

Taking Some Guesswork Out of Sketch Work

By Margaret Berrier and Robert Mark

THE Fort Stanton Petroglyph Rock is located along the Rio Bonito drainage near Fort Stanton, on the western slope of the Sacramento Mountains in Lincoln County, New Mexico. It was created by pecking and carving into a large sandstone boulder (Figure 1), and has been documented in the past using various photographic and drawing techniques. Recently I used a Structure from Motion (SfM) 3D model to help take the guesswork out of my sketch work to create a more complete and accurate drawing.

Many of the petroglyphs in the Sacramento Valley vicinity are easy to see and photograph due to the contrast between the dark patina and the original color of the rocks revealed when the indigenous people pecked through the desert varnish. But occasionally researchers are confronted by difficult panels placed on rocks with little to no patina. Furthermore, these are often softer surfaces that rapidly deteriorate.

As part of one of the prior documentations of LA 20301, this large boulder was recorded by placing 4-mil clear polyethylene sheeting over the boulder and securing it with specialized rubber cement tape. The pecked outlines were traced onto the plastic with indelible marker (Hammack 1982:7).

As you can see from Figure 1, the boulder is at a steep angle, making tracing and attachment of the polyethylene a challenge. From my experience with this material, it stretches and slips as the tracing is executed. This was state-of-the-art recording technique at that time, some 40 years ago, and this tracing is surprisingly accurate considering those challenges. A redrawn version of this tracing from Hammack's report is shown in Figure 2 (1982:7). This method eliminates some of the subjectivity of field sketches. Dennis Slifer's *Signs of Life: Rock Art along the Rio Grande* shows a later drawing of the boulder with only a few of the elements (1998:207). Figure 3 is redrawn from Slifer and shows some of the inaccuracies of field sketches.

Tracing on a polyethylene sheet has been used by many rock art researchers. Often they use blue painter's tape to attach the sheeting to the rock. These tracings on plastic are difficult to reproduce and store due to their size. With new dating techniques for rock art, the use of plastic sheeting is being discouraged because even a tiny bit of residue from the sheeting could throw the dating off. In a previous study, plastic fibers were shown to have contaminated the radiocarbon age of a panel significantly (Miller et al. 2002:80). Pressing on the plastic sheeting using an indelible marker could cause tiny particles of the plastic to adhere to the rock if not done very carefully, especially on rougher surfaces like this Dakota



Figure 1. Fort Stanton Petroglyph Rock along the Rio Bonito.

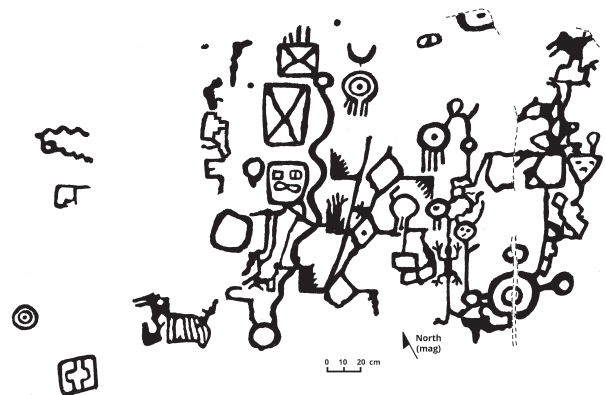


Figure 2. Berrier's recent redrawing from tracing done on polyethylene sheeting reported in Hammack 1982:7.

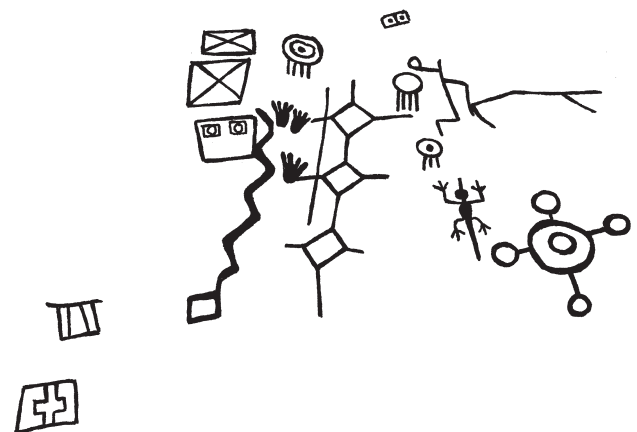


Figure 3. Berrier's redrawing from Slifer's illustration (1998:207) in *Signs of Life: Rock Art Along the Rio Grande*.

sandstone. The rubber cement tape or painter's tape also leaves residue that may affect radiocarbon dating. Current documentation recommendations encourage the minimal touching of the surface.

New state-of-the-art recording techniques include SfM photogrammetry as a way to document rock art panels in a non-invasive way. SfM is a "photogrammetric method for creating three-dimensional models of a feature or topography using overlapping two-dimensional photographs taken from many locations and orientations to reconstruct the photographed scene (Crosby 2016)."

These 3D models are an important part of a complete documentation of some sites. I gained experience with tracing two-dimensional renderings of 3D models while documenting horizontal sites using models and radiance scaling enhancements created by Robert Mark and Mark Willis (Berrier et al. 2019). While revisiting the Fort Stanton Petroglyph Rock site in the summer of 2019, I took a set of overlapping photos that provided Robert Mark with the needed geometry to create a 3D model. He also used additional images he had taken on a previous visit. A link to the 3D model is <https://skfb.ly/6RPrw>. Another version can be found at <https://skfb.ly/6RQ6w>. Robert Mark then created a radiance scaling enhancement using a technique described below using that model (Figure 4).

Mark and Billow (2020:1) state:

High quality Structure from Motion (SfM) 3D models can be used to enhance the visibility of petroglyphs that are otherwise almost or completely invisible. The model must accurately capture the geometry of the rock surface. A colored curvature map, that is generated from the model's mesh using Meshlab Render Radiance Scaling and then is manipulated in Photoshop, can produce surprising results. Photoshop is used to blend (overlay, soft light, or hard light) the red or blue channel from the color curvature map with the original image or a shaded one that can also be generated in Radiance Scaling.

I was able to create a more complete and accurate drawing of the Fort Stanton Petroglyph Rock from a two-dimensional print of the radiance scaling model (Figure 5).

Tracings are very time consuming, but make it easier to see the details of the images by eliminating the distractions of color, texture, and a shadow that might appear in a photo. A tracing eliminates some of the subjective tendencies of field sketches and insures a more accurate sense of proportion and distance among elements than field sketches. Tracing also allows for easier identification of individual design elements. Caution was taken to insure tracings were as objective as possible. No documentation



Figure 4. Radiance scaling enhancement.



Figure 5. Tracing created using the radiance scaling enhancement.

Asterisk symbol indicates bullet damage.

Brown lines indicate edge or crack

is complete without both photos and tracings. Many older reports have since been subjected to poor-quality photocopying or scanning, which often renders the original photos, sketches, and tracings into indecipherable shadowy blobs. Sometimes even the original older report has photos of such poor quality that they are hard to decipher. In the future, if there is deterioration of digital data, the hard copies of the drawings may still be visible.

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The method that I use to trace the panels also provides researchers with the opportunity to re-examine the panels and become more aware of similarities and nuances that are not always noted when just photographing the panels. Tracing makes it easier to categorize and compare imagery, is useful for land managers to relocate imagery, and can be used for publication.

Although most documentation of rock art sites does not require SfM 3D models, this tool is important for revealing details at sites like the Fort Stanton Petroglyph Rock.

Acknowledgments

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What Have You Been Doing?

SINCE February or thereabouts, the rhythm and pace of our lives was disrupted by a new virus. This has affected each of us in different ways. For some, doom-scrolling the daily news headlines has become a nearly full-time activity. That, combined with fretting over family, friends, and ourselves, might be stymieing much of our to-do spirit, affecting our normal productivity. For others, stay-at-home requirements may be something of a respite from the supervisors, co-workers, clients, and other acquaintances who tend to set the priorities for what we accomplish most days. Maybe you find yourself with more "me-time" that is welcome. Most of us, I suspect, find ourselves vacillating from one such state to another as the days and weeks roll by.

If you are among those inclined and able to use this time to engage in a rock art project, we would enjoy hearing about it. Is it a project for which you are developing a proposal? An incomplete project that you have dusted off and are giving your renewed interest? A field trip or a recording project in the great outdoors, so amenable to social distancing? Or maybe it's getting some of those boxes and trays of slides and prints in order and scanned; drafting an article or a reminiscence of a trip or experience; listening to podcasts and lectures; or experiencing virtual tours of rock art sites on the Internet. Whatever it is, we hope it brings you comfort and a sense of accomplishment.

Since we didn't have the chance to connect at the annual conference, your ARARA friends and fellow members would like to hear what you have been up to these last few months. Please drop us a note or a picture or two, and send in your piece for *La Pintura* to ajgwinters@yahoo.com (Amy Gilreath) or ravens_eye@gmail.com (Linda Hylkema). ☼

Online Happenings of Interest

WE hope you took part in our first free Zoom online lecture, "Buffalo Caves, Emergence and Transformation," hosted by Larry Loendorf and co-authored by Laurie White, on June 13. It was promoted through our social media and an email notification was sent to current Members. If interest remains high, more presentations will be developed. You may also find these two free rock art presentations interesting: 1) Karen Steelman's "Portable X-ray Fluorescence Analyses at the Meyers Spring Pictograph Site," a 28-minute talk (sponsored by Shumla) at <https://youtu.be/HpKRIPmVYFw>, and 2) Jason Nez's "Sacred Landscape, Sacred People," a 1½-hour webinar (sponsored by Crow Canyon Archaeological Center) at <https://youtu.be/vhkADKMB5sM>. Mr. Nez was a popular keynote speaker at the ARARA Conference in Flagstaff, Arizona, in 2019. ☼