METHODOLOGY FOR IDENTIFYING, OBSERVING, RECORDING, AND REPORTING SOLAR INTERACTIVE ROCK ART PANELS

By Clay Johnson

We are the Utah Rock Art Research Association. "Research" implies a scientific approach to data acquisition in so far as methods, terminology, description, and conclusions are concerned. If what we are doing is research, findings should be based on repeatable, clearly defined data and packaged in a form acceptable to the scientific community. This means that studies should deal with a site en toto, that negative results should be reported along with positive ones, and that just plain speculation should be avoided, or at the very least, clearly labelled as such.

Methodology determines the scope and accuracy of research. The methods reported here are the result of a year and hundreds of hours of direct observation, experimentation and study. They will yield useable data with the least amount of wasted effort and missed interactions. They can be employed in broader examinations, such as recording interactions daily through a year or a shorter period, searching for lunar interactions, surveys of rock art over a large geographical area, or accurate recording of questionable rock art features.

NON-INTRUSIVE RECORDING AND OBSERVATION

Recording and observation must be non-intrusive. Researchers from Mallery to present have used, published, and recommended intrusive methods of recording rock art. The public at large, predictably, is utilizing these methods, often with less care than the professionals. No thought has been given in the past to possible solar interactions with the panels, and thus any care expended has been to avoid damaging the glyph elements themselves. Gnomons for solar interactions may be located within the glyphs themselves, anywhere on the panel containing the glyphs, on adjacent rock ledges or edges, or on rock several meters from the panel itself. Although shadow sharpness falls off rapidly with gnomon distance, thereby setting a practical limit of 10 to 20 meters on the distance from gnomon to panel, accidental movement of large boulders even many meters distant from a panel could conceivably alter the effective horizon, thus destroying panel interactions. The base rock itself must not be touched. No chalking, wetting, overlaying, leaning, grasping, fingering, or other handling or touching of the rock can safely take place until a site is fully understood. Then it is not necessary. Slide photos or videotapes backed by written description must become the only acceptable means of recording. Sketches made from slides can be checked for accuracy or to resolve questionable marks on return visits. It is inadvisable to stick a scale to the panel, even for official recording. A measurement of a distinctive element can be made with a tape measure without touching the panel, this measurement recorded and included with the site sketch. Anyone requiring more accurate measurements of glyph elements than this provides will undoubtedly have to visit the site anyway. For study of solar interactions, it appears that features such as size and position relative to related panels, and asymmetric elements have far more applicability than precise measurements of glyph features.

It is also the responsibility of the researcher to avoid two more possible intrusions. One is activities such as scrambling around on a talus slope below glyphs, dislodging material or destroying ground cover. This can lead to accelerated erosion or wasting of the rock the panels are located on, or slippage of gnomons separate from the base rock itself. Something of this sort may recently have caused the loss of the solar interaction at Fajada Butte in Chaco Canyon, as reported in National Geographic (Vol. 177 #6) for June, 1990. The other activity which can lead to site damage is careless publishing or release of data on solar interactions, leading to uncontrolled public inundation of a site, or unintentional publication of improper recording or observation techniques which are then copied by others.

EQUIPMENT

35mm camera with lenses from 28mm to 200mm. For particularly inaccessible spots, a 400mm lens and tripod may be necessary. Macro capability is desirable on a telephoto lens, as this allows close-ups of small glyph elements without touching the panel.

Color film is the most effective, ASA 100 Ektachrome can be developed locally most places, and a 1/2 to 1 stop underexposure based on light from the sunlit portion of a panel works best for this researcher.

Video Camcorder. This is necessary to properly record solar interactions as they were meant to be observed. Interactions may take from one or two minutes to as long as six hours (based on observations at one site). Several interactions may occur at a site on one day. Two hours worth of battery capability is advised. A tripod will be found nearly essential. The camcorder should be set in a position to record the entire panel. Manual focus setting will avoid autofocus changes as the light on the uneven surface of the panel changes. Date should be recorded on the screen at the start of the run, and the clock recorded during the run. Using the <u>pause</u> button to record two or three second "slices" of the interaction at one or two minute intervals will compress an hour or so of panel activity into a more viewable five minute record. Warning! The observer must be alert for interactions which occur very suddenly and for a brief period of time. The one minute interval recommended above is long enough to miss significant nuances of some interactions. The observer must continue to observe the panel during the time between video "slices", ready to record any sudden changes on the panel. Exact alignments with specific panel elements should be backed up by 35mm slides, and the time the slide was taken recorded on the field sheet for the site. Slides show a much sharper image of the precision of an alignment, while the video sequence shows the flowing patterns of the event.

Compass. A Compass is helpful for estimating sunrise and sunset positions on-site, and for recording panel location.

Almanac. Necessary to determine sun declination when estimating future panel interactive dates.

Binoculars. Helpful for observing possible panel interaction, they also aid in locating new panels and in resolving hard-to-see glyphs. Often a glyph that is invisible to the observer standing immediately in front of it can be seen quite easily from 4 or 5 meters with good binoculars.

Notebook and pencil.

Field Sheet and Map. Initial visit to a site should include a thorough attempt to locate all rock art and any natural terrain features which might be considered part of the site. A sketch and field sheet should then be drawn showing relative location and position of panels and terrain features and any other cultural features, with a name and or number assigned to each panel. The field sheet should have a column for date, time on site, general comments, and notes on each panel. Slide photos of a panel should always have the time taken noted in the column for that panel, then later recorded on the slide itself. General information which ultimately will prove valuable in understanding a site, and which should be noted under general comments, includes noting the available floral and faunal resources at the time of each visit, presence or absence of water, comfort of site relative to surrounding habitat (Is it cool while the terrain around it is blazing hot? Is it warm against a protected south-facing cliff wall, while the winter winds blow cold elsewhere?) and any other environmental factor which might conceivably affect cultural activities. Questions for future investigation suggested by observation should also be noted here as they occur. (See Plate B1 for a sample Field Sheet.)

Panel Function Sheet. A graph allowing the observer to plot changes in panel condition (from lit to dark, dark to lit) over a day of observations will prove absolutely necessary for all but the simplest and smallest sites. Some panels do not change condition on a given day, remaining dark (or lit) all day. Some panels change condition once on a given day, some panels twice. Some panels change condition as many as six times on a given day. Since solar interactions occur while a panel is changing condition, and since the observer must be in position to observe a panel during the change, the observer must know when to be at the panel. At a site with many panels to keep track of, all of which cannot be seen at one time from a central location, the panel function sheet can prevent years of missed data. The sheet should make note of the time variant the observer is using (daylight, mountain standard, etc.), the site and date, the panel numbers or names, and have a column for noting whether a specific interaction is

FIELD SHEET:

site sketch goes here

DATE: ____________ TIME ON SITE: ____________ DATE SIGNIFICANCE: ____________

CONDITION CODES: D: dark L: lit P: panel light, not on glyph A: sun & shadow on glyph

TYPE CODES: Non: non-significant Sug: suggestive alignment Sig: significant alignment

Panel #&Name			Panel#&Name			Panel#&Name		
1.								

COMMENTS (Also see back of sheet): ____________

Method Plate B1

non-significant, suggestive, or significant. It is necessary to have complete condition data from local sunrise through local sunset for each panel at the site. This sheet allows the observer to predict approximate times of interaction, identify possible concurrent panels, arrange observation personnel to concentrate on suggestive or significant interactions, and will also eventually reveal any overall yearly patterns designed into the site. (See Plate B2 for a sample Panel Function Sheet.)

BASIC PROCEDURE

The initial visit to locate the site should be used to take photos for later sketches, identify features, and prepare a field sheet and panel function forms. This can occur any time of the year. It is recommended that most of a day be spent at the site on the initial visit, as rock art elements are often revealed by changing light values, and because a day at the site will give the observer a feel for horizons and terrain features which may affect the situation.

The second visit, or first actual observation visit, should be timed so that the sun's path is within approximately 1/2 degree of declination of the path for a key solar date (i.e. solstice, equinox). This means the visit should occur within ten days before a solstice, and within one to two days before other key solar dates. The observer must be prepared to persist from local sunrise to local sunset on this day. Field sheet and panel function sheet must be filled out, photos taken of interactions which appear to have potential, and probable interaction type (non-significant, suggestive, or significant) for each panel, for each change of condition, noted. This will enable the observer to be in the right place at the right time on the key solar date. It will also identify time periods for which there is no interaction possible, which may allow the observer to spend less time at the site on the key solar date. Ideally, any site selected should be studied periodically through at least one full cycle of possible solar paths (from solstice to solstice) to identify all functions of all panels, and to demonstrate that any suggestive or significant interactions recorded are not everyday occurrences or coincidental events. In practice; given cloudy days, goofs by the observer and non-functioning equipment, it could take several years to record the interactive solar events at one site.

Keep a journal or notebook which allows expansion of notes recorded on the field sheet, and a recording of questions, ideas, correlation, and predictions. Organize all photographic materials so they are identified as to time, location, panel, event, interactive type, and other important facts.

Sketches. Sketching is most accurately accomplished by projecting a slide of the panel onto a white piece of paper affixed to a smooth surface such as a wall, and tracing the features. It will be found helpful to record graffiti and cracks in pencil, glyph details in fine tip black marking pen, and painted elements

PANEL FUNCTION OVER ONE DAY

Site: ______________________

Time of Year: ______________

Circle one: Daylight or Mountain Standard time

. . . indicates lit

——— indicates dark

X indicates interactive

CODES: A=A.M. P=P.M. SUG= suggestive interaction

NON= non-significant interaction SIG= significant interaction

CODE & PANEL NAME	A 6	7	8	9	10	11	12	P 1	2	3	4	5	6	7	8
1.															
2.															
3.															
4.															
5.															
6.															
7.															
8.															
9.															
10.															
11.															
12.															
13.															
14.															
15.															
16.															
17.															
18.															
19.															
20.															
21.															
22.															
23.															
A. Non / P. Sug X. EXAMPLE	———		X	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	X ———	———	———	———

Method Plate B2

in colored pencil that approximates the paint. To correctly sketch small details, slides of the details can be projected on the paper, and the projector moved back and forth until the scale is correct. Asymmetries in glyph elements, seemingly random blotches, or small lumps or points on a glyph line are often clues to a significant interaction with those elements.

Sketching a projected slide identifies and duplicates those features, which other sketching methods often miss. Although some distortion of photographed panels will occur because of lens size, angle, distance, and uneven rock surface, this method allows the best chance of recording accurately (and updating) the cultural and other features actually present on the panel.

Examine the flow chart (Plate B3). If all you have is a chance sighting and a couple of snapshots, you don't have enough to report.

RESEARCH

Initial site selection. If the researcher is working on a more usual archaeological excavation at a site which includes rock art panels, then the site has been chosen. When seeking solar interactions unconnected to any ongoing excavation, the researcher will increase chances by selecting for observation a site which has multiple panels to observe.

Based on work at one site, <u>suggestive</u> alignments may occur randomly at any time of the day and year, although most suggestive alignments I noted culminated on key solar dates. An alignment which appears suggestive may actually be a decayed <u>significant</u> alignment, culminating on another day. A large number of suggestive alignments were observed at the site, many of which were on key solar dates, and many of which did not later become significant alignments. This suggests that perhaps the natural shadow play on a rock surface may have inspired many of the shapes on rock art panels.

<u>Significant</u> alignments, again based on the present working hypothesis, will occur at important dates of the solar year. Observed to date are significant alignments on winter solstice, summer solstice, the equinox, and on winter and summer crossquarter dates. An almanac will yield dates for the solstices and equinoxes; crossquarter dates must be calculated by counting the days between an equinox and solstice and dividing by two. Crossquarter dates which fall between a period of two sunrises should be observed both days. In North America, only the solstice dates could have been obtained by Native American's direct observation of the sun's path. Crossquarter dates would have to have been calculated after identification of a solstice. This may also be true of equinox dates. Solstice panels are then probably the panels most likely to occur at an interactive site. At each solstice, the sun's path is relatively unchanged for a period of about six days. Thus, the observer at an unstudied site will

FLOW CHART FOR ORGANIZING INFORMATION ON INTERACTIVE PANELS

Official Site Number or Location

Physical Description of Panel and Sketch
(assign letters to individual elements on complex panels)

Type of Interaction
(suggestive or significant)

Interactive Date and Time

Chance Observation
(alignment noted, photo [preferred] or sketch. Use standard shape descriptions.)

Further Data Needed

Interactive Sequence
(Use standard terminology, include sequential photos, Note if video available. Note gnomon location. Note concurrent panels.)

Additional Data
(Observations from other dates or times, dark-lit cycle through year, other data.)

Conclusions
(Example: This panel is a significant, precise, solo, Winter Solstice bracket panel, achieving culmination or best alignment at sunrise on 18 December and again on 24 December. The panel is dark all day from 26 December through 16 December each year.

Method Plate B3

increase chances of locating significant interactions by observing the site for a full day sometime during the week of the solstice. If a significant interaction is observed, then future visits to record changes in the interaction are dictated. Any site at which a solstice interaction is recorded should be studied through a yearly solar cycle to determine the interactive extent of the site.

A consistent procedure should be used in observing interactions, and a standard terminology used in describing observations.

A high percentage of panels at the research site for this paper were involved in concurrent interactions with other panels. Sequential and similar interactions with other panels had multiple interactions involving different gnomons at different key solar dates, and had extremely large or extremely tiny features that supported interactions. One feature utilized for interactions was so large as to involve the entire site. Several interactions focused on individual pecks or dots so small they would normally be ignored altogether, or seemed to be accidental marks. The observer, to be accurate, must have eyes and mind open to all possibilities, and make every attempt to record what is there, rather than what is assumed to be the "important" part of a rock surface.

PREDICTIVE METHODS

The factors involved in panel interactivity include the direction the panel faces, irregularities in the horizon, location of adjacent rock, available gnomon material, dips, curves, or cracks in the surface of the panel, daily changes in the sun's path, slight intentional changes in the depth or angle of a pecked element, and the individuality of the maker or makers of the panel elements. Taken together, these factors are a <u>chaotic system</u>, the slightest change in one factor resulting in often large and unanticipated changes in the appearance of the system. Nevertheless, anything man creates or alters seems always to have some internal logic. An analogy would be that when modern man builds a book shelf, although many types of fasteners are readily available, he tends to use all phillips head screws, or all glued joints, rather than gluing one shelf, putting phillips head screws in one side of the next and nails in the other side, using bolts on a third shelf, and so on,. A wider application of the principle gives us Rose Springs points for Fremont occupations and Desert Side Notched points for late Numic occupations. The safest working hypothesis is that any internal logic to glyph panels would be pan-site, rather than pan-Fremont. At McKee Spring, there does seem to be an internal logic to interactive panels. A simple example is that all zig-zag or snake elements at the site are involved in solar interactions. Panels which functioned on the same solar date often had features in common. Asymmetries to basically symmetrical elements at the site have proven to be good indicators for solar interactions. Use of internal logic to predict interactions will have to be done on a site by site basis until and unless broader applications are demonstrated.

At the research site, winter significant interactions are most frequent at sunrise. It must be pointed out, however, that some interactive panels never receive sun at local sunrise for a site. In one example at the site, it is physically impossible for a west-facing panel to receive sun before noon on any day of the year. The panel, which functions as a winter solstice indicator, interacts at panel sunrise, which is when sun can first strike the panel, at circa 1:15 P.M. Panel locations at a site may display an overall design, such as all winter solstice panels being at one end of a panel assemblage, or at a site which features predominantly winter panels, all panels being dark at sunrise during the summer half of the year. At the site studied, most panels which have a significant or suggestive function on one key solar date also have a (differing) significant or suggestive function on one or more other solar dates. Once a function is observed for a panel, the observer should assume that panel may have other functions on other dates.

It must be admitted that data available to support the internal logic hypotheses are sparse, that seeing patterns in artifacts of a culture other than one's own is difficult, and that the researcher will probably, at least initially, see the connections in retrospect, making their validity suspect.

Salvage Archaeology

Solar interaction with rock art offers the best chance of determining the panel meaning, attribution, symbolism, and answering questions of culture process involving the panel's makers. In the distribution of panels utilizing certain key dates, certain symbols for certain dates, or certain patterns to the particular multiple functioning dates for each panel, lie possible answers to many questions of distribution, trade, chronology, habitation patterns, or yearly rounds. The most important part of an interactive panel is the interactions. Salvage archaeology should at a minimum include methodical full day observations at known key solar dates through a sun path cycle (solstice to solstice). This could be accomplished in a minimum of six months, involving perhaps twelve days of observation, assuming no cloudy periods bracket a key date.

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