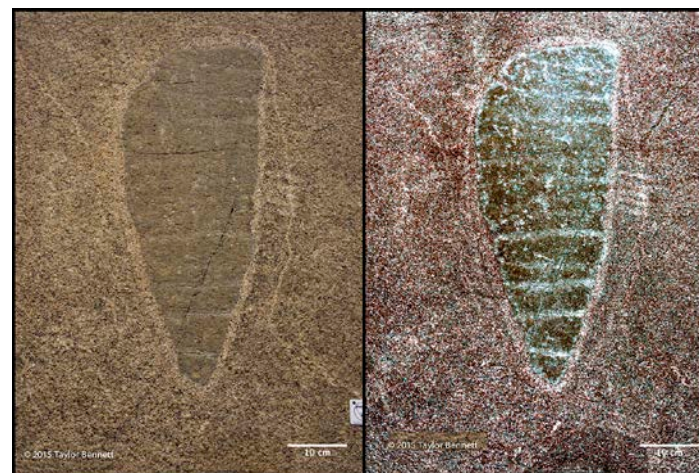


plied manually using stereo-paired aerial or satellite images to construct topographic maps of terrain. However, improvements in digital cameras and computing now allow photogrammetry to be performed using consumer-level hardware and software. While there are open-source software methods to perform photogrammetric calculations, the method applied here used a commercial software called Agisoft Photoscan (see note below) to construct a digital 3D model of the Donner Pass petroglyphs.

During the 2013 trip, I captured a sequence of photogrammetry images of a large panel of petroglyphs near the information plaque at the Donner Pass site. I revisited the Donner Pass site on August 23, 2015 and captured additional images of this panel and combined all the images into a single digital 3D model. I then applied the LRD setting in DStretch to the images to “re-texture” the model with enhanced images to produce the orthophotos shown in Figures 1a and 1b.

Further images of petroglyphs using photogrammetry and DStretch were captured in August 2015 during the recent BARARA field trip to Picayune Valley in the Granite Chief Wilderness, west of Lake Tahoe. These may appear in a future newsletter.

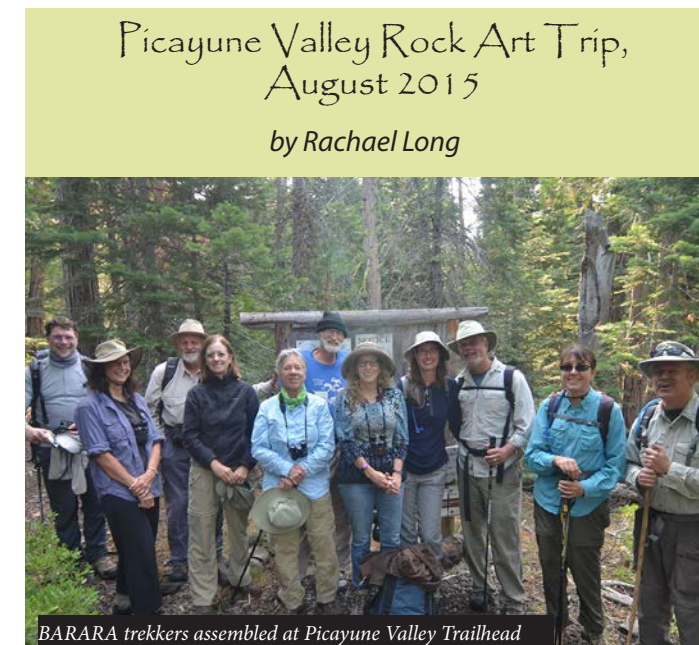
Photogrammetry and DStretch can be useful for documenting and monitoring petroglyph sites over extended time periods, as a scientific record in the event that damage occurs and allowing detailed comparisons to be made. Another useful



Figures 2a and 2b. Style 7 petroglyph near Donner Pass, CA-NEV-4, enhanced to show interior lines using LYE setting in DStretch.

computational imaging technique for petroglyphs is Reflectance Transformation Imaging (RTI), which records very detailed images of the surface texture of objects and surfaces. These are important tools to help document and protect cultural heritage sites.

Note: The DStretch plugin for ImageJ, written by Jon Harman, is an easy-to-use application of the mathematical technique of Principle Components Analysis (PCA), which has been used by NASA and other agencies for remote-sensing applications. For certain models of Canon cameras modified with the open-source Canon Hack Development Kit (CHDK) firmware, DStretch can be installed and used to view enhanced images on the camera’s electronic display. It can also be used on desktop and mobile computers. For more information about DStretch and CHDK, visit www.dstretch.com and <http://chdk.wikia.com/wiki/CHDK>. For more information about photogrammetry, Agisoft Photoscan software, and RTI, see <http://culturalheritage-imaging.org/Technologies/> and www.agisoft.com.



The Picayune Valley in the Sierras was named by gold miners of another era for its scarcity of minerals. However, our BARARA rock art trip to the area in August was anything but trifling. For us, the valley was filled with an abundance of other treasures, reminding us that you don’t need gold to be a wealthy person.

We arrived at Talbot campground in the middle of a thunderstorm. Temperatures dropped and the rain fell, cleansing the air and bringing relief from the heat in the valley below. Pierre secured our group a delightful, private campground right next to beautiful Talbot creek and welcomed us with a roaring fire. Lively discussions followed as we swapped stories of adventures and rock art trips around the world.

Our group gathered early the next morning at the entrance to the Granite Chief Wilderness area with our guide and Forest Service Archeologist Nolan Smith and his wife Dee. The walk into Picayune Valley was nearly three miles, but we hardly noticed with the gorgeous scenery of the glaciated valley sur-

rounded by high mountain peaks. Along the way, we enjoyed carpets of ferns and ancient forests that had never been logged. We also sat by mortars in a rock by a dry stream and found Basque carvings of names and portraits in aspen trees dating back to the early 1900’s.

Our first petroglyph site brought us through a beautiful meadow filled with native grasses and wild flowers that smelled faintly of sweet carrots. On the surrounding granite shelves we saw several faint etchings of circles and wavy lines that Jon Harman brought to life with his D-Stretch technology. Continuing on up the valley, we easily crossed the middle fork of the American River, a mere tiny creek with no snow pack this year, and dropped into a valley to Will Gortner’s site. On the surrounding shelves of granite by a creek, we found a dazzling array of drawings typical of Style 7 High Sierra Rock art, including concentric circles, snakes, and other whimsical shapes that looked like flowers and balloons.

Adding to the beauty of the site was the gorgeous rock filled with natural stripes and swirls of different colors. Sometimes



the rock art was drawn right between these lines, showing how native people, including the Martis Complex and perhaps the Maidu the Washoe who inhabited the area, valued and incorporated natural features into their art.

After lunch and soaking our feet in the nearby creek we walked further up the valley to the Walter Freeman site. On a prominent rocky outcropping, we found vivid drawings of small and large bear paw prints and lively concentric rings. Along the way back, we enjoyed several more sites with abstract drawings of circles and wavy lines, showing the richness of the valley for its cultural importance to native people.

We arrived back in camp early that evening, to another roaring fire made by Pierre. Karen cooked up some wild oyster mushrooms that she collected along the trail, adding to the richness found in the Picayune Valley. The next morning we savored the mountains with a dip in Talbot Creek. When our group parted, we were all fully satisfied at having discovered an abundance of treasures in the Picayune valley.

Wollemi Rock Art

by Luke Freeman

Wollemi (pronounced Wollem'eye') is the kind of wilderness area where you'd expect to find some long lost tribe of hippies living out in the bush, it's so wild. In fact it gets even wilder - twenty years ago a bushwalker discovered a pocket of unusual trees in a rugged canyon which turned out to be a holdout from the dinosaur era (the Wollemi pine was thought to be extinct). But surprise! The area is only a 2 hour drive from downtown Sydney. The park is twice as big as Alameda county and is filled with rugged sandstone canyons choked with spiny bushes and vines, and only a few fire trails venture into its fringes. There are bushwalkers like you've never met before who bushwhack their way through the terrain using sketch maps that show the 'passes' in and out of some of the larger gorges.

In 2009, the discovery of the Eagles Reach rock art cave in the Wollemi wilderness changed the whole perception of rock art in the Sydney area with the notion of an Eagle totem - and the location of the Wollemi pine along with the Eagle's Reach cave are probably the most closely guarded secrets in Australia.

Thankfully there are more accessible Wollemi rock art caves, most notably the Dingo cave where its approximate location is a testament to the power of the internet. I.e. a bushwalker's bulletin board back in the early days of the net recorded a discussion between 2 bushwalkers that gave an approximate locality - and this kind of lapse hasn't been repeated since.

Even with the approximate location known it took three separate tries to find the site, which has impressive charcoal drawings of dingos on a cave wall next to a small creek. It seems so remote; but not shown in the photo (figure 1) there's added figures and a bit of graffiti. Hence the reason the Eagle's Reach location is so secretive.

Another recorded site described in Jo McDonald's prolific Dreamtime Highway publication is the Boorai creek site on the periphery of the Wollemi. Jo was a relatively recent visitor to a



Figure 1--Dingo Cave Shelter

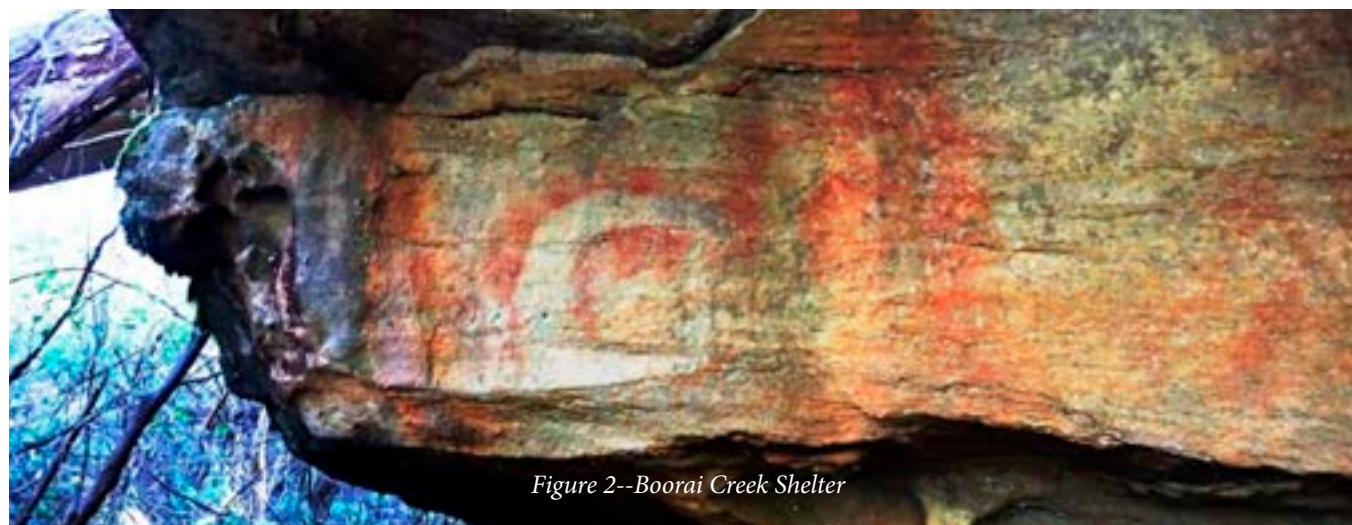


Figure 2--Boorai Creek Shelter



Figure 3--Devil's Lair Cave



Figure 4--Wheelbarrow Ridge Shelter

BARARA meeting, and this cave shows an interesting roo tail stencil (yes that's Aussie talk for kangaroo). The figure was obvious when we located it on an overnight walk in. However, after emailing the photo (figure 2) to Walter, it took a few days of analysis and a further sketch (see 'tail here' and 'roo bottom' here) until it took on meaning. There was also a large boomerang and numerous faint red hand stencils in the shelter.

There are more and more new sites being discovered deeper in the wilderness area; but their locations go into the black hole of the National Parks Service (NPS) aboriginal heritage register. Thankfully there are numerous sites in the surrounding pastoral land adjacent to the park where their locations are easier to find. These sites were recorded in field surveys before the NPS register was created back in the early 90's.

The Devil's Lair Cave (figure 3) is one such shelter in which the above photo shows stencils of weapons (a shield, boomerangs and stone axe), and of course the ubiquitous stencilled hands. And (figure 4) a cave on nearby Wheelbarrow ridge that gradually leads down to the Hawkesbury river system contains numerous shelters and carvings scattered along the ridge.

Travel through the Australian bush whether it be by modern day bushwalkers or traditional indigenous Australians is/was accomplished by the same means - walking along ridge tops to

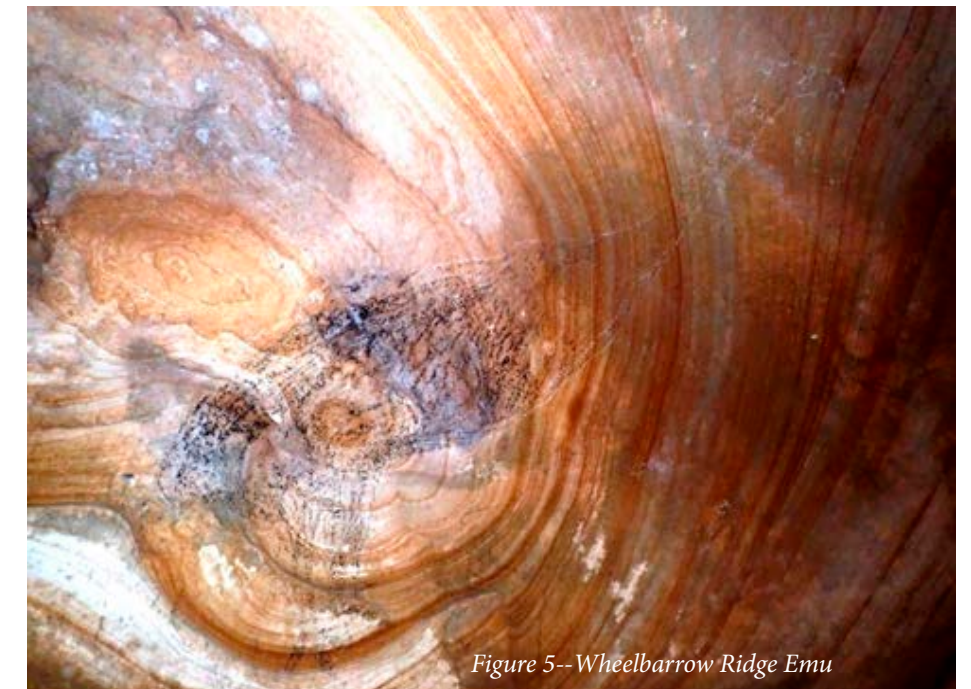


Figure 5-- Wheelbarrow Ridge Emu

avoid the thick scrub in the gullies.

While rock art in northern Australia from Kakadu and the Kimberly overshadows Sydney art in terms of complexity, vividness and imagination; Sydney rock art tells a simpler story like: 'We caught a roo here! Or, 'We hung out here and here's our dogs'; and 'Here's our hands and yes, this is us.'



A Dazzling Diversity: Paleolithic Art in the French Caves

by Chris Galapp and Frank Cox

Frank and I made a pilgrimage to France this summer, to visit the Paleolithic caves—a longtime aspiration for us. We were privileged to travel with Thomas Dowson (<http://archaeology-travel.com>), an internationally respected rock art researcher who operates his custom tour service from his UK hub. With Thomas to arrange the visits, so we could optimize our time, and we often were able to visit two or more caves in a day.

The wonders of the French caves are many—and in retrospect I was struck by the diversity of the techniques and styles we experienced while there for two weeks in July. I would have thought that there would be a lot of similarity, and of course, thematically there was—but the technical approaches to the imagery and the site specific conditions were very different in every cave we visited.

The French control their sites very strictly—the up side to this is comprehensive preservation of the caves and the art—but on the other hand, we always led and supervised by official guides. Also, no photography is allowed, for many good reasons—primarily that photography is disruptive to the viewing experience.

The Replicas

The French government protects the most vulnerable caves by shutting them and making copies, lending a bit of a theme-park flavor to the experience. We started at the newly opened **Grotte Chauvet-Pont d'Arc** in southern France. This replica site, meticulously reproducing the Chauvet cave rediscovered in 1994, depicts the 36,000 year old imagery of felines, woolly rhinos, mammoths, and bison. These large mammals make appearances in many of the caves, reflecting the Ice Age fauna that roamed in the dry, cold climate the people inhabited. The educational value is high at this site, and it very thoughtfully executed.

A second replica is the well-known **Lascaux II**, a faithful reproduction of the delicate original, primarily the Hall of the Bulls, one segment of the original. Descending into the underworld of this cave is a surprisingly near-genuine experience—we were moved by the scale and the vivacity of the creatures bounding across the ceiling, including a falling deer in the exit passage. As we emerged, we learned that a brand new Lascaux replica is under construction, which will reproduce the entire painted cave system.

Into the Caves

Centered in the Vezere River Valley in the Dordogne region, is a little medieval town of Les Eyzies, which is convenient to many of the great Paleolithic caves that are open to visitors. This town is ground zero for the so called Cro-Magnon Man, the modern human remains that were discovered in the 19th century—next door to our accommodation, the CroMagnon Hotel. Les Eyzies boasts a wonderful museum, the National Museum of Prehistory, which houses and presents a comprehensive overview of the archaeological record of the area.

The variety of cave configurations is amazing. There is **Rouf-**

ignac—where the black (magnesium dioxide) painted images are a kilometer deep into the hard rock cave, so far that visitors travel to them on a little train, passing through a low passage-way which included ancient cave bear nests. Mammoths are the primary subject matter here, including one at the very end of the chamber which is unusually expressive and illustrative.

Font de Gaume is a sweet cave, a narrow gallery featuring magnificent polychrome bison, along with engraved versions of the same. There is **Cougnac**, a pair of classic limestone caves with amazing geologic features, soda straws, stalactites, stalagmites, and painted mammoths estimated at 29,000 years old, as well as what is known as the 'wounded man'. There is **Combarelles**, which features finely engraved images of over 200 animals (horses, bison, mammoths, reindeer, bears lions) and also human forms, which are more unusual in the Ice Age imagery.

There is a fine tiny rock shelter, **Abri de Poisson**, which contains a singular, magnificent salmon petroglyph, all alone on the ceiling—and which was very nearly excised at the turn of the 20th century for profit, until it was determined that this and other cave art was real and a part of the cultural heritage—and in 1913, protection of this fish constituted the first legal precedent that the cave art should be protected. The drill holes surrounding the image remind us how nearly it came to being sold on the open market, thereby destroying the integrity of this special site. The **Cap Blanc** site is a cave with beautifully sculptured friezes of horses, reindeer and bison in high bas relief carved into the white limestone of a shallow cave, created between 16 – 12,000 years ago.

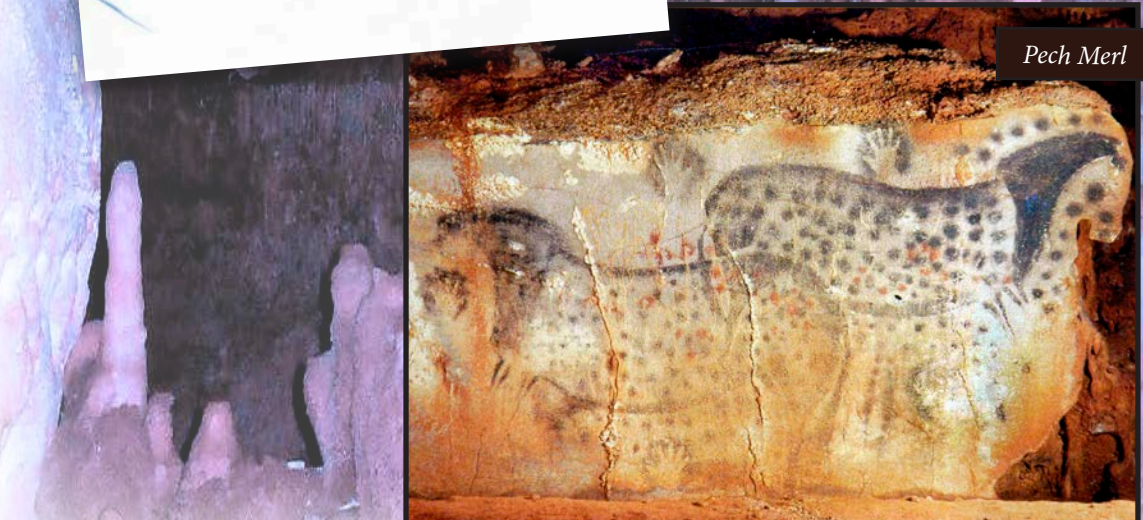
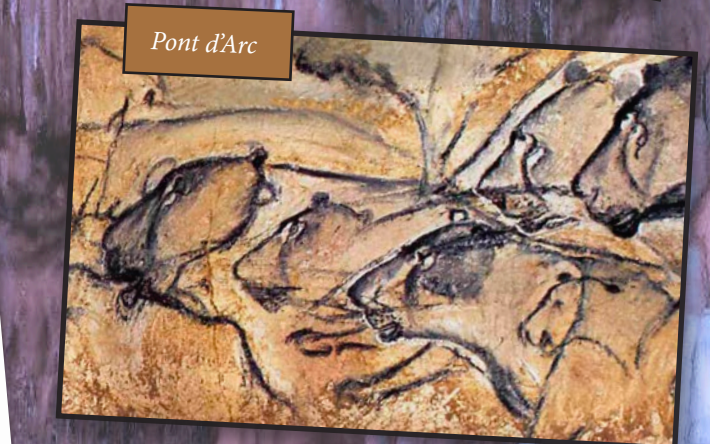
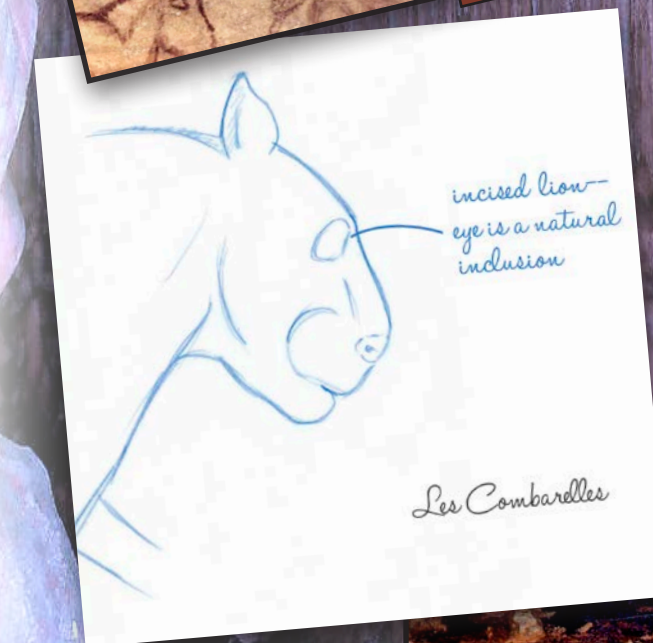
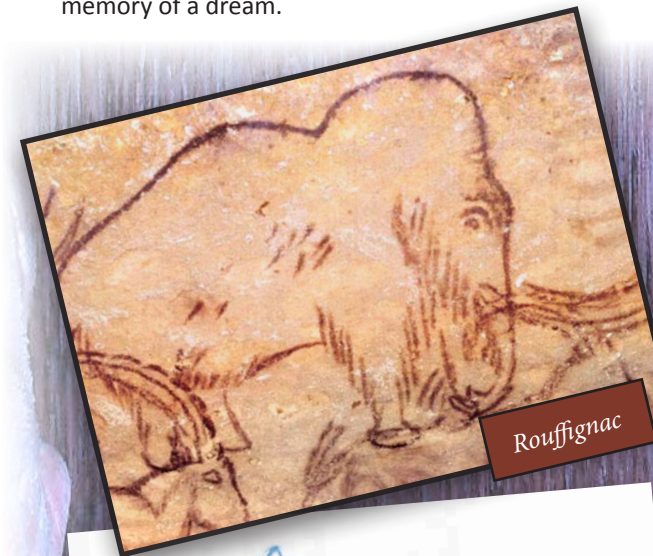
In a different part of the country is perhaps the most important visit-able site—**Pech Merl**—with its magnificent horse panel, and astonishing natural formations. It is privilege to witness this fine rock art.

Human depictions are relatively rare in the caves, but when present, they are usually represented at the deepest chambers, along with the most 'dangerous' animals—the lions and bears. This is a pattern that has been identified in many of the caves, and is a fascinating observation. There was evidently some sort of a canonic order to how the images were created, and that order seems to have been communicated among some of the image makers, through time.

The act of entering a cave is an act of courage, of spiritual transcendence and seeking. Leaving the 'upper world', and moving into the depths of the caves is a complete alteration of

one's reality and state of being. Even as tourists safely entering these places, we felt an utter shift in our perceptions of our surroundings and began to identify with the image-makers, even if for a very short time. The changes in humidity, temperature, lighting, sound awareness, and physical vulnerability submerged us into the world of the Ice Age pioneers who expressed their experiences so forthrightly on the walls. Re-emergence is jarring, and one carries the below-world impressions like the memory of a dream.

So, many Paleolithic people found their way into the caves at different times—they left their marks of similar animal subjects in a great variety of ways—some scratched, some painted, some using the native declivities of the rock surface to bring the animals to life, honoring the local megafauna, some displaying masterful polychrome technique, always using the ingenuity that fit the conditions and particular canvas they encountered.





San Diego Rock Art Symposium

ROCK ART 2015

40TH ANNUAL
ROCK ART SYMPOSIUM
NOVEMBER 7, 2015

Online Registration and payment are now open for **Rock Art 2015**, San Diego's 40th Annual Rock Art Symposium, sponsored by San Diego Rock Art Association.

- Registration is \$25 for all attendees.
- SDRAA is continuing the Rock Art Papers series
- Registration includes a commemorative mug with the conference logo.
- Our 2015 T-shirt will feature the Sunwatcher logo. Deadline for T-shirt orders is October 23, 2015.
- Complimentary Registration for Native Americans.

San Diego Community College District Educational Cultural Complex Theatre

4343 Ocean View Blvd, Room 159, San Diego, CA 92113

Doors Open at 8:00 a.m. for Registration and Check-In

Symposium Papers 9:00 a.m. to 4:30 p.m.

Lunch Break Noon to 1:30 p.m.

Visit www.sdraa.org for full information and online Registration



Join/Renew your membership in the Bay Area Rock Art Research Association!

Founded in 1983 by Dr. Paul Freeman and Leigh Marymor, BARARA attracts like-minded individuals who are committed to exploring rock art all over the world, preserving and conserving it, providing education, and studying rock art in creative and interesting ways. Members enjoy access to field trip information and receive a newsletter that is published twice a year.

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