

Teonanacatl: The Narcotic Mushroom of the Aztecs

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[429] Because of the important roles which they played in ceremonial and in daily life, the narcotic plants of ancient Mexico are of especial interest to the anthropologist. Mexico possessed and still possesses many plant narcotics and intoxicants, of which a few are outstanding in their uses and are extremely interesting because of their great antiquity as well as because of the important bearing their use, distribution and history may have on questions of a theoretical nature. Of the most notable, are the toleselo or coral-berry (*Sophora secundiflora* (Ort.) Lag. ex DC.), ololihqui or piule (*Rivea corymbosa* (L.) Hall. f.), peyote (*Lophophora williamsii* (Lem.) Coult.), and teonanacatl (*Paneolus campanulatus* L. var. *sphinctrinus* (Fr.) Bresadola).

Long the center of confusion and ambiguity, teonanacatl was not known botanically until very recently. Therefore, a thorough discussion of the ethnobotanical history of this narcotic mushroom should be made available to anthropologists in order that the erroneous interpretations now rather widespread in anthropological literature concerning teonanacatl may be corrected.

II.

In his *Historia de las cosas de Nueva España*, Sahagun² recorded the earliest description of teonanacatl and discussed its narcotic and medicinal uses among the Mexican Indians of the period of the Spanish conquest. One of these references in a general consideration of useful plants, states that

they (the Chichimecas) possessed a great knowledge of plants and roots, and they were acquainted with properties and virtues of them; these same people were first to discover and use the root which they called peiotl, and those who are accustomed to eat and drink them used them in place of wine; and they did the same with those which they call nanacatl, which are harmful mushrooms which intoxicate the by the same way as wine...³

[430] A more detailed description of the plant and its uses occurs in a chapter which deals specifically with narcotic plants:

There are some small mushrooms in that region which are called teonanacatl; these grow under the grass (hay) of the fields and pastures. They are round, have a rather high stipe, slender and terete. When eaten, they have a bad taste, having the throat, and they cause intoxication. They are medicinal for few fevers and for rheumatism. Only two or three need to be eaten. Those who eat them see visions and feel a faintness of the heart. And they provoke to lust those who eat a number, or even a few, of them.

From Sahagun's reports (as well as from other early reports which are quoted below), it is absolutely clear that the narcotic which the Aztecs called teonanacatl was a mushroom, Teonanacatl has been identified with the dried tops of the peyote-cactus, *Lophophora*

Williamsii (mescal button) and this misidentification has been widely accepted in botanical and anthropological literature. For this reason, it is necessary to examine closely and evaluate all of the early reports concerning teonanacatl and its uses. In the first of the excerpts quoted above, Sahagun clearly distinguished between "the root which they call peiotl" and "nanacatl, which are harmful mushrooms." Likewise, in the chapter on plant narcotics, from which the second excerpt is taken, Sahagun discusses, in one paragraph, the "small mushrooms . . . which are called teonanacatl" and, in another paragraph peiotl, the "earth-cactus."

There is another herb like the earth-tunas which is called peiotl. It is white and grows in the north. Those who eat it see terrifying and amusing visions. The intoxication persists for two or three days and then stops ...

Still further assurance that teonanacatl was a fungus is found in a third reference to the narcotic in Sahagun's Historia:

The first thing which they ate at the gathering was small, black mushrooms which they called nanacatl. These are intoxicating and cause visions to be seen and even provoke sensuousness. They ate these (mushrooms) before dawn, and they also drank chocolate before daylight. They ate these little mushrooms with honey and when they began to be excited by them, they began to dance, some singing, others weeping, for they were already intoxicated by the mushrooms. Some did not want to sing but sat down in their quarters and remained there as if in a meditative mood. Some saw themselves dying in a vision and wept, others saw themselves being eaten by a wild beast; others imagined that they were capturing prisoners in battle, that they were rich; that they possessed many slaves, that they had committed adultery and were to have their heads crushed for the offense, that they were guilty of a theft for which they were to be killed, and many other visions which they saw. When the intoxication from the little mushrooms had passed, they talked over among themselves the visions which they had seen

[431] In a chapter on mushrooms (De las setas), Sahagun used the term nanacatl to refer to mushrooms:

The cone-shaped mushrooms (nanacatl) genus *canopus agrorum* in the mountains are good to eat. They are cooked for this purpose ...

Sahagun not only described teonanacatl as a mushroom, but the plant is figured in (Plate CI; Fig. 453a) the Paso y Troncoso edition of Sahagun's writings as a small mushroom growing in a grassy field.

In addition to Sahagun's direct statements that teonanacatl was a mushroom it is obvious from linguistic evidence that the term nanacatl refers to mushroom. Teonanacatl probably was the specific word for the intoxicating mushrooms, for it appears that nanacatl referred to mushrooms in general. In Mexico at the present time, mushrooms are called nanacates.

In his Dictionnaire de la langue Nahuatl ou Mexicaine Siméon analyzed general words which include the root nanacatl and clearly indicated the meaning of the term:

Nanacatl, Champignon: quauhtla-nanacatl, champignon des bois; au. fig. nanacatl nictetitiniemi (Olm.), rendre quelqu'un pervers, lui donner de mauvais conseils. En comp: nonanac ou nonanacauh (Olm.) mon champignon, R. nacatl ?

Nacatl, Chair, viande; ... nonac, ma viande, la chair que je mange.

Teonanacatl, Espèce de petit champignon qui a mauvais goût, enivre, et cause des hallucinations; il est médicinal contre les fièvres et la goutte (Sah.) RR. Teotl, nanacatl.

Teyhuinti, Qui enivrc quelqu'un, enivrant; teyhuinti nanacatl, champignon enivrant.

Further evidence can be derived from a definition of teonanacatl offered by Jourdanet and Siméon in their translation of Sahagun's Historia:

(Teonanacatl) C'est a dire: champignon dangéreux. Later me générique est nanacatl, qui se met en composition avec d'autres mots pour designer les diverses espèces de champignons.

As further corroboration, the compounds used by Hernandez may be cited. By adding adjectival prefixes to a modification of the term nanacatl, Hernandez⁴ described several types of mushrooms under the heading "De nanacatl seu Fungorum genere": iztacnanacame (white mushroom), tlapalnanacame (reddish mushroom), and chimalnanacame (yellow-orbicular mshroom). He described teonanacatl as teyhuinti or "intoxicating."

[432] In his Catálogo, Garcida⁵ called eleven species of Agaricus, one of Hypohyllum, and two species of Boletus, all Oaxacan Fungi, by the common name nanacatl. This is certainly convincing evidence that the word still refers to mushrooms in modern Mexico.

In the works of Serna,⁶ a very complete description of the use of "coloured mushrooms," quatlanamacatl as a narcotic for divination is found:

And it so happened that an Indian had come ... bringing some of the coloured mushrooms which are gathered in the hills and, with these, he had performed a great idolatry. But before explaining this (idolatry) I wish to explain the nature of the said mushrooms which, in the Mexican language, are called quatlanamacatl ... these mushrooms were small and yellowish and to collect them, the priests and all men, appointed as ministers for these impostures, went to the hills and remained almost the whole night in sermonizing and in superstitious praying. At dawn, when a certain little breeze which they know began to blow, they would gather them (the mushrooms), attributing to them deity. They have the same effect as ololiuqui and peyote, for when they are eaten or drunk, they intoxicate, depriving those who partake of them of their senses and making them believe a thousand absurdities.

A further description of the use of narcotic mushrooms, teunamacatlite, is given by Benvento in Kingsborough⁷ and by Orozco y Berra:⁸

They had another kind of intoxication..., which was induced by small toad-stools or mushrooms... . which are eaten raw. Because of the bitter taste of these mushrooms, they drink after them or eat with them a little honey after which they shortly see a thousand visions, especially snakes. They went raving mad, and they ran about the streets wildly . . . In their language they called these mushrooms teunamacatlith, a word which means "bread of the gods"...

The meaning of the word teonanacatl has been questioned recently by LaBarre,⁹ who states that Benvento's etymology ("bread of the gods") is wrong. The acceptance of this etymology or a similar one ("flesh of the gods") is wide. Safford¹⁰ accepted "flesh of the gods" as a correct translation of teonanacatl. Bancroft,¹¹ furthermore, writing of Nahuatl intoxicants, said:

Among the ingredients used to make their drinks more intoxicating the most powerful was the teonanacatl, >"flesh of the gods," a kind of mushroom which excited the passions and caused the partaker to see snakes and divers other visions.

[433] In an unpublished manuscript,¹² V. A. Reko applies the meaning of "divine food of a soft or fleshy nature" to teonanacatl. According to usage reported to Siméon,¹³ nanacatl refers to mushrooms in general, but Simeon suggests, with reservations, that the root of

nanacatl may be nacatl, the word for "meat" or "flesh." According to Siméon, therefore, teonanacatl may mean "flash of the gods."

In early Mexican literature, other references to the uses of mushrooms for intoxication are less detailed but nevertheless of interest and of importance.¹⁴ Usually, they lack common names or descriptions which might make it possible to identify the actual plant which was used.

Kingsborough reports that "wild mushrooms" were given to visitors to Montezuma's coronation, and that the mushrooms intoxicated the visitors and caused them to dance.¹⁵

Motolinia¹⁶ described a religious feast held by Montezuma at which intoxicating wild mushrooms were eaten; the visions which accompanied the intoxication were believed to constitute divine advice concerning the future.

Duran, quoted by Bourke,¹⁷ states that, after the sacrifices of human beings at the coronation of Montezuma II, the multitude ate raw mushrooms which induced an intoxication which was much stronger than alcoholic intoxication; many committed suicide at the height of the intoxication, some received visions and were, in this way, enabled to prophesy the future. Although it is difficult to identify the plant which served as the narcotic these cases, the symptoms of the intoxications induced are the same as those induced by the teonanacatl of the ancient Aztecs and are the symptoms of the intoxication induced only (among the mushrooms) by members of the genus *Panaeolus*, the genus with which teonanacatl has been identified.

Thompson¹⁸ reports Saville as saying that Tizoc, an Aztec ruler, who was poisoned after a five year reign, may have been killed by the substitution of poisonous mushrooms for the intoxicating kinds which were normally eaten at ceremonies. The deadly *Amanita phalloides* (Fr.) Qué. by possibly have been the instrument of death, but this species never could have been secretly substituted, in a fresh condition especially, for the entirely different *Panaeolus* spp., while slightly poisonous, they are not known to cause sudden death by poisoning.

[434] III.

The many references to the general use of narcotic mushrooms among Mexican Indians of four hundred years ago suggests to the ethnobotanists of the present time that these plants may still be used in parts of Mexico, in a similar way.

Curiously enough, the actual utilization of mushrooms as intoxicants in modern Mexico was unobserved until very recently. In 1923, Doctor Blas Pablo Reko wrote, in a letter to Doctor J. N. Rose of the United States National Herbarium,¹⁹ that the teonanacatl is a "fungus ... which is still used under the same old name by the Indians of the Sierra Juárez in Oaxaca in their religious feasts."

In 1936, Mr. Robert J. Weitlaner of Mexico City visited the capital of the Mazatec region of Oaxaca, Huautla de Jiménez, and learned of the use of certain mushrooms in witchcraft and divination among these primitive peoples. He secured a few samples of the narcotic plants and sent them to Reko who forwarded several pieces to the Botanical Museum of

Harvard University for identification.²⁰ These specimens were insufficiently preserved upon arrival to make possible a definite specific identification; they belonged to the genus *Panaeolus*, and were possibly referable to a species which is closely allied to *P. campanulatus* var. *sphinctrinus*.

While I was engaged in ethnobotanical investigations among the little known Mazatec Indians of the District of Teotitlán, Oaxaca, with Dr. B. P. Reko in the summer of 1938, samples of the narcotic mushrooms and information concerning their use were collected in Huautla de Jiménez.²¹ These mushrooms are referable to *Panaeolus campanulatus* L., var. *sphinctrinus* (Fries) Bresadola.²² Though apparently used rather frequently, the plant does not appear to be common in the Mazatec country. It is valued highly. Growing in boggy pots in pastures and open fields it is as easily available only during the rainy season from June to September. Those who search for, the plant gather and dry the specimens for use during the rest of the year. Because of the belief that the mushroom is semi-sacred, it is **[435]** not offered for sale in the markets of the Mazatec towns, although the yashun paper made from the bark of *Heliocarpus appendiculatus* Turcz.) and other articles for brujería (witchcraft) are important articles of sale in the markets of Huautla.

The native Mazatec names by which *Panaeolus campanulatus* var. *sphinctrinus* is known in Huautla de Jiménez and San Antonio Eloxochitlán are t-ha-na-sa (meaning unknown), she-to ("pasture mushroom"), and to-shka ("intoxicating mushroom").

Among the Mazatec Indians there are professional diviners who earn a livelihood locating stolen property, discovering secrets, and giving advice through *Panaeolus*-intoxication. It is impossible to state whether or not these diviners practice their art exclusively with *Panaeolus*; it is probable that they are general curanderos (herb-doctors) as well. Due probably to the frequent ingestion of the slightly poisonous *Panaeolus*, they are said to age rapidly, signs of approaching senility being apparent at the age of thirty-five.

The narcotic is taken to induce a semi-conscious state which is accompanied by a mild delirium. The incoherent utterances which are made during the intoxication are interpreted as prophetic or admonitory.²³ The doses which the Mazatec Indians prescribe vary with the size and the age of the individual. Usually fifteen mushrooms are considered sufficient to induce the desired effect, but larger doses are reported. Overdoses of fifty to sixty mushrooms result in severe poisonings, while continued use of excessive quantities is said to produce permanent insanity. While this might be an unexpected physiological result of the type of intoxication induced by species of *Panaeolus*, it was not possible to verify this with actual cases in the field. According to a number of descriptions from the Indians, the intoxication lasts about three hours. Shortly after ingestion of the mushrooms, the subject experiences a general feeling of levity and well-being. This exhilaration is followed within an hour by hilarity, incoherent talk, uncontrolled emotional outbursts, and, in the later stages of intoxication by fantastic visions in brilliant colours, similar to the visions so often reported for the narcotic peyote (*Lophophora Williamsii*).

Johnson,²⁴ engaged in ethnological work among the Mazatec Indians in 1938, was informed that brujos (witch-doctors) use several kinds of **[436]** mushrooms. He reports the names of these as *steyi* and *tsami-ye*, *tsamikishu*, and *tsamikindi*. Unfortunately it was not possible to procure specimens, photographs, or descriptions, and botanical identification is thus precluded. It is not improbable, however, that one or more of these is

a *Panaeolus*. Although in my two visits to the Mazatec country narcotic mushrooms other than *Panaeolus campanulatus* var. *sphinctrinus* were not found in use in divination, it is possible that poisonous mushrooms of the same or of other genera may be utilized. As emphasized below, the intoxication which has symptoms making it valuable to the Indians for divination is especially, but not exclusively, typical of the entire genus *Panaeolus*.

Mr. Bernard Bevari of Mexico City, who has carried out ethnological studies among the Chinantec Indians and who has visited the Mazatec tribe, writes in a letter to me, that he was informed of the use of mushrooms for intoxication among the Mazatecs.

Extending my ethnobotanical investigations in northeastern Oaxaca in the spring and summer of 1939, I learned that *Panaeolus campanulatus* var. *sphinctrinus* is used as a narcotic for divination among the Western Chinantec Indians. The consumption of the narcotic is not uncommon in the western Chinantla²⁵ where the fungus grows in the high mountain pastures during the torrential rains of July. In the pueblitos of Santa Cruz Tepetotutla and San Pedro Sochiapam in the District of Cuicatlán, aged men were seen gathering this mushroom in fields, and in San Juan Zautla, District of Cuicatlán, information as to the use of the plant was obtained from two sources. In Tepetotutla five mushrooms (Schultes 722) were obtained from one of the gatherers in exchange for several quinine pills. In these Chinantec villages, the *Panaeolus* has the name *nañ-tau-ga* the information as to the utilization of the plant and descriptions concerning the intoxication were identical with those obtained from the neighboring Mazatec Indians. Furthermore, in Tepetotutla, I was informed that small doses of from five to eight of these mushrooms are prescribed for several consecutive days for severe attacks of rheumatism. No medical uses were reported in the Mazatec region but, according to Sahagun, *teonanacatl* in small doses of two or three was medicinal for fevers and for rheumatism among the Aztecs.

Further evidence of the use of narcotic mushrooms was obtained among [437] the Chinantec and Zapotec Indians who together inhabit the small town of Latani, near Santiago Choapam, District of Choapam, in the south-easternmost corner of the Chinantec area. Since my visit to Latani was made before the advent of the late June and July rains, it was impossible to collect specimens of the fungus which, according to the inhabitants, is eaten as a narcotic for divination. Very detailed descriptions of the fungus and a full account of the type of intoxication which it induces indicate that the intoxicating mushroom of Latani is also a species of *Panaeolus*. The possibility that it is *Panaeolus campanulatus* var. *sphinctrinus* is not remote. The Chinantec name is *a-ni* ("medicinal mushroom") or *a-mo-kya* ("medicine for divination").

It is interesting to note here that *ololiuqui* or *piule* (the seeds of *Rivea corymbosa* (L.) Hail. f., often mistakenly identified as a *Datura*), another divinatory-narcotic of ancient usage in Mexico, is found growing in dooryards in Latani and is used, in the same way as the mushrooms, as an aid to divination.²⁶

There can be little doubt that *Panaeolus campanulatus* var. *sphinctrinus* used among other Indian groups in Oaxaca and possibly in other states as well. Johnson writes in a letter to me that the mushrooms are known to the Cuicatec Indians of the District of Cuicatlán, Oaxaca, but that these people do not use them. Reko has learned by correspondence that the Zapotecs of Santiago Yaveo, District of Choapam, Oaxaca, use this narcotic, but when Reko and I visited this pueblo in 1939, no specimens could be obtained. Search for this

use among the Zapotec Indians of Santa Maria Tonaguia, San Ildefonso Villa Alta, Santa Maria Temascalapa, San Juan Yatsona and San Juan Yaée produced no results. Likewise, during a verin short stay in the Mije country, I could not learn of its use among the inhabitants of Santa Maria Chisme, San Juan Metlattepec, and Santiago Zacatepec (at the base of Cerro Zempoaltepetl). I think that it is highly probable that the narcotic properties of the *Panaeolus* mushrooms are employed in divination among these peoples, however, and that when intensive investigation is carried out among the Mijes, the use of *Panaeolus* will be discovered in this poorly studied tribe.

The names under which *Panaeolus campanulatus* var. *sphinctrinus* is or has been known may be summarized as follows:

Aztcs: nanacatl (mushroom), teonanacatl (sacred mushroom); quauhtlanacatl (wild mushroom) teunamacatlth (probably an erroneous rendition of teonanacatl).

Chichimecas: name unknown

[438] Chinantecs: nan-tau-ga; a-ni; a-mo-kya.

Mazatecs: t-ha-na-sa (meaning unknown); she-to (pasture mushroom); to-shka ("intoxicating mushroom"). Although the names for the narcotic mushrooms reported by Johnson cannot definitely be applied to this species, it is probable that the mushrooms are species of *Panaeolus*: steyi; tsami-ye; tsamikishu; tsamikindi.

IV.

Panaeolus campanulatus L. var. *sphinctrinus* (Fr.) Bresadola is a small mushroom of boggy spots in meadows during the rainy seasons. This species and its closest relatives are found on all the major continents. The mushroom is about ten centimeters high, with a slender, terete, dark brown stipe from one to two centimeters in diameter. The dark colour of the stipe serves to separate this variety from its close relative, *P. papilionaceus* Fries. The pileus, three centimeters in diameter and one half centimeter high, is either parabolical, conical, or nearly hemispherical, often slightly cuspidate or obtusely acuminate, smooth, light yellowish-brown. The gills are spotted and are dark brownish-black. The spores, varying from 12-18 times 7.5-12 μ , are black, sublimoniform. When dried, the entire mushroom assumes a brownish-black colour.

An excellent coloured illustration of *Panaeolus campanulatus* var. *sphinctrinus* is to be found in Bresadola's *Iconographia Mycologica*.²⁷ Technical Latin diagnoses of the characters of the plant may be found in Bresadola's *Iconographia Mycologica* and in Fries' *Epicrisis*;²⁸ Bresadola's latin diagnosis is republished in Schultes' *Plantae Mexicanae* II.

V.

Species of the genus *Panaeolus* have long been known to be poisonous,²⁹ but the use of *Panaeolus campanulatus* var. *sphinctrinus* as an intoxicant in Mexico is the only instance in which its properties have been employed for narcotization, so far as I have been able to learn from the anthropological and botanical literature.

Ford³⁰ divides mushroom-poisoning into five categories according to the physiological action of the poisonous constituents of the plants: 1) the choleric type (caused by the deadly, *Amanita phalloides* (Fr) Quél.; 2) the nerve-affecting type which is marked by convulsions, coma and occasional death (caused by *Amanita muscaria* (L.) Pers., which is used in Kamchatka as a narcotic); 3) the gastrointestinal type; 4) the blood-dissolving type; 5) and the cerebral type. *Paneolus*-intoxication belongs to the fifth category of poisonings. The narcotic action is mainly cerebral and is characterized by exhilaration; a feeling of ease and well-being, muscular incoordination; drowsiness, a staggering gait or difficulty in walking, emotional excesses, laughter and hilarity, incoherent and delirious speech, mydriasis, and fantastically coloured visions.

Most of the full description of the use of *teonanacatl* among the ancient Aztecs indicate, by the peculiar type of intoxication, that the mushroom was a species of *Paneolus*. It is indeed significant that these early descriptions and the notes obtained from the Mazatec, Chinantec, and Zapotec Indians agree completely with the description of a typical *Paneolus*-intoxication by Douglas³¹ and Rieger.³²

Knowing that *Paneolus* was a poisonous genus, the late Professor Santesson³³ carried out a series of pharmacological studies with specimens of *Paneolus cmpanulatus* var. *sphinctrinus* which were collected in the Mazatec country.³⁴ The results of experiments with frogs indicated that a principle was present which induced a kind of narcosis very similar to that which is induced by *ololiuqui* (*Rivea corymbosa* (L.) hail. f.) another Mexican oracular narcotic. Santesson called this state "eine Art Halb-narkose." Chemical tests convinced Santesson that a glucoside, but no alkaloid, was present. This is rather unexpected, since in *Amanita muscaria* (L.) Pers., the Kamchatkan narcotic mushroom, the active principle is an alkaloid – muscarine.

VI.

The identity of *teonanacatl* was unknown for three centuries. During this time doubt has been expressed concerning the accuracy of all of the earlier writers in describing the narcotic as a "mushroom." As a result, considerable confusion and uncertainty arose and a serious error has been accepted and widely spread in the botanical and anthropological literature. The first attempt to identify *teonanacatl* was made in 1915, when Safford³⁵ published his conclusion that the so-called "mushroom" was, in reality, the dried tops of the cactus *Lophophora Williamsii* (Lem.) Coulter and, notwithstanding all of the numerous early reports, was not a fungus. "Three centuries of investigation," wrote Safford, "have failed to reveal an endemic fungus used as an intoxicant in Mexico, nor is such a fungus mentioned either in works on mycology or pharmacography; [440] yet the belief prevails even now that there is a narcotic Mexican fungus..." On the basis of this argument, Safford concluded that the dried, brown, discoidal head ("mescal button") of the spineless peyote-cactus' (*Lophophora Williamsii*) >resembled a "dried mushroom so remarkably that, at first glance, it will even deceive a mycologist." When this "remarkable" resemblance is analyzed with actual specimens, however, it is found not to exist. There is actually very little similarity in appearance between the dried pilei of Basidiomycetes and mescal buttons. The shrivelled crowns of the cactus have a heavy cushion of closely packed areolate tufts of silky hairs on the upper surface and a conspicuous fibrovascular region on the lower surface. It seems highly improbable that either the early writers or the Indians were likely

to confuse dried peyote with dried mushrooms. But Safford concluded that those same people who gathered peyote and teonanacatl (one of which inhabits dry, calcareous deserts; the other, wet, soggy, mountain pastures) failed to recognize the hard wrinkled, brown mescal buttons (which Safford stated were teonanacatl) as a part of the soft, succulent, green peyote-plant. The former he assumed the Aztecs called teonanacatl, the latter, peiotl.

Much of Safford's ethnobotanical investigation of Mexican plants was brilliant. It is not surprising, therefore, that this conclusions on this mysterious "narcotic mushroom," which was known only in the literature were accepted and became firmly established in both botanical and anthropological literature³⁷ This identification was repeated several times by Safford and early gained a wide audience.³⁸ Some of the recent writers on the subject of narcotics, however, have not accepted Safford's conclusions.³⁵ Prior to 1915, when Safford made his identification of teonanacatl, a number of authors had occasion to mention the narcotic and accepted the statements which all of the early writers had made concerning the fact that teonanacatl was a mushroom.⁴⁰

The first published objection to Safford's identification appeared in 1936 in a popular book by V. A. Reko⁴¹: "Dem (the Safford identification) muss **[441]** widersprochen werden. Die Nanacates sind Giftpilze, die mit Peyote nichts zu tun haben.." He suggested, but apparently without any basis, that nanacatl might be a species of Amanita.

From the first appearance of Safford's identification, however, Dr B. P. Reko has opposed the opinion that teonanacatl was a form of peyote. In 1923, he wrote to Dr J. N. Rose of the United States National Herbarium:⁴² "I see in your description of Lophophora that Dr Safford believes this plant to be the teonanacatl of Sahagun which is surely wrong. It is actually as Sahagun states, a fungus which grows on dung-heaps and which is still used under the same old name by the Indians of the Sierra Juárez in Oaxaca in their religious feast..." In 1919, he had stated⁴³ that teonanacatl was "div. géneros de hongos, especialmente un hongo negro que crece sobre estiercol y produce efectos narcoticos."

In 1939, specimens of *Paneolus campanulatus* L. var. *sphinctrinus* (Fr.) Bresadla which were collected in the Mazatec country of northeastern Oaxaca were identified as teonanacatl.⁴⁴ Later, the same plant was found to be used among the neighbouring Chinantecs and Zapotecs. There is, therefore, no longer any reason for the retention of Safford's misidentification of teonanacatl with *Lophophora Williamsii*.

The entire genus *Paneolus* is known to be poisonous. Differences between species are often very slight and extremely technical. Different species, having the same intoxicating properties and being so similar in gross appearance are without doubt utilized along with *P. campanulatus* var. *sphinctrinus*. Although I have found no other mushroom used as teonanacatl in Oaxaca, numerous reports that there are several kinds of teonanacatl must be interpreted to mean that other species are actually used. Although the identification of "teonanacatl" was made on the basis of specimens of *P. campanulatus* var. *sphinctrinus*, it is probable that this vernacular name refers to several or numerous species of *Paneolus* and that further ethnobotanical research will result in the discovery of other species which serve as divination-narcotics in southern Mexico.

VII.

In summary, it may be stated that:

- 1) *Paneolus campanulatus* L. var. *sphinctrinus* (Fr.) Bresadola (and possibly other species of *Paneolus*) is used as a narcotic in witchcraft and **[442]** divination among the Chinantecs, Mazatecs and Zapotec of southern Mexico.
- 2) The size, colour, form, growth habits, uses, and narcotic effects of *Paneolus campanulatus* L. var. *sphinctrinus* correspond so closely to the descriptions of the same aspects of the *teonanacatl* of the Chichimecas and early Aztecs that there can be no doubt that this species represents the intoxicating mushroom which was described by many of the early writers as one of the chief narcotics of Mexico at the time of the Spanish Conquest.
- 3) The discovery of the use of *Paneolus* in three Mexican Indian tribes and its identification with *teonanacatl* should dispel the confusion which has resulted in the literature from Safford's misidentification of *teonanacatl* with peyote.
- 4) Although it seems to have been and to be widely used in southern Mexico as a narcotic, *Paneolus* is not known to be utilised as an intoxicant by any other group of primitive peoples.

Notes

- 1) It is with pleasure that I express my appreciation of the constant interest which Professor Oakes Ames, Director of the Botanical Museum of Harvard University, has shown in the ethnobotanical work which has led among other things, to the rediscovery of *teonanacatl*. I wish also to thank the several workers whom I mention in this article for making available for me unpublished information in their possession.
- 2) B. de Sahagun, *Historie generale de choses de la Nouvelle Espagne*.
- 3) The translations which appear in this paper are free translations made by the writer from the original sources.
- 4) Francisco Hernandez (1790), p. 357.
- 5) Manuel Martinez Gardica (1391), p. 21.
- 6) Jacinto de la Serna (1892) pp. 61-63.
- 7) Lord, Kingsborough (1848), p. 17.
- 8) Manuel Orozco y Berra (1880) p. 437.
- 9) Weston LaBarre, *The peyote cult* (1938), pp. 128-130.
- 10) William Safford, *An Aztec Narcotic* (1915), p. 291.

- 11) Hubert Hugh Baseroft (1882), p. 360.
- 12) Victor A. Reko (undated).
- 13) Remi, Siméon (1885).
- 14) Kingsborough (1848), Fr. Motolinia (1858), p. 23; Orozco y Berra (1880).
- 15) Kingsborough, Antiquities of Mexico (cronica Mexicana), p. 153.
- 16) Motolinia (1858), p. 23.
- 17) John G. Bourke (1891).
- 18) J. Eric Thompson (1933), pp. 31, 74.
- 19) Letter preserved on herbarium sheet number 1745713, United States National Herbarium, Washington, D. C.
- 20) In an earlier article (32, p. 39), I stated that these mushrooms were collected among the Otomis of Puebla. This is an error which was caused by a misunderstanding in correspondence. In the article I gave no credit to Mr. Weitlaner for his work on teonanacatl in the Mazatec country, since this information has only recently been communicated to me by Mr. Jean B. Johnson.
- 21) Schultes and Reko 231, Collections of Economic Botany No. 5548 (Botanical Museum Harvard University, July 27 1938).
- 22) Schultes (February, 1939).
- 23) This, interestingly, parallels the use of ololiuqui or piule (*Rivea corymbosa*) which is also used as a narcotic for divination in parts of Oaxaca. Investigation revealed that this narcotic convolvulaceous plant, the seeds of which are used, is known in the Mazatec region but is no longer utilized. It is used, however, by the Chinantec and Zapotec Indians to the south (Schultes ined.).
- 24) Jean Bassett Johnson (1939).
- 25) The term Chinantla is extremely ambiguous, having been used in a number of different senses by historical anthropological and botanical writers. It is a term which, as Bevan points out (Instituto Panamericano de Geografia e Historia. Publ. N. 24, Mexico, 1938) should be used only in its widest sense: "asynonym for the region where any dialect or Chinantec is spoken". It is used here in this sense.
- 26) Richard Evans Schultes, *Plantae Mexicanae* VI.
- 27) J. Bresadola (1931), p. 894.
- 28) Elias Fries (1838), pp. 235-236.

- 29) Louis C. C. Krieger (1935).
- 30) W.W. Ford (1923), pp. 225-229.
- 31) B. Douglas (1917), pp. 209-221.
- 32) Kreiger (1935).
- 33) C.G. Santesson (1939), pp. 1-9.
- 34) Schultes and Reko, op. cit.
- 35) Safford, An Aztec Narcotic (1915).
- 36) N. L. Britton and J. N. Rose (1922) p. 84; William E. Safford, Narcotic Plants and Stimulants of the Ancient Americans (1917) pp. 398-405.
- 37) Herbert J. Spinden (1917), p. 36; Eric Stone (1932), p. 55; J. Eric Thompson (1932), p. 31, 74. See E.W. Enmart: The Badianus Manuscript (Baltimore, 1940), p 66.
- 38) William L. Stafford (1917).
- 39) Jean Bassett Johnson (1939); Weston LaBarre, Native American Beers (1938); Ibid., The Peyote Cult (1938); Bals Pablo Reko (1919); Victor A. Reko (undated); Ibid. (1936); Sahagun (1938); Schultes (April, 1937); Ibid. (November, 1937), Spinden (1917).
- 40) Bancroft (1882), p 360; Thomas A. Joyce (1914), p. 156; Siméon (1885); Manuel Urbina (1900), p. 25; Ibid., (1912), p. 131.
- 41) V.A. Reko (1936).
- 42) Letter preserved on herbarium sheet number 1745713, United States National Herbarium, Washington, D. C.
- 43) Blas Pablo Reko (1919).
- 44) Schultes (February, 1939).

Bibliography

- BANCROFT, HUBERT HUGH, The native races, vol. 2 (San Francisco, 1882).
- BOURKE, JOHN G., Scatological rituals of all nations (Washington, D. C., 1891).
- BRESADOLA, J., Iconographia Mycologica (Milan, 1931).
- BRITTON, N. L, and J. N. ROSE, The Cactaceae, vol. 3 (Washington, D. C., 1922).
- DOUGLAS, B., Mushroom poisoning (Torreya, vol. 17, pp. 171-175, 209-221, 1917).

FORD, W.W., A new classification of mycetismus (mushroom poisoning) (Transactions Association of American Physicians, Vol. 38, pp. 225-229, 1923).

FRIES ELIAS, *Epicrisis systematis mycologici seu synopsis Hymenomycetum* (Upsala 1836-1838).

GARCIDA, MANUEL MARTINEZ, *Catálogos de la flora y la fauna del estado de Oaxaca* (Oaxaca, 1891).

HERNANDEZ, FRANCISCO, *De historia plantarum Novae Hispaniae*, vol. 2 (Rome 1790).

JOHNSON, JEAN BASSETT, *Elements of Mazatec witchcraft* (Ethnological Studies No. 9, Gothenburg, pp. 128-150, 1939).

JOYCE, THOMAS A., *Mexican archaeology* (New York, 1914).

KINGSBOROUGH, Lord, *Antiquities of Mexico* (Ritos antiguos, vol. 9, London-New York 1848).

KINGSBOROUGH, Lord, *Antiquities of Mexico* (Cronica mexicana, vol. 9, London-New York 1848).

KRIEGER LOUIS C. C., *A popular guide to the higher fungi (mushrooms) of New York State* (New York State Museum Handbook, 11, Albany, 1935).

LA RARRE, WESTON, *Native American Beers* (American Anthropologist, vol. 40 no.2, pp. 224-234, April-June, 1938).

Ibid., *The Peyote cult* (Yale University Publications in Anthropology no. 19, pp. 128-130, New Haven, 1938).

MOTOLINIA, FR- TORIBIO DE, *Historia de los Indios de Nueva Espana* (in *Coleccion de Documentos para la Historia de Mexico*, vol. 1, Mexico, 1858).

OROZCO Y BERRA, MANUEL, *Historia antigua de la conquista de Mexico*, vol. 3 (Mexico, 1880).

REKO BLAS PABLO, *De los nombres botánicos aztecos* (El México Antiguo, vol. 1, no. 5, pp. 113-157, December, 1919).

REKO, VICTOR A., *Was bedeutet das Wort Teonanacatl?* Unpublished manuscript undated.

Ibid., *Magische Gifte—Rausch- und Betäubungsmittel der Neuen Welt* (Stuttgart, 1936).

SAFFORD WILLIAM E., *Identification of teonanacatl of the Aztec with the narcotic cactus Lophophora Williamsii and an account of its ceremonial use in ancient and modern times*, (Botanical Society, Washington, D. C., May, 1915).

Ibid., *An Aztec Narcotic* (Journal of Heredity, vol. 6, pp. 291-311, 1915).

Ibid., Food Plants and textiles of ancient America (Proceedings, 19th International Congress of Americanists, Washington, D.C.; 1917).

Ibid., Narcotic plants and stimulants of the ancient Americans (Annual Report, Smithsonian Institution, Washington, pp. 398-405, 1917).

SAHAGUN, BERNARDINO DE, (Editor: Bustamante, Carlos Maria de) Historia general de las cosas de Nueva España, vol. 3 (Mexico, 1829-1830).

Ibid., (Translators: Jourdanet, D. and Remi Simeon) Histoire generale des choses de la Nouvelle Espagne, vol. 3 (Paris, 1880).

Ibid., Historia general de las cosas de Nueva España, vol. 3 (Mexico, 1938).

SANTESSON, C. O. Einige Mexikanische Rauschdrogen (Archiv für Botanik, vol. 29a, no. 12, pp. 1-9, 1939).

SCHULTES, RICHARD EVANS, Peyote and plants used in the peyote ceremony (Botanical Museum Leaflets, Harvard University, vol. 4, no. 8, April 12, 1937).

Ibid., Peyote (*Lophophora Williamsii*) and plants confused with it (Botanical Museum Leaflets, Harvard University vol. 5, No. 5, November 19, 1937).

Ibid., *Plantae Mexicanae* II. The Identification of *teonanacatl*, a narcotic Basidiomycete of the Aztecs (Botanical Museum Leaflets, Harvard University vol. 7, no. 3, February 21, 1939).

> Ibid., *Plantae Mexicanae* VI. *Rivea corymbosa*, the narcotic *ololiuqui* of the Aztecs (Botanical Museum Leaflets Harvard University, ined.).

SERNA, JACINTO DE LA, Manual do ministros de Indios para el conocimiento de sus idolatrias y estirpacion de ellas (in Coleccion de documentos ineditos para la historia de España, vol. 104, Madrid, 1892).

SIMEON, REMI, Dictionnaire de la langue Nahuatl or Mexicaine (Paris, 1885).

SPINDEN HERBERT J., Ancient civilizations of Mexico and Central America (New York, 1917).

STONE, ERIC, Medicine among the American Indians (New York, 1932).

THOMPSON, J. ERIC, Mexico before Cortez (New York-London 1933).

TORO ALFONSO, Las plantas sagradas de los Aztecos y su influencia sobre el arte precortesiano, Proceedings 23rd International Congress of Americanists, pp. 101-121, New York, 1930).

URBINA, MANUEL, El peyote y el ololiuqui (Anales Museo Nacional México, vol. 7, 1900).

Ibid., El peyote y el ololiuqui (La Naturaleza, vol. 1, no. 4, 1912).

