The International Journal of the Addictions, 28(6), 521–538, 1993

Misuse and Legend in the "Toad Licking" Phenomenon

Thomas Lyttle

P.O. Box 4465, Boynton Beach, Florida 33424. Telephone: (407) 734–3809

ABSTRACT

Between 1988 and 1992 a new illicit drug experience arrived on the cultural scene in the United States, Canada, South and Central America, and Australia. The media created a frenzy of misinformation in reporting on the latest drug craze which was termed "toad licking." The uses of bufo toad secretions have occurred throughout history in a variety of cultural milieus. These are explored as a backdrop to contemporary drug use/misuse issues. At the interpersonal and social level, media exposure helped create and maintain the use/misuse phenomenon, turning a fairly obscure activity into a potential epidemic.

Key words. Hallucinogenic drugs; Media; Altered states

INTRODUCTION

"Toad licking" is a contemporary colloquial euphemism given to the oral ingestion of the glandular secretions of the bufo toad. The genus *Bufo* includes *Bufo marinus* (the common marine toad; see Fig. 1) and related species (e.g., the European *Bufo vulgaris*, the Amazonian *Bufo aqua*, and the North American *Bufo alvarius)*.

All have parotoid glands located on their backs. These glands produce a wide variety of biologically active compounds including dopamine, epinephrine, norepinephrine, and serotonin (Boys, 1959; Marki et al., 1961).

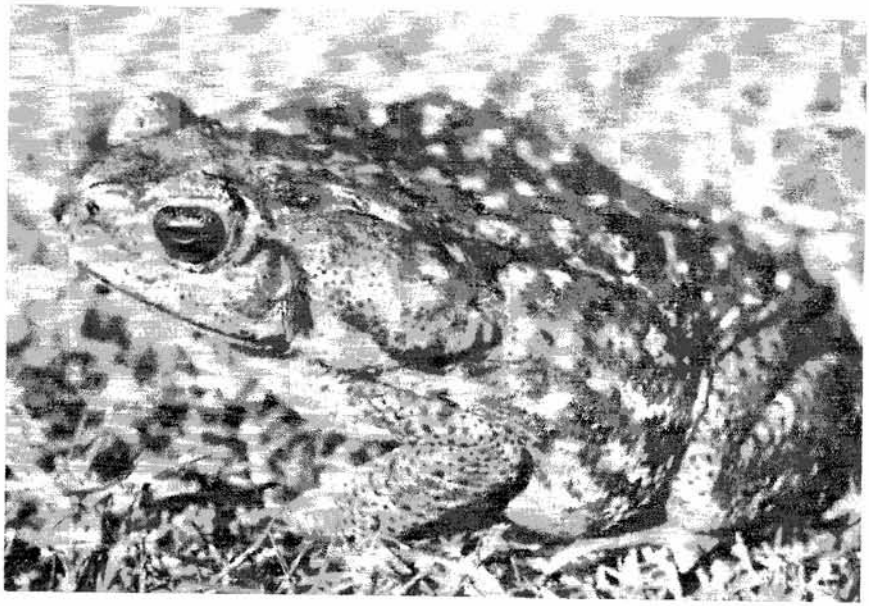


Fig. 1. *Bufo marinus* (above, the common marine toad, showing the prominent parotoid glands), *Bufo alvarius, Bufo aqua,* and *Bufo vulgaris* all share similar physical characteristics. *Bufo alvarius* has additional glands on its legs and at the corner of its mouth called "tibial glands." *Bufo marinus* also grows to a much larger size, the largest on record weighing 4 pounds. (Photograph by Dennis Carnejo.)

These compounds are all neurotransmitters found in animal tissue. Other compounds secreted by the bufo toads include the *extremely* cardioactive steroids bufogenin and bufotoxin (Gessner et al., 1961; Erspamer et al., 1967; Turner and Merlis, 1959). The genus *bufo* also produces the *possibly* hallucinogenic compound bufotenine (5-hydroxy-dimethyltryptamine). See Table 1.

I say "possibly" because there exists a plethora of confusing and contradictory studies, news reports, and anecdotal accounts surrounding various uses of bufotenine and toad secretions generally. See Table 2.

These many studies include the purely pharmacological, the anthropological, the religious, and most recently report on unusual illicit uses or misuses by the general public to get "high," etc. The latter is reportedly done by "licking" the parotoid glands of live bufo toads.

"TOAD LICKING"—SOME HISTORICAL ANTECEDENTS

The first wave of news reports regarding "toad licking" or the oral ingestion of bufotenine occurred in the mid-1980s in the popular press, where it was

Table 1.

Major Categories of Constituents of Toad Venoms

I. Toxic Venoms

A. Bufogenins—Generally known as bufagins. This class of organic molecules represents the major cardioactive principle biosynthesized from cholesterol containing 24 carbon atoms in their structure. These may be distinguished from the 23 carbon steroids of digitalis and strophanthus. These do not contain nitrogen and are generally labeled with alphabetic letters.

B. Bufotoxins—These molecules contain nitrogen and are conjugates of the steroidal bufogenins with suberic acid/arginine (suberylarginine).
   1. Vulgarobufotoxin—First isolated from the European Toad, *Bufo bufo bufo* in 1922.
   2. Cinobufotoxin—first isolated by Chen and Chen from Chinese medicinal preparation ch'an su, (Japanese senso) from 1929–1931. Identified by K. K. Chen (1931–1933) as coming from skin preparation of Asian toad, *B. gargarizans*.
   3. Gamabufotoxim—First isolated from Asian toad, *B. formosus* in 1930. Its steroid residue is called gamabufotalin.
   4. Marinobufotoxin—First given the name of bufagin by Abel and Macht in 1911. Isolated from *B. marinus* in 1930.
   5. Alvarobufotoxin—First isolated in a very small amount as an amorphous form by Chen and Chen in 1933; recently isolated from *B. alvarius*, along with cholesterol.

An unconjugated cardiotonic steroid molecule was extracted from *B. marinus* in 1988 and named bufalin. The bufotoxins are generally distinguished by the number and location of hydroxyl radicals.

II. The Phenethylamine Bases—The Catecholamines

	Isolated from *Bufo marinus*, *B. aqua*: the American tropical toad	Isolated from ch'an su; *B. gargarizans*
A. Dopamine	×	
B. *N*-Methyl-dopamine (epinine)	×	
C. (-)Noradrenaline; (-)norepinephrine	×	×
D. (-)Adrenaline; (-)epinephrine;	×	×
E. Corresponding enzymes:		
1. Catechol-*O*-methyl transferase	×	
2. Phenylethanolamine-*N*-methyl transferase	×	
3. Nonspecific *N*-methyl transferase	×	
4. Imidazole-*N*-methyl transferase	×	

III. The Tryptamine Bases

	A[a]	B[b]	C[c]	D[d]
1.[e] Serotonin, enteramine, 5-hydroxytryptamine, 5-HT	×	×	×	×

(*continued*)

Table 1. *Continued*

	A[a]	B[b]	C[c]	D[d]
2.[e] *N*-Methyl-serotonin, *N*-methyl-5-HT	×	×	×	×
3.[f] Bufotenine, *N*-dimethyl-5-HT	×	×	×	×
4. Bufotenidine, *N*-trimethyl-5-HT	×		×	×
5.[g] *N*-Methyl-5-methoxy-tryptamine		×		
6.[g] *O*-Methyl-bufotenin, *N,N*-dimethyl-5-methoxy-tryptamine		×		
7.[h] Dehydrobufotenine	×		×	×
8.[i] Bufothionine				×
9.[j] Bufoviridine		×		

[a] *Bufo marinus*—American tropical toad.
[b] *B. alvarius*—Colorado River toad.
[c] *B. bufo bufo*—European toad.
[d] *B. gargarizans*—Asian toad; probable source of ch'an su.
[e] Vasoconstrictive agents producing autonomic and cardiovascular distress.
[f] Paradoxical hallucinogenic agent with pressor effects.
[g] hallucinogenic.
[h] Convulsant agent with a novel tricyclic structure.
[i] Sulfate ester of dehydrobufotenine.
[j] Sulfate ester of bufotenine.

Table 2.

Pharmacological Profiles of Bufotenine/Bufotenin

A. Bufotenin isolated from parotoid glands of *Bufo bufo bufo, B. vulgaris,* the European toad, and *B. aqua, B. marinus,* the giant tropical toad:

1. Phisalix, C.; Bertrand, G. (1893). *C. R. Soc. Biol.* 45:477; *C. R. Acad. Sci.* 116:1080.
2. *Idem.* (1902). *C. R. Soc. Biol.* 54:932; *C. R. Acad. Sci.* 135:46.
3. Handovsky, H. (1920). *Arch. Exp. Pathol. Pharmakol.* 86:138.
4. Wieland, H.; Hess, G.; Mittasch, H. (1931). *Bericht* 64B(2): 2099.
5. Jensen, H.; Chen, K. K. (1932). *Bericht* 63:1310–1314.
6. Wieland, H,; Konz, W.; Mittasch, H. (1934). *Annalen* 513:1–25.
7. Jensen, H.; Chen, K. K. (1936). *Jour. Biol. Chem.* 116:87.
8. Erspamer, V. (1954). *Pharmacol. Rev.* 6:425.
9. *Idem.* (1959). *Biochem. Pharmacol.* 2:270.

B. Bufotenin isolated from fungi:

1. Wieland, T.; Motzel, W.; Merz, H. (1953). *Annalen* 581:10–16; Extracted bufotenin from *Amanita mappa, A. muscaria,* and *A. pantherina.*

Table 2. *Continued*

C. Bufotenin containing fungi associated with shamanistic and social pharmacologic rites:

1. Bourke, John Gregory; Captain, U.S. Army (1891, 1934). *Scatologic Rites of all nations*; Washington, D.C.
2. Heizer, Robert F. (February 1944). Mixtum Compositum. The use of narcotic mushrooms by primitive peoples; *Ciba Symposia* 5(11):1713–1716.
3. Fabing, Howard D. (1956). On going berserk: a neurochemical inquiry; *Scientific Monthly* 83:232–237.

D. Bufotenin isolated from *Piptadenia perigrina*; cohoba snuff:

1. Stromberg, Verner L. (1954). *J. Am. Chem. Soc.* 76:1707; Bufotenine constitutes 1% of the weight of seeds of *P. perigrina.*
2. Fish, M. S.; Johnson, N. M.; Lawrence, E. P.; Horning, E. C. (1955). *Biochim. Biophys. Acta* 18:564; Isolated from *P. Perigrina* seeds: DMT, DMT-oxide; 5-OH-DMT (bufotenine); 5-OH-DMT-oxide; and a fifth unidentified indole.
3. Fish, M. S.; Johnson, N. M.; Horning, E. C. (1955). *Jour. Amer. Chem. Soc.* 77:5892–5895.
4. Fish, M. S.; Horning, E. C. (1956). *Jour. Nerv. Ment. Dis.* 124:33–37.
5. Fish, M. S.; Johnson, N. M.; Horning, E. C. (1956). *Jour. Amer. Chem. Soc.* 78:3668–3671.
6. Stowe, B. (1959). Occurrence and metabolism of simple indoles in plants; *Forschr. Chem. Org. Naturst.* 17:248–297.
7. Iacobucci, G. A.; Ruveda, E. A. (1964). *Phytochemistry* 3: 465.

E. Bufotenine effects in animals:

1. Evarts, E. (1954). *Jour. Med. Chem.* 4: 145. Intravenous injections of bufotenin in the monkey produce a splaying out of hind legs in a pseudoparaplegic manner and the animal becomes indifferent to noxious stimuli.
2. *Idem.* (1955). *Am. J. Physiol.* 182:594–598. Bufotenine causes a delay in *trans*-synaptic transmission in the optic tract of the cat.
3. *Idem.* (1956). *Arch. Neurol. Psychiat.* 75: 49–53. Comparative behavioral effects of LSD and bufotenin; Both result in similar behavioral response in the monkey.

F. Bufotenin and related tryptamines urinary excretion associated with states of mental illness:

1. Haddox, C. H.; Saslaw, M. S. (1963). *Journ. Clin. Investiga.* 42:435. 5-MeO-Tryptamine was found in the urine of patients with rheumatic fever—30–210 micrograms/24 hours.
2. *Idem.* (1963). *Jour. Neuropsychiatry* 5:14. Bufotenine is reported in urine of mentally defective patients.
3. *Idem.* (1967). *International Jour. Neuropsychiat.* 3:226. Bufotenine is reported in the urine of chronic schizophrenics; and by inuendo it is alleged to be associated with the genesis of this disease.
4. *Idem.* (1967). *Nature* 216:490. Bufotenin is reported in the urine of mentally defective patients.
5. *Idem.* (1967). *Nature* 216:1110. In chronic schizophrenics, excretion of bufotenine and *N*-methyl-tryptamine should be less than 10 micrograms, if they occur.

(*continued*)

Table 2. *Continued*

6. Fischer, E.; Spatz, H. (1970). Studies on urinary elimination of bufotenine-like substances in schizophrenia; *Biol. Psychiat.* 2:235–240.
7. Heller, B.; Narasimhachari, N.; Saide, J.; Haskovec, L.; Himwich, H. E. (1970). *N*-Dimethylated indoleamines in blood of acute schizophrenics. *Experientia* 25:503.
8. Cottrell, A. C.; McLeod, M. F.; McLeod, W. R. (1977). A bufotenine-like substance in the urine of schizophrenics. *American Jour. Psychiat.* 134:322–323.
9. Raisanen, M.; et al. (1984). Increased urinary excretion of bufotenin by violent offenders with paranoid symptoms and family violence. *Lancet* 2:700–701.

G. Bufotenin—psychotomimetic effects in humans:

1. Fabing, H. D.; Kropa, E. L.; Hawkins, J. R. (March 1956). Bufotenine effects in humans. *Federation Proceedings* 15: 421.
2. Fabing, H. D.; Hawkins, J. R. (May 18, 1956). Intravenous bufotenine injection in the human being. *Science* 123:886–887.
3. Fabing, H. D. (May 1957) Toads, mushrooms, and schizophrenia. *Harper's Magazine*, pages 50–55.
4. Naranjo, Plutarco (July/September 1958). *Archivos de Criminologia, Neuropsiquiatria y Disciplinas Conexas*, 2nd epoca, VI(no. 23):358–379. Psychotomimetic effects of DMT and bufotenin.
5. Costa, E.; Himwich, W. A.; Himwich, H. E. (1959). *Neuropsychopharmacology* pp. 299–303. Psychotomimetic effects of injected bufotenin.
6. Gessner, P. K.; McIsaac, W. M.; Page, I. H. (1960). *Jour. Pharm. Exp. Ther.* 130:126–133. "...it has been known for some time...that bufotenine...is somewhat psychotomimetic."
7. *Idem.* (1961). Pharmacological actions of some methoxyindolealkylamines. *Nature* 190:179–180. Including serotonin, bufotenine, and 5-MeO-DMT.
8. Anonymous (November 11, 1967). Hallucinogens and psychosis. *Nature* 216:538. Reference is made to psychotomimetic properties of bufotenine.
9. Anonymous (1968). The chemistry of the brain. *Nature* 219:838. Bufotenin is referred to as a well-known hallucinogen.
10. Ahlborg, U.; Holmstedt, B.; Lindgren, J. (1968). Fate and metabolism of some hallucinogenic indolealkylamines. *Advances in Pharmacology* 6B:213–229. Including DMT, 5-OH-DMT (bufotenin), and 5-MeO-DMT.
11. *Encyclopedia Britannica*, 15th edition (1975). Micropedia II:349–350. Bufotenin identified as a mild hallucinogen.
12. McLeod, W. R.; Sitaram, B. R. (1985). Bufotenine reconsidered. *Acta Psychiatr. Scandin.* 72:447–450. Intravenous bufotenin at 2 mg and 4 mg show no hallucinogenic effects. 8 mg i.v. results in profound emotional and perceptual changes, extreme anxiety, a sense of imminent death, visual disturbance associated with color reversal and distortion, severe flushing of cheeks and forehead. Suggests bufotenin is a psychotomimetic under some circumstances (high dose, i.v.).
13. Kysilka, R.; Wurst, M. (March 3, 1989). High-performance liquid chromatographic determination of some psychotropic indole derivatives. *Jour. Chromatog.* 464(2):434–437. Including bufotenin, psilocybine, and psilocin.

Table 2. *Continued*

H. Bufotenin—nonpsychotomimetic effects in humans:

1. Turner, W. J.; Merlis, S. (January 1959). *Arch. Neurol. Psychiat.* 81:121–129. Tried Cohoba snuff; reported no hallucinogenic activity due to bufotenin.
2. Hofmann, A. (1963). Psychotomimetic substances. *Indian Journal of Pharmacy* 25:245–256. Bufotenine is not psychotomimetic.
3. Fischer, Roland (1968). Chemistry of the brain. *Nature* 220:411–412. Bufotenin is not a true psychotomimetic compound in the sense that LSD, mescaline, and psilocybin are.
4. Schultes, R. E.; Hofmann, A. (1973). *The Botany and Chemistry of Hallucinogens*, page 90. It seems probable that 5-OH-DMT (bufotenin) does not contribute to the psychotomimetic activity of cohoba or virola snuffs.
5. Stafford, Peter (1978, 1983, 1992). *Psychedelic Encyclopedia.* Bufotenin is uninteresting and not psychedelic.
6. Grinspoon, L.; Bakalar, J. B. (1979). Psychedelic drugs reconsidered. Bufotenin is not psychedelic.
7. Shulgin, A. T. (October/December 1981). Bufotenine. *Jour. Psychoactive Drugs* 13(4):389. Bufotenin is not orally active; at high dose i.v. (16 mg), there is face purpling, difficulty in focusing, physical tension, anxiety and dopiness.

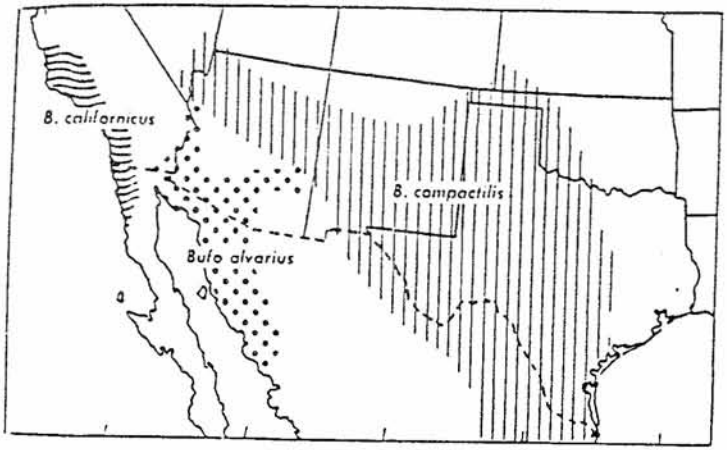
Shulgin, A. T. (1988). The controlled substances act; page 317. 32 Federal Register (FR) 10308 (July 13,1967): The initial proposal for placing bufotenine, diethyltryptamine (DET), and ibogaine into Schedule 1 as controlled drugs. 32 FR 13407 (September 23,1967): Final action on proposal. 32 FR 15340 (November 3, 1967): Official final word on the listing of bufotenine, DET and ibogaine.

highly sensationalized, and it has continued to the present (Anonymous, 1986, 1991). The story is developing still, and it holds implications of interest to serious drug researchers and sociologists.

The "toad licking" stories themselves are usually reported in areas (South or Central America, Canada, The United States, and Australia) where the bufo toad is either indigenous or is easily transported from an indigenous environment. Reports have also appeared where the bufo has been artificially introduced into an eco system for reasons of pest control, as in Australia (Lewis, 1989; Anonymous, 1990a; Ebert, 1988). See Fig. 2.

The practice of "toad licking" seems to have developed out of legendary and mythological uses of toads through history. Reports of bufo uses as a poison as well as a magical tool go back as far as Roman times. (Davis, 1985). The poet Robert Graves (1948) cites Gwion regarding "the toad" and its uses in sorcery. He states:

> ...Gwion implies that a single gem can enlarge itself under the influence of "the toad" or "the serpent" into a whole treasury of



Map 1

Map 2

Fig. 2. *Bufo marinus Linnaeus*, 1758; *B. marinus (L) Schneider*, 1930: Habitat is West Indies, Mexico, and Central and South America; the amount of venom averages 580 mg per toad. *Bufo alvarius Girard*: Habitat is southern Arizona; the venom averages 400 mg per toad (Map 1). *Bufo marinus* was imported into Eastern Australia in 1935 for "pest control" in sugar cane fields (Map 2). Information taken from Bucherl and Buckley (Eds.) *Venomous Animals and Their Venoms*, Academic Press, New York, 1971: Chapter 38, V. Deulofeu and E. A. Ruveda, The basic constituents of toad venoms; Chapter 39, J. W. Daly and B. Witkop, Chemistry and pharmacology of frog venoms; Chapter 40, K. Meyer and H. Linde, Collection of toad venoms and chemistry of the toad venom steroids.

jewels. His claim to be as learned in math and to know myriads of secrets may also belong to the toad/serpent sequence . . .

Boetius de Boot, in his *Parfait Joallier* (1644), describes "the toad stone" alleged to ". . . exist in the toad's head . . . another sure talisman for obtaining perfect Earthly happiness . . ." (de Givry, 1963). Johannes de Cuba, in his *Hortus Sanitatus* (1498), ". . . has indicated a method, at once both practical and elegant, of extracting this stone which I especially recommend to my readers . . ." (de Givry, 1963). See Fig. 3.

The bufo toad was reintroduced to Western Europe by Christopher Columbus on a return voyage from America (Davis, 1985). "The toad" remained a legendary ingredient in witches "philtres" or 'brews," supposedly used at Sabbaths for magical purposes (Fabing, 1956; Wilson, 1973; Chilton et al., 1979; Lee and Schlain, 1986). This was probably as an admixture.

In 1986, both the *New England Journal of Medicine* and *Discover* magazines reported that "classic German violinists used to handle toads before their performances because the toxins reduced the sweat on their palms . . ." (Anonymous, 1986).

"Toad licking" also seems to have developed out of Central and South American religious uses. It also has precedents in Southeast and Southwest North American Indian tradition.

METHOD OF EXTRACTING THE TALISMANIC STONE FROM A TOAD'S HEAD
Johannes de Cuba, *Hortus Sanitatis* (Paris, about 1498).

ILLUSTRATION FROM HORTUS SANITATIS
1491
Chapin Library, Williams College

Figure 3.

The Choco Indians of West Colombia learned to "milk" these bufo toads to obtain the glandular secretions. In *The Serpent and the Rainbow* by Wade Davis (1985) is this description:

> . . . the Choco Indians learned to milk these toads by placing them in bamboo suspended over flames. The heat caused them to extrude a yellow liquid, which dripped into ceramic vessels . . .

The venom was then used for a variety of purposes, divinatory, hunting, etc.

The bufo toad also seems to have played important roles in Central American religions. Virtiually *all* the amphibian remains at the postclassic Maya sites at Cozumel (Mexico) are bufo. There is even conjecture that this toad played some "narcotic-like" role in ancient Olmec traditions (Chilton et al., 1979; Davis, 1985). There is, however, no conclusive evidence so far as to the true meaning(s) of the bufo toads in these cultures.

North American Indian tribes of the Southeast and Southwest have also implemented bufo into their cultures. In 1981 several reports surfaced regarding the discoveries of anthropologist Dr. Jean Rundquist who discovered ". . . over 10,000 toads" in an Indian burial site in South Carolina, United States. In *Omni* magazine (August 1981) Maurer reported that

> . . . excavating a Cherokee Indian burial site in South Carolina, Dr. Jean Rundquist found something she did not expect . . . the skeletal remains of 10,000 toads. She discovered that the Indians in New Mexico and the Caribbean . . . snorted a chemical in the dried toad skins . . . that they used the chemicals in ceremonies . . .

In 1984, author and researcher Albert Most revealed his The Church Of The Toad Of Light with his publication of his book *Bufo alvarius: Psychedelic Toad of the Sonoran Desert* (Venom Press, 1984). This small book detailed how to use the bufo toad for ritual and pleasure. Shown was how to catch the toad, extract or "milk" the glandular secretions, dry them, and then "enjoy" the smoked vapors. His book claims that 5-MeO-DMT (5-methoxy-*N*,*N*-dimethyltryptamine) is the active hallucinogen, not bufotenine. 5-MeO-DMT is the *O*-methyl ether of bufotenine (Gessner et al., 1961; Marki et al., 1962).

The subject of clandestine or cult uses of bufo present an interesting dilemma for researchers. The very nature of such illicit activity makes open, usually easy data gathering troublesome. Anecdotal or "word-of-mouth" descriptions often prove invaluable so far as providing a profile of the activity itself.

A private letter to the author talks about the introduction of hallucinatory toad venom to well-known American (Indian) artist Christobal. This letter

details Christobal's "yarn art" (an innovative stylized art form) based on his bufo exposures. Letter-writer Jacaeber Kastor (1989) states:

> . . . the colors are very subdued in the Polaroid . . . they are vibrant and fluorescent in the yarn painting, etc. This piece has to do with Leo (Mercado) turning Christobal on to the toad secretions and Christobal incorporating the desert toad into his technology/iconography, etc. . . . A very interesting mixology . . .

In another note to researcher B. J. Ridge, Kastor states that "the toad is in their (Huichol) cosmology, but I don't think that any of the older Huichols ever tried smoking it . . ." (Kastor, 1989).

Christobal's (1989b) actual description of his bufo toad visions are as follows:

> The symbol of brother toad and the mushroom which are Gods to give wisdom of the shamanism and to study how to be able to communicate and be able to receive direction and encounter the sacred places that exist. Because not all (places) serve for that which one wants to know. For the Gods say in which place one can ask for that, which one in reality wants to know, to be able to learn here is when the shaman are in the sacred places with their candles praying to wait for the hour when the Gods arrive to be able to communicate for their power and ask luck for their shamanism . . . And when the hour arrives they see that the candles surge . . . the life force appears as if it explodes and from the sparks the force which comes out is seen and that is the way it is where the transformation occurs . . . It is power which the brother toad and the mushroom have . . . because in this way . . . the Gods speak . . .

Another more recent anecdotal account showing bufo venom use comes from *The Village Voice* (July 10, 1990). Author G. Trebay describes art critic Carlo McCormick's sojourn with the hallucinogenic toad "the group drank tincture of peyote, chewed dried peyote buttons and smoked the dried secretions of a desert toad whose toxins produce . . . 'an effect,' etc." (Trebay, 1990).

The non-oral, psychoactive uses of bufo toads (smoking, enema, snuffs, etc.) are well documented. What are the implications of these non-oral uses of bufo in relation to supposed "toad licking," etc?

A number of reports show bufotenine itself to be totally inactive orally (McKim, 1986; Root, 1990; Horgan, 1990). Toxic reactions have been reported in humans and animals after oral ingestion, however (Anonymous, 1986, 1988; Uzelac 1990).

If this is true, then where did the whole "toad licking" scenario emerge from? What are the implications so far as drug reporting and research, legal studies, placebo theory and urban legends, etc.?

THE CONTEMPORARY SITUATION

In 1967 the Food and Drug Administration and the Drug Enforcement Administration placed bufotenine (the supposed main psychoactive in the bufo toad) on its Controlled Substances List. It was assigned to Schedule One, making it highly illegal to possess.

In the mid-1980s, the newspaper *USA Today* reported that Australian "hippies" were forsaking traditional drugs for "cane toads," which they "boil for a slimy, potentially lethal cocktail" (Anonymous, 1988). A later corresponding report described "the Drug Squad in Brisbane (Australia) as having . . . a Heinz Baby Food jar which carried the label Venom Cane Toad: Hallucinogenic; Bufotenine" (Lewis, 1989).

A few months later, a Dr. Inaga gave a lecture in Baltimore, Maryland, in which he "comically" mentioned the "phenomenon" (Horgan, 1990). Almost simultaneously, Dr. Alex Stalcup of the Haight Ashbury Free Medical Clinic gave this statement to reporters: " . . . it is amazing the lengths that people will go to, to get high . . .". He was referring to the recent "toad licking stories" that were starting to circulate in the media (Seligman, 1989).

This media interest became the topic of discussion at a 1989 conference on crack cocaine in San Francisco (Seligman, 1989; Presley, 1989). Berkeley police chief R. Nelson was there and commented that "[toad licking] . . . is a problem that comes up from time to time," legitimizing the rumors. Pressed at a news conference, Robert Sager, head of the DEA's Western Regional Laboratory said "[bufo toad venom] . . . is in the same legal category as heroin or LSD," further confusing the issue through incomplete comparisons (Seligman, 1989). While all three are in the same legal category, only LSD and heroin are widely used drugs.

A New York City DEA spokesman also stated to the press "that we have heard of it . . . but have yet to make an arrest" (Carillo, 1990), implying that there was some sort of active problem.

The rumours now circled back to the Haight Ashbury Clinic. In response to the press releases, the Clinic stated that 'ironically . . . the DEA's actions have inspired a few people to try licking live toads" (Carillo, 1990).

Reporters now pressed any expert they could find to investigate the apparently "legitimate" stories. Back in Australia, Glen Ingram, a herpetologist at Queensland Museum, stated to the press that "it [toad venom] gives them a kick like alcohol . . .". This and other wire service stories led some Australians to react with "panic" according to *Scientific American*. Alarmed at

the newest "drug craze," some people in Australia formed "toad eradication leagues" (Horgan, 1990).

Back in California, a probation officer stated to the media "we hear of youngsters who do this frequently [lick toads].... It is not as strong as LSD, but it's free" (Montgomery, 1990).

At this point, little in the way of names, precise locations, fatalities, or witnesses had appeared in the legitimate press. The press had, presumably with the help of so-called "experts" in related drug misuse fields, fueled partial rumors and misinformation. As well, most of the press reports lacked the solid primary sources needed to trace back for facts.

Later in 1990 this started to change when reports naming P. Cherrie and G. Murphy appeared in *The Albany Times Union*. The story reported that "Gary Murphy and Paul Cherrie saw a TV show about 'toad licking' and decided to experiment." They scraped some toad secretions from the backs of the cane toads in Cherrie's pet collection and spread it on a cracker (Anonymous, 1990c). Murphy, 21, said that after an hour of "deep hallucinations" he awoke "bam!" in the hospital. Both men suffered severe vomiting (Anonymous 1990c). The story was amended a few days later in the tabloids, which reported that Murphy had killed himself after being prematurely released from the hospital (Alexander, 1990).

Stanton Geer was next named, awaiting trial in Colombia after being arrested on "toad licking" charges. He faced a sentence of "two years and a $10,000 fine" if convicted for "drug abuse" (Street, 1990). Other names also started appearing.

During all this, Dr. Stalcup from the Haight-Ashbury Clinic in San Francisco complained that "we were getting calls from all over the world—Germany, England, South America, etc. from reporters wondering about this new high" (Dorgan, 1990).

Then, once again, the rumors started to circle. According to Dr. Sager of the DEA, Australian journalists were now studying the United States situation to see "if there was a cane toad problem in California" (Dorgan, 1990).

The main problem with substantiating the original and later reports was "that they are all based on other reports... and that there is no evidence to support them" said writer Michael Dorgan (Dorgan, 1990). Writer Eileen Uzelec said this was a case of "media feeding on media" (Dorgan, 1990). Words like "urban legend" were now being used along with other explanations.

In all this confusion, a number of legislators were convinced that where there was smoke, there might be fire. Not to be beat to the punch for solutions to the newest drug "epidemic," Representative Beverly Langford (D, Calhoun, Georgia) introduced legislation to the State General Assembly regarding "toad licking" (Secrest, 1990):

> In a resolution introduced Monday, apparently with a straight face, Rep. J. Beverly Langfod (D, Calhoun) called on the General Assembly to look into "the extreme danger of toad licking becoming the designer drug of choice in today's sophisticated society. . . . [The Assembly] has been very diligent in finding and proposing a legitimate solution to every conceivable type of drug problem . . .

The next legislative attempt to curb this new drug menace appeared in Vancouver, British Columbia (Canada). The report states (Anonymous, 1991):

> . . . Vancouver police today said that they want the Canadian government to ban imports of the potentially lethal giant toad blamed on the deaths of several Australian drug users . . .
>
> . . . Cpl. John Dragoni said the city police force is applying to Ottawa to prohibit ownership of . . . the toads . . . by outlawing them under The Federal Narcotics Control Act, etc.

Trying to lend some credibility to what was becoming an embarrassing flurry of misinformation, George Root, a former administrator at SP Labs in Miami, Florida, stated Root, 1990):

> . . . there has been speculation in the anthropological literature regarding the possible hallucinogenic use of bufo, but this debate is largely based upon the fact that bufo is a common representation in the art of some Meso-American peoples . . . and the fact that bufo skeletal remains have been found at archeaological sites.
>
> Speculations aside, there is a very good reason why licking toads will not get you high. The toxic compounds are likely to kill you before you could possibly consume enough bufotenine to have a hallucinogenic effect (if there *is* a hallucinogenic effect).

CONCLUSION

Within the space of four years, an informational epidemic based in "toad licking" lore and legendry played minor havoc among supposedly "professional" drug experts and journalists. This led to incidents of public concern and actually stirred legislative debate among lawmakers in the United States and Canada. An examination of the media frenzy, and the willingness of our culture to support such unfounded conclusions, points to weaknesses in our public policies and attitudes about illicit drug use/misuse. We cannot fathom existing drug use/misuse problems if we base our understanding on false or confused premises. "Toad licking" is an example of this.

FUTURE RESEARCH NEEDS

Scholars in the future must diligently pursue primary sources for facts, not hearsay. In the case of the ongoing "toad licking" phenomenon, this led to outlandish and distorted stories which may or may not have had a basis in fact. Future reporting and information gathering should be weighed against this profile.

This article should be seen as a preliminary profile of an ongoing cultural phenomenon involving drug use/misuse. Future surveys of this particular topic must include a solid bibliography showing primary, secondary, as well as "hearsay" accounts, police and medical statistics, and in-depth interviews with key participants. Future research must also study this phenomenon in relation to other aspects of cultural life.

Understanding drug use/misuse issues—both legitimate as well as clandestine—is a complicated undertaking. Let us hope that future scholars will gain a better understanding through our current diligence.

ACKNOWLEDGMENTS

The assistance of researchers David Goldstein, Roger Knights, Charles Andrew, and B. J. Ridge in obtaining newspaper accounts, bibliographic material, and some anecdotal accounts is appreciated.

REFERENCES

ABEL, J., and MACHT, D. (1911). The poisons of the tropical toad: *Bufo aqua*. *J. Am. Med. Assoc.* 56: 1531.

ALEXANDER, J. (1990). Toad licker kills himself. *The Weekly World News* October 2, p. 21.

ANONYMOUS (1981). Toad away. *Drug Survival News* (October).

ANONYMOUS (1986). It could have been an extremely grim fairy tale. *Discover* 12.

ANONYMOUS (1988). Terror toads. *The New York Times* June 28, p. A24.

ANONYMOUS (1989a). Drug experts warn of new high—Toad licking. *San Francisco Examiner* June 1, p. H10.

ANONYMOUS (1989b). Colorado River toad licking. *The National Enquirer* August 8, p. 6.

ANONYMOUS (1990a). Australia's investments in cane toads. *The Chicago Tribune* April 9, p. 14A.

ANONYMOUS (1990b). Toad lickers gamble with death. *Sea Frontiers* June, p. 36.

ANONYMOUS (1990c) Minds go loose from toad juice. *The Albany Times Union*, no date, p. A2.

ANONYMOUS (1991). Toad addicts licking giant toads to get high. *The Palm Beach Post* July 31, p. 9A.

BOYS, F. (1959). *Poisonous Amphibians and Reptiles*. Springfield, Illinois: Thomas.

CARILLO, C. (1990). Toads take a licking from desperate druggies. *The New York Post* January 31, p. 4.

CHEN, K., and JENSEN, H. (1929). A pharmacognostic study of Ch'an Su, the dried venom of the Chinese toad. *J. Am. Pharm. Assoc.* 23: 244–251.

CHILTON, W., Bigwood, J., and Jensen R. (1979). Psilocin, bufotenine and serotonin: Historical and biosynthetic observations. *J. Psychedelic Drugs* 11(1–2): 61–69

CHRISTOBAL (1989a). Photo of stylized yarn art featuring bufo visions (from the collection of Thomas Lyttle).

CHRISTOBAL (1989b). One page handwritten note describing bufo visions (from the collection of Thomas Lyttle).

DAVIS, W. (1985). *The Serpent and the Rainbow*. New York: Simon and Schuster

DAVIS, W. (1988). *Passage of Darkness: The Ethnobiology of the Haitian Zombie*. Chapel Hill: The University of North Carolina Press.

DEGIVRY (1963). *Picture Museum of Sorcery, Magic and Alchemy*. New York: New York University Press.

DORGAN, M. (1990). Nobody, but nobody licks toads in California. *The Sunday Albany Times Union* February 18, p. A24.

EBERT, R. (1988). Hungry toads raising cane. *The New York Post* October 1, p. 2.

ERSPAMER, V., VITALI, T., ROSENGHINI, M., and CEI, J. (1965). 5-Methoxy- and 5-Hydroxyindolealkylamines in the skin of *Bufo alvarius*. *Experientia* 21: 504.

ERSPAMER, V., VITALI, T., ROSENGHINI, M., and CEI, J. (1967). 5-Methoxy- and 5-hydroxyindoles in the skin of *Bufo alvarius*. *Biochem. Pharmacol.* 16: 1149–1164.

FABING, H. (1956). Intravenous bufotenine injection in the human being. *Science* 123: 886–887.

FABING, H. (1967). Toads, mushrooms and schizophrenia. *Harper's* 214: 51–55.

FURST, P. (1976). The virola tree as a source for hallucinogenic snuffs. In *Hallucinogens and Culture*. Novato, California: Chandler and Sharp.

GESSNER, P., McISAAC, W., and PAGE, I. (1961). Pharmacological actions of some methoxy-indolealkylamines. *Nature* 190: 179–180.

GOLDSTEIN, D. (1992). *The PHD (papers from the history of drugs) Catalog*. New York: Privately published.

GRAVES, R. (1948). *The White Goddess*. New York: Farrar, Straus and Giroux.

HOFMANN, A. (1963). Psychotomimetic substances. *Indian J. Pharm.* 25: 245–256.

HORGAN, J. (1990). Bufo abuse: A toxic toad gets licked, boiled, tee'd up and tanned. *Sci. Am.* 263(2): 26–27.

KANUS, L. (1989). Review of *Cane Toads: An Unnatural History*. *Libr. J.* 114:122.

KASTOR, J. (1989). Private correspondence to Thomas Lyttle.

KENNEDY, A. (1982). Ecce bufo: The toad in nature and Olmec iconography. *Curr. Anthropol.* 23(3): 273–290.

LEE, M., and SCHLAIN, B. (1986). *Acid Dreams*. New York: Grove Press.

LEWIS, S. (1989). *Cane Toads: An Unnatural History*. New York: Dolphin Press.

LYTTLE, T. (1989a). Private correspondence.

LYTTLE, T. (1989b). Drug-based religions and contemporary drug taking. *J. Drug Issues* 18(2): 271–284.

LYTTLE, T., and MONTAGNE, M. (1992). Drugs, music, and ideology: A social pharmacological interpretation of the acid house movement. *Int. J. Addict.* 27(10): 1159–1177.

MARKI, F., AXELROD, J., and WITKOP, B. (1961). Dehydrobufotenine: A novel type of trycyclic serotonin metabolite from *Bufo marinus*. *J. Am. Chem. Soc.* 83: 3341.

MARKI, F., AXELROD, J., and WITKOP, B. (1962). Catecholamines and methyltransferases in the South American toad (*Bufo marinus*). *Biochim. Biophys. Acta* 58: 367–369.

MAURER, A. (1981). Ancient pyschedelics. *Omni* August, p. 38.

McKIM, W. (1986). *Drugs and Behaviour: An Introduction to Behavioural Pharmacology*. Englewood Cliffs, New Jersey: Prentice-Hall.

MONTGOMERY, C. (1990). Druggies find new way to get high: They lick toads. *Weekly World News* October 28, p. 6.
MOST, A. (1984). *Bufo alvarius: Psychedelic Toad of the Sonoran Desert*. New Mexico: Venom Press.
MOST, A. (1985). Advertisement for *The Church of the Toad of Light* T-shirts (from the collection of Thomas Lyttle).
MUGGER (1989). Colorado River toad licking. *The New York Press* August 11.
O'SHEA, B. (1990). A year of political pageantry and toad licking. *Atlanta Journal and Constitution* March 11, p. C5A.
PRESLEY, D. (1989). Toad licking poses threat to youth of America. *The Weekly World News* July 11.
ROOT, G. (1990). First the bad news, toad licking will not get you high. *New Times* (letter).
SCHULTES, R., and HOFMANN, A. (1980). *The Botany and Chemistry of the Hallucinogens*. Springfield, Illinois: Thomas.
SECREST, D. (1990). Bill gets hopping mad on way to lick toad problems. *Atlanta Journal and Constitution* February 13, p. D1F.
SELIGMAN, K. (1989). The latest high—Warts and all: Thrill seekers risk death to lick toads. *The San Francisco Examiner* May 29, p. A10.
SHULGIN, A. (1988). *The CSA (Controlled Substances Act) Manual*. LaFayette, California: privately printed.
STREET, M. (1990). Toad lickers get busted. *The Weekly World News* March 13, p. 12.
TREBAY, G. (1990). Mexican standoff: Carlo McCormick's bad trip. *The Village Voice* July 10, p. 19.
TURNER, W., and MERLIS, S. (1959). Effects of some indolealkylamines on man. *Arch. Neurolog. Psychiatry* 81: 121–129.
UZELAC, E. (1990). A desperation high: Crack, coke, croak? *The Baltimore Sun* January 30, p. 5.
WILSON, R. A. (1973). *Sex and Drugs: A Journey beyond Limits*. Chicago: Playboy Press.

THE AUTHOR

Thomas Lyttle is publisher of *Psychedelic Monographs and Essays*, a cross-disciplined journal devoted to hallucinogenic substance research. He is the author of over fifty articles dealing with ethnopharmacology, psychopharmacology, and the psychology of religion for the popular and scientific press. Along with researcher David Goldstein, he has helped compile the *PHD* (Papers from the History of Drugs) catalog and database, which lists over 11,000 arti-

cles on file in hard-copy form. He is part of a growing movement of "amateur academics" who have no official affiliation to credentialed institutions, but who nevertheless provide scholarly research within the field.