Willow Creek Observatory, An Ancient Solar Observatory at Willow Creek, California

BY

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ABSTRACT

This paper presents an ancient observatory situated on the rim of Willow Creek Canyon in northeast California which illustrates both the importance of the place of early man in the Cosmos and also the importance of the specific site that ancient men chose to record events observed in that Cosmos. The site includes natural chambers modified by the early astronomers, with deeply carved glyphs, symbols and inscriptions. At the summer solstice sunrise, a narrow beam of light forms a bright triangle on the rear wall of the cave. After noon a light pointer shaped like a finger moves down the wall and lands on the glyph carved on the boulder jammed between the walls. At sunset, in the second chamber, in the afternoon, a sliver of light illuminates the top circle of the so-called "tree" glyph, the light never gets lower on the cross-bars nor to the circle at the lower end of this glyph. Later in the afternoon a light pointer traces the outer of six rings of a mask-like glyph. On the Autumnal Equinox at sunrise a vertical shadow matches the points of five stacked chevrons. At sunset, a pointed shadow moves across the six rings of the mask-like glyph to the top of the outer ring. As a predictor of the summer solstice a light pointer lands on a distinctive glyph 59 days before and after the Summer Solstice in the Sunset Chamber. These and other effects and glyphs are dramatic indications that the site was used over a long period of time to mark the change of seasons. Confirmation was established that the curved stone now lying on top of the sunrise chamber had once been the "target stone" for the summer solstice light pointer.

Introduction:

This paper is an accumulation from an expedition on June 20,21,22, 1989. Revised and augmented with additional information gathered on subsequent expeditions on September 21, 1992 and April 22, 1993, June 20, 21, 22 1994 and June 17 through 24, 1995. These expeditions represent an on-going investigation of the site. The 1995 study at the site was sponsored by the Battle Point Astronomical Association.

The Cosmos

At some very early time, ancient man realized that he was imbedded in the miracle and mystery of the Cosmos, and he began to observe the phenomenon of the stars and the constellations, the sun, the moon, the planets and special celestial events. However, these early people did not see the sky as we see and understand it. The sky was an entity filled with powerful and threatening forces. (Marshack 1972, Hudson 1980, Brennan 1984, Mayer 1973).

Cultural Context

The seasons were of both pragmatic and mystical concern and were observed, notations were made and means were found for prediction. It has been found that hunter-gatherers, in this case the early people of California, had the need and obtained the knowledge and sophistication to record, memorialize

and predict the celestial events which marked the seasons. Undoubtedly the people held ceremonies and celebrations on the occasions of seasonal importance (Hudson and Underhay 1978; Hudson 1980) To the early people the sky was a place peopled with powerful beings who competed and struggled with each other. The outcome of these struggles could have dire or beneficent consequences for humankind. The native peoples could help stave off disaster and maintain the cosmic balance by performing certain ceremonies at the proper time of the year. It was apparently crucial to them to know when the solar year began. (Hudson and Underhay 1978)

The Indian tribes found in this general area upon the invasion of the white man in the 1850s were: The Northern Maidu (northeastern dialect); The Northern Paiute (Uto-Aztecan); The Atsugewi (Hokan family); The Shasta; The Wintu; The Yana; The Nomlaki; The Konkow and the Achomawi (Hokan family). (Heizer and Whipple 1951, Hudson 1984)

" The Maidu calendar recognizes 12 lunations with more or less descriptive epithets. It opens in Spring, appears to contain NO CLEAR REFERENCES TO THE SOLSTICES, and possess no fixed points. There is no mention of a device for correction, and it may be presumed that the Maidu dispensed with any, leaving a lunation un-named whenever their moons ran too far ahead of the year as determined by seasonal events..... On the whole, a more distinctly UN-ASTRONOMICAL calendar than that of the Maidu can hardly be imagined..... Four seasons were recognized by the Maidu.... Spring (flowers), Summer (earth, dust, dry), Autumn (seeds, acorn bread), Winter (snow)". (Kroeber 1925)

"The Northern Paiute were part of the Uto-Aztecan family," Kroeber argues that, " the California Paiutes are better to be known as Shoshonean distributed from Oregon to Southern Mexico. The culture was generally poverty stricken (in California) due to the difficulty of keeping alive on the high plateau country. No references to calendar or seasons could be found regarding the Paiutes." (Kroeber 1925)

William R. Palmer, University President and Stake President of Cedar City, Utah collected stories from the Paiutes. Many of these stories indicate a great knowledge of practical astronomy according to Nal Morris. (Morris, 1995)

"The Atsugewi cut off a knot each day to measure the number of days which have elapsed in order to know when to attend celebrations". (Voeglin 1942)

"Every village had marks of observation" among the Western Shasta. "Watch where sun rises for shortest day, know when shadow is at certain place sun is going to back-up and that it will snow". Among the Western Shasta the "year begins in Winter Solstice, when for 2-3 days the sun rises and sets over same marks in the large assembly house. The year is counted from one winter solstice to the next. The rising of the Pliades and the Morning Star were especially observed". (Voeglin 1942)

Among the Valley Maidu, "an old woman kept a bag of different beans and eats a different sort every month. She settles arguments between men about the month by the kind of beans left in the bag". (Voeglin 1942)

The Middle Wintu determined two solstices. "Old men watch the sun. It oscillates for 3 days. Sun looks around finally decides to go north or south. The Southern Wintu mark the Winter Solstice only ... don't bother about summer solstice". (Voeglin 1942)

"The Eastern Shasta made marks on the center pole of the assembly house with chalk. The Western Shasta noted the shadow on flat rocks around the center post of the assembly house. The Western Atsugewi watched where the sunlight strikes on the center post of living house or sweat house, but made no marks on the post. The Western Shasta watch when the sun rises or sets between trees. One man now uses a board by his door. Atsugewi West watch shadow from Soldier Mountain... It goes to

Jim Hunt's place for solstice... The Mountain Maidu observed both summer and winter solstice by the sunrise only". (Voeglin 1942)

The above excerpts from Kroeber and Voeglin give the impression that the tribes of northeast California were unsophisticated about celestial events. Hudson and Underhay 1978; Hudson 1984 and Mayer 1975 and 1977 present convincing evidence that these and other California tribes, or their predecessors were indeed very knowledgeable and sophisticated about astronomical observations. Hudson describes a complex philosophical and mythical framework involving celestial objects, people and other beings with rituals to maintain the cosmic balance involving the sun, the moon, certain stars and constellations. Hudson sites evidence that eclipses could be predicted. An elite group developed to observe, record, interpret and conduct ritual activities to assure proper interaction of the society and the gods. (Hudson 1984) Mayer shows petroglyphs that match constellations and makes a convincing case for the acceptance of Miller's Hypothesis that petroglyphs throughout the southwest recorded the supernova event of 1054 A.D. (Mayer 1977)

Other sites in the west demonstrate early man's need and capacity to measure, note and record the various seasonal events. At Parowan Gap, Utah, Nal Morris has been investigating an elaborate and ingenious arrangement of cairns, light/shadow alignments, glyphs and systems of counting to achieve precise determination of salient events of the year. (Morris, Preliminary Report, 1995)

At Little Blue Table, Idaho, well marked "stations" where the horizon features were watched, have been verified as sun-watching positions to determine the various seasonal points of importance.

It is clear that the people of these cultures "needed to know not only where they were in place, but also in time". (Morris, personal communication 1994) They had "appointments" to keep with migrating game animals, ripening plants, roots, berries, seeds and nuts as well as with other members of their tribe who spread out over the landscape for hundreds, perhaps thousands of square miles of essentially trackless territory over the course of a year.

Cultural Conclusion

The various Indian tribes in the area of northern California (Atsugewi, Achamawi, Maidu, Wintu, Paiute and Shasta) Fig.2. seem to have kept track of the seasons in various informal ways. This suggests that the indigenous people living in the area in the 1800s, while noting the change of seasons, did not carry on the intense and meticulous observations indicated by the sophistication of the Willow Creek Observatory. It is possible that the tribes present at the time of the invasion of the Whites were late comers to the area, and other people were the ones who used and embellished the Willow Creek site, possibly at a very early time. Alternatively, the tribes in the 1800's could have been the direct descendants of the earlier people, but the traditions of acute astronomical observation could have become diluted over time due to the many vissicitudes of life during those long periods in that area.

Throughout California, according to Hudson, the hunter-gatherer tribes developed cultural, religious, mythic and practical involvement with the celestial events with considerable sophistication (Hudson 1984)

It is worth noting that the most elaborate, carefully drawn and inscribed glyphs associated with alignments seem to be the oldest. Later glyphs, although repeating many of the same symbols as found in the earlier engravings, are less carefully done, not as deep and in many cases are merely marks scratched through the desert varnish. This suggests the possibility that the knowledge and commitment

to astronomical observation and recording was brought into the area from elsewhere and over time, faded in practice and content.

At this point, there has been no attempt to date these glyphs with any of the scientific methods available. It is possible that the oldest of the carvings are very old. A site near Lakeview, OR has revealed a portion of an escarpment of basalt covered with closely packed glyphs including a glyph of concentric circles. This panel of glyphs has been concealed by drifted soil and the lower portion runs down BELOW a layer of Mt. Mazama ash (Crater Lake) indicating that this panel of glyphs presumably covering the 120 ft long cliff-face was created prior to 4750 BC. (Cannon and Ricks 1986) The connection to Willow Creek at this time is tentative.

Geographical Context

The site is situated in the northeast section of the State of California, U.S.A. in the Great Basin area. The site is a well-known petroglyph site designated as CA-LAS-32 north of Susanville, CA at 40.469* N, 120.44* W, about 60 miles east of Mt. Lassen volcano. The site is marked on USGS topographical maps as "petroglyphs." (Connick & Connick 1988)

Local Environment

The country is high desert plateau with sage and rabbit bush mixed with sparse grass and occasional junipers and pines. The climate is dry, cold in winter and hot in the summer. The desert floor is littered with basalt boulders and stones weathered out of the underlying lava floor. Honey Lake can be glimpsed to the south, still a considerable body of water, but much diminished from it's size when the climate was wetter at the close of the last glaciation when man perhaps first entered upon this area. Elevation is approximately 1300 meters (4275 ft.)

The subject site is located on the eastern rim of Willow Creek Canyon in an outcropping of basalt which forms a ridge running generally north-east to south-west, rising about 30 ft. above the surrounding plateau and dropping about 200 ft. into the canyon on the west side.

FOCUS OF THIS PAPER

Two natural caves in the outcropping, one facing northeast and the other facing southwest are the main features of interest at the site. The main events observed are the summer solstice sunrise and sunset events and the Autumnal Equinox sunrise and sunset events.

To accurately record the petroglyphs, I used sheets of TYVEK, a DuPont product taped to the rock face with ubiquitous "Duct-Tape". India Ink was dabbed on a small bag of muslin filled with local grass using a kitchen sponge as a reservoir. Too much ink smeared the surface of the TYVEK, but a partially dry muslin bag, rubbed vigorously across the surface, brought out the pattern of the rock carving in startling accuracy. Subtle details were revealed which were invisible to both eye and camera. The petroglyph was completely protected from any abrasion and no ink soaked through the TYVEK onto the rock.

THE SUNRISE CHAMBER

North end environs

The north end of the outcropping containing the "sunrise chamber" is heavily embellished with petroglyphs, all diagrammatic or symbolic in nature. Figure1. There is only one human figure, and one figure of an animal and one of a "bird" (this inside the sunrise chamber) can be found in the area.

Note the red ochre painted vertical line directly over the sunrise chamber light opening.

"Signboard"

Note the panel of glyphs above the entrance, some painted with red ochre. The crossed circle is an ancient symbol for "field", "world", and by extension, "the universe" but in this context may represent the year with four seasons. There are two small circles adjacent to this glyph, connected with short lines, possibly symbolizing the sun and the moon. The next symbol to the right is not completely clear, but the photograph and the rubbing indicates a vertical line rising from a small circle with several horizontal branches. A long horizontal line caps the stem curling into a small circle on the right and left. Over this runs a horizontal serpentine that loops around and down on the left to return to the small circle at the base. There then appear to be two vertical red ochre lines followed by a very prominent pecked and red painted oval pierced by a vertical line. This latter is similar to the Chinese sign for "middle or center, which the Chinese have used as the symbol for their country since 680 B.C. to this day." (Lindqvist 1989) This glyph is painted with red ochre which seems to have protected the engraving from weathering as the neighboring rock is now almost flush with the left side of the painted engraving making the rubbing indistinct even though the red ochre makes the figure very clear. The stem is shown by the rubbing to turn back on itself just as does a similar glyph at CA INY 272 (Schmidt ESOP 21 1992)This panel of glyphs reads like a signboard announcing the importance and possibly the authorship of the earliest work at the site. Figure 2.

The approach to the Sunrise Chamber

On the approach to the entrance there is a "threshold" boulder with an inscription looking very much like a form of writing. An inscription similar in character is inscribed on a boulder inside the sunrise chamber wedged between the walls at the floor. The purpose of the latter is discussed below under "Elements of the Sunrise Chamber".

Outside the entrance to the right is a large (four ton) block of stone which has fallen over from it's original position. Figure 3. We determined by measurements that this stone was originally upright but already separated from the larger block immediately to the south. Petroglyphs can be seen running down and underneath it where it would be impossible to peck them today. Those that can be seen on the under surface consist of parallel zig-zag lines and a circle. Rubbings were taken of the glyphs on this stone.

Adjacent to this stone, a larger block, still standing in place to the south. The top is deeply inscribed and heavily eroded, the glyphs being eroded down at the same rate one must suppose. Figure 4.

West of the entrance is a pyramid shaped rock with deeply carved parallel serpentine with adjacent divided circles. A piece of this rock is missing but a photo from 1926 shows it in place with a circle inscribed.

To the right of the chamber entrance and above the fallen stone the rock face is covered with carefully designed and deeply inscribed glyphs. Figure 5. The concentric circles on each side of the rock's lower edge, connected by a short line, seem to express "here is the place that the sun turns the corner". Above this is a concentric circle connected to two small circles and three small circles which could represent a constellation. This is drawn in the same way that both Chinese and Aztec constellations were drawn. (Moran and Kelley 1953 and Aveni 1980) Alternatively, this glyph could

represent the sun and the five visible planets, two inner ones (Venus and Mercury) and three outer ones (Mars, Jupiter and Saturn). Earth is not shown if this represents a subjective view from Earth.

Above the entrance at the top of the basalt outcrop on an irregular but generally horizontal surface is a panel of glyphs with a serpentine with twelve turnings plus a smaller lobe (that may indicate an understanding that some years contain more than twelve full moons) connected to a circle with a dot in the center. There is a line through six of these loops. This may represent the cycles of the Lunar year as seen in similar glyphs at Newgrange (Brennan 1983) The other glyph in this panel is a circle connected to a wavy line from which extend lines leading to loops or circles. A small serpentine comes in from the right around the head of the first mentioned circle at the head of the serpentine. Figure 6.

The apparent age of the carvings at this site seem to cover a great range as some are almost completely weathered away and cannot be seen unless the light strikes at a tangent to the rock face while others are very clear and seem to be almost new, being lightly pecked through the desert varnish. The latter are done more crudely but reflect many of the same motifs as the more ancient carvings.

Connick and Connick describe these variations and discuss the petroglyphs in their paper mentioned above. They classify them as "Great Basin Abstract: VULGARIS, being lightly pecked through the rock surface and hardly patinated; PROMINENT, being deeply carved and somewhat patinated; and CLASSIC, being deeply carved, carefully made and heavily patinated, weathered and eroded". (Connick and Connick 1988)

It is my belief that the petroglyphs at this site are associated with the use of the site and so are astronomical in content and meaning. Some seem to be markers and gages, some seem to be symbols of the sun, the moon, constellations and the planets. There are glyphs which could be impressions of a comet as well.

To the west of the entrance is a large boulder with a sloping, slightly concave face directed easterly, covered with a complex of glyphs which Mayer shows to be constellations. (Mayer 1975)

Nearer the entrance on the south face of an angular boulder is a petroglyph which is completely invisible under all but a tangent beam of sunlight. Four circles set in a vertical row connected by a line is closely associated with another vertical line with a circle at each end and a short crossbar at midpoint which has a "lobe" at each end. Figure 7. My belief is that these figures represent astarisms important to the culture at the time.

Elements of the Sunrise Chamber

The first cave to describe is a narrow fissure opening to the northeast. It is about 3 ft. wide at the entrance, narrowing to 1 ft. wide farther in and extends back about 21 ft. The floor of the chamber slopes upward. The roof is formed by very large slabs of stone covering most of the fissure except for the rearmost portion which is open to the sky. There is a keystone shaped boulder almost concealing the entrance wedged between the sides of the chamber. This stone has been carved, inscribed and modified in shape. Halfway back in the chamber the crevice narrows where another roughly triangular boulder is wedged between the walls about 6 ft. above the floor. This stone has been carved away on one side. The rear of the chamber becomes wider with side crevices providing somewhat more space. The rear wall consists of unmarked rounded boulders but the Connicks recall that when they first visited this site in the 1960s, there were several large stones in the rear of the room that have been removed, presumably lifted out through the roof hole. One in particular is a 6 ft. long slightly bowed "column-stone", triangular in section now resting above the chamber.

This "column stone" was closely inspected during the 1995 visit and was found to have a portion of an ancient glyph on a sloping face at what was once the top. This face, with its remanent of glyph could have received the "light triangle" when the stone was in place. We made a Plaster of Paris mold of this stone, carefully protecting the surface with "Saran Wrap" before applying the plaster and cheese cloth cast. Our intent is to reproduce the stone in fiberglass to stand it in its original position for further study. The Vandals who removed the stone chipped off most of the top surface when they chain-hoisted the stone out through the roof hole. This is truly desecration of major proportions to a precious site that is just beginning to reveal its secrets.

There is a small boulder lying on the floor, wedged between the walls, which I at first thought to have fallen from its original position. A glyph like a multi-legged table is inscribed on its surface. Figure 8a. On June 22, 1994 I observed a light pointer slide down the west wall of the chamber with a short finger extending downward. This light pointer first touched the small drilled hole at the center and just above the horizontal line of the glyph, then moved down to touch the long vertical line just to the right of the shorter center line. Looking upward to see what rocks formed this light pointer, I saw that some sticks, stones and other debris was clogging the crevice that formed the light pointer. After cleaning this debris out with my knife, I looked back to see that the finger of light now extended to fill the whole of the carved line to the right of the short center line. Noting that this was the day AFTER the summer solstice, it appears that this stone with its "chair" glyph was not displaced but was in its intended position, and served as another gage to "fine tune" the exact day of the solstice. It is my intent to return to the site for a week's stay to bracket the summer solstice in 1995 to make sequential photos and time-lapse video of this particular sequence. Other events were observed that need further study as well.

In 1995, this stone with its seven-legged glyph was observed and recorded meticulously with both 35mm camera and video camera each day over the course of a week bracketing the summer solstice. First, beginning at 1:00PM PDT a broad shaft of sunlight slid down the rock face and proceeded to spotlight the entire top of the boulder. This then moved off the boulder and another narrower pointer of light moved quickly down the cave wall to become shaped like a fist with an extended index finger. The tip of this finger, on the 18th, moved first to the drilled hole above the top horizontal line, then moved across that line and touched the top of the second leg to right of center, then flooded down into the glyph, moving off into the third leg. This process was repeated on the 19th and the 20th, each day moving closer to the short center leg. On the 21st, the summer solstice, the finger of light moved down and touched the top of the center leg, flooding it as it moved through the glyph. Figure 8b. After the solstice, the finger began to move back toward the right each day.

It was clear that there was a discernable change from day to day. A person watching this event could quite closely identify THE day of the solstice.

The corners of the walls of the chamber have been rounded off and can be compared to the sharp corners of the naturally split rock elsewhere in the basalt outcropping. Areas of the rock walls have been dressed prior to the carving of the elaborate glyphs on the walls of the chamber.

Petroglyphs inside the "Sunrise Chamber"

Inside the Sunrise Chamber are the boldest and seemingly the oldest of the rock carvings. The most prominent inscription is on the east wall and is a long serpentine beginning at a small circle, passing through an oval divided into six parts, rising and falling to connect a series of small circles and circles with central dots, finally entering the lower left quadrant of a large glyph where after three loops

or nodes, it crosses the vertical centerline of this "seasons diagram" and loops back on itself. Figure 9. This looping back is very similar to astronomical notations in the Boyne Valley of Ireland. (Brennan 1980 and 1983). I believe that this diagram shows the sun passing through the second quarter of the year, crossing the mid-line after which it turns and begins to move back toward the south. This large rounded quadrangle is divided vertically and horizontally and contains several circles with dots in the four quadrants. This glyph at first looks like a large mask, but it may be a diagram of the year with it's four seasons.

Below and to the right of the "seasons diagram" is another crossed square figure with the horizontal divider running off beyond the border to the right.

Above the "seasons diagram" is a complex figure looking somewhat like a "bird". Figure 10a. The eye of this bird is a circle with a dot in it. On the days approaching the summer solstice, sunlight streamed in just after sunrise to illuminate this eye. On the day of the solstice the eye was more fully illuminated than on days before or after. This figure is one of the only glyphs representing a zoomorph in the whole complex. Figure 10b. The Egyptians had a mythical bird called "Benu" which was associated with re-creation of life in the Spring. (Krupp, 1991)

Other cultures may have revered birds of various kinds, the Japanese for instance, hold the crane to be a sacred figure. I would be interested to hear of other societies that have a bird in their religion.

These glyphs are carved one to two inches wide and up to one inch deep into the basalt. Edges are very worn and smoothed and the patina is the same inside the glyph as on the mother rock. These inscriptions all give an impression of great antiquity.

The Summer Solstice Sunrise Event

On the morning of June 21 the interior of the chamber is quite dark prior to the actual sunrise. As one crouches in the cramped chamber watching the back wall of the cave there is not much light until the edge of the sun peeps above the rim of the horizon which is about 20 miles away and slightly elevated at 0.81 degrees. The azimuth at the instant of the sun's appearance is 58.4* E of N (Connick and Connick 1988) At this instant there appears on the back wall of the chamber a bright, crisp triangle of red light approximately 6 inches on a side with it's point up. Figure 11. It is difficult to convey the drama of this event in words. The bottom of the triangle of light is shaped by the top of the "keystone" at the entrance which has been chipped and worked. The right side of the triangle is formed by the stone to the right of the entrance with the two sun symbols previously described. The left side of the triangle is shaped by the hanging stone halfway up the passage. It is evident that this stone has been carved away on it's west edge to allow the light to graze by to create the light triangle. One must ask whether this observatory is so old that it was necessary over the centuries to batter or grind away the hanging stone to keep up with the change of position of the rising sun at the solstice due to the change of obliquity. According to Connick's calculations the sun was 0.51* farther north in 1000 BC and 0.94* farther north in 4000 BC. This would have reduced the base of the triangle by 1.7 cm and 3.1 cm accordingly. The triangle may have been more of a dagger, or may have been smaller at the time the chamber was first used for observations. (Connick and Connick 1988)

After the triangle first strikes the rear wall, the patch of light begins to move downward and to the right, getting larger and growing fuzzier on the edges as it moves. The combination of projected shadows on the serpentine leading to the "seasons diagram" illuminates the loops and circles of the serpentine in sequence, Figure 12, until this part of the glyph is completely illuminated and a shadow cuts across the top of the serpentine outlining the whole sequence in stark relief. Because the moving

sunlight strikes obliquely across the stone face, the changes in the lighting are very rapid, and only minutes are required for this dramatic display. Finally, the line dividing the light and shadow bisects the "seasons diagram" diagonally from upper left to lower right, cutting through the upper left sun symbol, through the intersection of the axes and through the lower left sun symbol touching the top of the larger circle in the same quadrant. Figure 13. This again seems to express the idea that half the year has past and recognizes that the summer solstice occurs off the true north-south and east-west axes.

Meanwhile, back at the chamber entrance, the finely cut "noon-gage" of six parallel lines on the east wall of rock on each side of a shallow vertical ridge has a shadow moving across it, cast by a notch cut in the overhanging lip above the glyph. As the sun moves high in the sky around mid-day, this shadow seems to mark the time of mid-day on the solstice. Figure 14.

West Wall Glyphs

On the west wall of the sunrise chamber is a complex panel which has some unusual characteristics. Figure 15.

The rubbing revealed what photographs and closest observation did not, that the tight serpentine of again 12 turnings seems to curl under itself in several places which is most unusual for petroglyphs found in North America. This gives the inscription a three dimensional quality. The stacked chevrons are another unusual feature which have a definite purpose as described below. The coiling of lines of the glyph has a visceral quality for which there is no obvious interpretation except for the purposeful chevrons.

The Autumnal Equinox Event at Sunrise

At sunrise on the equinox, September 22, 1992 the first point of light of the rising sun cast a vertical shadow which falls precisely along the points of the five stacked chevrons. Figure 16.

THE "SUNSET CHAMBER"

Elements of the "Sunset Chamber"

This chamber is another natural cave formed by the natural splitting away from the main mass of basalt a very large slab of rock which leans out toward the west overlooking Willow Creek canyon, creating a passage about six feet wide with a roof of large slabs of rock spanning from the outer leaning wall to the mother rock on the east side of the chamber. This cave is oriented generally west. The floor of the chamber slopes downward as you enter.

On the right or east side is a glyph wrapped across the "nose" of a rounded vertical edge of the rock consisting of six parallel lines which form a series of six concentric half-circles which cross the "nose" and form another series of concentric half circles to the left of the "nose". The smallest inner circle on the left is closed at the top and looks to be a very well articulated eye. Figure 17.

Farther into the cave five parallel, wavy, but essentially vertical lines rise from a chaos of inscriptions below to meet the roof slab above. To the left of these lines is a short double serpentine with marks in the loops. This small glyph resembles the ancient Chinese symbol for the moon, but more distinctly resembles the Mayan glyph for Venus. (Moran and Kelley 1969; Figure 17.

Deeper into the cave there is a glyph like a stylized tree, far up underneath a large boulder which makes up part of the interlocked roof of the chamber. It must have been very difficult to carve this glyph, but it is there nonetheless. It resembles a gage of some sort, but at this date it has not been

revealed to us just how this might work as no light has been seen to mark it. Because of its inaccessible location, it was barely possible to make a rubbing of this glyph. This glyph has a stem which begins in a 4 inch diameter circle at the lower end as do other glyphs at the site.
On the 1995 trip, I had determined to more closely inspect this glyph and record the events around the summer solstice to see how the sunlight interacted with this glyph. By watching it each day from the 18th through the 23rd, the narrow crack between the roof boulder and the east wall emitted a narrow band of sunlight that, on the solstice day, at 4:51 PDT, struck tangent to the rockface and clearly revealed a second circle with raised center point at the top of the glyph touching but offset to the left of the vertical stem. The sun was then as high in the sky as it would ever be at that azimuth (248*). After this climax, it retreated upward and never would illuminate the lower portions of the glyph. Figure 18, 19.

Bob Fortner, a fellow member of the BPAA had joined me at the site by this time and assisted in stretching a string from the center of the lower circle up through the light aperture to be fastened to a tripod. By dropping a plumbob from the same point we were able to measure the legs and hypotenuse of the string and determine the angle of elevation and with a compass, approximate the azimuth. Upon returning home at the end of the trip, I found the the vertical angle to be 68.9*. This information along with the azimuth, the latitude and longitude and the altitude of the site were given to Rollin Gillespie. He was able to determine that the only object in the sky in that position was the moon during its farthest excursion to the north on the occasion of its major standstill. He cautioned me that the hand-held compass, the magnetic properties of basalt, the questionable accuracy of the stretched string through the slot and several other subtle but important factors could effect the accuracy of our findings. However, there is no question that this is a gauge to mark both the highest elevations of both the sun and the moon. This glyph is then a most ingenious instrument contrived by the early people to do quite sophisticated astronomical comparative measurements. See Figure 19.

It now becomes necessary to return to Willow Creek once again, equipped with more accurate measuring instruments such as a transit, a laser pointer and other equipment to more fully record the pertinent information. The position of each cross-bar, the edges as well as the center of the lower circle, the slope of the rock wall etc. can then be plotted with precision. The true north can be determined as well with sun sights and Polaris sights so that this one will be caught safely in the net. Not to make excuses, but truly, if we had known what we would find with our preliminary measurements, we would have come better prepared.

The Summer Solstice Sunset Event

At sunset, I observed a long shaft of light, six inches wide, coming to a point exactly like a pencil, projected from the conjunction of the roof slab and the outer support rock at the mouth of the chamber. As the sun moved lower in the sky, this pointer traced around the outer ring of the right hand concentrics until it reached the top of the ring, level with the inner circle. It then pulled away to the right as the sun set.Figure 20. We asked ourselves if there might be some alignments on the occasion of the autumnal equinox, and we determined to return to the site on that date.

In 1995, Bob Fortner and I observed several dramatic effects during the course of the afternoon, prior to the event described above, when sunlight projected through various openings in the roof of the sunset chamber, struck the "sunset mask" from different angles, first illuminating the left side eye and concentric arcs, then later illuminating the right side in similar fashion. These very moving light plays emphasized the importance of the glyph as a figure to watch carefully in the approaching hours toward

sunset, and of course, the light pointer described above, did mark the approach and the specific day of the solstice. We watched each day during the course of a week and it definitely was possible to note the difference between the position of the light pointer on the days before during and after the solstice.

Here again was an incredibly clever instrument combining accurate observation with sheer drama. Whoever created this and other contrivances at this site was a gifted person of great genius. Who these people were and when they lived here is yet to be determined, however, they deserve our admiration and respect!

Autumnal Equinox sunset Event

On September 19, 1992, accompanied by Rollin Gillespie and Nal Morris, both accomplished archaeoastronomers, I visited the site again at the autumnal equinox. We were richly rewarded.

At sunset, on the 22nd, a shadow cast by a knob of rock to the right of the concentric half circle glyph, formed first what looked like the profile of an Indian, whose nose, acting as a pointer, moved up through the concentric rings changing as it moved to the shape of a female breast. When the point of the shadow reached to the innermost ring, it then moved out along the top ends of the rings to the very top of the outermost ring where it held as the last limb of the sun sank below the horizon. This was the identical point touched by the light pointer at sunset on the evening of the summer solstice.

I must say that this event moved us deeply. We had to ask ourselves if we had just seen a silhouette of the ancient astronomer himself, or perhaps herself.

Predictions

The equinox sunset event inspired us to investigate the possibility of an alignment involving the glyph to the left of the five parallel lines, the three lobed double-lined serpentine. By stretching a string from the center lobe to the apparent intersection of the stones forming the solstice light pointer, we determined with Nal Morris' expertise, and his lap-top computer loaded with his astronomical program "SHAMOS", that the 279.5* azimuth and the 9.40* elevation gave a prediction of 4-23-92 at 17:53 and 8-17-92 at 17:59 standard time for an alignment with the light pointer.

A cautionary note: The basalt at this site has magnetic properties which can affect compass bearings. Our bearings should be verified by observations of astronomical bodies and accurate timepiece before acceptance.

These dates are exactly 59 days on each side of the summer solstice date. This amounts to two 29.5 day lunations. The ancient shaman/astronomer/priests could mark the April 23 date by the light pointer resting on the marker glyph, note the phase of the moon, and wait until the moon was in the same phase twice, and know that on that occasion it would be the day of the summer solstice. Corroboration of the solstice day could be had by noting that two lunar cycles after the summer solstice day, the sun was found to set in the same place on the horizon, and the light pointer would again rest on the center lobe of the target glyph. Many years of observation must have been necessary to confirm this prediction of the summer solstice. On years when the moon was a new crescent in the evening sky this system would have been especially notable and distinct. This obviates the necessity of having a number system, or even having to make 59 notches on a stick. We determined to verify this prediction by direct observation on April 23.

The probability of there being a Winter Solstice alignment seemed to be strong, and I did visit the site on Dec 21 1992. Neither sunrise nor sunset alignment could be seen which means that there was none or that I missed it. Because the temperature was 17* F and there was 6 " of snow on the ground,

my theory is that the astronomers spent the winter in warmer parts, just as the Maidu were found to do. These hunter-gatherer people gathered together at their winter quarters in the lee of Diamond Mountain near Honey Lake.

I drove to the site on April 21, 1993.The following day, April 22, was a bright sunny day with small cumulus clouds sailing above but with plenty of space between for sunlight. I began observing at 1600 with 35mm camera and a video camera, taking pictures with both at 5 minute intervals. The sunlight entering the chamber gathered itself into a more and more narrow shaft until it became a sharp spear of light which sliced across the rock wall until the point rested about one inch below the center of the middle lobe of the target glyph. This spear of light grazed the ridges of the "sunset mask" and at the culmination of the sequence, it seemed to emanate from the eye of the "mask" and the point appeared to pierce the target glyph, almost to the center. Figure 21.

Crouching there in the rough-walled cave, I had the eery sensation that I was being glared at by the eye itself!

In Figure 22, the setting sun silhouettes the conjunction of the roof slab and the outer end of the west wall rock. I had hoped to see a more precise verification of our prediction on April 23, the predicted day, but the morning showed low heavy clouds, with snow squalls on the nearby mountain and the beginning of a major storm. There was nothing to be gained by staying, so I headed home certain that our theory was correct.

ADDENDA

The 1995 expedition gave the opportunity to more fully explore the other features of the site. Below is a summary of some other features of significance.

West of the main escarpment is a column of rock containing a carefully pecked grid. This has three lines of four squares with a diagonal running through the lower left hand square. This looks like a calendar showing 12 moons in the year and sometimes a 13th. Adjacent to this large glyph is a figure incorporating some natural tight fissures in the rockface that looks very much like Orion. Close inspection revealed that the fissures have been carefully pecked along the outlines of the figure. Figure 23.

Rubbings of the large stone below and to the west of the main escarpment, south of the column of rock mentioned above is a row of three circles connected with a line. If one stands on the concave face of this rock looking down at the glyph, it will be in the same relationship to the viewer as the belt of Orion will be as it sets on the horizon in the exact west in a horizontal position. This is the counterpart of the line of three connected circles to the left of the sunrise chamber, which is, with its upper circle offset to the left, a perfect representation of Orion's belt as it rises in the exact east in the Autumn. Figure 24.

Another monolith, north of the above mentioned one, carries a glyph of three concentric circles. If a person stands in front of this glyph, he looks up slightly, gazing directly north. If he raises his vision above the monolith, he is looking directly at Polaris around which the stars appear to rotate in concentric circles.

Above and to the left of this glyph is a glyph that seems to represent a standing person. Immediately to its left and somewhat below is a five "fingered" glyph sharply made, definitely not a representation of a hand. This is virtually identical to the "Freestone Proportional Glyph" shown as Fig. 3c in Nal Morris' preliminary report on Parowan Gap. Figure 25.

AFFINITIES

While it is beyond the scope of this paper to discuss similarities between this site and other sites, I would like to suggest that the glyphs at Willow Creek have an affinity with several other sites.

The Wallula Petroglyph Stone, found along the Columbia River, lying prone, but now standing vertical outside Portland City Hall has many features similar to the glyphs at Willow Creek. The local native people claimed that it was done by people who preceded them but was used as a goal for daring rite-of-passage rituals by young men. (Hill and Hill 1974)

The site investigated by John Curtis at Little Blue Table in SE Idaho is similar in both setting and inscriptions to Willow Creek. We intend to investigate this further.

The site at Swansea, Inyo County CA (INY 272) described in a paper by Roderick L. Schmidt in ESOP Vol. 21 1992 has similar characteristics. (Schmidt 1992)

The functioning of the site and many of the symbols found at Newgrange, Ireland echo the work at Willow Creek. (Brennan 1983)

Certain of the Willow Creek glyphs look very much like early Chinese symbols carrying meanings appropriate to the context of the site. (Lindqvist 1989)

Several patterns of small circles connected by lines are similar to the manner in which the Chinese and Aztecs recorded constellations. (Moran and Kelley 1969)

The functioning of this site and certain symbols used are much like the Parowan Gap site.

When the Long Lake site is exposed by a properly conducted archaeological dig, the glyphs should be analyzed and compared with other sites such as suggested above.

CONCLUSIONS

This site was used as an observatory for noting the Summer Solstice, the Autumnal Equinox and possibly other events including dramatic alignments which allow a prediction of the Summer Solstice by marking the date 59 days before and after the event. It is now clear in 1995 that not only the sun was being observed but that the moon and certain groups of stars were being observed, measured and recorded as important vestiges of seasonal changes. The ancient people who used this site were probably hunter-gatherers, who developed an elaborate and sophisticated method of noting, measuring and marking various celestial events. The ancient people found that this site lent itself to some unique alignments of sun and season and with a little modification and embellishment, turned the natural rock caves into chambers to memorialize various events that they observed. The "little embellishment" is not meant to disparage the tremendous amount of work and long years of observation that created this ingenious observatory which still works today. The oldest or "Classic" petroglyphs are very old, as evidenced by the depth of the carving, the similarity of patina to the untouched rock, and comparison with the other fresher, newer looking inscriptions. How old is yet to be determined, perhaps by cation ratio dating, or by determining the shift on alignments, or by measurement of the depth of weathering for bare rock compared to rock protected by being painted with red ochre, or by other means unknown to this author or yet to be developed. While certain affinities to old world sites, symbols and observations suggest themselves, no definite conclusion can be drawn at this time as to any influence from other than indigenous cultures. However, with hints suggested by this site, these avenues should certainly be pursued.

The investigation of 1995 involving the "tree glyph" indicates that it may be possible to establish the date that this glyph was originally used according to Gillespie. More accurate and thorough

measurements must be taken to achieve this end. It can confidently be concluded that this site was used over a very long period of time and reasonably concluded that more than one culture inhabited the area and used the observatory or at least mimicked the inscriptions. This site, as a natural happening, could have made the event of sunlight penetrating the womb of the earth more magical, more significant to the ancient people who first witnessed them than if a mere human device or structure had been erected to accomplish the same ends of marking the change in the seasons. This was the COSMOS itself involving mankind in it's miracles. These people, immersed in nature, belonged to the cosmos and it's processes, and with ritual, they could play a part, to maintain the balance, to preserve not only their fragile culture, but the COSMOS itself. Hudson and Underhay in "Crystals in the Sky" describe the beliefs and rituals of the California Chumash tribes who carefully studied the heavens and conducted regular ceremonies in order to provide "ritual sustenance for the community and supply meaning to life itself". (Hudson/Underhay 1978) They suggest that these beliefs were common to many if not all of the California tribes.

At the very least, this investigation, which is only beginning to reveal the information about the use of the Willow Creek Observatory, should demonstrate that some of the enigmatic glyphs throughout the western United States, can be better understood if it can be shown that they are in an astronomical context. This new perception of the purpose of the site and it's glyphs can move the appreciation and understanding of this ancient work from merely "art" into the realm of functional astronomical symbolism and notation which in turn can give us better understanding of the concept of the cosmos in the minds of the ancient astronomers.

Fig. 1 Northest face of basalt outcrop showing entrance to sunrise chamber.

Fig. 2 The "signboard" panel above the sunrise chamber entrance.

Fig. 3 Top of the "fallen stone" showing much eroded glyphs. Note the small five "fingered" device in the center and the crossed circle and the divided circle with a dot in each half.

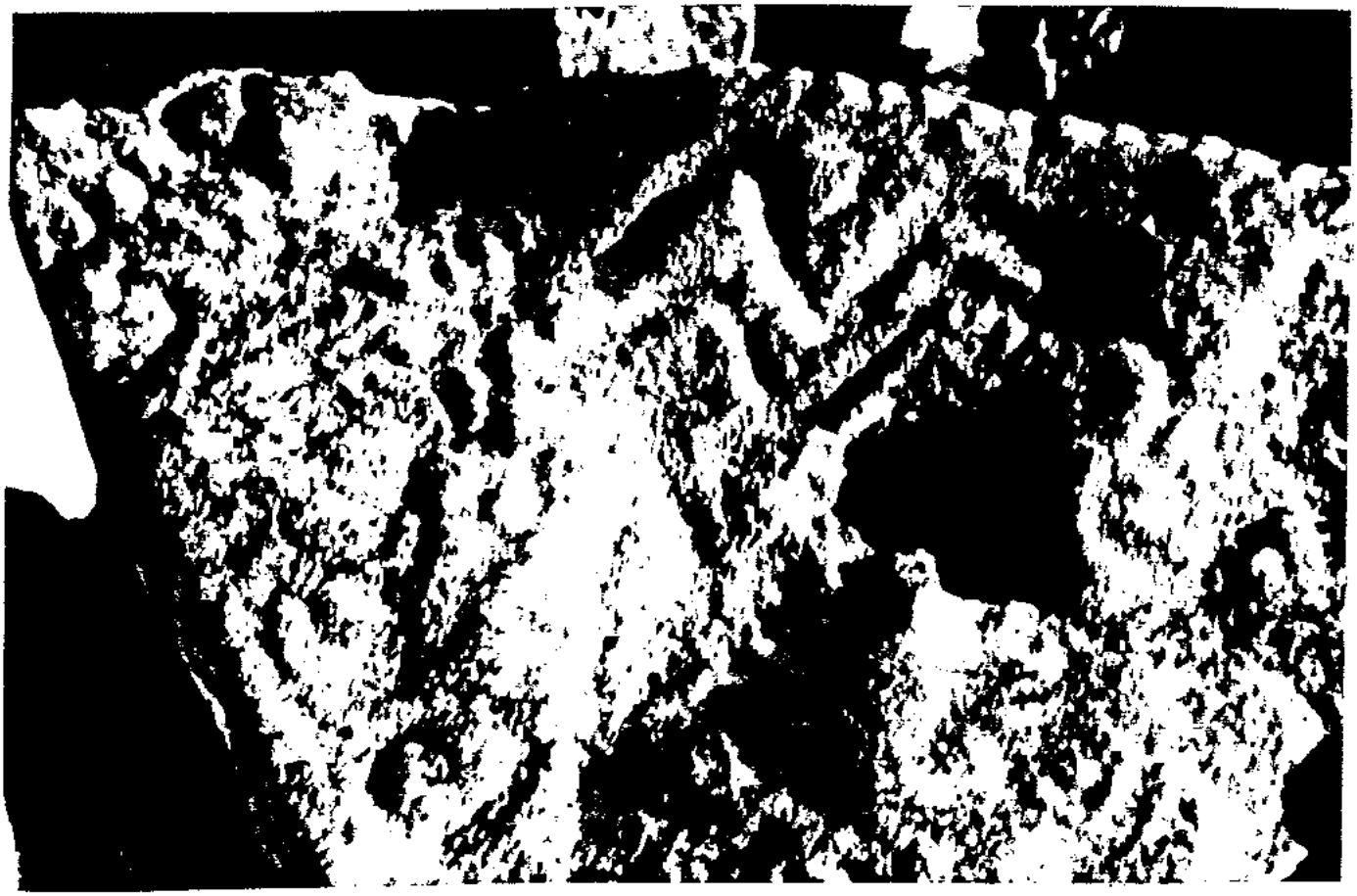

Fig. 4 The top of the still standing companion to the "fallen stone" showing deeply carved and greatly eroded glyphs.

Fig. 5 Rock face to the right (west) of the entrance to the sunrise chamber. Note the two concentrics that wrap across the horizontal ridge at lower left. These seem to symbolize that this is the place where the sun turns back.

Fig. 6 A sinuous line with 12 lobes and a 13th with a line through six and a circle and dot for a "head". A perfect lunar year cycle symbol.

Fig. 7 Four circles connected with a line and close beside it a circle with a cross-bar with a lobe at each end, and a circle above connected to the stem line. You are facing northwest when you look at this glyph. What constellations set in the northwest that these can represent?

Fig.8a A seven-legged glyph with a slightly bent top-bar on small boulder jammed between the walls of the sunrise chamber.

Fig.8b Same glyph with the finger of light striking the center leg on June 21, 1995

Fig. 9 The "grand sunrise glyph" on the east wall of the sunrise chamber.

Fig.10a The heron-like bird above the grand sunrise glyph appearing to rise from the body of a dead bird.

Fig.10b The eye of the bird fully illuminated by the rising sun on the day of the summer solstice.

Fig.11 The first light from the rising sun on the summer solstice casts a triangle of light shaped by the stones of the cave on the back wall where once stood a target stone.

Fig.12 The rising sun illuminates the sinusoid that enters the "seasons mask" lower left quarter, crosses the center-line and turns back.

Fig.13 Later in the morning, the sunlight/shadowline marks the center of the seasons glyph and two sun symbols.

Fig.14 Outside the sunrise chamber, two different arrays of lines note the six months on each side of the equinox.

Fig.15 On the west wall of the sunrise chamber, a complex of visceral lines coil under themselves in palces. A very unusual effect in western petroglyphs.

Fig.16 At first sun on the equinox, a shadow line exactly matches the line of chevrons in the preceding figure.

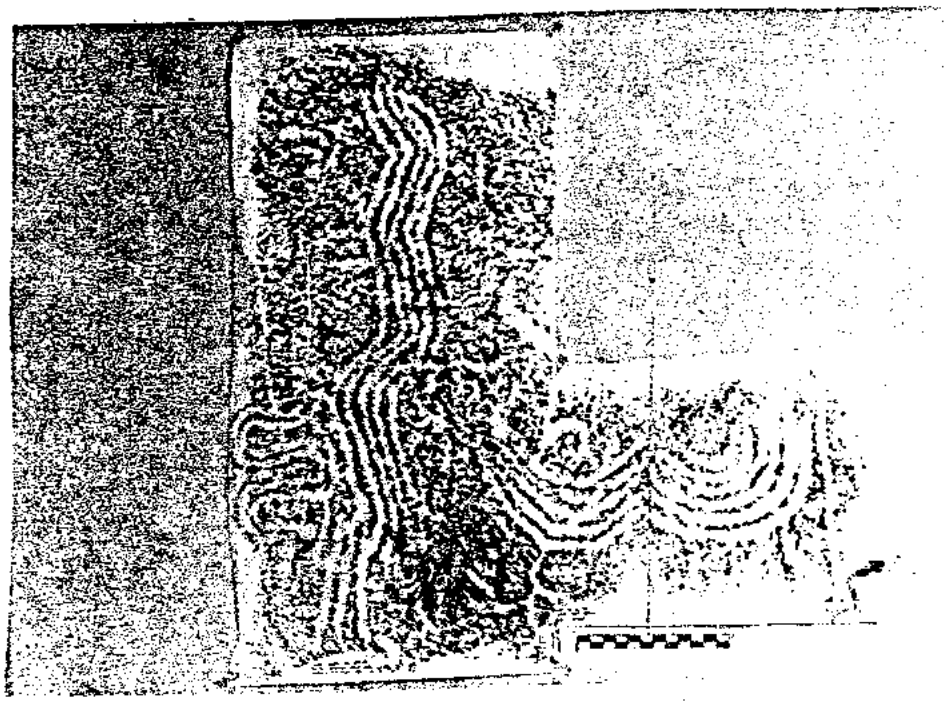

Fig.17 Arrangement of glyphs on the east wall of the sunset chamber. Note the one-eyed glyph on the right.

Fig.18 Farther into the sunset chamber, high up on the east wall, almost inaccessable, is a glyph that is a guage to mark the northernmost positions of the sun and the moon.

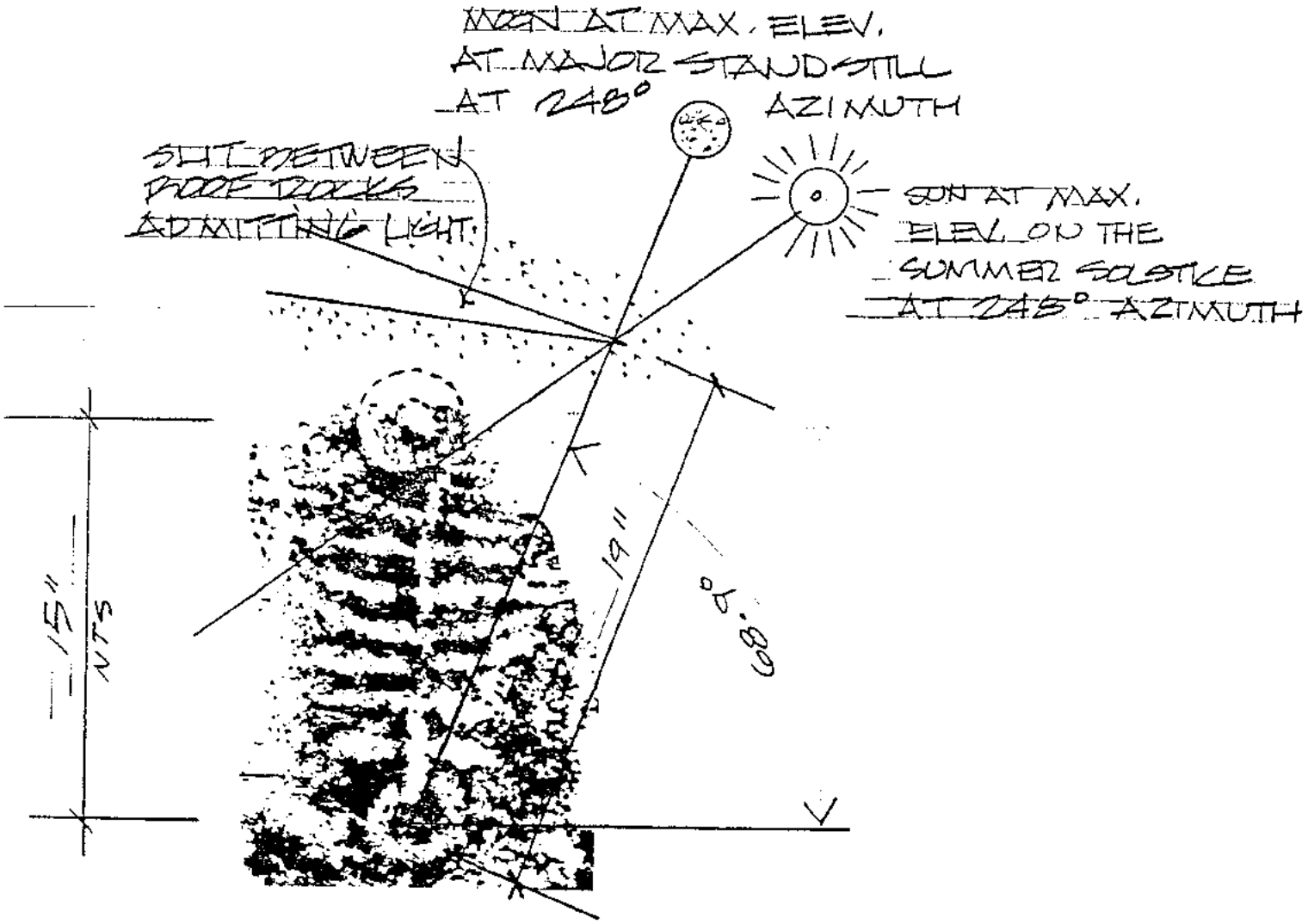

Fig.19 Diagram showing the observed and measured angles of the sun and the moon at their most northern excursions.

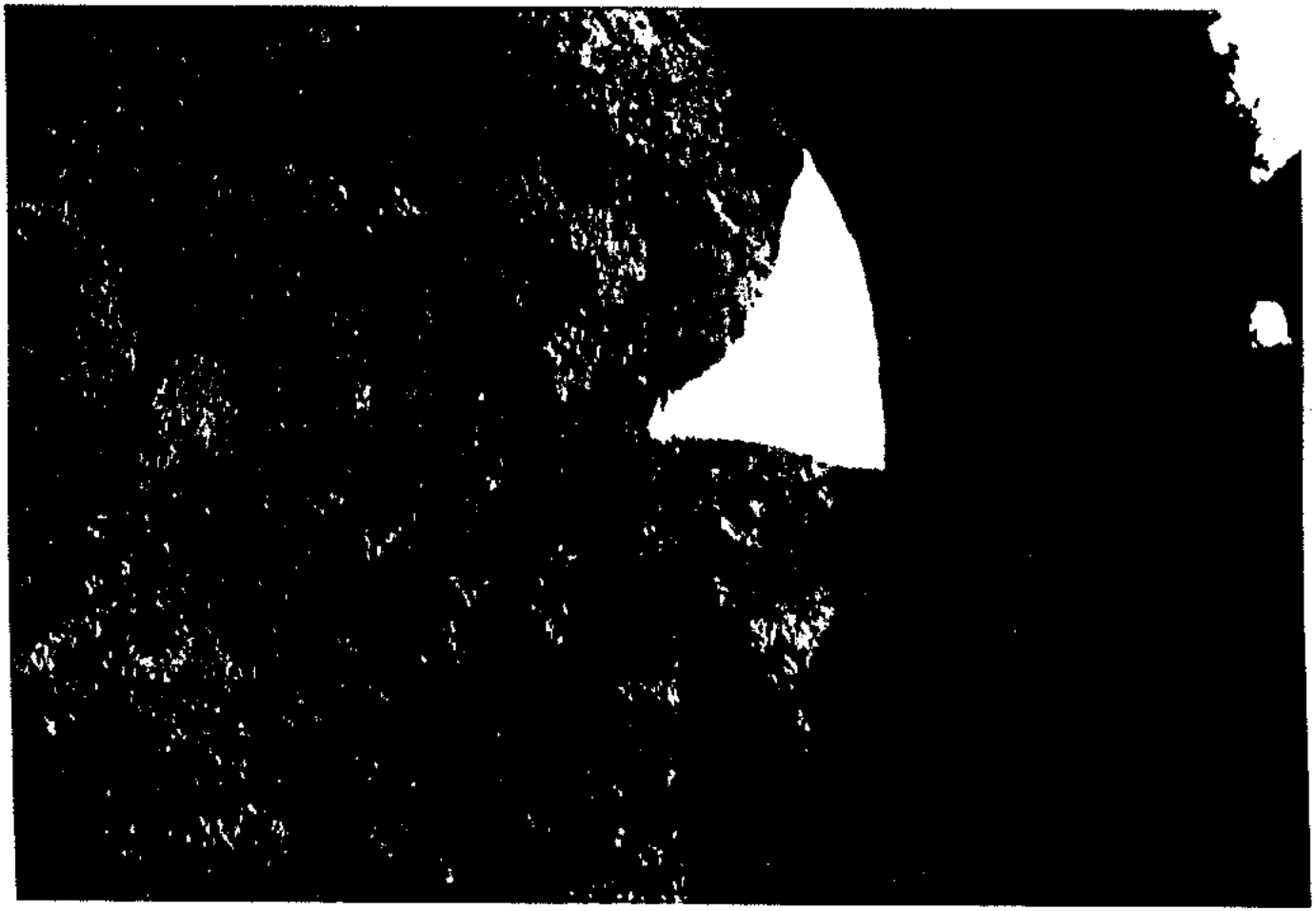

Fig.20 The light pointer just leaving the top of the outer concentric arc toward sunset on the day of the summer solstice.

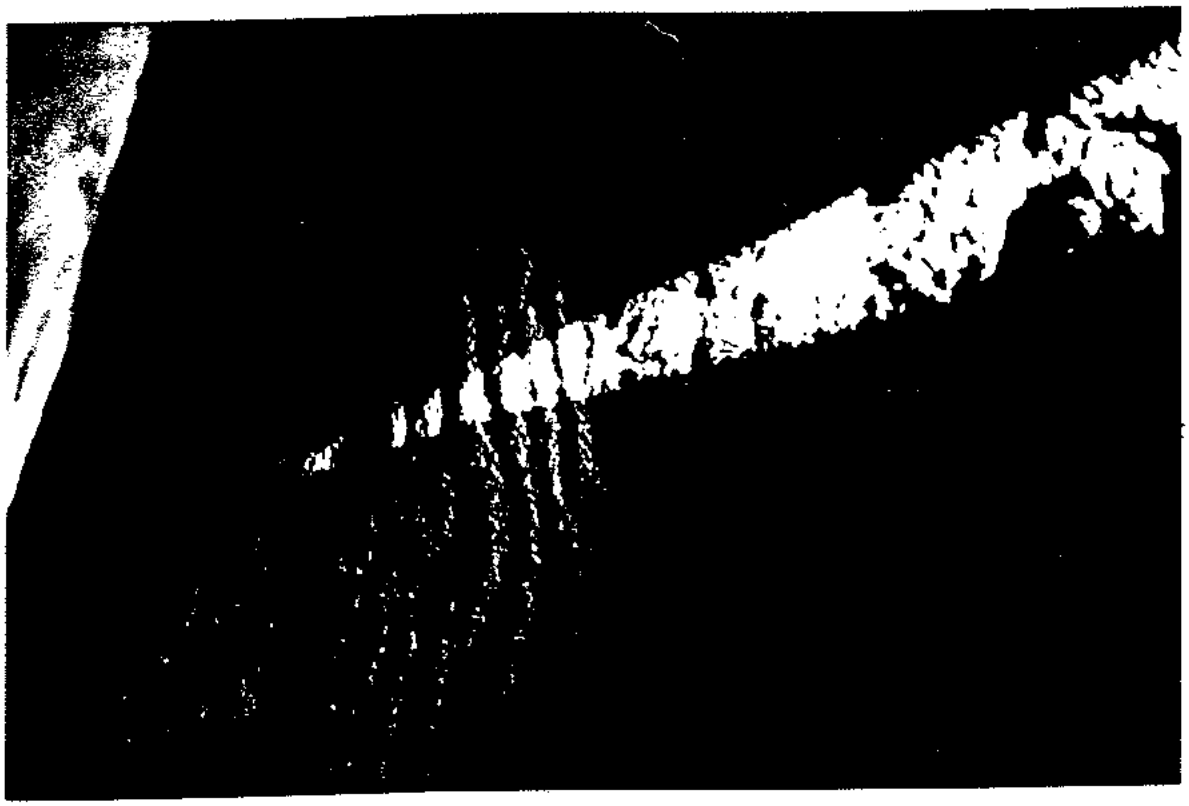

Fig.2! The light spear emanating from the eye of the "sunset mask" striking the center of the double serpertine to predict the summer solstice by two lunations.

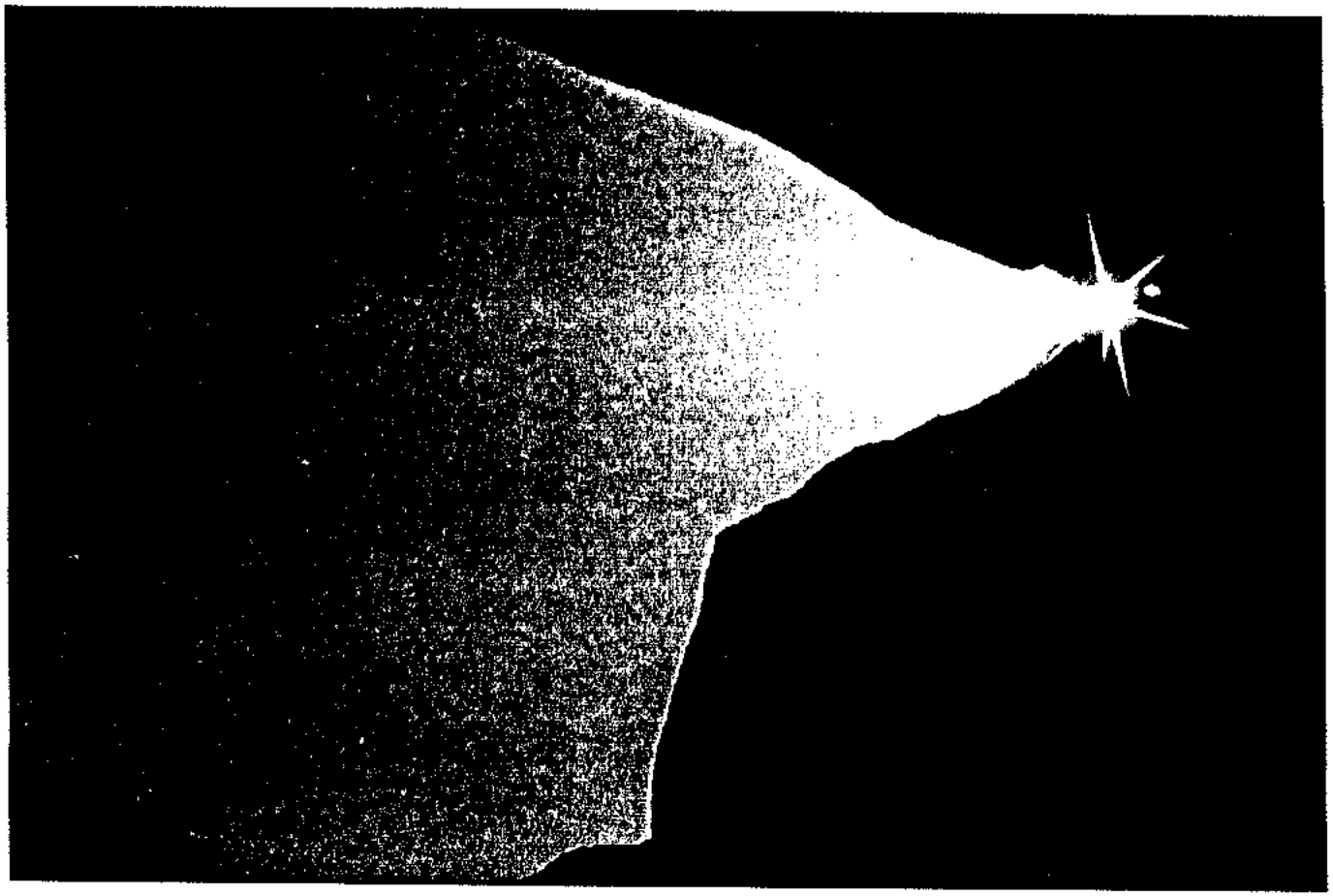

Fig.22 The roof rock and the otuer ledge shape the light pointer at the mouth of the sunset chamber.

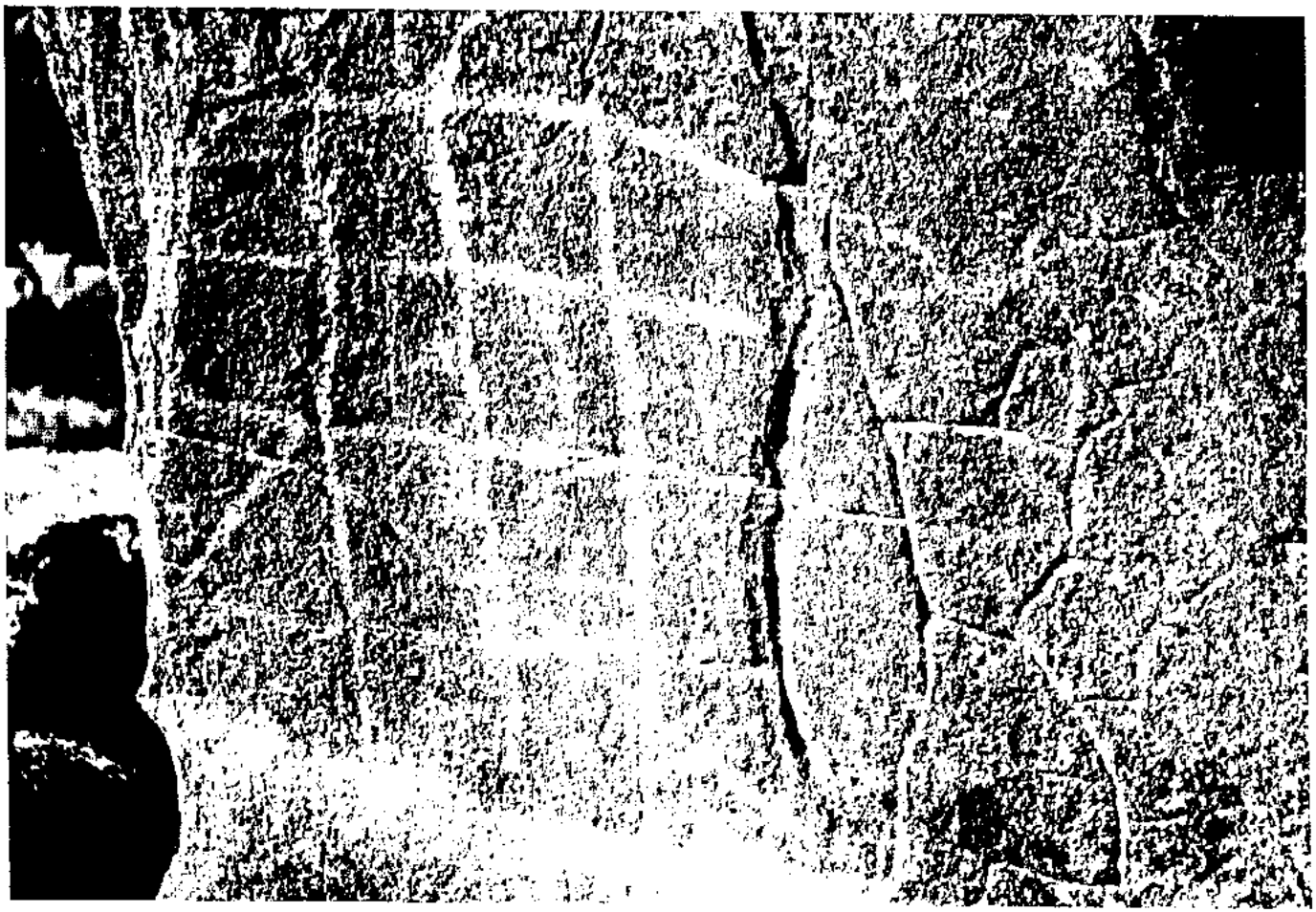

Fig.23 The "year grid" showing 12 and sometimes 13 full moons in a solar year with a figure to the right that may represent Orion.

Fig.24 This array may represent Orion's belt as it rises exactly in the east. Note the off-set of the upper circle. Orion's belt does the same.

Fig.25 On the south face of a monolith west of the main escarpment is this concentric, human-like figure and a proportioned half-year glyph like one at Parowan Gap, Utah

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I further wish to acknowledge the support and encouragement of my wife, Carol Patterson-Rudolph, for the constructive criticism and great assistance in preparing this paper, and to Rollin Gillespie and Nal Morris for their companionship and helpful suggestions and advice during the investigation of this site.

This paper has been prepared to record new information about the site subsequent to the Connick's discovery, namely the Summer Solstice sunset event, the Autumnal Equinox sunrise alignment, the Autumnal Equinox sunset event, and the confirmation of the 59 day Summer Solstice prediction event.