

# Mushrooms and Evolution

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For perhaps tens of millennia human beings have been utilizing hallucinogenic mushrooms to divine and to induce shamanic ecstasy. I propose to show that the human/mushroom interaction is not a static symbiotic relationship, but rather a dynamic one through which at least one of the parties has been bootstrapped to higher and higher cultural levels. The impact of hallucinogenic plants on the evolution and emergence of human beings is a heretofore unexamined phenomenon, yet it promises to provide an understanding of not only primate evolution but also the emergence of the cultural forms unique to *Homo sapiens*.

At Gombe National Park in Tanzania, primatologists found that one particular species of leaf kept appearing undigested in chimpanzee dung. They found that every few days the chimps would vary from their usual pattern of eating wild fruit. Instead, they would walk for twenty minutes or longer to the site where a species of *Aspilia* was growing. They would repeatedly place their lips over an *Aspilia* leaf and hold it in their mouths. Chimps were seen to pluck a leaf, place it in their mouths, roll it around for a few moments, then swallow it whole. In this way as many as thirty small leaves might be eaten.

Biochemist Eloy Rodriguez of the University of California, Irvine, isolated the active principle from the *Aspilia* — a reddish oil now named thiarubrine A. Working with the same substance, Neil Towers of the University of British Columbia found that this compound can kill common bacteria in concentrations of less than one part per million. Herbarium records studied by Rodriguez and Towers showed that African peoples used the same leaves to treat wounds and stomachaches. Of the four species of *Aspilia* native to Africa the indigenous peoples used only three; the same three species were the ones utilized by the chimpanzees.

These findings show clearly the way in which a beneficial plant, once discovered by an animal or a person, can be included in the diet and thus confer an adaptive advantage. The animal or person is no longer threatened by certain factors in the environment, such as diseases that may have previously set

constraints on the life span of individuals or perhaps upon the growth of the population as a whole. This type of adaptive advantage is easily understood. Less easy to understand is the way in which plant hallucinogens might have provided similar yet different adaptive advantages. These compounds do not catalyze the immune system into higher states of activity, although this may be a secondary effect. Rather, they catalyze consciousness, that peculiar self-reflecting ability that has reached its greatest apparent expression in human beings. One can hardly doubt that consciousness, like the ability to resist disease, confers an immense adaptive advantage on any individual who possesses it.

Consciousness has been called “awareness of awareness” and is characterized by novel connections among the various data of experience. Consciousness is like a super nonspecific immune response. There is no evolutionary limit to how much consciousness can be acquired by a species, and there is no end to the degree of adaptive advantage the acquisition of consciousness will confer upon the individual or the species in which it resides.

There is reason to question the scenario that physical anthropologists present us regarding the emergence of human consciousness out of binocular, bipedal primates. The amount of time allotted to this ontological transformation of animal organization is excessively brief. Evolution in higher animals takes a very long time to occur. For example, the biologist who studies the evolution of the early amphibians operates in time spans of rarely less than a million years and often speaks in terms of tens of millions of years. But the emergence of humans from the higher primates is something that has gone on in less than a million years. Physically, humans have apparently changed very little in the last million years; but the amazing proliferation of consciousness, of social institutions, of coding practices, of cultures, has come so quickly that it is difficult for modern evolutionary biologists to account for it. Most do not even attempt an explanation.

There is a hidden factor in the evolution of human beings that is neither a “missing link” nor a telos imparted from on high. I suggest that this hidden factor in the evolution of human beings, the factor that called human consciousness forth from a bipedal ape with binocular vision, involved a feedback loop with plant hallucinogens. This is not an idea that has been widely explored, though a very conservative form of this notion appears in R. Gordon Wasson’s *Soma: Divine Mushroom of Immortality*. Wasson does not comment on the emergence of humanness out of the primates, but he does suggest hallucinogenic mushrooms as the causal agent in the appearance of spiritually aware human beings and the genesis of religion. Wasson feels that omnivorous foraging humans would have sooner or later encountered hallucinogenic mushrooms or other psychoactive plants in their environment.

The strategy of these early human omnivores was to eat everything and to vomit whatever was unpalatable. Plants found to be edible by this method were then inculcated into their diet. The mushrooms would be especially noticeable because of their unusual form and color. The state of consciousness induced by the mushrooms or other hallucinogens would provide a reason for foraging

humans to return repeatedly to those plants, in order to reexperience their bewitching novelty. This process would create what C. H. Waddington called a “creode,” a pathway of developmental activity (in other words, a habit).

Habituation to the experience was ensured simply because it was ecstatic. “Ecstatic” is a word unnecessary to define except operationally: an ecstatic experience is one that one wishes to have over and over again. It has been shown in experimental situations that if one creates a situation in which *N,N*-dimethyltryptamine (DMT) can be delivered to a monkey on demand, then a large number of monkeys exposed to that experimental apparatus will prefer the DMT over food and water. DMT was used in these experiments because it is a very short-acting, overt hallucinogen that occurs in many different plant species. Though we cannot analyze the laboratory monkeys’ state of mind, it is very clear that something in the experience impels them to return to the stimulus again and again.

Wasson’s idea that religion originated when an omnivorous protohuman encountered alkaloids in the environment was countered by Mircea Eliade, the most brilliant expositor of the anthropology of shamanism and the author of *Shamanism: Archaic Techniques of Ecstasy*. Eliade considers what he calls “narcotic” shamanism to be decadent. He feels that if one cannot achieve ecstasy without drugs, then one’s culture is probably in a decadent phase. The use of the word “narcotic” — a term usually used for soporifics — to describe this form of shamanism betrays an unsettling botanical and pharmacological naiveté. Wasson’s notion, which I share, is precisely the opposite: it is the presence of a hallucinogen in a shamanistic culture that indicates its shamanism is authentic and alive. It is the late and decadent phase of shamanism that is characterized by elaborate rituals, ordeals and reliance on pathological personalities. Where these latter phenomena are central, shamanism is well on its way to becoming simply “religion.”

One view of plant hallucinogens is to see them as interspecies pheromones or exopheromones. Pheromones are chemical compounds exuded by an organism for the purpose of carrying messages between organisms of the same species. The meaning of the message is not intrinsic in the pheromone’s chemical structure but in evolutionarily established convention. Ants, for instance, produce a number of secretions with very specific meanings for other ants. However, these chemical “languages” are species-specific; the ant of one species cannot “read” the pheromones of another species. In fact, there is one known case where a pheromone means one thing to one ant species and yet bears a completely different meaning to another ant species, much in the same way that the English word “no” means “yes” in Greek.

If hallucinogens are operating as exopheromones, then the dynamic symbiotic relationship between primate and hallucinogenic plant is actually a transfer of information from one species to another. The primate gains increased visual acuity and access to the transcendent Other, while the benefits to the mushroom arise out of the primate domestication of previously wild cattle and hence the expansion of the niche occupied by the mushroom. Where plant hallucinogens do not occur such processes cannot take place, but in the presence of hallu-

cinogens a culture is slowly introduced to ever more novel information, sensory input and behavior and thus is bootstrapped to higher and higher states of self-reflection.

It is reasonable to suggest that human language arose out of the synergy of primate organizational potential by plant hallucinogens. Indeed, this possibility was brilliantly anticipated by Henry Munn in his essay "The Mushrooms of Language." Munn writes:

Language is an ecstatic activity of signification. Intoxicated by the mushrooms, the fluency, the ease, the aptness of expression one becomes capable of are such that one is astounded by the words that issue forth from the contact of the intention of articulation with the matter of experience. The spontaneity the mushrooms liberate is not only perceptual, but linguistic. For the shaman, it is as if existence were uttering itself through him.

Other writers have sensed the importance of hallucinations as catalysts of human psychic organization. Julian Jaynes, in his controversial book *The Origin of Consciousness in the Breakdown of the Bicameral Mind*, makes the point that there may have been major shifts in human self-definition even in historical times. He proposes that through Homeric times people did not have the kind of interior psychic organization that we take for granted. What we call ego was for pre-Homeric people what they called a "god." When danger threatened suddenly and unbidden, the god's voice was heard in the individual's mind, a kind of metaprogram for survival called forth under great stress. This integrative psychic function was perceived by those experiencing it to be either the direct voice of a god, the direct voice of the leader of the society, the king, or the direct voice of the dead king, the king in the afterlife. Merchants and traders moving from one society to another brought the unwelcome news that the gods were saying different things in different places, and so cast early seeds of doubt. At some point people integrated (in the Jungian sense) this previously autonomous function, and each person *became* the god and reinterpreted the inner voice as the "self" or, as it was later called, the "ego."

Hallucinogenic plants may have been the catalysts for everything about us that distinguishes us from other primates, except perhaps the loss of body hair. All of the mental functions that we associate with humanness, including recall, projective imagination, language, naming, magical speech, dance and a sense of *religio* may have emerged out of interaction with hallucinogenic plants. Our society more than others will find this theory difficult to accept, because we have made pharmacologically obtained ecstasy a taboo. Sexuality is a taboo for the same reason: such things are consciously or unconsciously sensed to be entwined with the mysteries of where we came from and how we got to be the way we are. A theory of plant hallucinogens as central to the origin of mind suggests a scenario such as the following:

We know that the Sahara was much wetter as recently as four or five thousand years ago. The Roman historian Pliny referred to North Africa as "Rome's breadbasket." The presumption is that over the last 150,000 years the Sahara

has grown gradually drier, changing from a subtropical forest to grasslands and recently to desert. When the grasslands first appeared, the arboreal adaptation of the primates ill served their continued survival. They left the trees and began to foray onto the grasslands. Their arboreally evolved repertoire of troop signals came under pressure to further expand. It has been suggested that it was the generation of hunting-pack signaling such as occurs in wolves and dogs that served as the basis for language. But another result of moving out of the trees and onto the grasslands was the likelihood of encountering the manure of ungulate herbivores, and in the same situation coprophilic (dung-loving) mushrooms. Several species of psilocybin-containing mushrooms are coprophilic; *Amanita muscaria*, which has a symbiotic relationship to birch and fir trees, is not.

The far fewer number of plant species that characterizes grasslands in contrast with forests makes it highly likely that any grassland plant encountered would be tested for its food potential. The eminent geographer Carl Sauer feels that there is no such thing as a natural grassland. He suggests that all grasslands are human artifacts resulting from burning. He bases this argument on the fact that all grassland species can be found present in the understory of the forests at the edge of the grasslands, but a very high percentage of the forest species are absent in the grasslands. From this he argues that the grasslands are so recent that they must be seen as concomitant with the rise of large human populations.

The next step in the cultural evolution of the bipedal pack-hunting primates was the domestication of some of the browsing herbivores. With the animals and their manure came the mushrooms, and the human-mushroom relationship was further enhanced and deepened. Evidence for these speculations can be found in southern Algeria. There is an area called the Tassili Plateau, a curious geological formation. It is like a labyrinth, a vast badlands of stone escarpments that have been cut by the wind into many perpendicular narrow corridors, almost like an abandoned city. And in the Tassili there are rock paintings that date from the late Neolithic to as recently as 2,000 years ago. Here are the earliest known depictions of shamans in coincidence with large numbers of grazing animals, specifically cattle. The shamans, dancing and holding fistfuls of mushrooms, also have mushrooms sprouting out of their bodies. Similar images occur in pre-Columbian Peruvian textiles wherein the shaman is shown holding an object that has been identified as either a chopper or a mushroom. Chopping tools have been found that resemble the depicted object. Unlike the Peruvian images, with the Tassili frescoes the case is clear. Here we see dancing shamans with six, eight, ten mushrooms clutched in their hands and sprouting from their bodies.

The herding peoples who produced the Tassili paintings moved out of Africa over a long period of time, perhaps from 20,000-5,000 years ago. Wherever they went, their pastoral lifestyle went with them. The Red Sea was landlocked at that time. The boot of Arabia was backed up against the African continent. The land bridge there was utilized by some of these African pastoralists to enter the Fertile Crescent and later Asia Minor, where they intermingled with populations already present and became well established by 12,000 years ago.

These pastoral people had a cult of cattle and a cult of the Great Goddess. The evidence for this comes from a number of sites in southern Anatolia, the best researched being Çatalhöyük, a site dated to 8,000-9,000 B.P. Çatalhöyük has only begun to be excavated and contains amazing shrines with cattle bas-reliefs and heads of the cattle covered with other designs — the very complex paintings of a very complicated civilization.

It is possible to see in the confluence of the cult of the Great Goddess and the cattle cult a recognition and an awareness of the mushroom as the third and chthonic member of a kind of late Neolithic trinity. For the mushroom, seen to be as much a product of the cattle as milk, meat and manure, was the pipeline to the presence of the Goddess. Recently Riane Eisler in her important revisioning of history, *The Chalice and the Blade*, has advanced the important notion of “partnership” models of society being in competition and oppressed by “dominator” forms of social organization. These latter are hierarchical, paternalistic, materialistic and male-dominated. Her position is that it is the tension between these two forms of social organization and the overexpression of the dominator model that is responsible for our alienation. I am in complete agreement with Eisler’s view. In fact, this essay asks a question that is an extension of her argument. What was the factor that maintained the equilibrium of the partnership societies of the late Neolithic, and what factor faded and in fading set the stage for the emergence of the evolutionarily maladaptive dominator model?

I believe that it is the depth of the relationship of a human group to the gnosis of the vegetable mind, the Gaian collectivity of organic life, that determines the strength of the group’s connection to the archetype of the Goddess and hence to the partnership style of social organization. The last time that the mainstream of Western thought was refreshed by the gnosis of the vegetable mind was at the close of the Hellenistic Era, when the Eleusinian Mysteries were finally suppressed by enthusiastic Christian barbarians. The late medieval Church that conducted the great witch burnings was very concerned that all credit for episodes of magic and derangement should be given to the devil — hence, the church suppressed knowledge of plants such as datura, deadly nightshade and monkshood and the role that they were playing in the nocturnal gatherings and activities of the practitioners of the craft. After all, we cannot have a devil who is such a diminished figure that he must rely on mere herbs to work his wiles. The devil must be a worthy foe of the Christos, and hence nearly coequal.

My conclusion is that taking the next evolutionary step, the Archaic Revival, the rebirth of the Goddess and the ending of profane history are agendas that implicitly contain within themselves the notion of our reinvolvement with and the emergence of the vegetable mind. That same mind that coaxed us into self-reflecting language now offers us the boundless landscapes of the imagination. Without such a relationship to psychedelic exopheromones regulating our symbiotic relationship with the plant kingdom, we stand outside of an understanding of planetary purpose; and understanding of planetary purpose may be the major contribution that we can make to the evolutionary process. Returning to the bosom of the planetary partnership means trading the point of view of the ego for the intuitional translinguistic understanding of the maternal matrix.

The people of Çatalhöyük and other Mesopotamian peoples existed undisturbed in the ancient Middle East for a long time, practicing their Mother Goddess religion. Then, around 5,000-7,000 B.P., a different kind of people with wheeled chariots, patriarchy and a ritual involving horse sacrifice swept down from north of the Caspian Sea into Turkey and Anatolia, and what is now Iraq and Iran, encountering the pastoral, mushroom-using lowlanders. These invaders are the people that Wasson has suggested were the bearers of *soma*. He felt that *soma*, the intoxicating plant of the Vedic hymns, may have been the mushroom *Amanita muscaria*. A mushroom mystery cult was carried out of the forests of Central Asia by Aryan people who eventually settled in India.

The problem with this hypothesis is that *A. muscaria* is not a reliable visionary hallucinogen. It has proven difficult to obtain a consistently ecstatic intoxication from *Amanita muscaria*. Much ink has been shed over this problem. Some have suggested that *A. muscaria* must be pounded with milk curd in order to decarboxylate muscarine, the active toxin, into muscimol, the hallucinogenic constituent. Others have suggested that the *Amanita* must be dried or roasted and aged before it is rendered nontoxic and effective. The fact of the matter is that muscimol is not a deep hallucinogen even when used as a pure compound. Wasson was on the right track, correctly recognizing the potential of *Amanita muscaria* to induce religious feeling and ecstasy, but he did not take into account the imagination and linguistic stimulation imparted by the input of African psilocybin-containing mushrooms into the evolution of Old World mycolatry.

We know that at least one psilocybin mushroom, *Psilocybe cubensis* or *Stropharia cubensis*, is circumtropical in its distribution, occurring throughout the warm, wet tropics wherever cattle of the *Bos indicus* type are present. This raises a number of questions. Is *P. cubensis* exclusively a creature of the manure of *Bos indicus*, or can it occur in the manure of other cattle? How recently has it reached its various habitats? The first specimen of *Psilocybe cubensis* was collected by Earle in Cuba in 1906, yet current botanical theory places the actual point of origin for the species in Kampuchea. An archaeological dig in Thailand at a place called Non Nok Tha has been dated to 15,000 B.P., and there the bones of *Bos indicus* have been found coincident with human graves. Some of the bones have burnt-out centers, indicating that they had been used as chillums to burn and presumably smoke vegetable material. Chillums of the Non Nok Tha type are used even today among yoga sadhus throughout India. *Psilocybe cubensis* is common in the Non Nok Tha area today.

At what point, then, did *P. cubensis* enter the New World? In southern Mexico, coincident with the Mayan cultural area, natives use a number of psilocybin-containing mushrooms: *Psilocybe mexicana*, *P. aztecorum*, *P. mazatapec* and others. These mushrooms constitute the Mexican mushroom complex discovered by Valentina and Gordon Wasson in the early '50s. *Psilocybe cubensis* also occurs in these areas, being especially prolific at Palenque. Palenque is the site of the ruins of one of the most exquisite cities of the Mayan climax. Many people have taken the mushrooms at Palenque and have had the impression that they were ingesting the sacred sacrament of the people who built this fabulous aban-

doned 7th century Mayan city, but this notion is disputed by modern botanists. We cannot be certain that *P. cubensis* was the mushroom sacrament of the Maya. Most orthodox botanists argue that *P. cubensis* entered the New World with the Conquest, transported by the Spanish and their cattle. In the absence of a decipherment of the Mayan glyphs, it is not easy to imagine how such a matter could be proved or disproved. In my opinion, given the long viability of the spores and the generally prevailing winds at the equator, the circumtropical distribution of *P. cubensis* is probably a very old fact of the ecology of the planet.

What seems reasonable to suggest is that the Indo-European people coming out of Central Asia contacted valley-dwelling, pastoral, partnership cultures and assimilated from them the cult of the coprophilic psilocybin-containing mushroom, carrying it eastward into India. The evidence is thin, but on the other hand, the evidence has not been sought. After all, the current desert climate of the region encompassing Iraq, Iran, southern Turkey, Jordan and Saudi Arabia makes this a very unlikely place to look for archaeological evidence of a mushroom cult. However, Robert Graves' *Food for Centaurs* discusses how a taboo usually indicates an earlier historical involvement with the forbidden item in the inventory of the culture; and mushrooms, which are hardly to be found in the contemporary environment where these religions are practiced, are very taboo in the substratum of primitive Zoroastrianism, Mandaeanism and the undifferentiated cult religions that preceded them. Mandaeanism specifically forbids the eating of mushrooms, according to Wasson.

In *The Sacred Mushroom and the Cross*, John Allegro, concentrating on post-Exilic Judaism in Palestine, makes a controversial case that can be judged only by Sumerian philologists. He posits that there are mushroom words, phrases and symbols that can be traced through Akkadian into Old Akkadian, back into Sumerian, and that mushrooms were used very early in this area. My own approach has been to work forward from the Vedas. The Vedas are hymns that the Indo-European people composed somewhere along their millennia-long peregrinations to India. The Ninth Mandala of the *Rigveda* especially goes into great detail about *soma* and states that *soma* stands above the gods. *Soma* is the supreme entity. *Soma* is the moon; *soma* is masculine. Here we have a rare phenomenon: a male lunar deity. The connection between the feminine and the moon is so deep and obvious that a lunar male deity stands out, making its traditional history in the region easy to trace.

I reexamined the mythologies of the Near East, trying to find a lunar god that would prove that this idea had been imported to India from the West. I found that the Sumerian civilization's northernmost outpost was a city called Harran, a city traditionally associated with the beginning of astrology. Invented in Harran, astrology spread to China, later to Egypt and throughout the ancient world. The patron deity of the city of Harran was a moon god, Sin or Nanna. Sin was male and wears a cap that looks like a mushroom. No other deity in that pantheon has this headgear. I found three examples of Sin or Nanna on cylinder seals, and in each case the headgear was prominent. In one instance the accompanying text by a 19th century scholar mentions that this headgear

was in fact the identifier for the god.

Why was the Aryan deity connected with the mushroom perceived as male? Though this is a problem for folklorists and mythologists, certain points are obvious. German folklore has always associated the moon with the masculine, and the mushroom will take the projection of masculinity or femininity with equal ease. It is obviously connected to the moon: it has a lustrous, silvery appearance in certain forms and it seems to appear at night when the moon rules the heavens. On the other hand, one can shift the point of view and suddenly see the mushroom as masculine: it is solar in color, phallic in appearance and imparts a great energy. The mushroom is actually an androgynous shape-shifting deity that can take various forms relative to the predisposition of the culture encountering it. One can almost say that it is a mirror of cultural expectations. That is why for the Indo-Europeans it took on a masculine quality and why in other situations it seems to have a very lunar quality. Either way, it is a hallucinogen that is not wild, that is associated with the domestication of animals and with human culture. This association with domesticated animals implicates the mushrooms in the cultural development of the Indo-Europeans, the people who wrote the Vedas.

These same Indo-Europeans were the authors of a breakthrough in religious ontology. For them there were no sacred rivers, no sacred trees, no holy mountains. They transcended geography in their notion of deity. They built a fire, and where the fire was kindled the center of the universe came to rest. They had discovered the transcendence of time and space. A sacramental plant hallucinogen that is linked to the dung of domesticated animals means that the sacrament is as nomadic as the people and animals that provide its favored milieu.

There are a number of problems with this theory, one of which is the lack of confirmation in India of the presence of *Psilocybe cubensis* or other psilocybin-containing mushrooms. *Amanita muscaria* is also rare in India. I predict, however, that a careful search of the flora of India will reveal *P. cubensis* as an indigenous component of the biome of the subcontinent; and I maintain that the desertification of the entire area from North Africa to the Thar region around Delhi has distorted our conception of what occurred in the prehistoric evolution of religious ontology when these civilizations were in their infancy and the area was much wetter. It is my suggestion that the mushroom religion is actually the generic religion of human beings and that all later adumbrations of religion stem from the cult of ritual ingestion of mushrooms to induce ecstasy.

A rethinking of the role that hallucinogenic plants and fungi have played in the promotion of human emergence from the substrata of primate organization can help to lay the basis for a new appreciation of the unique confluence of factors responsible and necessary for the evolution of human beings. The widely felt intuition of the presence of the Other as a female companion to the human navigation of history can, I believe, be traced back to the immersion in the vegetable mind that provided the ritual context in which human consciousness emerged into the light of self-awareness, self-reflection and self-articulation: the light of the Great Goddess.