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WHAT

DO

SQUIGGLES,

DOTS,

AND

SPIRALS

ON

ROCK

WALLS

# ANCIENT ALTERED STATES

“H

ERE'S A REAL NICE SHEEP getting killed,” says archeologist Dave Whitley, pointing at a rock. Whitley is not hallucinating. Step up to the rock and a carving can be seen: a horned sheep and a man with a bow and arrow, a petroglyph made by a Shoshone some 1,500 years ago.

The Shoshone was the one hallucinating. He was a shaman, Whitley says, who came here to this canyon in the Mojave Desert in California on a vision quest. The bighorn sheep was his spirit guide. “Killing the sheep” is a metaphor for entering the supernatural through a hallucinogenic trance.

BY MARY ROACH

You can see why Whitley has taken some grief in his day. For 30 years the prevailing theory about petroglyphs like this one has been that they were all about hunting. The assumption was that Native Americans believed that making art of their prey would magically cause the creatures to materialize in abundance. On the surface, the hunting-magic explanation seemed to make sense. Of some 100,000 petroglyphs in the canyons of the Coso Mountain range, 51 percent are bighorn sheep and

MEAN? ASK YOUR LOCAL SHAMAN—OR



13 percent are male humans. For a long time no one bothered to question it.

Trouble is, the Shoshones didn't eat much sheep. "We looked at 10,000 bones, and precisely 1 was a bighorn," says Whitley, tossing back a wool serape. If not for the serape, you would be hard-pressed to divine the man's vocation. Ruddy-cheeked and plaid-clad, he could as easily be out here hunting chukar or mending downed fences. "If they were going to make rock art out of what they were eating," he adds, "there'd be bunnies all over the rock." Though Whitley spends most of his time running a cultural resource management consultancy in his hometown of Fillmore, California, his background is in research and academics, at UCLA (where he still teaches) and at the Rock Art Research Unit of the University of the Witwatersrand in Johannesburg, South Africa.

What sets Whitley and a handful of his colleagues apart is a willingness to stray from the ordinary precepts of archeology into the hinterlands of anthropology and psychology. Whitley turned to ethnographies of the Shoshone and Paiute tribes that inhabited the Coso Range—a string of small mountains lying east of the Sierra Nevada—from as early as A.D. 1200 to the end of the last century. Ethnographies are detailed descriptions of the lives of people in traditional cultures, gleaned from interviews and the observations of field anthropologists.

From ethnographic materials, Whitley learned that the places shamans made rock art were held to be portals to the supernatural; cracks and caves in the rock were interpreted literally as openings to the beyond. The art itself—carved with chunks of quartz—is said to depict visions that came to the shamans in their trances. The bighorn sheep is referred to as the spirit guide specific to rainmaking. One ethnographic source cited shamans who traveled from as far away as Utah to these canyons in their quest for rain.

With an average annual rainfall of about four inches, the Mojave Desert seems an unlikely setting for rainmaking activities. This is a landscape of dust and desolation, a sere, scrubby chenille of sage and salt-bush. Joshua trees point



**Geometric patterns in rock carvings may portray images seen in trance states.**

spiky. mascara-wand limbs this way and that, invariably at nothing. Sheep Canyon, where we are hiking, is a dry riverbed.

"It does seem odd," allows Whitley, "until you realize that Native American shamanic rituals subscribe to the principle of symbolic inversion." Where the natural world is dry, its supernatural counterpart is the opposite.

Why didn't archeologists bother to check the ethnogra-







A rock art tableau depicting shamans clothed in their own trance-inspired designs.

Courtesy Dave Whitley

phies before? “Partly,” says Whitley, “there’s this perception that prehistory has to be interpreted on its own terms. If we go to the ethnography, then we’re assuming that the past was like the near present, and then what’s the point of doing archeology? There’s a deeply embedded presupposition that archeologists maintain, and that is that because things change over time, time causes things to change.” Which isn’t always true.

**Entoptic, or “within the eye,” images from carvings in California’s Coso Range.**

Shamanic rituals have persisted unchanged for centuries.

The other part of the story is that few archeologists had any real interest in pinning down the origins and meaning of rock art. Whitley was the first American archeologist to do a dissertation interpreting rock carvings (the technical term is petroglyphs; rock paintings are pictographs). There has been a tendency among archeologists to regard the study of ritual and belief as less scientific and less relevant than the study of technology and subsistence. “It’s that bumper sticker: ‘He who dies with the most toys wins,’” Whitley says. “Which is, to me, a very shallow, materialistic view of human culture.”

To illustrate his point, Whitley gives the example of Australian Aborigines. “You can take a line from the center of Australia out to the coast, and you can plot on that line a series of different aboriginal cultures. And if you look at the complexity of their kinship system and the complexity of their technology and tools, what you see is a perfect inverse relationship.” Coastal groups have a complex technology and tend to use a lot of tools. In the middle of Australia, it’s more like it is in the Cosos. “Those guys are running around near to buck naked, surviving only on their wits, yet they have this kinship system that is mind-bogglingly complex. And it structures every aspect of their social life. Now what is more important, this complex cognitive mental construct or the kind of tools these folks made?”

Whitley stops talking and directs his gaze at my hiking boot. “You’re standing on a sheep.”

**THE ART OF THE COSO MOUNTAINS** is not all sheep and stick-legged men with feathers and horns. High above Whitley’s head is a circle filled in with grid lines, like a flattened fly’s eye. Across the canyon, a sine wave snakes across a boulder. Beside it is an arc of nested curves, like a fragment of a mammoth fingerprint. Abstract patterns are everywhere among the boulders—grids, hatch marks, zigzags, curves, spirals. They’re trippy, doodley, devoid of any recognizable meaning. For years, archeological theories about these markings amounted to guesswork. Maps? Menstrual calendars? Sol-





stice observatories? Forget about it. Let's go dig up a hogan.

There is another place you can reliably see these images, and that is inside your head. In the 1960s, neuropsychologists began cataloging the visual imagery of altered states of consciousness. Subjects given LSD or mescaline would lie on mattresses, describing their visions into researchers' tape recorders. The first stage of the hallucinogenic experience—whether brought on by drugs, sensory deprivation, fasting, or rhythmic movement—is characterized by recurring geometric patterns, known variously as “phosphenes” or “entoptics.” The seven most common categories strike a familiar chord: grids, parallel lines, dots, zigzags, nested curves, meanders, and spirals.

Whitley wasn't the first to notice parallels between this abstract imagery and that of rock art. In the 1950s, a German neuropsychologist named Max Knoll noted similarities between electrically stimulated (and, later, LSD-induced) patterns that appeared in his subjects' visual fields and common abstract patterns in southern African rock art. In a 1970 article in *Scientific American*, psychologist Gerald Oster highlighted “phosphenelike figures” in prehistoric cave drawings.

One of the first archeologists to come on board was David Lewis-Williams, professor of cognitive archeology and director of the Rock Art Research Unit at the University of the Witwatersrand. Lewis-Williams found examples of the seven common entoptic patterns throughout the ancient rock art of the San bushmen. He also found evidence in the ethnographies that San shamans went into trances, both to heal and to make rain, and that they recorded their trance visions on the rock to preserve them. (Coso Shoshones believed that if they forgot their visions, they would die—powerful incentive to jot them down.) Lewis-Williams's “neuropsychological model” for interpreting rock art incorporated not only abstract images but also the representational images that occur in the later stages of trance.

The Shoshone and Paiute shamans didn't, as is often assumed, take peyote or jimsonweed. Their route to trance was



also says Kandinsky studied shamanism and the role of the subconscious in art, and that this influenced his transition from figurative to abstract art. “His paintings are full of entoptic forms.”

Entoptic means “within the eye.” It's believed that these geometric patterns derive from the optic system itself. In some instances, says Whitley, “you're basically seeing what's in your eyeball.” Retinal blood vessels and “floaters”—the faint squig-

## SOMEWHAT SURPRISINGLY, WHITLEY HIMSELF HAS NEVER TRIED HALLUCINOGENIC DRUGS. HE DID EXPERIENCE ENTOPTICS ONCE, WHEN

a combination of exceptionally strong native tobacco, lack of sleep, sensory deprivation (the canyons here are mute as tombs), and fasting.

Somewhat surprisingly, given his interests, Whitley himself has never tried hallucinogenic drugs. “What I do do is, I interview archeological field crews a lot.” He did experience entoptics once, when someone ran a heavy dolly over his foot. “Pow! Entoptics. Just like the cartoonists draw around someone's head when the safe lands on his toe. Those guys are keyed in to it.”

Cartoonists aren't the only artists keyed in to entoptics and altered states. Whitley says Wassily Kandinsky, revered tribal elder of abstract art, wrote a paper in a psychological journal in 1881 about the entoptics that preface a migraine. Whitley

gly lines that meander across the vision field—may be the anatomic inspiration for dots and meandering line entoptics. Concentric circles, spirals, and grids are probably generated by neurons firing in the visual cortex and the retina.

In the second stage of altered states imagery, the mind steps in and tries to make sense of the doodlings set before it. This is something minds do: they decode visual input, matching it against the memory banks of stored experience. If a match is made, the image is recognized. How the brain interprets an entoptic depends on the state of the brain's owner. “The same ambiguous round shape,” wrote psychologist M. J. Horowitz in *Hallucinations: Behavior, Experience, and Theory* in 1975, “. . . can be ‘illusioned’ into an orange (if the subject is hungry), a breast (if he is in a state of heightened sex-

Courtesy Dave Whitley





**"Killing the sheep" is a Shoshone symbol for entering the supernatural in a trance.**

ual drive), a cup of water (if he is thirsty), or an anarchist's bomb (if he is hostile or fearful)." Or a bighorn sheep body if he's a shaman on a rainmaking vision quest.

By way of demonstration, Whitley leads me to a carving of a bighorn that is more horn than sheep. Three parallel arcs span the length of the sheep, rainbowlike, from its head to its tail. Whitley identifies the entoptic: "Nested or catenary curves." The size of the horns, and the fact that there are three, not two, suggests the curves appeared first, and the shaman then interpreted them as horns.

A few hundred yards down the canyon, Whitley points out

The man with the horns is the shaman himself, in his own vision, entering the supernatural and "shape shifting" into his spirit guide. The original assumption about the horns was that they were a hunting disguise. Which makes sense until you think about it. "It'd be way too heavy," observes Whitley. "Besides, the Native Americans have systematically denied this."

The talons in place of the shaman's feet could be part of a common metaphor for entering the supernatural: flight.

(Many petroglyphs of therianthropes—beings part animal and part human—also have wings in place of arms.) This probably ties in with the feeling of floating up and out of one's body, as often happens during the third stage of a mind-bending altered state.

"Here's a guy with six fingers on one hand," says Whitley. "Clearly not a normal individual." Again, it fits with the literature on altered states of consciousness. Imagined extra digits are a common hallucination.

The humanoid figures that aren't busy turning into sheep are busy shooting them with bows and arrows. In the mythology of the Native American cultures of the Far West, death is the most prevalent metaphor for entering the supernatural. (At this point, according to Whitley, the shaman has become his spirit guide and the two are considered interchangeable.) Whitley cites the example of Coyote, the shaman character of myth, who begins many of his adventures by dying or being killed, whereupon all manner of supernatural events ensue. On a physiological level, the metaphor makes sense. Consider what can happen to a person who enters a trance: his eyes roll back into his head, he may go limp and lose consciousness, he may bleed from the nose. Whitley has shown me examples here today of bighorn sheep with lines coming from their noses.

Beside the horned shaman is a shaman with what appear to be truncated golf clubs or perhaps musical quarter notes protruding from his head. Whitley insists they're California quail topknot feathers. They do look a lot like the bobbing

## SOMEONE RAN A HEAVY DOLLY OVER HIS FOOT: "POW! ENTOPTICS."

a fantastical creature, like something from one of those split-page children's books in which the giraffe's head is on the monkey's body, with kangaroo legs. The figure sports bird-talon feet, an upright humanoid body, and big, downward-curling horns.

This is an example of Stage 3 of Lewis-Williams's neuropsychological model: the full-blown vision. The shamans didn't think of it as a vision. To them it was a parallel reality; they had entered the realm of the supernatural. The literature on altered states of consciousness describes the sensory changes involved. According to Lewis-Williams, "This shift to iconic imagery is also accompanied by an increase in vividness. Subjects stop using similes to describe their experiences and assert that the images are indeed what they appear to be."

doohickey you see on these birds' heads, but to link this to the flight metaphor strikes me as a bit of a reach.

As it turns out, it might have nothing to do with flight metaphors. Rain shamans, Whitley explains, wore a distinctive headdress festooned with quail head feathers. Know your ethnographies.

**NOT ALL PETROGLYPHS FIT THE** neuropsychological model of rock art. The Hopi carved clan symbols on rocks during pilgrimages. Northern Plains tribes decorated the landscape with symbolic renderings of their war exploits. The carving on the standing stone in front of us fits no established categories. Whitley has no idea who made it, or why. It says, " $E = mc^2$ ."

Given that this canyon sits within the million acres of su-



persecut labs and missile ranges known as China Lake Naval Air Weapons Station, it was most likely military personnel. Even if the carving were a sheep, Whitley wouldn't have been fooled into believing it was carved by early Native Americans. He can eyeball a petroglyph and tell, by the degree to which



the carved areas have darkened, approximately how old it is. Our little theory of relativity inscription is, relatively

**A giraffe surrounded by clouds of matching entoptics, from a Namibian petroglyph.**

speaking, brand-new. The etching still appears white. After about 500 years, a "brown crud," as Whitley puts it, begins to become visible. The crud, known in academic circles as rock varnish, derives from microbes on the rock surfaces. The microbes metabolize manganese in the dust that lands on the rock, and metabolites accrete on the rock's surface. Over time, different trace elements leach out from the varnish at different rates. By calculating what's

leached out and how much, chronometricians can get an idea of how long the varnish has been there, and from that, the carving's age. This can be compared with the results of radiocarbon-dating of organic materials



**A haze of red dots—cave decor from Pech-Merle, France, dating from 23,000 B.C.**

such as lichen and pollen that are trapped on the carving as the varnish accumulates on top of them. Neither method is especially precise, but the combination suffices to pin the date to within a few hundred years.

While the oldest Coso petroglyphs may have been made as long as 16,500 years ago, the overwhelming majority fall in the neighborhood of less than 1,500 years old. Whitley has a theory to explain the sudden flurry of shamanism in the region. An examination of the archeological record around this time shows a dramatic increase in abandonment of villages in the region. The likely reason: The area was being sucked dry

by a major drought some 800 years ago. Hence the unprecedented upsurge in rainmaking endeavors.

In a bizarre display of symbolic meteorologic inversion, rain clouds have appeared overhead. Against the gathering gray, a dozen Canada geese fly in perfect V formation, as though under orders from the base commander.

The rock art of the Coso Range is by no means the oldest in the world. The famed Lascaux and Chauvet cave paintings of France date, respectively, from 15,000 and 30,000 years ago. As anthropologists had yet to materialize 30,000 years ago, no ethnographies exist for these peoples. Partly because of this, European rock art archeologists were slow to warm to the shamanistic, neuropsychological model. The skepticism may also have had to do with the European separation of archeology and anthropology; they're not, as they typically are in the States, part of the same academic department.

In 1992, Whitley brought French archeologist Jean Clottes, the world-renowned scholar of Paleolithic cave paintings, out to the Mojave and did his pitch. Clottes wasn't easily swayed. Though the rock art of France and Spain most certainly includes the classic entoptic patterns, Clottes saw too many other images that didn't fit.

"Over the next two to three years," says Whitley, "I brought him back to the Cosos again, and he started reading the ethnographic texts." Eventually Clottes crossed the divide. Whitley knew he had him when Clottes called him up in 1995 after the discovery of the famed Chauvet cave. "He said to me, 'There's a therianthrope here!'"

It's easy to buy the entoptics portion of the theory; the similarities between the rock art and the hallucination descriptions in the neuropsychology papers are too striking to dismiss. Less clear are the Stage 3 visions. What's odd is the uniformity of the Coso shamans' hallucinations. The vast majority of the estimated 100,000 images found in the Coso Range fall into one of six categories: bighorn sheep (51 percent), humans (13 percent), other animals (5 percent), weapons (2.4 percent), medicine bags (1.3 percent), and geometric (entoptic) designs (26 percent). Yet the hallucinations of nonshamanic drug-induced trance are limitlessly diverse. Whitley's answer to this is that the shamans may have been practicing some form of "lucid dreaming." With the help of special glasses that flash lights when the eyes begin the characteristic movements of REM sleep, lucid dreamers achieve a borderline level of consciousness that allows them to watch their dreams like movies and, it's said, even influence the plots and direct their outcomes. The ethnographies say nothing of this practice. However, as Whitley points out, that doesn't mean it didn't occur. "This may," he says, "be an example of rock art supplementing the body of ethnographic knowledge."

Back at the mouth of the canyon, a vision appears out of the mist: four wild horses running abreast, manes rippling like white water. As abruptly as they appeared, they wheel and vanish again into the fog. A comment about the four horses of the Apocalypse prompts a raised eyebrow from Whitley. "Some horses got left behind when the military evicted the homesteaders here." Some things are less symbolic than they appear. And some aren't. □