

EVIDENCE FOR THE USE OF BUFO *MARINUS* IN THE OLMEC

SHAMANIC TOOL KIT

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ABSTRACT

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This thesis explores the use of toad imagery in Olmec iconography. The *Bufo marinus*, secretes a highly toxic poison that, when used with discretion, has hallucinogenic properties. Both archaeological and artistic representations strongly suggest imagery of the *Bufo marinus* was used in Olmec art as a focus of transformation rituals. The majority of interpretation on Olmec transformational images has been supernatural beings, such as the jaguar. I suggest characteristics of these

supernatural entities have been misinterpreted and are actually based on the *Bufo marinus*. Furthermore, I propose these characteristics imply the use of bufotinen in order to control the toad's ability to transform. My thesis will demonstrate through the use of Erwin Panofsky's method of structural analysis the expanded presence of toad imagery within the larger corpus of Olmec style art.

CHAPTER 1

INTRODUCTION

While transformation and the shamanic toolkit have been the topic of much discussion in Olmec art, I propose there is information on this topic that has yet to be thoroughly explored. I believe there is evidence within Olmec art indicating the existence of *Bufo marinus* toxin as an important element in the shamanic toolkit. The pharmaceutical properties of the toxin bufotenin, which can be extracted from various species of toad, can be used as a hallucinogen that is perfect for aiding the act of transformation. The toad *Bufo marinus* also possesses transformative attributes. In the molting process, it is as though the toad were not only shedding old skin but also its old self, becoming something new all together. Rather than just a substance used for entering a trance, the toad becomes a being to emulate. For this reason, unlike other hallucinogens, I believe the use of bufotinen would be expressed iconographically on transformation figures. I will show there are characteristics of such figures

demonstrating the use of bufotinen. In the following chapters I will provide data to support this argument.

In chapter two I layout the theoretical background and methods I used in my research. The theories and approaches to analyzing art as an anthropologist are those of Erwin Panofsky and Robert Layton. As multiple structural analyses are an integral part of my thesis, I will also explain the theory behind this process. The methods section of this chapter not only explains the way I completed my research but also the features I look for when identifying the toad in my structural analyses.

In chapter three I describe the history of research on the ritual process of transformation and how it is portrayed in Mesoamerican art, especially in the art of the Olmec. Representations of shamans or shamanic leaders in the midst of transformation have been analyzed by various experts in the field, for example: Coe, Reilly, Kennedy, etc. As there has been constant ambiguity behind the term "shaman" (Klein et al. 2002:383), note that within this paper I define a shaman as a religious practitioner, ruler, or any combination in which the individual has the ability to transform into a companion spirit or way. In this chapter I discuss the previously published opinions on the

act of transformation and the shamanic tools used in order to enter the transformative state.

In chapter four, to prove that toads were likely an important aspect of Olmec iconography, I use the method of up-streaming from the Maya. Up-streaming from a related culture helps to reveal stories and allegories vital for the interpretation of iconographic symbols. Here, the toad can be found in art, hieroglyphic inscriptions, and the Popol Vuh. The purpose of this chapter is merely to note the importance of the toad throughout Mesoamerican history not to imply the Maya as descendents of the Olmec. The chapter will prove to be a valuable part of iconographical analysis in Panofsky's method.

In chapter five I will complete numerous structural analyses highlighting the toad-like features of Olmec transformation figures. This chapter will include the execution of the first two steps of Panofsky's method of structural analysis. Many times these features have been improperly classified as jaguarian. Artifacts identified as toads will be addressed, as well as some which are frequently branded as jaguar or shamans in transformation. I will present various structural analyses of these artifacts making a case for the representation of toad imagery in multiple art forms of the formative period.

To understand what purpose the Bufo toad would serve within the shamanic toolkit one needs to be aware of its pharmaceutical properties. Chapter six explores the chemistry of toad toxin and the chemistry of bufotenin (McBride 2000). This chapter will also explore the various hypotheses behind how the toxin was ingested by the shaman. Finally, in chapter seven, I will perform the final step in Panofsky's method of structural analysis. Using all the information gathered in previous chapters, I will be able to make an iconological interpretation on the meaning of these transformation figures. Various artifacts, displaying the toad-like qualities discussed in chapter four, are discussed that imply use of toad toxins to facilitate the act of transformation.

I will make my concluding statements in chapter eight where I will show how my argument has proven not only the inclusion of toad toxins in the shamanic toolkit but also the forms its portrayal takes in Olmec art and iconography.

CHAPTER 2

THEORETICAL BACKGROUND AND

METHODS

THEORETICAL BACKGROUND

Unlike the study of art history, iconography is concerned with the meaning behind a work of art and not solely its form. The theoretical background of my thesis is based on this concept. I was especially influenced by the theories of Erwin Panofsky, Kent Reilly, David Joralemon, Robert Layton, and Alan Merriam. Each of these authors describes the

problems that arise when anthropologists attempt to analyze the art of ancient cultures.

Table 1: Panofsky's three-step method of artwork interpretation.

OBJECT OF INTERPRETATION	ACT OF INTERPRETATION
I. <i>Primary or natural</i> subject matter- (A) factual, (B) expressional- constituting the world of artistic motifs.	<i>Pre-iconographical description</i> (and pseudo-formal analysis).
II. <i>Secondary or conventional</i> subject matter, constituting the world of <i>images, stories and allegories</i> .	<i>Iconographical analysis.</i>
III. <i>Intrinsic meaning or content</i> , constituting the world of "symbolical" values.	<i>Iconological interpretation.</i>

In his book, *Meaning in the Visual Arts*, Panofsky developed a three-step iconographical process for art interpretation (see Table 1). In order to understand the meaning inherent in a specific work of art, Panofsky claims one must understand the cultural traditions from whence it arose. Using the Panofsky method, the first step of interpretation involves the identification of the primary or natural subject matter. This is pure description of the artwork's form, i.e. color, shapes, material, and representation of natural objects.

The next step involves the identification of the secondary or conventional subject matter. Here, one identifies motifs within the artwork. Motifs are defined as being composed of symbols within a culture, which are combined to create meaning. The motifs can then be connected with themes or stories inherent in the culture. This step is commonly acknowledged as an iconographical method. Of course, the only way in which the connections can be properly made is to correctly identify motifs. This identification requires extensive study of artistic representation and the linkage of those representations into style groupings present in the culture.

The third and final step in Panofsky's method involves interpretation of the intrinsic meaning or content of the

artwork. In this step the researcher uses works of art to uncover information about the people within the culture. Panofsky states, "...ascertaining those underlying principles which reveal the basic attitude of a nation, a period, a class, a religious or philosophical persuasion-qualified by one personality and condensed into one work." (1955:30). In other words, one makes iconological interpretations based on the literary knowledge as well as the archaeological research of a culture (Panofsky 1955:26-40).

Iconological interpretation is largely the result of iconographical studies and description. A misidentification or incorrect description can lead each subsequent step in the wrong direction. If a step in the iconological process is skipped, one runs the risk of misidentifying a motif and possibly connecting it with an inappropriate theme. The personal and cultural biases of the researcher may also overshadow the intended meaning of the artist. It makes sense then that vast differences in opinion can arise within the field.

Researchers are faced with an especially difficult challenge when dealing with ancient art or art from a non-literate society. It is in those art traditions which lack written word, where one must focus on iconographical methods. The iconology of these cultures is difficult to

discern, primarily because the lack of written material is a hindrance to the establishment of pattern.

The method of up-streaming is one solution to this problem. Up-streaming involves studying a cultural group's successors. This method finds its roots in David Joralemon's "Continuity Hypothesis" (1976:58-59), influenced by Miguel Covarrubias (1957). This hypothesis states, "there is a basic religious system common to all Mesoamerican peoples. This system took shape long before it was given monumental expression in Olmec art and survived long after the Spanish conquered the New World's major political and religious centers." (Joralemon 1976:58-59; Deihl 2004:98). This apparent pattern, which is documented throughout later Mesoamerican cultures, allows for us to make the assumption it can be applied to the Olmec as well. Up-streaming, of course, also poses concerns. Though stories may be passed from one generation to the next, these same stories may well evolve overtime when combined with the stories of neighboring cultures, causing a disjunction in meaning. Additionally, the original meaning may have disappeared altogether.

Robert Layton explains that religion is often the focus of art in ancient non-literate societies (1991:36). This makes it even more important for the anthropologist to

understand the particular beliefs of these cultures when analyzing their iconography. It is all too easy to allow our own cultural biases to impose themselves upon our interpretations of artwork. We must be flexible and open to new interpretations.

In his article, "The Arts and Anthropology", Alan Merriam writes that art is symbolic in multiple ways (1964:232). It is symbolic in representing direct meanings as well as reflective of cultural meaning. Art also reflects political, religious, and social organization. Finally, art crosses cultural borders and is, in a way, reflective of all mankind. Studying art for the purpose of advancing the knowledge of a particular culture and their traditions requires an awareness of all levels of the artwork's symbolic meaning. Pure description of art does not enhance our anthropological understanding of ancient cultures. Within the scope of this thesis, when examining ancient art objects, I strive to apply the methods and processes of interpretation pioneered by Panofsky, Layton, and Merriam.

Research Methods

As previously stated, the methods used to link the use of hallucinogenic substances to the shamanic aspects of

specific works of art are derived from the art historical process. In this thesis I examine specific aspects of the Shamanic use of hallucinogens, specifically bufotenin, toad imagery, and related avian imagery of the Olmec and Maya. I used various literary resources to study religious rituals involving trance and the imagery of avians and toads within Mesoamerica. I also investigated published field notes generated by the excavations of Formative period Olmec ritual centers. I had a particular interest in the faunal remains recovered from these sites. If toad toxins were used in these areas, bones of the *Bufo marinus* would be found in abundance. I examined the chemical qualities and needs of bufotenin in order to create a viable yet non-lethal hallucinogen.

For field research, I traveled to Princeton University and, with the help of Gillette Griffin viewed the institutions large collection of Olmec art with a focus on Shaman imagery and figures displaying toad-like features. I also attended the symposium Olmec: The Origins of Ancient Mexican Civilization at the University of Texas in Austin. The symposium featured various Olmec experts who inspired multiple veins of research. Those presentations have been invaluable for the development of this thesis.

Structural Analysis Methods

In this thesis I will be performing numerous structural analyses. To complete this process I used the method laid out by Erwin Panofsky. These exercises will consist of figures representing shamans, shamanic tools, and toad representations.

To identify shamanic features and tools I will be referring to literary sources including various books and articles by Kent Reilly and Peter Furst. To identify toad motifs I will be using the methods and interpretations laid out by Alison Bailey Kennedy in her article, *Ecce Buffo: The Toad in Nature and in Olmec Iconography* (1982). Here I will briefly describe the features I will be looking for when gathering a collection of Olmec and Maya art for my thesis. In order to accomplish this task, it is imperative to gather a restricted corpus of imagery. Within that corpus I will identify motifs derived from shamanic activity. Critical to this shamanic motif set are specific motifs that are linked to acts of transformation. Certainly, these representations are of particular interest to my research. In order to understand the nature of Olmec iconography, one must grasp the concept of *pars pro toto*, a Latin term meaning; the parts equal the whole. Often images will display only one characteristic of an icon and the

viewer is to understand its presence when making interpretations (Kennedy 1982:275). For this reason, it is no surprise that the toad would have gone unidentified in so many Olmec transformational images.

In her article, Allison Kennedy claims that artifacts often identified as jaguars or Olmec Dragon are actually misinterpreted representations of toads (1982:274). Features used to identify a toad motif are those referenced by Kennedy. These features may represent various periods through a toad's lifespan. From tadpole through the molting process, each stage can be found in Olmec iconography.

The stance of a toad is represented in zoomorphic as well as anthropomorphic figurines. The stance itself is identified through multiple features. The first of which is an upturned head. A cropped posterior is also indicative of a toad (Figs. 1 and 2). Although this has been claimed to be representative of a crocodile's tail (Kennedy 1982), notice the slope in the backs of figures 1 and 2.



Figure 1: Posterior of Bufo toad.



Figure 2: Posterior of Jade Olmec Toad 800-500 BC

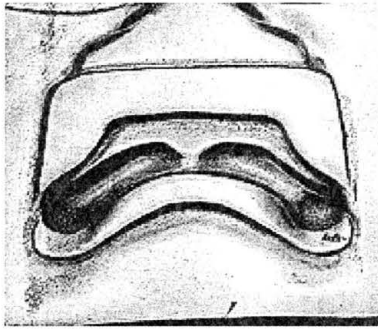


Figure 3: Toothless
Gums of Olmec celt
displaying toad-like
features

Anthropomorphic figures are likely to be seen in the stance of a toad viewed from the front.

Other characteristics I examine include the pug nose and down turned mouth of the Bufo toad (Kennedy 1982:274). Many anthropomorphic figures possess these features.

Individuals carved in the Olmec style, often display down turned mouths. The toothless gums of this downturned mouth make it quite toad-like (Fig. 3).

While boney elements called supraorbital crests run along the brows and eyes of actual toads, these same

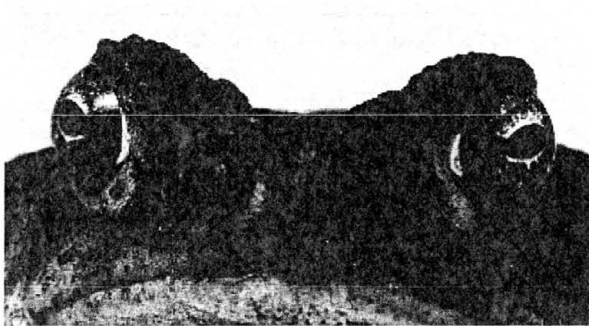


Figure 4: Frontal view of Bufo Toad

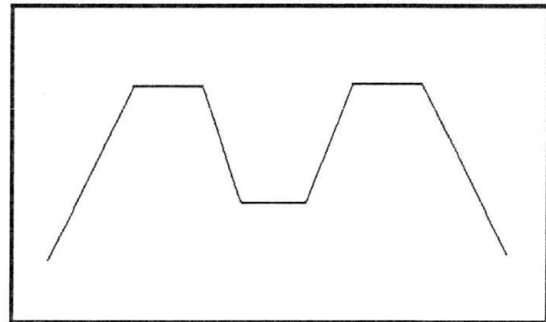


Figure 5: Double Merlon

elements are incorporated in toad representations. When viewed from the front, the eyes of a toad form a double merlon (Figs. 4 and 5). This is an important toad feature to identify. The double merlon symbolizes a portal to

another realm (Reilly 1994). As the toad is able to survive on the earth as well as in the water, this ability to cross barriers was not lost on the Olmec or the Maya (Kennedy 1982:274). As will be shown in chapter 5, toad imagery is important in the depiction of travel between realms. This intra-orbital crest may be represented naturalistically or stylistically as a cleft in the head of a figurine.

The cleft has previously been associated with maize growth, i.e. fertility (Kennedy 1982:274). In fact, the cleft appears on almost all representations of the maize god. Though this may indeed be the case, toads are equally associated with fertility and agriculture (Kennedy 1982:274). The cleft has also been linked to the furrowed brow of an adult jaguar (Kennedy 1982:274). In the tradition of *pars pro toto* it is possible for this characteristic to represent maize, fertility, a jaguar, and the toad.



Figure 6: Close up
of toad's paratoid
gland

Finally, I will be identifying features of transformation associated with the toad. Features indicating transformation are among the most common in toad representations. I will be looking for images referencing the

toad's super-orbital crests, paratoid glands, molting process.

The presence of the paratoid glands is a particularly telltale feature of toad representations (Fig. 6). They are located directly behind the toad's eyes and supraorbital crests. The glands produce the toxin bufotenin, an ingredient known to be used as a hallucinogenic substance (McBride 2000). These types of substances are a necessary component in the transformation process. This would have made bufotenin a major substance within the shamanic toolkit. The paratoid gland may be the most obvious and yet misidentified of all toad motifs. The gland is represented in various ways. It can be a bulbous protrusion behind the eye or an area marked with stippling. Kennedy claims that the characteristic referred to as the "flame brow" (Fig. 7) is also a misinterpreted supraorbital crest or paratoid gland



Figure 7: Serpentine Mask
900-600 BC



Figure 8: Frontal view
of Harpy Eagle

(Kennedy 1982:274). Peter Furst identifies these as the plumage of the harpy eagle or "jaguar of the sky" (Fig. 8) (1995:75). As I will demonstrate in later chapters, both interpretations may be equally accurate.

The molting process of a *Bufo marinus* is an obvious example of transformation in nature. The process begins as

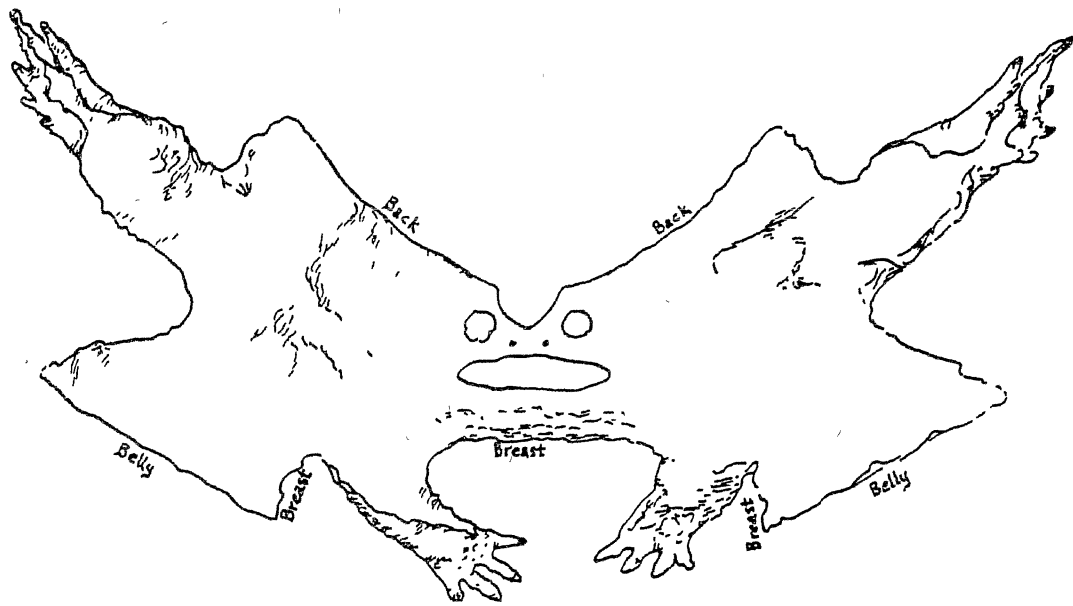


Figure 9: Illustration of a toad's molted skin by Allison Kennedy

the toad's skin splits down the center of the back starting behind the head (Fig. 9). Often this is observed in toad imagery as a line or set of double lines. On an anthropomorphic figure, like that of fig. 12, the split is below the neck on the collarbone where the shaman has begun to transform into a jaguar. The jaguarian nature of a shaman's way can be symbolized by the jaguar fur beneath the splitting skin. After the skin begins to peel from the

Bufo marinus's body, the toad pulls the skin into its mouth where it is attached at the corners.

As the toad eats its skin during molting, the final stage of that absorption is the consumption of the legs. With

this action in mind, Kennedy proposes a most interesting feature to single out as toad-like (1982:282). The forked

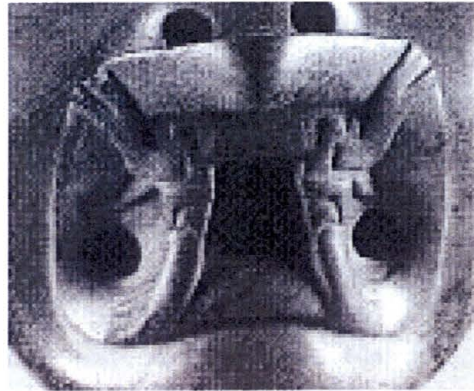


Figure 10: The mouth of a Were-Jaguar mask

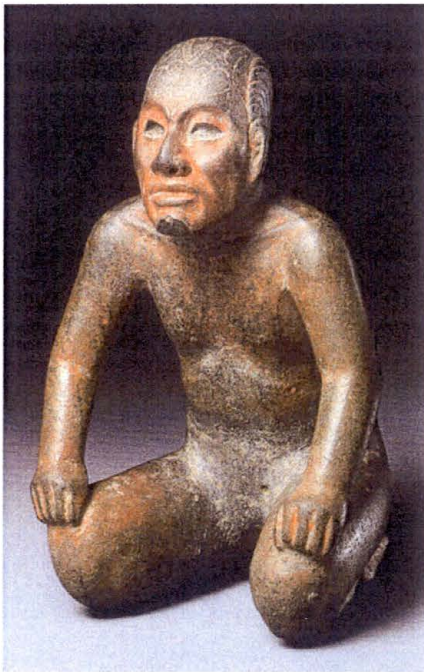


Figure 11: Shaman in Transformation Pose 800-600 BC

elements which protrude from the mouth of a Were-Jaguar (Fig. 10) may actually be the remains of a toads shedding skin (Kennedy 1982:282). This simple observation is the most compelling of Kennedy's arguments.

In order to understand the intrinsic meaning behind these toad representations and their link to transformation, I will further discuss how the toad is portrayed

in shamanism. Common motifs signifying a shaman are indicators of transformation. A pose, described by Reilly,

has widely become associated with trance and transformation (1989) (see Fig. 11). In this pose the hands of the figure are poised on the knees with legs bent underneath the body allowing the figure to assume a rocking motion.

Transformation is also characterized by a shaman taking on the features of an animal. This animal is most often



Figure 12: Shaman
Revealing Jaguar way
900-600 BC



Figure 13: Shaman in
Process of
Transformation 800-
500 BC



Figure 14:
Shaman
Personifying
Jaguar 900-600
BC

interpreted as a jaguar. *The Shaman in Transformation Pose* (Fig. 11) has been linked to various figures assumed to be created by the same artist (See Figs. 12-14). These are thought to be sequential representations of a shaman transforming into a jaguar (Reilly 1989:11-14). Later chapters will provide further evidence of the figures' sequential meaning.

It will also be important to identify evidence of toads associated with utilitarian artifacts. A basic feature of plates, bowls, pipes, or snuff trays that would indicate use in the shamanic toolkit are their ability to hold a hallucinogenic substance (Furst 1995:78). Certainly this tool use is further emphasized if the specific object has toad-like features in its incising or its exterior form.

CHAPTER 3

HISTORY OF RESEARCH

The objective of this chapter is to offer a brief overview of what archaeologists and iconographers have published on Mesoamerican trancing, transformation rituals, and were-jaguars. This will provide a basis for the direction my research takes in later chapters. In some cases, later chapters will elaborate on various ideas as they become relevant to the argument at hand.

Trancing and Transformation Rituals

Shamanic transformation is one of the cornerstones in the Mesoamerican belief system (Miller and Taube 1993:26). It appears the Olmec especially, had intricate religious ties to transformation (Miller and Taube 1993:28). As there are no written records of Olmec history, authors have used iconographic, ethnographic, and up-streaming methods to draw conclusions on the Olmec belief system. Through these methods it is proven, once again, that religion and political power are closely linked in Mesoamerica. This

link is established in a quote by Kent Reilly,
 "...hieroglyphic discoveries demonstrate conclusively,
 however, that Classic period Maya kings validated their
 right to royal power by publically proclaiming their
 ability to perform the shamanic trance journey and
 transform into power animals." (1995:30).

In order to complete the act of transformation, a

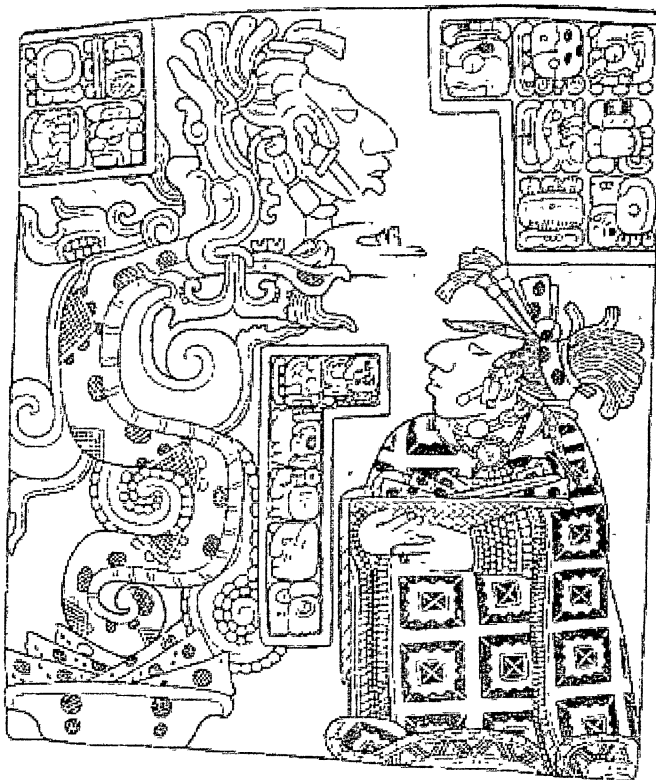


Figure 15: Illustration of Yaxchilan
 Lintel 15

shaman or king must
 perform a trancing
 ritual of some kind
 (Reilly 1995:30).
 Through trance the
 shaman can become "...an
 actual vehicle for the
 supernatural..." (Miller
 and Taube 1993:152).
 Various trancing
 methods have been
 documented and
 hypothesized
 throughout

Mesoamerican studies.

Freidel et al. claim the Maya participated in
 bloodletting and sacrifice to enter trance-like states

(1993:207). Along with other methods, bloodletting was practiced by piercing the male genitalia or pulling ropes with stingray spines through the tongue (Freidel et al. 1993:209, 217). While in these trances, the shaman would call upon vision serpents from whose jaws gods and ancestors would emerge (Fig. 15). This interaction would allow for communication between realms (Freidel et al. 1993:207-208).



Figure 16: Jade Spoon 900-600 B.C.

Trances can also be induced by deprivation of some kind (Miller and Taube 1993:152), fasting, or through the use of hallucinogenic substances (Diehl 2004:100). Furst claims there is no direct evidence that the Olmec used hallucinogens to facilitate trance and transformation, but as it was a common practice in the rest of Mexico, Central America, and South America, it is highly likely (1968:162). One such substance native to the Mesoamerican region is the psychotropic plant *Nicotiana rustica* (Diehl 2004:123). When

smoked, the nicotine in this type of tobacco has an intense effect on the adrenaline medulla, sending the user into ecstatic trance (Furst 1995:78-79). Furst also proposes the seeds of a Mexican relative to the *Anadenanthea peregrine* tree may be crushed to create a hallucinogenic snuff (1995:77). As snuffing is a common method of ingesting hallucinogens, Furst hypothesizes an Olmec "snuffing complex" (1995:77-78). He believes the religious and political elite would have owned jade "spoons" or snuff trays (Fig. 16) (Furst 1995:78). Objects commonly deemed jade beads may actually be snuffers used in conjunction with these "spoons" (Furst 1995:78). According to Classic Mayan texts, the word *uay* is a Mayan term meaning "animal companion spirit". Later, *uay* was used in reference to the actual act of transformation into this animal (Freidel et al. 1993:190). In order to gain additional bestial power during times of war, Mayan soldiers would transform into their *uay* (Freidel et al. 1993:192). Even modern day shamans are believed to have the ability to make this transformation (Freidel et al. 1993:192-193). In central Mexico, the belief system centering on the transformation of shamans into animal spirit companions is called *nagualismo* (Gossen 1994:556).

Transformation into the companion spirit is depicted in many Classic Maya painted vessels. The ritual often involved costumed individuals participating in dance (Fig. 17). During this dance, kings and shamans would enter a



Figure 17: Altar de Sacrificios
Vessel

trance-like state and dress in elaborate costumes and masks depicting their *uay* (Freidel et al. 1993:260). Though jaguars and avians were common companion spirits, some costumes were of fantastical supernatural creatures (Freidel et al. 1993:261). In the following passage, Freidel et al. write on the extreme religious importance of these dances within society.

It is important to realize that Classic pageants were more than just acts of civic pride and piety. They transformed participants into supernaturals, as the paths across the abyss opened on the grand stairways and plazas of their cities. Both gods and humans danced, and through the dance one became the other. For the Maya, the ambiguity was as it should be. Sorcerers, kings, and nobles transformed into their *wayob* and journeyed into the Otherworld before the transfixed gaze of their people.

(Freidel et al. 1993:265)

As shaman are inherently able to transform into jaguars, when the felines are seen in "unusual circumstances" or attacking humans, some cultures believe they are actually transformed shaman (Furst 1968:155). Perhaps this belief leads iconographers to identify the half man half jaguar "were-jaguar" motif.

Were-Jaguars

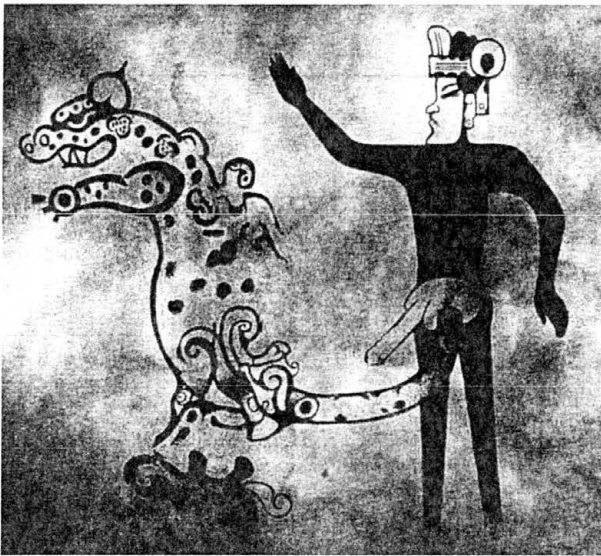
Distinguishing various god representations within Olmec iconography is a difficult task. Richard Diehl states, "Olmec supernaturals not only blended symbols and attributes but also apparently shared functions in a highly fluid, non-compartmentalized world with diffuse boundaries between their specific roles." (2004:101). The pantheon of Olmec deities has been stated to include: the Olmec Dragon, the Olmec Bird Monster, Fish Monster, Banded-Eye God, Water God, Maize God, Feathered Serpent, and the Were-Jaguar (Diehl 2004:102). Diehl claims, though he is not the first to do so, that the were-jaguar god is the least understood of all Olmec deities (2004:104).

Indeed, the motif most fundamentally associated with the rise of the Olmec style, emblematic of one of Mesoamerica's first great civilizations in the Pre-classic period (2000 B.C. to A.D. 250), is a were-jaguar creature that has hundreds of

variant forms, all of which appear to link human political and religious authority with the supernatural power of jaguars or other jungle cats. This iconography merges human and jaguar facial features into a single countenance, making unmistakable the message that human, natural, and sacred power somehow come together in this idea.

(Gossen 1994:558)

According to Michael Coe, the were-jaguar was the Olmec's principle deity and an early manifestation of the Mesoamerican Rain God (1968:111). The concept of a were-jaguar, part human part jaguar, was an idea stemming back to the identification of the "Olmec style". The Olmec style was largely distinguished by George Vaillant and Miguel Covarrubias (Coe 1968:42, 61).



Coe describes the were-jaguar character as having oval eyes, thick lips, snarling mouth, and cleft head (1968:42). Peter Furst acknowledges the diverse circumstances in the way the were-jaguar

Figure 18: Cave Painting, Guerrero motif is depicted, not only conceptually but representatively (1968:148). This includes treatment of the body and facial expressions as

well as the ratio of human to jaguar characteristics (Furst 1995:73).

Various explanations exist on the origins of the were-jaguar creature. The ambiguity which surrounds the were-jaguar motif has caused numerous archaeologists and iconographers to reevaluate its meaning. The "Stirling Hypothesis", created by Matthew Stirling, suggests the were-jaguar is the result of copulation between a jaguar male and human female (Diehl 2004:104, Stirling 1955).

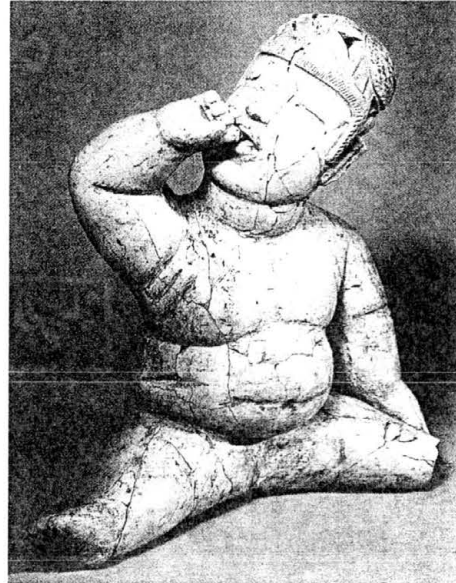


Figure 19: White Ware figurine with supposed infant/jaguar features

Although Stirling claims this is supported by two San Lorenzo monuments, they are too badly damaged to be thoroughly convincing (Diehl 2004:104). As of yet, the only clear representation of a human and jaguarian creature in a seemingly sexual scene is found in a cave painting from Guerrero (Fig. 18) (Diehl 2004:104).

Coe claims hollow white-ware baby figurines (Fig. 19) depict "Jaguar's Children" i.e. the resulting offspring of jaguar-human copulation (Diehl 2004:164, Coe 1965). According to Diehl, the small jade figurine in Fig. 20,



Figure 20: Jade
Necaxa Tiger

dubbed the *Necaxa Tiger*, has the body of a human infant and facial features of a jaguar (2004:165). Through ethnographic research, Furst discovers some Amazonian cultures in South America believe the original father or mother was jaguarian (1968:152). These people also often believe there are tribes of "Jaguar Men". In one

creation myth in particular, a group of jaguar-people were created before the birth of human beings. These jaguar-people were both men and jaguar and could equally transform

from one to the other (Furst 1968:152).

Carson Murdy suggests the Olmec were-jaguar is a naturalistic depiction of infants born with congenital deformities combined with jaguarian features (1981:861-871). Specifically, the features which can be explained by brain and spinal cord

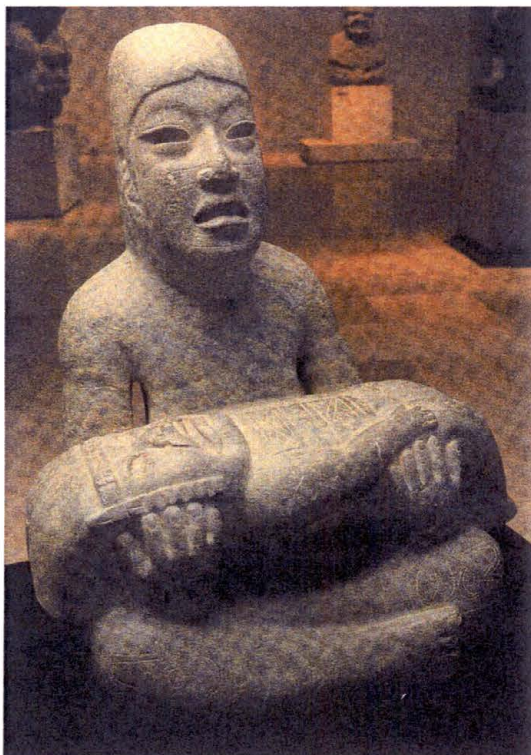


Figure 21: Las Limas Figure

defects (Murdy 1981:862). Michael Coe has suggested the cleft head of these creatures is caused by the disease, *spina bifida* (Murdy 1981:862, Coe 1962:85). Cranial defects associated with *spina bifida* are *hydrocephalus* and *encephaloceles*. *Hydrocephalus* causes enlargement of the cranium (Murdy 1981:863), symbolized by the disproportional size of the head in baby were-jaguar images (Murdy 1981:865). *Encephaloceles* can manifest as *cranium bifidum* (i.e. a cleft skull) (Murdy 1981:863). The Olmec may have viewed these deformities as reminiscent of jaguarian features and thus believed the child to be connected to the powerful beast (Murdy 1981:862).

Myelomeningocele is yet another serious congenital spinal condition. The condition often results in the cranial deformities mentioned above (Murdy 1981:863). Although the average rate of human births resulting in *myelomeningocele* is only 1 in 1000, it is more likely to occur in families previously affected with the condition (Murdy 1981:866). If the infants affected with this were in fact associated with jaguars, purposeful inbreeding may have been encouraged in order to produce more of these individuals (Murdy 1981:866, 869). Were these children born into noble families, the elite would wish to exploit the child's connection with the jaguar. It may account for

figurines depicting an adult male holding one of these baby were-jaguars (Murdy 1981:869). Murdy suggests the limp limbs of the baby were-jaguar in figurines like the *Las Limas* figure (Fig. 21) is the result of paraplegia or death while the snarling face is caused by extreme pain: all a consequence of some congenital deformity (1981:865).

Other researchers have denounced the concept of a were-jaguar altogether, claiming the creature depicts other animal features. Muse and Stocker believe the were-jaguar motif is actually a caiman or crocodilian (Stocker et al. 1980:740, Muse and Stocker 1974). In fact, Stocker et al. claim the "Fire Serpent" and "Were-Jaguar" motifs identified by Nanette Pyne are profile and frontal views of the same crocodilian character (1980:752). David Joralemon identifies some representations of the were-jaguar as "Olmec Dragon" (Furst 1981:161, Joralemon 1976). As will be discussed further in later chapters, authors like Peter Furst believe the were-jaguars are toads with jaguarian features (1981:150). Furst states, "It is, in short, a classic example of transformation and mediation between contrasting but complementary beings, environments, and by extension, cosmic realms" (1981:150).

Though the were-jaguar motif displays continuity in some characteristics, I believe the variety of

circumstances, artifact types, and additional features displayed by were-jaguars may indicate not one but multiple supernaturals or shamanic events. Those artifacts displaying toad-like qualities will be the focus of the following chapters. The evidence I will provide in those chapters will prove this hypothesis to be as likely or more likely than those previously proposed.

CHAPTER 4

TOAD IMAGERY AND THE MAYA

Introduction

The toad appears as a noteworthy symbol through the Formative and into the Postclassic periods of Mesoamerica. It appears in the iconography at many major sites in the region such as, Teotihuacan, Monte Alban, the Aztec Templo Mayor, Cholula, Itzapa, and Cacaxtla (Gonlin and Lohse 2007:101). In the interest of brevity and for the purpose of this thesis, I will specifically examine the toad's significance within the Maya culture.

The purpose of this chapter is not to imply a strong Olmec influence on the Maya style, religion, or iconography, but to demonstrate the continuity of the toad as an important icon throughout Mesoamerica as a region and time. My intent is to prove that as the toad appears so prevalent in other Mesoamerican cultures, it is likely to be found in the Olmec Heartland as well. In this chapter I will present evidence of the toad in Maya mythology, hieroglyphics, and art. Also I will briefly discuss two

excavations of Maya sites where bones of *bufo marinus* have been located in ritual settings.

Mythology

The Polpol Vuh, the story of creation, is believed to be the most important of all Maya myths. In the Maya Popol Vuh the toad, known as Tamazul (see Fig. 22), ate the louse carrying a message to the hero twins from their grandmother to



Figure 22: Tamazul, Drawing by Karl Taube

meet the Lords of Xibalba in the underworld. The toad was then eaten by the snake, Zaquicaz, who promised to deliver him and his message quickly to the twins. A falcon soon swallowed up the snake with Tamazul in his belly. Once the falcon arrived at the ball court where the twins were playing the falcon proceeded to vomit the snake, the snake then proceeded to vomit Tamazul, who attempted to vomit the louse. Hard as he may try the toad was unable to do more than drool. Tamazul, who originally walked on four extended legs, was crushed by one of the hero twins for lying,

causing toads from that point on to hop with legs bent. At last the louse was found in the mouth of the poor toad (Tedlock 1996:112-115). The name Tamazul comes from the Nahuatl proper word meaning "toad" (Tedlock 1996:269).

To the Maya, snakes, frogs, and toads each have a strong association with rain, fertility, and water (Gonlin and Lohse 2007:102). Throughout Mesoamerica, these creatures are most plentiful during the rainy season. According to Culbert, the *Uo* frog, seen emerging only on the rainiest of days, is considered to be an assistant to the mighty chacs or rain gods (1974:79). In the Yucatan, where the chac-frog cult thrived, the *Uo* frog is the musician assistant to the chacs croaking to call upon the rain (Dobkin de Rios 1974:149). Usually occurring in groups of four, the assistants are sometimes thought to be attributes of a single rain deity (Dobkin de Rios 1974:149). Although a specific species or type of toad/frog has yet to be identified within the codices, the character appears largely standardized and in high frequency within the Madrid codex. Its features consist of a stout tailless body, flattened head, and toothless mouth. Within the codex it is referred to as the *Uo* frog (Dobkin de Rios et al. 1974:149).

Uo is also the name of the second month in the Maya calendar. This month occurs during the height of the rainy season. During the month's various festivities a ritual dance called *Okot uil*, or "dance of the moon or month", is performed. It has been suggested, that *uil* is a contraction of *uoil* or *uinal uo*, meaning "of the frogs" (Dobkin de Rios et al. 1974:149).

Nancy Gonlin explains that even modern Maya people use toads and frogs for agricultural rituals and rituals honoring "Itzamna" the chief rain god (2007:102). One modern prayer to the chacs or Itzamna includes young boys dressing like and mimicking toad behavior (Gonlin and Lohse 2007:102).

Hieroglyphics

The toad, or frog as they are used interchangeably (Dobkin de Rios et al. 1974:149), is found in various forms of Maya writing appearing on vessels and in multiple codices (Gonlin and Lohse 2007:101). The toad is a common phonetic

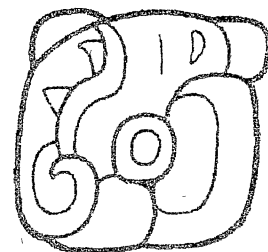


Figure 23: Phonetic glyph "ju"

Maya hieroglyph. Phonetic glyphs are pictures which represent sounds which put together create whole concepts. Fig. 23 is an example of the *ju* or *hu*, representing an

upended frog or reptile (Montgomery 2006:120). Fig. 24, or *SI*, is a similar phonetic glyph of the upended frog as an intransitive verb meaning "to be born". This is referred to as the "birth glyph" (Montgomery 2006:217). The glyph *SI-ya-ja* (Fig. 25) uses *SI* in a passive verb glyph meaning "was born" (Montgomery 2006:218). This type of glyph is often used to denote the birth of an elite or noble (Gonlin 2007:101).

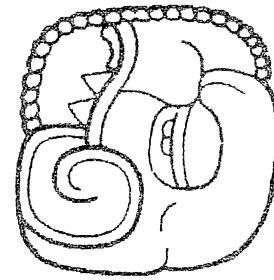


Figure 24: Phonetic glyph "SI"

The version of this glyph, seen in Fig. 26, is an example of the upended frog being used in the Lunar Series. It literally states, "10 days since the moon was born" (Garber class handout). In the Maya Long Count aspects of the upended frog can be seen in the *Winal* glyph (Fig. 27), note the curl at the corner of the mouth when compared to Figs. 23, 24, and 25. The *Winal* (sometimes spelled "Uinal") is a noun meaning, month of twenty days (Montgomery 2007:269). Just as the Maya numeric system is in base 20 because of humans

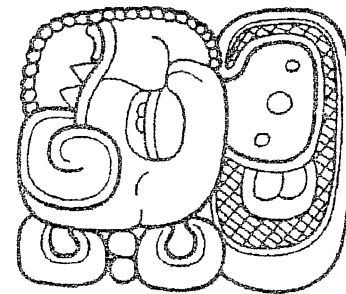


Figure 25: Glyph "SI-ya-ja"

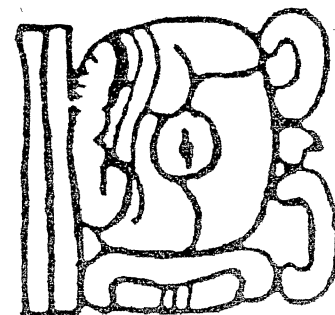


Figure 26: Lunar Series glyph

possessing 20 digits, Miller and Taube propose the Winal is depicted as a toad because of their having 20 digits (1993:168).

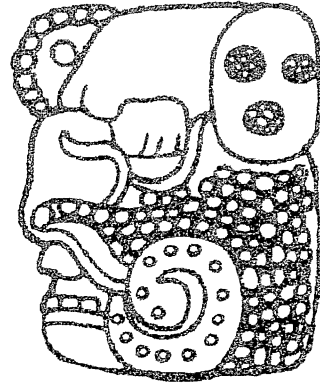


Figure 27: Winal glyph

The frog glyph can also be seen in reference to names of specific people. In the Main Group of Copan, a large Maya site in Honduras, a stone Monument is inscribed with "Siyah K'ak'" or "Smoking Frog". The name may refer to a Teotihuacano warlord. This warlord has also been recorded at the Maya city of Tikal in Guatemala (Gonlin and Lohse 2007:101).

The strange figure in Fig. 28 can only be found in one of the three Maya codices, the Madrid Codex. Although Paul Schellhas designated this as God P, the frog deity, some believe it to be a manifestation of God N. God N, often depicted wearing a turtle carprice upon his back, is a common figure within all codices as well as the star of many stela scenes (Miller and Taube 1993:146-48). Some have



Figure 28: God P

hypothesized this frog god is depicted sowing seeds and using a planting stick to create furrows in a field (Dobkin de Rios et al. 1974:149).

Art

As representations of toads are often depicted associated with hallucinogens and transformation within the corpus of Olmec art (as discussed in previous chapters), the Maya also illustrate this connection. Unfortunately, though there is much that can be learned about the ancient



Figure 29: Illustration from Late Classic Maya bowl

Maya from ethnohistory, the arrival of the Spanish and their distaste of psychotropic drug use has erased much of the native knowledge on the subject (Dobkin de Rios 1974:150). Many of the artifacts mentioned within this chapter in this chapter possess certain attributes of these themes.

The hieroglyphs mentioned previously can also be found on large and small scale sculpture. Fig. 29 is an image from a Late Classic Maya bowl. The Tonsured Maize god is depicted rising from a turtle carapace representing the earth. Two additional figures also emerge from either end of the carapace. From the right is the God of the Number 13 (Taube 1988:196). A Uinal toad can be seen on the left of the central figure, appearing with spotted paratoid glands,

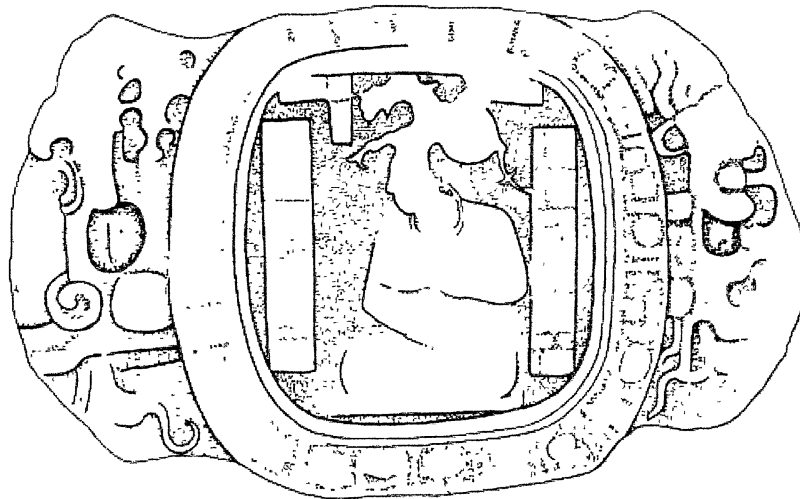


Figure 30: Machaquila Altar A

fangs, and a clawed foot (Taube 1988:196). As will be discussed later, a large zoomorphic sculpture of a toad with similar attributes has been found at the Guatemalan site of Quirigua.

The image in Fig. 30 is the top view of Machaquila Altar A. The alter stands on four leg supports and depicts a similar mythological event as Fig. 29. The rounded central image is a tortoise carapace which surrounds a Maya lord, likely placing himself in the position of the Maize god. Unfortunately, the glyphs on the outer rim of the shell are too damaged to decipher. Again, on either side of the shell two figures emerge. From the right is God K. Though partially deteriorated, at the left of the central figure is a Uinal toad (Taube 1988:191). One can just make out the slit oval eye and curled mouth of this upended toad.

Certain species of water lilies have proven to produce psychotropic poisons (Dobkin de Rios 1974:150). According to Taube, the Uinal toads emerging from the turtle carapace in both Figs. 29 and 30 are shown with water lilies bound to their heads (Taube 1988:189, 196). Dobkin de Rios also mentions the uinal glyph on Stela D at Quirigua as wearing a water lily headdress (1974:150). In particular areas of the Maya realm the Maize god is depicted as having water

lily stems passing through his hands. It is suggested that these anatomical associations directly relate to water lily drug use (Dobkin de Rios 1974:150).



Figure 31: Stela 11 from
Itzapa

The mouths of various creatures including frogs are viewed as a gateway to the underworld. A shaman making a journey to the underworld is a common illustration in Mayan art. Stela 11 (Fig. 31) from Itzapa, a Protoclassic Maya site (Miller and Taube 1993:168), depicts the frog's open maw as the portal through which the shaman makes his descent or emergence. Kennedy's interpretation of this stela suggests the figure descending into the toad's mouth is the molted skin or his "old self" (Kennedy 1982:282). Toads are often associated with shamanic journeys as their toxins can be used to create hallucinogens associated with trance. The elements flowing from the toad's sides may be the release of venomous toxins from his paratoid glands (Kennedy 1982:282).

A similar image can be seen in Fig 11. Stela 6 from Itzapa (Fig. 32) depicts a seated open mouthed toad with

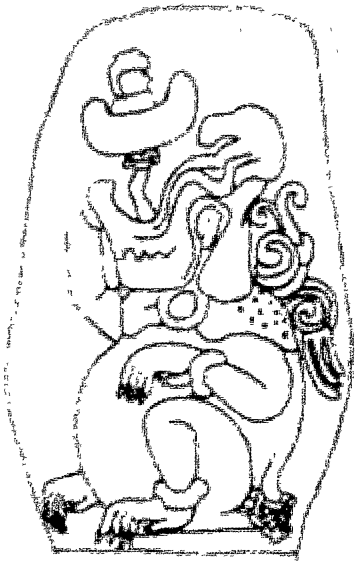


Figure 32: Stela 6 from
Itzapa

human-like hands. The paratoid glands are indicated by stippling behind the head. Miller and Taube suggest the swirling motifs emanating from the glands are representative of the *bufo marinus* toxin (1993:168). Balancing on the tongue of the toad, which protrudes upward from the open maw, appears to be a human figure inside a bowl or canoe. This could refer to the individual's birth or their ascension to the throne i.e. birth of a king.

As briefly mentioned, both of the toad motifs on the stela in Figs. 31 and 32 exude swirling substances from their sides possibly depicting the bufotenin toxin. The figures emergence from the toad's maw may be symbolic of the shedding of old skin as they transform into their new self, as king, shaman, or creature traveling to other realms.

The site of Quirigua in south-eastern Guatemala is home to a number of frog and toad-like representations. The zoomorph in Fig. 33 is a bolder sized toad sculpture. Note the squat body, cropped posterior with in-turned legs, and stubbed nose. Zoomorph G's most convincing toad attribute



Figure 33: Zoomorph G from Quirigua,
Guatemala

is the spotted paratoid gland located behind the eye. Robert Sharer believes this to be representative of the species *Bufo marinus* (1990:44).

Sharer describes this zoomorph as

having predominately jaguar attributes due to its clawed feet and fangs (Fig. 34) (1990:44), but I view these features as secondary to those of the toad.

The transformative characteristics of this gargantuan sculpture are threefold. First, are the implications behind the appearance of the toad's paratoid glands. This gland, being specific to toads with a venomous toxin (Kennedy 1982), indicates its

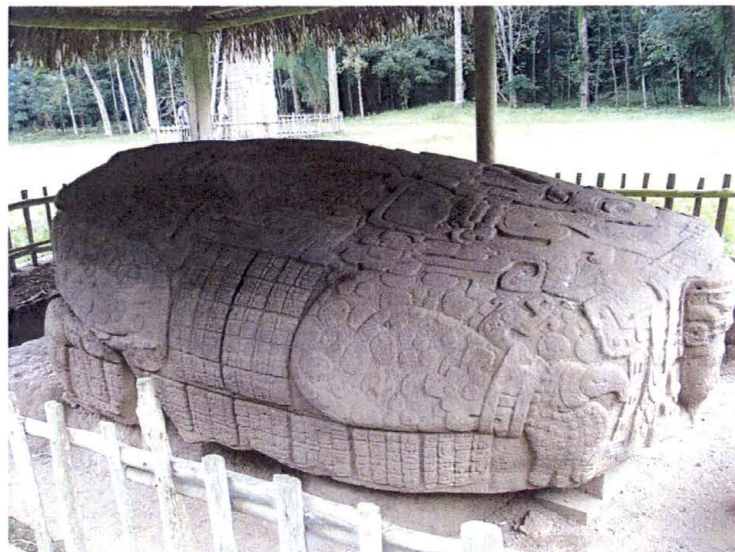


Figure 34: Rear view of Zoomorph G

possible function as a hallucinogen. Second, jaguar features signify the transformation into the feline in order to take on its powerful attributes. Finally, a human head can be seen emerging from within the beast. This individual, likely a shaman, may be depicted here attempting to possess the abilities of each animal.

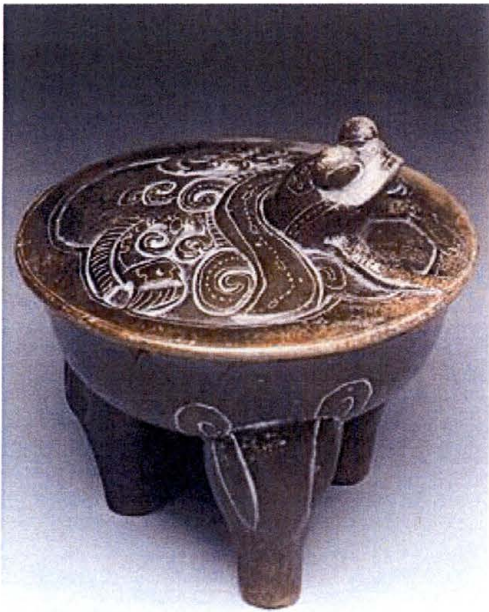


Figure 35: Mayan Lidded Vessel
AD 400-600

Other artifact types from the Maya region are found with more naturalistic representations of toads and frogs. One example can be seen in figure 35. The lidded pot depicts a frog breaching the water's surface. Perhaps it is pulling himself from the swirling waters of the

underworld. It is unknown what the pot's specific function was, but it is likely ritualistic. This vessel may have contained a *Bufo marinus* hallucinogen. It may also have served as an offering bowl for bloodletting rituals which were usually performed under the influence of hallucinogens in order to open portals to the supernatural realm. Of course, it may have been an elite feasting vessel as well.

If possible, residue analysis would be able to illuminate more information on the vessel's true purpose.

Artifacts found in Tomb I of Mound E-III-3 at the site of Kaminaljuyú in Guatemala link the hallucinogenic properties of toad toxin to the hallucinogenic properties of some mushrooms. Within the tomb multiple frog or toad shaped vessels and mortars were discovered alongside small mushroom shaped stones. The modern peoples in the Quiché area often refer to an "unholy mushroom" called *holom ixpek*, or "toad's head". The boss on some of the frog-like vessels is noted as originating from the toxin of a North American species of toad (Dobkin de Rios 1974:149). Perhaps this would also prove true of the vessel seen in Fig. 14. The burial offerings in Tomb I indicate the individual as a wealthy shaman (i.e. an elite religious practitioner).

Multiple small sculptures like the one in Fig. 36 have been found in and near the site of Copan. Toads are prominent icons at this site and many smaller surrounding sites (Gonlin and Lohse 2007:101). In fact, one site is aptly named "El Sapo" or "The Toad" after the abundance of amphibians which appear on the site's petroglyphs (Gonlin and Lohse 2007:101). As previously discussed, there is a religious link between the toad and agricultural fertility. Therefore, it is fitting that the majority of these

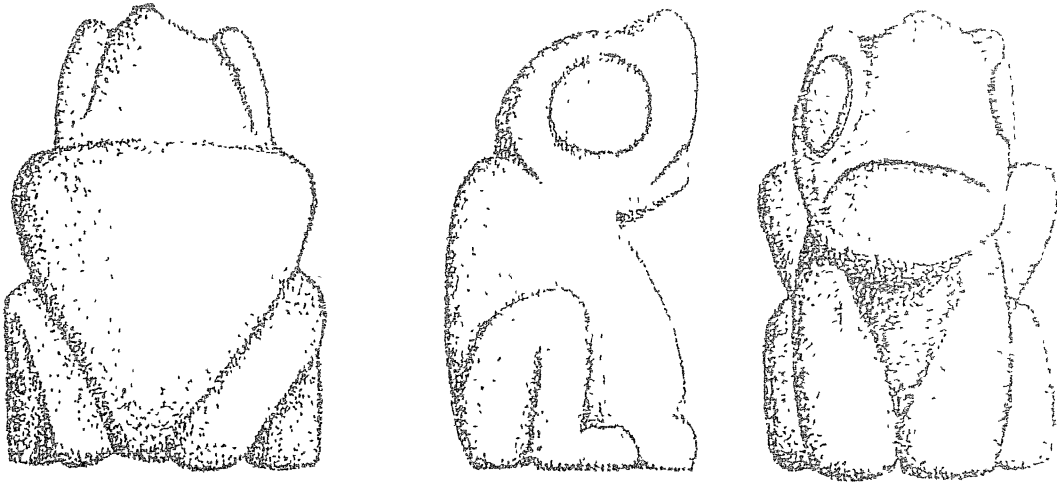


Figure 36: Small frog sculpture from Copan Valley, Honduras

figurines are found in the more rural areas and villages associated with the epicenter of Copan (Gonlin and Lohse 2007:103). People at these sites may have placed these figurines in small family shrines in hopes of a plentiful harvest.

Dobkin de Rios also describes two amphibian shaped whistles found in Maya ritual settings. She believes them to have been associated with the use of hallucinogens due to the importance of auditory stimulation while in a drug induced trance (Dobkin de Rios 1974:149).

Bufo Remains in Site Excavations

The first group of excavations is located on the island of Cozumel off the Gulf Coast of Mexico. Nancy Hamblin examined the faunal remains in the back dirt from

Sabloff and Rathjes' excavations on the island in the early 1970's. The remains of at least 77 species were extracted from 10 sites. Though most of the bones have been dated to the Late Postclassic, some were interred as early as the Late Formative period. The majority of the 283 bufonid bones were of the species *Bufo marinus*. The remains of this toxic toad were mostly found in burials (Hamlin 1984).

Their appearance in this type of ritual setting may imply Maya knowledge of their hallucinogenic properties. As discussed previously, the toad is a symbol for birth. Death and rebirth are common themes in Mesoamerican mythology. For example, in the Maya Popol Vuh the hero twins are killed in the underworld only to be reborn thus taking their revenge on the lords of Xibalba (Tedlock 1996). In my opinion, the addition of bufo toads in the Cozumel burials may, not only indicate the use of their psychotropic qualities, but also the rebirth of the individuals interred with them. I would suggest this to be even more likely if the individuals were decapitated, as this is often a necessary step in the process of rebirth (Ashmore 1991:213).

Bufonid bones were also found in excavations of the Formative Maya site of Cuello in Northern Belize in the late 1970's. Most of these bones were located in chultuns,

or artificial storage chambers. Hammond and Miksicek propose the significant amount of *Bufo marinus* bones found in one chultun may signify their "...use as food or in balche, the Maya ceremonial beverage, for their toxic exudates." (Hammond and Miksicek 1981:269).

Conclusion

In this chapter, I have presented evidence of the great importance the toad was to the Maya. I have provided examples regarding their religion, writing system, art, and site remains. It is evident the toad appears throughout Mesoamerican history as a highly respected creature. Its connections with the rain gods, agricultural fertility, transformation, and the hallucinogenic properties of its toxin make it a prime candidate for worship by commoners and elite alike. Representations of these themes are artistically expressed in the form of small and large scale stone sculpture, painting, and ceramics.

Themes of Mesoamerican art are static in many ways. I propose, though fewer examples of the toad have been identified in the Olmec Heartland, they would have also recognized its value. If Joralemon's "Continuity Hypothesis" (1976:58-59) holds true, the religious and related symbolic systems held by some Mesoamerican

cultures, are similarly held by all. Although there are no Olmec codices to describe their religious system, the same basic beliefs resonate through the iconography of the heartland. As stated in previous chapters, I believe toad imagery has been overlooked or has gone unidentified in Olmec iconography and is likely to be a more prevalent theme than was previously thought.

CHAPTER 5

IDENTIFYING THE TOAD:

PRE-ICONOGRAPHICAL

DESCRIPTION AND ANALYSIS

Structural Analyses

In this chapter, I will be completing step one and two of Panofsky's method of structural analysis on numerous Olmec artifacts displaying toad-like features. To review, the features I will be identifying are: up-turned head, cropped posterior, squat stance with drawn up in-turned limbs, pug nose, down-turned mouth with toothless gums, supraorbital crests, cleft head, paratoid glands, split skin of the molting process, and forked elements protruding from the mouth. It is here that previous misconceptions of jaguarian or Dragon features will be corrected. In certain instances, artifacts that do not display toad-like attributes will be provided to show the distinct differences between what is truly jaguar and what is toad.

In the following pages an image of an artifact will appear accompanied by the pre-iconographical description and some iconographical analysis. I will divide these

artifacts into two groups: toad representations and anthropomorphized toad representations. Amongst the artifacts will be small portable figurines, ritual axes, masks, monuments, and utilitarian objects. David Joralemon was one of the first individuals to compile a complete "dictionary" of Olmec iconography. He was also the first to coin the term "Olmec Dragon" (Furst 1981:161). This designation was a step in the right direction for Olmec iconographical studies. By pulling focus away from an idea of a solely jaguarian cult, Joralemon opened doors for the acknowledgment of other important animal totems. Animals like the harpy eagle and alligator began to receive recognition within the corpus of Olmec art. This trend of broadening the variety of bestial characters identified within Olmec iconography must continue in order to understand the world as perceived by the Olmec.

The conclusion of this chapter will revisit Joralemon's interpretations in, "A Study of Olmec Iconography" (1976). With the knowledge that is gained through the following structural analyses, this veritable dictionary in Olmec iconography will prove due for revision.

Toad Representations

It has already been asserted that crocodilian or dragon motifs have been mistaken for jaguar imagery for quite some time (Stocker et al. 1980:743). In the case of this jade figurine, from the Brooklyn Museum (Fig. 37), it is obvious that toad imagery has been mistaken for dragon. It has the squat stance of a toad along with hunched in-



Figure 37: Jade "Olmec Dragon" 800-500 B.C.

turned limbs.

The flattened back ends with a severe slump to a cropped posterior. The figure has a raised head,

downturned mouth, and distinct pug nose. Finally, this toad has the "flame brows" demarcating the paratoid glands or supraorbital crests behind the eyes.

The supernatural effigy to the left (Fig. 38) possesses similar qualities to the previous artifact. The down turned mouth and pug nose mimics that of the toad. The supraorbital crests are also visible on this figure. The posture in which the figure is carved suggests the squat stance of a toad with limbs pulled close to the body and

head tilted upwards. The body of this creature is covered in spots reminiscent of those commonly seen on the *Bufo marinus*.

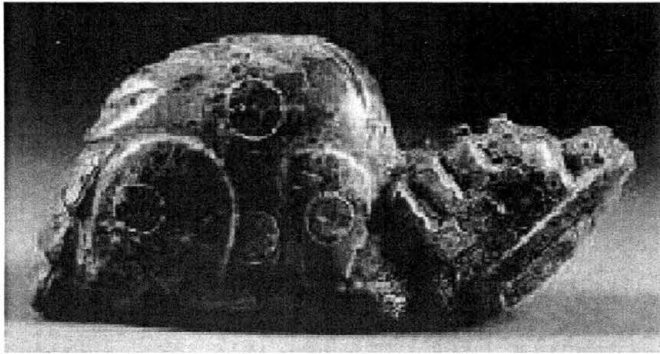


Figure 38: Supernatural Effigy 900-500 B.C.

David Joralemon attributes many of the "dragon's" features to those of the crocodile. Though this is a reasonable theory, the features also tend to

corroborate with those of a toad. Notice that tails are not present on either figure. One suggestion for this occurrence is it symbolizes the tail of the crocodile as it floats below the water's surface. Though the figure may possess attributes of several animals, a more simple explanation is that it denotes the cropped hind end of a toad.

Fig. 39 is an image of a *Bufo marinus* viewed from the side.

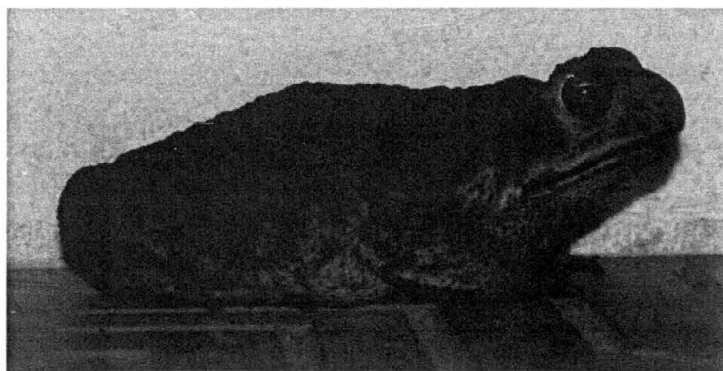


Figure 39: Side view of *Bufo marinus*

When compared to the figurines in Figs. 37 and 38 the resemblance is uncanny.

The toad depicted in Fig. 40 is raising an offering bowl with an incised pattern on the outer edge above its head. The patterning includes multiple front facing cleft heads. These mimic the double merlon-like head of a *Bufo* toad. The spotted paratoid glands behind the orbital socket, indicates that



Figure 40: Toad Effigy
Vessel 1200-900 B.C.

it was a representation of the genus *Bufo* (Reilly 1989:10). The toad is depicted as beginning the process of shedding its skin. The dappled split down the figure's back originating from the nose is precisely where the molting of the *Bufo* toad begins. As the splitting of the skin continues down the toad's posterior, a pattern of short hatch marks is revealed. This patterning may represent jaguar fur, making the effigy a label for the effects of using the vessel's contents (i.e. prescription bottle). Perhaps the cross hatched pattern appearing on the splitting skin of the toad in Fig. 5 also symbolizes jaguar fur.

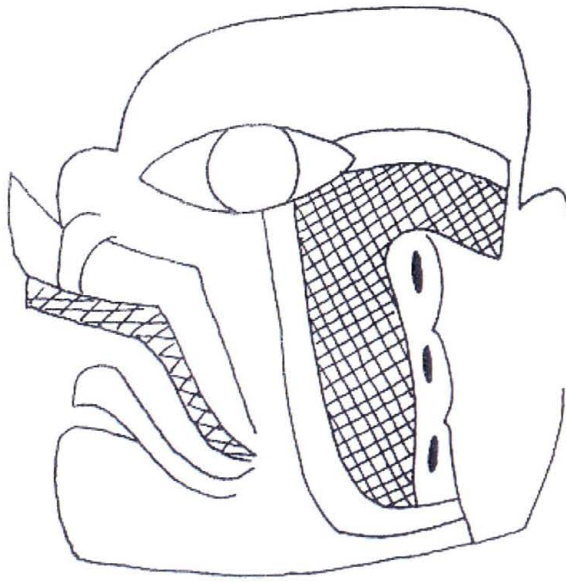


Figure 41: Toad-like Incisions from Tlapacoya Ceramic Vessel



Figure 42: Tlapacoya Vessel 1200-900 B.C.

Figure 41 is an image incised on a ceramic bowl from Tlapacoya (Fig. 42) (Joralemon 1971:79). The profile of this creature displays a toad's down turned mouth and toothless gums (indicated by cross hatching under the upper lip). More importantly, I believe the cross hatching along the back of the head is representative of the splitting skin seen on both Figs. 48 and 50. In fact, if the image in Fig. 41

was seen from above it would likely form the "V" shape as on the Shaman in Transformation Pose (Fig. 52 and 53).

Anthropomorphized Toad Representations

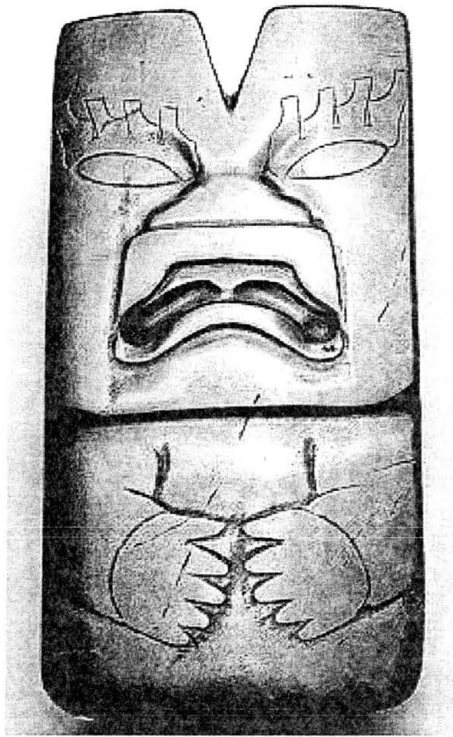


Figure 43: Jadeite
Ceremonial Axe

The jadeite ceremonial axe in Fig. 43 displays the classic Olmec "were-jaguar baby-face" (Furst 1981:149). The figure has the characteristic flame eyebrows or superorbital crests in the case of a toad. The figure also possesses a cleft head, a downturned mouth and toothless gums, which are analogous of a toad's. Furst believes that that grouping of features may not reference a jaguar but the earliest

manifestation of Tlaltecuhtli, the Mesoamerican Earth Mother Goddess the jaguar toad (Furst 1981:149).

The jade plaque in Fig. 44 may also be an anthropomorphized toad. Not only is the top of the helmet or headdress cleft, but the forehead is as well. All Bufo toads have this intraorbital depression (Kennedy 1982:274). The arms of the figure are drawn up and back comparable to the stance of a toad or frog (Fig. 45).



Kennedy claims this stance is "a clear attribute of toadiness" (1982:276). The mouth of the figure displays the same toothless gums

Figure 44: Jade Olmec Plaque 900-600 B.C. identified by Kennedy as a toad design (1982:279). Furthermore, in order to see a full frontal view of the individual's face, when viewed from the side the head would have to be raised like that of a toad. It is possible the plaque depicts a shaman taking on the transformative qualities of the *Bufo marinus* toad.



Figure 45: Front view of *Bufo marinus*. Note cleft head and stance

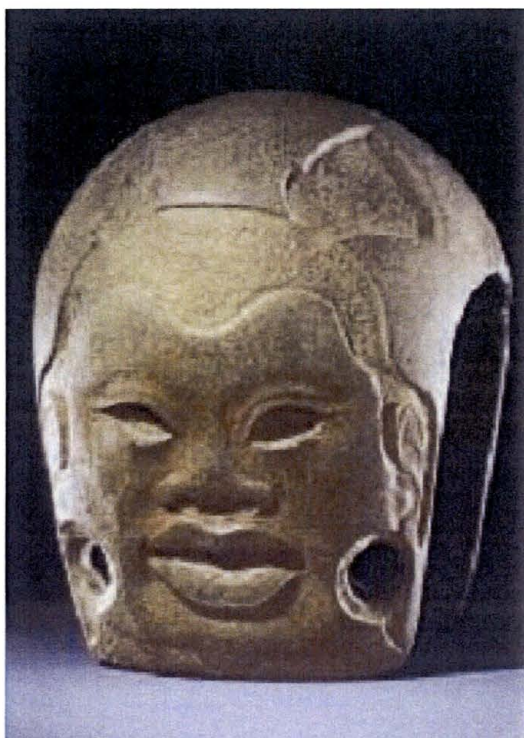


Figure 46: Stone Yuguito 900-600 B.C.

boarded by a spotted motif crowned with two curved trapezoidal shapes indicating the Bufo toad's paratoid glands. Fine incisions cover the face including two identical toad-like faces over the eyes (Fig. 47). The small faces consist of cleft heads, down turned mouths, and a barely distinguishable snout.

Though at first glance this object from Guerrero (Fig. 46) may appear to be a mask, it is actually a *yuguito*, an object used in the Mesoamerican ballgame (The Olmec World 1996:238). The hollowed out basalt stone (Diehl 2004:166) depicts a classic Olmec face. Carved in relief, the face is

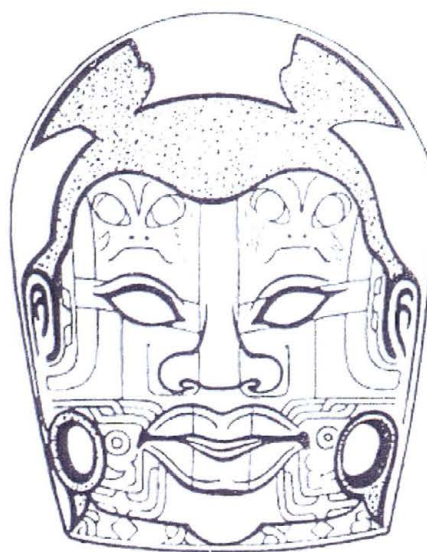


Figure 47: Covarrubias' drawing of incisions on stone yuguito

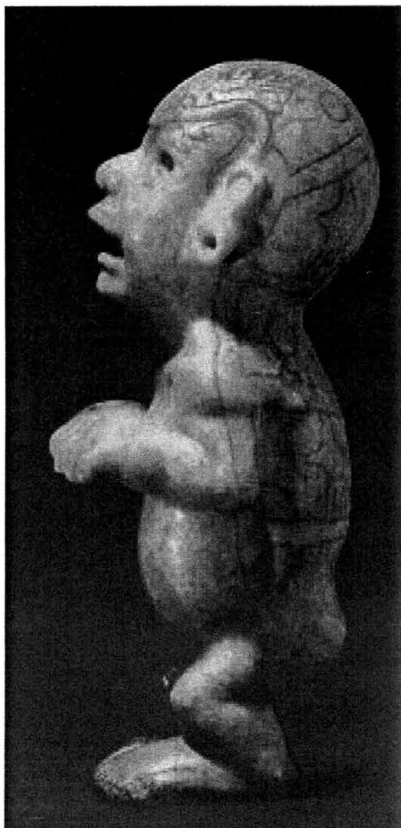


Figure 48: Figure with Incisions 900-600 B.C.

incisions are identified as markings of the Olmec dragon but the linear divide between the sides is reminiscent of the toad's molting process. The line that runs down the lower half of the back disappears towards the top of the shoulders and head. This is likely an indication of a

Figures 48 and 50 are examples of anthropomorphic sculptures with features of toads. They have incised spotting, linear, and star designs over their heads and bodies (Fig. 49). The "flame brow" motif appears above the eyes on either side of the deep cleft in the figures' foreheads. The spots and stars may refer to the poison glands or markings of the *Bufo marinus*. The

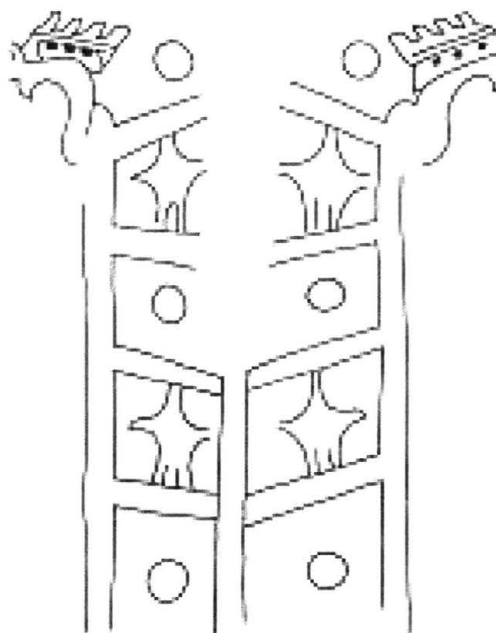


Figure 49: Illustration of incisions on fig. 12

transformation figure. *The Olmec World* claims the designs signify a pelt that, when worn, allows an individual to travel to the "supernatural realm" (1995:220).



Figure 50: Squatting Figure
1000-500 B.C.

figurines resemble that of a toad's bent legs and lifted head. The figures appear to have an infantile quality. As previously discussed, the toad/frog was symbolic of birth to the Mayans and could have had a similar meaning for the Olmec. If figures 48 and 50 are indeed infants with toad motifs the sculptures may be fertility objects.

Boney elements begin in the middle of their brows and run up and around their eyes. These correspond to the supraorbital crests on the image of a *Bufo marinus* in Fig. 51. The mouths display the toothless gums of the toad. If placed on their stomachs, the postures of the



Figure 51: Close up of Bufo toad's
supraorbital crests

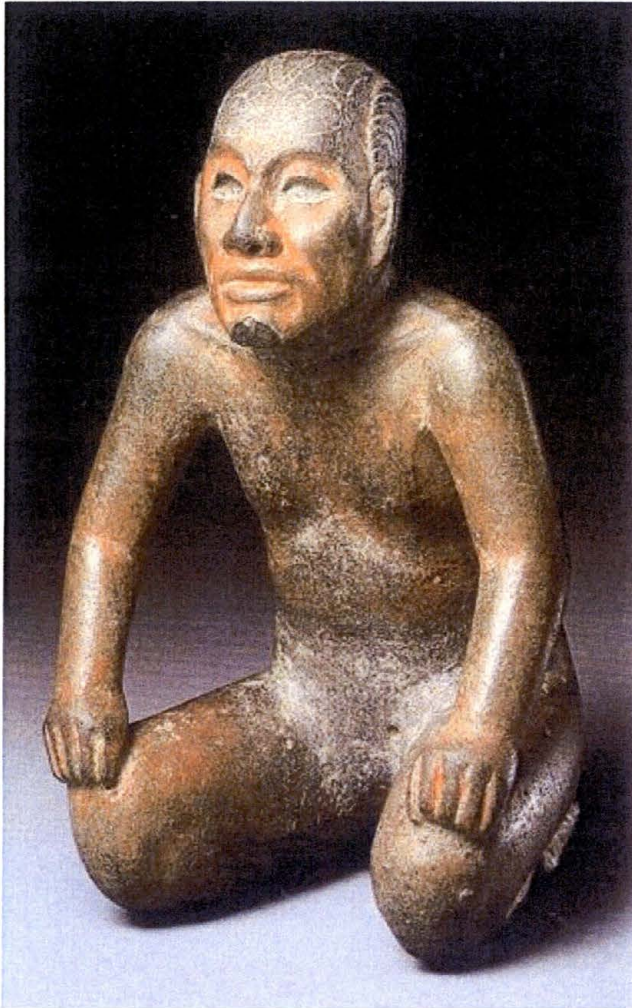


Figure 52: The Shaman in Transformation Pose 800-600 B.C.

underneath the body in a form which allows for a rocking motion. The bald pate of the figure (see Fig. 53) is incised with the image of the *Bufo marinus* (Reilly 1989:9). The face of the toad is located upon the shaman's forehead. The paratoid glands, where the toxins

Kent Reilly was the first to offer in-depth analysis the next figure, *The Shaman in Transformation Pose* (Fig. 16). The shaman is shown in a kneeling posture that has become associated with trance (Reilly 1989). The hands are poised on the knees. The legs are bent

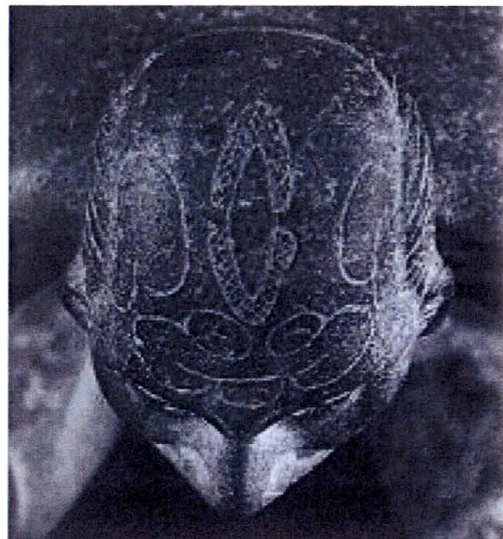


Figure 53: Detail of incisions on The Shaman in Transformation Pose

are manufactured, are the globular shaped incisions to the far left and right on the figure's head (Reilly 1989:9). The crosshatched "V" shapes behind the toad's eyes most likely represent the splitting of the skin as the toad begins the process of molting (Reilly 1989:11).

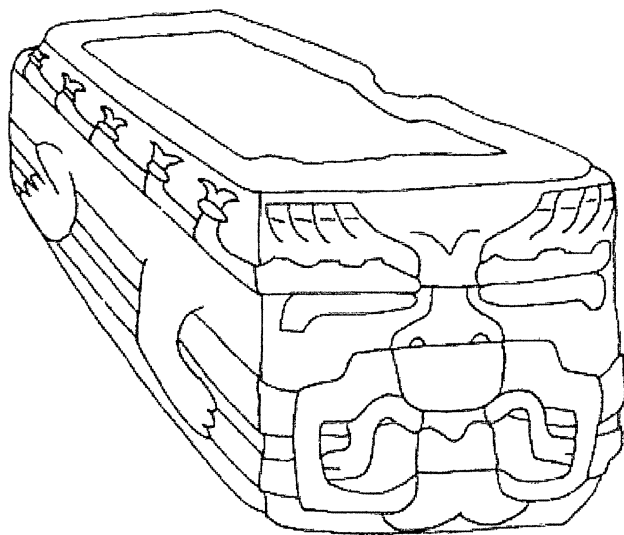


Figure 54: Monument 6 from La Venta 400 B.C.

Figure 54 depicts La Venta Monument 6 carved approximately 400 B.C. The sarcophagus is carved with the image of the "earth dragon" or what Joralemon calls God I (1971:51). The composite creature

displays a crocodilian body with vegetation sprouting from its back floating in the waters of the underworld. Its facial features consist of a cleft forehead, flame brows (representing either the harpy eagle or the toad), and a serpent's forked tongue. Hanging from the mouth of the dragon below a pug nose are the tell-tale legs of a toad. Once again these features were misidentified as a jaguarian mask by Covarrubias (1957:66).

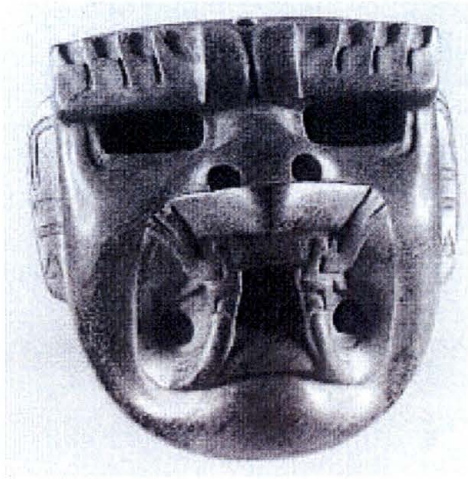


Figure 55: Serpentine Mask
900-600 B.C.

forked elements on either side which extend from the top to bottom lip. One may first categorize these as fangs but upon further examination one notices they do not originate from the gums. Again, these elements likely represent the final step in the molting process where the toad, having devoured his own skin, is left with the legs dangling from its jaws.

The mask in Figs. 55 and 56 represent the face of a supernatural. Once again, the "flame brow" motif is located above the eye indicating the supraorbital crest. The mask also possesses the toad's pug nose. The mouth has prominent



Figure 56: Side view of serpent mask

The effigy axes in Figs. 57 and 58 display a cleft head and down turned mouth. They also possess the forked frog leg elements protruding from the center of their mouths. Like the yuguito from Figs. 46 and 47, small toad-



Figure 57: Effigy
axe 1000-500 B.C.



Figure 58: Effigy
Axe 900-500 B.C.



Figure 59: Kunz
Axe

like faces are inscribed above the eyes of each supernatural. Though badly worn, faces consisting of cleft heads and down turned mouths can be made out.

A similar effigy axe to those in Figs. 57 and 58 is the Kunz Axe (Fig. 59). The pug nose and down turned mouth on this jade axe appear below a fierce snarling brow. From the mouth protrude the forked interlocking frog leg motif. Though these elements have been called fangs or bifurcated fangs (Furst 1981:150), there is a distinct difference between these and what I am calling "true fangs". From the mouths of the effigy axes in Figs. 60 and 61 "true fangs"

extend from the gums and end in sharp points. Though the fangs from these two figures could be considered feline, in comparison, the "bifurcated fangs" in Figs. 57-59 can barely be called fangs at all.

There are various opinions on what type of creature or deity these figures represent. The faces are commonly called archetypal Olmec were-jaguars (Deihl 2004:39, Furst



Figure 60: Effigy
Axe displaying "true
fangs" 900-600 B.C.

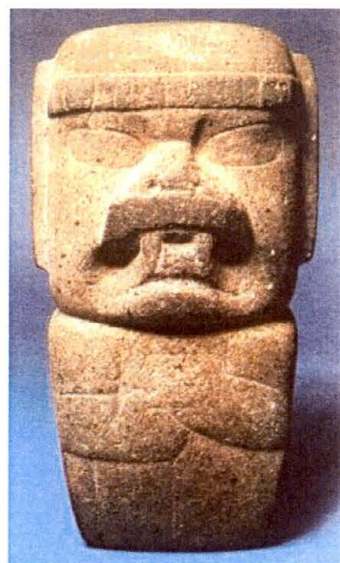


Figure 61: Effigy Axe
displaying "true
fangs" 1000-500 B.C.

1981). Unlike Furst's conclusions stating the faces portray an Earth Mother Goddess, Coe asserts artifacts, like the Kunz axe, are illustrations of the "crying jaguar baby" Rain God (1968:45). Though this identification ignores the presence of the supernatural's toadiness, the association of this figure with the Rain God may be accurate.

The evolution of Mesoamerican rain god iconography is depicted by Miguel Covarrubias' chart in Fig. 62 (Covarrubias 1957:62, Taube 1995:94-95). According to



Figure 62: Chart depicting evolution of Mesoamerican rain gods by Miguel Covarrubias. Covarrubias, the evolution begins with an Olmec "jaguar" mask and transforms into the rain gods Chaac, Tajín, Tlaloc, and Cosijo (1957:62-63). Taube states the chart depicts the Olmec ancestor of the rain god (Fig. 62a) as a jaguarian being (1995:95). Of course, this image is clearly

reminiscent of Fig. 43, sharing various attributes of a toad. As discussed in the previous chapter, the toad's mythical association with the rainy season has been constant throughout Mesoamerican belief systems. Rather than a multitude of rain gods developing from a jaguarian ancestor, it makes more sense that the Olmec "jaguar" mask displays features of the toad.

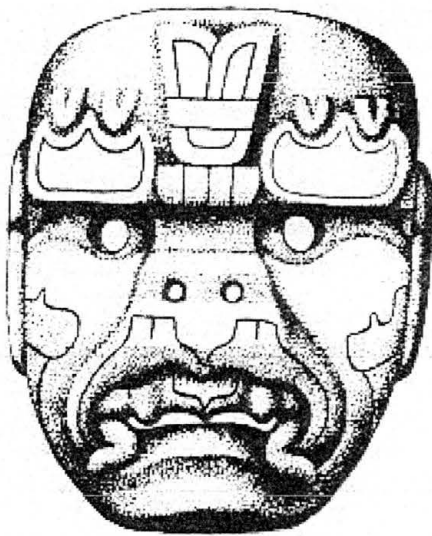


Figure 63: Illustration of
Olmec Greenstone Mask by
Covarrubias

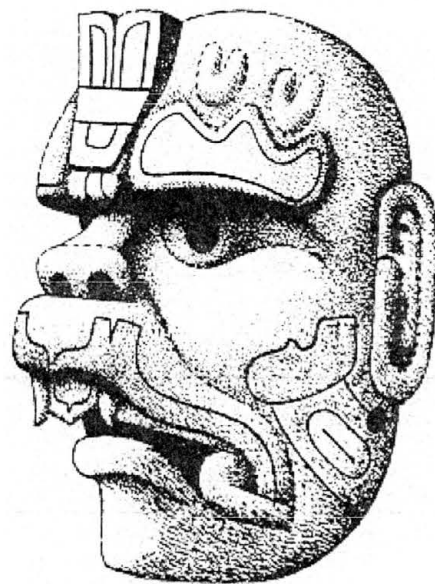


Figure 64: Illustration of
side view of Olmec
Greenstone Mask by

Further evidence of this toad ancestry can be seen in depictions of later rain gods (Figs. 62c and 62j). Figs. 63 and 64 (also pictured in Fig. 62c) are detailed illustrations, by Covarrubias, of a late Olmec greenstone mask from Veracruz (Coe 1968:147). The cleft head has been replaced by what appears to be wrapped vegetation or what

Joralemon calls "Blade-like Maize Vegetation" (1971:13). Emerging from the "flame brows" are additional small forked vegetation-like elements. It is not unreasonable that fertility and rain motifs would be combined. The face also consists of a pug nose and down-turned mouth. The cheeks of the mask are incised with a motif; similar to the "flame brow", atop rectangular structures marked with vertical ovals. Incised on the upper lip of the mask are two forked designs. Interestingly, not only do toad legs hang from the corners of the mouth, but "true fangs" also protrude from the gums. This is the first time these motifs have been seen in conjunction. As I have previously stated, it is possible, not unlike the modern Maya; Olmec shamans wore masks such as this to honor the rain god during rituals for agricultural fertility.

Joralemon's Study Revisited

Within his study of Olmec iconography, David Joralemon presents the first dictionary-like list identifying common Olmec motifs. This analysis allows for a more specific classification of some of these symbols. For instance, the "cleft tail" (Joralemon



Figure 65: Illustration of "Cleft Tail" by Joralemon

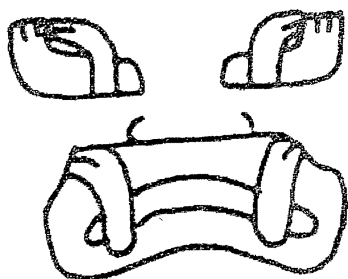


Figure 66: Illustration
of "Vegetation Sprouting
from the Facial Region"
by Joralemon

1971:11) in Fig 65 is clearly the
cropped hind end of a toad.

Additionally, the face motif in Fig.
65 termed "vegetation sprouting from
the facial region" (Joralemon

1971:13), more closely resembles the
protrusion of shedding toad skin.

Joralemon has numbered various god representations
based on the identification of various characteristic
combinations (1971). Two of these in particular share

qualities previously described in this
chapter as toad-like. The first of
these gods is God I (Fig. 67). The
images in Figs. 54-59 would all be
considered depictions of God I under
this classification.

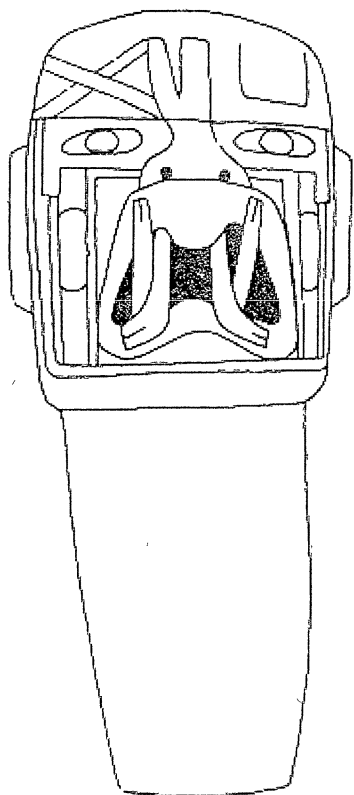


Figure 67:
Illustration of Olmec
Hacha by Covarrubias

God I is described as having a
wide flattened nose and one to two
pairs of cleft elements protruding
from the mouth. When a depiction
displays two pairs of these forked
elements, as does the illustration of
an Olmec hacha in Fig. 67, Joralemon

identifies the downturned pair as fangs and the up-turned pair as vegetation (1971:58). As I have provided examples of how the Olmec represent "true fangs" (Figs. 60 and 61), I firmly believe the downturned elements signify *Bufo marinus* toad legs. As for the up-turned elements, symbolism of vegetation is a possibility. Though I find it more likely to be symbolic of the toad's four legs, the religious connection between toads and agriculture cannot be denied.

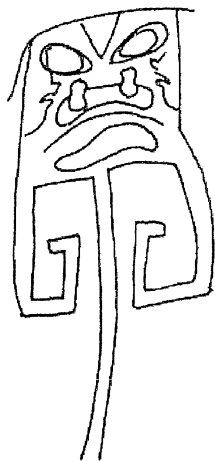


Figure 68:
Illustration of God
X

Fig. 68 is a representation named by Joralemon as God X (1971:86). Characteristics of God X include a cleft head, narrow eyes, a toothless mouth, and figure eight elements coming from the nostrils. This character is similar to those incised above the eyes on Figs. 47, 57, and 58. As God X often appears as a secondary god on representations of

major deities (Joralemon 1971:86), it is likely that Figs. 47, 57, and 58 are highly important supernaturals. If Joralemon is correct in his identification of this figure as God X, it is obvious the god has a close relationship to the toad or bufotinen use.

Now that the toad has been identified within the corpus of Olmec iconography, it is important to understand its purpose there. The following chapters are dedicated to not only proving the potential value of the toad within the shamanic tool kit, but also how its depiction within Olmec art indicates the methods of its utilization.

CHAPTER 6

CHEMICAL PROPERTIES AND USE OF BUFOTINEN

The purpose of this chapter is to explore the hallucinogenic properties of the toxin bufotinen, found in the paratoid glands of *Bufo marinus*. First, I will explain the neurological processes of hallucination. Next, due to the chemical compound dimethyltryptamine (DMT), its similarities to lysergic acid diethylamide (LSD) I will describe the physiological and psychological effects these substances produce in humans. I will then discuss the chemical properties of bufotinen and how it reacts within the human brain. Finally, I will discuss the possible methods used to exploit the toxin, including techniques employed by other cultures throughout history.

David Lewis-Williams describes the neuropsychological model which defines three stages of hallucination. The first stage consists of various geometric shapes that seem to rotate and pulsate with light. These geometric shapes are called entoptic images (Lewis-Williams 2001:337).

In stage two of the neuropsychological model the brain attempts to interpret the entoptic phenomena (Lewis-Williams 2001:338). Wavy lines often take the shapes of snakes while spots may become seed pods or portals. The progression of hallucinations is highly susceptible to suggestion at this point. The individual's environment and state of mind are highly influential in this stage (Lewis-Williams 2001:339). A transition, manifested as a vortex, occurs between stages two and three. The sides of the vortex are often gridded (Lewis-Williams 2001:339). This experience may be likened to going through a portal, i.e. leaving one realm of existence and entering another.

In stage three of the model, fully formed hallucinations occur. Individuals begin to see "otherworldly" beasts and feel as though they are experiencing transformation themselves



Figure 69: Serpentine Mask 900-600 BC



Figure 70: Frontal view of Harpy Eagle

(Lewis-Williams 2001:339). Within stage three, hallucinations occur not only to visual senses but somatic senses as well, meaning, hallucinations are felt physically. An individual may experience prickling of the skin as if they were being shot with darts (Lewis-Williams 2001:342) or growing fur. The feeling of taking flight is another common somatic hallucination. Individuals may experience the feeling of flight as they take on physical abilities of sacred avians in order to enter the celestial realm of the gods. In Olmec art this is represented by the adoption of harpy eagle attributes. Often referred to as "flame brows", the harpy eagle's distinct orientation of feathers upon its crown, is portrayed above the eyes on many Olmec transformational figures (see Figs. 69 & 70).

Authors Newberg, D'Aquili, and Rause believe they have pinpointed the area of the brain responsible for the types of hallucinations that occur in stage three of the neuropsychological model (2001). The parietal lobe, which is located beneath the crown of the skull, controls sensory perception, body orientation, and visual and spatial tasks (Newberg et al. 2001:19). This region of the brain is also the center for language, an important component in creating myths (Newberg et al. 2001:65).

Physiological Effects of LSD/DMT

As will be discussed within this chapter, the active hallucinogen in *Bufo marinus* toxin, bufotinen, shares many chemical properties with the active hallucinogen in LSD. This includes the resulting effects. It is important to note that there is a broader spectrum of physiological effects from LSD use than any other drug (Grinspoon and Bakalar 1979:11). The following is a list of physiological effects commonly experienced when using LSD:

- Dilation of the pupils
- Increase in deep tendon reflexes
- Increased heart rate
- Increased blood pressure
- Increased body temperature
- Mild dizziness
- Mild nausea
- Mild chills, tingling, and/or trembling
- Slow deep breathing
- Loss of appetite
- Insomnia
- Activation of sympathetic nervous system (i.e. the body's system to physically prepare for emergencies) (Grinspoon and Bakalar 1979:11-12).

The physiological effects of DMT, the hallucinogenic compound in bufotinen, are similar to those of LSD. The only outstanding difference in the effects of DMT is an increase in intensity and occurrence of pupil dilation, increased blood pressure, and increased heart rate (Grinspoon and Bakalar 1979:19).

Psychological Effects of LSD/DMT

The psychological effects of DMT are the same as those brought on by LSD, though they may affect the user with more immediacy and with greater intensity (Grinspoon and Bakalar 1979:19). Authors Grinspoon and Bakalar describe the psychological effects of DMT as, "... like instant transportation to another universe for a timeless sojourn (1979:19)." The psychological effects of LSD are tremendously variable and often influence the user to one extreme or another (Grinspoon and Bakalar 1979:14). The following is a list of these psychological effects:

- Generally associated with:
 - changes in perception
 - changes in feelings
 - changes in thought
- Brilliant and intense impact of sensory stimuli on consciousness
- Esthetic responses are greatly heightened
- Heightened body awareness and changes in the appearance and feeling of body parts
- Vibrations and undulations in field of vision
- Heightened and distorted depth perception
- Prolongation of after images
- Appearance of anthropomorphized inanimate objects
- Synesthesia (sensations of seeing sounds, hearing or tasting colors, etc.)
- Time slowing or stopping
- When individual closes eyes fantastical images appear in the following sequence:
 - 1st geometric shapes
 - 2nd landscapes
 - 3rd structures
 - 4th animate beings
 - 5th symbolic images
- Impaired short term memory

- Intense introspection
 - Heightened effect of environment on sensibilities causing extreme emotional responses
 - Feelings of transcendence above everyday life and people
 - Boundary between self and the environment disappears and individual may feel as though they have become one with the natural environment, other people, and/or animal(s).
 - Feeling of past incarnation
 - Feeling of identification with a particular animal
 - Feelings of death and rebirth
 - Become extremely suggestible
 - Feeling of floating above one's body
 - Feelings of interaction with the gods
- (Grinspoon and Bakalar 1979:12-14).

The last eight psychological effects are particularly likely to increase an individual's sense of transformation and transcendence to another realm. As the physiological and psychological effects of these substances are so variable, one must take care to control or consider mood, personality, expectations, and setting before taking drugs (Grinspoon and Bakalar 1979:14).

Chemical Properties of Bufotinen

The following sections of this chapter review the dispute on the viability of *Bufo marinus*' toxin as a hallucinogenic. Numerous physiologists and chemists have done studies and experiments to answer this hotly debated question with mixed results. In the end, it boils down to

if and how the toxin travels from the point of ingestion to the brain.

The blood brain barrier (BBB) is a system of tightly adjoining cell walls in the brain's capillaries that protects the brain from fluctuating body chemistry, viruses, and foreign chemicals or bacteria (McBride 2000:327). In order for any physiological or psychological effects to take place, a hallucinogen must be able to pass the BBB and bond with serotonin receptors (McBride 2000:323). This is a difficult task for a number of substances. On the matter of the permeability of the blood brain barrier, McBride quotes renowned Physiologist Arthur Guyton:

In general, the blood cerebrospinal fluid and the blood-brain barriers are highly permeable to water, carbon dioxide, oxygen, and most lipid soluble substances such as alcohol and most anesthetics, ...and almost totally impermeable to plasma proteins and many large organic molecules. Therefore the blood cerebrospinal fluid and the blood-brain barriers often make it impossible to achieve effective concentrations of...some non-lipid soluble drugs in the cerebrospinal fluid or parenchyma of the brain.

(McBride 2000:326)

The drug bufotinen, posses several attributes which make it difficult to penetrate the BBB. First, it is a large molecule. Bufotinen also has a low lipid solubility (chemical's solubility in fatty tissues, allowing for absorption into the body), making the crossing of the BBB even more difficult (Lyttle et al. 1996:278, McBride 2000:321). Bufotinen also has a low partition coefficient,

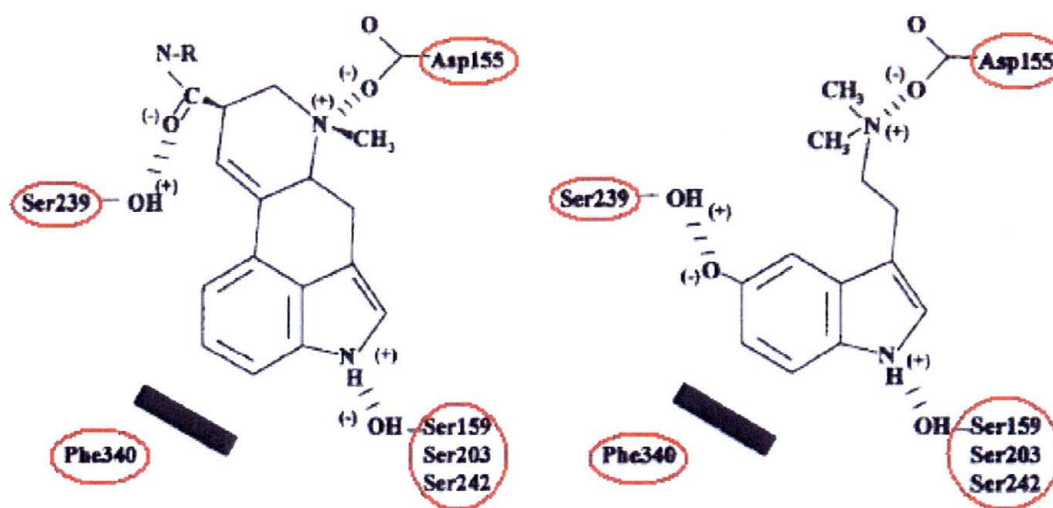


Figure 71: Illustration of potential binding sites for 5-HT_{2A} and 5-HT_{2C} receptors in LSD (left) and Bufotinen (right)

0.06. This attribute deals with a molecule's extent of distribution. One sign of a low partition coefficient is being insoluble in water (McBride 2000:326-327). McBride states, the proposed minimum partition coefficient for hallucinogenic activity is 1.40 whereas the optimal level is 3.14 (2000:326). This low partition coefficient is the final hurdle in crossing the BBB.

Out of the fifteen serotonin receptors in the brain, receptors 5-HT_{2A} and 5-HT_{2C} are closely linked to hallucinatory experiences (McBride 2000:323-324). Though the partition coefficient for LSD is an optimum 3.30, as Fig. 71 illustrates, bufotinen and LSD have almost identical potential binding sites for 5-HT_{2A} and 5-HT_{2C} receptors (McBride 2000:325). These data prove the toxin's potential for causing the same hallucinogenic results. Of course, a means of crossing the BBB must first be established.

Various circumstances can be created which will disrupt the effectiveness of the blood brain barrier. A rapid increase in blood pressure, for instance, can cause the BBB to "leak" larger molecules (McBride 2000:327). Experiments involving chemically induced hypertension using vasopressors, like epinephrine, have resulted in the BBB allowing access to previously impassible molecules (McBride 2000:327-328). McBride concludes, though bufotinen can likely cross a disrupted BBB, it is an inefficient hallucinogen when used unaided by additional chemicals (2000:328).

Collection of the toxin secreted by Bufo toads is relatively simple. Recent chemists and biologists have recorded various ways in which to extract the venomous

toxin from toads. First, the toad must be a living specimen. The toxin is only produced when the toad is in a heightened state of agitation. Dead toads do not produce the venomous substance (Chilton et al. 1979:62). While holding a glass dish or bowl over the head of the toad, the paratoid gland can then be squeezed either by thumb and forefinger or by the use of forceps. The toxin will then shoot into the container (Chilton et al. 1979:62; Chen and Kovaříková 1967:1535).

Human experiments with bufotinen have yielded ambiguous and varied results. In 1955, researchers Fabing and Hawkins (1956) systematically injected prisoners from the Ohio Penitentiary with increasing doses of the sole agent bufotinen. The experiences of the subjects were recorded along with the exact time they were happening after the injection. Experiences varied from changes in facial coloring, tingling sensations, vomiting, and various changes in vision and visual perception (Chilton et al. 1979:63, Fabing and Hawkins 1956). Harris Isabell conducted several experiments with bufotinen on human subjects in 1956. First, he administered the drug as a snuff with no results. Next, he administered the drug intravenously resulting in slight changes in visual perception and minor hallucinations (Chilton et al. 1979:63). In 1959 an

experiment was conducted in New York on schizophrenic patients by Turner and Merlis. The patients were, once again, injected with straight bufotinen. Though no hallucinations were reported, the drug had an intense effect upon the peripheral nervous system (Chilton et al. 1979:63-64). The peripheral nervous system consists of the somatic and sensory systems and, unlike the central nervous system; it is not protected by the BBB. In 1985 an experiment was reported by W. R. McLeod and B. R. Sitaram where subjects were given bufotinen in the form of nasal drops. At high dosages subjects experienced extreme paranoia and changes in visual perception (Lyttle 1996:278).

Though occasional perceptual changes and visual manifestations occurred in these experiments, no full hallucinations were experienced. Bufotinen, which has been shown to amass within the brain in small amounts, paired with the high dosage given to subjects may explain the minor physiological and psychological responses (McBride 2000:328). These results are likely due to bufotinen being the lone substance injected into the individual.

The results are compromised by the removal of bufotinen from the other natural agents within Bufo toads. Toad skins are home to a number of indolealkylamines

(bufotinen), cardiotoxic sterols and, most importantly, catecholamines. The cardiotoxic sterols in the venom of Bufo toads can be lethal. Even in diluted amounts, when injected into animals bufotinen caused the heart rate to slow and eventually stop (Chilton et al 1979:62). Epinephrine is a highly abundant catecholamine and Bufo *marinus* toxin and skin can contain up to 5% of this hormone (McBride 2000:328).

Smoking of the toad's skin could be an effective way to neutralize the lethal cardiotoxins while the inhalation of epinephrine can intensify its potency as a vassopressor (McBride 2000:329). Authors Davis and Weil reported hallucinogenic results from experiments involving smoking of dried skins derived from Bufo *alvarius*, a relative of Bufo *marinus* originating from the Sonora Desert in Northwestern Mexico (McBride 2000:323). McBride also proposes that an enema made from a combination of epinephrine and bufotinen may be an effective method of use (2000:329). If bufotinen is left intact with the other naturally occurring substances in the toad's toxin, the active hallucinogen will likely be able to pass the blood brain barrier and bind with the necessary serotonin receptors.

Potential Use Methods of Bufotinen

Hallucinogenic substances found in plants have been used for centuries all over the world by individuals attempting to bring themselves closer to the divine (Grinspoon and Bakalar 1979:37). Just as these cultures found a way to harness the chemical abilities within plants like mushrooms and morning glories, many also made use of the bufotinen toxin found in various species of the Bufo toad. Perhaps further investigation of the methods used by these peoples to exploit the hallucinogenic properties of the toxin will further illuminate the possible methods used by the Olmec.

Though, as previously discussed, some may doubt the abilities of prehistoric people to have successfully utilized bufotinen, Chilton et al. report various documented cases of ancient toad toxin use. Drugs derived from toad toxins have been recorded in ancient European and Chinese pharmacological records (Chilton et al. 1979:62). One of these methods includes the drying of toad skins (Chilton et al 1979:62). The drawing of poisonous toad skins through a pierced septum has also been called a cure for night-blindness in ancient Chinese pharmacological records and a method of sharpening vision for hunting by Patamona, Arecuna, and Macusi people. Midwives from across

the globe including those in Egypt and China have used toad toxins during childbirth to increase contractions of the gravid uterus (Kennedy 1982:276). It is documented that the external use of toad venom acts as a powerful hemostatic (Lyttle et al. 1996:279). The epinephrine in the toad's toxin causes the blood vessels to constrict, therefore stopping bleeding. This capability was capitalized upon by various cultures. In France a medicine called BUFON™ was sold for this purpose until 1960 (Lyttle et al. 1982:279).

Juvenal, a Roman satirist, wrote of the use of toad toxins by Roman prisoners in the late 1st century AD (Chilton et al. 62). In the 16th century, Italian prisoners would use the toad to slowly poison themselves. The poison was created by placing a toad along with salt into bag and shaking it. As the toad becomes agitated it secretes its toxin which is absorbed by the salt (Chilton 1979:63).

Toad toxins have been used to poison the tips of arrow heads by various cultures in South America. For example, the Choco Indians of Colombia created poison arrow heads by placing a toad inside a bamboo tube, heating it over a fire, collecting the secretions, letting it thicken, then spreading it onto the tips of their arrow heads (Chilton et al. 1979:62).

Richard Schultes describes how several tribes inhabiting the rain forests of South America use toad toxins to enter trance like states. Rather than ingesting it, the tribesmen would cut or burn themselves to introduce the toxin directly into the blood stream (1972:28). Modern day Quiché Maya living in Guatemala carry on a practice, dated back to at least the early 1600's, involving the ingestion of toad toxins fermented in a ceremonial alcoholic beverage (Schultes 1972:28). Perhaps the alcohol aids in the transfer of bufotinen through the blood brain barrier. The chemical reactions between alcohol, bufotinen, and serotonin have yet to be examined.

Kennedy proposes one possible method for the absorption of toad toxin is through a veritable "death mask". She reports that all Olmec jade figurines appear to have pierced septums, though it is unclear what was hung from them. She claims that perhaps the flayed skin of *Bufo marinus* was hung through this hole and the toxin was absorbed through the highly sensitive nasal capillaries (Kennedy 1982:281). Though at this point in time no studies have been done to verify the legitimacy of this hypothesis, various cultures in Mesoamerica (including the Olmec) use snuffs that are absorbed in this manner (Kennedy 1982:281, Grinspoon and Bakalar 1979:18, Schultes 1972:28, Ott 2001).

Perhaps this would be possible if the toad was secreting the toxin before death and the epinephrine in the toxin was sufficient to disrupt the blood brain barrier. In accordance with McBride's suggestion of an enema combining toad toxin with another agent, are numerous examples of snuffs and enema concoctions consisting of dried toad skins mixed with varying plant seeds (Kennedy 1982:282). These plants may contain chemical properties to aid the bufotinen in crossing the BBB. For instance, two of the psychotropic plants native to the region are morning glories and *Nicotiana rustica* (Schultes and Hofmann 1992). The nicotine within tobacco releases epinephrine, serotonin, and other chemicals (Furst 1995:79) which could aid in the transfer of bufotinen to receptor cells.

Ethnographic research uncovered one recipe from several shamans in the Mexican state of Veracruz. Kennedy relates this translation in her article. The paratoid glands are removed from the toad and ground into a paste. Next, it is mixed with lime and ashes of a burned tamtwili plant. The next few steps involve the mixture being boiled with water and corn beer. Finally, a series of evaporations and fermentations takes place. Supposedly, the result is hardened dough that has retained the psychedelic properties

of the toad toxin and eliminated the lethal effects of the cardiotoxins (Kennedy 1982:285).

The last proposal for how the Olmec utilized the venom of the *Bufo marinus* toad is yet another hypothesis presented by Kennedy. Many aquatic birds, such as ducks, have highly efficient bills and livers for ingesting the poisonous toad. The flat bill, having no capillaries in which to absorb the toxin, allows for the squeezing out of the majority of the toad's secretions (1982:287). Their livers, being much more effective than those of other animals, are able to metabolize the poisons without harming the bird (Kennedy 1982:287). Kennedy suggests that the small amounts of toxin ingested by the duck each time it eats a *Bufo marinus* builds up within the liver. If a duck was monitored and habitually fed these toads the liver may then be eaten by an individual to consume a safe dosage of the toxin (Kennedy 1982:287). In the following chapter, artifacts which lend support to a number of these proposals on the use of toad toxin will be discussed.

CHAPTER 7

USE OF HALLUCINOGENS IN THE SHAMANIC TOOL KIT

As previously discussed, I propose that the toxin is used by shamans in rituals to transform into their animal way. This chapter is dedicated to artifacts which support shamanic use of the toad toxin, bufotinen. I will demonstrate that each artifact displays not only toad features, as described in chapter 5, but also the results or its method of use. As hallucinogens have been proven to send the user into another realm, I believe some of these artifacts are meant to represent the transportive power of toad toxin. Other artifacts will be identified as implements within the shamanic toolkit which facilitate the ingestion of the bufo toxin. The final section of this chapter is dedicated to evidence supporting Kennedy's proposal on the use of water fowl to consume the hallucinogen.

Shamanic Transformation

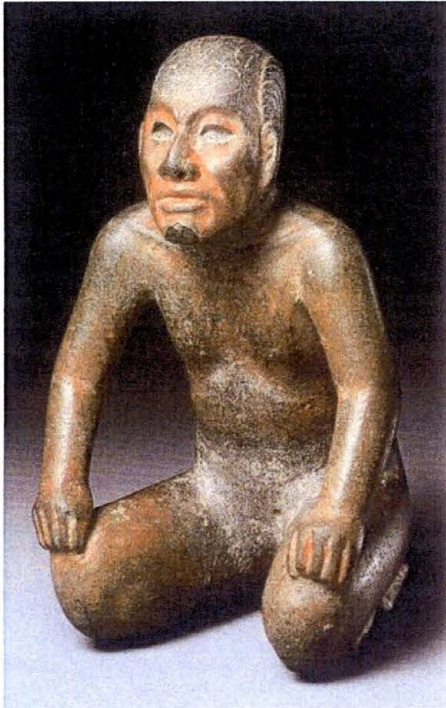


Figure 72: Shaman in Transformation Pose 800-600 B.C.

As previously stated, one of the most recognizable artifacts displaying the use of the *Bufo marinus* in shamanic transformation is the sculpture, *Shaman in Transformation Pose* (Fig. 72)

(Reilly 1989). According to Reilly's hypothesis, he is beginning the process of transformation. The eyes of the shaman were once inlaid with reflective precious stones (Reilly

1989:7). This glistening material would imbue the sculpture a supernatural appeal. This supernatural essence would illustrate the shaman's entrance into an otherworldly realm. Reilly states (rightly so, in my opinion) this sculpture proves the use of *Bufo marinus* toxin as a hallucinogenic aid in the transformation process (Reilly 1989:9). As described in chapter 5, The shaman is depicted with a molting *Bufo marinus* incised on his head.

Iconographers such as Reilly, Furst, Benson, and Joralemon have argued that the sculptures in Figs. 73, 74, and 75 are

related to the *Shaman in Transformation Pose* (Fig. 72), if not carved by the same hand (Reilly 1989:11-14).

Together, these sculptures act as a step by step visual depiction of a shaman's transformation into a jaguar through the use of Bufo toxin. The Hauberg-Dumbarton Oaks figure (Fig. 73) is still seated in the transformation pose but the skin along the collarbone has begun to split. From the split a new head begins to reveal itself depicting the shaman's jaguar *uay* or tutelary animal. The shaman now bears jaguarian ears and mouth but retains a humanoid nose and a set of human ears. In Fig. 74, the shaman is rising from the kneeling position and has become more bestial, only retaining human limbs. Finally, in Fig. 75, the shaman



Figure 73: Hauberg-Dumbarton Oaks Figure



Figure 74: Were-Jaguar Figure
Kneeling on One Leg



Figure 75:
Olmec style
Standing Were
Jaguar

is in a standing position his body and limbs now taking on jaguar-like traits. Not surprisingly, the arms of Fig. 75, terminating in tightly clenched fists, have noticeably enlarged veins. This distension of the veins is a common occurrence when taking hallucinogenic drugs due to the increase in epinephrine into the body (Grinspoon and Bakalar 1979:11-12). According to McBride, the toxin secreted by the *Bufo marinus* is high in epinephrine (McBride 2000:328). It follows that if the shaman in Fig. 75 is the same shaman as in Fig. 72, the effects of the *Bufo marinus* are depicted in both figurines.

Shamanic Tools

Jade spoons, like the one in Fig. 76, are thought to have been used as hallucinogenic snuff trays (Furst 1995:78, 1972:28). Similar artifacts have been found all the way to South America where these snuffers are very



Figure 76: Jade Spoon 900-600 B.C.

common (Furst 1995:78). It is fitting to think that toads would be represented in this artifact type. The hallucinogenic properties of Bufo toad toxin would make them a principal subject for objects in this vein of service. The spoon may have been worn as a pendant by its ritual user (The Olmec World 1996:189). This particular spoon (Fig. 76) closely resembles a tadpole with its bulbous middle and trailing tail. The tadpole is an allegorical image for transformation as the toad develops. The tadpole's journey through maturity also symbolizes the toad's ability to breach the watery underworld and crawl out into the earthly realm.

Often when using certain types of mind altering substances, liquid drains from the user's nostrils. Images depicting this occurrence are found in multiple examples of Olmec iconography. Some of these

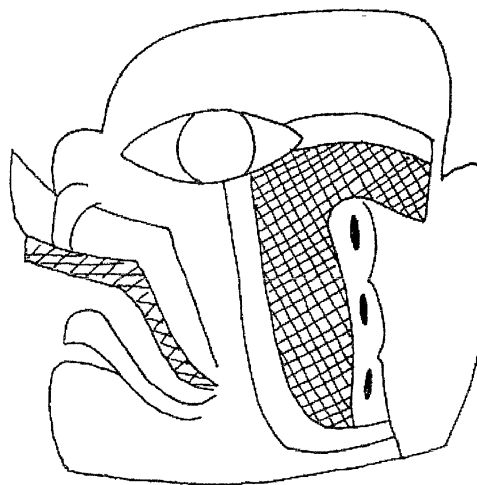


Figure 77: Illustration of image on the Tlapacoya Vessel

images are found in conjunction with toads indicating its exploitation. For instance, the figure on the *Tlapacoya Vessel* (Fig. 77) may have contained a hallucinogenic bufotinen substance that would cause the ritual user's nose

to run. Figures such as the character in Fig. 78, incised on various masks and celts may be indicative of the toxin's use.

The toad effigy vessel from the Río Balsas area, seen in figure 79, was likely a tool for shamanic ritual involving toad venom. The splitting skin revealing a jaguars fur beneath therefore, mimicking the toad's transformative abilities. Witnessing the natural occurrence of the toad's molting would seem very reminiscent to the Olmec's ritual process of shamanic transformation.



Figure 78:
Illustration of
God X



Figure 79: Toad Effigy Vessel
1200-900 B.C.

Hallucinogens were part of rituals where shamans and shaman kings would travel through a portal into another realm (Reilly 1994). The double merlon motif appearing on the bowl symbolizes the opening of a portal (Reilly 1994). This motif leads me to believe a hallucinogen derived from *Bufo marinus* poisons was contained

within the vessel.

Transportation to the "Otherworld"

The toad's ability to travel from one realm to another is utilized in the symbolism on Monument 6 from La Venta

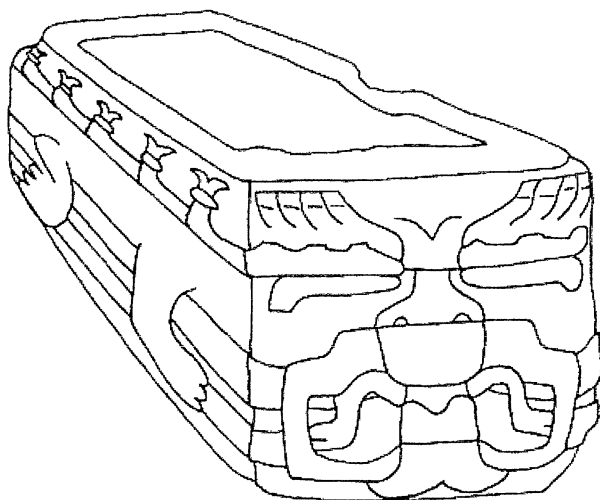


Figure 80: Monument 6 from La Venta 400 B.C.

(Fig 80). Perhaps the individual who was buried within this crypt wished to illustrate their capacity to harness the toad's ability to travel between realms.

This ensures safe travel from the world

of the living to the world of the dead.

It has also been postulated that the appearance of frog legs in the mouth indicates rebirth (Furst 1981:158). When appearing on transformation figures, the motif symbolizes the shaman's "rebirth" as his *uay*. On the other hand, in the case of a sarcophagus the following passage by Furst seems especially poignant.

The so-called "bifurcated fangs" thus appear as nothing other than nature replicated to symbolize the drama of cyclical death and rebirth in the earth. By depicting in a composite image this extraordinary process in the toad as the earth's

metaphor precisely at the point when the animal is altogether free of its dead epidermis, while the last of it is still being sucked into its own toothless mouth, the Olmec artist has admirably succeeded in synthesizing destruction and regeneration in a single image...

(Furst 1981:160)

With this idea in mind, the discovery of the toad symbolized on a sarcophagus raises the toad from a mere substance to a powerful icon whose power can be harnessed through the use of its image. Like so many humans before and after him, the individual entombed in this coffin may have tried to ensure his place in the afterlife.

Duck Imagery

If the use of ducks played an important role in the preparation of the Bufo toxin, then a considerable amount of duck imagery should be found within the corpus of Mesoamerican art. This section will introduce the appearance of duck imagery in Olmec and Mayan art.

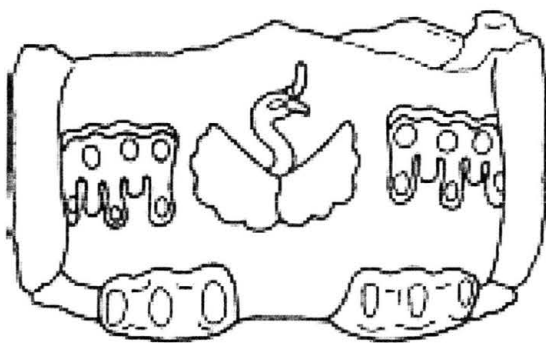
In the article *Another Look at Bufo marinus and the San Lorenzo Olmec*, the authors investigate the popular belief that bones of the Bufo marinus found here are proof of their ritual utilization (Cyphers et al. 2005). Their findings conclude the bones found at this site were likely not a result of human interaction what-so-ever. The large

deposit of *Bufo* bones was a singular find where one would expect multiple excavation units to produce these caches if they were being used habitually (Cyphers et al. 2005:129). They concluded this singular find was more likely due to the erosion of earth into the ravines from which the bones were excavated (Cyphers et al. 2005:131). Though this may be true, the argument is not for the habitual use of *bufo* toads but ritual use.

One might think this was enough evidence to reject the use of *Bufo marinus* toxins (at least from this site) but Kennedy proposes a method of diluting the poison to make it consumable for humans. This intriguing process involved the employment of ducks. Kennedy witnessed water fowl (ducks especially) native to the Olmec region feeding on *Bufo marinus*. The ducks were able to drain the toads of the majority of their poison. Due to their highly sophisticated livers and practical flat bills, the ducks were able to digest the toads without recourse (Kennedy 1982:286). She concluded the proper preparation of a duck's liver which had recently eaten a *Bufo marinus* would result in a non-lethal hallucinogen (Kennedy 1982:286).

There is a great deal of evidence that ducks were of immense importance to the Olmec. San Lorenzo (the same site from which Ann Cyphers et al. reviewed research on *Bufo*

bone caches) was home to a complex hydraulic system. At one end of this system a large duck shaped basin was discovered; Monument 9 (Fig. 81). Monument 9 had wings and feet of a duck as well as a carved flying duck figure on the breast. The function of the basin is thought to have been ritualistic and not utilitarian. The illustration of



the duck flapping its wings has been explained as having connections with the coming of rain (Taube 2004:173).

Figure 81: Monument 9 from San Lorenzo Perhaps, as the water fowl were consuming the whole toad, the absence of *Bufo marinus* bones in ritual settings may then be explained. Another interpretation for the basin has been as a ritual bathing area for the king to bring rain (Diehl 2004:39).

Duck representations are common among Olmec, Protoclassic, and Early Classic Maya (Taube 2004:171). Artifacts with duck imagery were highly ceremonial.

For example, the duck effigy vessel from Fig. 82 was a

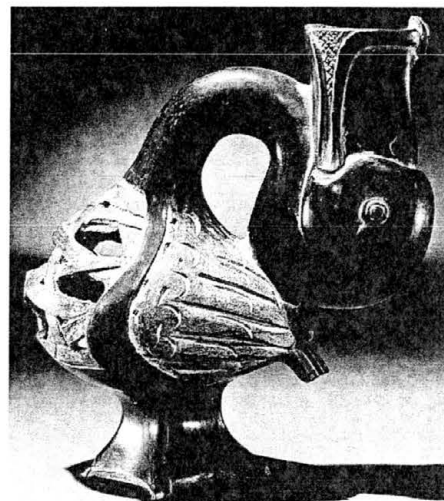


Figure 82: Duck Effigy Vessel 1250-900 B.C.

ceremonial incense burner. Incense burners appear in depictions of ritual performances quite often in Olmec art. The incense was placed and burned in the cylindrical bill where the smoke would be released. The neck is hollow and would allow for the scent to flow from the open gridded breast (The Olmec World 1996:182). While waiting for the bufo toxin to take effect, the shaman will be surrounded by the pungent haze emitted from an incensario such as the one seen in Fig. 82.



Figure 83: Jadeite
Duck Billed Pendant

La Venta, another Olmec center, produced two monumental sculptures representing duck bill masks and three duck billed pendants, like those of Figs. 83 and 84 (Kennedy 1982:285).

There are holes drilled on either side of the jade or serpentine objects so they could be worn.

These pendants display

an individual with a normal human face until, below the nose, a large duck bill is present. It is possible the figure here is representative of an individual wearing a



Figure 84: Duck
Billed Pendant
900-600 B.C.

buccal mask (Kennedy 1982:285) or perhaps a shaman displaying his duck uay (The Olmec World 1996:266). Kennedy believes while dressed in this duck-like garb, a shaman was attempting to gain the duck's power of withstanding the Bufo toxin.

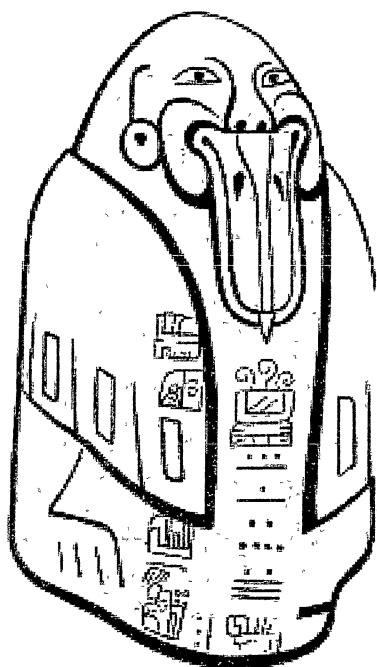


Figure 85: Tuxtla Statuette

Finally, a statuette of a shaman in full duck regalia is represented in the Tuxtla statuette (Fig. 85). The bill, and its placement, is almost identical to those in Figs. 83 and 84. The statuette is an example from Epi-Olmec culture. It was found in the Tuxtla Mountains neighboring the Olmec heartland. The inscriptions found on the object are actually part

of an Isthmian writing system (Diehl 2004:184). This artifact may represent a shaman displaying his spirit companion, or an attempt to imbibe the powers of the duck to ingest Bufo hallucinogens. Either way, it is obvious the imagery of the duck was of considerable importance to the Olmec and their predecessors.

CHAPTER 8

CONCLUSIONS

In the end, the toad proves itself to be of a greater import to the Olmec than previously speculated. As I have illustrated, features formerly assumed to be jaguarian are actually those of the toad or representations of bufotinen usage. Furthermore, within this thesis different artifact forms have been discussed and demonstrated as meaningful toad representations. There has been harsh skepticism as to the use of *Bufo marinus* toxins in shamanic rituals, but one must not underestimate the Olmec's understanding of the natural world and their ability to manipulate it to their advantage.

The appearance of toads in various aspects of later Mesoamerican cultures further the likelihood that Olmec art is the source of later toad representations. As Panofsky and Layton warn, anthropologists must be wary of their initial evaluations of ancient art.

Artistic representations of transformation and altered states of consciousness, though seemingly fanciful, in many respects may be more representational of true experiences

within the human brain. "If we can show correspondence between the imagery of altered states of consciousness as established by neuropsychological research and the imagery of an art, we can infer that altered states of consciousness were associated with the production of that art." (Lewis-Williams 2001:345). Though bufotinen is not a viable hallucinogen on its own, McBride has proposed numerous possibilities which would make it so (2000). Bufotinen is a toxin not unlike LSD or DMT. As previously discussed, the toxin needs only to breach the blood brain barrier in order to send the shamanic user into a hallucinogenic trance. The research done by McBride has shown the pharmaceutical properties of bufotinen make it an ideal substance for entering a trance-like state (2000).

Iconographers would also do well to re-examine shamanic relationship with respect to birds. Like many symbols in Olmec art, they can display a variety of meanings at once. It is possible that shamanic flight and the bringing of rain are only part of what these avian images reference.

Through numerous structural analyses, I have proven that the toad has been overlooked in the studies of Olmec iconography thus far. In conclusion, future studies will only add to our knowledge of the shamanic toolkit and

rituals. It follows that the toad has significance to the Olmec that may shed light on other aspects of Formative period shamanism not yet understood.

Future research, especially in Maya studies, may include investigation of the toad's association with death and rebirth. The toad has been found in this context not only in the Olmec Dragon sarcophagus in Chapter 5, but also in zoomorph G from the Maya site of Quirigua (see Chapter 4). Zoomorph G was erected as a death monument to Quirigua's most celebrated king, K'ak' Tiliw Chan Yopaat (Matthew Looper, 2009). Looper states the human figure emerging from the rear of the zoomorph appears to be coming from the animal's birth canal, possibly symbolizing ancestral rebirth (1996:187). Additionally, the death of the Mayan Lord 18 Rabbit, recorded on the Copan Hieroglyphic Stairway, refers to the king as being reborn in death through the use of the upended toad glyph (Looper 2009, 1996:78). As rebirth is a dominant theme in Mesoamerican mythology (Tedlock 1996), any symbol relating to this subject warrants further investigation.

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