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# FOOD, CULTURE & SOCIETY

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## Food, Foam and Fermentation in Mesoamerica

BUBBLES AND THE SACRED STATE OF INEBRIATION

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### Abstract

Edible foam is held in particularly high esteem in Mesoamerica, and in certain instances, even considered sacred. Based on “observational” rather than “cultural” logic, this paper suggests reasons for this high regard. It proposes that the relationship between bubbles and the sacred state of inebriation is a key factor contributing to the status of edible foam in Mesoamerica.

**Keywords:** foam, Mesoamerica, alcohol, cacao, sacred drink, peyote

### Introduction

Food in all its manifestations, preparations and conceptualizations can be studied as multiple and interrelated systems of communication by means of which we interact with one another, learn from one another, and construct our individual realities. One way to approach the study of food and its communicative potential is to explore all food-related behavior and its meanings within a single community at a single point in time. This can tell us much about how food and other aspects of culture are interrelated and how food practices function to communicate information in the community.

A second approach is to pick a particular food item and trace through time relevant aspects of its composition, production, distribution, preparation and consumption, again within the framework of a single community. Because it misses food practices related to other food items, this longitudinal approach benefits from a careful choice of food to study, and is an excellent way to observe diverse changes within a community over time, relating food practices to various other cultural practices.

A third possibility is to focus on a process or product of food preparation, comparing this particular food-related element from one society with another

within some circumscribed area, perhaps as small as a single neighborhood, or as large as a nation or broader culture area. This third approach is selected here as a means of focusing on the meaning or communicative value of edible liquid foam in diverse regions of mostly indigenous Mesoamerica, which roughly speaking encompasses the southern half of Mexico, all of Guatemala, Belize and El Salvador, and a western sliver of Honduras (Figure 1). The topic and area were selected because edible foam is highly valued by indigenous societies, even to the point of being sacred, and understanding why this is so can illuminate other areas of cultural endeavor.

With this approach, I extract from an analysis of the data, drawn mostly from published accounts, suggestions about why foam is so highly regarded and what factors have been important in the development of its communicative symbolism in the constituency under consideration. By means of interrogating the importance of edible liquid foam I have been able to derive additional insights about the meaning of the sacred and even how it might be embodied in ritual fermented drinks in Mesoamerica. It is interesting to know that pulque is drunk during rituals, for example, but even more interesting, and perhaps even exciting, to think that the act of fermentation and the bubbling and foam produced during this process is an index of divine presence. The paper also provides an example of how one might answer the question of why something is considered to be sacred; a question not always adequately explored. Connections found and documented here between foam, fermentation, the sea and even soda pop are food for thought, suggesting



**Fig 1:** Map without nation boundaries showing Mesoamerica as it is referenced in this paper (courtesy GNU Free Documentation License).

areas of inquiry that might be developed further in future work, or by other persons working in related areas.

The foams herein discussed are more or less ephemeral groupings of gas bubbles contained within or atop a liquid.<sup>1</sup> Sometimes the result of natural processes, the bubbles that can be referred to as foam or froth can be produced in numerous ways, from pouring, shaking, stirring or beating a liquid (as in making whipped cream), to opening a container in which pressurized gas is held in liquid (as when opening a bottle of champagne or soda pop).

Numerous persons have remarked on the importance attached to the production of froth or foam on the sacred Aztec beverages made of cacao and other ingredients, especially ground maize (e.g. Coe and Coe 1996; Green 2010; Stross 2010: 560). It has also been observed that Mayan peoples today, as in earlier times, place a high value on edible foam accompanying various chocolate<sup>2</sup> drinks (Coe and Coe 1996; Green 2010). A late Classic Maya palace scene on the “Princeton Vase” shows a woman pouring a cacao drink from one container to another (Coe and Coe 1996: 50), a means of producing foam as well as the lesser matter of mixing the ingredients. This same method has been depicted on the sixteenth-century Codex Tudela (Green 2010: 327), and was employed at various times and places in Mesoamerica to create a head of foam on a liquid. Indeed, Coe and Coe (1996: 88) suggest that until the Spanish introduced the *molinillo* (a grooved beater stick twirled between the palms of the hands), pouring liquid from one vessel to another was the standard Mesoamerican method of frothing drinks. That said, it seems likely that some sort of beater stick was also used on occasion to create froth prior to the Spanish invasion (Dakin and Wichmann 2000: 63–4; but cf. Kaufman and Justeson 2007: 219). Today, methods for making the highly desired foam vary: some indigenous societies in Mesoamerica prefer the decanting technique, while others prefer some form of beater; other societies use a mixture of both methods.

An indication of the importance of foam and foaming beverages that goes beyond depictions of its production can be found in its simple representation in Mesoamerican iconography. For example, in Justin Kerr’s archive of rollout photographs of Maya vases, foam is represented on painted vessels from Classic Maya times, mostly in the form of dots surmounting a beverage container (Kerr 2010): K5445 shows a bowl with dotted foam being poured either onto paper or into a bowl below it; K6418 shows a wide-necked vessel with what may be foamed cacao, depicted as brown blotches instead of black dots; K8764 includes a wide-necked vase with black dotted foam represented on top of it; K8385 has an upright vessel with black dotted foam issuing from its top (Figure 2); and K8936 depicts a drinking bowl being held above a narrow-necked jug with circlets instead of dots surmounting the rim—the contents of the jug may be pulque.

Postclassic Maya foam can be seen in several places on the Dresden Codex, including on page 48a (the top register), where God N is holding what is believed to be a cup of foaming pulque (Figure 3). Lounsbury (1973) interpreted this foam sign, with its central circlet, as the Maya glyph for the syllable *mo*, which is similar to the Maya word for foam (*om*). Also shown on the Dresden Codex, page 35, is a round-bottom Maya vessel marked with a “moon” sign (the “Caban curl”); a



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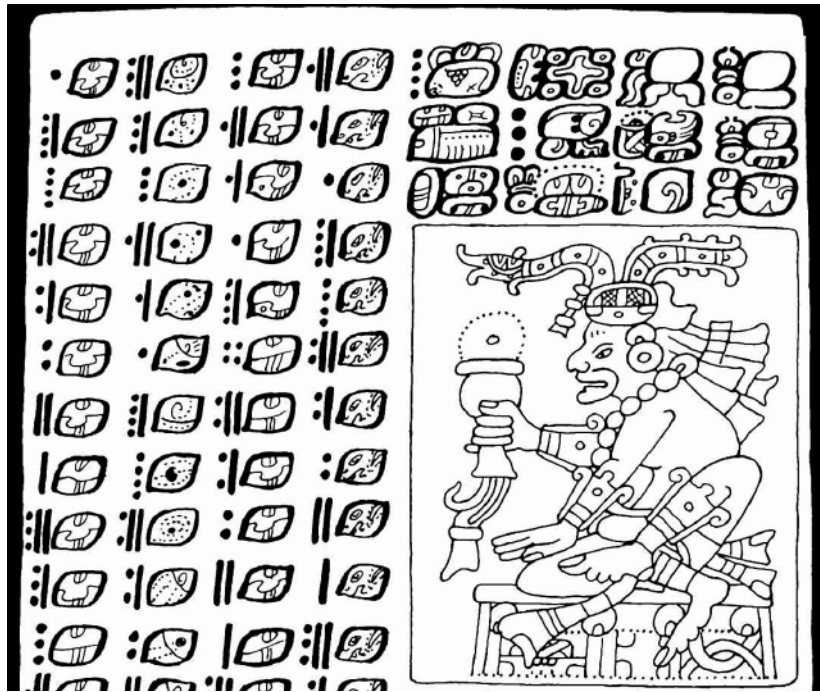
**Fig 2:** Rollout of Classic Maya painted polychrome ceramic funerary vase depicting seated ruler with upright vessel and black dotted foam issuing from its top; K8385 from photographic archive of Justin Kerr (courtesy of Justin Kerr).

semicircle of dots of foam above the rim suggest that this is a pulque vessel. A similarly shaped round-bottom Aztec vessel marked with a different “moon” sign and a swarm of dots above the lip is identified as a pulque jug on page 27r of the Mendoza Codex.

Eating or drinking, and sometimes sharing, foam produced on various plant-based beverages, including those made with cacao has apparently long been of importance in numerous Mesoamerican societies, not to mention elsewhere in the world where one often finds appreciation for a frothy cappuccino or a large head on one’s beer. Encountering more and more instances in Mesoamerica where froth or foam is, and was, seen as desirable or even imperative, the question naturally arose as to what it is about foam that makes it culturally important to the point of being sacred to some peoples, while only tasty to others. Does foam symbolize or communicate something special to peoples of Mesoamerica? Do the different people and cultures of indigenous Mesoamerica have widely varying reasons for valuing froth, and/or is there some underlying observationally logical or naturally symbolic basis for its importance? Does foam participate in an approach to the sacred that to some extent transcends cultural and linguistic differences? These are the main questions for which I hope to provide tentative answers in this paper.

In an important paper on foam and maize–cacao drinks in southern Mexico, Judith Green posed questions related to those above with respect to a specific type of Mesoamerican drink, composed primarily of water, ground maize, and chocolate:

Five hundred years ago, Spanish cleric Diego de Landa recorded that his Maya informants enjoyed foamy beverages of cacao and maize for major celebrations. Landa (1941[1566]: 90) remarked on the high value the Maya placed on the buttery foam crowning these beverages. His words elicit two questions that will be considered in this analysis: How could stable foam be created on a beverage of maize gruel (*atole*) and chocolate, and why was the foam so highly valued? (Green 2010: 315)



**Fig 3:** Dresden Codex, page 48a (top register); (Detail from line drawing by Jens Rohark, courtesy www.wayeb.org).

Answering these questions took Green through Yucatan, Tabasco and Oaxaca, where she learned that Zapotecs create long-lasting fatty foam on their version of the maize gruel and cacao (chocolate) beverage by means of adding specially prepared ground seeds of the pataxte tree (*Theobroma bicolor*).

Learning why the foam of this maize and cacao beverage is so highly valued was more difficult, for it was hard to pin down a single answer, and the multiple answers summarized valiantly by Green are not entirely satisfying:

Besides the sensory pleasure from the taste of chocolate foam layered on a comforting daily food, *atole*, there may be at a deeper level the spiritual identification of the Maize God with the cacao in the juxtaposition and final mingling of the two. (Green 2010: 340)



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No doubt the delightful taste of the foam in a foaming beverage, to which an ingredient is usually added for the creation of the foam, has something to do with the value of and the desire to eat the foam from this beverage, to which I would like to add that the presence of the foam would by itself attest at the time to the relative freshness of the product. Champagne or a beer gone flat, or a cappuccino without the foam, in the end leaves something to be desired in flavor, and knowing in advance about the freshness is definitely to be desired. With respect to the deeper

level, the spiritual identification, juxtaposition and mingling of the Maize God with cacao is not so persuasive. After all, to many people froth is also important on cacao drinks lacking maize ingredients, not to mention on drinks with neither maize nor cacao. “People had a pragmatic reason for stabilizing the foam too. Celebrations last for hours and the drink must be presented with foam” (Green 2010: 340).

If foam were not already highly valued, then presumably there would be no particular reason *a priori* to need to stabilize the foam in order for it to last longer. As the foam is highly valued, then of course there is such a pragmatic reason to stabilize it, but that reason cannot also simultaneously be a reason for the foam’s importance. “There is a performance aspect to making and serving the drink properly, with its stirring stick and the requisite and impressive head of chocolaty foam, to each guest” (Green 2010: 340).

This is an excellent point, the implications of which can be drawn out. When substantial work goes into creating the foam and serving it properly, this creates its own valuation for the foam, as production effort is a large part of value, and the recipient of the foam should be able to appreciate his/her own valorization bestowed by virtue of being served the foam that represents the effort that went into the production and serving of it. In beverages that require much work to produce and maintain the foam, this could help explain the foam’s value. However, there are foaming beverages of high value in Mesoamerica that do not require much work at all in the production of the foam, for example pulque (Henderson 2008), so the explanation, applicable on a limited basis, is more difficult to generalize.

According to one Zapotec, the foam represents the faith of the community in its health, strength, and hope for the future. The Zapotecs believed foam was the life of the drink. So making foam must have symbolized creating and preserving life. (Green 2010: 340)

These are two potentially promising reasons for the valuing of foam, but it would be more satisfying if we knew by what rationale foam is thought to represent faith of a community in health, strength, and hope. Is there some evidence for this belief, or some symbolic connection that could be sustaining the belief, and how well attested is the belief? More persuasive is that foam could be seen as the life of the drink, for movement (activity) is to many people the hallmark of life, and continually active and moving bubbles, the stuff of froth, can easily be seen by a couple of extended metaphors as indexing, or at least symbolically representing, life.<sup>3</sup>

Foam is highly valued in other beverages besides the maize and cacao drink in Mesoamerica.<sup>4</sup> It is valued for different reasons in different societies and sometimes for different reasons in the same societies. Furthermore, some traditional lore suggests that foam outside of the symbolic realm of food—such as on bodies of water, or in curing without ingestion—is viewed as sacred in some regions. It will be useful to explore these avenues of information in order to reprise some of the reasons for foam’s importance in Mesoamerica and to propose possible underlying reasons based on observational logic (Stross 2007: 2), relating them to traditional explanations given for the valorization of foam as food on drink. Ultimately, I will

propose that the process and products of fermentation together provide a key component in uncovering some of the importance attributed to foam or froth.

## Some Examples of Valued Foam in Mesoamerica

### *Lacandons*

Lacandon Mayans mix ground toasted cacao beans and ground parched maize along with water, to which they add pieces of a large thorny vine called *sukir* <suquir><sup>5</sup> that are then removed after they have added their essence to the liquid in order to stimulate the production of foam:

The liquid is then whipped with a wooden beater without being either heated or cooked. Then the foam is spooned off and placed on top of *ma'ts* gruel and drunk. When all the foam that can be generated is gone, the remaining liquid is drunk, but the foam is the most desirable part. (Baer and Merrifield 1971: 210)

Coe and Coe tell of a similar, but more sacred, chocolate drink made by a ritual sponsor's wife, who:

Roasts the cacao beans, then grinds them with a stone mano and metate, not the iron hand-mills used in ordinary household kitchens (in fact she does this in a special cooking hut next to the "god house where the clay effigy "god pots" are kept). While grinding, she mixes in a grass called aak', which makes the cacao liquid foam as she beats it with a wooden stick. Water is then stirred into the mixture, the liquid strained, and finally poured into bowls containing either balché (a ritual mead flavored with a certain tree root) or sak ha (our already familiar corn gruel). This is then "fed" to the "god pots." (Coe and Coe 1998: 65;<sup>6</sup> cf. Davis 1978: 213; McGee 1990: 48)

Foam or froth is characteristic of the fermentation process, and is seen in greater or lesser quantity on the sacred beverage of the Lacandon (and Yucatec Maya), a fermented drink known as *balché*, at one time made of honey, water, and bark from the *Lonchocarpus* tree, and now more frequently made with sugar substituting for the honey. Lacandons expect to vomit when drinking *balché* (McGee 1990: 79), though they try not to do so. They claim that *balché* is physically and spiritually purifying (McGee 1990: 73) and that it allows for communication with the deities in the other world (McGee 2002: 39). The topic of foam stemming from the fermentation process and its meaning is important and is dealt with in more detail below.

Lacandon speakers have other, and perhaps unexpected, associations with foam. For example, in *Lacandon Dream Symbolism*, Bruce (1979: 188) tells us that "dreams of boiling or foaming kettles and pots foretell fever and vomiting," and *yoom* [foam, froth] is a bad omen. "[You will see] a person foaming at the mouth ... If you dream of someone foaming at the mouth, an animal is about to die foaming at the mouth" (Bruce 1979: 252). This kind of foam is understandably undesirable.



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### ***Chinantecs and Mazatecs***

For weddings and religious festivals, the Chinantecs of Oaxaca make a maize-based drink called *popo* with added water, cacao (or bars of chocolate) and unrefined sugar. Like the Lacandon Mayans, they add another ingredient to produce large quantities of foam when the mixture is agitated (Weitlaner and Cline 1969: 533). Instead of the *pataxte* that helps the Zapotecs to produce froth on their “*atole*-chocolate,” the Chinantecs utilize masticated saponin-rich young shoots of a vine that some have identified as a species of *Smilax* (Bost 2009: 42; Standley 1920: 104) and others as a species of *Dioscorea* (Soleri and Cleveland 2007: 284; Soleri *et al.* 2008: 284; Standley 1920: 144, 1646; Weitlaner and Hoppe 1969: 517). There is at least general agreement that the plant name in Spanish is a variant of *cocolmecatl*. The drink *popo* is made with hot water and beaten to a froth, nowadays with the *molinillo* spun rapidly between the palms of the hands.

Mazatecs, neighbors of the Chinantecs, living in the northern corner of Oaxaca, make a largely foam drink similar to the Chinantec *popo* by adding water to ground maize dough, cacao, and what is said to be the root of a *cocolmecatl* vine, itself identified tentatively as *Dioscorea remotiflora* (Weitlaner and Hoppe 1969: 517).<sup>7</sup>

### ***Zapotecs, Aztecs and Mixtecs***

Some seventy years ago, Miguel Covarrubias provided a well-described glimpse of the Isthmus Zapotec version of the Chinantec foam drink:

Unfortunately becoming rarer every day is the delicious *bu'pù* [foam], a drink mostly served at feasts and marriages. It consists of hot, unsweetened *atole* over which is poured a cold, sweet foam made of fresh cacao, sugar, and toasted petals of frangipani (*gie'caci*) and *gie'suba* flowers beaten to a thick foam with a long beater called *pala*. The hot thick *atole* drunk simultaneously with the fragrant cold foam makes a refined and delicate drink. (Covarrubias 1946: 275–6)

The similarity between the Isthmus Zapotec and the Chinantec names for the related beverages is of interest, as is the fact that the drink is named “foam” in Isthmus Zapotec. The word for foam in Proto-Mixean, reconstructed from several Mixean languages in Oaxaca, and unrelated to Zapotec, is *oo'p*, which if reduplicated would be just about the “mirror image” of Chinantec *popo*.<sup>8</sup> In Zoque, a relative of Mixe, *popo* means “white,” which has been seen by some as related metaphorically to foam or froth.<sup>9</sup> Other Zapotec languages (often referred to in the literature as “dialects” of Zapotec) seem to have unrelated names for the drink as well as for foam. Aztec <*pozoc*-> foam is clearly related to Aztec <*pozon*-> [to boil], sharing an initial *poz*-, is a component also of the word *pozol* which in much of southern Mexico refers to cold maize gruel, but in the central highlands where the Aztec empire originated it more often refers to a boiled hominy stew or soup that includes other ingredients.

Other versions of this foamed maize-cacao drink of Oaxaca, called *tejate* in Mexican Spanish as well as “drink of the gods” or “beverage of kings,” employ the fragrant flowers of a tree known as *flor de cacao* (*Quararibea funebris*) in addition to the ground-up seeds of the mamey fruit (*Pouteria sapota*) (Soleri and Cleveland 2007: 112). The *flor de cacao* apparently operates as a producer of foam for the *tejate*, and it is said by some to have unspecified psychoactive properties as well.

As in the central highlands of Mexico, the major fermented brew typical to much of Oaxaca is pulque, fermented from the sweet liquid sap produced in the center of certain kinds of agave plants that have had their budding tip nipped for that purpose (Bruman 2000: 61–82). The amount of foam found at the top of a vat of pulque varies, but it is frequently substantial, exhibiting an ongoing process of fermentation. Not surprisingly, pulque is related to rain and to fertility (as for example, in Nahuatl speaking Tepoztlan), and its relation to foam in Aztec thought is reflected in Classical Nahuatl’s *Pozonaltepetl*, pulque’s place of origin in Postclassic Aztec narratives. According to this lore, the first batch of pulque was made on Mount Chichinauhia, which was then renamed Mount Pozonaltepetl [Mountain of Foam] to commemorate the froth on the head of the beverage (Koontz 2008: 18).

Called *octli* in Nahuatl, pulque was well known to the Aztecs and their predecessors as an important alcoholic beverage; milky in color, foamy, and rather viscous. Evidence from some of their descendants suggests that pulque inebriation is believed to put one in a transcendent state that could be considered sacred and in which communication with the deities and ancestors is possible.

In a small Mixtec-speaking town in the Mixteca Alta of Oaxaca, just as in Aztec-speaking Tepoztlan, pulque is also related to fertility. It is

associated on several levels with blood. Its consumption is said to restore blood, and its whiteness associates it with semen and milk, which ... are male and female blood ... The association of pulque with semen is significant in the context of ritual offerings made to stimulate corn production ... [I]n sowing and tending to his fields, the farmer is felt to transmit “the heat of life” to the corn plant, so that it bears an ear of corn. (Monaghan 1995: 221)<sup>10</sup>

This fits with the local anthropomorphized conception of the maize plant as a young, pretty, marriageable woman, which can be inferred from the fact that inhabitants speak of the plant in exactly that way (Monaghan 1995: 217). What could be more sacred than fertility?



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### ***Tzotzils and Tzeltals***

In the course of appropriate ritual activities, Tzotzils and Tzeltals become inebriated on homemade rum (*pox*), a liquor distilled from sugar cane juice, and on *chicha* (Tzeltal *chi'ilha'*, literally “sweet water”; Tzotzil *pahal vo'*, literally “sour water”), fermented sugar cane juice, reaching thereby a state of transcendence, ritual purity, and enabled communication with the spirit world that is inhabited by the ancestors and deities. The *chicha* from fermented sugar cane generally has somewhat less

froth than pulque, which is made from agave plants of the sort known as maguey, but *chicha* elicits similar inebriation and has related significance to those who imbibe.<sup>11</sup> Both rum and *chicha* are necessary ritual items present at ceremonial occasions.

In addition, it has been observed that a carbonated soft drink (either Pepsi Cola or Coca-Cola, depending on the individual community, and in some places also orange soda) has taken the place of *chicha* among the religious paraphernalia deemed ritually important for imbibing and sharing during ceremonial occasions, just as cigarettes have been added to the ritual items that traditionally included gourds of powdered *pilico* [native tobacco]. It is not unusual to see a Tzotzil or Tzeltal speaker kneeling on pine needles inside a church with offerings to the saints of lit candles and Coca-Cola.

That Coke would have ritual significance to an indigenous community is so noteworthy that more than one reporter has covered the story of its use in Chamula, a Tzotzil community (only one of many Tzotzil and Tzeltal communities in which soda is used in religious ritual). For example in her story “Traditional healers put Coke to the test,” Teresa Borden describes a traditional ceremonial cure performed by an *h’lol* [shaman, healer] named Maria Lopez for her son Diego, who suffers from aches:

She kneels on the packed-dirt floor and keeps other offerings nearby: sprigs of basil, a jar of homemade sugarcane rum, and two bottles of Coca-Cola. Lopez is an *lol*, or shaman, who conducts the rituals central to the life of the Tzotzil Maya populations of this region. Coca-Cola plays a key role in those healing sessions, along with a homemade rum called *pox* (pronounced *posh*) ... [she] then pours the rum into a small cup, taking a sip before giving it to Diego and other members of the family. She sprinkles the rest over the candles, which flare as the alcohol ignites. In a moment, she does the same with the Coca-Cola, pouring a cup for each person so they can all drink at the same time. (Borden 2004)<sup>12</sup>

Note in the above description that one bubbly beverage (Coke or Pepsi) is substituted for another that foams (*chicha*), while the distilled liquor remains. Carbonated drinks as foam producers and as significant ritual paraphernalia are sold in front of the church by merchants who also sell candles and rum for the rituals performed inside. The local guides are usually ready to explain things to tourists:

The reason that cola has edged itself into the Chamula religion, our guide tells us, is that burping is considered cleansing because it expels the spirits. He tells us the integration of cola into the local religion has replaced more traditional herbs with healing properties because the Chamula pray for cures to illnesses—they do not go to doctors. Other sources say that before cola, the holy water was locally-made liquor called *pox*—sometimes still used as a supplement to cola. (Robin Ewing, personal communication 2005)

The guide's explanation about belching as cleansing is interesting and has a certain plausibility, but this requires a bit more discussion, to be taken up below.

Not only do Tzeltals appreciate and have important ritual uses for aggregates of bubbles (i.e. foam) in the fermented drink known as *chicha*, and in carbonated soft drinks;<sup>13</sup> they also use the root of a plant called *ch'opak* (*Polygala floribunda*) that contains saponins as a ceremonial substitute for soap when, for example, washing a newborn baby, or as a ritually purifying shampoo (Stross, field notes, 1967). While this is not an example of edible foam, it is mentioned here because observation of the cleansing properties of inedible foaming substances might well have contributed to cultural logics of appreciation for foam in edible form,<sup>14</sup> and also because saponins are present in the ingredients of various Mesoamerican drinks, as major contributors to the froth.<sup>15</sup>

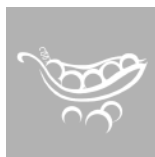
### ***Chatinos***

Distantly related to Zapotecs, Chatinos speak a tone language with as many as twelve distinguishable tones, and occupy a part of southeastern Oaxaca. They drink a slightly alcoholic fermented cane juice beverage called *tepache* (which has froth), and non-alcoholic *champurrado*, hot chocolate thickened with maize *atole*, but with no head of foam. Nevertheless, foam has considerable importance to Chatinos.

Janna Weiss, an ethnobotanist particularly interested in herbal medicine, lived with Chatinos in Oaxaca Mexico for eighteen months, learning about the Chatino worldview as it relates to plants and medicine. Given her interests, it is not surprising that she found foam particularly noticeable in the context of medicine. In Zenzontepec, for example, she noted that Chatinos use *espinosilla* (*Hydrolea spinosa*) to cure *espanto* [fright], mixing it by hand and mashing it in water, putting it on the head of the patient, though not in their mouth: "You put the foam in a cup and there it comes out what the fright comes from, from a person, dog or a bull or any animal. The foam falls and out comes the figure of an animal, dog, person" (Weiss 1998: 205).

Here we can see that the plant-produced foam is supposed to have what we would call a "magical" property of revealing as it dries out the cause of an illness, in this case the illness known as *espanto*. Weiss expands on the importance of foam to Chatinos in correspondence, and notes that the whipped chocolate drink is also made by Chatinos:

Foam is very important to the Chatino: by whipping the herbs "hasta que se espuma" the *aire* is brought into the remedy and it is then ready for consumption—I suppose you can say that it has been made sacred, is blessed by the spirit realm—one's intentions, and the gods, have been well-placed into the remedy. Also, the Oaxacan chocolate in the mercado is similarly whipped. Like the copal smoke, that is the bridge between the physical and the spirit world, in a reverse direction—the smoke goes up into the *aire*, sending up prayers and wishes, carrying away the illness and fright, and the other brings the *aire* into the remedy and into the body. (Janna Weiss, personal communication 2010)



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### ***Huichols and Coras***

In prayer and narrative, Huichol shamans refer frequently to the “foam of the sea” as sacred, and sea foam has an important place in Huichol mythology as the shamans (*mara’akame*) well know. For example, red sea foam represents the hearts of creatures from the sea:<sup>16</sup>

They were pushed out at the sea where the great gods of the sea were sitting in their shaman’s chairs near their votive-bowls. The great gods of the sea did not know what these new creatures were since they came out of the sea as green-blue spray. The next time some came out as yellow spray. Finally others came out as red foam. This was their hearts (Zingg 2004: 8). New things are born from “hearts” or essences, which the Huichol see in the red sea foam that flowed from Our Father the Sun ... The Sun itself has a “heart” that is its forerunner. (Zingg 1982, Vol. 1: 177)

In discussing the Aztec place of mists, Tamoanchan, Lopez-Austin interprets Huichol references to red foam in a slightly different way. “According to a Huichol myth, the Sun created earthly beings with his saliva, which appeared in the shape of red foam on the surface of the ocean’s waves” (Lopez Austin 1997: 17; Zingg 1982, Vol. 2: 187).<sup>17</sup>

In the Huichol narrative about the birth of the Saints, foam is immediately brought into the picture. “In the sea the water boiled. Green foam rose to the surface. The Sun went down into the sea and listened to the foam” (Zingg 1938: 557). That the foam of the sea has life in it and may represent the creating of life comes out just as clearly from a Huichol narrative about “five ancestor deities sent by the Earth Mother ... to teach the first people how to hunt deer ... So she created five ancestors out of sea foam to teach the people to hunt the deer” (Valadez 1996: 271).

Foam even comes to Huichols in visions induced by the ingestion of the psychoactive cactus peyote (Huichol *hikuri*), as in this narrative about one such vision:

There was a deer where the peyote was. The deer acted like it was drunk. Then white foam started to come from its mouth, the kind of foam that comes from grinding peyote. The foam looked like soap, like when the hikuri is killed. That’s how it was pouring out. (Schaeffer 1996: 159)

Peyote is made into a foaming drink by the Huichols. The froth is also used for anointing as with holy water, illustrated here in a partial description of the peyote dance:

During this latter ceremony a woman is specially selected to grind the dried peyote on her metate. She adds water to the pulverized peyote, making it into a white frothy drink for the participants. The leading shaman stirs the drink with

the point of a prayer arrow and people are anointed on the head with the foam from the peyote. In some instances, cattle are also anointed on their heads and horns, as are bags of offerings ... At each location the participants drink cupfuls of the liquefied peyote. (Schaeffer 1996: 151)

A bit more detail is provided in the following description where we learn that the women create froth by stirring it (before the shaman extracts some of the foam):

On the morning of the first day of Hikuri Neixa, women chosen to be the Niwetsika take turns grinding dried peyote on a grinding stone, adding this sacred powder to water, and stirring it until a thick froth appears. This peyote is used to anoint offerings and baptize the heads of the participants. It is also drunk at intervals throughout the ceremony. (Schaeffer 2002: 209)

Huichols also make an alcoholic drink from sprouted maize that they call *nawa*, referred to in local Spanish as *tesgüino*, *tejuino* or *tequino*. It develops a froth that is augmented for drinking by stirring with a whisk or by pouring from one container into another. There is a non-alcoholic version of this same drink, sold as *tequino* in Puerto Vallarta and Guadalajara by Huichol vendors, and with this too foam is important:

I spotted my first objective: a tequino vendor, selling his tart fermented corn drink out of an eskimo cooler ... and he prepared a cup in front of me—he rapidly poured the stuff back and forth to mix and froth it, and served it over ice. Corn-yellow in color, it had a sharp, almost grapefruit-juice flavor, but with lots of corn taste. In the hills you can get an alcoholic version, but this was just tart and delicious and very refreshing. (Fnarff999 2009)

The Coras living in Nayarit, Mexico are neighbors of the Huichols, and speak a closely related language. On certain ritual occasions, Coras grind peyote on a metate and add water to the ground product. The ground-up peyote-infused liquid is then poured back and forth from one vessel to the other, creating a great deal of froth. The foam is then offered around to assembled members of the group, and each person shares small portions of his foam with the other members. When the foam is depleted, they add more water to the ground peyote and the liquid is poured back and forth from one vessel to another until more froth is created (Margarita Valdovinos, personal communication 2010)



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### **Discussion: Observations Concerning Foam, its Meaning and Importance**

The data presented above give a picture of two classes of foaming drinks being produced and highly appreciated in Mesoamerica: non-alcoholic beverages, usually with cacao, maize and other additives, and fermented alcoholic beverages. Edible foam has also been made from the peyote cactus to produce visions and other effects, giving the plant the status of living deity.

The above data also persuasively indicate that froth or foam, an aggregate of small bubbles generally on a liquid, is highly valued in Mesoamerica, most frequently in the context of beverages, but also in other contexts as well. In an effort to understand why this is so, it will be useful to enumerate some observations about foam, observations that most people could make, and that may well contribute to the meanings and associations that an individual might generate with respect to foam outside of the immediate contexts of experience. These observations are enumerated below and discussed in terms of their explanatory relevance to answering the questions posed at the beginning about why foam is so important in Mesoamerica, and what could account for the special sacredness attributed to the foam.

1. Foam appears to enhance the actual flavor of almost any drink: coffee froth, chocolate froth, beer froth, pulque froth, the bubbles in carbonated soft drinks, even the bubbles in champagne (Liger-Belair *et al.* 2009). Imagine drinking any of these that have gone flat. Even peyote, which is rather bitter in any form, is still considered to taste better (or at least be easier to swallow) in the form of froth. In the United States, whipping things up, as in the production of froth, is clearly appreciated, and there are several technologies for producing aggregates of air bubbles in food and drink. Whipping makes butter and cream cheese more easily spread, potatoes more appetizing to many, and meringue pie delightful. Americans love whipped cream to top off a pie, or even just plain CoolWhip (which is largely hydrogenated vegetable oil). In short, one can observe that foam enhances the flavor of things, in part by making portions of those things more available to the olfactory sense, which is well known to contribute greatly to the perceived taste of food (cf. Perkowitz 2001: 44). There is also a tactile dimension to foam or froth that many persons find pleasurable and that may be related to perceived enrichment of flavor. Flavor enhancement is a good reason to appreciate foam, to value it. But this is different from saying a drink is “sacred,” or “a drink for the gods,” and that the foam contributes substantially to that sacredness.
2. The movement or energy that creates foam can either be internal (fermentation, effervescence, rising bubbles in liquid) or external (whipping, pouring). It can be observed that foam is often a product of external agitation. That is to say, liquids can be made to foam or froth when whipped or poured from one container into another. Although the form of agitation required to produce the foam in a beverage may be culturally variable and important to specify, it is easy to observe that, other things being equal, more foam requires more agitation, which requires more energy; to this end, a highly foamy beverage implies more value added. When more work is required to produce a product, then the product will be more highly valued in general; and in general, the more highly valued an individual, then the more they deserve to consume a highly valued beverage. No wonder only the nobility used to get the foaming *atole*-chocolate beverages. This surely accounts for some of the high value accorded to froth on these beverages, but just as surely, this cannot be the whole story. Again, being valued is not the same as sacred.

3. Agitation in a container that produces edible foam in a beverage has been seen as analogous to the sex act. Green has pointed out that frothing cacao drinks with the beater may be associated with sex in the eyes of Yucatec Mayans, who relate the *molinillo* to a penis and the frothing process to intercourse (Green 2010: 334). It is conceivable that whatever “sacredness” a person or society might associate with sex could be generalized to make the foam of an *atole*-cacao drink agitated with the *molinillo* beater seem to be sacred as well. But this sexual symbolism would seem not to apply so obviously, if at all, to the dominant (and perhaps the only) form of ritual froth production in pre-Columbian times—pouring the liquid back and forth from one container to another—and it was in pre-Columbian times that the drink and its foam were actually seen as the divine beverage of gods and kings.
4. It can also be observed that it sometimes takes more than agitation to get good quantities of foam, and especially foam that lasts for a while before the bubbles break and it dries up. Many persons can observe or might be told that certain plant additives can lead to very generous and long lasting froth, and at least some people will know through observation or training what some of the implicated plants are, and how much to use for a given effect. There are very specific plant species and plant parts or products that can be put into a drink recipe to produce long-lasting foam upon agitation. Foam is produced when saponins or certain proteins or fats (as in milk, for example), are present in the ingredients of a beverage containing water, especially when it is beaten, whipped, or poured from one vessel into another (Perkowitz 2001). Notable quantities of foam are characteristic of several different Mesoamerican drinks made from water, maize and chocolate along with other different additives. One could perhaps infer then that it is the plant additives (such as yam, smilax shoots, ground mamey seeds, calcified *pataxte*, etc.) that make the foam sacred. As these plant additives differ from recipe to recipe, this seems an unlikely observational source for generalizing the sacredness or importance of foam.
5. It is easily observable that parts of certain plants cause foaming action when agitated in water, and that this can have a cleansing effect when applied to skin, hair or cloth. Soaps and shampoos thus created produce foam and can be used for cleaning (purifying). These plant parts containing saponins, as for example in soapberry (*Sapindus*), or other chemical compounds including various proteins and fats that can make foam, can sometimes in small quantities be seen to have uses beyond cleaning (or purifying), such as in creating edible foam. A generalization from this observation, extended to edible foam, would suggest a symbolic sort of cleansing or purifying, and there could be a certain degree of “sacredness” transferable thus to the drink. This is indeed what could be plausibly related to the “white drink” of Native Americans of the southeast, for the drink appears to lead to vomiting, which is internally cleansing (and by symbolic extension, purifying). The sacred *atole*-cacao drink, however, does not appear to share the mild emetic action of the *Ilex vomitoria* and the Lacandon *balché* mentioned above, so the logic of extending purification to the *atole*-cacao drink would be greatly vitiated.





6. One can observe foam in water where the plant producing it is used as a fish poison. It can kill or stupefy fish, but seems not to harm those humans that eat the fish, especially if they cook the fish. An observationally logical conclusion could be drawn that the foam (and the plant producing it) is of some assistance (perhaps of a divine sort) to humans. So, adding this plant (often containing saponins) as an ingredient in *atole*-cacao could indeed, with a slight stretch in plausibility, be viewed as an extension or generalization of an inference based on observation of the foam in action, rendering assistance in capturing food.<sup>18</sup> Even so, it must be added that this is not the same as rendering the food either tasty or sacred. Fish acquired through such poisoning are unlikely to taste any better than fish captured by net or arrow.
7. Those who have seen an animal or person foaming at the mouth may interpret this as a sign either that said animal or person has rabies, or they are in some way mentally infirm, experiencing an epileptic seizure, or at the least in an abnormal state, or possibly that they are angry or unduly excited. In either case, foaming at the mouth should occasion caution as it might be dangerous, and because most people do not observe cases of rabies, they generally have to be instructed in its etiology. Although in some societies insane people or epileptics may be viewed as containers of some sort of sacredness (suggesting that foam from the mouth of shamans for example could well be felt to have curative powers, as indeed turns out to be the case), *atole*-cacao drinks are not made with foam from the mouth of an animal or person.<sup>19</sup>
8. It would be a commonplace observation for almost anyone in Mesoamerica a thousand years ago, and for an indigenous person even today, that the cacao tree producer and its chocolate products are highly valued and considered sacred, as food and drink for kings, and as sacrificial food offerings to the deities, and generally as important items in the enactment of ritual activity. Similarly maize in all its forms was seen as a sacred plant; food for people, offerings for gods, the staff of life. To some extent it makes sense that the combination of two sacred products could be seen as sacred. Perhaps this alone might be seen as explaining the high value placed on the various *atole*-chocolate drinks. However, it does not explain the high value placed on the froth itself, and the related fact that the frothed version of the *atole*-chocolate drink is considerably more elevated in stature than the non-foaming version.
9. The continually moving and changing bubbles in foam may be evidence of life, for they illustrate movement, and movement or activity in part defines life. What never moves is dead; what moves somewhat is alive, what moves a lot is very alive. One can see bubbles making their way up from carbonated beverages, bubbles in volcanic outflows of lava, bubbles in the fermenting and fermented beverages such as pulque; all of these become foam when they reach the surface, if there is enough surface tension to hold them together. Indeed, bubbles can be seen to have their own life cycle from "birth" to "death." As life has its own quality of sacredness, one might say that the observed characteristic of life found in bubbly froth could be extended to make the *atole*-cacao beverage share in this quality. Thus, a plausible generalization might be made that drinks with

foth, being more alive, are closer to being sacred drinks than those without. But if all life is sacred, what singles out the foaming *atole*-cacao drink or any other foaming drink as an important index of the sacredness of life to begin with?

10. It is easy to observe that foam, whether or not viewed as a “life form,” is a temporary material, continually drying out unless refreshed. One can therefore conclude that the presence of foam or froth, in addition to whatever “aliveness” it signals, is a sign of freshness, activity and potency. These qualities would undoubtedly be valued in a beverage. Needless to say, something that maintained the presence of foam without the need for refreshing by constant agitation would also be obtained and utilized whenever possible if there were no noticeable negative side effects. This quality of representing freshness and potency must be seriously considered as part of the reason for the symbolic potency of foam as indicating a desirable beverage, and possibly also as an indicator of the sacred.
11. The various edible foams discussed here can be grouped into three classes: (a) those containing caffeine, (b) those containing alcohol, and (c) those containing hallucinogenic alkaloids:
  - a. *Class A.* Cacao contains the bitter alkaloid caffeine and the related alkaloid theobromine. Cacao beverages have relatively little caffeine and do not froth up without some additives causing them to do so.
  - b. *Class B.* All the alcohol-containing beverages that result from fermentation of food plants belong to the second category. Significant foam is part of the production of these beverages; it is a necessary component of the fermentation process. This foam would be easily observable by anyone coming into contact with a fermented alcoholic drink in Mesoamerica, or elsewhere.<sup>20</sup>
  - c. *Class C.* The third class mentioned contains psychoactive substances such as mescaline. Peyote is the Mesoamerican member of this class that was discussed with respect to foam.

While simple observation would attribute to any of these edible foams special powers, maize-chocolate drinks containing caffeine and theobromine produce little in the way the effects associated with Classes B and C, such as sharpening insight; protecting from hunger, thirst and exhaustion; creating inebriation; and/or experiencing an altered state in which vivid “dreams” occur. Thus, the foam of the maize-chocolate drink, which is artificially produced by added plant ingredients, would have to be seen as the provider of the special powers. Peyote, though widely known, is limited in use and distribution within Mesoamerica, whereas that second category of fermented alcohol containing beverages is ubiquitous in Mesoamerica, and it can be observed both to have quantities of froth or foam while brewing and also to cause inebriation when imbibed. If froth is natural to alcoholic beverages, as well as to ground peyote in water, it might just make sense to want to make froth on less potent beverages such as the maize-cacao drink, in order to symbolically liken it to the other two more potent drinks.



12. Fermented alcoholic beverages characteristically have foam or froth, especially pulque. No special effort goes into the making of the foam, so in this case the effort or cost of production does not contribute to the high valuation of the foam itself, though it could be a factor in the valuation of the total product, which includes the foam; after all, it takes about three days to produce the fermented drink. Because of the invariant presence of foam on fermented beverages, it might be observed and concluded that the foam is part of the key to their effects, which are very highly valued. The real value of course is due to the fact that fermented alcoholic beverages lead, when imbibed, to a state of inebriation that is almost universally characterized in indigenous Mesoamerica as a “sacred” state, a state of facilitated communication with the otherworld and with the deities and ancestors.

The unexplainable capacity of fermented alcoholic beverages to produce their own froth while also becoming inebriating constitutes an additional mystery. In other words, they have a potency to create froth which can be observationally correlated with the capacity to inebriate. It is then not just the “froth” that is transferred from alcoholic beverages, but the “generative process of frothing” that is mimicked by human hands.

Generalizing the observable production of foam as a correlate of a fermented beverage, and thus of special qualities including inebriation seems to be a plausible observational logic. It could by itself perhaps account for the high symbolic esteem in which foam in general is held, including foam on the *atole*-cacao drinks.

We have seen that with various forms of a chocolate beverage, often maize-based, it is very important to develop a froth or foam during production, and that this is accomplished with the aid, usually of some plant additive, often containing saponins, or perhaps in some cases special proteins or fats; chemical agents that promote the production of foaming. This foaming seems to be generally quite important ritually and socially. Observational logic could be a basis for crediting foam with the power to inebriate (or put one in a sacred state), at least symbolically, and the symbolic transfer of this quality from foaming fermented beverages to foaming beverages not containing alcohol, suggests that in some ways consumption of the *atole*-chocolate beverage involves and maybe facilitates communication with the gods (cf. Dreiss and Greenhill 2008: 4). Inferences based on observation of various characteristics of foam with respect to various beverages in Mesoamerica have been discussed and it is this one in conjunction with number eleven that is the most persuasive to me. The sacredness is in the foam, and it is there by virtue of the powers that foam seems to have in connecting humans with deities.

It is worth going one step further now and considering a hypothesis that the ritual importance of foam in cacao drinks is based on a symbolic transfer from the former use of cacao to produce a fermented alcoholic beverage. Some evidence has been generated by archaeologists indicating that indeed in the distant past, some 3,000 years ago, cacao may have been a basis for the earliest fermented alcoholic beverages in Mesoamerica (Drye 2007; Henderson *et al.* 2007). Hull (2010:

241) has presented a few examples of recent cases of cacao drinks mixed with alcoholic beverages by Mayans, a nineteenth-century fermented alcoholic drink made of maize and cacao by Itzaj Mayans, and a hieroglyphic text on a panel from Classic Maya times at Piedras Negras referring to participants getting inebriated from a cacao drink. This suggests that a cacao-based alcoholic drink was not only early in Mesoamerica, perhaps constituting the first widespread fermented beverage, but it was also at least sporadically present right up to the present.

At some point after 1,000 BCE, pulque, derived from the agave or century plant may have supplanted the cacao-based drink in parts of Mesoamerica, while sprouted or chewed maize-based *chicha* replaced it in other areas.<sup>21</sup> By this time, the symbolic extension of foam as correlate of alcohol and communication with deities to foam as symbolic of “sacredness” would have allowed kings, as representatives of deity on earth, to achieve such enhanced valorization through foam even when imbibing non-alcoholic cacao beverages with or without maize. Froth created from plant additives could have provided the symbolic activation of the now non-alcoholic drink, allowing it to retain its sacred status.

In enumerating and discussing the possible conclusions and generalizations that could be drawn from observations of various kinds of foam, as means towards the end of understanding the importance of edible foam, the various possible observations were taken up one at a time, and for the most part disposed of. They were for the most part natural observations that people could make, providing a plausible basis for meanings and associations extended to foam outside of the immediate contexts of observation. And it is just such meanings and associations when shared in a speech community and embodied in tradition that become part of the worldview or culture of a people.

## Conclusion

This paper has endeavored to provide examples of Mesoamerican uses of and attitudes towards edible foam (and in a couple of cases medicinal foam), to enlist the notion of observational logic in order to uncover, enumerate, and evaluate the relatively small number of observations that might be made about edible foam or froth, particularly but not exclusively, in the context of indigenous Mesoamerica. The purpose of this procedure has been to discover potential meanings of foam in Mesoamerica and to learn why foam seems to be generally highly valued in Mesoamerica, even in some cases to the point of sacredness. This goal has been tentatively reached.

The question remains, however, why indigenous Mesoamerica? Why, for example, do Europeans not generally see alcohol inebriation as a sacred state? While inadequate without a fuller explanation that is beyond the scope of the present paper, the short answer may be in part, but only in part, that the antimicrobial properties of chili pepper and a lack of large domesticated livestock in Mesoamerica allowed Mesoamericans to reserve pulque and other fermented beverages for religious specialists and the nobility without condemning the rest of the population to the ravages of parasites and pathogens that ale and other alcoholic beverages in Europe disposed of to some extent (Nabhan 2004: 123–39).



Why the general populace in several other parts of the world do not regard inebriation as a sacred state is a challenging question that will not soon be answered fully.

A limited number of observations made about various examples of foam in Mesoamerica, with special attention to the highly desirable foam on *atole*-cacao beverages, along with a discussion of how these observations might lead to creating sacred symbolic foam as important on a traditional beverage, has resulted in several possible reasons for the importance of foam, with one outstanding candidate. To rephrase this, in various Mesoamerican indigenous communities, foam (or froth or carbonation) is viewed as sacred or akin to sacred, including the foam that even today is so important in the production of some maize-cacao drinks. In addition to the obvious fact that it likely tastes better and fresher because of the foam (which would not necessarily make it sacred), there is another observationally logical reason that foam should be so important, which is that foam is an inextricable part of the fermentation process, and fermentation leads in many cases to important edible products, and especially to alcohol, which puts people in a sacred state, a state in which communication with the gods is possible. Sacred communication then is seen to be facilitated by alcohol from fermentation, of which a real index is foam; symbolic sacred communication then might be seen as also indicated by foam when it occurs on a product lacking alcohol but which may have ancestral forms with alcohol produced by fermentation.

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### Notes

- 1 Leavened bread and other edible solid foods that have been "foamed" are well discussed by Perkowitz (2001), but not involved here.
- 2 Cacao (sometimes cocoa) generally refers to the tree and the fruit from which chocolate is derived. Like many others, I use the terms chocolate and cacao interchangeably in this paper.
- 3 For the Zapotecs of the past, a single word, *pee*, meant "wind, breath or spirit." Anything

that moved had *pee*, and “Anything with *pee*—a river in flood, the moon, the foam on top of a cup of hot chocolate, or a bolt of lightning—could move and thus was considered alive” (Marcus and Flannery 1994: 404).

- 4 Ground and cooked maize gruel without the chocolate is called *atole*, and does not foam, distinguishing it from the “*atole-cacao*” or “*atole-chocolate*” referred to in this paper. To be sure, certain drinks based on a mix of *atole* and cacao do—quite deliberately—lack foam. These names of these drinks are quite different from the names of the *atole-cacao* drinks, however, they and lack the high value and social importance of the *atole-cacao* drinks discussed in this paper.
- 5 Brackets are used to present words in the form that they are given by the source from which the reference is taken. Otherwise a normalized phonemic orthography is utilized here for words that are not English or Spanish.
- 6 *Aak'* should be *ak'*, which simply means “vine” in Lacandon, and may well refer to the sukir vine used in the secular maize-cacao drink. *Balché*, it should be noted, is flavored not with a root but rather with the bark of the balché tree (*Lonchocarpus longistylus*).
- 7 Standley identifies it as *Dioscorea macrostachya*, with further characterization of this plant known locally as *bejuco de coraza* or *cocolmecatl* in the Sierra Juarez as follows: “The young fleshy asparagus-like shoots contain an albuminous juice that is used in the preparation of *pozonque*, a delicious and very nutritious refreshment, made of ground chocolate, mashed soft corn, and this juice, beaten into a light foamy mass. The ground starchy matter of the enormous rhizome is used as a *barbasco*, for stupefying fish. It probably contains the same alkaloid, *dioscorine*, that has been found in other species” (Standley 1920: 1646–7)
- 8 I note this similarity of sounds for words of similar meaning in unrelated languages to suggest the possibility that if onomatopoeia is not involved as an explanation, then diffusion is likely involved, which attests in yet another way to the importance of foam in the areas that are linguistically involved (cf. Zapotec *bu'pù* “foam,” proto-Mixe Zoquean *\*oo'p* “foam,” and Maya *om* “foam”).
- 9 See for example the North American Indian yaupon holly frothed drink, which despite its dark color was called “white drink” because of the color of the foam (Roy 2005: 36).
- 10 Compare this Mixtec notion of transmitting the “heat of life” with the following interpretation of a passage from the Quiché sacred book derived from Tedlock’s 1985 edition of his translation of the Popol Vuh. “‘It is just a sign I have given you, my saliva, my spittle’. Because of the mention of ‘sign’ (retal) here, Andres Xiloj remarked, ‘Then this is a dream.’ Asked what would be augured by being spit on in a dream, he said, ‘This is two matters. It depends on whether the saliva is good or bad. When it is good it has a lot of foam; when it is just clear water it is bad. But here in the Popol Vuh, one isn’t told which kind of saliva it is’” (Tedlock 1985: 195).
- 11 In the Andes of South America, *chicha* is a fermented drink made from maize. It is yellowish in color, has a foamy froth, and is served warm. In parts of Guatemala too, *chicha* is made with maize (La Barre 1938).
- 12 Anthropologists have known about this for decades, but the phenomenon does not show up in their scholarly productions, so such descriptions as this must be derived from newspaper articles.
- 13 They are familiar as well in non-ritual contexts with a regional maize and cacao drink, *tascalate*, which is a foamy cold drink of ground toasted maize, ground cacao and *achiote*, which make it a bright reddish-orange color.

- 14 It is of interest to note that bulbs of the soap lily or amole of California (*Chlorogalum pomeridianum*) were extensively used as shampoo and soap by Native Americans in California. The obvious foaming action due to saponins in the bulb may well have stimulated investigation of its other uses, which included both food and fish poison. For food it was necessary to roast the bulbs overnight in earth ovens to render the toxic foam-producing saponins inactive (Balls 1962).
- 15 Saponins when shaken in water solutions produce non-alkaline foam, useful as soap substitute or shampoo; the more saponins the more foam. Saponins have been used as the frothing agent in beverages such as those Mesoamerican drinks discussed here, as well as in commercial soft drinks and beer, although they have long been discouraged in commercial formulations because of potential toxicity by means of the breakdown of red blood cells. Famine foods containing saponins require baking to prevent this hemolysis, which would otherwise create a bruised appearance all over the body. Saponins are very toxic to fish, without making them inedible, and so plants containing them have also been employed as fish poisons in many parts of the world (Heizer 1953).
- 16 Huichols are not alone in relating the heart to foam. Nahua shamans in Morelos diagnose illnesses by passing an egg around the body then breaking the egg in a glass half full of water, then studying the result. A foam-like appearance will indicate that there is a heart problem (Álvarez Heydenreich 1987: 147–51).
- 17 Noteworthy is the fact that the South American Inka creator god's name Viracocha literally means "sea foam" (Cieza de León 1977: 20). The Greek tradition that goddess Aphrodite was born from sea foam (fertilized by Uranus) (DeVries 2004: 257), suggests, if we reasonably choose not to link these three traditions historically, that there may be something one can observe about the appearance or behavior of sea foam that can logically be linked with deity.
- 18 The same foam-producing plant (e.g. *Chlorogalum pomeridianum*) may be used as food, shampoo and fish poison, fish being more susceptible than humans to the effects of saponins.
- 19 Recall here the abovementioned Lacandon dream interpretation that dreaming of a person foaming at the mouth portends an animal soon to die foaming at the mouth.
- 20 A Cape Nguni (an indigenous group in South Africa) healer-diviner's ritual paraphernalia includes psychoactive plant substances that "contribute to healing rituals: sorghum beer, the foam (*ubalawu*) of which produces plentiful dreams (Hirst 1990: 64–6) constitutes perhaps the most common agent diviners use to alter consciousness" (Walter and Fridman 2004: 916).
- 21 To be sure, Mexico and Guatemala have seen fermented alcoholic drinks derived from a variety of other sources, including pineapples, plums, prickly pear fruits, pitahaya cactus fruits, and nancé fruits, but these never gained the overall currency that cacao, agave and maize-based alcoholic drinks enjoyed over great spans of time.

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