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*-- A Solstice Site --
in the
San Gabriel Mountains
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Abstract

Big Rock is the oldest published rock art (pictograph) site in California. The site has been reinvestigated regarding a newly discovered feature. The site is comprised of a large boulder with the feature of a special stone-carved ancient hole that has been previously unreported archaeologically. A hypothesis was devised and tested that the special hole served to mark the winter and summer solstices and that it was involved in tribal ceremonies conducted by ancient ancestral Kizh Shamans. Preliminary results indicate positive tests of the hypothesis involving artifacts that were previously unexplained. The specifics involved, with the hypothesized use of the artifacts in association with the special hole, indicate that Big Rock, at present, is a unique astro-archaeological site in American Archaeology.

Project Background

The subject site is a large boulder that rests beside the upper reaches of the San Gabriel River in the San Gabriel Mountains. Those mountains overlook the greater present-day Los Angeles area. The mountains were called Hidakupa in the Kizh language (Johnston 1962, 21), and they were part of the original territory of the tribe (Fig. 1). Hidakupa was recently recognized as sacred to the Kizh by the State of California's Native American Heritage Commission and was given its Sacred Lands File designation of N-LAN-32. Today the subject site of this article lies within the U. S. Forest Service's Angeles National Forest and it is also within the San Gabriel Mountains National Monument area that was created by President Obama in 2013. The Kizh Tribe has had a place on the advisory panel for the monument regarding its cultural resources (ancient sites) and especially its sacred sites of which the subject site is a prime example. The site was previously given the official State of California archaeological site designation of CA-LAN-164. This article is presented as an example of good, cooperative relationship between archaeologists and Native Americans which, unfortunately has not always been the case. This project will, hopefully, show that such cooperation can lead to positive results for both Native Americans and the scientific community.

The subject boulder is indeed a "big rock." It measures 6.9 m (22.64 ft.) in maximum length by 4.6 m. (15.09 ft.) in width. It has a circumference of 18.8 m. (61.96 ft.) and a present maximum height of 2.50 m. (8.2 ft.). Dr. George Rossman, Professor of Geology at Caltech University, has determined that the boulder's geology is complex but that in lieu of concerted analyses, it may be called "granite."

The site's pictographs were once very visible which led to scholarly interest in it (Fig. 2). William J. Hoffman first published the site with the title "Azusa Canyon Pictographs" in the 4th Annual Report of the Bureau of Ethnology, 1882-1883 (Hoffman 1886). His work constitutes the oldest published rock art site in the "California culture area" per se. That Native American area is not contiguous with the present-day borders of the State of California but is a somewhat smaller area comprised of tribes with cultures that are similar enough to each other yet are distinctive enough from other major culture areas (i.e. Northwest Coast, Great Basin and Southwest) so as to be termed "Californian" (Heizer 1978, see map IX). Three years after Hoffman's article, Garrick Mallery published the site also in a Bureau of American Ethnology Report with the title "Picture writing of the American Indians" and he provided an early illustration of the site's pictographs (Mallery 1889; Fig. 3)

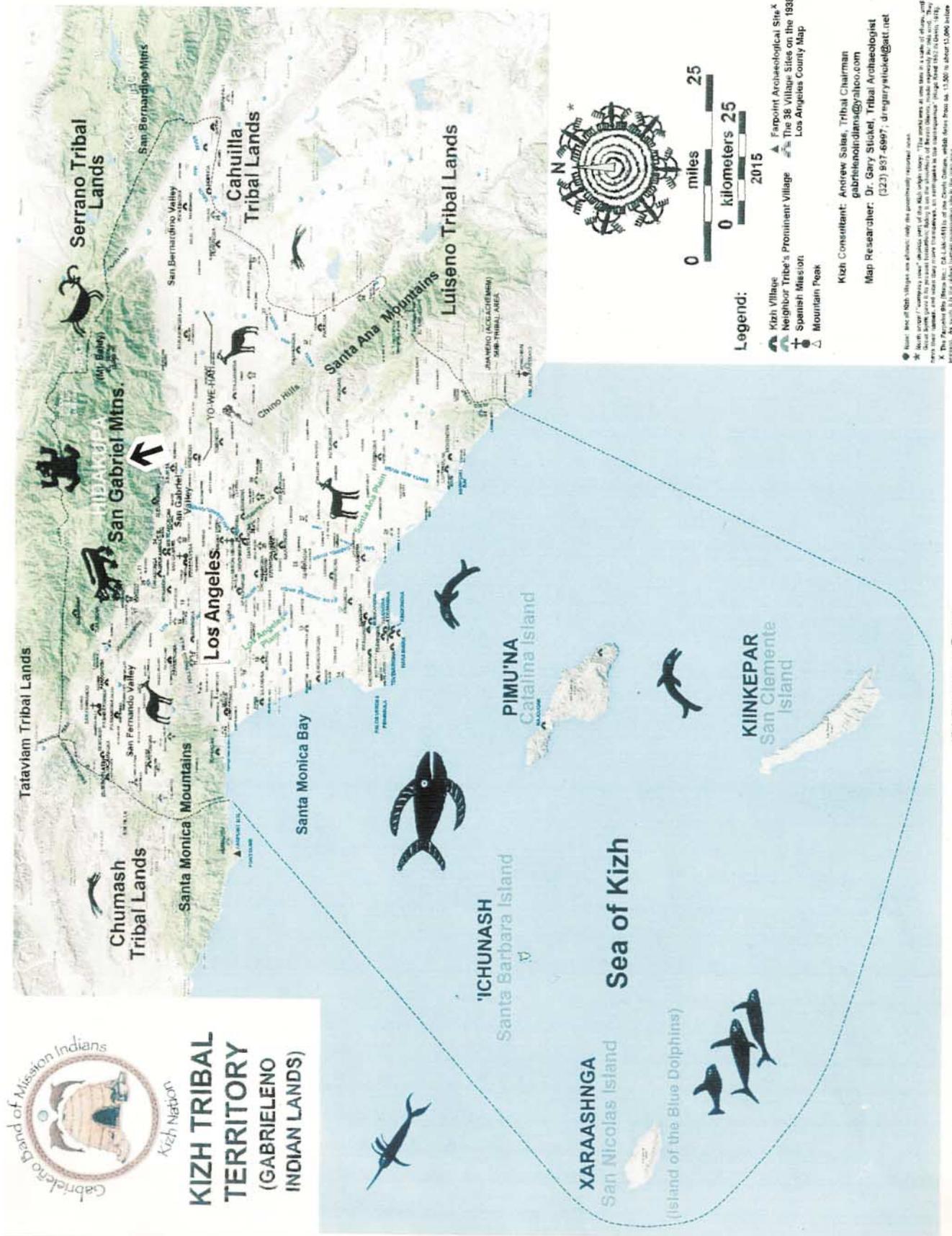


Figure 1: Kizh Tribal Territory with arrow showing site area

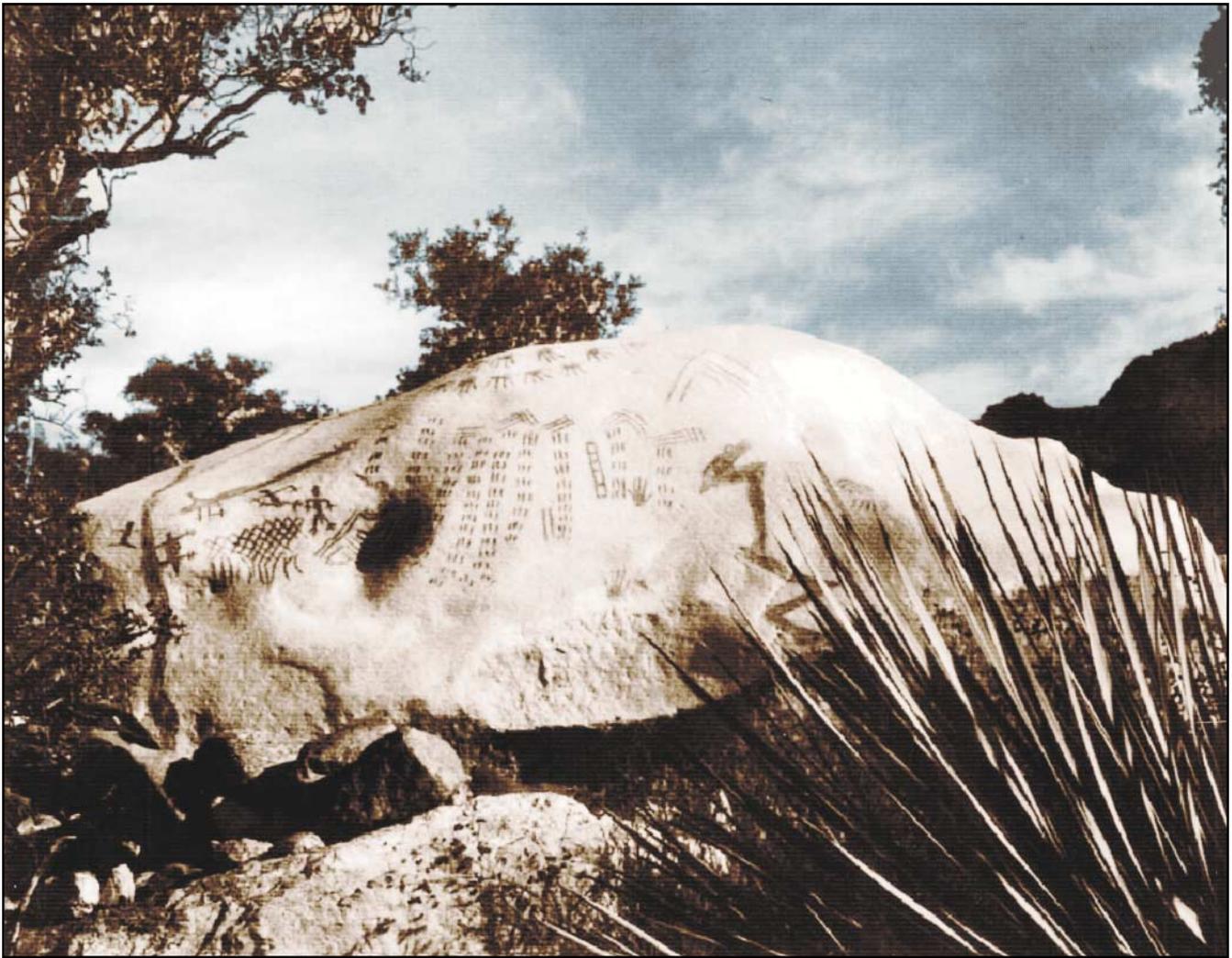


Figure 2: Photograph of Big Rock in the 1930s

Since then the site has been periodically mentioned in publications by the renowned Julian H. Steward in 1929; Fenenga 1949; Smith, et al. 1961; Sandburg 1971 and by Heizer and Clewlow (1973, 101). The site was mentioned for a more general audience interested in those mountains as well (Robinson 1983). All of those publications focused on the rock art (pictographs) at the site and their place in the general rock art styles of the region (e.g. Whitley [2000] referred to the rock art of the area as being in the “California Tradition”). More specifically, Clewlow (1978, 620) listed the general area of Big Rock as in the initial “Southwest Coast” “Pictograph style area;” however none of those previous scholars and authors noted or made reference to the boulder’s singular other feature, the special sculpted hole even though it had been noted by a Kizh informant early on.

The Kizh Tribal regard for the site

The first ethnographic mention of the site occurred in the early 20th century. The locally renowned ethnographer, John Peabody Harrington, was working for the Smithsonian Institution at that time. He interviewed a Kizh informant named Jose de los Santos Juncos in 1904 who stated “. . . in Azusa [now San Gabriel] Canyon there is a big painted rock with a hole through it” (Harrington 1986; emphasis ours). Harrington called the tribe of the area “Gabrielinos,” a name given to them by their Spanish Empire conquerors and a name that persists today. However, today’s tribal members prefer to be called by their original ethnic name of Kizh (pronounced like “teach;” Stickel 2016).

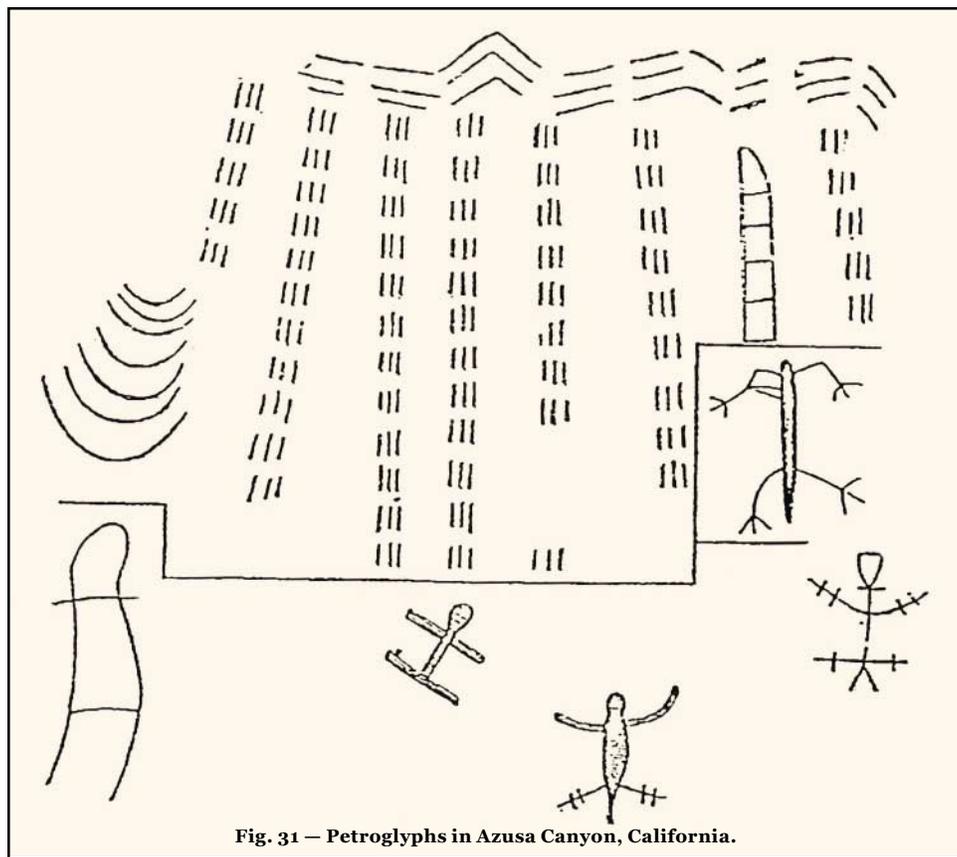


Fig. 31 — Petroglyphs in Azusa Canyon, California.

Figure 3: Mallery’s 1889 illustration of Big Rock’s pictographs (note referred to as “Petroglyphs.”)

The site has been referred to by different names, some of which can be used to identify the site’s location. Since the site has suffered both degradation and vandalism, another name was decided upon that would not give away it’s location so as to protect it as much as possible. Since the Kizh informant referred to it as “big . . . rock,” the Kizh Tribe decided to call it today “To–Tah Yo–o–et,” which is Big Rock in the Kizh language. The Kizh consider Big Rock as a very sacred place of worship of their ancestral shamans and people particularly with regard for solstice ceremonies and girl’s puberty rituals (Chief Salas here and Teutimez 2017). The results of the research described below reinforces their collective opinion.

Research Plan and Methods

Since the Big Rock Site (CA–LAN–164) is in the recently created San Gabriel Mountains National Monument, the Kizh Archaeology Team decided to revisit the site and check on its current status in 2016. What the team found was appalling. When the site was last published it was relatively well preserved with the pictographs still visible and enabled to be photographed with a standard camera and film at that time (Sandburg 1971). However shortly thereafter, in 1972, the government redirected the nearby (about 10 meters away) San Gabriel River to flow directly onto the boulder. The affects of that action were that all the paintings were faded so badly that they cannot be seen today with the naked–eye. As shown below, with some rare exceptions, the paintings were not recovered with our initial technological efforts so they can be analyzed with more sophistication. In addition, since the disaster of the flooding, local vandals have spray–painted graffiti all over the boulder covering up the ancient paintings (Fig. 4). Therefore, Big Rock has suffered severely from de facto degradation and from outright vandalism.

From the Kizh Tribal point of view, those acts have resulted in a terrible desecration of a major sacred ancestral site. Subsequently the Kizh Archaeology Team's intent has been to properly document the site, record it, photograph it, recover the paintings if possible and analyze it to have the best information available with which to provide for the site's proper future restoration, preservation, and veneration.

In order to record any recovered paintings and features, a 1x1 meter grid system was established across the Big Rock boulder. A plane table was then used to map a plan view of the boulder (Fig. 5). Each 1x1 meter grid unit was then initially photographed with both a digital camera and an analogue camera using blue filter film. Those photographs were initially subjected to the D–Stretch Computer Image Enhancement program. Unfortunately, the results were disappointing as the majority of the original paintings were not recovered then (an exception was some of the “diamond chain” elements; Fig. 6). However during that initial field work episode, an unexpected discovery was made. Team members climbed on top of the boulder, which is precarious as the boulder's surface is quite slippery, in order to observe any visible pictographs there. What was found instead was exceptional. A small circular hole was observed in a central location and at what may have been the original highest part of the boulder (note the boulder is not in its original location as seen in Fig. 2; cf. Fig. 7 which is the first aerial photograph of the boulder that was taken by a camera equipped drone). Unfortunately, the redirected river action washed away the then existing original pedestal–like earthen support below the boulder and lowered it to its present elevation. Importantly, our investigation observed that the hole was not round in shape but “shaped like a cogstone.” That discovery led us to explore the possible meaning of a cogstone–shaped hole.



Figure 4: Early 2000s photograph of Big Rock, after the paintings were faded and defaced with graffiti.

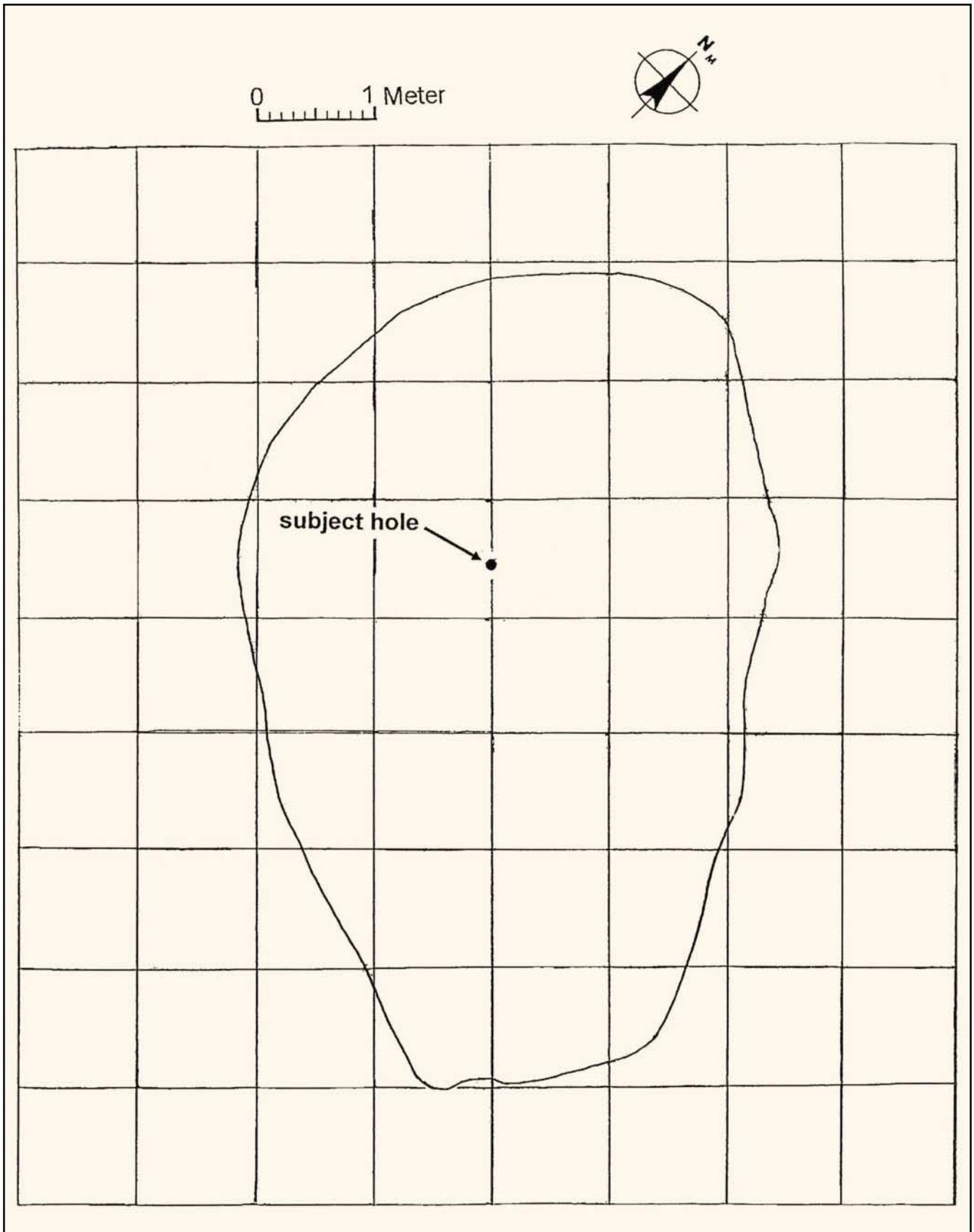


Figure 5: Plan map of Big Rock

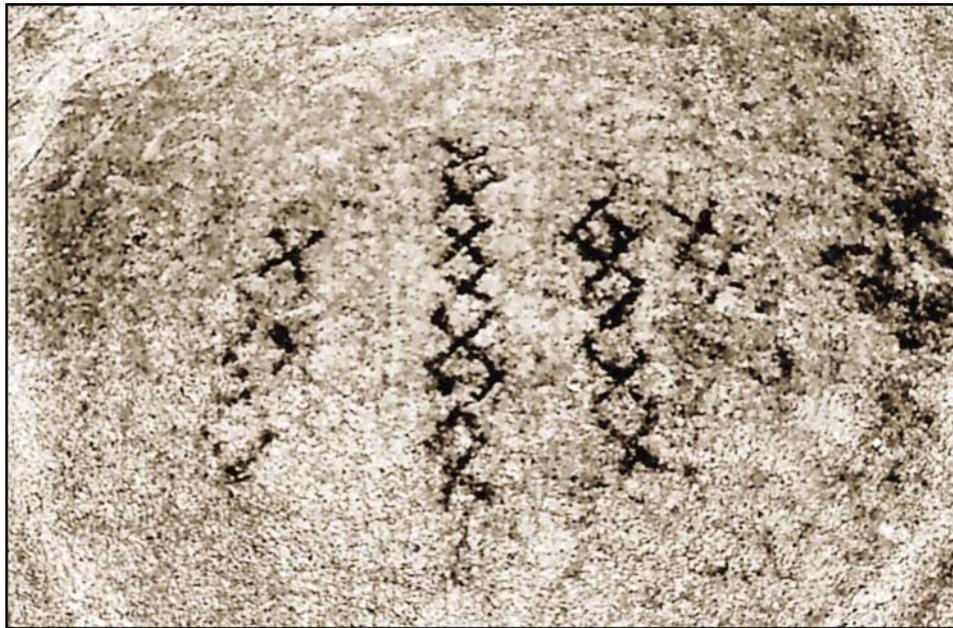


Figure 6: Computer enhanced photograph showing “diamond chain” pictographs

Cogstones and sunstones and the related hypothesis for Big Rock

The reference to the Big Rock hole being “cogstone” shaped refers to a class of artifacts that have been found throughout Kizh Tribal Territory. In an article entitled “The Cogged Stones of Southern California” by Eberhart in 1961, the general class of the unusual artifacts were described (Fig. 8). Their forms consist of mostly stone discoidals of “. . . 1¾ to 6 inches in diameter” (4.45 cm.—15.24 cm.) and in thickness from about 1 to 2 1/2 inches” (2.54 cm.— 6.35 cm.) (Eberhart 1961, 361). The stone discs have grooves, indentations or protrusions around their circumferences. Since the projections look like teeth or cogs —archaeologists have given them their appellation of “cogstones.” Eberhart also stated that the number of teeth or cogs varies from 3 to 22 (Eberhart 1961, 361). In the case of the Big Rock hole, it has 5 such projections around its perimeter (Fig. 9). The distribution of cogstones was presented in Eberhart (1961, his Fig. 3). That distribution area has recently been refined by Eissmann and Martz (2012, see their Fig. 4), who stated “. . . the majority (of cogstones have been) found in coastal Orange County and sites along the Santa Ana River . . .” which is squarely in Kizh Territory (Eissmann and Martz 2012, 7). Indeed, they mention that a major local site (CA-ORA-83) is “. . . long known as the cogged stone site for hundreds of cogged stones found there (some of which) . . . dating to ca. 9000 B.P. . . .” (Eissmann and Martz 2012, 8). The Kizh consider the cogged stones to be their “type artifact” representing the Tribe and its territory in general and they have one depicted on their Tribal emblem.

The shape of the Big Rock hole caused one of the authors here (E. G. Stickel) to recall a photograph of similar stone implements that had been discovered in the 1800s in a cave in the general area. That photograph of those implements appeared in the recent-most overview book on the “Gabrielino” (i.e. Kizh Tribe). It was a photograph of what appeared to be two such stones with each one attached to a wooden shaft (McCawley 1996, Fig. 65, p. 158). Those artifacts were part of a trove of extraordinary artifacts that had been found in what became known as Bowers Cave. The trove included an array of normally perishable artifacts including feathered headdresses, 9 baskets, bullroarers (one with its suspension string still attached), flutes, etc. (Elsasser and Heizer 1963). Among that exceptional collection were three stone disks with wooden shafts attached.

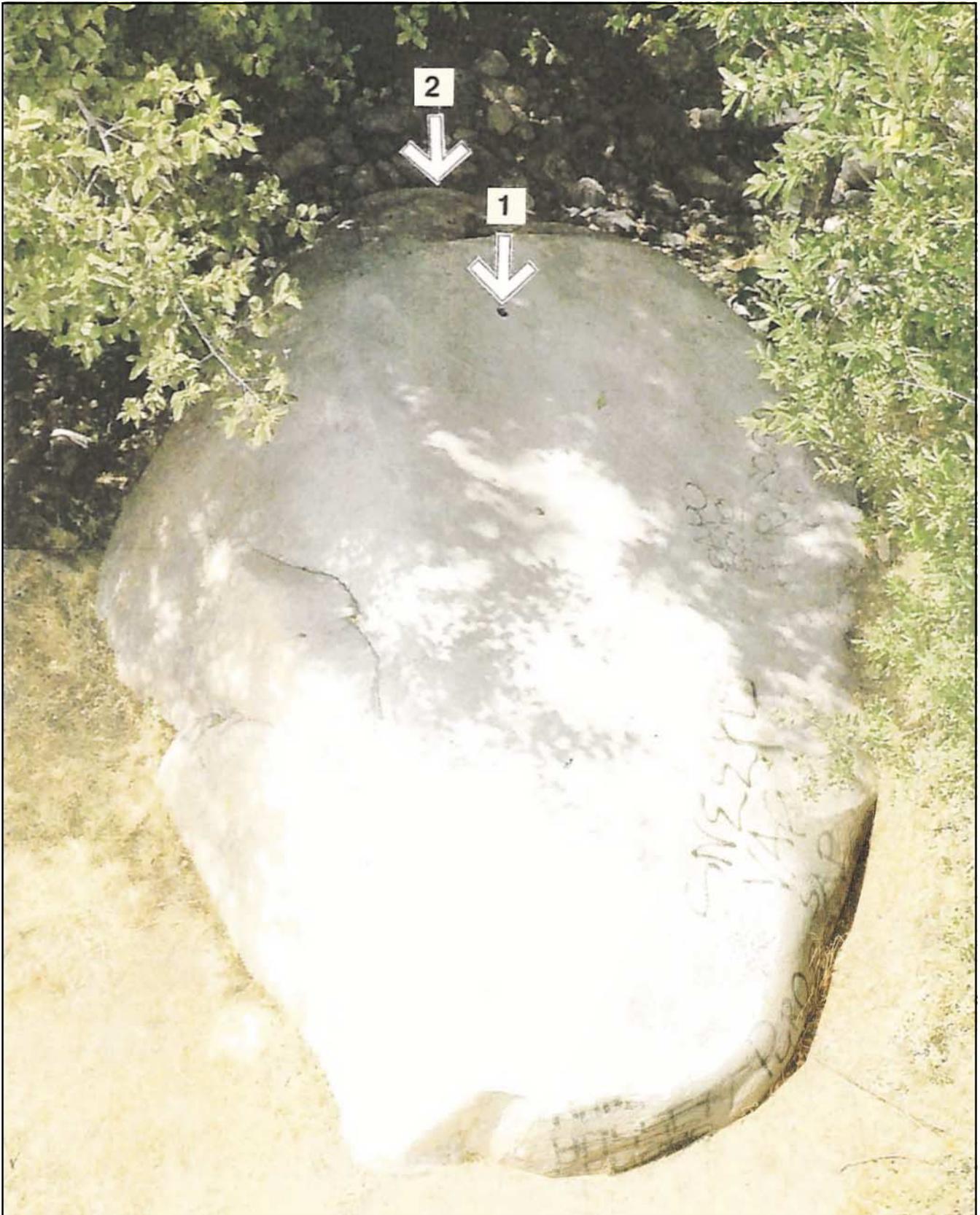


Figure 7: A drone aerial and oblique photograph of Big Rock (note arrow 1 indicates the subject hole; arrow 2 indicates the western edge of the boulder)



Figure 8: A selection of “cogstones” from Kizh Territory
(note A indicates one of a similar shape to the Big Rock hole; also note the two specimens at the right front row with incipient holes; courtesy of the Bowers Museum)

The collection was acquired by a Dr. Stephen Bowers (1885) who sold it to Harvard University’s Peabody Museum of Archaeology and Ethnology (Henshaw 1887, pp. 28–30; Elsasser and Heizer 1963). Those three artifacts were included in the museum’s collection with catalog numbers 39261, 39262 and 39264 along with their identifying labels of “stone clubs.” The museum still has them labeled that way today (Vasta 2018). However, that “stone club” interpretation was questioned long ago by Henshaw (1887; discussed below). Elsasser and Heizer (1963) stated that those artifacts probably had a ceremonial function rather than a mundane utilitarian one of serving as a “club.”

One result of Eberhart’s study is that he stated that “. . .the stones have been classified into four types” (Eberhart 1961, 362). One of them was his “Intermediate perforated type” which had holes drilled through them or “perforations” (Eberhart 1961, 363). Therefore, not all cogstones have holes in them. For reasons discussed below, we have focused on the ones that do have holes that would have accommodated the wooden shafts like the ones preserved in the Bowers Cave examples. Note the Kizh consider all “cogstones,” which they prefer to be called “sunstones,” as sacred paraphernalia (Teutimez 2017). Eberhart also stated that the perforations vary in maximum diameter (Eberhard 1961, 363). As to the function of the artifacts in general, Eberhart stated “The use to which coggled stones were put remains a mystery. Most writers attribute them some undefined symbolic or ritual function” (Eberhart 1961, 367). As noted above, when the Bowers Cave artifacts were included into the Peabody collection they were labeled as “clubs” (Vasta 2018). However, that interpretation was questioned long ago. Referring specifically to the Bowers artifacts now in the Peabody Museum:

In connection with their possible use as clubs, it should be mentioned that (regarding) the handles’ . . . strength . . . (and forms) So slender are they, and so heavily weighted, that it is evident they would be broken at a single hard blow. So similar however, are the three in general form and features. . . that. . . it cannot be doubted that they were designed to fulfill the same function. . . (Henshaw 1887, 30).



Figure 9: Two views of the subject Big Rock Hole
(note the view on the right shows its true shape and its bottom)

He went on to interpret their true purpose:

Ceremonial implements—After careful consideration of these implements, I am convinced that their peculiarities accord best with the idea they were the property of medicine men or conjurers, probably used in dances or superstitious (sic) ceremonies (Henshaw 1887, 30–31).

Elsasser and Heizer (1963) wrote an article also discussing the Bowers Cave collection. In their discussion of the three artifacts that wound up at the Peabody Museum, they noted the two-part combined artifacts or implements. They quoted Henshaw's comments cited above and then stated: "They are unique because they are the only perforated stones thus far found in the United States which are attached to handles" (Elsasser and Heizer 1963). They also described the three implements: "The handles are from 15 to 18 inches long, and are rather (made of) tough wood . . . *Artostaphylos* sp. ; manzanita? . . . the heads (stones) are fastened . . . (to) the handles. . . by asphaltum a mineral which abounds in many localities of Southern California and much used by Indians for fastening, mending, etc." [note the La Brea Tar Pits in Los Angeles were a major source for the Kizh] (Elsasser and Heizer 1963). The authors went on to discuss the function of the artifacts and they concurred with Henshaw that the composite artifacts probably served as ceremonial implements.

A current staff at the Peabody Museum, Meredith Vasta, was contacted for this study regarding the Bowers Cave artifacts in question. She kindly provided photographs of two of the implements still in the museum's collection (Fig. 10). She also noted that the artifacts are still labeled as "clubs" in the collection and she agreed that that interpretation was unlikely given how relatively thin and fragile the "handles" are (Vasta 2018). The shafts attached to the stones have diameters of 15.0 and 14.0 mm. (Elsasser and Heizer 1963). We concur that the implements' handles are too thin to withstand the force of any strong blow if they were to be used as clubs. In our collective opinion the wooden attachments were not used as utilitarian "handles" at all but rather they had a much different and significant purpose.



Figure 10: Photographs of two of the sunstaves at Harvard (courtesy of the Peabody Museum of Archaeology and Ethnology)

Ms. Vasta also informed us that the museum had previously transferred one of the three “clubs” to the South Australian Museum in Adelaide. The museum was contacted and Stephen Zagala, Research Fellow, World Cultures, responded and expressed interest in our research as to the new interpretation of those implements (Zagala 2019).

The ethnographer John Peabody Harrington conducted extensive fieldwork among southern California Indian Tribes in the early 1900s. He worked for the Smithsonian Institution and his work is considered renowned there today. Based on an informant's information, Harrington referred to such implements as "sunsticks." "The sunstick was a ritual implement used by shamans during seasonal ceremonies performed at the time of the winter and summer solstices" (Harrington as quoted in McCawley 1996, 158; emphases ours). Noting that the distinctive shafted artifacts have been found in Bowers Cave and elsewhere on Catalina Island ("Pimu'na" in Kizh), McCawley also interpreted them as "sunsticks" (McCawley (1996 158–161). Then based on Harrington's original ethnographic notes (Harrington 1977, 56–57, cf. Hudson and Underhay 1978, 63–66; Hudson and Blackburn 1986, 235–241), William McCawley went on to describe the special artifacts:

The sunstick was an item of ritual paraphernalia rich in sacred symbolism. It consisted of a wooden shaft approximately 15 inches in length, topped by a sandstone disc held in place with cord wrappings and asphaltum. The stone disc, six inches in diameter and painted green or blue, was set on a shaft at an angle. A pattern of lines radiating outward from the wooden shaft was painted on top of the disc. . . the shaft of the sunstick was a physical representation of the earth's axis and the sandstone disc represented the sun (McCawley 1996, 160).

McCawley (1996, 145) also noted the significance of the sun rituals to the Kizh by quoting Fr. Boscana (a local 18th century Spanish Colonial Priest): "The importance of the sun in Gabrielino religion is suggested by the description of the yovaar (sacred enclosure of worship at a village) quoted above, and by the fact that the summer and winter solstices were times of important ritual activity for the Gabrielino" (Boscana 1933:65–66; quoted in McCawley 1996, 145). Also the winter solstice was the time of the beginning of the Kizh ritual year (McCawley 1996, 169). Therefore, we agree that McCawley made a correct interpretation of the Harvard artifacts. That is, they were not used as clubs, but rather as ceremonial implements involved in both winter and summer solstice ceremonies.

Since the ethnographer Harrington noted that the implements he called "sun-sticks" were ". . . used in both winter and summer solstice ceremonies" (Harrington n.d., cited in Hudson and Underhay 1978, 66), we deduced that perhaps a similar implement was utilized at Big Rock and that it served as a gnomon. That is, the wooden shaft, rising above the inserted stone in the hole, served as a gnomon that would cast a shadow across the boulder on the solstices. The hypothesis purports to explain the use of the perforated and hafted cogstones. It would not explain, however, the use of all the other types and forms of the cogstone artifacts—only the hafted ones—the sunstaves. Regarding their function in general, the Kizh do not want to call them "cogstones" but rather "sunstones" since they maintain they were used in general for the worship of the Tribe's sun deity Tamet (Salas 2018; cf. the discussion of Tamet in McCawley 1996, 145). The cited information led to the formulation of a hypothesis that, if validated, would explain both how the special artifacts were used and the presence and special shape of the hole on top of Big Rock.

The hypothesis is that such a sunstaff was utilized at Big Rock. Contrary to previous interpretations, the sunstaff was not "topped" by a sunstone, but rather the reverse. The sunstone part of the implement was meant to be placed downward with its shaft rising upward above it. The operative concept for our research is that a sunstaff, similar to the ones in the Harvard collection, was utilized at Big Rock on the solstices.

Specifically, it is envisioned that the ancient Kizh Sky Shamans inserted the sunstone part of the implement (with its five protrusions) into the “subject hole,” whose special shape with five “cogs” openings having been made to accommodate it, on the winter and summer solstices as a part of related ceremonies. The purpose of the shaft extending above the stone was intended to serve the device as a gnomon. Thus, the implements’ shaft extending up above the sunstone served to cast a shadow as the sun rose to mark the Kizh sacred special times of the shortest and longest days of the year. Therefore, if the sunstaff/gnomon hypothesis were valid, then a significant shadow should be cast on the boulder of Big Rock on the solstices. The Kizh Archaeology team then set about testing the hypothesis.

Testing Procedure

In order to test the hypothesis a replica sunstaff was devised. It consisted of a Styrofoam base to serve as a sunstone and a reed gnomon inserted into it. In order to honor the Kizh ancestors, the reed was painted red and at its top there were affixed two feathers of Kizh sacred birds: Pah-ke-sar (Red-tailed hawk; *Buteo jamaicensis*) and Ow-koots (Crow; *Corvus brachyrhynchos*). The Kizh research team went to Big Rock on the winter solstice of December 21, 2017 and arrived there before sunrise (slated for a local mountain sunrise at 8:08 am.). The replica sunstaff was then inserted into the 6.8 cm. maximum diameter “subject hole.” The Styrofoam sunstone was intentionally made slightly larger than the hole so, when inserted, it would have a snug fit that would permit the reed gnomon to stand firmly erect, which turned out to be the case. The “sunstone” base was intentionally made of Styrofoam so that when it was slid into the hole it would not erode and damage the hole in any manner (the hole was partly eroded previously). Prior to our arrival on the winter solstice, it was not a given that the replica gnomon would cast a shadow as there have grown up around the once clear boulder area trees and high shrubs that could have kept the boulder in shadow throughout the day. We had to await sunrise and observe what would transpire.

Although the solstice sunrise for the general area was slated to rise at 6:45 a.m. , we did not see sunrise due to the intervening mountain peaks until 8:08 a.m. When it did appear for the boulder area, it made a spectacular rise over a sharp pointed peak to the east as it cast brilliant sunbeams off that peak (Fig. 11). At that point, the boulder was entirely in shadow. However, as the sun rose higher, a little lane of light shone across the boulder and the initial shadow cast by the gnomon was remarkably accommodated within it (Fig. 12). Eventually as the sun rose higher the gnomon cast a shadow completely across the boulder (Fig. 13); The azimuth of the gnomon’s shadow was N 309.5°. Thus, the arrangement of the sunstaff inserted into the special hole did, indeed, cast an impressive shadow on the winter solstice thereby establishing the feasibility of the hypothesis. It remained to be seen how the arrangement would function during the following summer solstice. Subsequently the team revisited the site on the next summer solstice on June 21, 2018, again before sunrise. When the sun did come up it did so over a non-distinct ridge to the east, unlike the sunrise of the winter solstice that rose over the sharp peak noted above. That fact probably indicates that the winter solstice was the more important of the two solstices to the ancient Kizh. Nonetheless, another notable shadow was cast by the sunstaff’s gnomon across the boulder (Fig. 14). That event further attested to the hypothesis in our collective opinion.

Site Iconography

Since the Big Rock site has drawn attention previously due to its pictographs, some discussion of them is warranted here. A seminal discussion of the various difficulties involved in correctly interpreting the original meanings of ancient artworks was presented in a book on ancestral Hopi artworks entitled: *Kival Mural Decorations at Awatovi and Kawaika-a* by Watson Smith (1952).



Figure 11: Shot of the winter solstice sunrise at Big Rock in 2017

In a book section entitled “Difficulties of Interpretation, Lo, the Inscrutable” he presented the problems (Smith 1952, pp. 164–172). Smith pointed out that even if a researcher has a living artist (or descendant of the artist(s)) as an informant, that the true meanings of the artworks may not be found out due to a variety of factors including: “. . . the actual ignorance on the part of informants, every one of whom cannot be expected to be familiar with every abstruse detail of the ceremonialism of the village.” Another problem is that a native informant may not want to divulge the sacred meanings of the art. Smith quoted “. . . a Zuni Man . . . (who related) We tell all sorts of stories to outsiders. . .” and he went on to quote the anthropologist Mischa Titiev who stated “It is by no means certain that any of the interpretations of specific ritual acts are correct. No informant is entirely trustworthy when the subject deals with sacred matters.” Smith mentioned the noted Anthropologist Leslie White who, speaking of the Indians at Acoma Pueblo in New Mexico, stated “They are ever on their guard to prevent any information concerning their ceremonies to become known lest they be suppressed (or ridiculed) by the whites.”

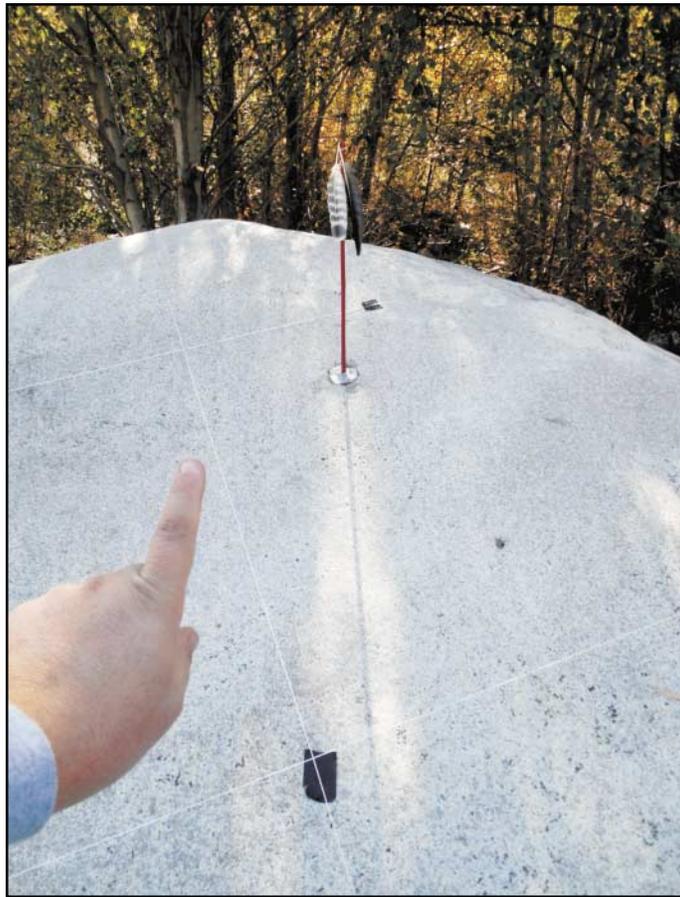


Figure 12: The 2017 winter solstice cast shadow across Big Rock (note the little lane of light accommodating it)

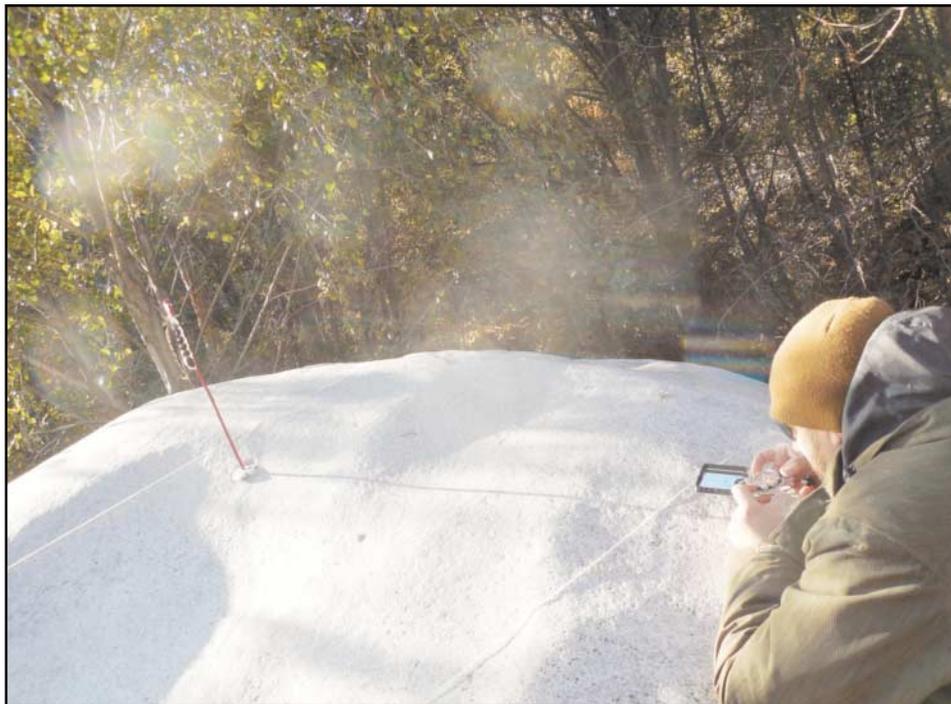


Figure: 13: The more extensive 2017 winter solstice cast shadow



Figure: 14: The 2018 summer solstice cast shadow on Big Rock

Smith went on to discuss the “Limitation of Ritual Knowledge to a Few Individuals.” He emphasized that there are religious leaders who (citing Goldfrank) have ritual knowledge “. . . held secret by the shamans and has not reached the commoners” of the Cochiti Tribe of New Mexico (Smith 1952, pp. 164–7). Another important factor is the “Subjective Limitations of the Investigator” :

The potential dangers in ethnographic and archaeological research are not entirely encompassed by the limitations of informants, however, for the entire process is a two-way affair . . . of which the investigator’s personal equation is also a significant factor. Raw data does not express or explain itself, its implications are subject to interpretation; and often to distortion . . . while a degree of rational inference and logical interpretation is always desirable and even necessary on the part of the expositor (one has to be aware of that) . . .

There is a tendency . . . to interpret the ethnographic or archaeological evidence in terms of the familiar psychological processes of the investigator and his own cultural pattern instead of in those of the vastly more difficult and unfamiliar framework of the people who created the evidence . . . that almost no white man, for example, is capable of thinking like an Indian . . . (Smith 1952, 168).

Having presented the difficulties in making correct interpretations of ancient artworks, we will hazard some proposed interpretations of Big Rock's pictographs. There are both geometric and anthropometric design elements on the Big Rock boulder. All are painted in red ochre (Hematite) pigments. The horizontal zig zag (see Figure 15-1) has been interpreted by the U.S. Forest Service Archaeologist of the Big Rock area, David Peebles, as representing the crest line of peaks of the San Gabriel Mountains to the north and there is a marked visual resemblance. As stated above, the mountains were called Hidakupa by the Kizh and were and are considered sacred to the Tribe. So, a representation of those mountains is quite possible. In possible association with the latter image, the large inverted V with another V inside it (Figure 15-2), has been interpreted by one of us (E. G. Stickel) as possibly representing the sacred high peak of "Joat." Joat is the Kizh name for Mt. Baldy (aka Mt. San Antonio). The word meant ". . . snow . . . (and that Mount was one of) . . . the great up thrusts (of peaks) that ringed the valley lands and gave shape and color to the Shoshonean (Kizh) world" (Johnston 1962, 21). Mt. Baldy is also the highest peak in the San Gabriel Range at 10,069 ft.; 3069.031 m.. However, Tribal Chairman Andrew Salas suggests the same image represents an unnamed peak in the immediate area of Big Rock to the south. The vertical rows of dashes (Figure 15-3) may represent "All the pines on top of the mountains (who) used to be (the first) people turned to trees when Wiyot died" (Wiyot, according to the Kizh creation story, was the original superchief or chief of chiefs of the Gabrielinos (Kizh) (Johnston 1962, 41). The Kizh today believe the "running man" image (Figure 15-4) represents the ancient Kizh runners who communicated and traded across the San Gabriel Mountains between the San Gabriel Valley to the south and the Mojave Desert to the north.

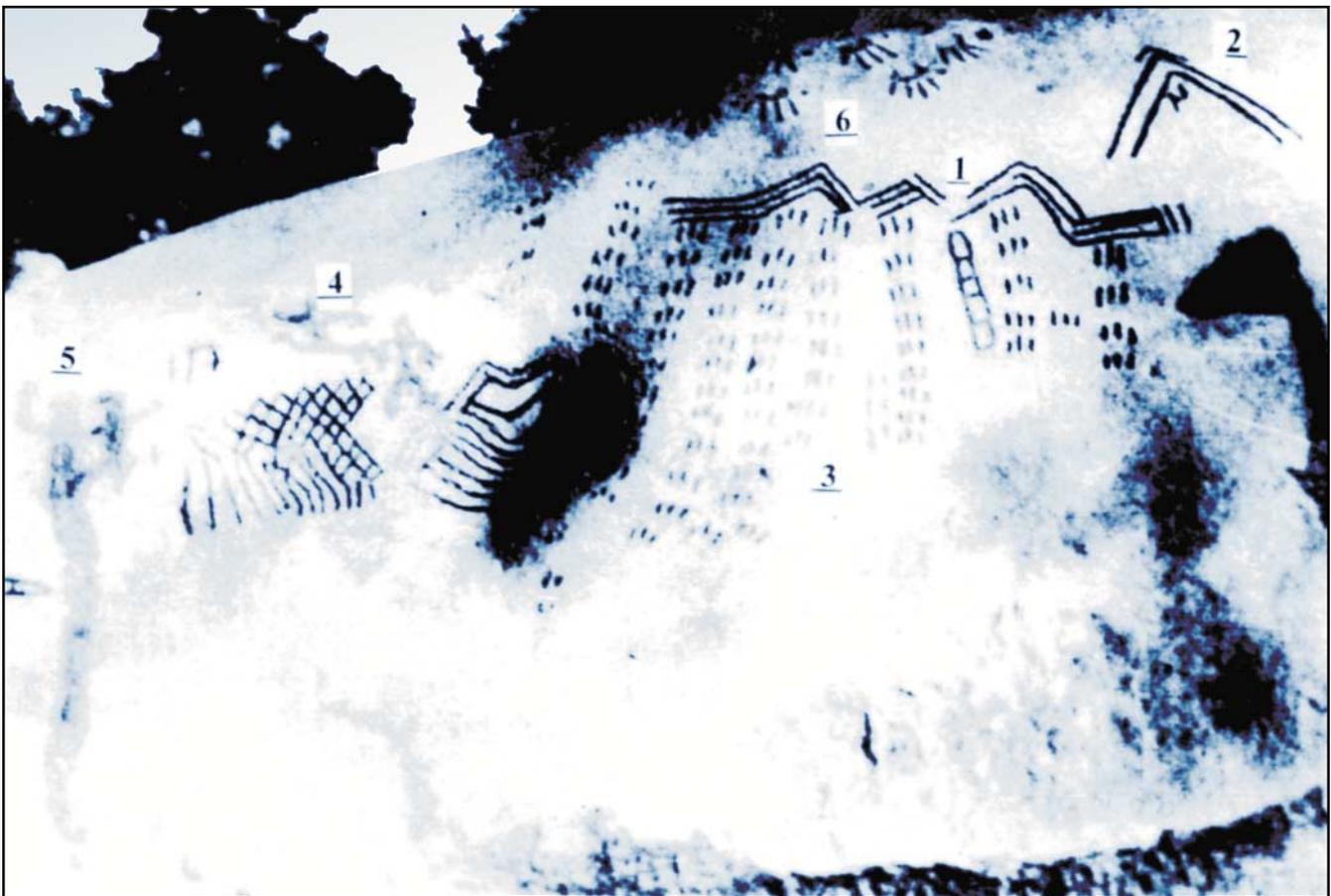


Figure: 15. 1-6; A 1930s photograph of the Big Rock pictographs
(note they may have been retouched then)

The elongated vertical element on the left-hand side of the panel (Figure 15-5), may represent “witch woman.” In Kizh legend, she kidnapped a baby and then, like so many Native American legends across America in which, a small animal comes to the rescue. In this case it was Muwat (Pocket gopher) which rescued the baby (Johnston 1962).

Lastly here, the grouping of handprints at the top of the panel (Figure 5-6) all have their fingers pointing downward, giving them a feeling of twinkling stars above the San Gabriels represented by the zig zag. Sandburg (1972, 81) proposed that the pictographs at Big Rock “. . . in all likelihood (were produced as) the by-product of girl’s puberty rites that were carried out when they became full members of the tribe.” He noted that when the three-day ceremony was over, the young girls would run to a rock and make a painting on it. It is possible that the handprints on Big Rock may be from the young girls involved in those rites. If the hand print paintings can be photographically recovered and computer image enhanced such that their precise sizes can be ascertained, then they could be analyzed in the manner that Dean Snow analyzed hand stencils found in Upper Paleolithic cave sites of France and his results indicated “. . . that persons who made hand stencils in the caves were predominately females” (Snow 2013, 746). Hopefully; in the future when Big Rock’s paintings can be accurately recovered a similar analysis can be attempted in order to test for the proposition that the handprints represent those of young women. Future field work efforts will be needed to accomplish such a study. To date the initial effort to recover the paintings using digital photography and D-Stretch enhancements, conducted by the California Rock Art Foundation was not able to recover most of the paintings only a small portion with the “diamond chain” design elements (Figure 6).

Whatever the true meanings of the painted elements on the Big Rock, all of them are considered to be the sacred ancestral artwork by the Kizh today (Teutimez 2017). The highly experienced Rock Art specialist Dr. Yohannes Lobser has indicated to us that, with suitable funding, he can recover the pictograph images utilizing his photo and enhancement methods (Lobser 2019). Hopefully when that occurs, the recovered images will provide fertile ground for future studies of Big Rock’s iconography.

Site Chronometric Dating

It was once stated that the age of the Big Rock site was impossible to determine due to a lack of associated dateable materials, which, in general is the case as there is no preserved village site adjacent to Big Rock (Sandburg 1971, 81). However, obtaining dateable organic material directly from the “subject hole” was not considered then as the hole’s existence was unknown. In an effort to provide chronometric dating in the form of radiocarbon analysis, the site was revisited on September 1, 2019. At that time flotation analysis was conducted on the “subject hole.” It was the hope that the ancient Kizh had put offerings of sacred plant material into the hole as part of their ceremonies. Those offerings could have been in the forms of “manit” (*Datura meteloides* and/or sage (*Salvia sp.*)) or others. Distilled water was poured into the 14 cm. deep hole. Then fortunately, organic material did float up to the surface and was skimmed off with sterilized implements and put into tin foil and plastic baggies and then air dried. Two samples were thus obtained from the subject hole, an upper hole sample and a lower one. Both samples were then submitted to the Beta Analytic Laboratory in Miami, Florida. The pretreatment and processing of the sample was discussed by the project’s Principal Investigator (E. G. Stickel) with a staff person at the laboratory (DeBone 2019). Since it was feasible, it was agreed that the lower sample would be assayed. That sample, of unidentified organic material, was given the laboratory designation of “Beta-539544.” Upon analysis, the sample successfully yielded a conventional radiocarbon age of:

210 ± 30 BP

As per laboratory procedure, probabilities regarding the true age of the sample were generated. Thus probabilities regarding the sample's age ranged from "50.5% 1734–1806 cal AD" to "30.8% (from) 1646–1684 cal AD" (Patrick 2019).

Given the results, and the research standard of 1950 AD as the base line date for "present," it is the opinion of both Beta Analytic and our view that the resultant date is prehistoric and prior to the time of the effective Spanish Empire's invasion and occupation of Kizh Tribal Territory in 1771 (Johnston 1962, 128). Big Rock's radiocarbon date quite possibly represents the terminal usage of the subject hole for Kizh ceremonies. The 14-C date indicates Kizh usage of Big Rock in the Late Prehistoric Period. The date also helps to establish the cultural significance of the site important for its restoration and on-going preservation.

Future planned research

Since the archaeo-astronomical utilization of Big Rock has been indicated by our research so far, further exploration of other possible solar and stellar correlations are in order. For example, Kizh Tribal Biologist Mathew Teutimez has noted the importance of certain stars (e.g. the north star) in the ancient Kizh belief system (Teutimez 2017). That research, including whether the site may have been utilized for equinox and other stellar observations, will be conducted by David Dearborn who has previously implemented developed computer research protocols. He has noted the following. Shadow casting in the manner proposed, here provides information not just on the time of day but can be used to determine season or temporal location in the year. Careful monitoring of the shadow path allows prediction of solstice or equinoxes before they arrive.

Another to be researched aspect is the fact that the Big Rock boulder is not lying in its original position in terms of both elevation and orientation. So, research will be conducted to computer analyze the boulder's 1930s photographs, which show indicative background peaks and distances involved. Computerized comparisons of those images with ones today will hopefully provide the data so that the original orientation and elevation of the boulder can be deduced. Such original orientation is important as the shadows cast on the solstices, for example, may have been correlated with certain painted pictographs for ceremonial and religious purposes by the ancient Kizh. Also potentially related to that research is the fact that a tiny, shallow, artificial hole was carved into the boulder some 63 cm. from the "subject hole." That tiny carved hole may have been on the original alignment of the shadow line cast on the ancient winter solstices.

Conclusions

The Big Rock Site, To-Tah Yo-o-et, (CA-LAN-164) is an ancient Kizh Tribal sacred monument. The sacred nature of the site is attested to by its pictographs and by the "subject hole" which was referenced by a Kizh informant in the early 20th century. Despite the early reference to the hole, it was not discovered until 2017 by the Kizh Archaeology team. Due to the unusual shape of the ancient carved hole, a hypothesis was tested that it was utilized for the insertion of a sunstaff which served to provide a gnomon for shadow-casting on solstice events. The subject hole has five "cogs" or protrusions around its perimeter. Apparently the ancient Kizh considered the number 5 to be sacred like the prehistoric people of Stonehenge who also considered the number 5 sacred as they built 5 monumental trilithons within their site's circular enclosure. The testing at Big Rock also indicates a new interpretation of the composite artifacts, now curated at Harvard, that they were not used merely as utilitarian "clubs" but rather were far more significantly utilized as ritual related implements. The hypothesis was tested during the winter 2017 solstice and the summer 2018 solstice events respectfully, both with positive results.

Those results indicate that Big Rock most probably served the ancient Kizh for religious and ceremonial observations related to the solstices. Such findings suggest there may be other site correlations with solar (i.e. equinoxes) and stellar events. The results of the subject hole's dating by radiocarbon indicates that it was utilized until the late prehistoric period. Moreover, since the sunstaff implements were probably involved with the specially shaped hole that was carved into the boulder's top, and since the Harvard sunstaffs have shafts that were intentionally set at angles, it is notable that sundials have gnomons also set at angles to facilitate the casting of shadows. Those facts support the hypothesis.

Importantly the sunstaff implements have been designated as unique artifacts in American Archaeology. Therefore, their use, involved with a specially shaped hole, makes Big Rock a unique astro-archaeological site in American Archaeology. The site may also be unique to world-wide archaeology and therefore adds variability to our knowledge of the past. Hopefully, these findings will assist the Tribe's current efforts to properly restore and preserve their outstanding Big Rock sky shrine monument where the ancient Kizh Sky-shamans worshiped so long ago with their sacred dances and flute melodies.

Dedications

We dedicate this research paper to the memory of the ancestral Kizh who created the Big Rock monument and worshiped there. We also dedicate this paper to the memory of team members California rock art specialist Georgia Lee and senior archaeologist Warren Wasson who unfortunately passed away during our research efforts.

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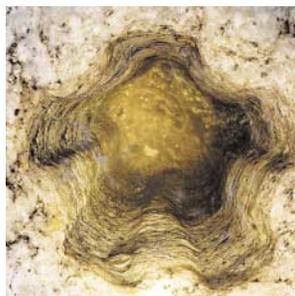
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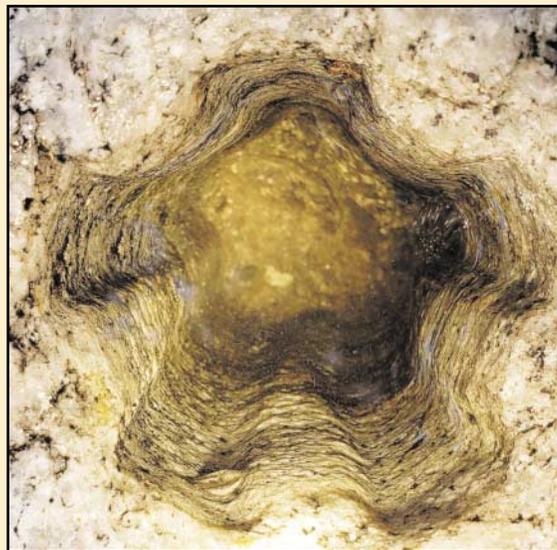
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