THE DETERMINATION OF ROCK ART PANELS AS ACTIVE SOLAR OBSERVATION SITES

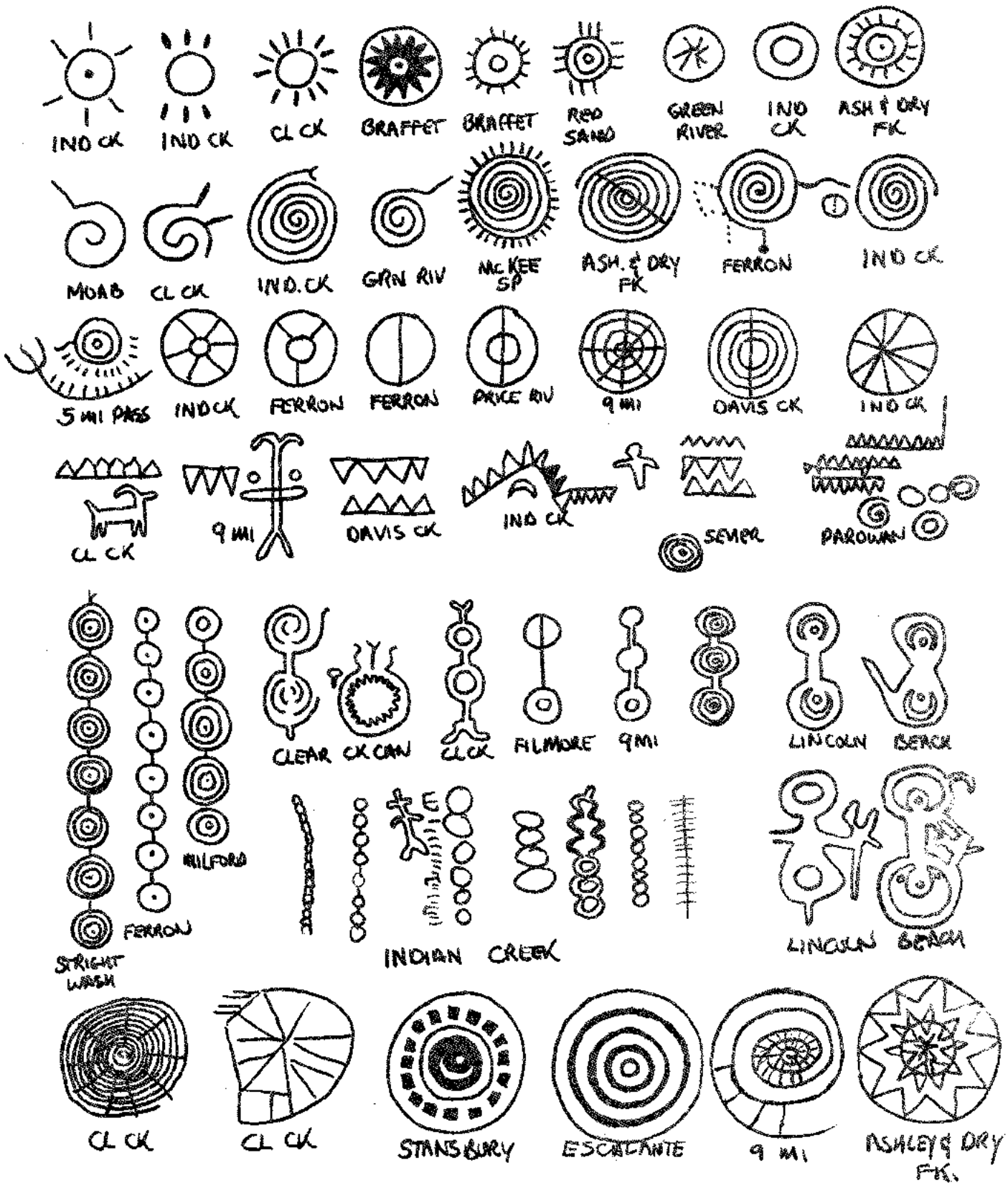
BY

JESSE E. WARNER

Since investigations into archaeoastronomy began, it has become evident that there is a need to understand what different types of solar observations have occurred within certain stylistic areas, to better understand what to expect in identifying an archaeoastronomy site. The purpose of this paper is to present some examples of different situations which commonly occur in Utah. This will help researchers make a more accurate assessment of whether a panel of rock art could be an active solar observation site or not. This problem is actually two-fold: first, determining the potential of a panel as a probable observation post before observing it, and second, determining whether the interactions that were observed were significant. There is actually a third problem with interacting panels that will only be briefly considered. This situation involves sites as markers not of specific solar periods, but for other dates or purposes.

CRITERIA TO CONSIDER BEFORE OBSERVATION

Leonard (personal communication) who has had far more experience in contending with the professional for acceptance than I, has suggested a list of criteria that he feels needs to be present for a site to conclusively convince the skeptical and hard-core astronomer. Other than the presence of symbols actually depicting the sun or other astronomical symbolism he stresses that first, there should be the addition of a modification or a man-made feature. This could be a modification of the surface casting the shadow or modifying a specific place to receive a more unique form of light. The second point he stresses is that there should be a specified starting or ending point for the movement of the shadow. In other words, the light or shadow at its initial appearance or dissemination should come into contact with a glyph or feature that should have an affinity with the sun or solar-related mythology, rather than in an empty, unused section of cliff. The third point Leonard stresses is that the interaction and performance should begin at the moment of sunrise or end at sunset.


IND CK
IND CK
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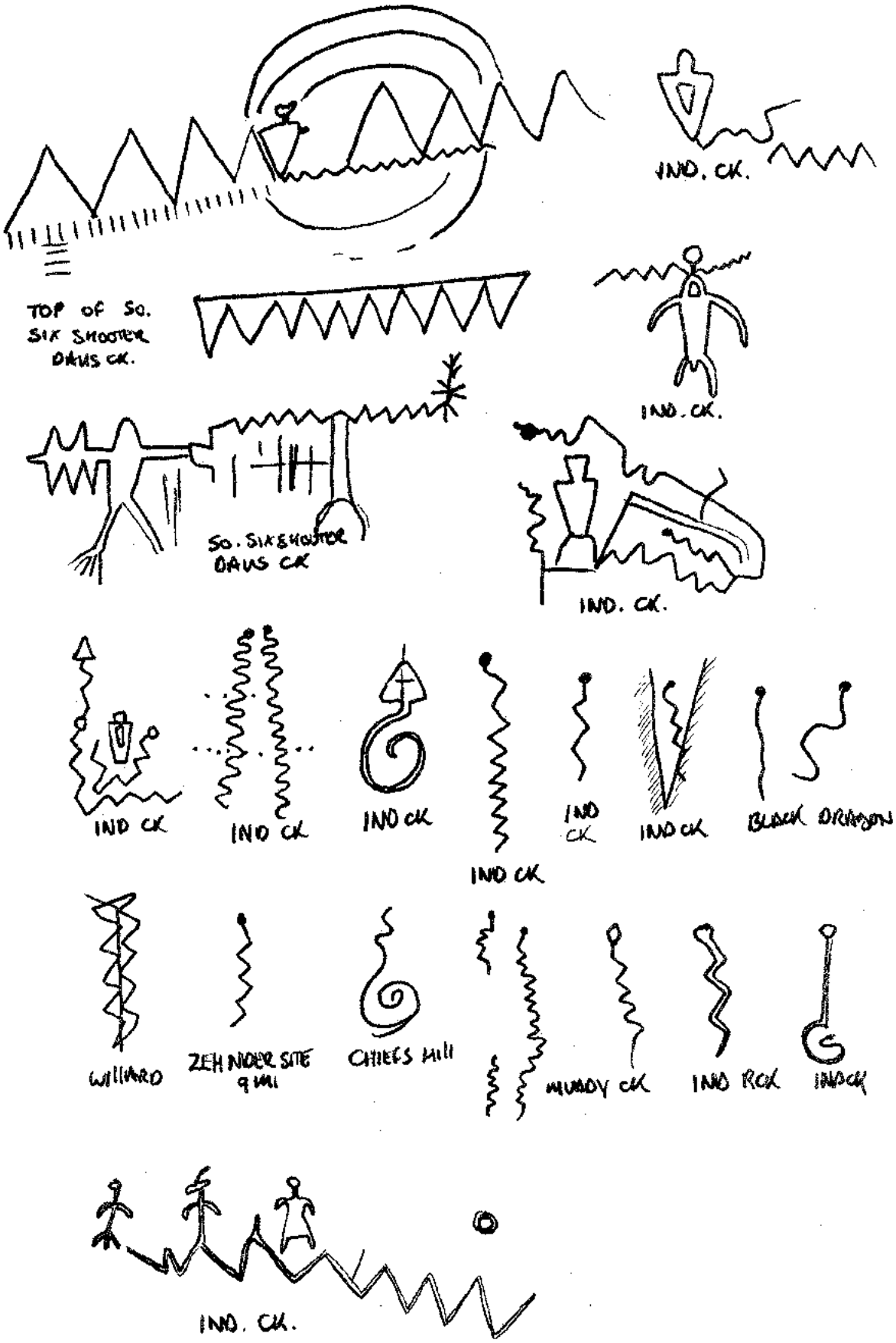
BRAFFET
BRAFFET
RED SAND
GREEN RIVER
IND CK
ASH & DRY FK
MOAB
CL CK
IND. CK
GRN RIV
McKEE SP
ASH & DRY FK
FERRON
IND CK
5 MI PASS
IND CK
FERRON
FERRON
PRICE RIV
9 MI
DAVIS CK
IND CK
CL CK
9 MI
DAVIS CK
IND CK
SEVIER
PAROWAN
CLEAR CK CAN
CL CK
FILMORE
9 MI
LINCOLN
BEACH
MILFORD
FERRON
STRIGHT WASH
INDIAN CREEK
LINCOLN
BEACH
CL CK
CL CK
STANSBURY
ESCALANTE
9 MI
ASHLEY & DRY FK.

FIGURE 1A


IND. CK.
TOP OF SO. SIX SHOOTER DAUS CK.
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SO. SIX SHOOTER DAUS CK
IND. CK.
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BLACK DRAGON
WILLARD
ZEHNDER SITE 9 MI
CHIEFS HILL
MUDDY CK
IND ROCK
IND CK
IND. CK.

FIGURE 1B

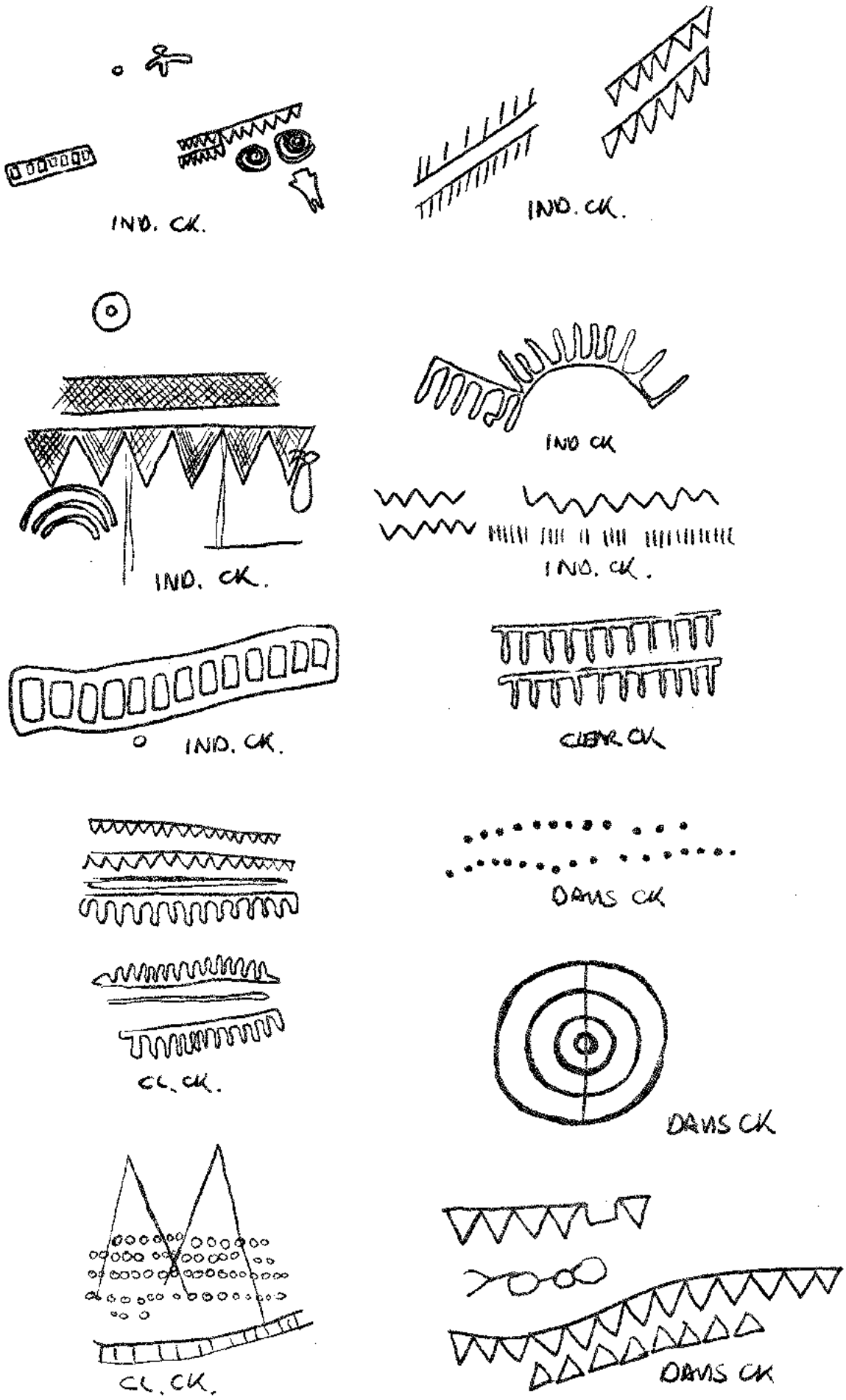
It must be noted that Leonard stresses these points only to convince the hard-core skeptic. I agree with Leonard that this would be an ideal situation, but how often will this occur? It may seem so, but it is not my purpose to convince those who refute the authenticity or the intention of these sites. It is my intention to determine the extremes and types of interactions. If we consider only the sites that meet the above qualifications we would have to ignore nearly all of our sites. While such sites are more conclusive, the ancient sun-watchers made a great variety of interactors and observational notations. We feel it is our duty to record all the situations possible, analyze types and frequencies and then present this information to both public and astronomer.

There are two major factors that help predetermine the likelihood of a site as an interacting panel. The first is the types of elements present and second, their relationship to certain physical features.

After viewing many interacting panels and studying their associated glyphs, I believe certain symbols indicate one of three situations. The first thing that could be indicated is the simple presence of a solar shrine (an observation post indicator). The second thing possibly indicated is activities involved with site usage (notations, narrations or symbols used in passive observations). The third thing is actual interacting symbols involved with the progressive movement of light and shadow. These are constructs to create unique interactions or performances at only particular periods of time (an active panel).

Since some sites have solar symbols that have never been observed to interact and do not seem to have much potential to perform, there is a good possibility that they may simply indicate the presence of a solar observation shrine. There are two different types of observation sites. These solar symbols may indicate the presence of either a horizonal observation post (a passive site) or an interacting site (an active site). An active panel is one in which moving forms of light and shadow come in uncoincidental contact with features of rock art at only specific times of the year. The presence of both types of sites can be marked by similar types of rock art.

Types of symbols most often indicative of observation sites are actual symbols representing the sun itself or concepts related to solar activity. In Utah, these often consist of rayed circles, concentric circles, dot-centered circles, spirals, dots, circles or spirals with multiple divisions, rising snakes, joined triangles or circles, snakes attached to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IND. CK.
IND. CK.
IND CK
IND. CK.
IND. CK.
CLEAR CK
DAMS CK
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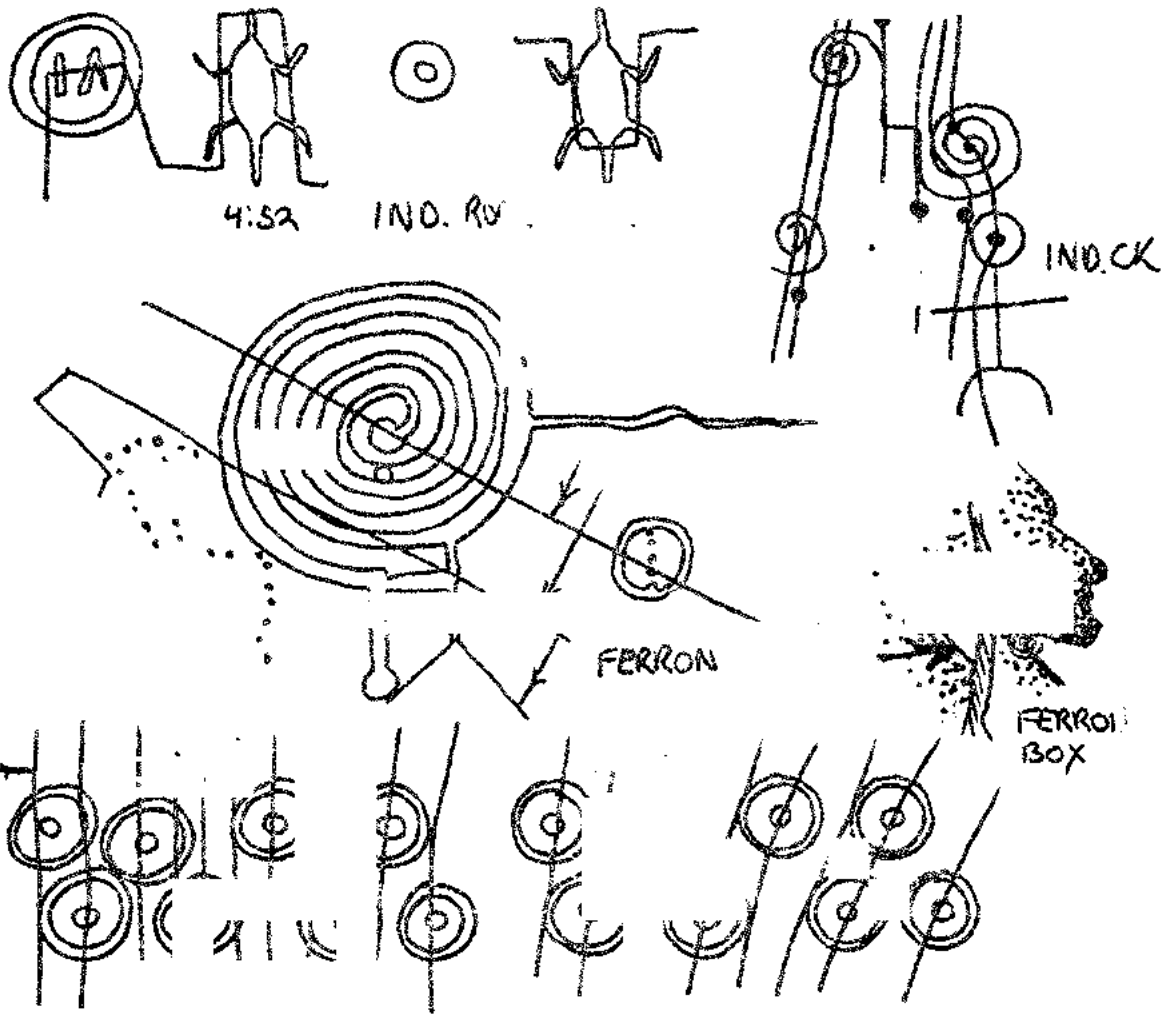
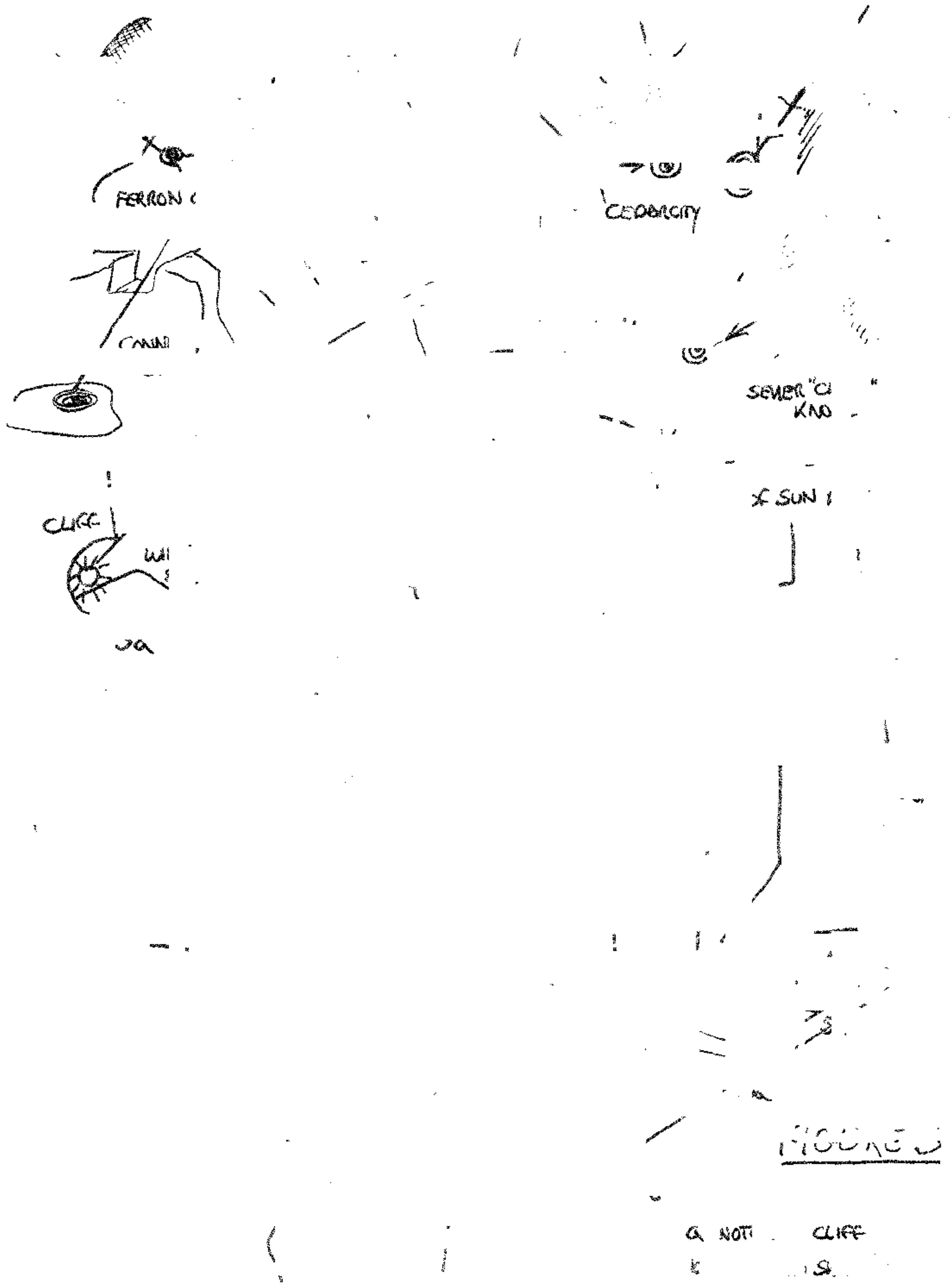
DAMS CK

FIGURE 2



FIG


FERRON
CEDARCITY
SEVIER
CLIFF
SUN
NOTE CLIFF

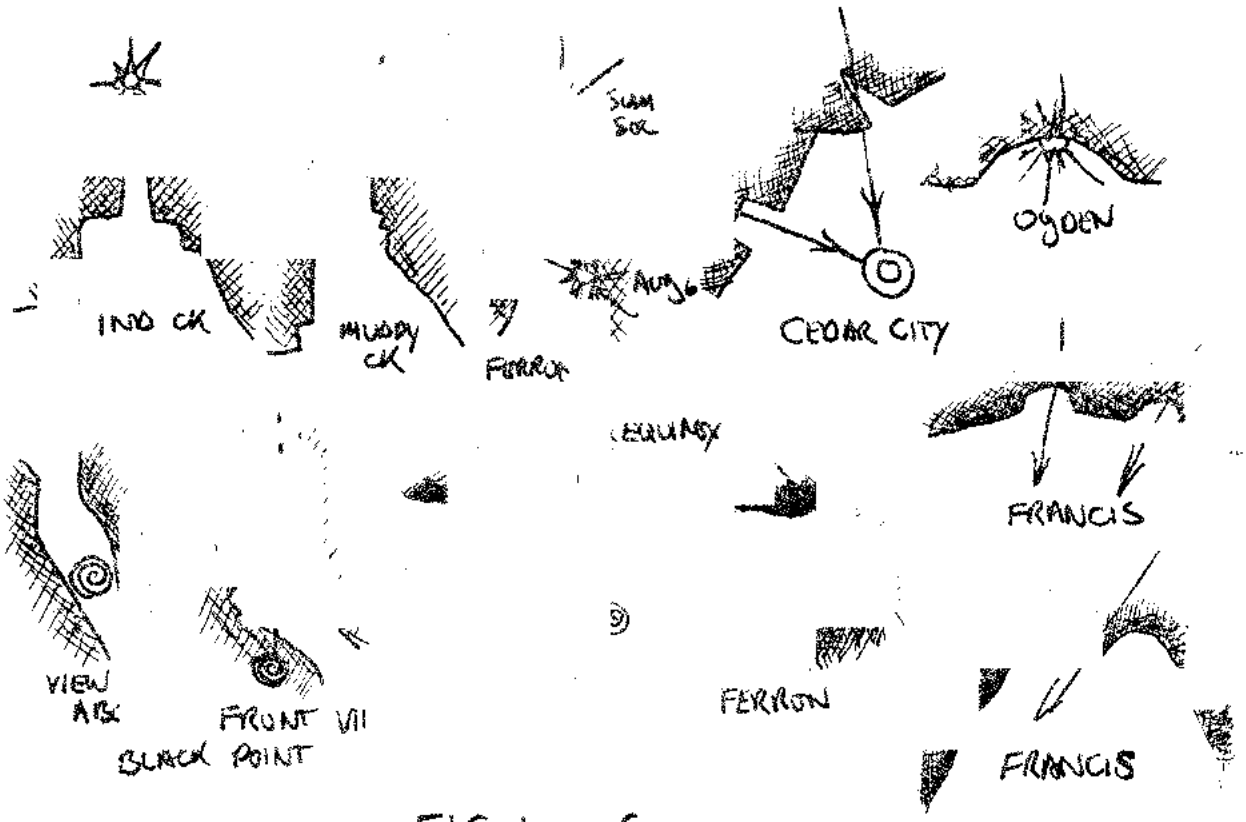
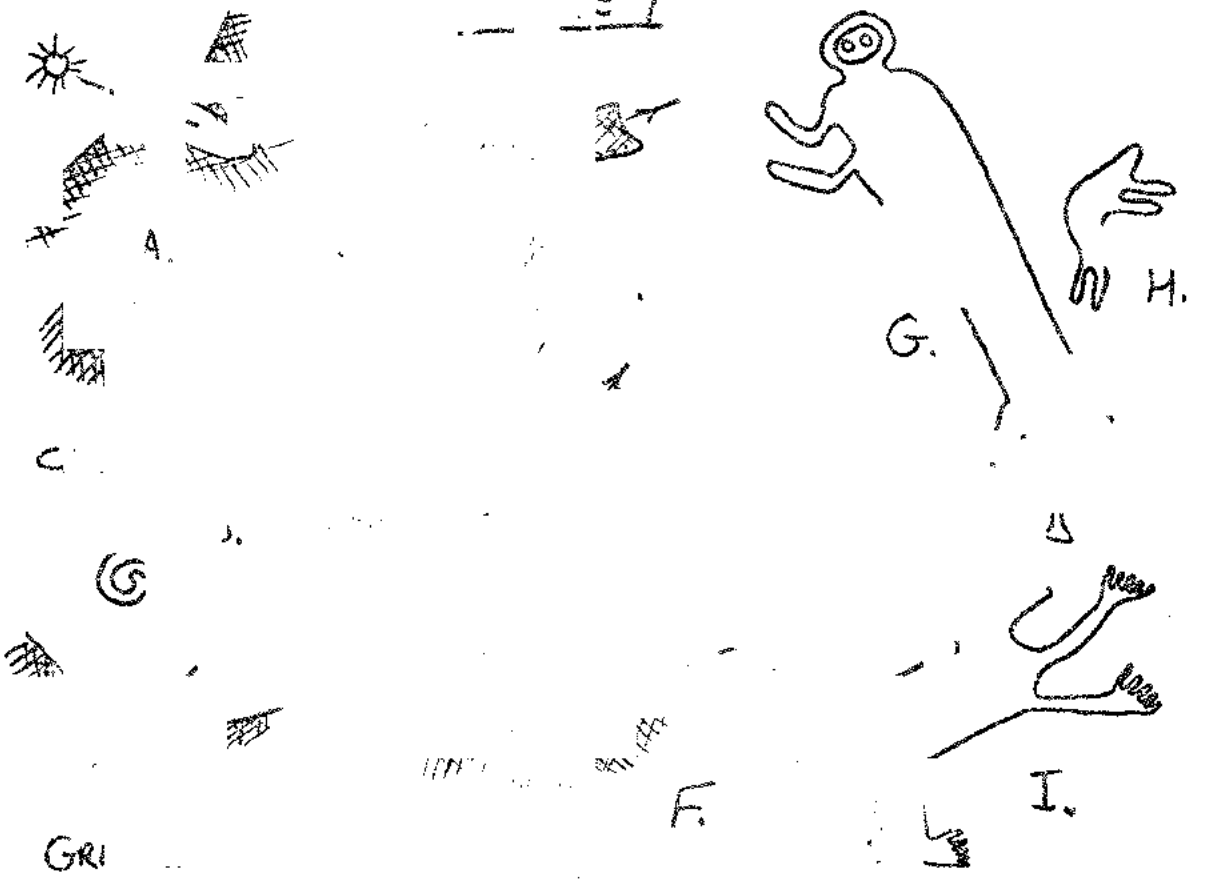

IND CK
MUDDY CK
FERRON
SUM SOC
AUG
CEDAR CITY
OGDEN
FRANCIS
VIEW ABS
FRONT VII
BLACK POINT
FERRON
FRANCIS

FIGURE 6


A.
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H.
F.
I.

GRI

anthropomorphs, rainbows, crescents, hatch-marks, rows of dots, short lines or other elements (Fig. 1a,b). Some of these are regionally diagnostic while others are universal.

The second situation represented by non-interacting symbols seems to have to do with "site usage". This includes things such as possible observer identification, clan or group affiliation, numbers of observations, visitations, mneumonic or arithmetic calculations, associated mythical narrations or related information that is not directly involved with the actual interaction, but may pertain to the events associated with or celebrated at that time (Fig. 2).

The third thing is actual interacting symbols. These have a wide range, from a simple circle to a human figure, from one symbol at a site to many interacting symbols in complex situations. Whatever the signs or symbols, they often have specific placement in different kinds of relationships so types of interactions vary. This makes some interactions very impressive and significant and others not as obvious. As a result, there are those which are questionable--and thus the problem in determining some sites as a shrine involved with calculating and observing solar movement (Fig.3).

In some cases, "site usage" or "calculation markings" are brought into interaction. They can also be involved in a periodical, sequential interaction ticking off one mark at a specific time. Then the next, a little later and the next, until the date of Solstice of Equinox or a period shortly before or after. I am now noticing interactions that must be intended for periods shortly before and after the exact solar event. This type of situation could possibly mark a period for ceremonial preparation before the event or continuation after. This, at the moment is still being investigated.

The types of interactions at a site are heavily dependent on the site's physical features. This includes cliff form, direction and alignment to the solar trajectory and the presence of a shadow that has unique qualities in its outline or differences in its progression from day to day throughout the year. Some of the physical features of a cliff that indicate that interactions will probably take place range from the extremely obvious to the very obscure. Some very obvious indicators of interactions will be the placement of a glyph next to a pointed protrusion such as those at Ferron Creek, Stansbury Island, Cedar City and Mill Creek (Fig. 4). Another very obvious indicator is the modification of the cliff surface. At the Barrier Canyon site in Indian Creek there are five man-made notches which cast a cup-shaped shadow around symbols placed to their left. By placing ones head on one of

these symbols which is cupped at Equinox, the sun can be seen to rise over the far horizon through the notch on Winter Solstice (Fig. 5).

Another type of obvious indicator for active panels is the placement of a glyph directly below a natural slot in an overhanging cliff. At the Barrier Canyon Style site in Indian Creek there is a large cleft in the cliff directly above the right circle. On May 6, August 7, the cross-quarter date marking half way between Equinox and Summer Solstice a shaft of light should fall across this circle making it a triple performer. On Muddy Creek there are two examples of this situation. On one panel there is an inverted triangle and a concentric circle, a combination of symbols repeated at Stansbury Island and Indian Rock. The other panel has a scratched triangle that conforms to the shape of light (Fig. 6).

On the western edge of the San Raphael Reef there is a dramatic Barrier Canyon figure placed under a slot that produces a shaft of light that moves up to the figure's mouth and then retreats back down on August 7 (Fig.11).

Some glyphs are placed in a position so they themselves actually point to the location of the appearance or disappearance of the sun or mark the place to observe this. These are passive horizonal observation markers. The most obvious is a notch or projection at an angle above the glyph. Near Moab, the tail of a spiral points to a very prominent narrow notch in the top of the cliff which the sun enters on only one day-- on Summer Solstice (Fig. 7a). In Clear Creek, a unique spiral has two projections, each pointing in the direction of a prominent indentation in the cliff above. The sun reaches its most northern position to rise in the upper notch on Summer Solstice and rises out of the lower notch on Equinox (Fig. 7b). Near Green River and Nine Mile are panels that have strong possibilities to also mark positions of sunrise (Figs. 7c,d,e).

Rock art can also mark the location to stand for observations of sunrise or sunset without the presence of slots, notches or projections. These, however, are not obvious. In Black Dragon Canyon (Figs. 7g,h,i), three figures reach out toward the position on the cliff where the sun appears on Equinox and Winter Solstice, and disappears on Summer Solstice.

Other surfaces are not obvious in their ability to portray their potential to create unusual interactions, let alone any

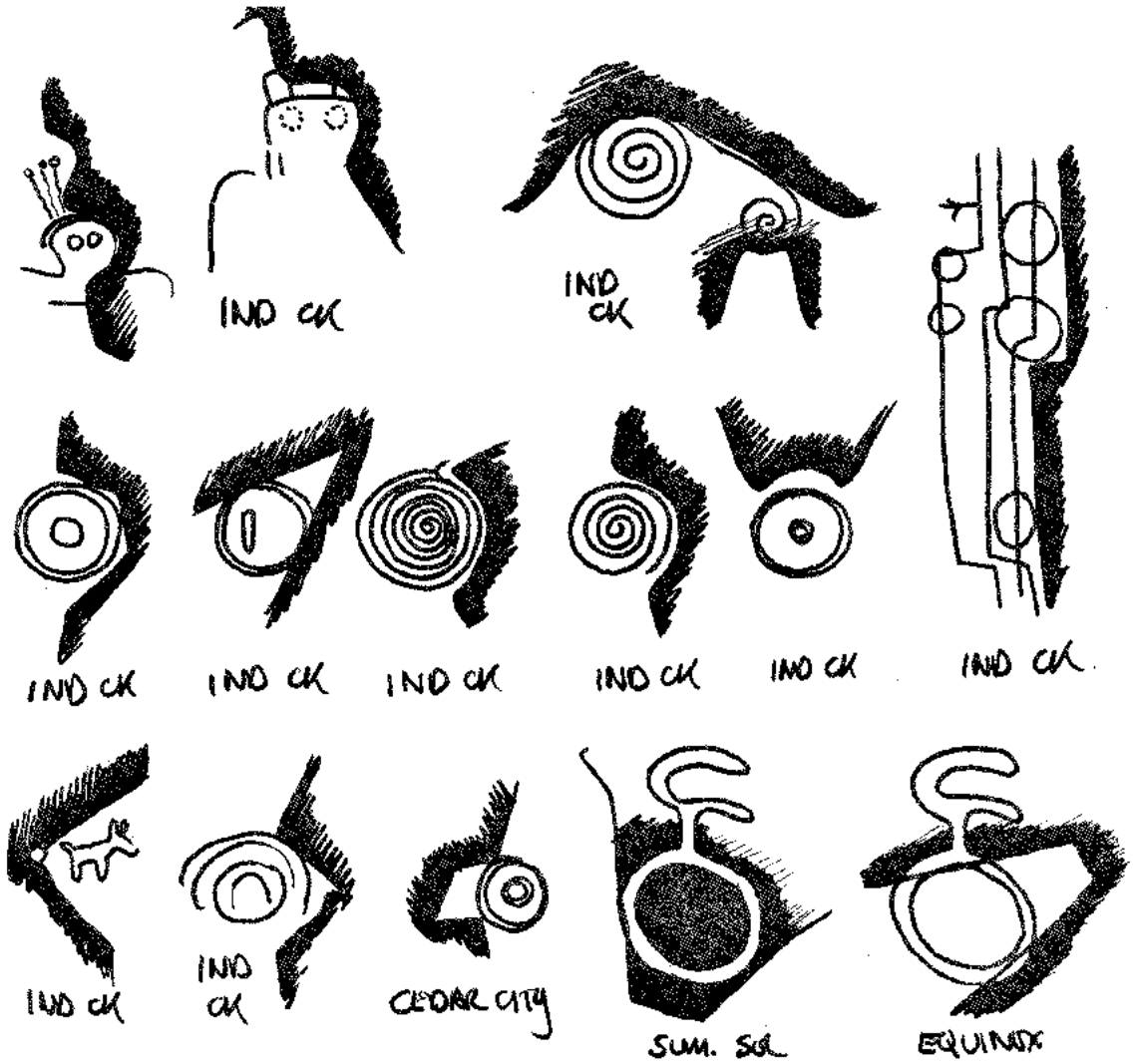

FIGURE 9

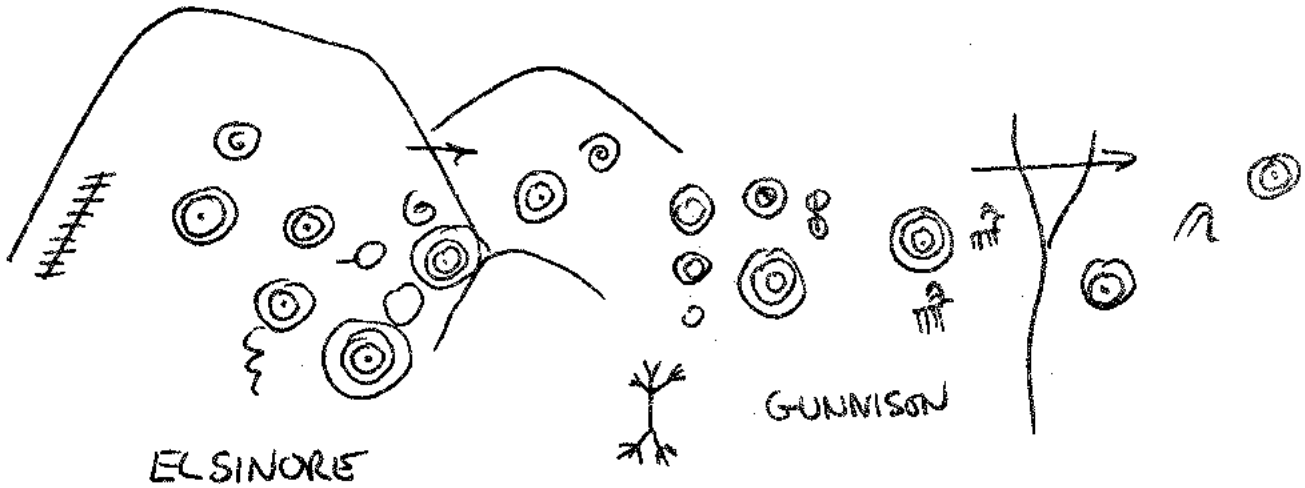

FIGURE 8

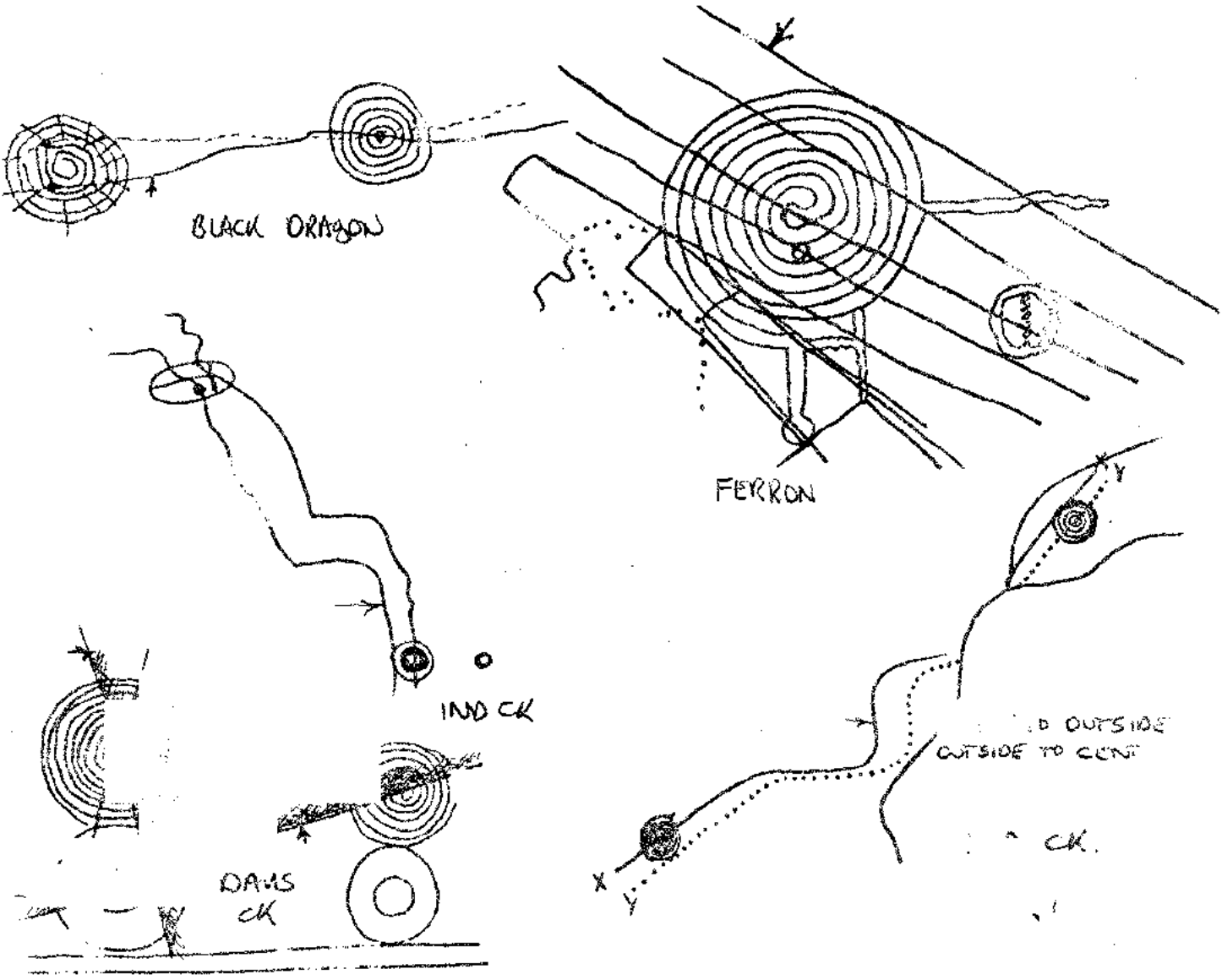
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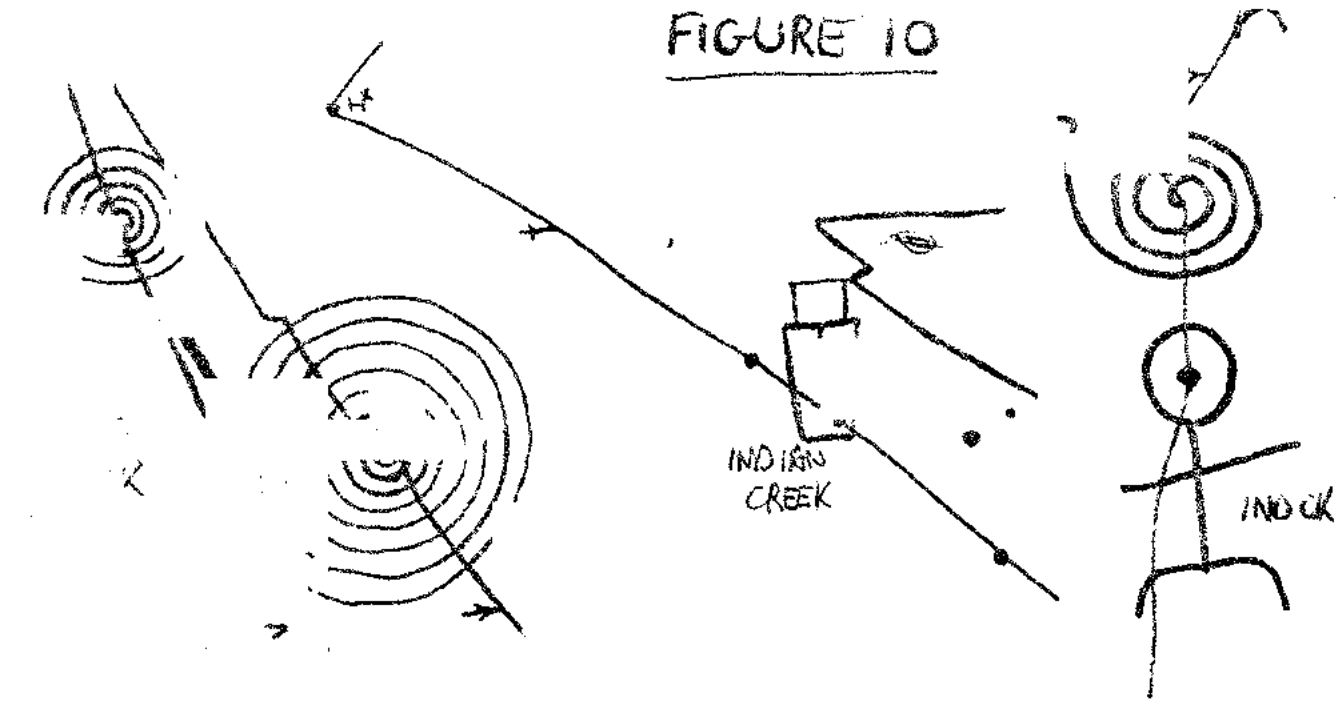
FIGURE 10


INDIAN
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interaction at all. On boulders like the one with the Double Spiral in Indian Creek or some of the cliff outcroppings at Stansbury Island, only a minute ripple or ridge in the surface casts the shadow. At sites like Gunnison and Elsinore, one boulder will cast its shadow onto an adjacent boulder in ways that are impossible to predict (Fig. 8).

In the sites presently known the types of shadow contact with rock art elements most often include, one: a notch in the shadow that cups the outside edges of an element or moves across the mouth of a figure (Fig. 9); two, a line bisecting or intersecting predetermined points of two or more elements (Fig. 10); three, a unique shape of light appearing, disappearing or transforming shape (Fig.11); four, there is also the movement of a line of shadow that can reach a specific point marked by rock art and then retreat.

These panels must be observed in both morning and afternoon. The panel may interact at only one of these times or possibly both. The panel must also be observed at each appropriate time of the year for possible interaction. If nothing happens on the prime quarters of the year and it is still felt to be a solar interactor it should be watched on the cross-quarter dates which are the beginning dates of the other months of the solar calendar (Fig. 12). Panels should also be watched several days to a week before and after to be completely convincing. These panels may only perform during one period. If they do, the divergence of the shadows between each observation helps to convince the skeptic of the fact that these kinds of interactions do not occur every day. If the panels interact at non-specific solar periods including non-cross-quarter dates, its purpose could have been for other reasons. These include beginning periods of ceremonial preparation, continuations of ceremonial observation or events in the social or ecological cycle that need notification.

DETERMINING THE SIGNIFICANCE OF SITES AFTER OBSERVATION

Many of the panels that have odd interactions may be difficult to determine as intentional. The main question many observers of less convincing sites ask is how can intention be determined. Take, for instance, the Equinox performance of the Double Spiral in Indian Creek (Fig. 13a) (Warner1983:46). During Summer Solstice (Fig. 13b) the performance left no doubt that it was intended for observation on June 22.

There is the possibility, however, that the Equinox alignment from the center of the large spiral to the top of the small spiral was also intentional. This possibility was not

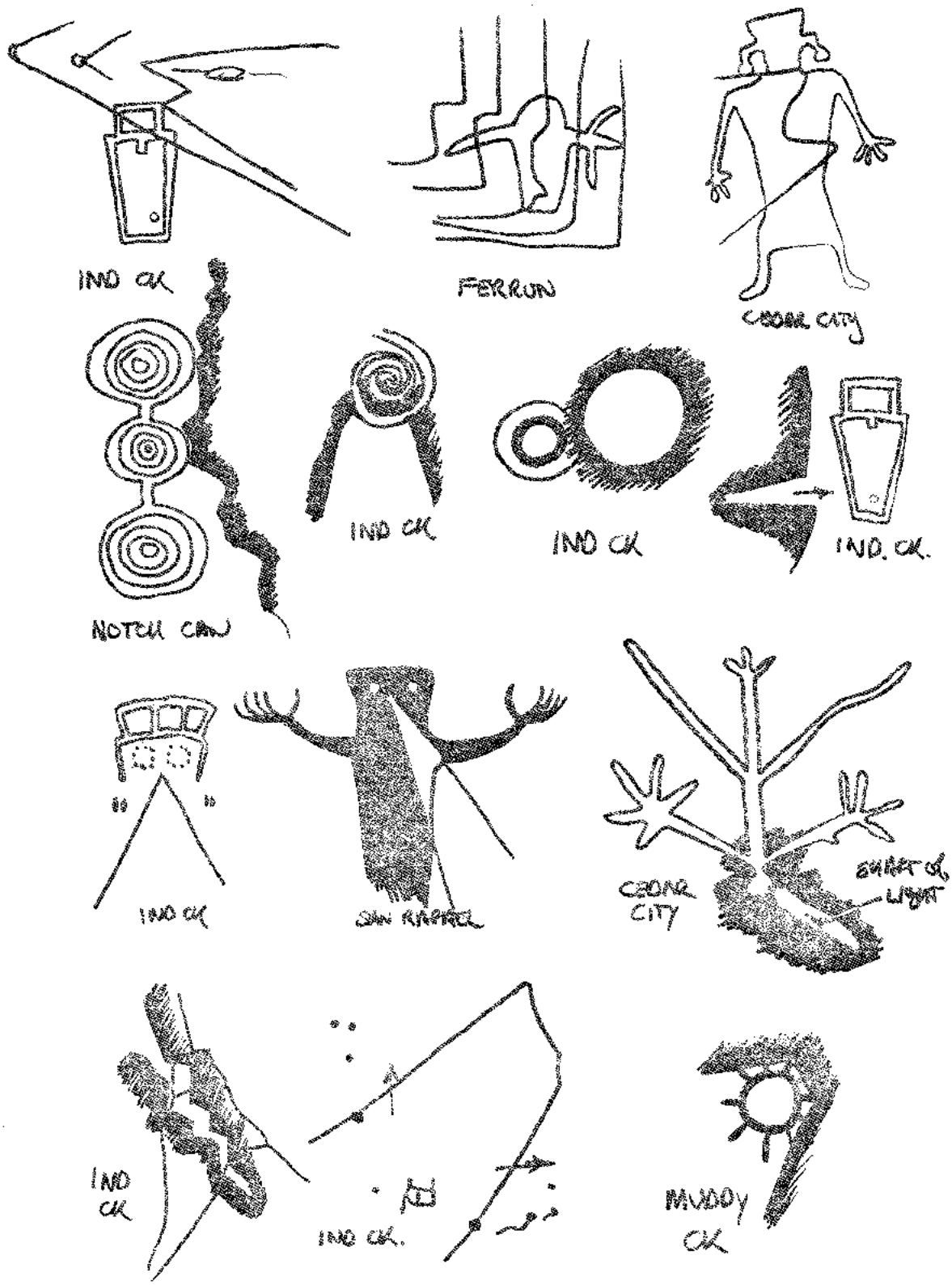
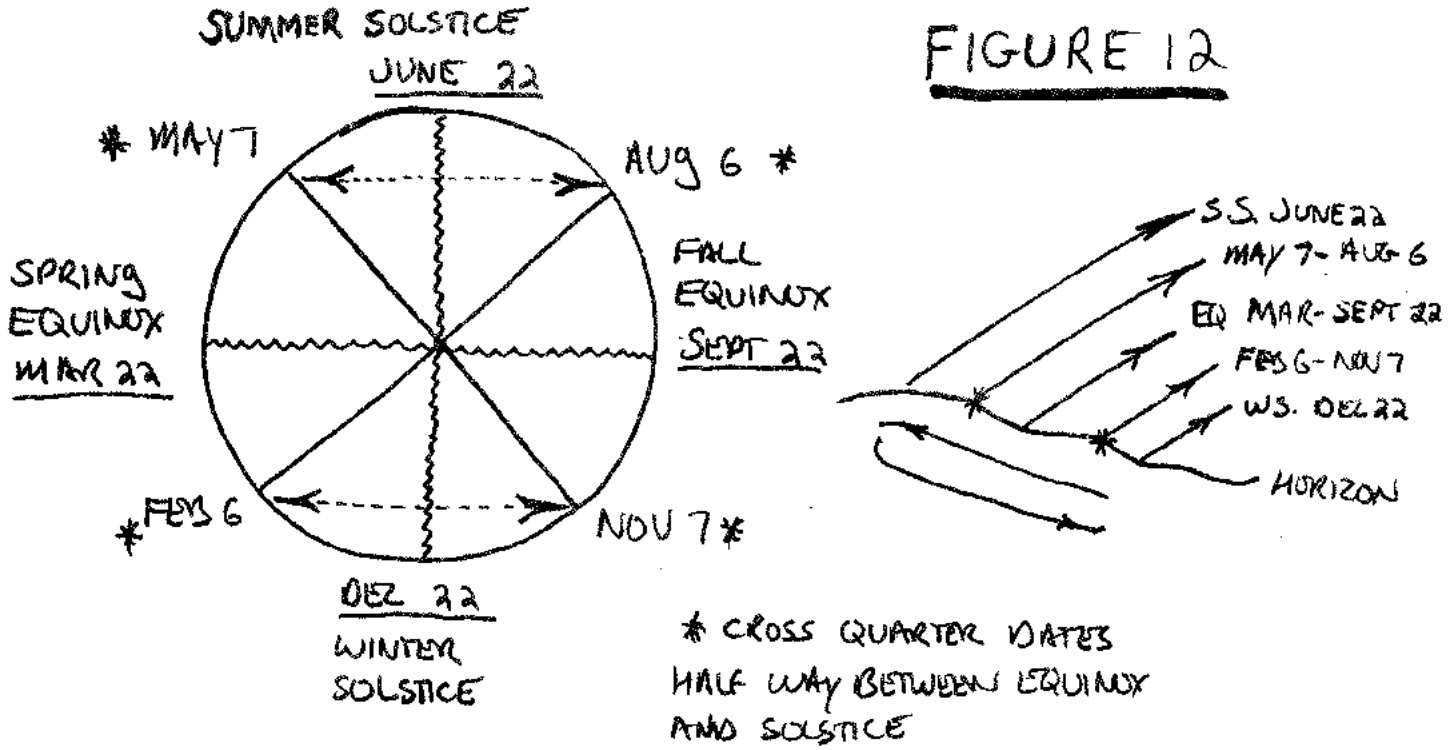

IND CK
FERRUN
CEDAR CITY
NOTCH CANY
IND CK
IND CK
IND. CK.
IND CK
SAN RAFAEL
CEDAR CITY
SUNSET OF LIGHT
IND CK
IND CK.
MUDDY CK

FIGURE 11

FIGURE 12



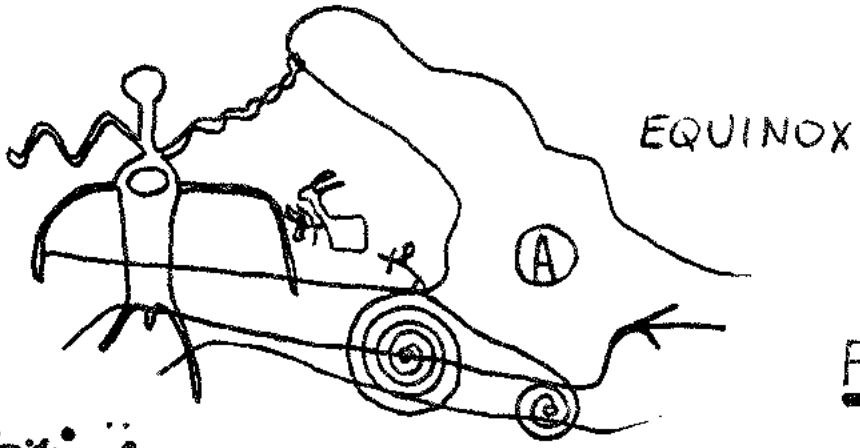


FIGURE 13

discussed in the initial presentation of this site. The question is "could both relationships be intentional?" If the panel was composed during Summer Solstice, then the Equinox one would seem coincidental. Yet, from several sites, especially the Barrier Canyon Style site in Indian Creek, panels show complex situations, making it difficult to determine the exact sequence in the symbol's construction. The left circle at the Indian Creek Barrier Canyon Style site must have been observed several times during the year before the final composition was constructed (Fig.14). While some of these are, others are not as convincing as they should be to prove that the less convincing interaction was intentional.

At Indian Rock on Equinox the shadow transforms from a vertical line bisecting the dot-centered circle whose point still touches the central dot (Fig. 15a). Yet during Summer Solstice a different triangle of light moves up to touch the lower edge of the same circle (Fig. 15b). The dot had to have been placed on the cliff during Equinox. While the diameter of the circle, if placed at Equinox, may not have been the right size or in the exact position to have the triangle of light during Summer Solstice rise far enough to touch its bottom edge. So it seems it could have been a dual performer observed at both times of the year. It seems obvious the outside circle may have been placed there to take advantage of the Solstice interaction since that is the highest point the triangle will reach and maintain its triangular shape.

The problem of the center-to-non--center alignment is illustrated by the Recessed and Black Circle panels during Winter Solstice, where alignments were center-to-first and second inside rings (Fig 16). At first this type of alignment was not considered to be the most crucial or the most significant possible. It is felt that at another time there may be a center-to-center alignment.

In Davis Creek, however, one panel demonstrates the importance of an off-set alignment. Even though it does not provide the reason for the alignment, it shows that its usage was intentional. At that site a spiral is attached to the top of a concentric circle. On this a line is scratched from the center of the spiral down to the left edge of the first inside ring of the concentric circle (Fig. 17a). One of the afternoon angles of the shadow on Summer Solstice cuts through the center of the upper spiral and touches the right edge of the inside ring on the concentric circle, thus making the exact opposite alignment of the scratched line (Fig. 17b). This is an extremely unique and important alignment, demonstrating that a center-to-a-non-center alignment was important. Now the Recessed and Black Circle panels are considered to be more

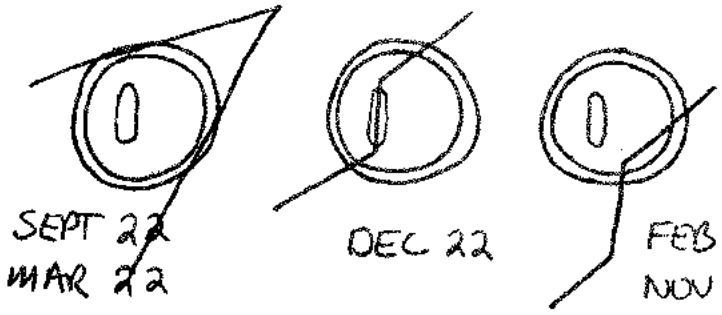


FIGURE 14

THE LEFT CIRCLE **INDIAN CREEK**

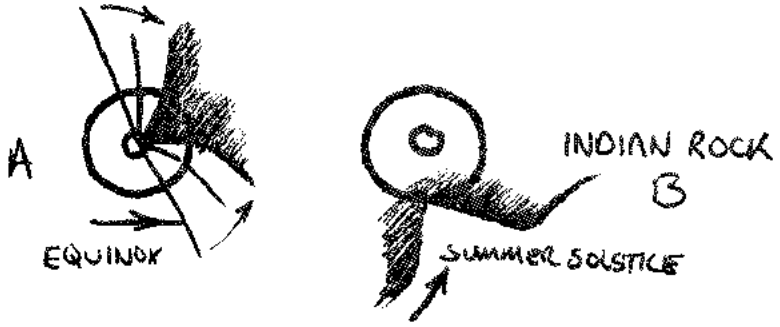


FIGURE 15

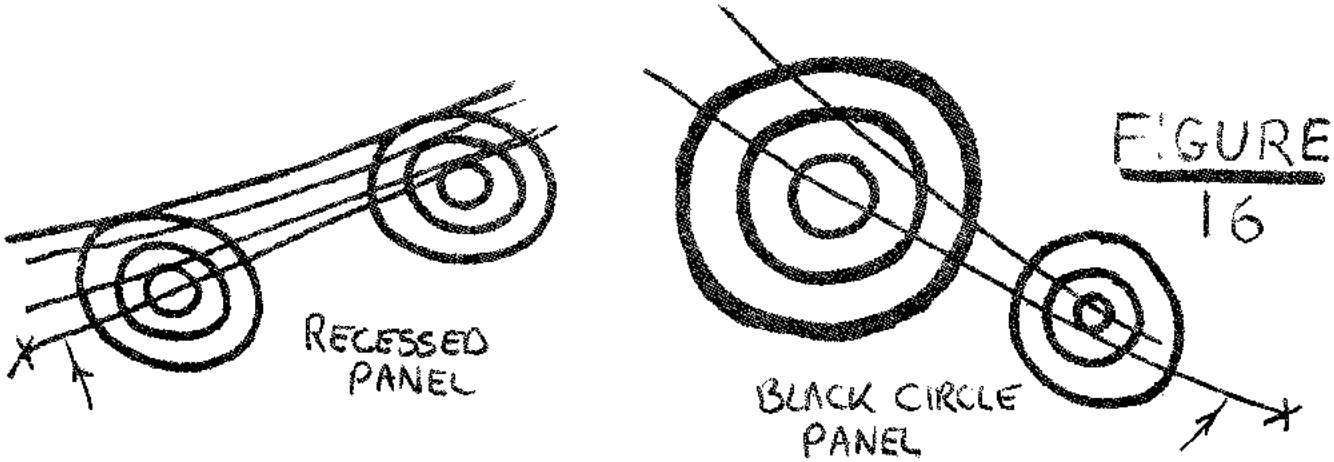


FIGURE 16

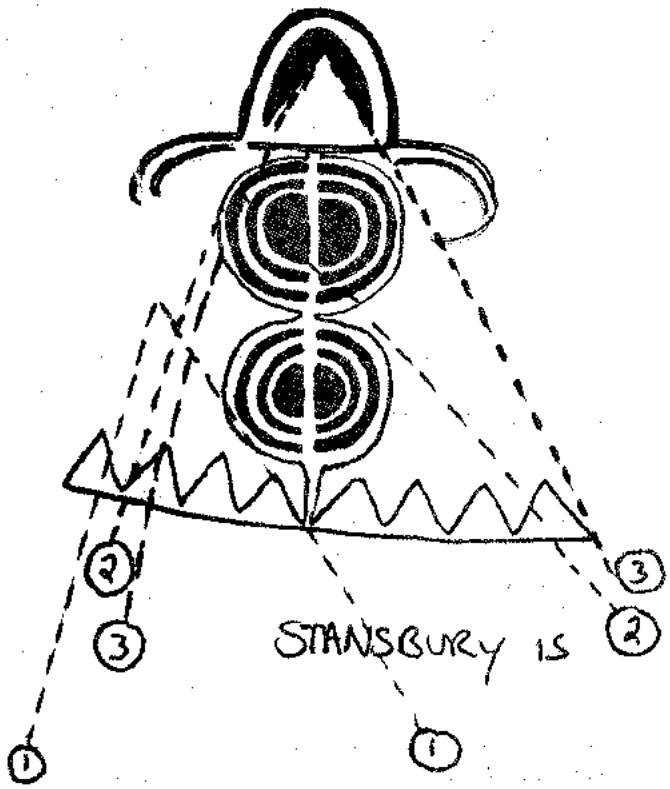


FIGURE 20

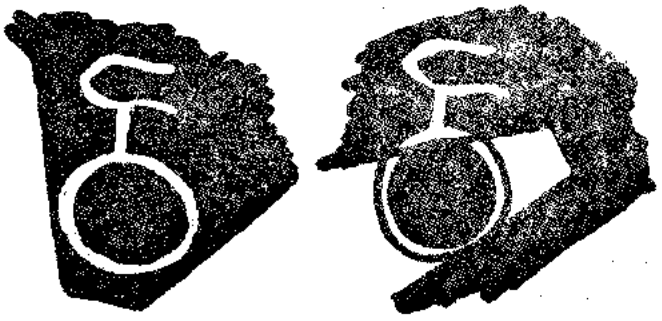


FIGURE 21

One thing that must be realized is that from all over, each panel is the result of different individuals, each taking advantage of the format of rock surface and the differing movements of shadow which create different forms of light between the extreme times of the year. Some individuals created the simplest interactions, knowing that their production would sufficiently mark a specific period of time for them. It takes us years of observation to become familiar with the peculiarities of shadow movement at a site. Some may be fantastic, while some seem so menial as to be questionable, except for the fact that shadows differ enough from period to period that it is possible to mark seasonal movement. I am now of the opinion that they looked for the most unique situations for shadow movement, but settled for different grades of impressiveness, depending on what features were available in their area. How sophisticated the interaction would be not only depends on the imagination, experience and background of the sun-watcher, but on the chance finding of a more unique light and shadow formation which would occur at the proper time.

Those who have been skeptical of solar sites and who challenge whether light movement across glyphs can be significant are admitting their unfamiliarity with this phenomenon and ignorance of the evidence. Others only question those sites which are not as convincing. What is needed to satisfy the skeptic is more of the spectacular, unquestionable interactions like Phil Leonard suggests. Since these are rare, we need enough observations throughout the year to document the differences in shadow forms on less convincing panels. It must be stressed that the ancient sun-watchers never created these panels to convince us that they were astute astronomers. They likely only had a desire to mark time and continue mythical traditions. These glyphs and the contexts in which they occur are important aspects of the artist's intent which will help us determine an important part of their social behavior now lacking in the archaeological record. The precision of our efforts to observe and record will make this part of their behavior and the amount of time they spent with these concerns more understandable.

The important fact is that downgraders of solar interacting sites have a more difficult time disproving sites as coincidental. Even though enthusiastic observations carry the risk of exaggeration, only those who take the chance will ever gain a complete understanding. Only those with enthusiasm toward rock art will ever make such discoveries. Any advancement in learning comes from filling needs and voids in what we think we know. To completely understand any culture we need to know how they were involved in observing seasonal changes and solar movement. It is easy to say "Why should they

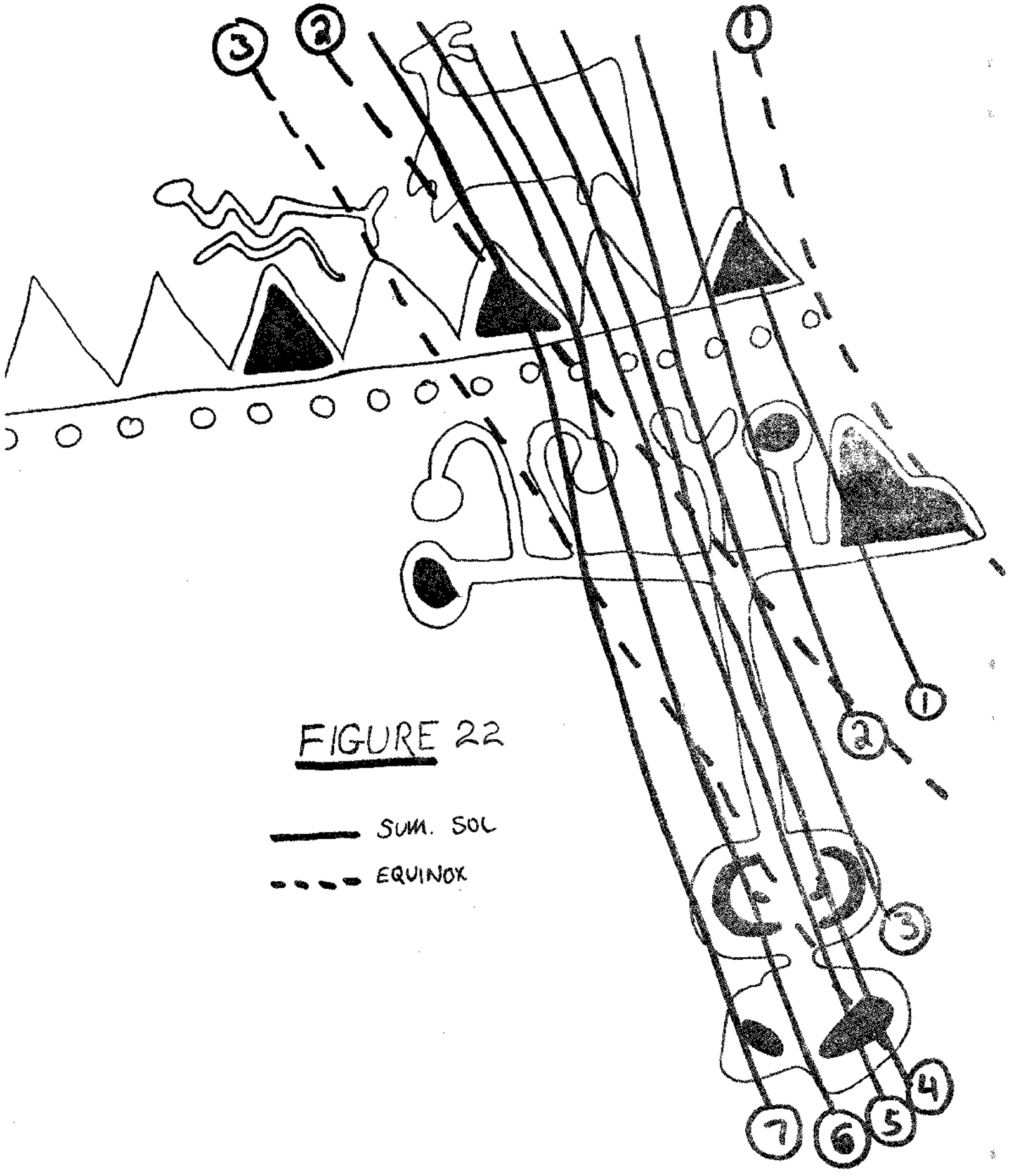


FIGURE 22

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have active panels if they had horizonal observations?", but if we do not look, how can we find out?

We see this need in the study of rock art and are supplying cases which will provide evidence to try the validity of whether they did or did not use rock art as active solar observation posts and that will hopefully help us understand to what degree. In doing this we are trying to maintain as unbiased an attitude as our primary cultural programming will allow. By taking this type of an investigation half way, we will not provide sufficient answers. Only an intensive investigation will provide the evidence to give any satisfactory conclusion.

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