SOLAR OBSERVATIONS AT BLACK POINT, 1985-1986

BY

JESSE E. WARNER

Near Cedar City, Utah is a lava butte that has been the object of an intensive recording project of the American Rock Art Research Association. This project was led by Frank and Alice J. Bock of California. Because of the sites' intensity, their survey is in its second season.

After visiting the site, one week after Equinox, it was obvious that this was a prominent solar observation center. This was a major theme at nearly every cluster of panels. As we progressed around the cliffs, panel after panel with potential for performance was identified. These panels range from simple to very complex. Prior to this, our solar observations were made in north, central, east and southeastern Utah. Because of what seemed to be a vague preference for certain types of interactions by different cultures we hoped to gain some additional data from this site.

With the number of possibilities here, we felt we could observe more interactions in fewer trips. Because of the number of panels, we are also in our second year of observation and have only observed half of the potential panels. The reasons for this are the number of simultaneous performances and the distances between panels and rough terrain.

Since there are two major concentrations of panels our strategy was to be in one of those two areas during its peak activity, based on the position of the sun's rising and the relationship of the glyphs to possible gnomen. This forced us to determine all possible shadow casters, dates and times for interactions. While in the area, we moved inbetween several simultaneously performing panels, and discovered other interacting panels with no obvious evidence of interaction. The most simultaneous performances were four, while the most we continued to watch at a time were seven. Because of this, the Utah Rock Art Research Association made this their March, 1986 field trip to assist. That effort resulted in several new discoveries and a broader perspective for participants. This created a greater interest in archeoastronomy and the fact that rock art was an important part of aboriginal life.

One item of concern is determining whether a panel is active (indirect), passive (direct), or a combination of both. Active panels involve shadows and elements. Passive sites mark horizontal positions of sunrise or sunset. Previously we discovered the use of secondary horizons. In other words, when the sun appears from a fixed point on the edge of a cliff, it in essence rises from there. These considerations involve more possibilities for observations, in that nearly every observation in, may have an observation out.

The horizon line between Summer and Winter Solstice from these two sections is rather flat. Prime sunrises occur on only minutely distinguishable features or none at all (Fig.1). It seems that observations from these panels on such flat horizons would not be as accurate as marking the position of the

shadows on the rocks. Using secondary horizons, like notches or points would provide a more diverse or distinct horizon line, but would still not be as accurate as marking a point on the cliff, because of the variability in head movement. However, the corresponding position on the rocks is very accurate. What is viewed on the cliff is a mirrored, reversed image of what one sees in the sky.

When approaching the main section of panels there are several glyphs that are met on the way. These seem to be glyphs that announce the nature of the site. William Strange, while at this site, suggested that these may create the structure of an approach for the site, based on previous research (Strange 1987).

One of these glyphs has been identified as a "Sunheaded" figure. This is a stick figure with a sun symbol head similar to many others, some of which are known interactors (Warner 1987). This figure had a horizontal shadow descend through its face at 9:05 AM on Summer Solstice. Because of the position of the notch in the shadow, possibly on the cross-quarter date, the notch could place an angle of light at the center, or cup the face. This needs to be observed. This illustrates the use of secondary horizons where it will obsreve the sun emerging from a "stone womb" at only one precise period (Fig. 2A,B).

The most impressive interactions in this section are directly above the "Sunheaded" figure (Fig.3). These involve two "sun symbols" at each end of a long series of panels. These sun symbols were placed below slots, creating the impression that a shaft of light would bracket them on Summer Solstice. On that date, at 12:44 PM the sun touched the left edge of a pecked spiral placed in a narrow crevice (Fig. 2 line 2). At that moment, the right edge of the shaft of light touched the left side of the large spiral, the left side of the shaft of light touched the left edge of a small spiral to its left (Fig.3A). At 1:11 PM, as the right edge of the light bisected the exact center of the large spiral, the left edge bisected the center of the small spiral (Fig.3B). At 1:40 PM, the shaft of light bracketed the large spiral (Fig.3C). This is an exceptional marker.

This was the last observation of the spiral at that time. After mapping the direction and movement of the point in the shadow (Fig. 3 line C), it is felt that the left point will continue to the right until it touches the center and then cups the spiral. This will have to be observed (Fig. 3D).

The anticipated occurrence with the rayed sun did not happen. At 4:33 PM the light descended most of the way down the window and then began to retreat back up (Fig. 4B). We were confident that these two glyphs were a pair with balanced performances much like the right and left circles in Indian Creek (Warner 1984:48).

No unique interactions during Equinox were noted, but a totally unexpected set of occurrences transpired on Winter Solstice. At sunrise, a rounded, curving block of stone created a shadow that bisected the sun symbol from sunrise until 9:16 AM, where the edge of the shadow touched the right edge of the disk (Fig.4A). For nearly an hour the shadow stayed on the disk, almost symbolizing the sun being held back on the horizon. This secondary feature was a unique and impressive interaction.

The balance was enhanced at 12:32 PM when the shadow cupped the large spiral that was centered in the shaft in Figure 3. By 1:10 PM the shadow bisected the spiral, with a point at its top edge. This made the spiral a dual performer like the right circle in Indian Creek. Now we had a performance by each on the same day, the situation we had anticipated on Summer Solstice (Fig. 4C,D).

The width of the spiral was determined by its placement in the shaft of light on Summer Solstice. The place along the shaft was determined by the point of shadow from the left on Summer Solstice and the point of shadow from the right on Winter Solstice, which happen to cross the same space. The spiral could have been placed anywhere along the shaft and made to fit, but it wasn't. The left point of shadow at summer solstice (Fig. 3D upside down, 4C) is as low as it will ever get as it enters the spiral. Before and after this, it will be higher. The opposite is true for the Winter Solstice point. What makes this more convincing is the unique movement of the winter shadow. From 11:53 AM the point lowers into the conjunction at 12:32, at which point it then ceases its downward movement and begins to rise up to the top edge at the moment of bisection. It is a very complex shaped pattern.

Between these two symbols are several glyphs that had minor interactions. Figure 5 was not anticipated. On Summer Solstice before the sun lit up the main panel, a circle of light appeared over one half of a two-headed sheep. This action may be very significant, if similar actions repeat. Morris (1986) reports a double-headed sheep that was vertically bisected on a pecked mark on Summer Solstice. Others feel this could represent a Zodiac conjunction when Spring Equinox occurs midway between Aries and Tarus (Leonard 1986, Mcglone 1983)(Fig.5).

On Summer Solstice an unexpected performance occurs on an interesting anthropomorph. This probable Fremont figure has no indication of performing. The interaction provides us with the reason for its placement and who it is. Its form and detail may provide additional information on who or what this individual may represent.

At 9:18 AM a segment of light approaches its head in a manner that suggests that a shaft of light might come from its mouth. This occurence hasn't been noticed on a Fremont figure (Fig.6A). In addition to that possibility, the light created another zoomorphic form whose mouth closes as it crosses over the figure. At four other sites different occurrences of what we feel this represents have been recorded (Warner 1983 A:E 31, 1983 B:E 54) (Fig.6B-E).

This open-mouthed form of light approaches the figure from the left and moves across its chest. As the light reaches the figure's right edge, the mouth transforms until it is no longer there. This creates the visual image of the mouth closing, devouring the figure as it crosses. For this reason, we call similar occurrences "swallowed-up ones". This may be an attempt to incorporate mythological events into a visually dynamic presentation (c.f. Tyler 1964:218-19).

The next panel has a figure holding the end of a spiral. Because of the prominent point of rock to its right, we anticipated an interaction (Fig.7A). On Winter Solstice the point of shadow touched the top of the spiral at 9:24 AM and continued moving to the right (Fig 7B). Because of the sun being at its lowest point, the point of shadow will be at the highest point it will ever reach. At a period before and after, the sun will be higher and corresponding shadows will be low enough to go through the center of that spiral. That afternoon a low angle of shadow rose as the sun set and touched the center of the spiral, it then finished off at the top edge (Fig.7C).

During Summer Solstice, at 11:24 AM, an angle of shadow comes into contact with the groin of the spiral holder. That seems important, since that has been seen before. At 11:51 AM a different little notch of shadow appears on the footprint and moves to the right, touching the center of the spiral while the larger main point of shadow is lower. (Fig.8).

On Equinox, the main point of shadow is still below the spiral, but a double point of light (Fig. 9 X and Y) moves to the right towards three figures. At line 1, point x forms an angle of light on the mouth area of the left figure. At line 2, point X comes out of the "mouth" of the second figure. Point Y at line 3 (Fig. 9), comes out of the large face of the right figure, which has been characterized as a Double Entity These are complicated figures currently under study where combinations of figures represent many different concepts. One of these concepts is an altered state, which may be represented here during solar observation. Line 4 places point x on the lower portion of the "emerging entity", that comes out of the lower figure's head. What makes that position important is that it also simultaneously bisects the spiral - a triple interactor. Even though this is not directly over the area of the emerged figure's mouth, it may not mean that it missed altogether. For example, at Equinox the sun continues to move through that position, so at a period shortly before Fall or after Spring Equinox (about one week) it will place point x on that figure's face. That may simply indicate a period for ceremonial preparation.

This is a very complicated panel as it is, but there is another factor that should be considered. Is this just four faces that seem to speak with light or does this panel also include several figures being swallowed up by the open-mouth form of points x and y like the figure previously discussed that is just to their left? Previously, to minimize any errors in the selection of what was probably intentional rather than accidental, we set the criteria that the type of interaction had to be completed at the edge of the figure involved like on figure 5 and 6 A. But on figures 6 B, C, and D it doesn't close on the exact edge of the figure, but to the right. We may be trying to define too restrictive a definition for this interaction. It will be several more years before we can gather sufficient evidence to support any rational conclusions.

Around the cliff, over the fence, are several panels that should have solar performances. To date we have only observed two panels. Next to a large, flat boulder covered with rock art is a boulder with a snake and a concentric circle on one face. The point between it and the cliffs casts a shadow that moves across the exact center of the concentric circle on Summer Solstice (Fig 10).

This occurred as the large upright pointed rock between it, and a composition on a large flat boulder to the north began to interact. That is the most complex interacting panel observed at the site. During Winter Solstice only the upright rock created a shadow that moved across the rock (Fig. 10,11A). There were several interactions that were definite. The first was the point that moved up to cup a solid dot (line 1). It then moved over to touch the top edge of circle 4. As the point of the shadow moved down to bisect that concentric circle it touched the face of a stick figure with outstretched arms at the same time it touched the figure's hand, and then bisected figure 4 (Fig. 11A line 3). This is reminiscent of a similar interaction at Notch Canyon (Warner 1985). In both instances, individuals not only appear to be viewing the bisection, but pointing it out. These types of interactions seem to involve the sunwatcher. This helps us put ourselves back into a better perspective. The shadow's edge then moved between circles two and three as it touched the edge of circle 10C (line 5). The point of the shadow then moved over to bisect circle 15 when it bisected circle 2 (line 6). From here there were several other contacts that continued similar interactions. Those are also illustrated in Figure 11A.

During Summer Solstice the tall pointed rock interacted with the southern portion of the panel in some interesting ways. When the sun lowered above the western mesa, it lowered a shadow across the panel that created some very interesting interactions (Fig. 11B). During both Equinoxes we were unable to observe this panel.

The observations made thus far on this panel give the impression that each section of the panel was created to interact with the movement of shadow at a specific time of year. The other figures on the stone probably add to the narrative.

The next major section of rock art is situated up the cliffs some distance. Between these two locations are many small clusters or isolated panels. The next heavy concentration occurs around the mouth of a large cave. The only interactions observed there to date are to the right and above the cave. Because of a different orientation to the horizon this site has most of its interactions occurring on Summer Solstice, a few on Equinox and only one noted on Winter Solstice. Other interactions, however, are anticipated.

At the moment of sunrise on Summer Solstice, the shadows began their performance on several different panels. At 6:34 AM on a large spiral above the cave, a point of shadow began to move to the right so that it cupped the spiral, then moved on until a very precise point touched the center at 8:02 AM (Fig. 12 A,B). On Equinox, the shadow created a reverse image of a point of light crossing the center (Fig.12C). This dual performance is also the kind of thing that we are looking for. Many good shadows existed which were not used. It is only by observation that we can determine what their preference was, and if that preference was similar or different from other regional or stylistic groups.

On the far right end of the main panel just after sunrise on Equinox, an angle of light retreats to the right of a circle where it may have appeared at sunrise (Fig.13). On summer solstice, however, the light appeared to the far left of the panel. At 6:36 AM on Equinox a point of shadow appeared and moved down over the top of a rayed spiral until it touched the tip of an upper ray (Fig. 14A).

At times like this, one begins to wonder how accurate the Indians were when creating some interactors. It is feasable that some interactors could have been off a day or two, in one direction or another, on Equinox. On Solstical dates, however, because the sun is at a limit in its movement, the shadows are more precise. We also don't know exactly what they intended. Leap year, the movement of the sun through its eclyptic, and other factors raise several questions.

The next interaction raises one of those questions. The rayed spiral was well executed and centered around a natural hole. To the right is a randomly pecked, less patinated circle, that the point of shadow perfectly cups (Fig.14B). The evidence suggests these were made by different groups at slightly different times.

The next interaction also appears offset. It seems that the interaction should have extended the light between the pecked lines. At 7:09 AM (Fig. 14.1 C) an extension of light grew wider as it moved to the right, centering on the bottom line. With the sun slightly lower before or after solstice, the light would rise so it would enter and progress between the lines. These interactions need to be observed several times to see what exactly would occur.

At 7:19 (point D Fig.14.2), a projection in the shadow cupped a solid dot. At 8:37 AM the point touches the center of a concentric circle. At 8:43 AM the form changed to an S curve that cupped the circle (Fig. 14G,H). This

comprises one continuous movement of the shadow.

At 7:06 AM just above this panel there is a dot centered circle that began to interact. A thin sliver of light appeared and moved to the right, but it was obvious that it would miss the circle (Fig.15). As the edge of the shadow moved to the right, the sliver of light stayed up high and became smaller. This sliver was created by a crack between two rocks just wide enough to let the light through while the sun was on that plane (Fig.15B). At 7:45 AM the edge of the shadow touched the edge of the circle. Then, the line bisected the center dot without a difinitive contact, but at 8:09 AM the circle was cupped by the form created by the junction of the two boulders creating the sliver. If the sun was higher or lower there would not be a sliver of light but the notch may be more pronounced. Why didn't they create a more impressive interaction?

On Summer Solstice a thin light appeared on an angle down to the right from the face of a reversed stick figure at 8:58 (Fig.16). This provides another with that symbolic context.

On Equinox, a spiral to the right of the cave had a point of shadow touch the center (Fig.17). Because of the configuration of rock above, I expect it to be a dual performer. On Winter Solstice at the moment of sunrise, a small spiral above the cave was bisected by a shadow. On Summer Solstice the progression of the shadow prior to 6:44 AM may have had an interaction but after that it was insignificant (Fig.18). Figures 18 and up contain interactions not dealt with in the text.

Observations at this site have been exciting as well as frustrating. Over all, the experience has been educational. Because of the variation in the different situations we have learned more about anticipating types and times of interactions. This site needs much more observation to identify the difference in performances and to possibly help answer why there is a difference from what is expected. So far we have only provided more questions than answers and a few illustrations that support the earlier occurrences by culture and time period. Many other interactions were not included in this presentation because they are not complete. It will be several years before they can be observed.

REFERENCES

LEONARD, PHIL
1986 Personal communications.

MC GLONE, WILLIAM
1983 Zodiacs in the West. Western Epigraphy Vol. 1 No. 2 December 1983. The Western Epigraphic Society.

MORRIS, NOWELL
1985 The Solar Observatory at Muddy and Rochester Creek. Utah Rock Art Vol. IV. Utah Rock Art Research Association, Salt Lake City, Utah.

STRANGE, WILLIAM
1987 Hogback, Nave, and Choir: Reporting Architecture of Holiness. Rock Art Papers Vol. 5, Sandings Museum Papers No. 23.

TYLER, HAMILTON A.
1964 Pueblo Gods and Myths. University of Oklahoma Press, Norman, Oklahoma.

WARNER, JESSE E.
1983a A Solstice Site on Ferron Creek. Utah Rock Art Vol. II. Utah Rock Art Research Association, Salt Lake City, Utah.
1983b Summer Solstice Observations in Indian Creek. Utah Rock Art Vol. II. Utah Rock Art Research Association, Salt Lake City, Utah.
1985 Notch Canyon as a Solar Observation Site. Utah Rock Art Vol. IV. Utah Rock Art Research Association, Salt Lake City, Utah.
N.D. Sunheaded Figures: A Study in Symbolism. Paper presented at the Utah Rock Art Research Association's 1986 symposium in Clear Creek Canyon, Utah. Salt Lake City, Utah.

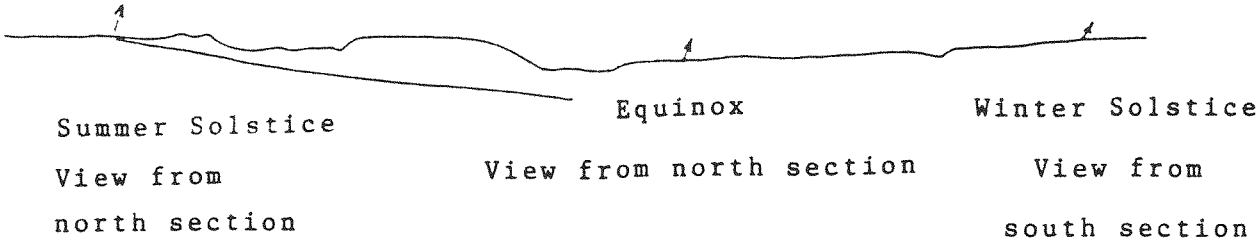


Figure 1

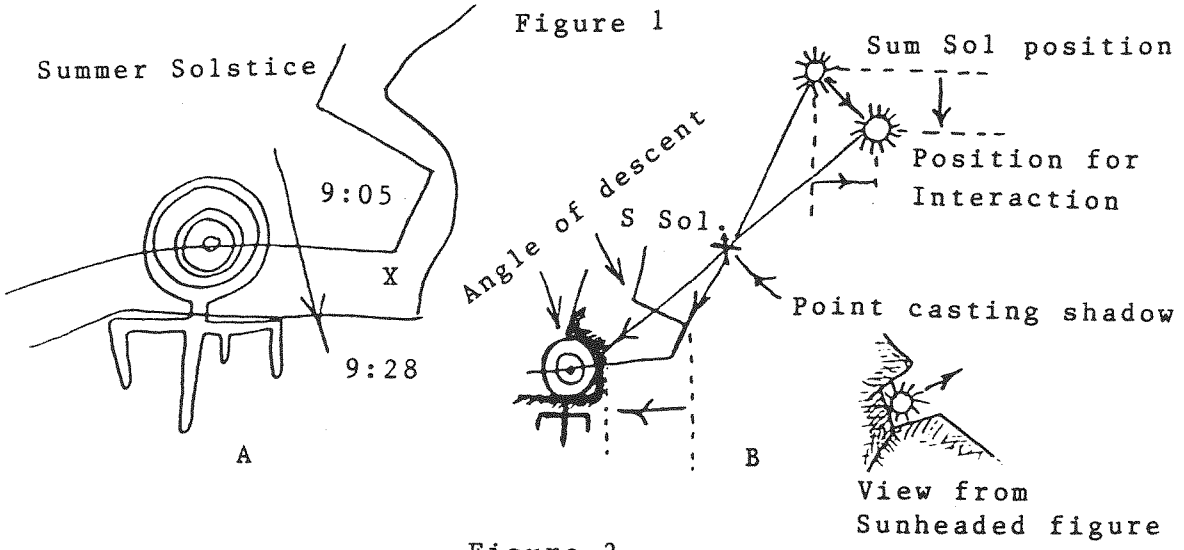


Figure 2

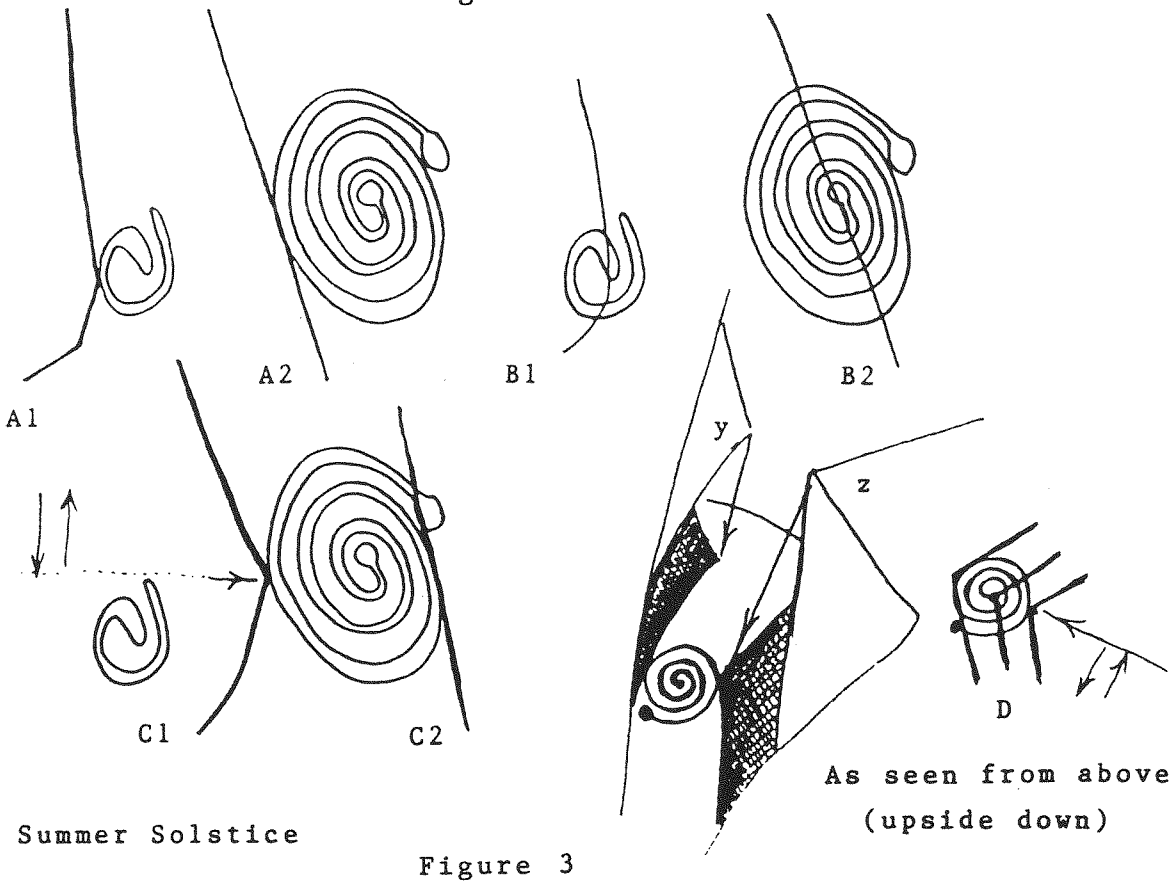
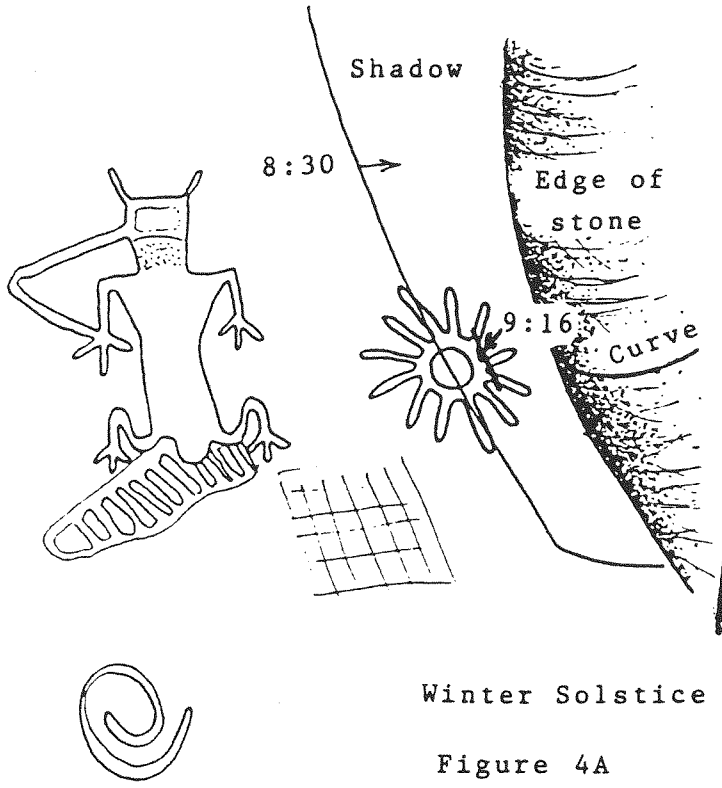
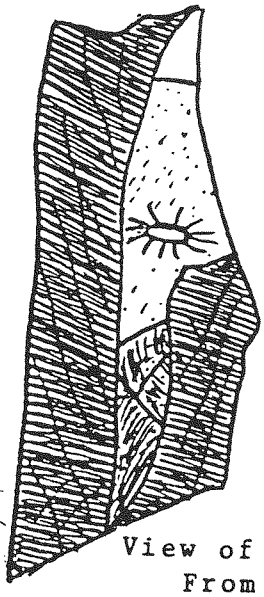


Figure 3



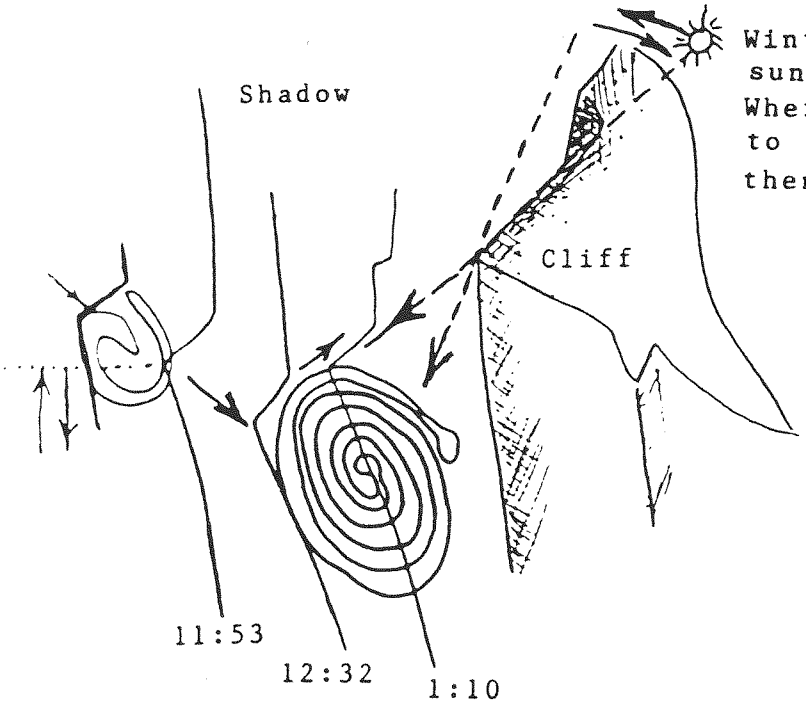
Winter Solstice

Figure 4A



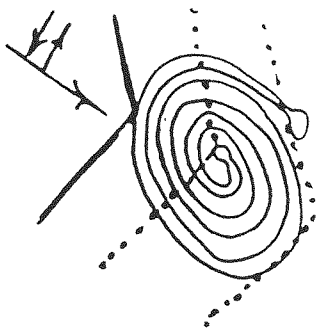
View of sun symbol
From top of
horizontal window

Fig. 4B



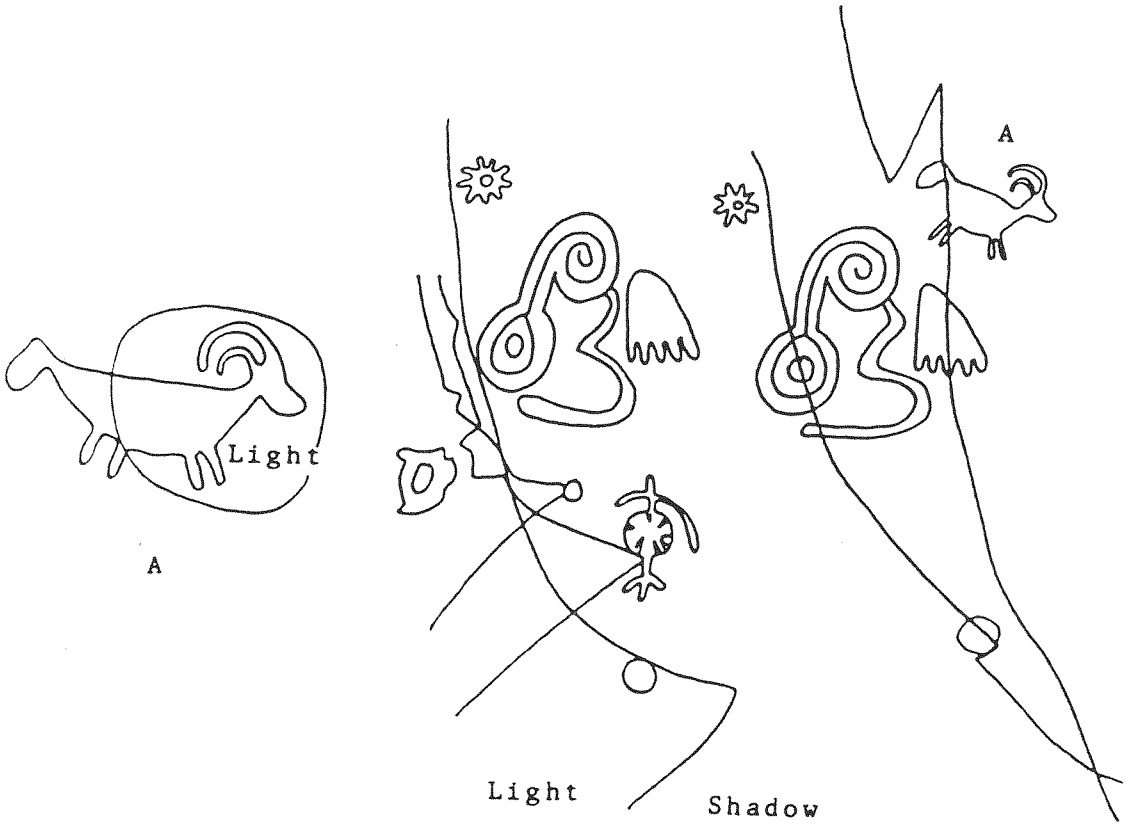
Winter Solstice

Figure 4C



Summer Solstice

Figure 4D



Summer Solstice

Figure 5

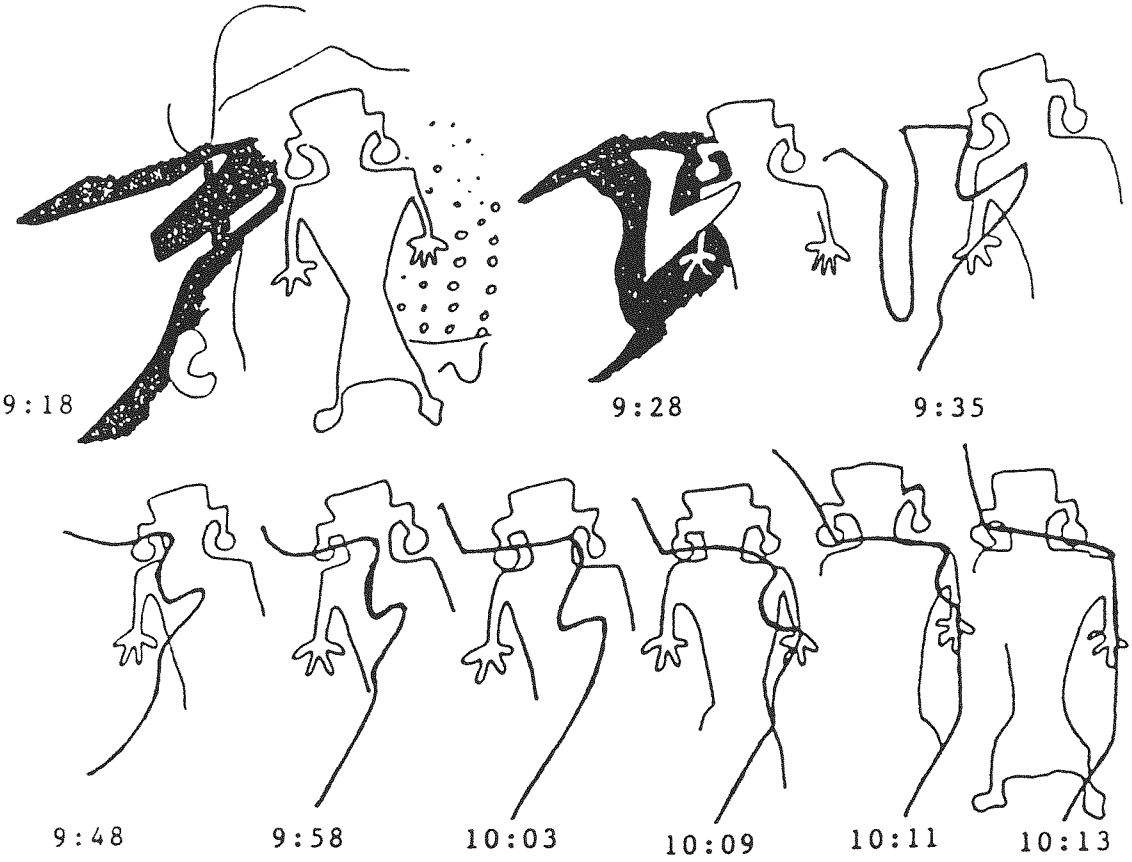
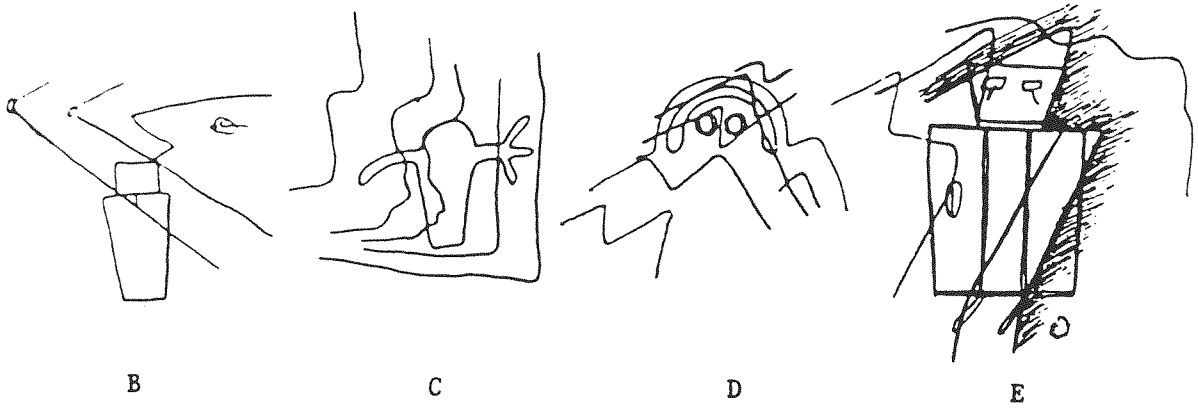


Figure 6A



Summer Solstice

Figure 6

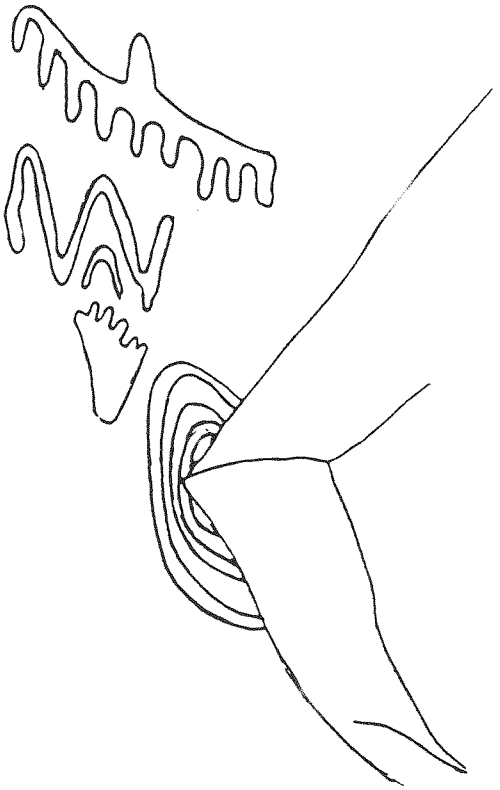
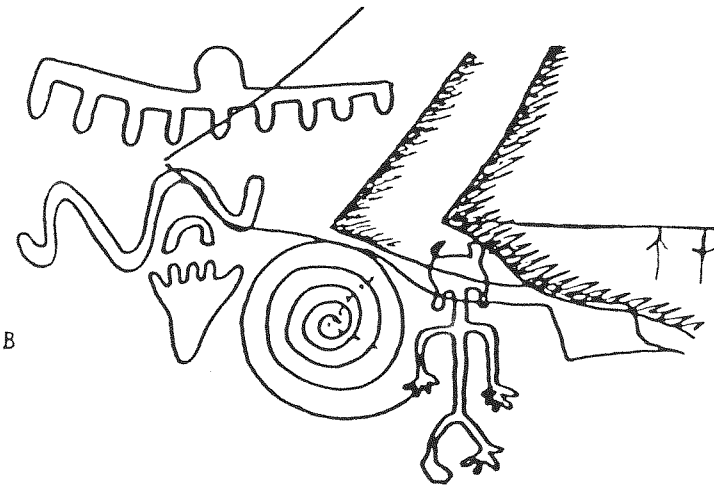


Figure 7A



Winter Solstice

Figure 7B

At a period both before and after Winter Solstice the point of shadow will be lower and should bisect the center of the spiral at the dotted line.

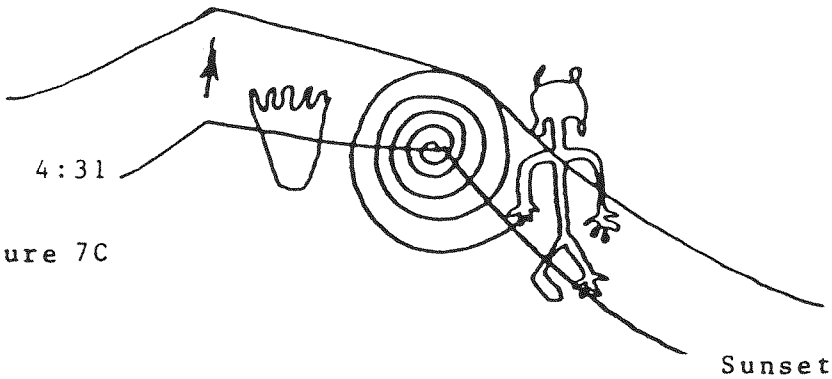
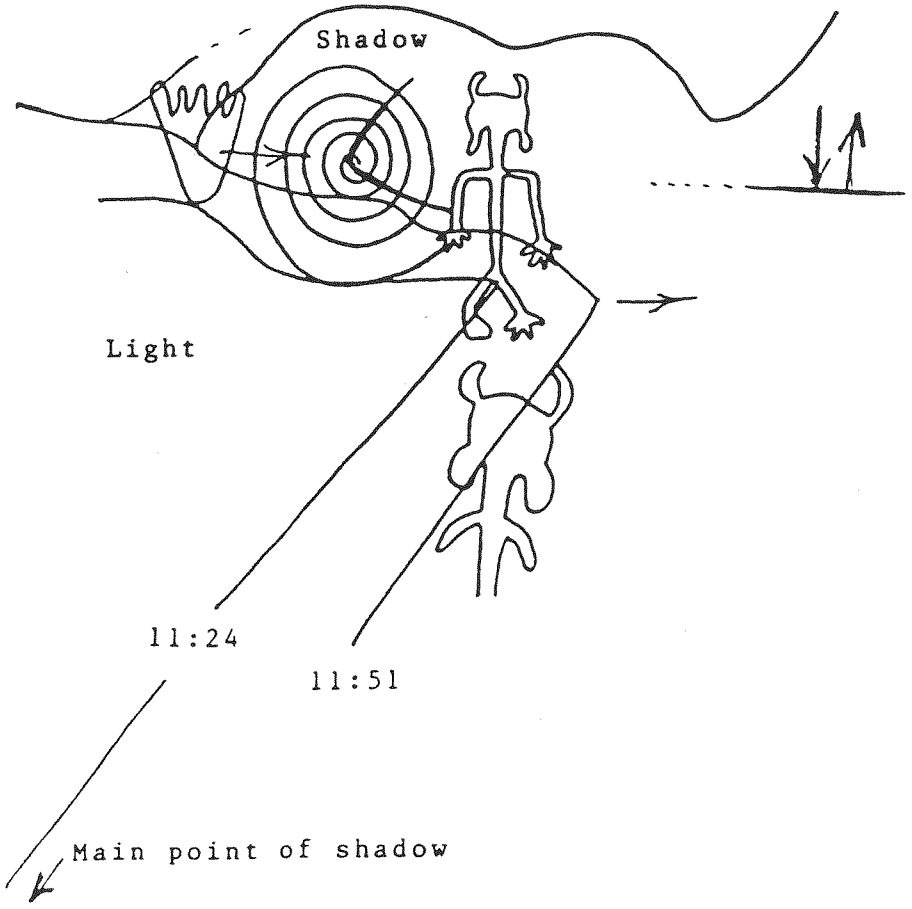
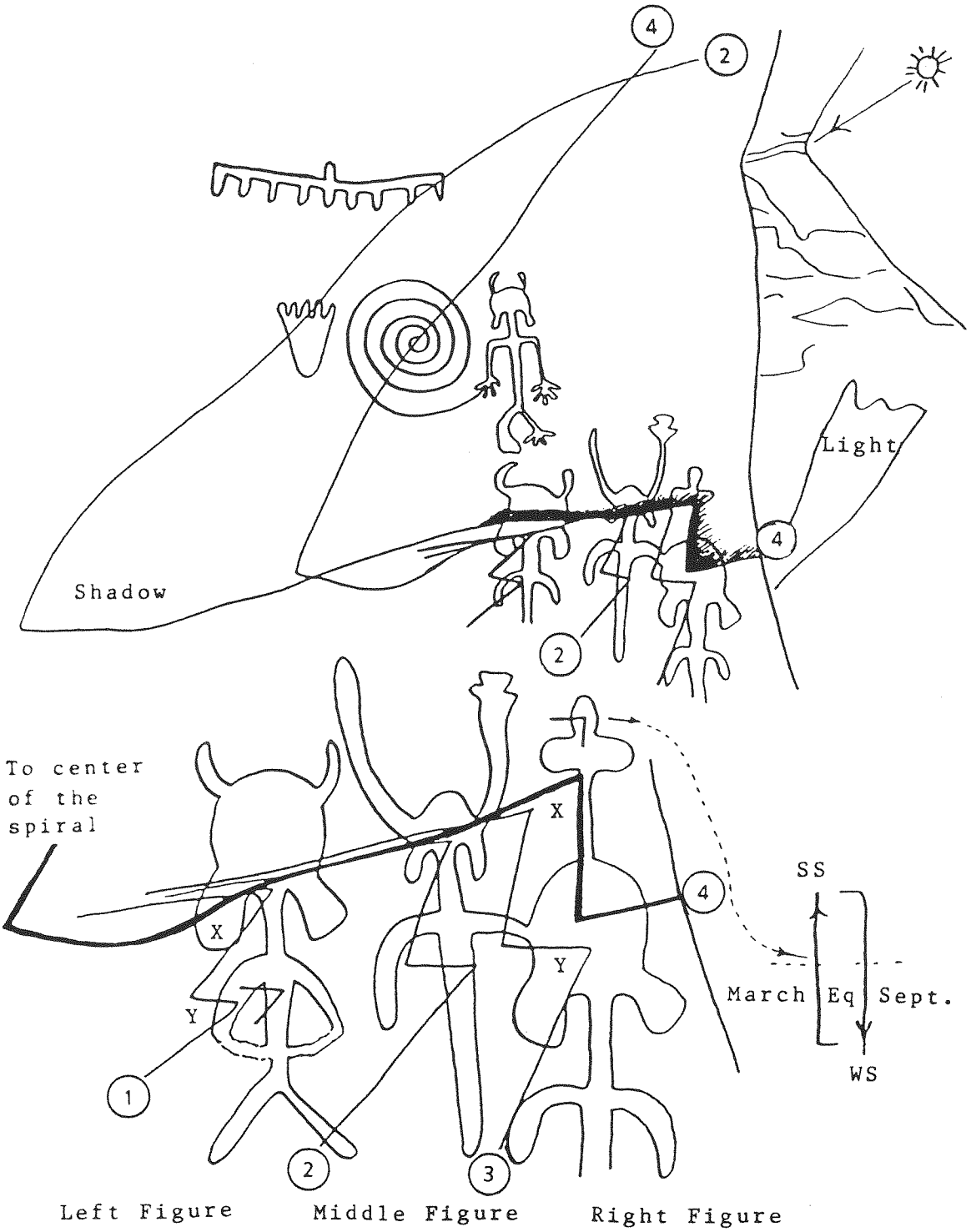


Figure 7C



Summer Solstice

Figure 8



Equinox
Figure 9

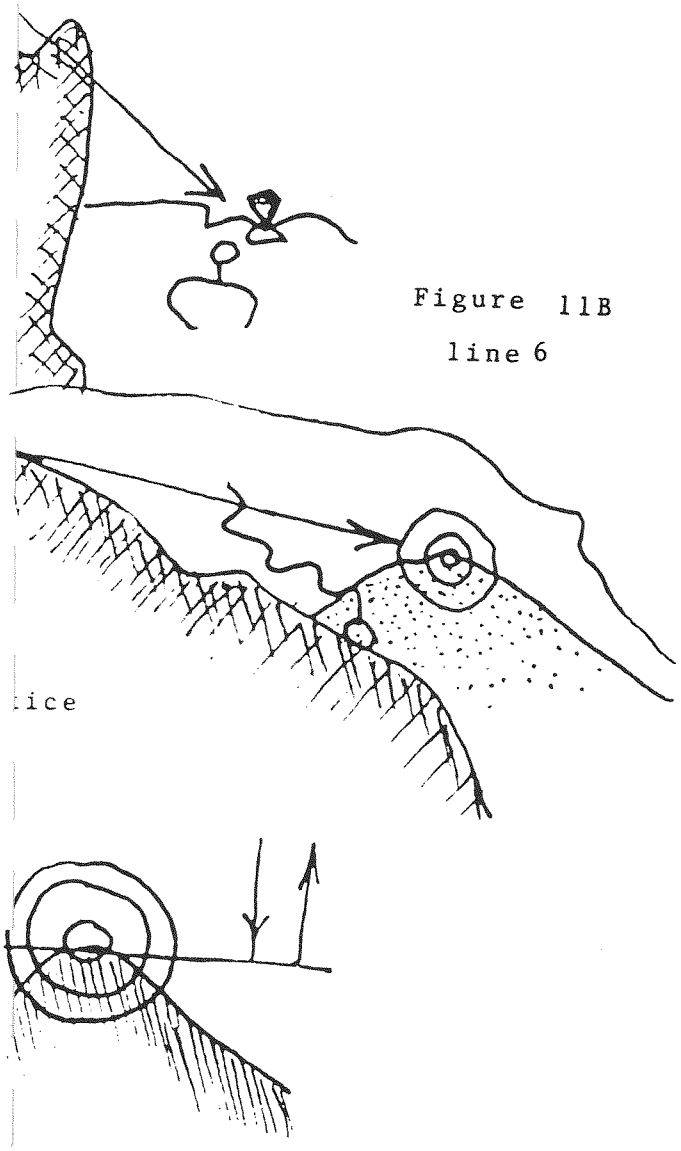
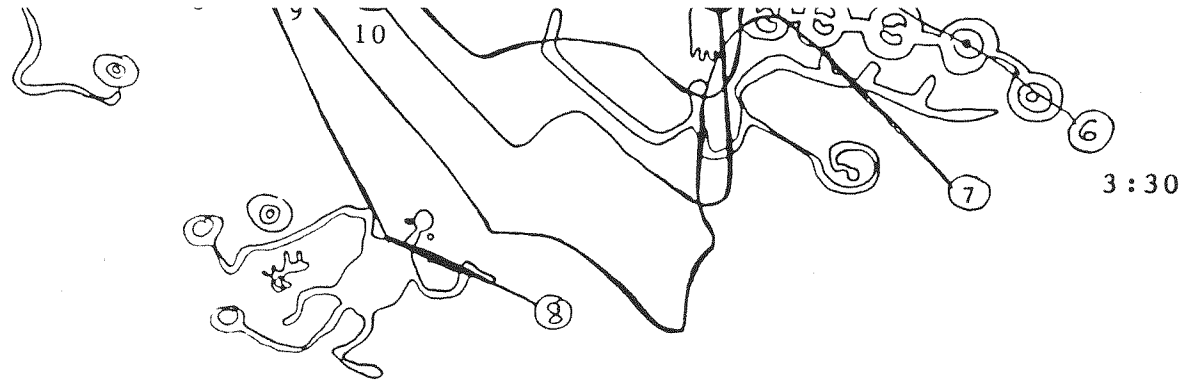


Figure 11B
line 6

Figure 10



Winter Solstice

Figure 11 A

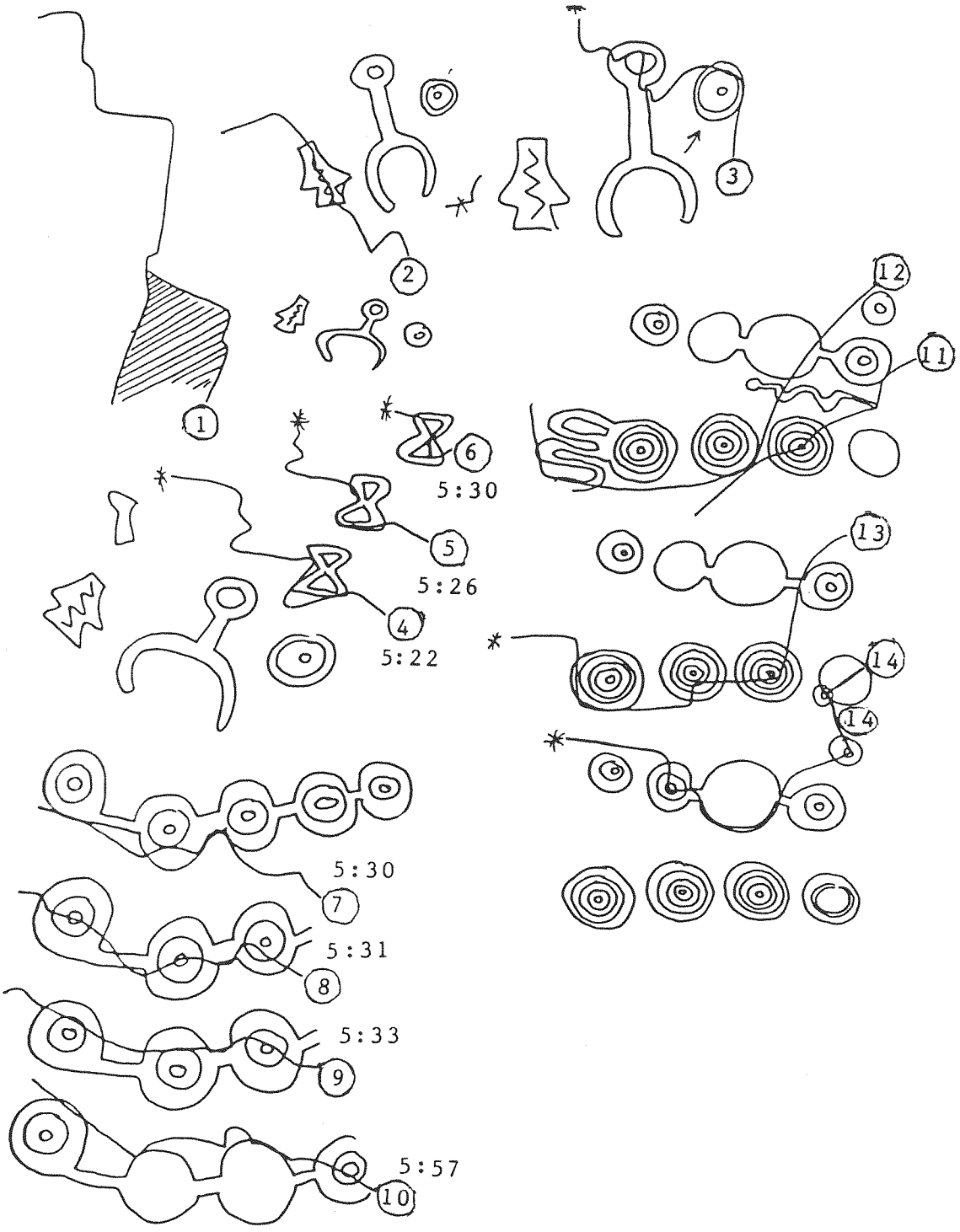


Figure 11 B

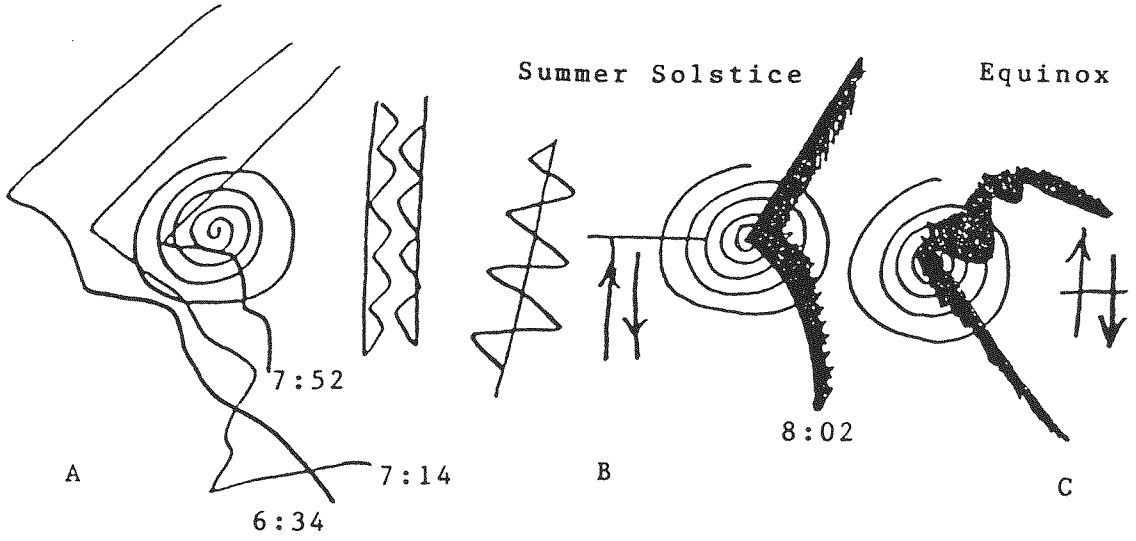


Figure 12

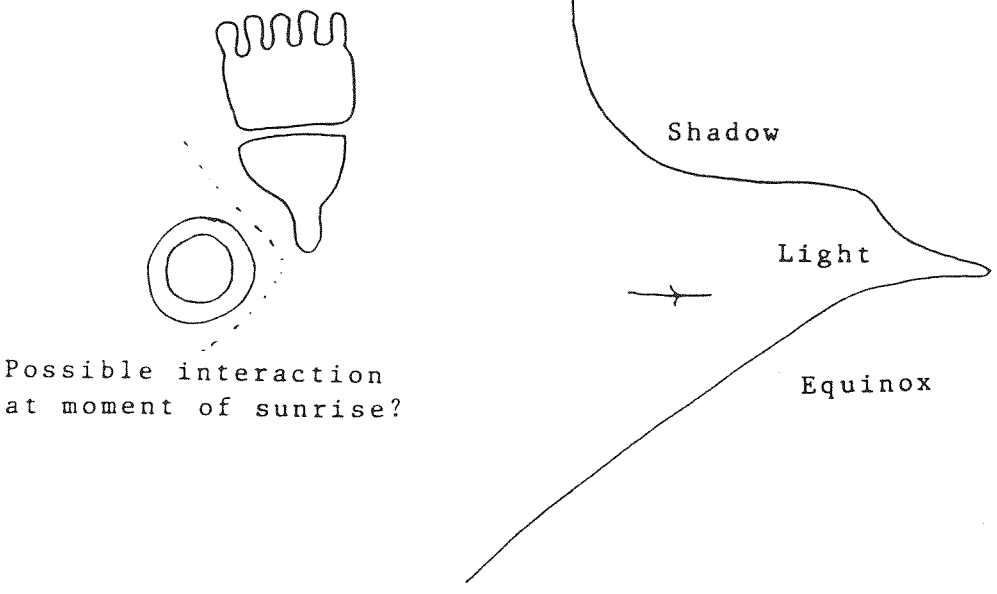


Figure 13

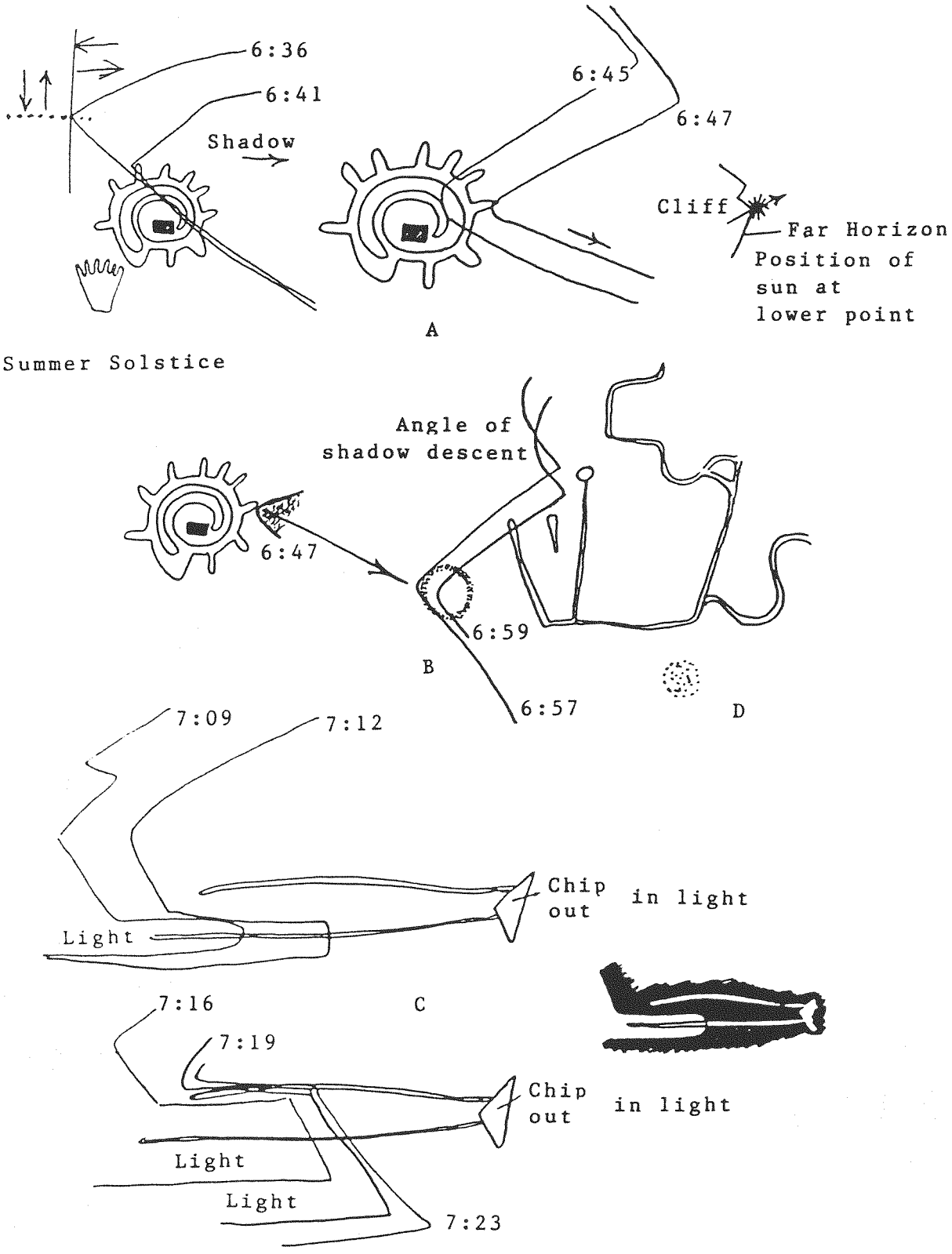

6:36
6:41
Shadow
6:45
6:47
Cliff
Far Horizon
Position of sun at lower point
A
Summer Solstice
Angle of shadow descent
6:47
6:59
B
6:57
D
7:09
7:12
Chip out
in light
Light
7:16
C
7:19
Chip out
in light
Light
Light
7:23

Figure 14.1

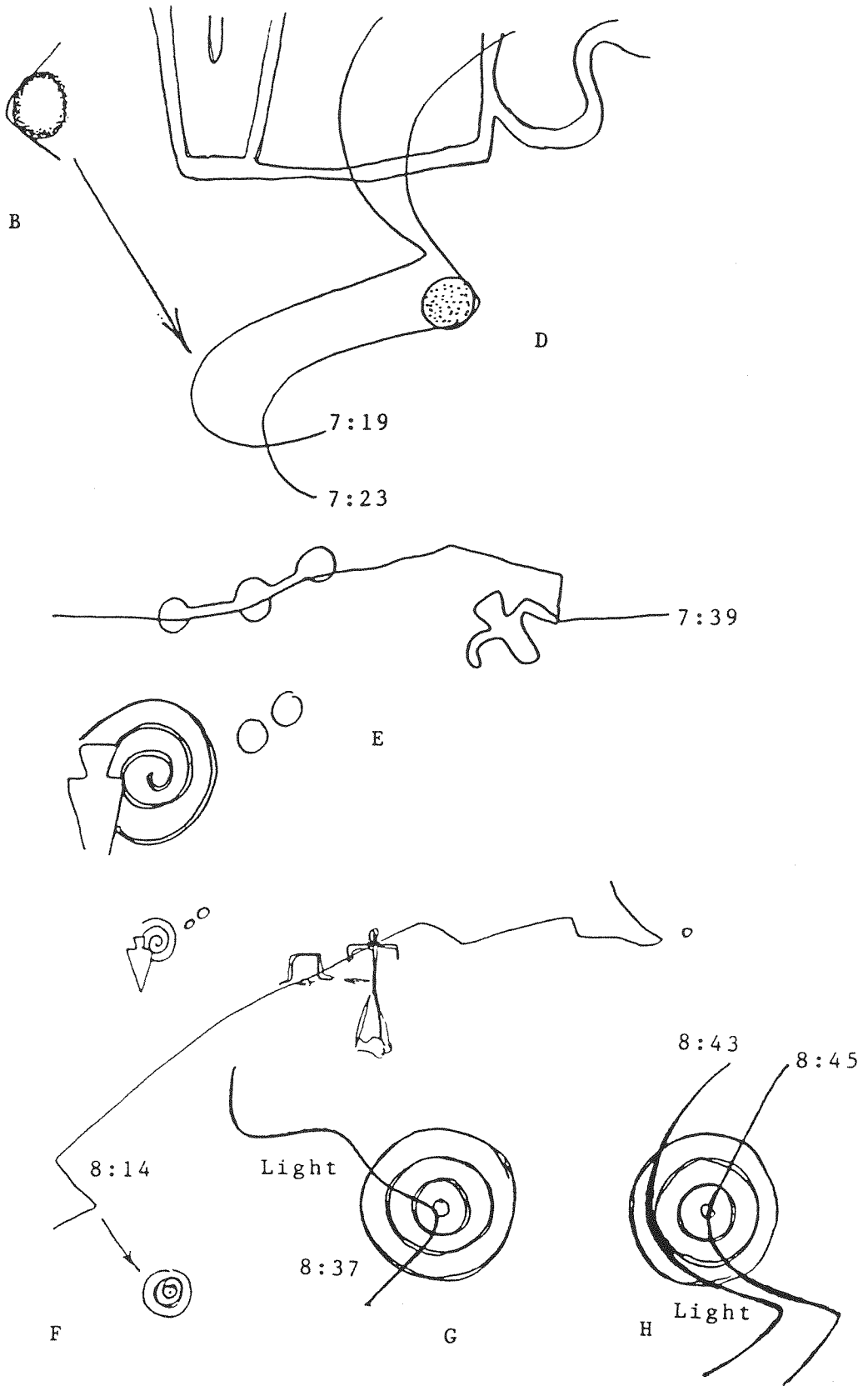


Figure 14.2

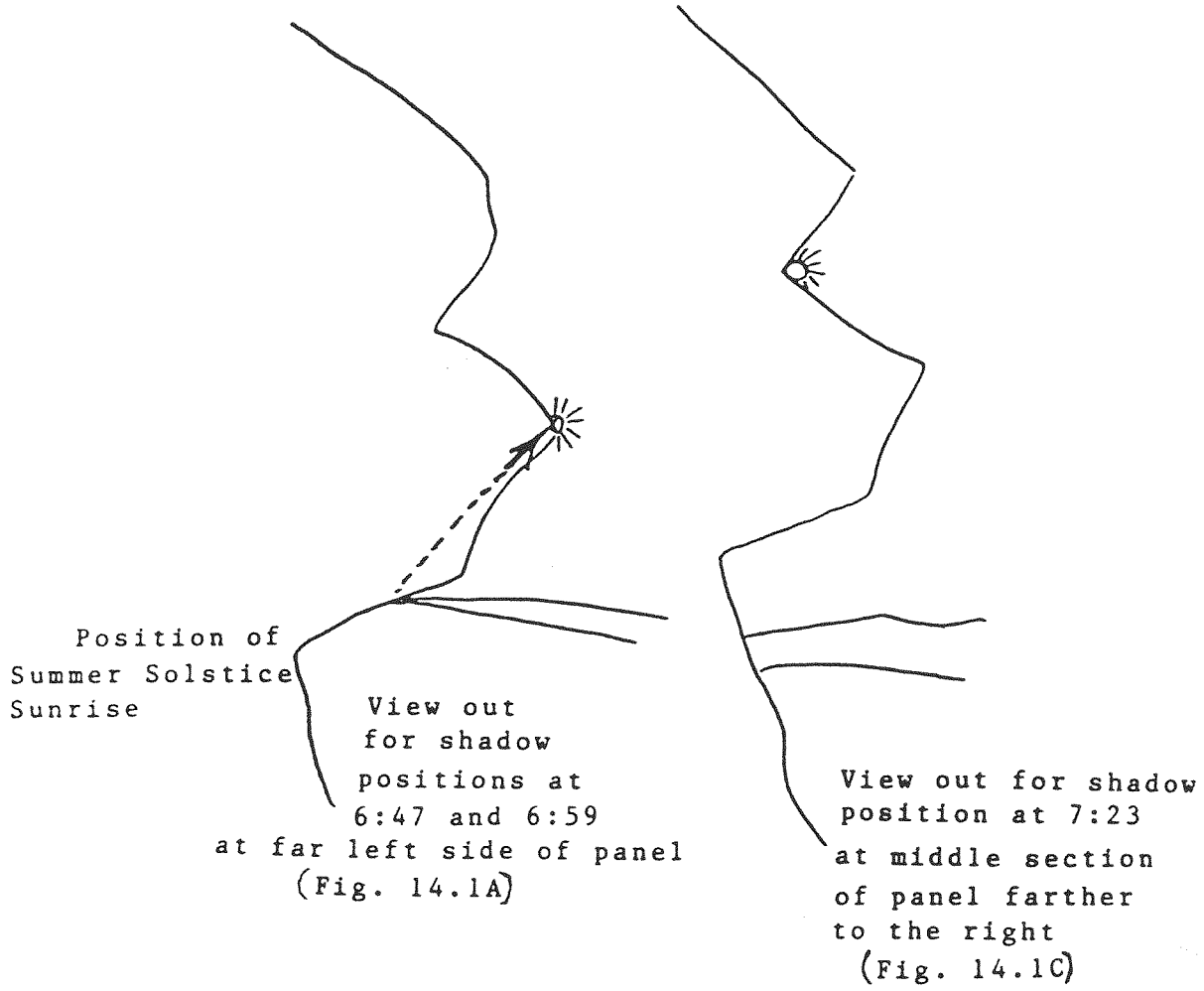

Position of
Summer Solstice
Sunrise
View out
for shadow
positions at
6:47 and 6:59
at far left side of panel
(Fig. 14.1A)
View out for shadow
position at 7:23
at middle section
of panel farther
to the right
(Fig. 14.1C)

Figure 14.3

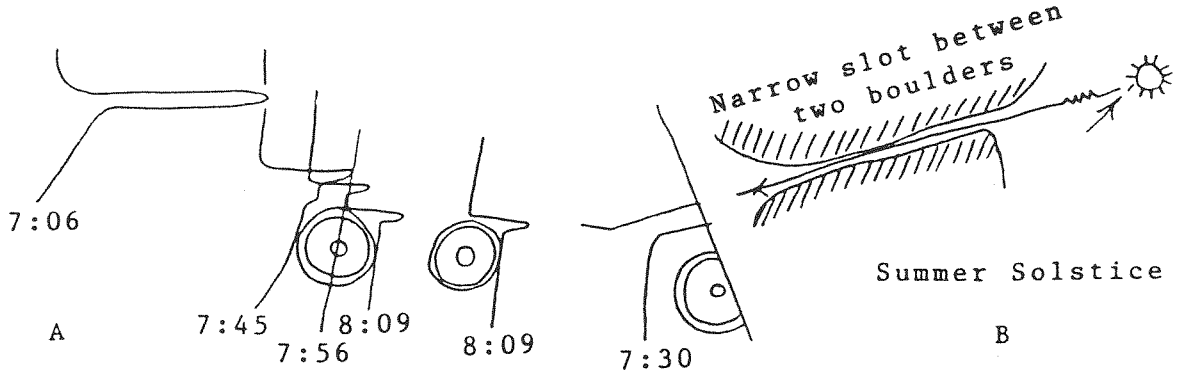


Figure 15

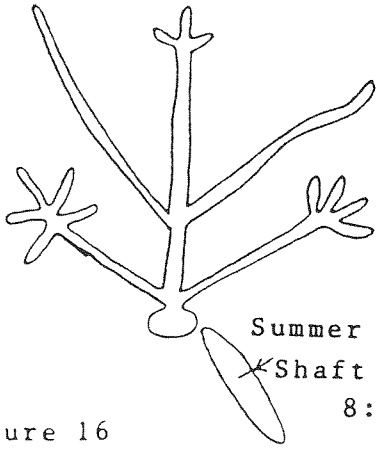


Figure 16

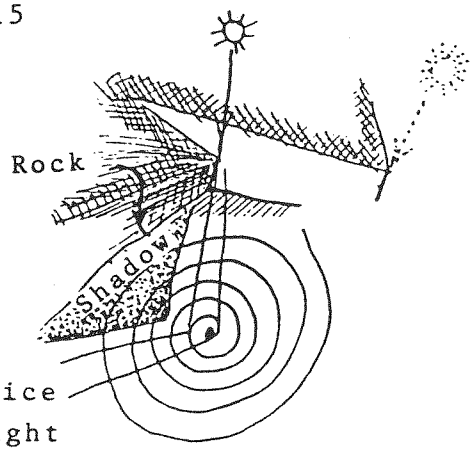


Figure 17

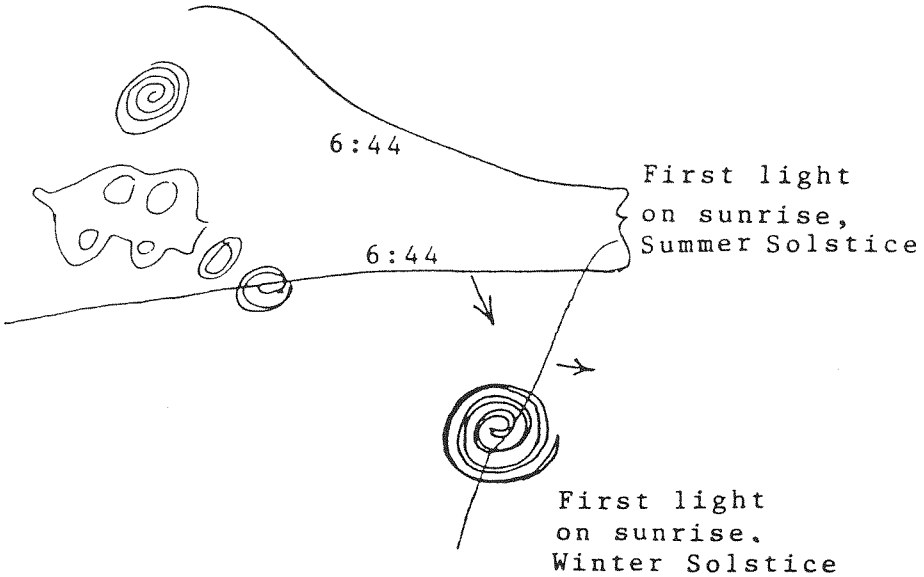


Figure 18