

THE MUSHROOM AND THE WATER LILY: LITERARY AND PICTORIAL EVIDENCE FOR *NYMPHAEA* AS A RITUAL PSYCHOTOGEN IN MESOAMERICA

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(Received November 13, 1980; accepted January 5, 1981)

Summary

In reconstructing early uses of psychotogens in Mesoamerica, mushrooms have occupied the attention of botanists and anthropologists almost to the exclusion of other plant motifs. Not all of the images and literary fragments extant lend themselves to mycological interpretation. Some authors have interpreted the peltate leaves and flower buds of the psychotogen *Nymphaea ampla* as being green mushrooms and/or stalked sea shells. The context of presentation, information on the water lily in Maya antiquity, and recent information on the chemistry of this white water lily suggest that we must reassess the role of *Nymphaea ampla*. In a reevaluation of these ancient literary and iconographic sources, it would seem that both mushrooms and water lilies emerge as important ritual psychotogens. While the contextual use of mushrooms is well known, the water lily has been largely ignored. This presentation provides some perspective on both of these important New World narcotics.

The antiquity of mushroom use in Mesoamerica is lost to us, but we are able to date mushroom veneration to at least 100 B.C. based upon the discovery of nine miniature mushroom stones in a late pre-Classic to early-Classic sites near Guatemala City. Progressive finds have been made from Vera Cruz in the north to El Salvador and Honduras in the south. The nature of these mushroom stones and the distribution of mushroom cults were documented by Mayer (1977) who gave dimensions of stones and associated figures. He recorded over 290 such effigies.

Several concepts regarding mushroom stones have been advanced. The 19th century idea that these were the products of cults of phallic worship have been discarded. Rose (1977) has suggested that they may have been used to form rubber balls used in the sacred ball games of the ancient Maya. While this idea may have some validity, it does not explain the miniature stones, and those that have associated metates for grinding. Furst (1976) discovered entries in Quiche and Cakchiquel dictionaries dating from *circa*

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1550 and 1690 B.C., respectively. These indicate an association between the mushroom and the underworld, and the mushroom and the loss of one's judgement. Mayer (1977) indicates that the dictionary of Fray Thomas Coto of *circa* 1690 makes specific mention of mushrooms that inebriate. Ethnomycologists no longer doubt the importance of the mushrooms that inebriate to the functions of priestly castes in ancient Mesoamerica. The tradition as it has evolved to the present day has been documented by Wasson (1974) in a word by word transcription of the *Velada* of Maria Sabina as well as through musical documentation.

Initial field data on hallucinogenic fungi came from Weitlaner's accounts of his witnessing holy rites involving sacred mushrooms, *teonanactl*, and the studies in 1938 and 1939 by Schultes (1940) in the area of Oaxaca. It was the collections of Schultes that provided positive identification of several species of *Psilocybe* and *Paneolus* that were hallucinogenic. These early studies spurred R. Gordon Wasson on to work with his wife and colleague Valentina on the context of mushroom use in this area among the Mazatecs and others. Collaboration between the French mycologist Roger Heim and Wasson (1958) provided a volume of great importance in advancing ideas in the area of ethnomycology. The primary corpus of their work was extended by Heim *et al.* in 1967. Since both of these volumes appeared in French, much of the information of these investigators was relegated to small bodies of scholars. With the publication in 1980 of Wasson's book, *The Wondrous Mushroom*, we have a fine synopsis of the mushrooms that are used in a ritual context in Mexico and Mesoamerica.

The field of ethnomycology has been greatly enhanced by Wasson's recent publication. Despite the erudition of Wasson's meticulous scholarship, there are elements in this book that disturb the ethnobotanist. These are the same elements that appeared in the earlier collaborations with Heim. Specifically, the assertion that the motifs associated with water are green basidiomycetes. Further, the interpretation of Nahuatl verses in a mycological context seems inappropriate. It is the purpose of this paper to indicate that these motifs and verses are better suited to the white water lily, *Nymphaea ampla*, and that this plant has psychotropic qualities that would suit the ritual nature of the iconography and poetic depictions.

In recent years we have seen the appearance of several papers suggesting that certain water lilies (*Nymphaea*) have served as hallucinogens in Maya civilizations and are still in use in some areas of Chiapas (Dobkin de Rios, 1974; Diaz, 1977; Emboden, 1979b and 1981). The concept that water lilies might be used as ritual psychotogens was extended to ancient Egyptian civilizations (Emboden, 1979a).

The collective evidence on water lilies in the old world and the new world suggest a contextual use as a ritual psychotogen. This evidence has been distilled from Maya and post-Maya ceramics, codices, stone reliefs and frescos. The ancient Egyptians left similar information in tomb sculpture, ceramics, frescos and papyri (Emboden, 1979a).

It is the assertion of Wasson (1980) that many of the pictorial images found in an aquatic context in ancient cultures of Mexico are mushrooms that induce hallucinations, or in Wasson's usage (*fide* Ruck) these are entheogens. The aqueous environments in which these are found bespeak the sacred nature of water and purification. The color green that these alleged basidiomycetes exhibit is indicative of holiness.

I would propose an alternative hypothesis. In so doing, my reasoning must be based upon interpretation rather than sound scientific evidence. I would not wish to detract from the presentation of Wasson, but botanical reasoning and familiarity with the imagery presented compels me to suggest a more plausible explanation of green, aqueous basidiomycetes. I shall review some of the same texts, images, and verses that have been dealt with by Wasson, and I shall add evidence from additional sources.

I cannot subscribe to the notion that those who take exception to a mycological interpretation of green, aquatic mushrooms are all "mycophobes". We are all searching for the most accurate and consistent presentation of data that are derived from sources that are often oblique, elliptical and highly stylized. This study should be regarded as a search for clarity and understanding, and not a challenge to the fine scholarship of R. Gordon Wasson, a man for whom I have great admiration.

In dealing with flowers in Nahuatl poetry, the subject of chapter 4 in Wasson (1980), Father Garibay's *Poesia Nahuatl* (1968) is cited with considerable frequency. In the Garibay translations there is frequent mention of flowers in the context of inebriation. Although Garibay denies any hallucinogenic (entheogenic) elements as being apparent in these texts, we must support Wasson in his stance that the poetry is flat and stale without "bone and sinew, the blood and muscle of their (Nahua nobles) poetry". What, may be argued, is the genus and species of "flores" referred to in these texts. Perhaps we go too far if we accept Wasson's assertion that "flores is the trope for the entheogens". This would seem to force much of the poetry into a sort of procrustean bed. In some instances it would seem that the flowers are possessed of beauty and fragrance and little more; however, in other verses the poet is explicit in speaking of their inebriating qualities. For example, "*De dónde las flores que embriagan?*" (I, p. 77). "From whence come the flowers that inebriate?" This is addressed to the *sacerdotes* or priests, those who would be the keepers of such mysteries. Likewise, "*He llegado a su presencia y hago estremecer... mis flores embriagadores.*" (II, pp. 34 - 35). "Having arrived in your presence, I wave my inebriating flowers." Also, "*Deleitaos con las embriagadores flores que están en nuestras manos.*" (I, p. 50). "Delight in the inebriating flowers that we hold in our hands." We further learn that the propiants encircle their throats with garlands of these flowers, recalling ancient Egyptian practices employing water lilies in a similar fashion.

Wasson, in reviewing the above in a fuller context involving his own thoughts regarding these verses, deduces that the flowers are "the inebriating mushrooms or morning-glory seeds". I would suggest that at this point no evidence has yet been adduced as to the specific nature of the flowers, but to state that "flowers" is a metaphor, and that "inebriating" is not a metaphor is taking liberties that go beyond poetic license. Likewise, Garibay's verses include the mention of *hongos* or mushrooms, and had these been intended, the texts would have so stated. The only argument to this can be that the poet was concealing the essential nature of *flores*.

On page 86, Wasson revises Garibay's translation of "*Brotaron las flores, Abren sus corolas ante él que da vida.*" (II, p. 113). "Flowers spring forth opening their corollas before the lifegiver." The revision of Wasson interpolates after the word forth, "like chicks from the egg". Although there are no corresponding words in Garibay's translation, a new sense has been imposed. This would seem unnecessary were it not to convey a mycological meaning. The emergence of a mushroom from its egg-like origins would lend support to the thesis that *flores* is really a surrogate for *hongos* and, more specifically, entheogenic mushrooms. The argument rests on the Nahuatl verb *cueponi* which Molina (1571) translates as "bursting forth, (1) as a chick from its shell, (2) as a chestnut having been roasted, and (3) as a flower emerging from its bud". Since Molina chose the egg metaphor as his first analogy, Wasson has seized upon this over the opening of a flower. However, the poem goes on to speak of the flowers as "rich fragrant flowers ... bedecked with flowery butterflies" (II, p. 113). This does not suit a mushroom, and the egg and chick interpolation is certainly out of place. One might as easily have used the chestnut example of Molina. The texts require neither of these alternatives. Since it is *flores* that the texts refer to, the logical bursting forth would be that of a flower opening. Many flowers open so rapidly that the patient individual is able to watch this progression. Some flowers literally burst forth as the result of opening until the points of the calyx tips separate. *Nymphaea* species generally open very quickly and close just as rapidly.

In *Poesia Nahuatl* (I, p. 49) "*Se va pintando tu corazón con flores polichromas; pintas tú*" is rendered as "Thy heart is being painted with polychrome flowers; thou paintest ..." etc. This recalls the many Maya polychrome vases that have survived with frequent depiction of water lilies. Although these were for the most part Maya vessels of the Classical and pre-Classical periods, they are manifest in the imagery of these pre-Conquest poems. The frequency of the water lily motif far exceeds any imagery that might be interpreted as mushrooms.

In a monologue of Nezahualcóyotl it is stated, "*Hay cantos floridos: que se diga yo bebo flores que embriagan, ya llegaron las flores que causan vértigo, ven y serás glorificado.*" (III, p. 11). "There are songs in flower: let it be said I drink the flowers that inebriate, already came flowers causing vertigo. Come, and you will be in glory." Wasson interpolates *poyma* after *flores* in the text and amplifies his choice by stating that the Nahuatl

poyomatli was intended to designate *Quararibea funebris*, a tree having fragrant flowers that were mixed with chocolate (*Theobroma cacao*) when it was made into a beverage. The problems with such an interpretation are to be found in Garibay's *History of Nahuatl Literature* (1953; I, p. 181) where we encounter "... *aquellas flores, anelhuayo y raíz no conocen*", translated as "... those flowers prosper, and roots they have not". This same statement is reiterated in *Poesia Nahuatl*: "*hay flores perfectas, hay flores sin raíces*" (I, p. 29): "there are perfect flowers, there are flowers without roots". Again in the poems we encounter, "*flores anelhuayo desarraigadas*". A further clarification of the nature of these "flowers without roots" is found in the same set of verses on the same page: "*aquí se yergue la Flor Blanca*" (III, p. 39). This is translated as "here stands high the White Flower". Wasson sees these as "fungal growths" as fungi have no roots.

For another interpretation, one might look to *Nymphaea ampla* of that region. It is a flower that is white and fragrant and whose flower buds are able to intoxicate due to their nupharidine content as well as possible apomorphine based upon the aporphine-like compounds isolated by Diaz (1977). An earlier verse (also III, p. 39) indicates that these flowers come from "the region afar where the water gushes forth". This suggests that they are aquatic. With the light of day the white flower bursts forth from its green calyx just as in the verses of the poem. The flower bud is ovoid. If one pulls the flowers from the still waters they have no roots. If they are dug they have a rhizome. This tuberous structure has few roots, but is conspicuous by its form. Why not a water lily instead of mushrooms?

Wasson (1974) records Maria Sabina chanting the following during her mushroom *Velada*: "Woman (of a) root below the water am I, Father Jesus Christ, tender root woman am I." (p. 61, lines 19 - 21). Wasson suggests this to be an important area of inquiry for the botanist. Since Diaz (1975) records the use of *Nymphaea ampla* in Chiapas where the rhizome is ingested, and since aquatic plants of medicinal value are few, we might suppose Maria Sabina invokes the water lily.

If a mushroom were intended in the previous verses, why was *hongos* used by Garibay (II, p. 55): "*He bebido vino de hongos y llora mi corazón*." The Nahuatl for mushroom in the original was *nanacaoctli*, the suffix *-octli* referring to any inebriating liquor. This is not the *xochitl* or flowers of earlier citations. We need not exclude mushrooms from all of these texts, but neither should we find them where they are not. Since the text specifies a white flower, why should we implicate the tree *Quararibea funebris* (Bombacaceae) whose cup-like flowers are yellow or "dazzling yellow" in the words of Wasson (1980, p. 101).

It is not necessary to select either a mushroom or a water lily in all of these various pre-Conquest verses, frescos, and codices. An example of this is to be found in the famed *Codex Vindobonensis* painted in a Mixtec scriptorium. In a future paper on this volume, I will point out the many instances in which the water lily is found in conjunction with the gods and with water and honey. It is my assertion (Emboden, 1979a, b) that the water lily (*Nymphaea*

ampla) played a major role in Maya civilization and was used in this and derivative cultures as a primary hallucinogen. Water, honey and the ubiquitous yeast formed a foaming beverage to which *Lonchocarpus yucatanensis* and *Nymphaea ampla* were added (Emboden, 1979 a, b). This same white water lily may be found on the page of the Codex (p. 24) on which Caso (1963) found "entheogenic mushrooms".

On page 24 of this codex, Quetzalcóatl is seen carrying a woman who is "the spirit of the mushrooms" as evidenced by the mushrooms in her hair. Subsequently he faces Piltzintecuhtli, or "Most Noble Prince", who holds a pair of mushrooms. Between the two is a flower supported on a peduncle of seven spheres. Piltzintecuhtli is an alter ego of Xochipilli, the Sun God and Prince of Flowers. In the subsequent scene seven gods and goddesses hold mushrooms aloft. Between the fifth and sixth personages we see the same spheres mentioned earlier, but five in number, surmounted by a flower bud that is elongate, or in the terminology of Rands (1953), "mammiform". It is noted by Wasson that this fifth figure in a series of deities holds but one mushroom. Is it the *Nymphaea* but that completes the iconography?

Wasson's commentary on this page stops with his description of that which he interprets as a "mushroom *velada*". I would not take issue with any of this interpretation, but I would like to extend it by finishing a description of that same page. Below figure seven is the *Nymphaea* bud on a knotted peduncle. Rands (1953), in his extensive examination of water lily motifs and their frequency in Maya territory, noted that the knotted peduncle was always associated with an especially significant religious rite. I would suggest that this same contextual use applies here. Just below this is the water lily bud and the five knotted spheres, and to the left is a lake and a diver. Below the aforementioned knotted water lily and bud with spheres is the same motif repeated, and to the left there is a confrontation of two deities. They are able to walk on the surface of the water. The figure to the right holds upright three water lily buds as a sort of emblem of power, much as in ancient Egypt (Emboden, 1979a). Underneath the water there is a knotted water lily with a green peduncle and white flower. Although Wasson does not reproduce this page in color, I have referred to a facsimile edition in color for this verification. On this page mushrooms are united with the water lilies in a divine context just as they are found in a divinatory context among the Maya.

An interpretation of the murals of Teotihuacán occupies Wasson's attention in chapter 8 of his book. The labyrinthine buildings are, in Wasson's thesis, cenacula where small groups of pilgrims might undergo ritual activity. While Wasson suggests mushrooms, morning-glory seed, *cacao* and *poyomatli* flowers as elements of the divine office, there is no mention of the water lily. I presented these murals and discussed my interpretation with Wasson in the Spring of 1979 and yet no mention is made of my interpretations. Yet, Miller (1973) is castigated for not mentioning the publications of Wasson and Heim. For this neglect he is (Wasson's words) "certainly not at home in botanical iconography nor the entheogens". Wasson asserts further that if

Miller had read and remembered an article that he wrote in 1957 "his text would have been utterly different". My rather lengthy 1979 discourse with Wasson is relegated on page 158 of his text to "Some have suggested that it [referring to the green mushrooms in his interpretation] might be the leaf of a water lily." After a few terse sentences that do not meet the arguments presented to him, this hypothesis is dismissed as "mycophobia". I would have expected a citation of the person who had made the identification of water lilies in the murals of Teotihuacán. In my defense, I must state that I do not harbor mycophobia; to the contrary, I have eaten numerous genera and species of mushrooms of both the old world and the new world. Yes, I have enjoyed the entheogenic experience of *Psilocybe cubensis* (formerly *Stropharia cubensis*). I will then present my interpretation of these murals as they were set forth to Wasson in 1979.

On a wall of a structure called Teopancaxco there is a mural that is reproduced as Fig. 2 on page 157 of Wasson's 1980 book. It must be remembered that most of the border of this mural had disappeared at the time of its discovery and a copy of an authentic fragment is reproduced as Fig. 1 on page 156 of Wasson's treatment. Accepting both figures as accurate representations, I find alternating peltate leaves of *Nymphaea ampla* and the flowers and flower buds of this aquatic, fresh water plant. The figures that Wasson sees as green (for holiness) mushrooms, I see as the peltate leaf of *Nymphaea* with its serrate margin. The third and the fifth glyphs of the original border (Fig. 1 in Wasson) are interpreted by Wasson as bivalves or snails, the former being the prevailing opinion according to the author. It is very easy to see that the entire scene is aquatic. Snails and bivalves are not found on a stipe — in this border *all* elements are stalked. If one views these as *Nymphaea* flowers subtended by a tripartite calyx, there is no problem of interpretation. Each flower alternates with a peltate leaf in which the petiole attaches to the center of the leaf in an umbrella-like fashion. Traces of green paint remain on the original leaves of the border.

Wasson suggests that if these peltate images were water lily leaves they would exhibit "a deep cleft where the stem (petiole) leads off". In nature, I respond, the leaf does not exhibit this in so pronounced a fashion as to attract attention to this particular feature. On dried herbarium specimens this aspect of the leaf becomes exaggerated. I would ask why these should be identified as fungi when the presumed "gills" do not emanate from the stipe (petiole) but are mere abbreviated marginal slashes and are not present at all on the sixth image reading Fig. 1 from the top to the base. How is one to explain the calyx of the third and the fifth images? As in the stylized presentations in ancient Egypt, they are tripartite. What basidiomycete is green and aquatic? As a metaphor green is for holiness and is sanctified by its association with water, according to the Wasson interpretation.

It is puzzling to encounter the statement that those who suggest a water lily (Emboden, obviously) "do not suggest a species and are idly guessing". This is misleading, for it was *Nymphaea ampla* that I suggested to Wasson on April 6, 1979, in Nash Hall of the Botanical Museum of Harvard University. I

also showed slides of this plant. It is even more curious then why he should present, in Fig. 3 of his text, *Nymphaea tuberosa*, a water lily that was not mentioned and which does not have the characteristic serrate margin and has not been linked to ritual use.

It should be mentioned that the repetition of the *Nymphaea* leaf and flower, or its bud, was common in Maya presentations and was well documented by Rands (1953). It is this same alternating series that is seen in the *Codex Bourbonicus* (Hamy, 1899) in the figure of Tlaloc, the god of rain, rivers, lakes, etc., reproduced in the Wasson tome as Fig. 4. However, in this presentation of some one thousand years later, the alternating images are at the tips of tributaries or waves and are so stylized that they could be identified only by conjecture. We should deal with primary sources that are revealing rather than secondary motifs that have lost any true identity. The deterioration of symbols is easily seen if one compares the Teopancaxco mural (Wasson's Fig. 2) with the devolved version in the *Codex Bourbonicus* (Wasson's Fig. 5). I cannot see the transition of the latter to Fig. 6 in which an image from the post-Conquest *Atlas* of Diego Duran shows a lake with margins on which there are nine small concentric circles. These appear on many aqueous motifs in the surviving codices as foam on water. Must we force our imaginations to extend these to mushrooms?

Turning our attention to another area of Teotihuacán, all may judge the magnificent mural of the complex of Tepantitla restored by Augustin Caletti on exhibition in the National Museum of Archeology in Mexico City. I, like so many others, have had the great pleasure of studying this restoration repainted by the skilled muralist Villagra. Fortunately, Villagra carried out his restoration almost twenty years before any discussion of entheogenic elements in the mural was initiated.

In the upper part of the primary mural of Tepantitla there is a massive deity that Kubler (1967) has taken to be a female divinity. Above her head is a giant flowering tree. To the right and to the left of this deity are hierophants from whose hands water pours into the great lake upon which the scene is resting. Along the margins of the pouring water we again encounter what Wasson identifies as "alternating shells and mushrooms", and which I take to be water lily leaves and buds. Note again (Wasson's Fig. 10) that the leaves are green and the margins are serrate. There are no gills extending to the pileus as is true of basidiomycetes. These aquatic elements are all stalked.

In the lower register of the aforementioned mural is a depiction of "Playing Fields of Paradise" (Caso, 1942, pp. 127 - 136). While the reproduction in Wasson (1980) is not as fine as that reproduced in Heim and Wasson (1958) we can see a sacred lake in the lower right in which a giant frog or toad is surrounded by "shell and mushroom", according to Wasson. I would point out that there are no indications of gills, only the conspicuously serrate margins. Of the three sets of water lily leaf and flower bud pairs, I would call attention to that in the lower right near the toad or frog's anal area. The leaf has a very decided cleft. That same cleft was stressed earlier as negative evidence by Wasson. He does not call his reader's attention to this

portrayal. I would agree when he states that this is "the real world of the entheogenic vision". But, I would suggest that it is the narcotic water lily that engenders the visionary experience.

Details in Wasson's Fig. 13 and 14 further establish the green water lily leaf with its serrate margin emerging from the mouth of a jaguar. I would refer the reader to Thompson (1972) for a discussion of the relationship between the jaguar and the water lily in *Commentary on the Dresden Codex*. An even greater amplification of this is to be found in Coe (1973) *The Maya Scribe and His World*. There is so intimate and regular a connection between the water lily and the jaguar that Coe uses the term "Water lily Jaguar" to identify that deity. While Tepantitla is not Maya, the same associations are to be found. As for the detail in Fig. 14 of Wasson, we see amphibians that are imperfectly developed (metamorphic) swimming with water lily leaves and buds (mushrooms and shells?) in their mouths. Interestingly, there is at the base (center of Fig. 14) a leaf and two buds with feathers emerging from the leaf. In Maya portrayals, it is common to find the flower with quetzal bird feathers stuck inside the corolla. This is regularly seen when a figure of great power wears the flower on his brow (Emboden, 1981).

In a structural complex known as Zacuala there is to be found a mural of the sacred lake in which there is a "radiant mouth". This motif is what Hasso von Winning (1949) has called the "vagina dentata" motif. From the four corners of the sacred lake there emerge four peltate, serrate, green water lily leaves that are called by Wasson "unmistakable greenish mushrooms". Figure 21 of Wasson, which is a painting by Mendoza of a reconstructed bowl from Zacuala, shows the same repetitive motif that has been argued throughout this paper. It is a frequent Maya theme (Thompson, 1966, p. 61).

From my own experiences, I have found that mushrooms with entheogenic properties are superior to any water lily species in provoking the sensation of ecstasis, literally liberating the soul from the body. I do not doubt for one moment that Wasson's research on hallucinogenic fungi is collectively some of the most important ethnobotanical research produced in this century. Much of his recent book is translated from his earlier work with the late Roger Heim and appeared only in French in editions from the Natural History Museum of Paris. There are, however, many new revelations given to us in *The Wondrous Mushroom*. I have initiated this paper on the basis of my personal conviction that, in the instances that I have cited, identifications made by Wasson are not correct. Both Wasson and I are making interpretive assertions, and only readers familiar with hallucinogenic fungi and water lilies will be able to make a decision as to which arguments are most compelling. Only through hypotheses and challenges to these are we going to have an accurate view of the essential activities of the ancient peoples of Mesoamerica.

It is my belief that we do not have to decide whether to accept a fungus or a water lily. Both figure prominently in the literature and iconography of priestly castes in the pre-Conquest period of Mesoamerica.

References

- Caso, A., *El Pariso Terrenal et Teotihuacán*, Curanderos Americanos, Mexico, D. F., 1942.
- Coe, M., *The Maya Scribe and His World*, The Grolier Club, New York, 1973.
- Diaz, J. L., *Etnofarmacología de Plantas Alucinógenas Latinoamericanas [Curanderos Científicos CEMEF 4]*, Centro de Estudios en Farmodependencia, Mexico, D. F., 1975, pp. 174 - 178.
- Diaz, J. L., Ethnopharmacology of sacred psychoactive plants used by the Indians of Mexico. *Annual Review of Pharmacology and Toxicology*, 17 (1977) 647 - 675.
- Dobkin de Rios, M., The influence of psychotropic flora and fauna on Maya religion. *Current Anthropology*, 15 (1974) 147 - 164.
- Emboden, W. A., The sacred narcotic lily of the Nile: *Nymphaea caerulea* Sav. *Economic Botany*, 33 (1) (1979a).
- Emboden, W. A., *Nymphaea ampla* and other Maya narcotic plants. *Mexicon*, 1 (1979b) 50 - 52.
- Emboden, W. A., Transcultural use of water lilies in Maya and Egyptian civilizations. *Journal of Ethnopharmacology*, 3 (1981) 39 - 83.
- Furst, P. T., Fertility, vision quest and auto-sacrifice: Some thoughts on ritual blood-letting among the Maya. In Merle Green Robertson (ed.), *The Art, Iconography and Dynastic History of Palenque*, Part III, The Robert Louis Stevenson School, Pebble Beach, California, 1976, pp. 181 - 193.
- Garibay, K. A. M., *Historia de la Literatura Náhuatl*, 2 volumes, Porrúa, Mexico, 1953.
- Garibay, K. A. M., *Poesía Náhuatl*, 3 volumes, UNAM, Mexico, D.F., 1964, 1965, 1968.
- Hamy, E. T., *Codex Bourbonicus*, Manuscrit Mexicain de la Biblioteque du Palais-Bourbon, Fac. avec comm. par E. T. Hamy, Paris, 1899.
- Heim, R. and Wasson, R. G., *Les Champignons Hallucinogènes du Mexique*, Editions du Muséum National d'Histoire Naturelle, Paris, 1958.
- Heim, R., Cailleux, R., Wasson, R. G. and Thevénaud P., *Nouvelles Investigations sur les Champignons Hallucinogènes*, Editions du Museum National d'Histoire Naturelle, Paris, 1967.
- Kubler, G., *The Iconography of the Art of Teotihuacán [Studies in Pre-Columbian Art and Archeology, No. 4]*, Dumbarton Oaks, Washington, DC, 1967.
- Mayer, K. H., *The Mushroom Stones of Mesoamerica*, Acoma Books, Ramona, California, 1977.
- Miller, A. G., *The Mural Painting of Teotihuacán*, Dumbarton Oaks, Washington, DC, 1973.
- Molina, A., *Vocabulario en Lengua Castellana y Mexicana*, 1571.
- Rands, R. L., The water lily in Maya art: a complex of alleged Asiatic origin. *Anthropological Papers, Bureau of American Ethnology Bulletin*, 151 (1953) 75 - 153.
- Rose, R. M., Mushroom stones and the highland Maya ball game. *Ph.D. Thesis*, Harvard University, Cambridge, MA, 1977.
- Schultes, E. E., Teonanacatl, the narcotic mushroom of the Aztecs. *American Anthropology*, 42 (1940) 429 - 443.
- Thompson, J. E. S., *Commentary on the Dresden Codex*, The American Philosophical Society, Philadelphia, PA, 1972.
- Wasson, R. G., *Maria Sabina and Her Mushroom Velada*, Harcourt Brace Jovanovich, New York, 1974.
- Wasson, R. G., *The Wondrous Mushroom*, Harcourt Brace Jovanovich, New York, 1980.
- Winning, H. von, Shell designs on Teotihuacán pottery. *El Mexico Antiguo*, Vol. VII, Mexico, D.F., 1949.