

Symbolism and Psychopharmacology: the Toad as Earth Mother in Indian America

Peter T. Furst

State University of New York, Albany

In: K.J. Litrak & T.N. Castillo (Eds.), 1972, *Religión en Mesoamerica, XII Mesa Redonda, Sociedad Mexicana de Antropología*, México, pp. 37-46

By a fortunate coincidence, the topic of this paper bears a close relationship to, and complements, the excellent iconographic study of Tlaltecuhltli which we heard earlier in this same symposium from Professor Nicholson. Because, as we shall see, the concept of Tlaltecuhltli - that is, the earth or earth mother as a monstrous toad with feline characteristics who, among other attributes, was originator of useful plants - is by no means only an Aztec phenomenon, nor even a predominantly Mesoamerican one. Rather, the earth mother as toad in Mexica cosmology and ritual seems to belong to a much wider, and far older, aboriginal ideological stratum that extends at least to Amazonia and the central Andes.

In Mesoamerica we find the toad widely represented in art, often with feline or other non-naturalistic attributes, including above all jaguar claws and fangs. Particularly striking are the well-known yugos, or yokes, dating from the Preclassic and Early Classic; many of these represent a supernatural toad, and even some that are usually identified with the jaguar might as easily be toads with jaguar characteristics. A recent publication by Ignacio Bernal, with drawings by Andy Seuffert, includes a number of yokes with frontal representations of the monstrous toad in the collections of the Museo Nacional de Antropología (1970: Figs. 7-14). I would suggest these effigy yokes represent the earth mother in her toad form; hence these images can be regarded as early prototypes of Tlaltecuhltli, as she appears on the underside of so many monumental Mexica stone sculptures. In contemporary Mexico, as in Guatemala, toads play a role in myth, sorcery and shamanism, and in curing, a phenomenon which is only sketchily reported and urgently requires scholarly investigation. The symbolic meaning of the toad is much better known from South America. It is here that the toad as earth mother or guardian is still the focus of an important and widespread mythological and ritual complex. It would seem, then, that it is to the southern manifestations of Tlaltecuhltli that we should look for the sorts of ethnographic data that could help explain in her origins and perhaps illuminate to some degree her wider culture historical implications.

As we turn to South America we are at once confronted with a set of traditions whose genetic relationship to each other and to those of Mesoamerica can hardly be doubted. In northern South America the basic elements of the story are as follows:

Before the birth of the divine hero twins, their natural mother is killed by the Jaguar People. However, the unborn twins are saved by Toad Grandmother, who is Mistress of the

Earth, Owner of Fire, as well as Mother of the Jaguars, and who herself has feline characteristics and can change back and forth between jaguar and amphibian forms. The manner in which she preserves the [38] unborn twins differs somewhat from area to area - often it is the eggs with the children inside, or else the pregnant uterus, which she places close to her magical fire. Eventually the twins emerge and she rears them, teaching them to hunt, cure, etc. They, in turn, have vowed to avenge the death of their natural mother, and as the foster mother is also Mother of the Jaguars, they kill her and dismember and incinerate her body in a clearing in the forest. From the dismembered toad sprout first of all cassava, or bitter manioc, and other useful plants. Manioc, which in its natural state is poisonous, is identified with the milky secretion flowing from the venomous glands in the toad's skin. Apart from these details the parallel between the dismemberment of Toad Grandmother by the divine twins and that of Tlaltecuhтли by Texcatlipoca and Quetzalcoatl is unmistakable.

It is important to note that these South American traditions are not restricted to one area or one language group or related languages. On the contrary, they transcend linguistic, cultural and geographical boundaries. Basically similar versions of the tradition are shared among a wide variety of peoples, including tropical forest farmers, riverine fishermen and hunter-gatherers. Related versions are found among Caribs, Arawakans, Tupians, Warao, Waika, and others. Moreover, the identification of toad and jaguar is found from one side of the subcontinent to the other. Judging from the feline toad effigies in Moche art, it prevailed prehistorically also in the Andes. And since these feline toads in Moche art are sometimes covered with symbols of manioc and other vegetation, we can assume that the feline toad as originator of cultivated plants was likewise shared by the prehistoric Andeans.

As Zerries demonstrates in his monograph of the Waika of Venezuela (1964), almost certainly some elements of the divine twin tradition were spread through culture contact; Warao mythology, for example, contains much that is traceable to Carib sources, and some linguistically unrelated peoples share related names for one or the other of the hero twins that may have been borrowed. However, the basic content of the tradition as a whole, and certainly the role played in it by the toad, would seem to be very ancient.

In addition to the association of a feline Toad Grandmother and the hero twins, there are also many related stories in which a First Indian or culture hero is taught hunting skills, etc., by a Toad or Frog Woman, who seems to be identical with the earth goddess in toad form in the twin tradition. She appears as mentor of shamans, being herself a great shamanness, capable of transformation, especially between toad and jaguar forms. Mythical jaguars may be known as Toad Woman and vice versa, and stories abound in which an Indian takes aim at a giant supernatural toad, only to have her disappear and reappear elsewhere in the form of a gigantic black jaguar. In many of these tales, as also in the hero twin tradition, the toad is clearly dualistic and her relationship to man ambivalent: on the one hand she is protector, mentor of shamans, foster mother, teacher of hunting skills, regenerator of the earth, bringer of fire and cultivated plants, etc., on the other hand she is antagonist who embodies misfortune, illness and death. [39]

In many respects the most interesting South American version of the earth mother as a monstrous toad is that of the Tacana of lowland Bolivia, whose mythology formed the subject of a massive monograph by the German ethnologist Karen Hissink (1961).

In the male-dominated pantheon of the Tacana, the Earth Mother is one of the few female edutzi, or gods, but she is clearly of fundamental importance in the supernatural scheme of things. She is variously known as Pachamama, a term borrowed from Quechua, or by one of several indigenous Tacana names. The most common of these is Eaua Quinhai, literally Earth Guardian. Other names are Anu Eaua, Grandmother Earth, or Eaua Edutzi, Earth Goddess.

In her human form she is seen as a monstrous, old whitehaired, cannibalistic woman living alone beneath the earth, with enormous breasts, gigantic arms and a huge mouth and vulva. Breasts and vulva, of course, symbolize her generative, creative aspect, while the great mouth, through which she swallows the dead and evil-doers, emphasizes her cannibalistic side.

It is her animal form, however, that interests us most in the present context. She is a toad, specifically the large venomous Bururu toad, species *Bufo marinus*, or some closely related species of *Bufo*. To represent her, a large, live, female *Bufo* toad is kept in a circular hole, approximately 30 centimeters deep, which is dug beneath the main altar in the center of the cult house, or temple - somewhat reminiscent of the sipapu, or sacred emergence hole, in a Hopi kiva, and the equivalent emergence hole of the subterranean gods in the Huichol tukipa (or calihuey).

The toad's home in the temple is kept covered with a cloth, or, more, usually, a flat disk of cedar wood. Perhaps symbolizing the cannibalistic aspect of the earth goddess, she is regularly fed by the yanacona (another Quechua term, which the Tacana use for their shamans), on a diet of small live frogs. On ceremonial occasions, the yanacona places offerings of chicha, brewed from manioc tubers, which the yanacona pours directly into the hole as an offering to the Earth Mother (reminiscent of the pouring of pulque on the earth in Mexica rituals). According to Tacana tradition, the Earth Mother taught the first people to make this manioc chicha, to be used both for her own special cult and to help hunters magically to take better aim. Manioc itself was also originated by Eaua Quinhai, as were other products of tropical forest agriculture. These beliefs in the toad as bringer of cultivated plants are similar to those found clear across South America, in Venezuela, the Guyanas and Brazil.

Interestingly enough, rather in the manner of Tlaltecuhli in the Mexican creation myth, Eaua Quinhai survived the cataclysmic destruction of a previous creation by a great flood. From this flood she managed to save fire and a certain amount of clay. She attempts to keep these vital things from the culture hero and the edutzi of the upper world, but through trickery they manage to steal fire and sufficient clay to rebuild the drowned earth, which is gradually enlarged beneath and around her. [40]

Thus we see her as a typically dualistic. Essentially she is a creator goddess: it is she who saved clay and fire from the great deluge and eventually she does share these, however reluctantly, with the edutzi and the first people. She is also originator of cultivated food plants and tropical forest horticulture. In a very real sense she is a culture bringer: from her, men learn to use fire and women potter's clay; she teaches the first shaman and his female helper how to prepare coca, how to brew ritual manioc beer, and how to make the first hallucinogenic snuff which is so essential to communication with the edutzi and through whose use the shaman, in his vital role as mediator between man and the supernatural, enables himself to transcend the limitations of the human condition and

travel freely through the different planes of the universe. Further, she is Guardian and Mistress of various animal species (especially those that make their home under the earth), of the earth herself, and of fire, of cultivated and various plants, and of potter's clay and the tools and vessels that are fashioned from it.

Eaua Quinahi also commands a pair of anthropomorphic bird-jaguars. The Tacana have several different kinds of flying felines, some hostile to man and others protective, but those belonging to Eaua Quinahi have a special vital function assigned to them in creation times by the earth goddess herself. The male of the pair was ordered to assist the two Earth Bearers by flying beneath them and supporting them in midair when they tire of their burden; it is this which causes the regular alternation of night and day. The other, his daughter, functions as Bringer of the Seasons and of Rain, and as Bearer of the Moon, whose cycle of waning and waxing is related to her constant flight back and forth from one end of the world to the other at the behest of Eaua Quinahi.

In her negative role, Eaua Quinahi is first of all the primordial antagonist of man and the other *edutzi*, because she refused to let go of her treasures of fire and clay. By her cannibalistic nature she is a figure of death and the underworld, devouring the dead and intervening in negative ways in different areas of human existence. For example she takes women who do not follow the proper ritual procedures in the preparation of potter's clay and the making of pots. Further, she punishes transgressions against the delicate balance of the universe - especially incest. As a matter of fact, that was precisely the origin of her pair of flying jaguars. These were originally an Indian and his daughter, whom Eaua Quinahi transformed into flying felines because the man had planned to sleep with his daughter in violation of the incest taboo. So much for the Toad-Earth Mother in Tacana mythology and ritual.

Very briefly, we must take note of some interesting parallels from Asia. Especially in China and Japan we again find numerous traditions in which toads appear as demons skilled in the magic arts, transformers, mentors, spirit helpers and alter egos of curing shamans, etc. There are a number of apparently quite ancient tales of sages living in mountain caves in the company of giant toads who taught them their magical knowledge and who function as their spirit companions and avatars. Some toads were feared as monstrous supernatural beings capable of inflicting death and destruction, [41] others were highly regarded as benevolent demons that could draw down the clouds and bring rain and - perhaps most significantly in the light of what is to follow - possessed magical powers to conjure up the most beautiful and radiant visions (Volker, 1950: 157-170).

Why should this be so? Why should apparently lowly creatures be widely regarded as magical? Why the toad as agent of transformation, teacher or helper of shamans, owner of the arts of curing, originator even of coca and hallucinogens? Why, indeed, the association of toad and toxic mushrooms? We know of the "toad-stool" and then folklore that associates toads, mushrooms and magical transformation in the Old World. But something of the sort may have prevailed also in highland Guatemala. Only recently Lowy (1971) described a newly discovered Preclassic mushroom effigy stone in which a toad is represented beneath the mushroom cap (Lowy, 1971).

It must be obvious that something more is involved in the origin of such complex ideas than simple rain magic - even though, undeniably, frogs and toads are in fact widely associated with the coming of rain. Recent research and a reevaluation of older data

indicates that this other dimension has to do with the toxic properties of certain frogs and toads, and beyond these, the somewhat surprising discovery that certain species are not merely poisonous but hallucinogenic.

Before we get into this, let us briefly consider some of the better-known cultural uses of toad or frog poisons. In his two-part monograph on the frog motif in South American art and mythology, published nearly forty years ago. Wassén (1934) brought together ethnographic data on the use of frog venoms for blowgun dart poison and also cited a variety of magical rituals and myths involving these powerful venoms. It was his conclusion that apart from the well-known association of frogs with rain, the prominence of the motif was probably in some way related to the magical use, to which the poisons were put. One of the most unusual of these, by the way, is tapirage - use of frog or toad venom to bring about a change in the color of the natural plumage of parrots. Feathers are pulled from the living bird, a little poison is smeared on the wound, and the new feathers are said to grow back in a different color - surely a phenomenon that cannot help but confirm the magical transformational powers of the venomous species of frog and toad. Tapirage has been widely reported from different parts of South America. It would be useful to learn if this technique was known also to the ancient Mexicans.

I became interested in the psychopharmacology of toads or frogs about six years ago when Drs. Gertrude Dole and Robert Carneiro described to me a rather extraordinary hunting ritual they had observed in 1961 among the Amahuaca, of the Peruvian Montaña. These Indians have several magical rites designed to improve a hunter's luck. The strongest magic of all is for a man to inoculate himself with an extremely potent frog poison. This is scraped off the back of a certain frog or toad with a small stick and rubbed into self-inflicted burns on the arms or chest. Within a short time the hunter becomes violently ill, suffering uncontrollable vomiting, diarrhea, convulsions and loss of consciousness. For some time thereafter, while still under the influence of the poison, he experienced hallucinations which he [42] regards as supernatural encounters with the spirits of the forest. This phase is accompanied by the drinking of ayahuasca, the powerful hallucinogenic drink brewed in many parts of Amazonia from the Banisteriopsis vine. It is not clear how much of the ecstatic trance experience can be ascribed to the frog poison, and how much to the effects of the ayahuasca. I am told by toxicologists that some constituents of frog poisons act on the central nervous system, so that effects similar to those induced by the botanical hallucinogens are not out of question. Of course, the radical purging of the system by means of the poison would tend to heighten the effects of the ayahuasca drink. In any event, the two aspects of the ritual are conceptually and functionally related.

The Amahuaca, incidentally, are not alone among the Peruvian Indians in such magical use of frog poisons. Kenneth Kensinger (personal communication) in 1966 observed similar practices among the Cashinahua, except that the latter employed a different species, and that they interpreted the experience as one of purification, designed to expel a sickness-like condition of bad luck, mainly in hunting. In this case too the poison ordeal was followed by the drinking of the hallucinogenic ayahuasca.

Clear across the subcontinent, as early as 1915 Roth reported very similar beliefs and magical practices among the Indians of the Guyanas. According to this writer, the poisonous exudations and spawn of certain frogs or toads were rubbed into cuts made in the skin, or introduced into the eyes, nose, mouth and ears of the hunter. These practices

received their charter in myths whose common theme is that a primordial hunter received his skill as a gift from a Toad or Frog Woman, who rubbed her venom into his sensory organs to heighten their acuity. After suffering the same drastic symptoms reported ethnographically from the Peruvian Montaña, the mythic Fist Hunter found himself imbued with miraculous skill in the pursuit game. Likewise, Guyana Indians shamans employed toads and venomous frogs in ritual curing, rubbing the animals over the body of the patient, or else introducing the poison into cuts. I am told that something of the sort survives in highland Guatemala, albeit in only symbolic form, the toad being passed over the patient's body without touching it. (Note: In the question-and-answer period following this paper, several colleagues mentioned similar curing practices in rural Mexico as well).

Some of the South and Central American species of venomous frogs - especially tree frogs - have been well-studied by toxicologists and their pathologists and their poisons analyzed (Daly and Witkop, 1971; Daly and Myers, 1967). Some are extraordinarily powerful - the venom of one colorful species of Panamanian tree frog that measures less than an inch is sufficient to kill one thousand mice. In fact, the poisons of some of these little amphibians are said to constitute the most powerful natural venoms known to man. These poisons, however, do not contain what could be called hallucinogens, even if some of their constituents may affect the central nervous system. [43]

It is a different story with certain toads; and here we get into a problem that is far from solved, but for which we have enough information to allow ourselves some educated speculation.

Among faunal remains at San Lorenzo, Michael D. Coe found three kinds of skeletal material predominating: fish, man, and surprisingly, *Bufo marinus* (Coe, 1971). Surprisingly, because this poisonous toad is most unlikely to have been used as food, since the skin of this species contains large poison glands whose contents would permeate the flesh in the skinning process.

But if not as food, what purpose might *Bufo marinus* have served the Olmec? The answer may be found in the pharmacology of this toad, and, in part, in certain practices involving toads in the Guatemalan highlands. The exudates from the skin glands of this species contain, among other constituents, bufotenine (5-OH-DMT) (? errore dell'autore; nota di G.S.). Bufotenine is an indole alkaloid also present in South American trees from which hallucinogenic snuffs are made. However, the action of bufotenine is still controversial, in that laboratory experiments on humans have so far failed to demonstrate conclusively that it is responsible for true psychotomimetic, or hallucinogenic, effects.

The reason is that bufotenine does not seem to penetrate the blood-brain barrier, which most investigators believe it would have to do to produce psychotomimetic effects (Holmstedt and Lindgren, 1967). On the other hand, Dr. Harris Isbell (1967: 377-378) of the University of Kentucky Medical Center, who experimented on himself with bufotenine, suggests that despite its apparent inability to cross the blood-brain barrier, bufotenine may yet be found to have some kind of central action that would make it psychotomimetically effective (commenting on this, a member of the audience said that his own self-experimentation with bufotenine had in fact resulted in visual hallucinations, such as flashes of intensely brilliant light, and that his field observations suggested that some modern Indian curanderos have complex techniques of separating the truly dangerous poisons from the possibly psychoactive constituents of *Bufo* venom. In this connection it

should be noted that characteristic parotid poison glands of *Bufo marinus* and *Bufo americanus* are often prominently emphasized in prehispanic toad representation; the well-known large stone toad in the Mexica hall of the Museo Nacional de Antropología and certain Maya ceramic toad effigies and toad glyphs are examples). In any event the question obviously arises whether *Bufo marinus* could have played a role in ritual intoxication in Olmec times. And if so, how?

A partial answer may in fact be available - first, in the writings of the seventeenth century English Dominican Thomas Gage, and secondly, in the manner in which some contemporary Indians of Guatemala prepare chicha for ceremonial occasions. Gage labored among the Pokoman Maya in highland Guatemala between 1625 and 1637; his first-hand account of his adventures was originally published in England in 1648. The following abbreviated quotation is from the 1958 University of Oklahoma Press edition, edited by J. Eric S. Thompson: [44]

"The Indians generally are much given to drinking, and if they have nothing else, they drink of their poor and simple chocolate, without sugar or many compounds, or of atole, until their bellies be ready to burst .. Among themselves they make drinks far stronger than wine. These they confection in those great jars that come from Spain. They put in them a little water, and fill up the jar with some molasses or juice of the sugar-cane, or some honey to sweeten it. Then, to strengthen it, they put in roots and leaves of tobacco, with other kinds of roots which grow there and which they know to be strong in operation. Nay, to my knowledge, in some places they have put in a live toad, and closed up the jar for a fortnight or a month, till all that they have put in be thoroughly steeped, the toad consumed, and the drink well strengthened This drink they call chicha. It stinketh most filthily, and certainly is the cause of many Indians' death, especially where they use the toad's poison with it..."

In his recent book, *Maya History and Religion* (1970), Thompson took note of this "tale of uncommonly strong waters"; however, he was primarily interested in the use of tobacco as an intoxicant, and probably did not realize that Gage may have provided a partial answer to a question Thompson himself posed elsewhere in his book concerning the nature of hallucinogens employed among the Maya.

I have been informed by my colleague Robert M. Carmack that the practice of steeping venomous toads - presumably of the species *Bufo marinus* - in fermenting chicha still survives in the Guatemala highlands, at least among the Quiche, and that, as in Gage's time, the express purpose is to render the beverage more potent. Perhaps the Indians know something the pharmacologists have so far missed. There are, as mentioned, a number of chemical constituents in *Bufo* poison. Their action in concert may be different from that of bufotenine alone. Perhaps, also, bufotenine has a different effect when taken in alcohol. Or else it may not really need to cross the blood-brain barrier. In any event, whatever the ultimate psychopharmacological verdict, it is not unreasonable to suppose that what Gage observed in the seventeenth century, and Carmack in the twentieth, represents a survival from the prehispanic past that may reach back to Olmec times and thus account for the *Bufo marinus* remains at San Lorenzo.

If the potential hallucinogenic effects of bufotenine are as yet unclear and perhaps even questionable, the same reservations do not apply to the alkaloids recently discovered in surprisingly large amounts in the skin glands of yet another species of American toad,

Bufo alvarius. While bufotenine, or to use its proper chemical formula, 5-Hydroxy-N,N-dimethyltryptamine, or 5-OH-DMT (non è bufotenina!!, nota di G.S.), is present in South American trees whose seeds or bark are made into hallucinogenic snuff, the real active component has been found to be another, related indole alkaloid: 5-Methoxy-N,N-dimethyltryptamine, or 5-MeO-DMT. This is the main constituent responsible for the psychotomimetic effects of several snuffs made from the species Anadenanthera and Virola. [45]

It is this same hallucinogen that has been found to occur also in Bufo alvarius, in what the investigators report to be "enormous amounts" (Erspamer et al., 1967: 1149-1164). What this means is that if Bufo alvarius rather than Bufo marinus were to be steeped in a fermenting beverage, or its toxic secretion ingested, in whatever manner, there would be little question of its hallucinogenic effects.

The problem lies in the present-day distribution of Bufo alvarius. Unlike Bufo marinus, which is found from North America all the way to Patagonia, Bufo alvarius is a North American desert toad, its native habitat restricted mainly to Arizona and Sonora. Further, we lack the kinds of cultural data for Bufo alvarius that we have for other species. Was it ever utilized by man? If so, by whom, and when? Was this toad anciently more widely distributed than it is today? The area to which Bufo alvarius is presently native was once inhabited by archaic desert cultures; it is also the putative homeland of the Uto-Aztecs, from which they expanded southward into Mexico as early as 1500 B.C. Was it the shamans of the pre-agricultural desert cultures who discovered the potent psychotomimetic effects of toad poison and whose ecstatic trance experiences gave rise to the now wide-spread beliefs in the toad as a transforming shamanness, mother of felines and earth monster?

Perhaps. Or is all this older still? One thinks of the widespread toad motif north of Mexico, including the Northwest Coast. How are we to explain the association of toads or frogs with shamanism in British Columbia, Mexico, South America, and in Asia? What about the widespread identification of the toad with the uterus in the Old World? Or toads with toxic mushrooms? Even the magical-medicinal use of toad poisons appears to have its Asian counterpart. Are we perhaps dealing with yet another manifestation of a very remote, common Asian-American shamanistic Ur-kultur?

We will never know for certain. But we must at least concede that the phenomenon of Tlaltecuhltli may not be comprehensible solely in the context of Mesoamerica, nor that of Eua Quinhai and her tropical forest analogues in a purely South American framework.

References Cited

Bernal Ignacio, 1970, Yugos de la Coleccion del Museo Nacional de Antropologia, Drawings by Andy Seuffert. Union Academique Internationale, Corpus Antiquatum Americanensium, Mexico IV. Instituto Nacional de Antropologia e Historia, Mexico.

Coe Michael D., 1971, The Shadow of the Olmecs, Horizon, vol. 13, No. 4, pp. 67-74.

Daly John W., 1967, Discussion in: Ethnopharmacologic Search for Psychoactive Drugs, Daniel H. Efron, ed., p. 381. U.S. Department of Health, Education, and Welfare, Public

Health Service Publication No. 1645. Washington. [46]

Daly John W. and Charles W. Myers, 1967, Toxicity of Panamanian Poison Frogs (Dendrobates): Some Biological and Chemical Aspects, *Science*, vol. 156, pp. 970-973.

Daly John W. and Bernhard Witkop, 1971, Chemistry and Pharmacology of Frog Venoms, in: *Venomous Animals and their Venoms*, Vol. 2, pp. 497-519.

Erspamer V., T. Vitali, M. Roseghini and J.M. Cei, 1967, 5-Methoxy- and 5-Hydroxyndoles in the Skin of *Bufo alvarius*, *Biochemical Pharmacology*, vol. 16, pp. 1149-1164.

Hissink Karin and Albert Hahn, 1961, *Die Tacana*, vol. 1: Erzählungsgut. W. Kohlhammer. Stuttgart.

Lowy B., 1971, New Records of Mushroom Stones from Guatemala, *Mycologia*, vol. 63, No. 5, pp. 983-993.

Roth Walter E., 1915, An Inquiry into the Animism and Folklore of the Guiana Indians. 30th Annual Report of the Bureau of American Ethnology, 1908-09, pp. 103-386, Washington.

Schultes Richard Evans, 1972, An overview of Hallucinogens in the Western Hemisphere, in: *Flesh of the Gods. The Ritual Use of Hallucinogens*, Peter T. Furst, ed., 3-54, Praeger Publishers, New York.

Thompson J. Eric S., 1958, *Thomas Gage's Travels in the New World*, University of Oklahoma Press, Norman.

Thompson J. Eric S., 1970, *Maya History and Religion*, University of Oklahoma Press. Norman.

Volker T., 1950, The Animal in Far Eastern Art, *Mededelingen van het Rijksmuseum voor Volkerkunde*, Leiden, No. 6 en 7.

Wassen S. Henry, 1934, The Frog-Motive among the South American Indians, *Anthropos*, 29: 319-370, Part II: The Frog in Indian Mythology and Imaginative World, 29: 613-658.

Zerries Otto, 1964, *Waika*, Klaus Renner Verlag, Munich.