

PUFFBALL USAGES AMONG NORTH AMERICAN INDIANS

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ABSTRACT.—This paper reviews the literature on the usages of puffballs (Lycoperdales and Tulostomatales) among the North American Indians. Usages are discussed under six general categories: religious, aesthetic/decorative, hemostatic, other medical uses, paramedical possibilities, and dietary or food uses. A table summarizing these usages of puffballs is provided.

INTRODUCTION

The importance of ethnomycological investigations is beginning to be appreciated even outside the narrower circle of mycologists. What little is known about usage and cultural significance of a number of fungi, including the puffballs (Lycoperdales and Tulostomatales) is scattered throughout the literature. This paper presents a literature review of the uses of puffballs by the North American Indians. Of the 102 ethnographies reviewed 50 included coverage of the fungi, with 36 of this latter group mentioning the puffballs. Although many North American Indian groups used puffballs for food, medicine, or other functions (Table 1), the Yuki (Chestnut 1974) and the British Columbia Indians (Turner 1978) avoided the puffballs, but yet used other fungi of their regions as an article of food.

In a literature review article it is not possible to verify identifications of the species mentioned. Puffballs are distinctive in appearance, yet immature mushrooms, particularly the *Amanita* species, can be mistaken for a puffball. Puffballs are quite common throughout the North American region and occur throughout the growing season. Some species, though, are limited to particular habitats, such as the stalked puffballs, *Battarrea* and *Tulostoma*, which are found in arid regions or in sandy soil.

DISCUSSION

The focus of this paper is on usages of puffballs by North American Indians. Usages fall logically into six general categories: (1) Religious/Magical; (2) Aesthetic/Decorative; (3) Hemostatic; (4) Other Medical Uses; (5) Paramedical Possibilities; and (6) Dietary or Food Uses.

Religious/Magical Uses.—Puffballs, which typically grew in circles on the prairies, were called by the Blackfoot *ka-ka-toos* or "fallen stars." According to Indian legend, puffballs were stars fallen to earth during supernatural events (Hellsen 1974). Puffballs and other fungi likewise were used as incense by these Indians in order to keep away ghosts. Chestnut (1974) reported that an Indian medicine man used dried puffballs, each filled with pieces of gravel and tied to a stick for a rattle. Another ploy was to decorate the tipi cover with figures of puffballs. Through a kind of sympathetic magic (since puffballs were commonly used as tinder or punk for lighting fires), the Blackfoot painted a small circle of puffballs at the base of their tipis, the representations of which were to insure fire to those within. Fire was a necessary ingredient for the survival of life. Johnston (1972), in fact, believes that these circular objects (puffballs) represent life itself arising out of the sacred earth.

Aesthetic/Decorative Uses.—Related to the tipi decoration function is the common use of puffballs as items of personal adornment or for aesthetic enjoyment. These usages often took on religious/magical meaning as well. The Chippewa Indians used the puffball, *Bovista pila* B. & C., as a magical charm (Densmore 1928). Wissler (cited in Johnston

TABLE 1.—*Summary of Puffball Usages Among North American Indians.*

| Indian Group | Fungus | Use(s) | Reference |
|---------------|---|--|---------------------------|
| Ahnishinaubeg | Puffballs | Food; smoking out bees | Keewaydinoquay 1978 |
| | <i>Calvatia utriformis</i> (Bull. ex Pers.) Jaap [cited as <i>Lycoperdon caelatum</i>] | Hemostat | |
| Arikara | Puffballs | Poultice ingredient for breast inflammation & abscess | Gilmore 1931 |
| Blackfoot | <i>Lycoperdon</i> spp. | Punk; tipi decoration; incense to ward off ghosts; hemostat | Hellson 1974 |
| Central Miwok | <i>Calvatia sculpta</i> (Harkness) Lloyd [cited as <i>Lycoperdon sculptum</i>] | Food | Barrett and Gifford 1933 |
| Cherokee | <i>Lycoperdon perlatum</i> Pers. ex Pers.; <i>L. pyriforme</i> Schaeff. ex Pers. | Healing agent for sores | Hamel and Chiltoskey 1975 |
| | <i>Geastrum</i> [cited as <i>Geaster</i>] | Prophylactic and therapeutic use on navel of newborn infants | Mooney and Olbrechts 1932 |
| Chippewa | <i>Bovista pila</i> B. & C.; <i>Calvatia craniiformis</i> (Schw.) Fr. | Charm; hemostat | Densmore 1928 |
| Iroquois | Puffballs | Food, especially in soups | Parker 1910 |
| | <i>Calvatia gigantea</i> (Batsch ex Pers.) C.G. Lloyd [cited as <i>Lycoperdon sculptum</i>]; <i>Lycoperdon</i> sp. | Food | Waugh 1916 |
| Kiowa | <i>Lycoperdon</i> spp. | Food; hemostat | Vestal and Schultes 1939 |

TABLE 1.—Summary of Puffball Usages Among North American Indians. (continued)

| Indian Group | Fungus | Use(s) | Reference |
|---|--|---|-----------------------|
| Kwakiutl | Puffball spores | Hemostat | Boas 1932 |
| Makah | <i>Calvatia cyathiformis</i> (Bosc) Morg. [cited as <i>C. lilacina</i>] | Medicine | Densmore 1939 |
| Menomini | <i>Lycoperdon pyriforme</i> Schaeff. ex Pers. | Dusting powder | Smith 1923 |
| | Puffballs | Food | |
| Meskwaki | <i>Calvatia gigantea</i> (Batsch ex Pers.) C.G. Lloyd | Food (introduced by H.H. Smith) | Smith 1928 |
| Missouri River region Indians: (Pawnee, Ponca, Omaha, Dakota) | <i>Lycoperdon perlatum</i> Pers. ex Pers. [cited as <i>L. gemmatum</i>]; <i>Calvatia cyathiformis</i> (Bosc) Morg.; <i>Bovista plumbea</i> Pers. ex Pers. | Hemostat | Gilmore 1977 |
| Mohegan | Puffballs | Hemostat | Tantaquidgeon 1928 |
| Navajo | Puffballs | Hemostat; poultice; infusion for sores, burns, itches | Wyman and Harris 1941 |
| Ojibwe | <i>Calvatia cranii-formis</i> (Schw.) Fr. | Hemostat for nosebleeds | Smith 1932 |
| Omaha | | Food | Gilmore 1977 |
| Paiute (of Nevada) | <i>Battarea phalloides</i> (Dicks.) Pers. | Poultice for swellings and sores | Train et al. 1941 |
| Potawatomi | <i>Morganella subincarnata</i> (Peck) Kreisel & Dring [cited as <i>Lycoperdon subincarnatum</i>] | Headache cure; dusting powder | Smith 1933 |

TABLE 1.—Summary of Puffball Usages Among North American Indians. (continued)

| Indian Group | Fungus | Use(s) | Reference |
|--------------|---|---|------------------------|
| Ramah Navaho | <i>Tulostoma campestre</i> Morg.; <i>T. brumale</i> Pers. ex Pers. [cited as <i>T. pedunculatum</i> L.] | Poultice or infusion for healing sheep leg-bone fractures | Vestal 1952 |
| Tewa | Puffballs | Food | Robbins et al. 1916 |
| | <i>Geastrum</i> sp. [cited as <i>Geaster</i>] | Medicine | |
| Yuki | <i>Lycoperdon</i> sp. | Healing agent for sores; rattle for medicine man | Chestnut 1974 |
| Zuñi | <i>Lycoperdon</i> sp. | Food | Stevenson 1915 |

1972) mentions the fact that some Blackfoot men wore necklaces of puffballs about the size of tennis balls and strung together on a thong. Such necklaces were prized because of the delicate odor they gave off. Indian boys sometimes wore a bandolier of puffballs across the chest, not strictly for aesthetic reasons, but primarily as a means of warding off respiratory diseases (Dempsey, cited in Johnston 1972). Not all North American Indians treated the puffballs quite so reverently. A commonly mentioned use of the puffball was in children's games. Children would gather the mature puffballs to play make-believe volcanoes ("puffs" of smoke from the "craters") (Curtin 1974).

Although apparently not a North American Indian usage, Watling & Seaward (1976) pointed out that prehistoric puffballs, *Bovista nigrescens* Pers. ex Pers. and *Calvatia utriformis* (Bull. ex Pers.) Jaap, may have been used more practically as insulation material to stop up holes in drafty dwellings.

Hemostatic Uses.—One of the major medical uses of puffballs by the North American Indians was as a styptic. The soft, central portion of dried, immature puffballs was pulverized and dusted into the broken skin or wound to stop bleeding. *Lycoperdon perlatum* Pers. ex Pers. (cited as *L. gemmatum* Batsch) was employed as a hemostatic agent by the American Indian (Corlett 1935). The Rocky Mountain Indians used the "prairie mushroom" to heal the navels of newborn infants (Scully 1970). *Geastrum* was used during parturition by the Cherokee (Mooney & Olbrechts 1932). The Missouri River region Indians likewise used puffball spores. From its universal application to this use among the Dakota is derived their name for the puffball, *Hokshi chekpa*, or "baby's navel" (Gilmore 1977).

The styptic function of puffballs (as aids in parturition or simply as cauterization for castration wounds, cuts or internal hemorrhages) is well documented both geographically and throughout history. This usage is, of course, not confined to North American Indians. Surgeons in the nineteenth century in Europe used puffball powder as a hemostat and the same remedy was employed in this century by the Pennsylvania Germans (Vogel 1970). A string of puffballs hung by the fireplace in many farm houses in cases of emergency (Watling and Seaward 1976).

Nonetheless, the use of puffballs as a hemostatic agent was practically universal among American Indians. The Navajo used the dried spores of members of the *Lycoperdales* as dusting powders, poultices and even lotions (Wyman and Harris 1941). Kee-

waydinoquay (1978) related that *C. utrifomis* (cited as *Lycoperdon caelatum*) was favored by the Ahnishinaubeg medicine woman, Nodjimahkwe, as a coagulant for heavy bleeding. The spores were blown onto the open wound. By combining puffball spores and spiderwebs held onto the skin by criss-crossing strips of bark from *Prunus emarginata* v. *villosa* Sudw. and securing the dressing with gum, the Kwakiutls in Canada were able to stop bleeding on the surface of the skin (Boas 1932). The Mohegans also used spiderwebs and puffball spores as a hemostatic dressing (Tantaquidgeon 1928). The Blackfoot drank a spore infusion for the treatment of internal hemorrhages. They also used species of *Lycoperdon* as a hemostat for castration wounds, cuts and nose bleeds (Hellson 1974). Likewise, the Chippewa (Densmore 1928) and the Ojibwe (Smith 1932) used the giant puffball, *Calvatia craniiformis* (Schw.) Fr. to halt nose bleeds. The Ojibwe would snuff the dried capillitia and spores up the nose. This remedy was a common Indian practice. Both the Rappagannock and the Mohegans used the powder of puffballs to stop bleeding, but the Rappahannock believed the powder was dangerous to inhale and termed it, appropriately, the "devil's snuff" (Weslager 1973).

Today it is medically recognized that massive inhalation of the spores of puffballs can cause symptoms of the reactive, pulmonary disease termed lycoperdonosis (Strand et al. 1967 and Henriksen 1976). This disease is characterized by pneumonia-like symptoms.

The Yuki of California believed puffball spores would cause blindness if allowed to get in the eyes (Curtin 1957). The Ramah Navajo used the name "no eyes" for *Geastrum* and *Tulostoma* since they feared that spores of these puffballs would cause blindness (Vestal 1952). It is easy to see why some Indians looked upon this so-called "devil's snuffbox" with superstition and fear.

Other Medical Uses.—Literature records other medical uses of puffballs. The Kiowa moistened the dry spores and applied them to small sores and scratches (Vestal and Schultes 1939). The Arikara made a poultice from the spore mass of a puffball, mixed with the pulverized roots of the red baneberry, *Actea rubra* (Ait.) Willd., to give prompt relief from inflammation and abscess of the breast of mothers (Gilmore 1931). The use of the dry spores of members of the Lycoperdales was widespread among the Navajo (Wyman and Harris 1941). Prescriptions for sores were used in cases of burns or itching. A cold infusion or poultice of the mycelium of *Tulostoma campestre* Morg. or *T. brumale* Pers. ex Pers. (cited as *T. pedunculatum* L.) was even used by the Ramah Navajo in veterinary exercises to heal sheep leg-bone fracture (Vestal 1952).

Young puffballs were generally gathered, sliced, and used as a dressing for swellings and sores. The powder of the mature puffball was often used as a remedy for earaches and broken eardrums (Scully 1970). The Tewa blew the spores of *Geastrum* (meaning "earth swelling") into the ear through a tube of corn husk to clear up discharges from the ear (Robbins, Harrington and Freire-Marreco 1916). Various species of *Lycoperdon* were used by the Blackfoot for removing foreign objects from the eyes (Johnston 1972). The dried interior of the immature puffball was held on the eye to remove the foreign object. Puffball uses were not, however, confined to therapeutic practices. The Menomini believed that the smoke-like powder discharged from the mature puffball, *Lycoperdon pyriforme* Schaeff. ex Pers., could cause permanent blindness to an approaching enemy (Smith 1923).

For a headache cure the Potawatomi used the pinkish puffball, *Morganella subincarnata* (Peck) Kreisel & Dring (cited as *Lycoperdon subincarnatum* Pk.), which they appropriately called "the headache berry" (Smith 1933). How the dose was given is not known. The spores of the same species and of *L. pyriforme* were used by the Potawatomi (Smith 1933) and Menomini (Smith 1923), respectively, for soothing chafing between the legs and under the arms of infants. Besides being readily available and effective, this "Indian baby talcum" was eminently the proper shade to use (Smith 1923).

Slightly more controversial uses of puffballs include the following: Hooker (cited in Watling and Seaward 1976) related that in the Far East puffballs were burnt on the skin

as a cauterly or counter-irritant for gout. This apparently was never an American Indian practice. A much more spectacular discovery is the recent association between certain puffballs and reduction of cancers. Beneke (1963) has produced some scientific support for an ancient folk belief that some species of puffballs act as anti-tumor agents. In laboratory situations, Beneke found that *Calvatia* species produce chemical substances active against tumors. Again, there is no mention of this particular usage among the North American Indians. Gasco et al. (1974) have reported that an antibacterial and anti-fungal agent has been isolated from *C. cyathiformis* (Bosc) Morg. (cited as *C. lilacina*). One year later Umezawa, et al. (1975) independently reported the antibiotic and anti-tumor isolate, which they named calvatic acid, from another puffball, *C. craniiformis* (Schw.) Fr.

Paramedical Possibilities.—Some other uses of puffballs are worth a brief review. Among the Ahnishinaubeg there is mention of the anesthetizing effects of the burning puffball when employed by the Indians to smoke out bees (Keewaydinoquay 1978). This was a common practice throughout North America. The literature is speculative in discussing the possible uses of puffballs as hallucinogenic agents. *Scleroderma verrucosum* Bull. ex Pers. is reported to cause gastrointestinal intoxication and *Lycoperdon pedicellatum* Peck (cited as *L. candidum*), *L. mixtecorum* Heim and *L. qudenii* Bottom. (cited as *Vascellum qudenii* [Bottom.] Ponce de Leon) are apparently questionable hallucinogenic intoxicants (Ott, Guzman, Romano and Diaz 1975). Lincoff and Mitchel (1977) stated that *L. marginatum* Vitt. ex Moris et De Not. is reported to produce psychoactive effects.

Dietary or Food Uses.—Culinary aspects of puffball usage are seemingly contradictory. Chestnut (1974) writes that the Indians of Mendocino County, California, disclaimed "any knowledge of the really edible qualities of puffballs;" in fact, they looked upon them with grave superstition. The Iroquois referred to the puffball as "devil's bread" (Waugh 1916). Certainly the Indians of British Columbia regarded them with apprehension, as evidenced by some of their names for puffballs, among them: "ghost's make-up," "ground ghost," and even "corpse." Mushrooms of any kind were avoided by the Kootenay people and given the unlikely name of "frog's navel" in the native language. It is further reported that the puffballs were not generally eaten by the Athapaskan people of Central and Northern British Columbia, although one source does suggest that the Slave ate them in times of famine (Turner 1978).

It is well to remember that puffballs must be eaten only when white and young, and they should be cut in half in order to be sure that an immature *Amanita* is not collected. Some species, e.g., *M. subincarnata* (cited as *Lycoperdon subincarnatum*), and *Scleroderma citrinum* Pers. and *S. cepa* Pers. have been reported or suspected as poisonous to eat (Lincoff and Mitchel 1977). Nevertheless, among the different groups of fungi, the puffballs are probably one of the safest groups to collect for food. Many species have been sought after as culinary delicacies throughout the world.

Tewa informants stated that they ate all kinds of fungi and puffballs without suffering any ill effects (Robbins et al. 1916). While white and firm, before the spores formed, puffballs were roasted for food by the Omaha (Gilmore 1977), and the Zuñi gathered puffballs in large quantities in the fresh state for food, and also dried them for consumption during the winter months (Stevenson 1915). The Iroquois liked the edible fungi quite as well as meat and esteemed puffballs as good material for soup. The fungi were peeled, diced, and then boiled in water with salt, grease and bits of meat as seasoning to make a tasty puffball soup. Puffballs were also fried in sunflower oil, bear oil or deer tallow (Parker 1910). It especially appealed to the Indians that these fungi might be used in soups, for soup was a favored dish with aborigines (Smith 1928). The Central Miwok used *Calvatia sculpta* (Harkness) C.G. Lloyd (cited as *Lycoperdon sculptum* [Harkness]), which they ground, boiled, and ate with acorn soup (Barrett and Gifford 1933). Other puffballs were eaten either raw or cooked. Keewaydinoquay (1978) reported that the Ahnishinaubeg enjoyed meals with puffballs. It was stressed, however, that the delicate taste of the puffball would be lost if salt were added before the cooking was completed.

Little is known about the true nutritive value of edible mushrooms, including puffballs. The nutrient composition of *C. cyathiformis* (cited as *C. lilacina*) is reported by Crisan and Sands (1978). *Lycoperdon perlatum* (cited as *L. gemmatum*) has a relatively low ascorbic acid content (Gilbert & Robinson 1957). Mushrooms appear to be good sources of several vitamins and minerals. Puffballs, however, have no significant vitamins, but considerable amounts of calcium, phosphorus, iron, sodium, and potassium. Mushrooms may be principally a carbohydrate source. Although impossible to make general statements which are true of all mushrooms, at their best some mushrooms provide nutritive value comparable to some high protein foods. The nutritional contribution to the diet is likely to correlate with the degree that the food is used as a staple (Crisan and Sands 1978). The nutritional assessment of species of puffballs, however, is needed.

CONCLUSIONS

Although some usages of puffballs, such as the stypitic function, are well known, other lesser functions of this interesting group of fungi are not as well appreciated. Investigations into the medical, paramedical and nutritional uses of the puffballs need to be encouraged in the future. Moreover, our fuller appreciation of the cultural backgrounds of Indian usages of these fungi can be enhanced by further ethnomycological studies.

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