

OPTICAL PHENOMENON AT RED SANDS CAVE

BY

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Red Sands Cave apparently was discovered by Milton Holt of Gunlock, Utah. He introduced Dr. Castleton to the site on September 9, 1978. Dr. Castleton included the site in his book, "The Pictographs and Petroglyphs of Utah", Volume 2 page 149. Members of URARA attempted to locate the site during field trips on three different occasions. During a visit to St. George, I convinced Mary Allen Toner that she and I should try to locate Red Sands Cave. Having found almost all of Dr. Castleton's rock art sites using his generously given descriptions, I felt secure in being able to locate the site. Fortunately I had with me his written description of Red Sands Cave. Before going into the field it is always appropriate to obtain as much information as possible about the site to be located. Mary and I visited a Mr. Holt at his home early the next day. We found him to be a very interesting man. He has the largest personal collection of old tools anywhere in Utah and it seems, probably the world. He also owns the best specimen of a petrified tree trunk with roots that I have ever seen.

We asked him about Red Sands Cave. He told us that he had not been there in many years, and he was not certain that he could locate it again. He told us that he would like to help us try to find the cave, but he was leaving town for an antique collectors meeting that afternoon. He did however provide us with as much additional information about the location of the cave as he could remember and we left.

Within a few hours, and with only minor difficulties, we had found the site. The petroglyphs are located on the upper surface of the partially collapsed ceiling of a south facing shallow cave. The ceiling slab occupies more than half of the floor area of the cave. The smooth slab containing the petroglyphs slopes to the west. There appear to be two ages or cultural differences represented. One group of people pecked symbols carefully. The dint marks are quite uniform in size and depth. The area pecked was repeatedly gone over to produce a sharp definite edge. The other type of pecking was more random and crude. The figures do not have sharp outlines. The crudely produced figures are superimposed over the fine petroglyphs.

As we were photographing the site, and as I was looking at the petroglyphs through my camera, the images suddenly reversed. Instead of being cut into the rock, the figures had the appearance that they were cut out from a thin rock slab and placed on the flat surface. It appeared as if the rock had been stripped away leaving the figures in relief. It was a spectacular effect. I had never experienced anything like it before. The whole image had

the appearance of an electron microscope photograph of bacteria on a smooth flat background - like a glass plate. I excitedly told Mary about what I was experiencing. She could not see it at first, but after concentrating for a few moments she could duplicate what I was seeing. Soon we were both luxuriating in this unusual phenomenon. After almost a half hour of looking at the petroglyphs through our cameras and taking photographs, Mary suddenly discovered that she was able to produce the same effect without the aid of the camera. By looking directly at the center of the panel, and concentrating on blocking out the surroundings, the images would reverse. With a little practice I soon could do the same. The effect was so fascinating that we spent at least three hours at the site. What turned out to be a short trip soon became an all-day preoccupation.

What was responsible for this phenomenon? It was the direction of the source of light. Our senses are accustomed to viewing objects with the light coming from above. When we are outdoors sunlight coming from above illuminates the objects around us. When we are in our homes or offices the lights that we use are generally placed overhead. This light produces highlights on the top of objects that protrude from a background and shadows that point down away from the light on the bottom of the object. When an object (a hole for example) is cut into a flat surface the shadows are reversed. The shadow appears on the top of the hole and the highlights on the bottom. When a light source comes from below our senses are aware of the situation because of gravity and the physical presence of our surroundings. When this occurs our senses adjust the visual images accordingly and we see a hole. But when our senses are deprived of this surrounding information the images become uncertain. Our senses automatically, because of conditioning, view the images as if the light is coming from above. When this happens objects appear to be coming out from a flat surface when in reality they are going into it. This occurs because the shadows and the highlights are on the "wrong" side of the object. This effect is more pronounced the less cluttered the surface. This is because there is less possibility for overlapping objects to occur, which is a clue to our senses that helps us determine which direction the light is coming from.

Situations producing this effect can be easily duplicated. When slides that are being projected, which contain no clues to indicate light source direction, are put into the projector upside-down they can appear reversed. The effect can also be produced when an illustration in a book is turned upside down. For some people it is difficult to achieve this effect because they cannot ignore all the other sensory information that is coming from the surroundings. Sometimes, before an object will reverse, it is necessary to concentrate only on the object for a time, and block out all other sensory information.

The physical setting of Red Sands Cave, the position of the sun, and the position of the rock slab with the petroglyphs on it relative to the cave walls allowed this phenomenon to readily occur. The sunlight was coming from the east and was reflecting off of the west wall on to the petroglyphs which were perpendicular to the wall. Thus the light was coming from the bottom of the panel. The petroglyphs when viewed through the narrow field of view of a camera lens knows where the light is coming from. Our senses provide to us

the correct positioning of the images. It was not until I had looked at the images and "forgot" for an instant about the light direction that the images became reversed. It was not always easy to produce the effect. It required a conscious effort to block out the information that the light was coming from below.

There are many questions raised by the discovery by Mary and myself of this site and the observed phenomenon. Was this effect known to the Indians who constructed these petroglyphs? Is there a way to determine if it was known? What would it mean anthropologically if the Indians were aware of it? How would these petroglyphs or the phenomenon have functioned within the prehistoric society?

These are difficult questions to answer. If some of these petroglyphs are unique to Red Sands Cave then they might have been created just because of the optical phenomenon. If other cave sites could be found containing images that are unique to cave sites where light sources could come from below the images then this would provide evidence that the Indians knew about the phenomenon and were using it.

Caves have always been encompassed with an aura of mystery and awe. The setting of the cave with the abundance of petroglyphs suggests that it could have been used as a ceremonial sanctuary, but this is speculation. Many petroglyph sites probably functioned ceremonially. Just because this panel is in a cave would not make it unique to that function.

The panel contains abstract symbols which might indicate supernatural concepts. These could have been used to produce an altered state of consciousness.

To substantiate any of these suppositions requires additional research. Other researchers should be aware of these figures and the associated phenomenon and look for others and record them where found.

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