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SUMMER SOLSTICE OBSERVATIONS IN INDIAN CREEK

Many areas of Fremont and Anasazi habitation seem to have only one or two ancient solar observatories. Indian Creek, Utah, is unique because in that area there is a high concentration of solar observatories. It is possible that there are other such areas awaiting discovery. Solar observatories served to determine summer or winter solstice and the vernal or autumnal equinox. The phenomena that occurred at an observation site were intended to be observed at a specific time between sunrise and sunset. The length of time that the phenomena last will vary from site to site. One site progressed through its points of contact in ten minutes, while another took over four hours.

Problems arise in determining which sites are observatories. The time of day and the season of the year that an observer must be present to determine that the site is an observatory is only one problem in their identification. The major reason that many observatories have not been discovered is that so few individuals are interested.

Because of the large concentration of possible solar observation sites a four day itinerary of four site observations each day was planned around summer solstice. If all went well, I hoped to record at least 18 sites, one after another. Unfortunately, half of each day the skies were overcast and it rained somewhere in the canyon every day. Consequently, most of our time was spent racing clouds and chasing shadows.

At some of the sites that I felt had strong solar implications no interaction of light or shadow occurred with the glyphs. These

sites may be either equinox or winter solstice sites. Calculating the time that the site would perform was another difficulty. If the site did not perform in the morning I returned in the afternoon. Even with all the difficulties I was able to observe 11 of the 18 panels. Of these 11 panels I was able to photograph only seven that were unique. Eight panels had no significant interactions. The remaining three panels had one or two small unique occurrences but the rest of the composition was unaffected. Several panels that I had not intended to observe, but were located next to panels I did observe, turned out to be far more impressive.

In the Indian—Davis Creeks Survey these sites have been assigned numbers. For convenience many have been given names that are suggested by a characteristic of the site. Many of these panels should be individual reports. Because of the large number of sites it would take years to present them a few at a time. Because of the pressure of the proposed Nuclear Waste Dump it was considered necessary to include them in one report to get the information out as fast as possible. The following is a description of what occurs at each site.

Time Clock

This panel is high and to the right of the McCreery Site, named in honor of the couple who discovered the winter solstice Observatory in the upper section of these panels. Many of the glyphs in these panels seem to have astronomical implications (Wellmann 1976; McCreery 1982:149). Since the McCreery's observed this site at

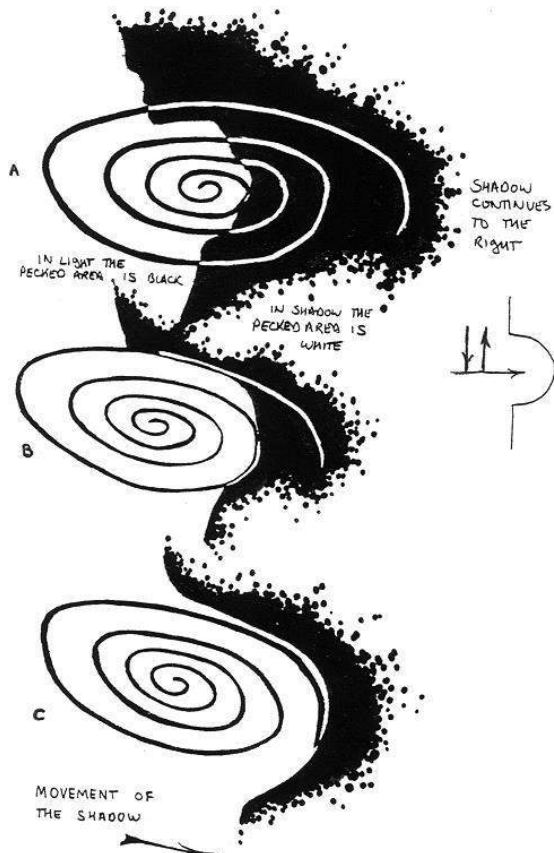


Figure 1 The Time Clock

winter solstice and found no interplay of light, shadow and glyphs, I felt that one or more of the remaining panels should perform during summer solstice. The only panel the clouds allowed us to watch was the *Time Clock*.

By the way the crescent-shaped shadow moved across the spiral (Figure 1) it became obvious that the circular indentation of the shadow indicated the placement of

the spiral. Viewing the curvature of the shadow's edge may not be the way the artist visualized this interaction. Most of these solstice panels can be viewed as either a positive or a negative picture. The negative view would be to visualize the curvature of the shadow. The positive view would be of a round projection of light pushing the shadow off of the solar symbol.

The first photograph was taken at 10:33 A.M. (All times are Daylight Saving Time.) The shadow's position at point B was at 10:38 A.M. At 10:48 A.M. the shadow reached point C. During equinox, three months later, the shadow had no crescent shape and moved across the same spiral in a straight diagonal line at 10:10 A.M. This verifies that the crescent-shaped shadow cupped the spiral only during summer solstice.

Double Spiral

This panel is located on a boulder on the valley floor. When I arrived at the site the shadow was already on the diagonal line connecting both spirals (Figure 2A line 1 and 2B line 1). It is possible that the other

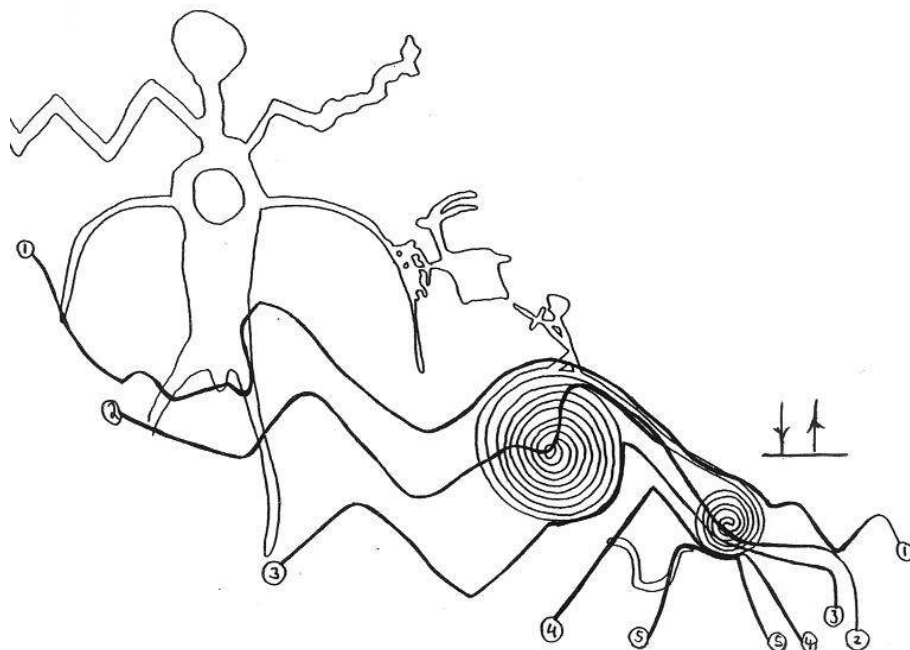


Figure 2A Double Spiral; Summer Solstice 1982

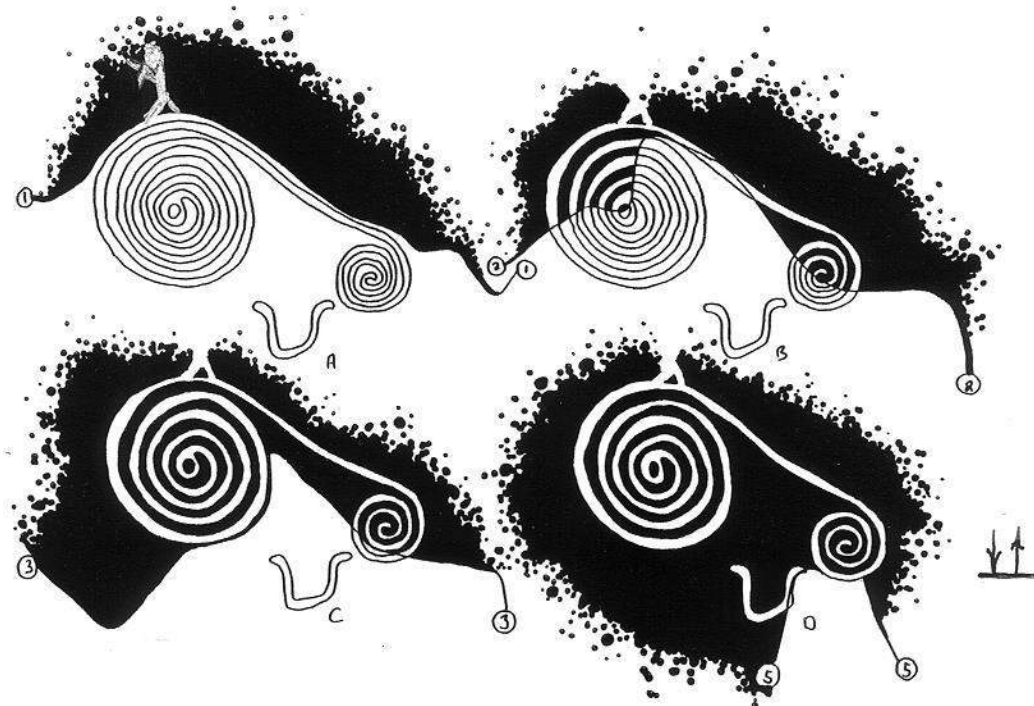


Figure 2B Double Spiral

glyphs on the panel had an earlier interaction. During the time the shadow descended across the panel the sun was directly overhead. Two small ripples in the upper surface of the boulder produced the shadows shown on the drawings. The shape and subsequent movement of the shadow evidently suggested a type of double spiral. The artist placed the double spiral so that the shadow curves around the top outside revolution and cuts the center of each spiral in half at the same time (line 2, 1:37 P.M.; line 3, 1:40 P.M.).

Line 3 illustrates the shape of the shadow as it curves perfectly around the outside bottom right portion of the center left spiral. The curve of the shadow's line above and below determined the size and placement of the left spiral. As the shadow continues to move downward, it forms a triangle of light above the "U"-shaped enclosure. This could be an

important symbolic relationship. This same relationship may be implied in the panel of *The Swallowed Up One* (Figure 7 line 4). The shape of the shadow in line 4 changes to create a pedestal of light illustrated by line 5. The top of the pedestal cups the bottom of the small spiral. This looks as if the artist may have tried to represent the sun balanced on top of a pinnacle.

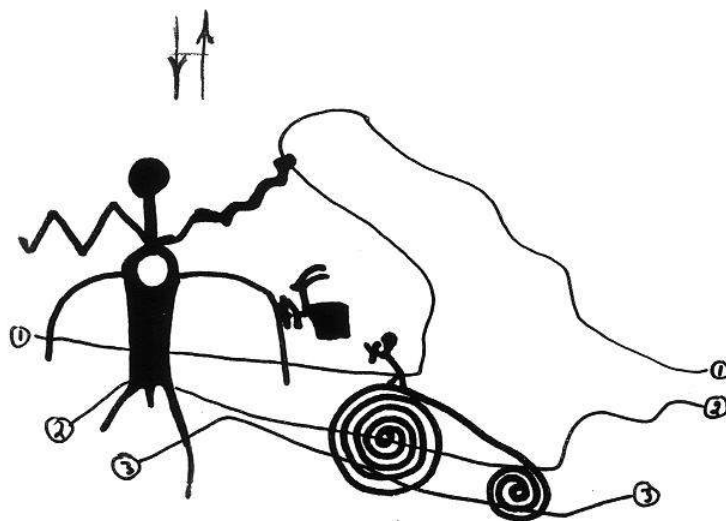


Figure 2C Double Spiral; Equinox 1982

Like the shadow at line 3 that creates the bottom curvature of the edge of the larger spiral, the position of the shadow at line 5 creates the bottom edge of the smaller spiral. Thus, the shapes and placement of both spirals were predicted by the shadow's movement. This is an extremely unique situation and is not a chance occurrence. The placement and size of each spiral were suggested by the shape of the shadow. The conformity of the shadow with the double spiral illustrates the foresight that went into these solstice compositions.

This panel has unique and important interactions that cannot be accidental. One, the top outside edges of the double spiral basically conform to the edge of the shadow. Two, both spirals have their centers bisected at the same time. Three, the inside and bottom edge of the large spiral conforms to the edge of shadow. Four, the triangle of light above the enclosure cups the smaller spiral. Five, the dual features of

the pedestal of light determines the outside curve of the right spiral. Six, this creates the visual impression of sunrise or sunset over a geological feature.

At equinox the sun's angle moved to the right and the shadow made a horizontal pass down over the composition without any unique relationships. This proves that only at summer solstice does the unique interactions of shadow and spiral occur (Figure 2C).

The Extended Arm Panel

On June 21 I went up to this panel at 7:30 A.M. At that time the shadow was in Position B (Figure 3). The crescent portion of the shadow was to the right of the spiral and was moving to the right. This indicated that this was probably a solstice site. The next day after photographing a sunrise in Davis Creek I returned at about 7:00 A.M. to see the shadow in position A. Other points of contact could have been made

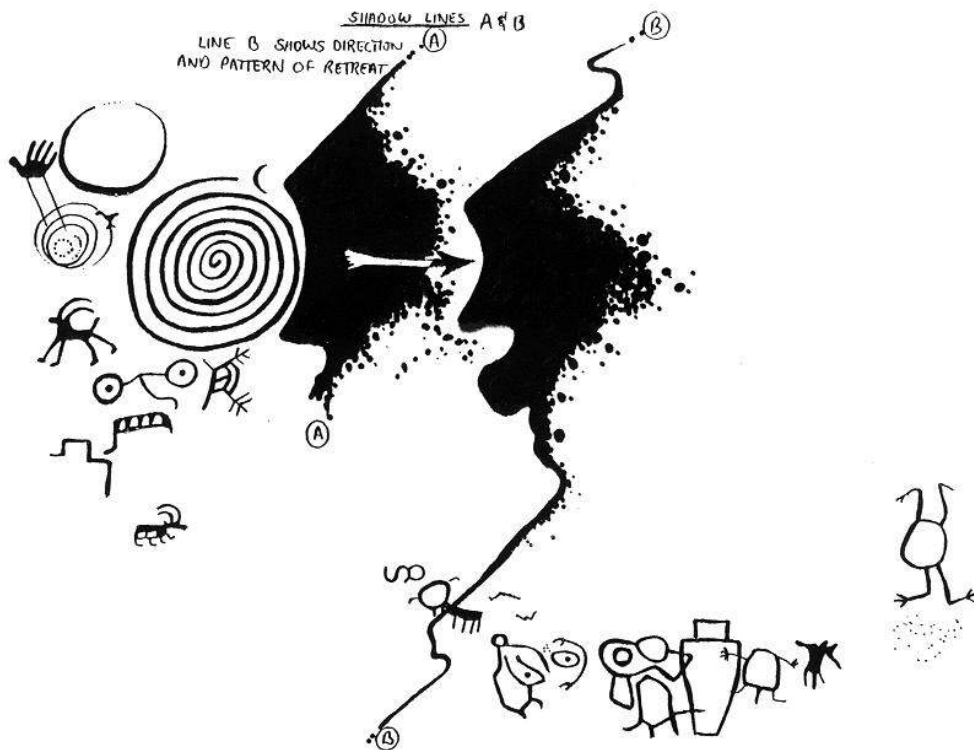


Figure 3 Extended Arm Panel

with other elements of the composition that surround the spiral, but I was unable to observe them. Notice in Figure 3 how the upper cusp of the crescent-like shadow is moving away from the center of the vertical crescent. It looks as if the upper cusp of the crescent-shaped shadow may have contact with the pecked crescent.

The shadow does not have the same form as it moves across the spiral during equinox. However, this same spiral interacted with an upper panel in the afternoon of September 22 on the autumnal equinox.

The Snake and Circle Shelter

This composition consists of a four-ringed concentric circle at the lower left and a long undulating snake above and to the right (Figure 4). A crescent and a large dot occur at the bottom central part of the panel. From the head of the snake a peaked line rises up, bends back and again rises to join the right central portion of a randomly pecked circle.

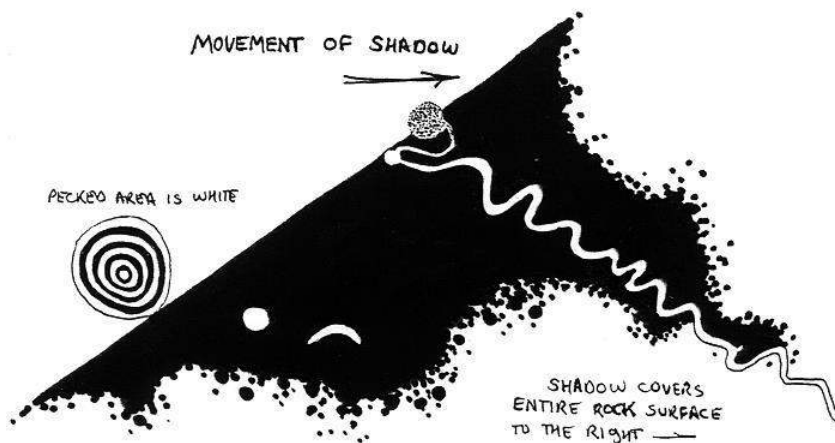


Figure 4 Snake And Circle Shelter

At 9:02 A.M. the angel of light touched the left outside edge of the concentric circle. At 9:10 it bisected the center ring. By 9:18 the light had moved to the edge of the concentric circle and at the same time touched the nose of the snake, and cut the randomly

pecked circle in half. This makes three points of contact.

This angle of light and shadow will become more offset each day until at equinox the sun moves vertically through the composition without any points of contact. At sunrise the vertical edge of the sunlight first appears to the right of the concentric circle. This makes it obvious that element placement could not be accidental and the observation was intended to be made at the time of summer solstice. The mathematical probability of the shadow accidentally interacting with the three prominent features of this panel during summer solstice and not at other times of the year is too great to be coincidental.

The Press Room

This is the most complicated set of interactions observed. The site consists of three large sections of stone. One boulder is split in half. The eastern half leans over the boulder with the panel, creating a shelter.

When I arrived the shadow had already progressed into the composition.

At 10:23 A.M. the shadow (Figure 5A line 1) was at a forty-five degree angle—with its top edge to the right. As the shadow moved to the right, the top edge of the shadow moved slower than its bottom edge. As the shadow moved across

the lower portion of the first spiral (Figure 5 line 18), the shadow's edge began its vertical alignment. From this point the angle of the shadow reversed as the bottom of the shadow began to advance faster than the top.



Figure 5 The Press Room; Summer Solstice 1982

The portion of the panel that has the most interaction with the edge of the shadow is

two parallel rows of dots that were placed horizontally across the panel (Figure 5

features A and B). Several single spirals, a reversed spiral and several other odd features on the panel also interact with the shadow. As the shadow swings across these two rows of dots they do not always line up dot for dot. There is some superimposition on this panel, however, it is felt that most of the composition is related to one stylistic period. A considerable amount of effort would have to be expended to unravel all the relationships expressed on this panel.

Some of the more obvious alignments involve irregularities in the shadow that conform to succeeding points, as well as bisection of various elements by the shadow. Some of these interactions involve such things as line 9 (Figure 5) which bisects two spirals at the same time. Lines 11 through 14 have a small bend in the shadow that successively curves around three dots and one undulation of the snake-like line. Lines 6 and 7 cup the left side of the left part of the double spiral. Lines 13 and 15 align with the descending and ascending tails that join the reversed spiral.

The shadow at line 18 touches the left side of the head of the upper anthropomorph, bisects a dot in the lower half of the reversed spiral, cuts through the center of that spiral, continues through a dot in the center of that spiral, then continues through a dot in the center of an anthropomorph's head located below that spiral. This makes a total of four unique points of contact. It is at this point (line 18) that the angle of light reaches its most vertical position, another important relationship. An observation made at the site when it was discovered on March 29, 1982, (one week after spring equinox), as well as another observation at the fall equinox revealed that when the shadow reached the position of line 18 it was not as vertical as it was at summer solstice. Clouds prevented an observation during winter solstice.

Since there is so much interaction in this panel I am uncertain of its exact significance. Certain features do seem to have an interrelationship with the shadow at summer solstice, more so than at any other time of the year that I have noticed. The two long rows of dots in the next two panels to be described are in the same area and consist mainly of dots.

The Stage

Only after careful consideration does the relationship of the dots in this panel become apparent. This panel seemed rather simple and unimpressive when first viewed. The panel consists of seven dots arranged in a crescent shape (Figure 6A and 6B). Between dots F and I is an abstract element. Between dots I and N are a snake-like line and an S curve.

This panel was photographed both in the morning and the afternoon. A shadow moved across the panel both times, however, the morning performance was the only one that had any unique interaction (Figure 6A).

The sun seemed to push the shadow open giving a right and a left hand shadow line. The effect was like the curtains of a stage being opened. The right side of the line made a constant and consistent movement to the right. On the left side line 0-4 moved from dot E down a short distance then back to dot E. While the left side moved down and back across dot E, the right side moved across points F to I. Line 5 (11:26 A.M.) had no corresponding point of contact while it touched the bottom left tip of the snake-like point at J.

Line 7 (11:33 A.M.) went through the vertical undulation of the snake-like line, through dots N and A, making three points of contact. Line 8 (11:38) touched the nose of the snake-like line and went through dot C. At 11:42 A.M. line 9 went through the

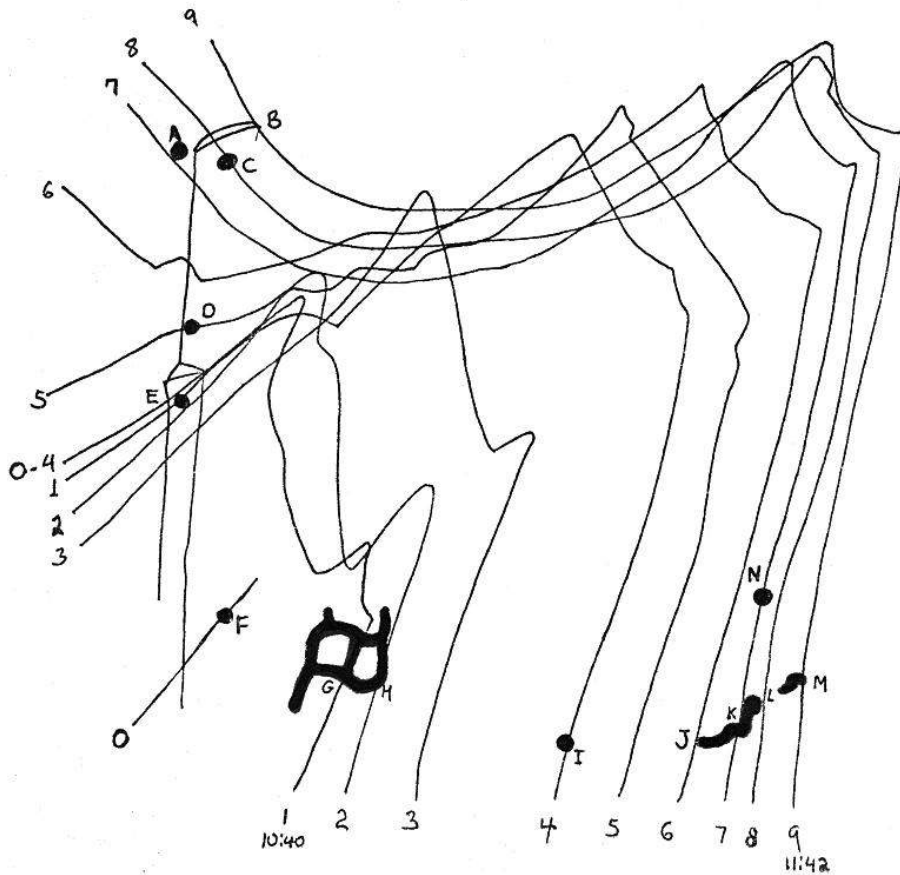


Figure 6A The Stage

nose of the S curve (point M) and touched the right tip of the natural feature at point B.

There is a large platform below this panel. Because of the platform and the effect of the shadow openings like a curtain, this panel had been called *The Stage*. With the way our culture likes to think in precise and clean cut terms it is difficult to visualize such abstract interactions. I have no way of knowing what was in the mind of the one who created these interactions. I sat there amused and entertained with the analogy of curtains. Whether they sat there for enjoyment of mere abstract interaction or some mythological portrayal, we will never know. The relationship of the shadow's retreat and the enlargement of the mass of the light, with the curved line of dots, is obvious, but their intent is definitely not.

Only the movement of light and shadow, and how they interact with the panel, help explain why the dots occur where they do. We may not comprehend the full meaning

of this representation, however, we must realize that the artist did have a purpose in mind when he created it.

The Stage and *The Swallowed Up One* show the importance of observing sites in both the morning and the afternoon, as well as at other important solar times of the year. When you find panels whose performance does not seem at all impressive, you could pronounce it as not being a solstice site and leave. Without

making observations at other times of the day or year, one cannot be certain that he

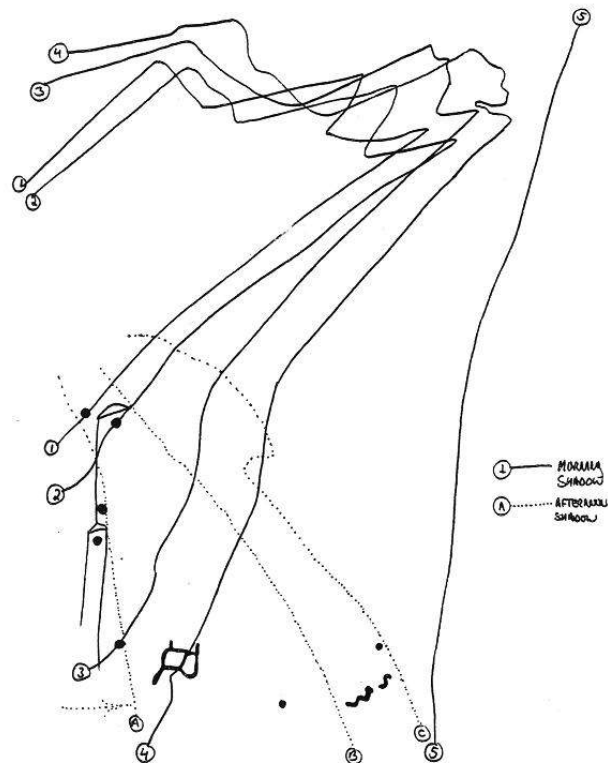


Figure 6B The Stage; Equinox 1982

has witnessed the most impressive or unique interactions.

At the time of equinox, the same basic form of light appeared on the cliff face but it was at least six feet above the composition (Figure 6B). Instead of opening up as it did during Summer Solstice, the light simply widened slowly and moved up the face of the cliff at a forty-five degree angle to the right. This indicated that the important time for observation of this panel was during summer solstice. It is important to call attention to the common use of a circle or anthropomorph, which is swallowed up or

The Swallowed Up One

This panel was also observed in the morning and the afternoon. At 10:45 A.M. the sun had moved down the panel to the diagonal ridge that bisects the panel at line 7 (Figure 7A). Since this ridge is an indistinct line, it was obvious that this was not the proper time for observation. At 2:30 P.M. the panel was in total sunlight. By 3:00 P.M. a diagonal shadow had begun to creep up on the cliff. When the shadow at line 1 had reached dot A it was 3:24 P.M. Between 3:24 and 3:50 P.M. the shadow moved closer to dot A, bisected point H and the natural spots lower down the line. At

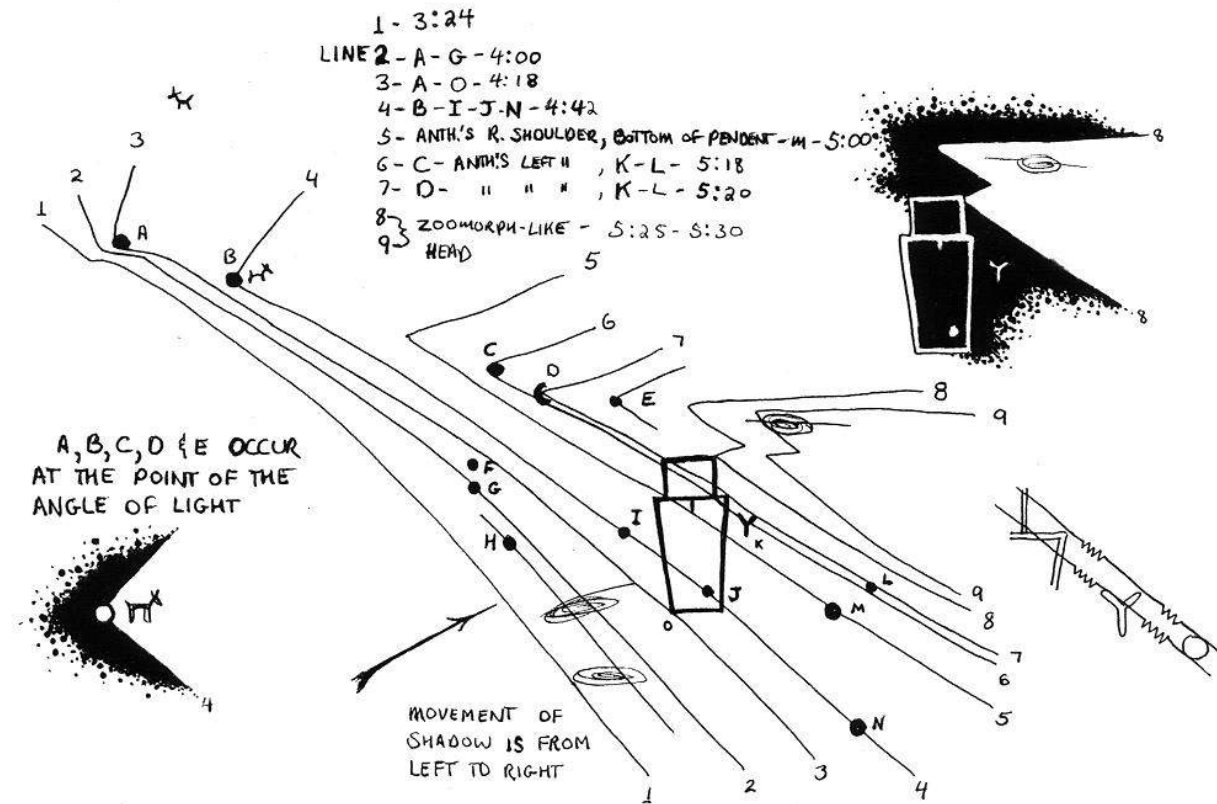


Figure 7A The Swallowed Up One

cupped on a crescent of light or a notch of shadow. The notch in the light mass at equinox could have been taken advantage of in this way, but it was not. This also indicates that the panel was a summer solstice site.

4:00 P.M. line 2 connected dots A and G. The top end of line 3 at 4:18 began to bend to the right to create a sharp angle of light pointing to the left. This could also be viewed as a notch within the shadow.

Dot A at this time occurs in a unique position. It is right at the point or in the notch of the shadow. At 4:42 P.M. (line 4) the point of the angle of light moved from dot A to dot B, and the edge of the shadow made contact with dot I. It then cut diagonally across the body of the anthropomorph and through dots J and N, thus making four points of contact. At 5:00 P.M. (line 5) the notch narrowed until the point of light became more of an acute angle. Three-quarters of the way to dot C, line 5, cutting diagonally through the junction of the neck and shoulder, touches the bottom of the pendant and bisects dot M. At 5:18 P.M. (line 6) the point of light has moved to place dot C at its tip. The shadow's line cut through the top left corner of the head, touched the junction of the right side of the head and shoulder, aligned with the left diagonal fork of the element K and the bottom edge of dot L. At 5:20 P.M. (line 7) the point of light had moved to the crescent-like mark D. It then descended to touch the tip of the right shoulder, the tip of the right fork of element K, and the top of dot L.

As the point of light moved from D to E the shadow line touched the top right corner of the head. At this time the shadow's line had completely engulfed the anthropomorph's head, and the light dropped from one ridge of rock on to a lower tongue-like ledge that abruptly reversed the apex of the point of light. The reversal created a zoomorphic-like figure with an open mouth, which has its bottom jaw resting at the corner of the anthropomorph's head. A deteriorated spot on the rock creates an eye-like image that completes the zoomorphic impression. It is impossible to tell if this spot is totally natural or if the weathering effects that have deteriorated the upper portion of this cliff acted upon a pecked area or a natural defect in the cliff face. It seems more than coincidental that it occurs in the exact place to form the eye at the moment the zoomorphic element appears.

The interplay of light and shadow with this panel displays four interesting and unique interactions. One, the shadow moves diagonally upward to the right and across the anthropomorph, seeming to be a sym-

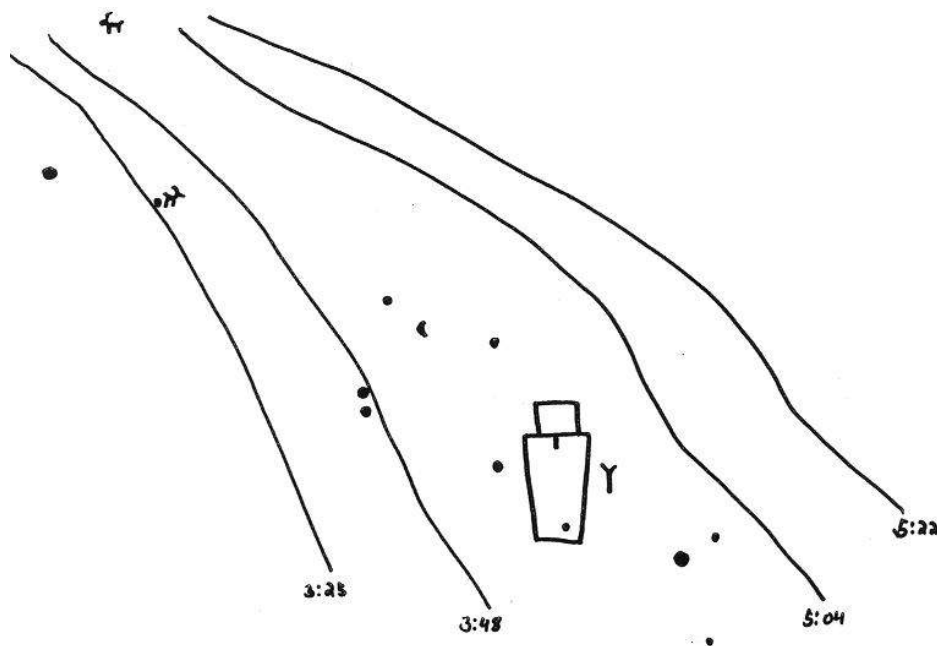


Figure 7B The Swallowed Up One; Equinox 1982

bolic representation of one being swallowed up. This point is stressed by the event of the occurrence of the zoomorphic figure. Two, the point of the triangle of light that is formed by the shadow successively touches dots A through E. The possibility of the point of light touching each of the five dots on this panel by chance is extremely remote. Three, line 4 joins four dots, Four, after the light leaves dot E it changes its form abruptly. The point of light reverses to create the mouth of a zoomorphic impression. Because of its position in relationship to the anthropomorph it appears to be about to swallow the anthropomorph.

During the afternoon of September 22, 1982, (autumnal equinox) the shadow again moved across the cliff but crossed the dots without any alignment (Figure 7B). During this time the shadow line remained fairly straight as it moved diagonally across the



Figure 7C The Swallowed Up One; Winter Solstice 1982

panel. The top did not form a point of light and the zoomorphic form did not appear.

It is interesting that during winter solstice as the shadow moved to the right another mouth-like slit in the shadow appeared. Because the sun set before the shadow reached the anthropomorph, this blunt-nosed open-mouthed form of shadow stops within inches of the anthropomorph (Figure 7C).

The Barrier Canyon Site

During summer solstice I anticipated that several interactions might occur at this site, but because of clouds I was unable to observe any performances. They will be observed at a later date and will be included in a subsequent report on the equinox and winter solstice performances in Indian Creek.

Solstice sites similar to those described above are considered sacred areas among contemporary Indian societies that ritually observe the movement of the sun. These solar observation panels are sanctuaries of religious institutions. In a sense, these sites were visualized as Hierophanies and Theophanies as explained by Eliade (1959a:11, 12 and 24).

If what Eliade states about pre-modern or traditional societies can be applied to the sun-watching cultures of Indian Creek then there is symbolism in the structure and function of the locations, elements, their contexts and interactions observed. These acts imitate and encode the activities of *illo tempo*—the original time.

These sites are placed where there were manifestations of sacred phenomena. This is where the power of deities was manifested. At these times the sun extends its finger of light and illuminates the stones. It then points to the symbols that verify myths and maintain order.

Some myths that relate to these events have survived and have been recorded. Some of these tell of the primordial acts of the Hero Twins, these feats directly relate to Eliade's eternal return and are manifested in some of these sites that symbolically recreates, commemorates and eternalizes their activities.

If all that these sun-watchers wanted to do was to simply determine solstice and equinox times, then one solar sunrise site for each in every main habitation area would do. Thus far I have observed 37 solar observatories or panels between Indian and Davis Creeks and I estimate that there are many more, far more than would be necessary to merely mark the sun's travels.

There has been a considerable period of occupation in Indian and Davis Creeks. Archaic, Glen Canyon Style VI, Barrier Canyon, Basketmaker, Pueblo, Fremont and Ute have been found. By any calculation many sites, whether used by successive cultures or not, must have been known to any one generation of observers. There is at least one site that was used for solar observation by each of these cultures except the Archaic, Glen Canyon Style VI and Ute. It is possible that these cultures may also have had solar observation centers because of the solar symbols in their panels but they were unobservable during summer solstice.

When illustrating archetypes Eliade explains "double aspects" with examples of opposites that echo Pueblo mythology. When I have a visible sky here, somewhere there is a sky that is invisible (Eliade 1959b:6). This Pueblo relationship has been illustrated in several places (Fewkes 1918; Voth 1901; Tyler 1964; Waters 1963; Parsons 1939). When the sun disappears here, it appears in the underworld. Thus for every solstice sunrise we have here, there

must also be a solstice sunset to fulfill the symbolism of opposites and completion.

In many cases both the archeoastronomical observatories and the petroglyph panel observation sites deal with one or more of three different concepts. One, the more traditionally reported calendrical observation methods of watching the sun's progression north and south along the horizon. Two, the positions of these horizon observations are often, but not always, marked by structures or rock art that includes solar symbolism. Three, the less well ethnographically documented observation of the way shadows and light interacts with the specifically placed elements and natural or constructed features of panels on cliff faces. Inherent in all three of these concepts is the possibility that mythological activities have been incorporated within the composition or terrain so as to interact with the movement of the sun and light and shadow.

These structures or compositions are located so that they interact only during solstice or equinox periods. Some of these are dual sites and perform on other occasions. Most of these sites were carefully selected because of physical features that create both odd shapes and definite movement of light and shadow. The shapes that the light and shadows create become vitally important elements within the compositions themselves. Since many of these involve more than mere dots and spirals, they are more than calendrical. The complete metaphysical features of such a composition are not visible except during those moments when the sun reaches down and by touching these stones creates the images and conjunctions that complete these otherwise meaningless panels. At these special times the light gives animation to the concepts that are concealed at all other times of the year. These special times when the elements actually move and interact in ways that manifest mythical activities are the mo-

ments for which the panels were created. The animated panels could be called the original motion pictures. These sites are endowed with power and as such are sacred. They are then magic places—offendable if not treated reverently.

According to one Pueblo myth, the older brother had to descend into the gaping jaws of a monster that was waiting on the horizon to devour him (Tyler 1964:219). This myth has lent itself to innumerable ways of expressing the basic concept of descending into or ascending out of jaw-like notches or becoming swallowed up. This may be the event depicted on a mural at Pottery Mound where a, "horned and plumed serpent consumes a purple man" (Hibben 1975:Figure 42).

It would be a rare site where natural forces would create unique features such as zoomorphic figures or other jaw-like notches in shadows that would allow the depiction of myths only on solstice or equinox days. These zoomorphic images and notches in shadows may occur on other panels on other days of the year. When they occurred and were noticed the solar observers may have incorporated their mythology into rock art at these sites that mark the beginning of a ceremony or calendrical period.

In the above analogy, light becomes a symbol of the sun. The elements the light interacts with represent its function, movement and order. Shadow then, as Eliade postulates, should express the opposite. The "double aspect" of this viewpoint is that shadow could represent the moon or some other force that may be opposite to or contend with the concept of light. Sites like *The Stage*, *The Snake* and *Circle Shelter* during summer solstice and the Barrier Canyon panels during the equinox express opposition in different ways. This involves not only a dividing line between light and

dark, where an element is either one side or the other, but when the sun is low, the shadow is high and as the sun rises, the shadow moves lower. The sun's motion is the force that moves notches and shadow lines and aligns them with circles and spirals. This reaffirms that these panels not only contain calendrical interactions but also call attention to the opposition in solar mythology.

It may be difficult to determine all the mythological implications these observatories contain, however, understanding that this practice existed helps us better understand the placement of elements and some of the performances. Even though we see the possible presence of mythology, we cannot, even with ethnographic accounts, be sure of the exact concepts, applications or continuity of meaning.

The Ferron Creek panel previously described (Warner 1983) echoes the placement of the anthropomorph in *The Swallowed Up One* panel and reaffirms the reason for their precise placement in those compositions. This strengthens the fact that mythology was indeed an integral part of some of these panels. What is exciting, is seeing these same types of phenomena repeated from site to site in Indian Creek, and then reoccurring a hundred miles away.

(Note: Since this paper was first published 10 additional swallowed-up panels have been identified.)

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