

## THE SOMA CODE

### The Soma Code, Part III: Visions, Myths, and Drugs

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#### ABSTRACT

In this final paper of a three-part series on the interpretation of luminous vision metaphors in the Rig Veda (RV), we consider several implications raised by the hypothesis that vision metaphors in the RV refer to the meditation-induced (and meditation-destabilized) phosphene sequence described by the author in Part I. First, we show that there is a remarkable continuity in the description of luminous visions in the RV, the Upanishads, and yoga meditation texts in the Hindu, Tantric, and Tibetan-Buddhist traditions. Second, we show that similar types of meditation-induced phosphene visions are also reported in studies of contemporary shamans and prehistoric rock art attributed to shamans. Since it is likely that shamanistic practices were widespread at the time the RV was composed, we examine evidence that the Vedic priests practiced shaman-like trance induction rituals and that the visions they induced were used as the basic organizing structure for Indo-Aryan myths that describe the attributes of gods and define the gods' roles in the trajectory of cosmic events. Third, we show that the hypothesis that luminous visions in the RV represent phosphene images is relevant to the current debate about the identity of the original Soma plant. If luminous visions refer to phosphene images and not to memory-based hallucinations with dream-like content, this would exclude Syrian rue, which contains hallucinogenic harmaline alkaloids, as a likely candidate. The leading alternative, Ephedra, contains an extract (ephedrine) that is an adrenaline-like stimulant that does not induce visions. But if the original Soma ritual required an all-night vigil, as some scholars suggest, then the attendant sleep loss would likely create a strong sleep-rebound effect and increase the incidence of sleep-onset seizures when the priests reactivated sleep rhythms by trying to meditate just before dawn when the sleep rebound effect would reach maximal levels. If the priests also drank ephedrine to keep themselves awake, this would potentiate the sleep deficit and also add the risk of overstimulating the sympathetic nervous system, which, in extreme cases, can trigger a temporary collapse and install a state of parasympathetic dominance, the final common outcome of many different trance induction rituals.

The Continuity of Visions in Vedic and Post-Vedic Meditation Traditions

Table 3.1. A comparison of descriptions of luminous visions in Vedic and Hindu texts.

	THE RG VEDA	SELECTED UPANISHADS	THE YOGASUTRAS
RECEDING RINGS	[T]he single wheel that is concealed 10.85.16	Fog, smoke, sun,... these are the preliminary forms which produce the manifestation of Brahman in yoga (SvetasUp, II: 11)	In the light, everything is encompassed, the seer as well as the seen (4.23)
MISTS OR CLOUDS	With the bright dhih, you drive, O you travelers in a radiant chariot 8.26.19  When the visions that are concealed begin to glow spontaneously, the Seers begin to glow . . . 8.6.8  The flame-arrows of Agni...assemble like streams of water into holes 10.25.4	In the city of Brahman is an abode, a small lotus flower; within it, a small space. What is within, that should be sought (ChandogUp, VIII: 1: 1)	
STAR			
RADIAL SPRAYS OF SPARKS		Fireflies...these are [also] preliminary forms . . . (SvetasUp, II: 11)	Also one sees countless bright speckles striking consciousness. Keep on watching: when the whirling [ <i>viniorttih</i> ] ends, the abode of the <i>atman</i> will appear (4.24 - 4.25)
BRIGHT BLUENESS	[T]he days that have dawned before the rising of the sun . . . 7.76.2		
BULBOUS IMAGE	[F]ill the dhih up, make it swollen like an udder filled with milk 10.64.12  [R]eceive them on thy navel, O Soma, thou who are the head . . . 1.43.9  Soma, stormcloud imbued with life... Navel of the Way . . . 9.74.4  The sharp seer, in heaven's navel, is magnified in the woolen filter 9.12.4  They milk the amsu, this bull at home on the mountain . . . 9.95.4  [G]littering like a waterskin 9.1.8	That which hangs down between the palates like a nipple, that is the birthplace of Intra (TaittrUp, I: 6: 1)  The person [ <i>purusa</i> ] the size of a thumb... like a flame without smoke. (KathaUp, II: 1: 12, 13)  He is of the measure of a thumb, of appearance like the sun,...the self he seems to be of the size of the point of a goad (SvetasUp, V: 13)	That bending-down image [ <i>viveka-nimnam</i> ] - it bears Aloneness [ <i>Kaivalpa</i> ] behind it (4: 26)

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<p>RAYS</p>	<p>He sloughs off the divine radiance, abandons his envelope, and goes to rendezvous with the Sky 9.71.2</p> <p>The filter of the burning has been spread ...Its dazzling mesh spread afar 9.83.2</p> <p>In jets, the pressed Soma is clarified 9.72.5</p>	<p>The bird of golden hue resides in the heart and in the sun, a diver-bird, a swan [<i>hamsa</i>], of surpassing radiance (MaitrUp, VI: 34)</p>	<p>That tearing apart [<i>chidrescu</i>] - it releases more changes (4: 27)</p>
<hr/>			
<p>BRIGHT WHITE FLASHES</p>	<p>I have drunk the navel . . . the eye is altogether with the sun 9.10.8</p> <p>[T]his inspired thought which is bright-like-lightning . . . the light of heaven at the abode or seat of rta 10.177.2</p> <p>[H]e has clothed himself with the fire-bursts of the sun 9.71.9</p>	<p>Brahman sparkles like a wheel of fire, of the color of the sun (MaitrUp, VI: 24)</p> <p>Brahman. the ocean of light. In it, worshippers become dissolved like salt (MaitrUp, VI: 36)</p> <p>They rise forth...like lightnings from the light within the clouds (MaitrUp, VI: 36)</p>	<p>To one elevated in awareness, who continues to relinquish desire, the vision of ultimate discernment bursts forth like a stormcloud of cosmic dimension [<i>dharmamegha-samadhi</i>] (4: 29)</p>

Table 3.2. A comparison of luminous visions in Tantric and Tibetan-Buddhist texts.

	TANTRIC TEXTS	TIBETAN-BUDDHIST TEXTS
<p>ANNULI MISTS OR CLOUDS</p>	<p>In the middle of the vault of the palate, like the tapering flame of a candle, the...fiery effulgences shine continuously (GA, p. 10 - 11)</p>	<p>'Meditate on the four wheels, each like an umbrella or like the wheel of a chariot' (YSD, I: ii: 62)</p> <p>From this practice come smoke-like or ethereal shapes</p> <p>The forming of thoughts ceases, and phenomena, appearing like smoke, mirage... (YSD, I: ii: 98)</p>
<hr/>		
<p>DOTS OR STARS</p>	<p>Above this energy [the ajna cakra midway between the eyes] dwells the dot, <i>bindu</i> (GA, p. 10 - 11)</p>	<p>Phenomena, appearing...like fireflies (YSD, I: ii: 98)</p>
<hr/>		
<p>RADIAL SPRAYS</p>	<p>When the <i>bindu</i> explodes and shatters, it expands immediately... (GA, p. 10 - 11)</p>	<p>The Flaring will appear as a yellow radiance (YSD, I: ii: 125)</p>
<hr/>		
<p>SPARKS</p>	<p>...a continuous whirling movement [<i>ghurni</i>] until there appear dazzling sparks just as the kundalini rises (AT, 5: 101, 107, 111; KS, II: 3)</p>	<p>Phenomenon, appearing...[like] something resembling the light of dawn, and something resembling a cloudless sky (YSD, I: ii: 98)</p>
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<p>BRIGHT BLUENESS</p>		<p>Phenomenon, appearing...[like] something resembling the light of dawn, and something resembling a cloudless sky (YSD, I: ii: 98)</p>
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BULBOUS IMAGE	<p>When the bindu explodes and shatters, it expands immediately and forms the mastaka [the 'Egg of Brahman'], similar to the angular fruit of the water chestnut (GA, p. 10 - 11)</p> <p>Concentrate on the image that resembles the stomach of a fish . . . [showing] unfoldment and contraction (TA, 5: 57-61)</p> <p>...the supreme <i>linga</i> [phallus] of the skull. From above the uvula, this <i>linga</i> showers nectar. In the inner space, the womb in the middle of the forehead, is found that nectar. Having raised it to the surface of the brahmadanda, similar to an ivory tusk, the kundalini releases its flow. Inside the tusk there is but one orifice, the mouth of the kundalini (GA, p. 10)</p>	<p>One should have a vision of the form of the Buddha outlined against a cloudless sky, like the moon's reflected form seen in water. Or one sees, as a form reflected in a mirror, the unobscured, radiant <i>Nirmanakaya</i> [Pure Illusory Body] (YSD, II: ii: 19-20)</p> <p>The Pure Illusory Body... springs forth from the State of the Clear Light like a fish leaping forth from water , or like the form of [the Celestial Buddha], which rises as one does upon waking from sleep (YGS, IV: iii: 34)</p> <p>And thus is produced the invisible psychic protuberance on the crown of the head. When the protuberance becomes filled with the vital force of the transmuted seminal fluid, one..realizes the State of the Great Vajra-Dhara [Wielder of the Thunderbolt] (YSD, I: ii: 144-145)</p>
----- RAYS	<p>The supreme energy blossoming into bliss is adorned like a five hooded cobra as she rises (AT: 248-251)</p> <p>The rising energy forms a five-fold wheel... like a swan of dazzling white drinking in the cosmos</p>	<p>-----</p> <p>Simultaneously with this realization, the white fluid...flows upward to the crown of the head (YSD, I:iii:144-145)</p>
----- BRIGHT WHITE FLASHES	<p>When the energy with five modal ities draws herself up . . . and enters Brahman's seat, she flashes forth like lightning.... such is the so-called serpent piercing. (AT: 248-251)</p>	<p>-----</p> <p>One gains...mastery of the Very Bright (YGS, IV:iii:35)</p>

A cross-text comparison of descriptions of luminous visions in the RV and in religious texts written much later in time reveal that there is a remarkable continuity that extends throughout history and into the present day. Table 3.1 compares excerpts from the RV hymns with excerpts from several Upanishads (translated by Ramakrishnan [1992]) and from Patañjali's *Yogasutras* (translated by the present author [see Note 1]). Table 3.2 compares excerpts from yoga meditation texts in the Tantric tradition - Abhinavagupta's *Tantraloka*, Goraksanatha's *Amaraughasana*, and Ksemaraja's *Shivasutravimarshini* (all translated by Silburn [1988]) - and excerpts from a Tibetan-Buddhist text, *The Epitome of the Six Abridged Doctrines* (translated by Evans-Wentz [1958] or Mullin [1996]). [Tables adapted from Nicholson, 2002a]

While cultural diffusion is clearly a factor that contributes to the recurring presence of similar phosphene images, the fact that these replications are so detailed supports the hypothesis that the primary reason for these similarities is not cultural diffusion but rather the nature of the causal mechanisms involved: as we explained in Part I, meditation-induced phosphene images are epiphenomena of the brain rhythms that govern the transition from waking to slow wave sleep, and this neurophysiology imposes narrow constraints on what kinds of phosphenes can appear in the visual field of meditators. Extrapolating from this hypothesis that meditation induces a predictable progression of light visions, we can anticipate that the same kinds of visions will appear in other religious traditions.

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### Did the Rig Veda Originate in Shaman-Like Visionary Experiences?

Visions of internally-generated lights devoid of content drawn from life experience (i.e., 'phosphenes') have played major roles in the founding and continuing revitalization of the world's major religious traditions [Bucke, 1969 (1901); Laski, 1961; Underhill, 1990 (1930); Arberman, 1963, 1968, 1970]. Based on analysis of the autobiographies of mystical visionaries in various traditions, we can infer that two types of phosphene images predominate during the early states of meditation or contemplative prayer - images of phosphene rings (annuli) and images of amorphous phosphene clouds or mists. Examples of mystics' descriptions of these two kinds of visions appear in Table 3.3 [Nicholson, 1996a].

Table 3.3. Autobiographical descriptions of visions of phosphene rings and clouds

#### HEBREW MYSTICS

[T]he appearance of the *wheels*...was like the gleaming of *beryl*; and the *four* had the same form, their construction being something like a *wheel within a wheel*" Ezekiel  
[T]ike a *dome*, shining like *crystal*, spread out about their heads....And above the *dome*, something like a *throne*, in appearance like *sapphire*..." Ezekiel  
[A] *round ladder*....like a full *sphere*, rolling back and forth before him...bright *blue*." R. Abulafia  
A glowing light...*clear* brilliance...A *purple* light that absorbs all lights..." Moses de Leon

#### HINDU AND BUDDHIST MYSTICS

[A] perfectly *round*, beautiful *deep-blue* shape, of a size appropriate to the center of a *mandala*, as if exquisitely painted, of extreme clarity..." Tsong Khapa  
[A] *luminous revolving disc*, studded with lights...a *lotus* flower in full bloom..." Gopi Krishna  
[B]oth my eyes became centered...When this happened, a *blue* light arose in my eyes....like a *candle flame without a wick*, and stood motionless in the *ajna chakra*." Muktananda

#### MUSLIM MYSTICS

[Like] *chandeliers*....sublime lights, [like] *stars*, *moon*, or the *sun*..." Sharafuddin al-Maneri  
[I]ts color is deep *blue*; it seems to be an *upsurge*, like...*water from a spring*." Najmoddin Kobra  
[V]isualize yourself as lying at the bottom of a *well* [looking up] and the well...in lively downward movement." Najmoddin Kobra  
[T]he color *green* is the...suprasensory uniting all the suprasensories." Alaoddawleh Semnani  
[T]he light rises in the Sky of the heart taking the form of...light-giving *moons*..." Najm Razi

#### CHRISTIAN MYSTICS

[H]is own state at...prayer resembles...a *sapphire* ; it is as *clear* and bright as the sky." Evagrius  
[D]escending like a bright *cloud of mist*...like a sun, *round as a circle*." Simeon Neotheologos  
[S]aw something in the air near him. He did not understand the type of thing, but in some ways it appeared to have the form of a serpent, with *many things that shone like eyes*, although they were *not eyes*." Ignatius of Loyola  
[T]he soul puts on...a *green almilla* [cape worn over shoulders, beneath armor]..." John of the Cross  
[The almilla is like a helmet which] covers all the senses of the head of the soul...It has *one hole* through which the eyes may look upwards..." John of the Cross

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[A] *round* thing, about the size of a *rixdaler*, all bright and *clear with light like a crystal*." H. Hayen

[I] saw a bright light, and in this light the figure of a man the color of *sapphire*...blazing with a gentle glowing fire...the three were in *one light*..." Hildegard von Bingen

[S]aw a *blazing fire*, incomprehensible, inextinguishable...with a flame in it the *color of the sky*..." Hildegard von Bingen

[S]aw placed beneath her feet the whole machine of the world as if it were a *wheel*. She saw herself placed above it, her eyes of contemplation magnetized towards the incomprehensible..." Beatrice of Nazareth

[I] saw the *eyes*...I do not know if I was asleep or awake..." Angela of Foligno

[A] kind of sunlit, winged being...like a *child's head* beneath two little wings." Abbess Thaisia

[R]ound patterns: *small circles would expand and eventually dissipate, only to be followed by other small circles of light*." Philip St. Romain

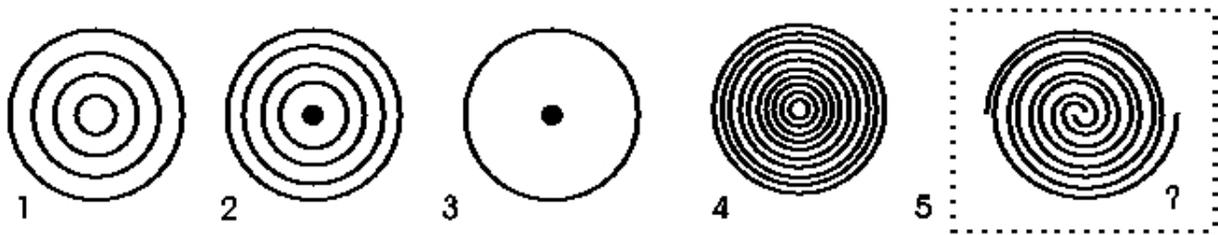
[A]n extraordinary *circle* of gold light...pulsating against a deep violet background...There were *always four or five*....As soon as one would fade, another would appear..." Philip St. Romain

These same two kinds of visions are also prominent in ethnographic studies of contemporary tribes that rely on shamanistic practices. Since we know that the oral traditions of the Indo-Aryans developed during a time when shamanistic practices were widespread, it is possible that shaman-like visionary experiences were influential in the composition of the RV hymns. Our analysis in an earlier article (Part I) of the luminous visions in the RV shows that ring-like image and amorphous mist-like images are important early harbingers of being on the path that leads to Soma and Indra: the Asvins' radiant, three-wheeled chariot manifests as bright wheel-like rings moving away from the viewer (similar to the phosphene image of receding rings) and the visions of Agni's flame-arrows that "assemble like water pouring into holes" (similar to amorphous phosphene mists). To put ourselves in a position to address the question of shamanic influences on the RV, we need first to examine how the phosphene images of rings and amorphous mists are embedded in the ritual practices, artistic creations, and mythological theories of shamanistic cultures.

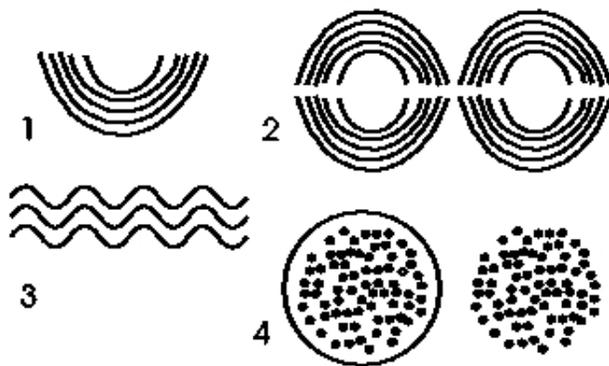
Shaman are individuals who specialize in making contact with an otherwise invisible world of spirits and in communicating with the spirits on behalf of other members of the tribe [Jakobsen, 1999]. Where shamanistic practices still exist, learning how to induce a trance and to see visions, then to go further and extend and elaborate those visions, is often a prerequisite for being accepted as an authentic shaman by others in the tribe [Noll, 1985]. For example, informants in the Alaskan Iglulik Eskimo tribe told Rasmussen [1930] that a shaman must be able to summon up an interior "illumination," called the *angákoq* or *quamaneq*, "a mysterious light which the shaman suddenly feels in his body, inside his head, within the brain, an inexplicable searchlight, a luminous fire, which enables him to see in the dark, both literally and metaphorically speaking, for he can now, even with closed eyes, see through darkness and perceive things and coming events that are hidden from others . . . . [p. 111]." To this Holtved [1967] adds that a shaman often "gets his visions sitting or lying in deep concentration at the back of the sleeping platform, behind a curtain or covered with a skin. The drum is not used in this connection [p. 47]."

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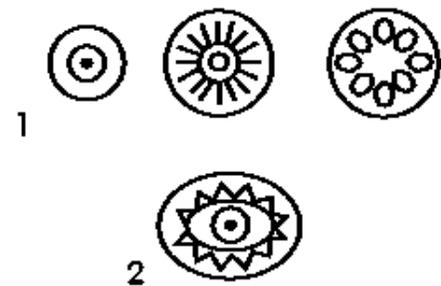
A Concentric Annular Images



B Waves & Mist-Like Images



C Eye-Like Images



D Compound Images

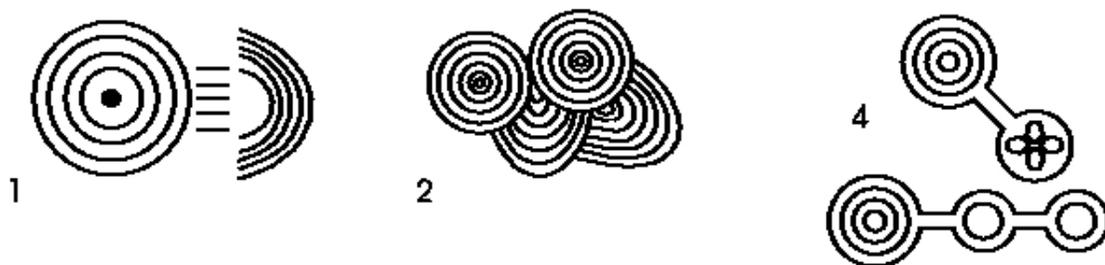


Figure 3.1. Images of internally-generated sensations of light with abstract geometric shapes ('phosphene images') in ethnographic reports and prehistoric rock art studies. A. *Concentric Annular Images*: 1. Four concentric annuli: South

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Africa (Lewis-Williams and Dowson, 1988, Fig. 1); California (Patterson, 1998, p. 43; Benson and Sehgal, Fig. 9 - 10). 2. Four concentric annuli with central dot: Australia (Halifax, 1982, pp. 39, 70; Taylor, 1988, pp. 286-7; Lawlor, 1991, pp. 46, 48-49, 108); Ireland (Herity, 1974, Fig. 37). 3. Single annulus with central dot: Columbia (Reichel-Dolmatoff, 1978, Plate 38); Alaska (Nelson, 1899, as cited in Benson and Sehgal, Fig. 5); Siberia (Vastokas, 1977, as cited in Benson and Sehgal, Fig. 2, p. 6). 4. More than 4 densely-packed concentric annuli, a 'tunnel-like' image which may represent a stream of dark, fast-paced receding annuli observed during the emergence of hypersynchronous CTC seizure (see text): Mexico (Siegel and Jarvik, 1975, pp. 125, 139); Ireland (Herity, 1974, Fig. 81); California (Benson and Sehgal, Fig. 6, p. 8). 5. Double spiral (included here because it, along with the single spiral, may represent an illusory sensation of movement associated with the 'tunnel' sequence of dark, fast-paced annuli rather than an independently-generate image): Ireland (Herity, 1974, Fig. 70; Dronfield, 1996, Fig. 9); Mexico (Halifax, 1987, p. 71; Schaefer, 1996, Fig. 31, p. 156). *B. Amorphous Waves and Small-Particle Mists:* 1. 'Navicular' image of horizontal 'nested' arcs: Ireland (Herity, 1974, Fig. 78); South Africa (Lewis-Williams and Dowson, 1988, Figures 1 - 4; Lewis-Williams, 1995, p. 7). 2. Juxtaposition of 2 sets of nested arcs: Columbia (Reichel-Dolmatoff, 1975, Plates 36, 39, 1978, Plate 23); South Africa (Lewis-Williams and Dowson, 1988, Fig. 2). 3. Parallel wavy lines: South Africa (Lewis-Williams and Dowson, 1988, Figures 1-2); California (Whitley, 1994, Fig. 1). 4. Clusters of tiny dots or circles: Columbia (Reichel-Dolmatoff, 1975, Plate 36); South Africa (Lewis-Williams and Dowson, 1988, Figures 1-2; Ouzman, 1998, Figure 3.6., p. 38). *C. Eye-Like (Iris and Pupil) Images:* Set 1. Ireland (Herity, 1974, Fig. 28, 36); California (Patterson, 1998, Fig. 3). Set 2. Columbia (Reichel-Dolmatoff, 1987, Plates 10 - 11). *E. Compound Images:* 1. Annuli-to-waves: South Africa (Lewis-Williams and Dowson, 1988, Fig. 1). 2. Annuli-plus-waves: Ireland (Herity, 1974, Fig. 37; Dronfield, 1996, Fig. 9). 3. Waves-to-eye: Ireland (Herity, 1974, Fig. 37). 3. Annuli-to-eyes: California (Whitley, 1998, Fig. 1). [From Nicholson, 2001]

In shamanistic cultures, the ritual art (and secular decoration) often incorporates patterns that are said to be representations of visions of light that the native informants see during meditation or other states of advanced relaxation. Some of these patterns are illustrated in Figure 3.1. The image of concentric circles, for example, covers the full face of a mask carved by an Eskimo shaman in Siberia to commemorate his journey to the spirit world and to depict the spirits (*tanghak*) he saw during his trance (e.g., see Nelson [1899, Plate 99], or Ray [1967, pp. 6 - 9, 17], both cited in Benson and Sehgal [1987]).

The motif of concentric rings also appears in the decorative and ritual art of aboriginal tribes in Australia [see Halifax, 1982, pp. 39, 70; Taylor, 1988, p. 287; Lawlor R, 1999, pp. 46, 48-9, 107-108]. Of particular interest is a report by Elkin [1974 (1945)] that "men of high degree" assemble in groups to create ceremonial ground-paintings (*ilbantera*) with 4 to 5 concentric rings that symbolize a sacred waterhole. This waterhole is seen as the portal all living beings have to use to move between the visible world and the world of spirits. The spirit world is envisioned as a paradise of perpetual light inside caves located deep within the earth [Eliade, 1964, p. 46]. To enter

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Dreamtime and find the light of spirits, an elder withdraws from social interaction and begins to meditate: "He is sitting down by himself with his thoughts in order 'to see'. He is gathering his thoughts so that he can feel and hear. Perhaps he then lies down, getting into a special posture, so that he may 'see' when sleeping. . . . [Elkin, p. 56]."

Ring-like phosphenes are also observed during the early stages of hallucinogen intoxication, that is, before the blood levels of the drug are elevated enough to trigger dream-like fantasies. For example, in a study of the peyote-induced visions of the Huichol Indians of the high Sierra Madre range in Mexico, Schaefer [1996] reports that "phosphenes induced by psychotic chemicals appear in two stages," and first to appear are the colored, abstract images, called *nierika*, that "serve as portals to other worlds. Many take the form of pulsating mandalas [Schaefer, 1996, p.156 and Fig. 31; Benson and Sehgal, 1987, Fig. 3]." In a study analyzing the frequency of particular kinds of geometric figures in Huichol peyote visions, Siegel and Jarvik [1975] found that 71% of items referred to "simple forms, colors, and movement patterns [Ibid., p. 125]."

While studying the Tukano Indians of the Amazonian rain forest, Reichel-Dolmatoff [1972, 1975, 1978, 1987, 1996] was told by Tukano informants that, after drinking one or two cups of *yajé* (ayahuasca), they see several different kinds of "luminous patterns" before the figurative hallucinations begin. These preliminary phosphenes include (1) circular shapes, which they draw as a single annulus with a dot in the center or as a set of 3 to 4 concentric annuli; (2) "wavy threads called *dáririri* with colors ranging from green to blue to violet," which they draw as wavy lines in parallel or as clusters of curvilinear arcs nested one inside the other; and (3) eye-like images [Ibid., 1996, p. 33]. All of these phosphene motifs are often used to decorate the walls of their houses [Ibid., 1978, e.g., pp. 12-13, 23, & 36; *ibid.*, 1996, pp. 157 - 203, Plates 36 - 39; *ibid.*, 1987, Plates 10 - 11]. When the ethnologist experimented with *yajé*, he observed the circular images himself: "A circle appears, it doubles, it triples, it multiplies itself (1972, pp. 91-92)." While these abstract phosphenes are often associated with ayahuasca, the Tukanos also report that the same kinds of visions also appear "during fleeting states of dissociation, daydreaming, hypnagogic states, isolation, sensory deprivation, or other situations of stress [Ibid., 1996, p.33]." The myths of the Tukanos attribute these light visions to energies (*bogári*) emitted by an invisible twin of the visible sun. These *bogári* energies are usually also invisible until they manifest as some natural light display - as flashes of lightning, for instance, or as airborne dust particles illuminated by a beam of sunlight - or manifest as an inner vision of light.

Many of the same images depicted in the artwork of shamanistic cultures - the concentric annuli, wavy lines, and eye-like forms illustrated in Figure 3.1 - are also found at prehistoric rock art sites. To explain why similar patterns appear at so many different rock art sites from the megalithic and paleolithic eras, sites which are widely dispersed geographically (ranging from Australia to South Africa to continental Europe, Ireland, and the far western regions of the United States), Lewis-Williams and Dowson [1988, 1993] have proposed a "neuropsychological model" of prehistoric rock art production and consumption. This theory, which has been elaborated in many subsequent studies [Whitley, 1994, 1998; Lewis-Williams, 1991, 1995a, b; Dronfeld, 1996a,b; Clottes and Lewis-Williams, 1998; Patterson, 1998], states that the "best-fit explanation" for why certain kinds of abstract, geometric images were carved at

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prehistoric rock art sites is that these images depict phosphene phenomena observed by shamans (or others) during altered states of consciousness.

If the same kinds of phosphene visions were induced by shamans in many megalithic and paleolithic cultures, by shamans in many contemporary tribes, and by visionaries in all of the mystical traditions of the world's major religions, the kinds of behaviors that induce these visions must arise independently, or, put another way, the behaviors necessary to induce phosphene displays must be relatively easy to discover on one's own. A person prone to fantasize or to dissociate from his or her surroundings will not find it difficult to drift into a self-hypnotic trance, and then, once in that state, to notice that glimmers of phosphene light appear. The use of hallucinogenic drugs also acquaints people with phosphene images that appear before dream-like hallucinations supercede. Our hypothesis identifying sleep rhythms as the underlying cause suggests that the only skill required to induce a predictable sequence of phosphene images is the ability to simulate the kind of mental and physical relaxation a person achieves just before falling asleep, since this state of low arousal 'fools' the body into premature activation of the brain mechanisms that govern a normal transition to sleep.

In his cross-cultural comparisons of shamanic practices, Winkleman [1986, 1990, 1992] found that the final common outcome of most trance induction rituals is installation of a physiological state of "parasympathetic dominance." A state of parasympathetic dominance is characterized by (1) onset of synchronous brain rhythms; (2) relaxation of the large skeletal muscles; and (3) onset of high-amplitude activity in the neurons of the hippocampal-septal circuits [Mandell, 1980; Winkleman, 1986]. The classic example of this state is slow wave sleep. If meditation activates slow wave sleep mechanisms, as we propose, then it institutes a state of parasympathetic dominance. But simulation of the transition to sleep is not the only way to reach this state; it is also possible to induce it by over-stimulating the complementary nervous system, i.e., the sympathetic nervous system, to the point of saturation and temporary collapse. Techniques to induce this kind of collapse are described by Sargant [1974] and by Winkleman [1986; 1990, 1992]. Some techniques of over-stimulation of the sympathetic nervous system used by shamans are sustained sleep deprivation, self-mortification to inflict pain, dancing to the point of physical collapse, or surrendering oneself to chants or drumbeats that drive the brain toward synchronous rhythms.

Where does this survey of shamanistic trance induction rituals, past and present, take us in our present inquiry about the effect of shamanistic influences on the composition of the RV? The key point is this: if the priests or wise men of the Indo-Aryan tribes induced the same kinds of visions as contemporary shamans, and they induced them using the same techniques - by retreating from social interaction and meditating - then, while engaged in this task, the priests were functioning like shamans, 'specialists' with special skills that enabled them to communicate with the spirit world on behalf of the tribe.

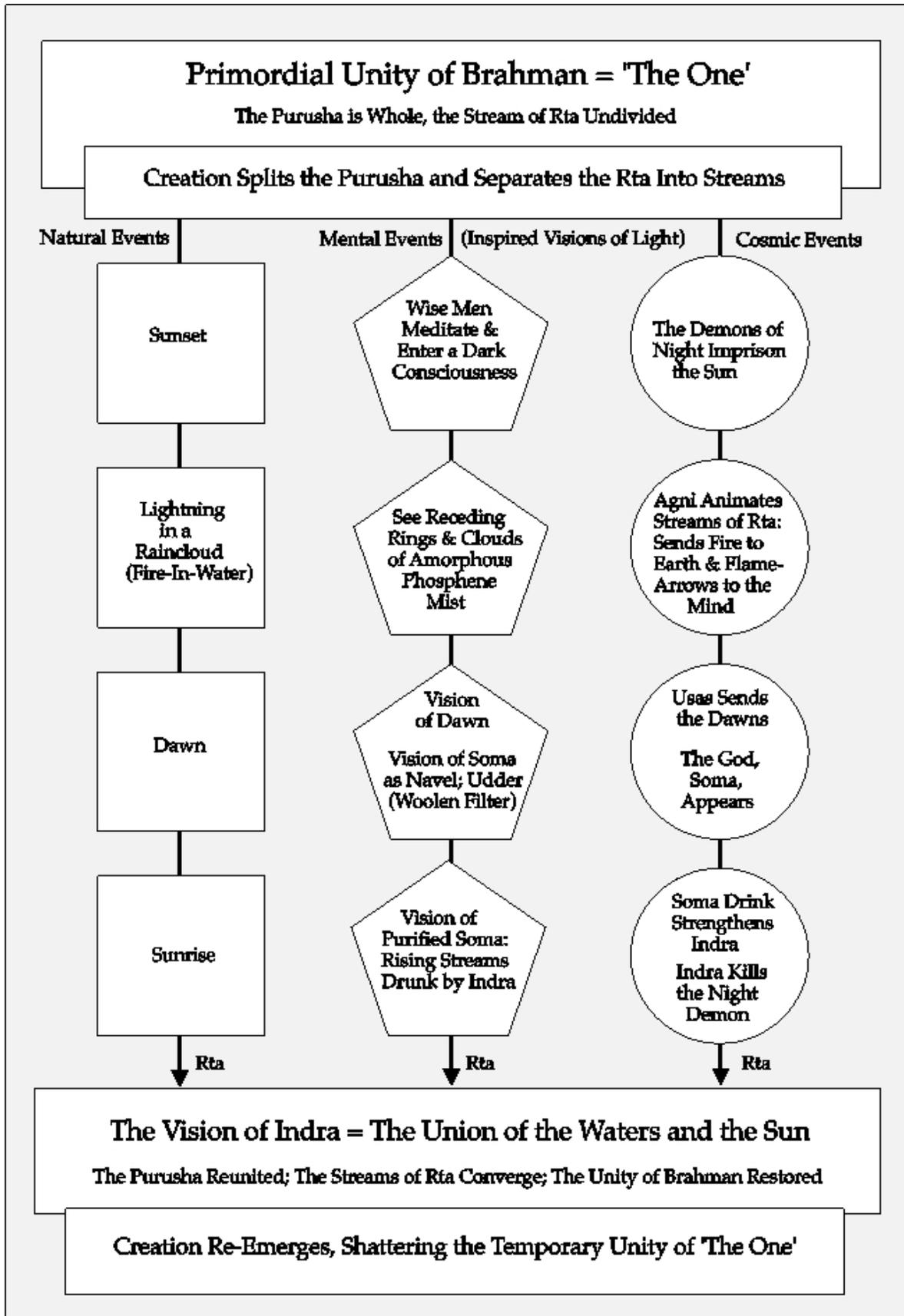
There is some evidence that these shaman-like visionary experiences may have provided the Indo-Aryans with the basic conceptual structure that informs the Vedic myths. The attributes of the gods, their actions, and the sequence of cosmic events they set in motion are arranged in sequences that closely parallel the sequence of meditation-induced phosphene images. Given that there is this close alignment, can we infer that the myths originated from the visions and not vice versa? The approach we employed to decode the metaphors for luminous visions in the RV was to use the sequence of

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meditation-induced phosphenes as a template for making 'predictions' about the kinds of visual characteristics that were likely to be important and about the order in which different kinds of visions would be likely to appear; as we now refocus attention from decoding vision metaphors to understanding the origins of the Vedic myths, it makes sense to experiment with a similar approach. We might ask, then, is it possible to predict the sequence of cosmic events described in the Vedic myths based on our knowledge of the mediation-induced phosphene sequence, and, conversely, is it also possible to predict the content of visions using the sequence of cosmic events as a standard?

Figure 3.2 describes the general trajectory of cosmic events posited by Vedic mythmakers, juxtaposing events that take place in three dimensions - the world of natural phenomena, the divine realm where gods act unseen, and the dark void of meditative consciousness which only the wise men can enter and where they see visions of other-worldly light. In Vedic myths, the creation of worlds splits the primordial Unity of Brahman and also splits the *rta*, the energy that instills Truth and Order, so that separate streams flow in all different regions of the created world. Although the streams of *rta* are split by creation, each stream retains an inertial momentum that tends to bend it back towards an eventual confluence with the other streams, a convergence that would restore the primal Unity - the "Union of the Waters and the Sun." Because the streams of *rta* are a part of everything that exists, there are sometimes harmonious convergences of events that take place in all three dimensions - 'homologies' that link natural phenomena, the acts of the gods, and the inspired visions of light that come to wise men. Homologous events are important because these convergences afford glimpses into the flow of the *rta* and the ultimate nature of the cosmos. Some important homologies linking natural events, divine actions, and human visions are listed in Figure 3.2. Referring to this chart, we can ask if it is possible to predict the sequence of events that appears in one of the columns once we know the sequence of events in another column. Several permutations are possible:

Figure 3.2. Flow chart illustrating some homologies of nature, divine acts, and human vision postulated by the Vedic myths.



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If we know the diurnal rhythm of sunset alternating with sunrise (in the left column), we can predict the overall trajectory of cosmic events in the Vedic myths (in the right column), namely, that the myths will center on the loss of the sun and attempts to bring the sun back into the sky. But knowing this does not enable us to predict the details of the Vedic myths that explain how this goal is accomplished.

If we know the sequence of the meditation-induced phosphenes (in the center column), we see, first, that it mirrors the diurnal rhythm of the sun - meditation, like sunset, casts human consciousness into a dark space, but eventually that darkness yields a vision of the rising sun - but, second, we see that the meditation-induced phosphene sequence also describes many different transformations that occur in the visions before the culminating vision of the sunrise. It is this detail in the phosphene sequence that provides a basis for making predictions about the events that take place at the cosmic level, or, put another way, to predict what kinds of gods will have to appear in the Vedic myths and what kinds of acts the gods will initiate to recover the hidden sun if, as we propose, the myths are based on the sequence of meditation-induced phosphene images.

The Vedic mythmakers are most likely to be posit divine responsibility for events when they detect similarities ('homologies') between natural phenomena, which are beyond all human control, and the visionary experiences that wise men can induce by meditating. Wherever such an homology occurs, we find a god assigned responsibility for coordinating these events that take place in different dimensions of reality. We can predict, for instance, that the Vedic myths will feature a god whose nature it is to release light in the midst of dark, since this homology is omnipresent, and, indeed, this is the nature of Agni: he sends fire to the forest, fire to the altar, and, in his incarnation as "Child of the Waters" (Apam Napat), Agni lights the fire of lightning inside the raincloud and send flame-arrows into the dark consciousness of "The Waters" of meditation. Following this same line of thought, we can also predict, based on homologies between a terrestrial dawn and a phosphene effect in which there is a gradual brightening of a pale blue color, that there will be a god assigned responsibility for sending both of these lights - hence the god, Usas. This brings us to the god, Soma.

We have described two phosphene visions in the meditation-induced sequence that the eulogists call Soma - the vision of newborn Soma as a bulb of wool and the vision of purified Soma shooting out of the woolen filter in three rays - but if all of the Vedic gods were created to explain homologies between visionary experiences and natural events, where is the natural phenomenon that is the homology for the vision of Soma? The answer is evident once we look beyond the Soma vision to see what comes next in the phosphene sequence: the streams of purified Soma "penetrate" to the abode of another god, Indra, who drinks them. Invigorated by this drink, Indra attacks and kills the demons of the night, releasing the sun. A brilliant, sun-like flash then appears. Given this culmination, we can now see, looking back at the Soma visions, that the homology for the Soma vision in the natural world must be the Soma drink that was prepared from the Soma plant. This analysis implies that the Soma drink must be invigorating and even exhilarating, and, indeed, as we shall see in the next section of

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this paper, the leading candidate for the original Soma is a strong stimulant. The homology that led the Vedic mythmakers to postulate the existence of a god named Soma must have been the common features shared by the preparation of an invigorating drink and a set of visions that began as a phosphene bulb that moved itself about, as if it were being pressured from some invisible force, and which then transformed into a vision of thin streams of white light shooting out like jets of fresh milk expressed from a cow's udder.

We are considering whether or not it is possible to predict the trajectory of cosmic events using the sequence of meditation-induced phosphenes as a standard. From our analysis of the Soma/Indra transformations, we can now see that the phosphene visions of Soma would have been the only source of information the Vedic priests had available, prior to Indra's manifestation as a sun-like vision, to track events taking place in the otherwise invisible realm of the gods. The myths portray Indra as struggling with the demons of the night to free the sun, but the particulars of the struggle - for example, the manner in which Indra obtained the power he needed to defeat the demons of the night - could only have come from the meditation-induced phosphene sequence. The importance of the Soma visions also highlights the importance of the Soma drink prepared for the human rituals; the existence of an homology linking a human drink that invigorates with visions of a celestial drink being prepared and then squirted out into the heavens is a sign that the streams of rta have informed both events - and a sign that a god is at work. The priests, knowing that it was possible to reproduce within themselves the awesome spectacle of a lightning storm, and confident that the vision of lightning and sun-like brilliance was the culminating vision beyond which there was nothing more to be seen, chose Indra, god of the thunderstorm, to be first among the gods, and saw the advent of Indra as a restoration of "The Union of the Waters and the Sun."

So far we have shown that a great many details about cosmic events in Vedic mythology can be predicted based on a knowledge of the diurnal rhythm of the sun and the sequence of meditation-induced phosphene images. Is it possible to make predictions in the reverse direction - to use the actions of the gods (the right column in Figure 3.2) as the standard to predict the content of visions (shapes, movements, colors, and temporal sequence)? Clearly not. And that's why the interpretation of the metaphors describing luminous visions in the RV has resisted interpretation for so long; experts in Sanskrit and Vedic studies have known for years about the Asvins' radiant chariot, Agni's flame-arrows, Soma's woolen filter, and Indra's lightning bolt, but have been unable to understand how these mythic events relate to the visionary experiences extolled by the eulogists.

If we can only make predictions in only one direction - from the visions to the myths - this suggests that Vedic myths were constructed around the armature provided by the sequence of light images that they could induce within themselves by meditating. These visions would have been the best evidence available about the nature of the hidden world of the gods.

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### The Search for the Original Soma

Scholars agree that a Soma ritual was practiced by the ancient Indo-Aryan tribes (and also that the Indo-Iranians who emigrated from the same original homeland had a 'Sauma' ritual), but exegesis of the RV and the Iranian *Avesta* has revealed very little information about the nature of the original Soma [Flattery and Schwartz, 1989, p. 6]. When Wasson [1971], an ethnobiologist, became interested in learning more about the original Soma plant, he was surprised to find out how little anyone knew about the subject:

But what manner of plant was this Soma? No one knows. For twenty-five centuries and more its identity has been lost. The Hindus . . . allowed this authentic Soma to fall into disuse and early on began to resort to sundry substitutes, substitutes that were frankly recognized as such and that to this day are met with in India in their peculiar religious roles [Ibid., p. 5].

Some Hindu sects still perform Soma rituals in which the priests prepare a drink by crushing the stalks of a plant called 'Soma' and filtering water through the mash [see Keith, 1925, Vol. 32, pp. 326 - 332; Gonda, 1982; Falk, 1989], but there are significant disparities between the effects produced by these drinks and the effects attributed to the original Soma in the hymns of the RV [Wasson, op. cit., p. 7].

In his review of existing theories about the identity of the Soma plant, Nyberg [1995], a botanist, concludes that scholarly debate has now narrowed the field of likely candidates to two plant species - Syrian rue and Ephedra. Syrian rue contains harmaline alkaloids, hallucinogenic substances which are also present in mescaline and ayahuasca and which clearly have the capacity to induce visions. In support of the theory that the original Soma/Haoma produced an hallucinogenic extract, Flattery [Flattery and Schwartz, 1989] analyzes ancient Zoroastrian texts and religious rituals and concludes that the priests who drank "sauma" during Zoroastrian rituals did so with the intent and expectation of inducing visions:

[T]he three Pahlavi accounts are consistent in showing that sauma brought about a condition outwardly resembling sleep (i.e., *stard*) ['stunned,' 'dazed,' 'sprawled'] in which targeted visions of what is believed to be a spirit existence were seen. [Ibid., p. 23]

From the apparent role of sauma in initiation rites . . . , experience of the effects of sauma, which is to say, vision of *menog* existence, must have at one time been required of all priests (or the shaman antecedents of them) [Ibid., p. 20].

The other leading candidate for the original Soma plant, Ephedra, contains the extract, ephedrine, a sympathetic nervous system stimulant analogous to adrenaline. Ephedrine excites the physiological systems of the fight/flight response but does not induce visions [Falk, 1989; Nyberg, op. cit.]. This is obviously an inconvenient fact for the advocates of Ephedra, a point Flattery underscores:

Despite being commonly designated haoma (and the like), Ephedra is without suitable psychoactive potential in fact (and is not regarded in traditional ethnobotany as having any psychoactive properties at all) and, therefore, it cannot have been

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believed to be the means to an experience from which priests could claim religious authority or wisely believed to be the essential ingredient in an intoxicating extract [Flattery and Schartz, *op. cit.*, p. 73].

The choice between these two candidate plants turns on a single issue - the nature of the luminous vision metaphors that describe the effects of drinking Soma in the hymns of the RV:

A primary consideration in the identification process is whether or not soma/haoma can be regarded as a hallucinogen. . . . In my opinion, as well [as Falk's], it is possible to choose a hallucinogenic candidate only if you have already decided to interpret the texts in this way [Nyberg, *op. cit.*, p. 385].

Falk rejects any interpretation of the RV hymns that would link Soma with "hallucinations." He clearly means to target the kind of visions that would be induced by the harmaline alkaloids in Syrian rue, that is, dream-like hallucinations that contain figures and objects drawn from life-experience, but Falk states his case in such a preemptory manner as to imply that he would also reject interpretations that linked Soma with phosphene images. His interpretation of a sample hymn illustrates his viewpoint:

The only half-serious reason to expect hallucination as an effect of Soma-drinking in an Indian context is the well-known Labasukta, RV 10.119. There it is said that some winged creature, after consumption of Soma, touches sky and earth with its wings and extends bodily even beyond these borders . . . . Usually it is Indra who grows until he extends beyond heaven and earth (e.g. RV 1.81.5; 8.88.5). . . . But Indra has no wings! And nowhere is it said that human Soma-drinkers feel that they are growing. . . . The act of growing in the Labasukta simply classifies the bird amongst the gods and gives no indication that it was due to the effects of any drug. . . . Because all the proponents of Soma as a hallucinogenic drug make their claim on the basis of a wrong interpretation of the Labasukta, their candidates must be regarded as unsuitable [Falk, *Ibid.*, p. 78].

Falk's reading of this specific verse is, in our opinion, seriously mistaken. Bird metaphors are often used in the RV to describe luminous visions, especially the streams of purified Soma, a subject we addressed at some length in Part II. Since the streams of Soma are said to penetrate as far as the seat of Indra, and since Indra drinks those streams just before appearing as a flash of lightning, it is not difficult to understand why a poet might say that Indra is lifted on wings. Also, bird metaphors are also used to describe Indra as a sun-like flood of continuous light, as, for example, in 10.177.1-3, discussed in Part I, where wise men are described as having seen in their hearts "the bird anointed with the magic of the Asura" appearing as a "revelation that shines like the sun in the footprint of Order [OFL]." Falk's interpretation of this particular verse - and his general rejection of any links between Soma and visions - is diametrically opposed to everything we have written in this series of articles on the interpretation of luminous vision metaphors.

It is understandable why the proponents of Ephedra as the original Soma plant would be moved to adopt this approach, since they have to account for the fact that ephedrine does not cause visions. There is, however, an alternative approach, one

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which has not yet been considered by any of the contenders, that supports the Ephedra hypothesis without requiring a denial of the links between the Soma metaphors in the RV and luminous visions. The key word, as noted earlier, is 'hallucination,' but now we need to be more precise in our definition of the term. In technical psychiatric jargon, internally-generated phosphene images are called 'formed' or 'unformed hallucinations' to distinguish them from dream-like 'experiential hallucinations' which contain memory-based content. If the Falk-Nyberg thesis were limited to the claim that the RV does not contain references to *experiential hallucinations*, the type induced by the hallucinogenic harmaline alkaloids in Syrian rue, and that, if there are no references to experiential hallucinations, then Syrian rue cannot be the original Soma, there would be no contradiction between the Falk-Nyberg position and our own. The problem left unsolved, then, is to find a way to explain how a stimulant like ephedrine could be associated in the minds of the Indo-Aryans with induction of inspirational visions.

### Vigils and Visions: Falk on Soma and Sleeplessness

Falk was the first to point out that the hymns of the RV often state that Soma "prevents sleep," an observation he illustrates by citing many verses: 10.34.1, which refers to the "alerting drink of Soma;" 8.92.12, where "Indra is awake because he drank Soma" (a point repeated in 9.36.2, 9.44.3, 9.103, and 9.106.4); and 8.44.29, where "Agni is awake [*jagrvi*] like an inspired poet [Falk, op. cit., p. 80]." Also, verse 9.96.18 calls "Soma a maker of seers, *rsikrt*;" 5.44.14 promises that "to someone staying awake the *rces* will come and the samans, and Soma will declare him his friend;" 1.53.1 disparages poets who are not blessed with "the gift of quasi-sleeping;" in 8.44.29 Agni is described as "awake like a poet" (a theme repeated in 1.31.9, 3.24.3, and 6.15.8); in 3.26.3, Agni, "a finder of the sun," is described as "staying awake waiting for the gods;" and, in 9.107.7, "Soma is called *vipra* and *jagrvi* and one who makes the sun rise [Falk, op. cit., p. 80]." Also relevant to Soma's identity as a stimulant is 8.79.7-8 where the eulogist "begs Soma to be peaceful to the heart" and "to ward off excessive agitation," an acknowledgment that over-stimulation of the nervous system can result from drinking Soma [Falk, op. cit., p. 87].

After drinking Soma, the priests may have mounted all-night vigils in which they avoided social interaction and chanted in solitude:

It is in this light that RV 8.48.14 is to be read, where the poet expresses the wish that neither sleep nor idle talk should govern him after he has drunk Soma . . . . So it seems that at least some of the poetry of the RV was created at night. That *jagrvi* does not just mean 'alert', but refers to the night, when ordinary people are asleep, is obvious from all these stanzas, which connect someone awake with the hope of seeing the sun rise [Falk, *Ibid.*, p. 80].

Falk reinforces this point by examining a Soma rite described in the Brahmanas - the *Atiratra* rite of the *srauta* Soma ritual - in which the priests are described as staying awake all night:

The priests have to stay awake, because 'wakefulness means light' . . . . The priests have to keep the fire ablaze and must never be silent. Fire, Soma, and the wakefulness and speech of the priests guarantee the destruction of the demons of the

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night, i.e. they help Indra in his mythic struggle, and on the mundane level, the priests overcome misery . . . . [Falk, 1989, p. 81].

The source text states that the priests did not drink the Soma themselves until after they had spent the night offering it to Indra, which means they would not have drunk any of it until sometime the next morning; however, it is also possible that the priests consumed some of the drink during the night to help them stay awake [Falk, op.cit., p. 82]. In either event, Falk suggests that this *srauta* ritual is probably closer to ancient Indo-Aryan custom than the *Agnistoma* ritual which lasts only a day. If he is correct, there is a way to explain how a stimulant like ephedrine came to be associated with inspirational visions based on the neurophysiology of slow wave sleep that generates the meditation-induced, meditation-destabilized sequence of phosphene images. This explanation can account for the outbreak of paroxysmal visions whether or not the priests drank ephedrine on the night of the vigil.

Losing a night's sleep increases the excitability of cortical neurons, creating a potential for synchronized sleep rhythms to rebound in force at the first opportunity. If the priests tried to meditate in the early hours just before dawn - a time when the sleep rebound effect would be particularly strong - there would be an increased risk that sleep rhythm oscillators, once activated by meditation, would destabilize. Indeed, this is precisely what happened to the author at the time he inadvertently triggered the outbreak of a subclinical seizure, although his sleep deficit was slightly more pronounced (only four hours of sleep in the preceding thirty-six hours). During this paroxysm, the author saw the phosphene sequence (see Part I) which includes images resembling the Vedic visions of the Dawn-before-dawn, the Soma filter, the streams of purified Soma, and Indra's lightning bolt.

If, in addition to the sleep deficit, the priests also drank the ephedrine the night before to help them keep awake, this stimulation of the sympathetic nervous system would not only aggravate the sleep rhythm rebound effect but also enhance the hyperexcitability of cortical neurons by over-stimulating the sympathetic nervous system. We have noted earlier in this article that the final common pathway of many different kinds of shamanic trance induction rituals is over-stimulation of the sympathetic nervous system to the point of triggering a temporary collapse, and that this collapse evokes a physiological state of parasympathetic dominance similar to slow wave sleep. Therefore, if the priests began to practice meditation after a sleepless night fueled by drug-induced exhilaration, and in this process activated the sleep rhythm oscillators, the risks of triggering a destabilization of sleep rhythm oscillators would be even greater than if they had not consumed the ephedrine.

In both of the scenarios, the proximate cause of the paroxysmal phosphene visions is meditating while in a sleep-deprived condition, not the use of ephedrine per se, but even if ephedrine is only a predisposing factor, it would not be surprising, given the proximity of events - the vigil, the prolonged sleeplessness, the drinking of a strong, exhilarating stimulant, and the advent of paroxysmal visions of light - if the participants were to conclude that there was a causal connection between these events.

Or perhaps the priests knew all along that there was no direct connection between the Soma drink and the Soma visions; perhaps what was most important to them was the homology between the exhilaration they felt when they drank the terrestrial Soma and the vision of a sun-like Indra bursting into view just after the vision of Soma jets

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shooting out like milk from a cow's udder. Consistent with this interpretation is the famous verse which reads: "One thinks he has drunk Soma when they press the plant. But the Soma that the Brahmans know - no one ever eats that. / Hidden by those charged with veiling you, protected by those who live on high, O Soma, you stand listening to the pressing-stones. No earthling eats you. / When they drink you who are a god, then you are filled up again. . . . 10.85.3-5 [OFL, p. 267]."

## NOTES

1. The translations for Patañjali's *Yogasutras*, verses 4.23 through 4.29, are my own. I was able to make translation, despite my rudimentary skills in Sanskrit, because this text can be read in conjunction with a source that provides word-by-word translations of the root Sanskrit terms [Feuerstein, 1989], because I had the template of meditation-induced phosphenes available for comparison, and because I could consult with Dr. Michael Witzel, Harvard, on words that seemed problematical (e.g., *nimnam*). Every published translation that I have read - and I've read many of them - uses 'experience-distant' metaphysical interpretations in the fourth chapter about Kaivalya, completely missing the possibility that these verses might actually be describing lights that would appear in the visual field. The template of meditation-induced phosphenes helped unlock the meaning of this text in much the same way it worked in the present study of vision metaphors in the RV.

## ABBREVIATIONS USED

- BH/W Bhawe, S. S., *The Soma Hymns of the Rig Veda, Parts I - III*, 1957, 1960, and 1962, as quoted in Wasson, R. G., *Soma: Divine Mushroom of Immortality* (Harcourt Brace Jovanovich: New York, 1971).
- DNG Dange, S. A. *Divine Hymns and Ancient Thought, Vol. I: RgVeda Hymns and Ancient Thought* (NAVRANG: New Delhi, 1992.).
- GRF Griffith, R. T. H., *The Hymns of the RgVeda, Vol. I - II* (Chowkhamba Sanskrit Series: Varanasi, 1971 [1889]).
- OFL O'Flaherty, W. D., *The Rig Veda: An Anthology* (Penguin Books: London, 1971.).
- WIL Wilson, H. H., *Rig-Veda Sanhita: A Collection of Ancient Hindu Hymns, Vol. I - VI* (Trubner & Company: London, 1888.).

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GON           Gonda, J. 1963. *The Vision of the Vedic Poets* (Mouton & Co.: The Hague, Netherlands).

### REFERENCES

- Arbman, E. 1963. *Ecstasy or Religious Trance: In the Experience of Ecstatics and from a Psychological Point of View, Vol. I, Vision and Ecstasy* (Scandinavian University Books: Stockholm).
- Arbman, E. 1968. *Ecstasy or Religious Trance: In the Experience of Ecstatics and from a Psychological Point of View, Vol. II: Essence and Forms of Ecstasy* (Scandinavian University Books: Stockholm).
- Arbman, E. 1970. *Ecstasy or Religious Trance: In the Experience of Ecstatics and from a Psychological Point of View, Vol. III: Ecstasy and Psychopathological States* (Scandinavian University Books: Stockholm).
- Benson, A., and Sehgal, L.. 1987. "The Light at the End of the Tunnel," *Rock Art Papers* 5(23):1-6 (Museum of Man: San Diego).
- Bhawe, S. S. 1957, 1960, 1962. *The Soma Hymns of the Rig Veda, Parts I - III*, as quoted in Wasson, R. G.. 1971. *Soma: Divine Mushroom of Immortality* (Harcourt Brace Jovanovich: New York).
- Dange, S. A. 1992. *Divine Hymns and Ancient Thought, Vol. I: RgVeda Hymns and Ancient Thought* (N. Singal, NAVRANG: New Delhi).
- Dronfield, J. 1996a. Entering Alternative Realities: Cognition, Art and Architecture in Irish Passage-Tombs. *Cambridge Archaeological Journal* 6(1): 37-72.
- Dronfield, J. 1996b. The Vision Thing: Diagnosis of Endogenous Derivation in Abstract Arts. *Current Anthropology* 37(2): 373-391.
- Eliade, M. 1964. *Shamanism: Archaic Techniques of Ecstasy* (Princeton University Press: Princeton).
- Elkin, A. P. 1977 [1945]. *Aboriginal Men of High Degree, 2nd Edition* (St. Martin's Press: New York).
- Erdosy, G. 1995. *The Indo-Aryans of Ancient South Asia: Language, Material Culture, and Ethnicity* (Walter de Gruyter: Berlin & NY).
- Falk, H. 1989. "Soma I and II." In: *Bulletin of the School of Oriental and African Studies* (University of London).
- Feuerstein, G.. 1989. *The Yoga-Sutra of Patañjali: A New Translation and Commentary* (Inner Traditions International: Rochester, VT).
- Firnhaber, R. P. 2001. *Mapping the ASC: A Cultural-Physiological Construct*. Paper presented at the 6th International Conference of the International Society for Shamanistic Research, Viljandi, Estonia.
- Flattery, D. S. and Schwartz, M.. 1989. *Haoma and Harmaline: The Botanical Identity of the Indo-Iranian Sacred Hallucinogen "Soma" and its Legacy in Religion, Language, and Middle Eastern Folklore* (University of California Press: Berkeley).
- Furst, P. T.. 1975. "To Find Our Life: Peyote Among the Huichol Indians of Mexico." In: Furst, P. T., Editor. *Flesh of the Gods: The Ritual Use of Hallucinogens*, pp. 136-184 (London: Allen & Unwin).

## THE SOMA CODE

- Gonda, J. 1963. *The Vision of the Vedic Poets* (Mouton & Co.: The Hague, Netherlands).
- Gonda, J. 1979. *The Medium in the RgVeda* (E. J. Brill: Leiden).
- Gonda, J. 1983. *Soma's Metamorphoses (The Identifications in the Oblatory Rites of Satapatha-Brahmana 12, 6, 1)* (North Holland Publishing Company: Amsterdam).
- Gonda, J. 1983. *Soma's Metamorphoses (The Identifications in the Oblatory Rites of Satapatha-Brahmana 12, 6, 1)* (North Holland Publishing Company: Amsterdam).
- Gonda, J. 1989. *The Indra Hymns of the RgVeda* (E. J. Brill: Leiden).
- Griffith, R. T. H. 1971 Reprint [1889] *The Hymns of the RgVeda, Vol. I - II* (Chowkhamba Sanskrit Series: Varanasi).
- Halifax, J. 1982. *Shaman: The Wounded Healer* (Thames and Hudson: London).
- Herity, M. 1974. *Irish Passage Graves: Neolithic Tomb-Builders in Ireland and Britain 2500 B.C.* (Irish University Press: Dublin).
- Holtved, E. 1967. "Eskimo Shamanism" In: Edsman, C. M., Editor, *Studies in Shamanism* (Almqvist and Wiksell. Stockholm).
- Jakobsen, M. D.. 1999. *Shamanism: Traditional and Contemporary Approaches to the Mastery of Spirits and Healing* (Berghahn Books: Oxford).
- Keeney, B., Editor. 1999. *Kalahari Bushmen Healers* (Ringing Rocks Press: Philadelphia).
- Keith, A. B. 1970 Reprint [1925]. *The Religion and Philosophy of the Veda and Upanishads , Harvard Oriental Series, Vols. 31 & 32 .* (Motilal Banarsidass: Delhi).
- La Barre, W. 1969 [1964]. *The Peyote Cult* (Schocken Books: New York).
- Laski, M. 1961. *Ecstasy in Secular and Religious Experiences* (Tarcher: Los Angeles).
- Lawlor, R. 1991. *Voices of the First Day: Awakening in the Aboriginal Dreamtime.* (Rochester, VT: Inner Traditions International).
- Lewis-Williams S, J. D., and Dowson, T. 1993. "On Vision and Power in the Neolithic: Evidence from the Decorated Monuments," *Current Anthropology* 34:55-65.
- Lewis-Williams, J. D. 1991. "Wrestling with Analogy: A Methodological Dilemma in the Upper Paleolithic Art Research," *Proceedings of the Prehistoric Society* 57(2):149-162.
- Lewis-Williams, J. D. 1995a. "Modeling the Production and Consumption of Rock Art," *South African Archaeological Bulletin* 50:143-154.
- Lewis-Williams, J. D. 1995b. "Seeing and Construing: The Making and 'Meaning' of a Southern African Rock Art Motif," *Cambridge Archaeological Journal* 5(1):3-23.
- Lewis-Williams, J. D., and Dowson, T. 1988. "The Signs of All Times: Entoptic Phenomena in Upper Paleolithic Art," *Current Anthropology* 29(2):201-245.
- MacDonell, A. A. 1971. *The Vedic Mythology* (Indological Book House: Delhi).
- Mandel, A.J.. 1980. "Toward a Psychobiology of Transcendence: God in the Brain." In: Davidson, J. M. and Davidson R. J., Editors. *The Psychobiology of Consciousness*, pp. 379-463. (Plenum Press: New York).
- McKenna, T. 1992. *Food of the Gods: The Search for the Original Tree of Knowledge* (Bantam Books: New York).
- McKenna, T. 1992. *Food of the Gods: The Search for the Original Tree of Knowledge* (Bantam Books: New York).

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- Nelson, E. W.. 1899. "The Eskimos About Bering Strait," *The 14th Annual Report of American Ethnology*, pp. 653 - 1110, as cited in Benson and Sehgal, supra.
- Nicholson, P. T. 1996a. "Phosphene images of thalamic sleep rhythms induced by self-hypnosis," *Subtle Energies and Energy Medicine* 7(2): 111 - 148.
- Nicholson, P. T. 1996b. "Dialogue: Phosphene images of thalamic sleep rhythms induced by self-hypnosis," *Subtle Energies and Energy Medicine* 7(3): 273 - 283.
- Nicholson, P. T. 1999. "Phosphene Epiphenomena of Hypersynchronous Activity Emerging in Thalamocortical Circuits and Triggering a Hippocampal Seizure," *Epilepsia* 40 [Supplement 2]: 27, 203
- Nicholson, P. T., and Firnhaber, R. P.. 2001. "Autohypnotic Induction of Sleep Rhythms Generates Visions of Light With Form-Constant Patterns," Paper presented at the 6th International Conference of the International Society for Shamanistic Research, Viljandi, Estonia.
- Nicholson, P. T. 2002a (In Press). "Meditation, Slow Wave Sleep, and Ecstatic Seizures: The Etiology of Kundalini Visions," *Journal of Subtle Energies and Energy Medicine*, Vol. 12, No. 3.
- Nicholson, P. T. 2002b (In Press). "Empirical Studies of Meditation: Does a Sleep Rhythm Hypothesis Explain the Data?" *Journal of Subtle Energies and Energy Medicine*, Vol. 12, No.3.
- Noll, R. 1985. Mental Imagery Cultivation as a Cultural Phenomenon: The Role of Visions in Shamanism. *Current Anthropology* 26(4):443-451.
- Nyberg. H.. 1995. "The Problem of the Aryans and the Soma: The Botanical Evidence." In: Erdosy, G., Editor, *The Indo-Aryans of Ancient South Asia: Language, Material Culture, and Ethnicity* (Walter de Gruyter: Berlin, pp. 383 - 406).
- O'Flaherty, W. D. 1971. *The Rig Veda: An Anthology* (Penguin Books: London).
- Patterson, C. 1998. "Seeking Power at Willow Creek Cave, Northern California," *Anthropology of Consciousness* 9(1):38-49.
- Persinger, M. A.. 1984. "Striking EEG Profiles from Single Episodes of Glossolalia and Transcendental Meditation," *Perceptual and Motor Skills* 58(1):127-133.
- Rasmussen, K. 1930. *The Intellectual Culture of the Iglulik Eskimos*. (Translated by W. Worster: Copenhagen).
- Ray, D. J.. 1967. *Eskimo Masks: Art and Ceremony* (University of Washington Press: Seattle).
- Reichel-Dolmatoff, G. 1972. "The Cultural Context of an Aboriginal Hallucination: Banisteriopsis caapi." In: Furst, P. T., Editor. *Flesh of the Gods: The Ritual Use of Hallucinogens*, pp. 84 - 113 (Allen and Unwin: London).
- Reichel-Dolmatoff, G. 1975. *The Shaman and the Jaguar: A Study of Narcotic Drugs Among the Indians of Columbia* (Temple University Press: Philadelphia).
- Reichel-Dolmatoff, G. 1978. *Beyond the Milky Way: Hallucinatory Imagery of the Tukano Indians* (UCLA Latin American Center: Los Angeles).
- Reichel-Dolmatoff, G. 1987. *Shamanism and the Art of the Eastern Tukanoan Indians* (New York: E. J. Brill).
- Reichel-Dolmatoff, G. 1996. *The Forest Within: The World-View of the Tukano Amazonian Indians* (Themis Books: Devon, UK).
- Sargant, W. 1974. *The Mind Possessed: A Physiology of Possession, Mysticism, and Faith Healing* (J. B. Lippincott Company: New York).

## THE SOMA CODE

- Schaefer, S. B.. 1996. "The Crossing of the Souls: Peyote, Perception, and Meaning Among the Huichol Indians." In: Schaefer, S. B. and Furst, P. T., Editors. *People of the Peyote*, pp. 138-168 (University of New Mexico Press: Albuquerque).
- Seigel, R. K., and Jarvik, M. E. 1975. "Drug-Induced Hallucinations in Animals and Man." In: Siegel, R. K. and West, L. J., Editors. *Hallucinations: Behavior, Experience, and Theory*, pp. 81-161 (John Wiley & Sons: New York).
- Taylor, P., ed.. 1988. *After 200 years: Photographic Essays of Aboriginal and Islander Australia Today* (Cambridge University Press: Cambridge).
- Underhill, E. 1990 [1910]. *Mysticism: The Preeminent Study in the Nature and Development of Spiritual Consciousness* (Doubleday: New York).
- Vastokas, J. M.. 1977. "The Shamanic Tree of Life." In: Brodzley, A. T., Daresewich, R., and Johnson, N., Editors. *Stones, Bones, and Skin: Ritual and Shamanic Art*, pp. 93-117 (Society for Art Publications: Toronto).
- Wasson, R. G. 1971 *Soma: Divine Mushroom of Immortality* (Harcourt Brace Jovanovich: New York).
- Whitley, D. S. 1994. "Shamanism, Natural Modeling and the Rock Art of Far Western Hunter-Gatherers." In: Turpin, S., Editor. *Shamanism and North American Rock Art* (Rock Art Foundation: San Antonio).
- Whitley, D. S. 1998. "Cognitive Neuroscience, Shamanism, and the Rock Art of Native California," *Anthropology of Consciousness* 9(1):22-37.
- Wilson, H. H. 1888. *Rig-Veda Sanhita: A Collection of Ancient Hindu Hymns, Vol. I - VI* (Trubner & Company: London).
- Winkelman, M. J. 1986. "Trance States: A Theoretical Model and Cross-Cultural Analysis," *Ethos* 4:174-203.
- Winkelman, M. J. 1990. "Physiological and Therapeutic Aspects of Shamanistic Healing. Subtle Energies and Energy Medicine. 1(2):1-18.
- Winkelman, M. J. 1992. *Shamans, Priests and Witches: A Cross-Cultural Study of Magico-Religious Practitioners*. (Arizona State University Anthropological Research Papers, No. 44: Tempe).