

The Potomac Sporophore

Summer | July 2014

Volume No. 29 | Issue No. 3

The quarterly publication of the Mycological Association of Washington (MAW) | www.mawdc.org

Don't miss
MAW's 3rd joint
foray. See page 7.

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Paul Stamets Regales His 'Tribe'

Willow Nero

Sporophore Editor

MAW members got a rare chance to meet Paul Stamets May 7 at a local lecture, "Immunity for Life: Mushrooms for Healthy People & Planet," the prominent mycologist and author gave in Bethesda, Md.

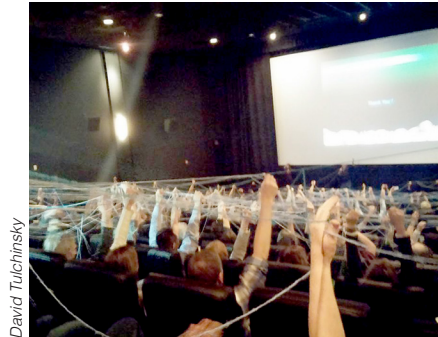
Stamets focused his talk on topics his fans should be familiar with from his TED Talk "Six Ways Mushrooms Can Save the World." He outlined his "tribal mycomission" to harness the power of fungi, which for thousands of years have thrived and provided significant benefits (even the power to survive extinction) to the organisms smart

enough to partner with them.

Stamets described the reality of the global warming crisis and how in his lifetime carbon dioxide levels have risen from 313 parts per million to 401, a 27-percent increase that

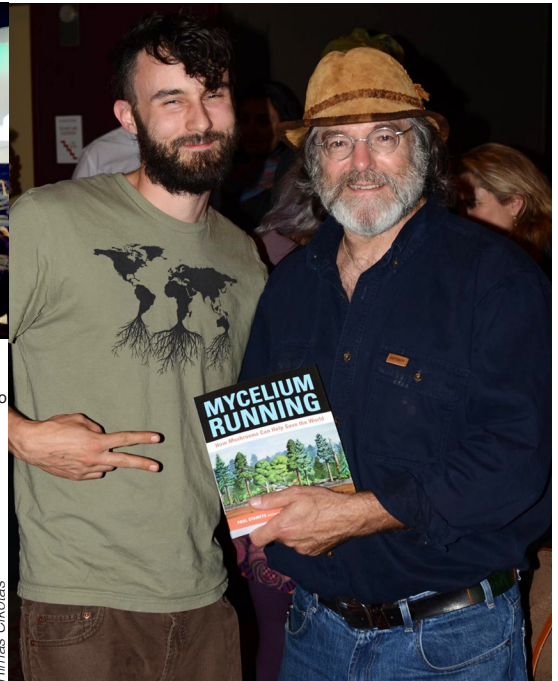
doesn't seem poised to reverse or dissipate.

Continued on page 6



David Tulchinsky

Prominent mycologist and author Paul Stamets invited his audience to toss balls of yarn (above), creating an interconnected web of "mycelia." Members got a chance to meet Stamets (right) and get books signed after the talk



Rimas Cikolas

Fungus Notebook: The 'Dung-Loving' Flesh of the Gods

William Needham
MAW Secretary

Common Name – Dung-loving *Psilocybe* — A mushroom of the genus *Psilocybe* aptly named in that it grows primarily on horse or cow dung. The anthropomorphic "dung-loving" should more appropriately be "dung-consuming," as it is a saprophytic fungus with no known emotions.

Scientific Name – *Psilocybe coprophila* — The generic name

is from the Greek words *psilo* meaning "bare" and *kybos* meaning "cube;" the specific name is from the Greek *kopro* meaning "dung" and *philos* meaning "loving."

The Dung-loving *Psilocybe* is the epitome of the little brown mushroom (LBM) — a diminutive, execrable, non-descript toadstool that almost begs to be ignored; it is characteristic of most of the species in the genus: small with a smooth,

viscid cap growing saprophytically on dead plants or dung. It instantiates the mycophobic perspective of the nugatory fungi, abiding at the nether reaches of the food chain, living on the very excrement of higher life forms.

The *Psilocybe* genus would be relegated to the dustbin of obscurity were it not for one relatively minor yet culturally significant fact: it produces the hallucinogenic

chemical psilocybin. The resultant conflation of mycology and psychopharmacology has an interesting history and an



William Needham

This *Psilocybe coprophila* clearly displays a main characteristic of its species: It's growing on dung and dead plant matter.

Science

Continued from page 1 uncertain future; “magic mushrooms” or “shrooms” are sanctified by some and vilified by others.

The DNA analysis revolution of the Kingdom Fungi resulted in a revision of the original genus *Psilocybe*, which had a basic problem based on Linnaean structural taxonomic principles: one group produced the hallucinogenic psilocybin and one group did not. This dichotomy was also manifest in the physiology of the two groups: the psilocybin-containing mushrooms (mostly stain blue to blue-black, whereas those that lack psilocybin do not stain at all. It may be hypothesized that the bluing is the result of psilocybin oxidation, though this has not been clearly established.

For all of the disruption DNA evaluations have wrought to fungal taxonomy, here clarity has prevailed, differentiating two different, monophyletic and totally unrelated genera. The nonpsilocybin mushrooms have been assigned to a new genus *Deconica* in the *Stropharia* family, and the psilocybin-containing mushrooms are now the sole occupants of the original genus *Psilocybe*

in the *Cortinarius* family. This seemingly simplistic change has been deceptively complicated in the process. A new type species (*P. semilanceata*) had to be accepted by the International Botanical Congress in 2010 for the now-psychedelic genus. While the formal split of the two genera may be helpful to mycologists, it further exacerbates the policy issues of associating mushrooms with drugs.

The historical use of psilocybin-containing hallucinogenic mushrooms for spiritual purposes is a matter of some direct evidence and a great deal of speculation. The native tribes of Mesoamerica had a well-established culture of *Psilocybe* mushroom use. In addition to several archaeological depictions of mushroom-shaped drawings and objects, there is direct testimony from the Spanish interactions with the Aztecs.

Bernardo de Sahagun was a Franciscan missionary in New Spain from 1529 until his death in 1590. In learning the Nahuatl tongue, he studied the beliefs and customs of the Aztecs, earning the sobriquet of being the first anthropologist. In his *Historia General*,

he notes: “The first thing to be eaten at the feast were small black mushrooms that they call teonanacatl, which bring on drunkenness, hallucinations, and even lechery. They ate these before dawn with honey, and when they began to feel the effects, they began to dance. Some sang and others wept. When the drunkenness of the mushrooms had passed, they spoke with one another of the visions they had seen.” Numerous translations of teonanacatl range from “god mushroom” to “flesh of the gods,” indicating a more profound numinous association than that suggested by the Franciscan, who describes a bacchanal. The subsequent proselytism of the Catholic church, in what became an expansive missionary effort, actively sought to eradicate the pagan mushroom cults, driving the practice sub rosa, where it remained for almost 400 years.

The *fons et origo* of Western cultural experi-



Dorinda

In 2010, *Psilocybe semilanceata* became the new type species for their genus; many species were moved to *Deconica*.

mentation with *Psilocybe* mushrooms is largely attributable to R. Gordon Wasson, a vice president at J.P. Morgan (about as unlikely a revolutionary as one might imagine). His interest in mushrooms began with his marriage to Valentina Guercken, a normative Russian mycophile who introduced him to wild edible mushrooms on their Catskill Mountain honeymoon — in complete contradiction to his own inherent mycophobia. Wasson’s newfound fascination with this dichotomy led to the philosophical underpinnings of the field now sometimes referred to as ethnomycology — and ultimately to the backwaters of rural Mexico to successfully penetrate the rumored mushroom cults that endured on the fringes of the Mexican ecclesiastical mainstream.

On the night of June 29, 1955, Wasson prevailed on a local ritualistic shaman healer of the Mazatec tribe named Maria Sabina (alias: Eva Mendez) to allow him to participate in a ceremony in which hallucinogenic psychoactive mushrooms were consumed. The profundity of the experience elicited Wasson’s lifelong crusade to legitimize and popularize the practice. On May 13, 1957, *LIFE* magazine published his seminal article entitled “Seeking the Magic Mushrooms” in which he provided a transcendent description that is a rather interesting admixture of the prosaic banker and the Book of Revelation: “[His visions] began with art motifs, angular such as might decorate carpets or textiles or wallpaper or the drawing board of an architect. Then they evolved into palaces all laid over with

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semi-precious stones. Then I saw a mythological beast drawing a regal chariot." The religiosity of the experience led Wasson to speculate as to a mycological provenance for spirituality in general and God in particular: "Could the divine mushrooms be the secret that lay behind the ancient mysteries?" Ultimately, he addresses the prosaic: "The mushrooms present a chemical problem. What is the agent in them that releases the strange hallucinations? ... The problem is of great interest in the realm of science. Will it also prove of help in coping with psychic

Tune In

Interested to learn more about what prominent mycologists have to say about *Psilocybe*? Make sure you've read up.

□ *FUNGI Magazine*, Vol. 4, No. 3, Summer 2011, delves further into the science, history, and lore of the genus. Search the archives at www.fungimag.com/archives.html.

□ Paul Stamet's book *Psilocybin Mushrooms of the World* (1996) doesn't contain the latest research, but it's still an essential guide to understanding these controversial mushrooms.

□ Read the Johns Hopkins study from 2006 at www.hopkinsmedicine.org/press_releases/2006/griffithspsilocybin.pdf. (Several studies, many of which are available online, have been conducted since.)

disturbances?" Very prescient ideas, as time would tell.

The "chemical problem" was resolved in fairly short order by Albert Hofmann, a Swiss chemist who worked for Sandoz Laboratories, a pharmaceutical company that now is a division of the leviathan Novartis; he is perhaps better known as the discoverer of lysergic acid diethylamide (LSD), which he first synthesized in 1938. Its discovery was as serendipitous as that of Fleming's penicillin from the *Penicillium* genus, and, quite coincidentally, it also involved a fungus — *Claviceps purpurea*, commonly called ergot.

While seeking an analeptic drug for the treatment of circulatory problems like postpartum bleeding, Hofmann stumbled upon LSD, which was not successful in addressing the intended application and subsequently was shelved. Five years later in 1943, he returned to the project and ac-

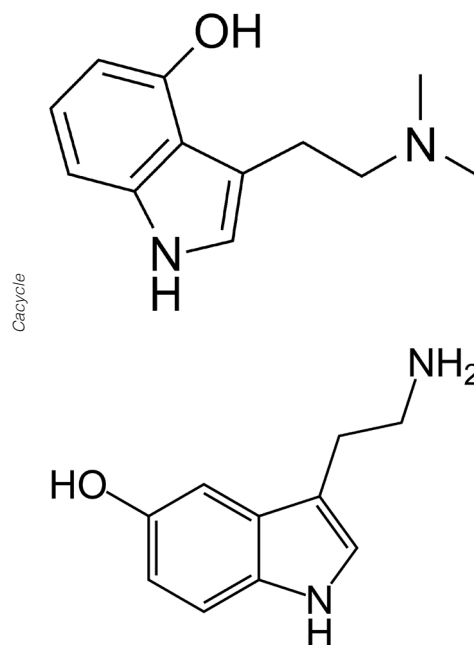
cidentally absorbed LSD through his skin. The resultant muted psychoactive effect was sufficient to elicit a determined self-directed experiment using 250 milligrams of the chemical (now known to be about 10 times the effect threshold). The resultant hallucinations were profoundly disturbing to the extent that Hoffman asked his assistant to take him home, which, due to wartime restrictions, was on a bicycle (the etiology of the first "bicycle day" LSD trip). This seminal work that made Hoffman the world's expert in psychoactive chemistry; in 1958, he identified psilocybin and psilocin as the active agents in psilocybin mushrooms, the chemical names being the obvious choice of provenance.

The conflation of psychoactive mushrooms and LSD that Hofmann perceived has persisted, their trajectories propelling the psychedelic '60s in a gadarene onrush to the drug wars of later decades. Psilocin is what is known in the lexicon of chemistry as an indole alkaloid, a compound with amine (NH) molecules held together by a hydrocarbon benzene ring and a nitrogen pyrrole ring.

Psilocybin is psilocin with the addition of a phosphate group. From the physiological standpoint, this is moot; on ingestion, the phosphate group is removed somewhere in the process of digestion, so only psilocin remains in the blood, ultimately to be circulated via the anastomosis of the vascular system. The hallucinogenic effect is the result of psilocin reaching the brain, where its indole-amine backbone emulates the neurotransmitter serotonin, which is chemically and structurally very similar.

LSD, while much more chemically complicated than psilocin, has the same indole structure and bonds to the brains receptors for the same reason. Empirically, LSD is a more powerful hallucinogen whose effects persist about twice as long as psilocybin. That is about as far as the science goes at this point. What remains of the history is in part the euphoria of madcap theater and in part the dystopia of bad trips and prison.

Timothy Leary was the director of the Harvard Center for Research in Personality in 1960 when he first experimented with *Psilocybe* mushrooms while vacationing in Mexico, which had become a popular venue for the more adventurous readers of Wasson's magic mushroom *LIFE* article. He described the experience three years later in *The*



Serotonin (above) and psilocybin (top) differ in the placement of the hydroxyl group and the dimethyl groups on the nitrogen.

Psychedelic Review as "above all and without question the deepest religious experience of my life." On his return to Harvard, he procured psilocybin from Hofmann at Sandoz Laboratories to conduct psychological experiments. The pansophism that the Mexican mushroom experience elicited in Leary led to his rejection of the constraints of academia to pursue the psilocybin experience on his own; He was fired by Harvard in 1963 and adopted the clarion call "Turn on, tune in, and drop out" in becoming one of the symbolic leaders of the psychedelic movement. In one notable episode, he took psilocybin with Allen Ginsberg and Jack Kerouac, the ensuing euphoria culminating in a game of football with a loaf of rye bread.

While Leary may well have been a visionary in the field of psychoactive chemicals and psychoses, his Panglossian and unscientific experimentation in all probability contributed significantly to the perception of drugs as an existential threat to Western work ethics and cultural norms. His conflation of LSD and psilocybin-containing mushrooms in pursuit of solipsistic ends forever tainted the latter with the former. There can be no doubt that his activism set the science of psychoactive drug treatments back about 50 years and contributed at least in part to the legislation that declared war on drugs.

On Oct. 24, 1968, Congress passed an amendment to 21 USC

Continued on page 7

Meeting File

Willow Nero
Sporophore Editor

May 6 — Kristine Ellor Defends Her Deep Appreciation for Compost and Agaricus

Kristine Ellor, mycologist and technical director of Phillips Mushroom Farms in Kennett Square, Pa., the largest producer of mushrooms in the U.S., shared with the MAW audience May 6 her presentation “Agaricus Cultivation — One Kennett Square Perspective.”

Ellor divulged that even though mushrooms have been cultivated in the West since at least 1638 in Paris, “There’s so much that we don’t know about mushrooms,” she said. “We can do it, and we know that it works, but we’re not entirely sure.”

Tracing a brief history of mushroom cultivation, Ellor explained how the original 1800s mushroom spawn was known as “milltrack” because its origin was the horse manure left behind from horses working mills. Until the 1920s, spawn was known as “cakes” — which has drawn some to speculate the “cake” Marie Antoinette supposedly told her countrymen they could eat wasn’t of the flour and sugar variety.

By the 1860s *Agaricus* mushroom cultivation reached the U.S., and several short publications described the process, which remains much the same among producers of *Agaricus bisporus* today:

☐ Create a nutrient source selected for your mushrooms.

☐ Inoculate the substrate with mushroom spawn.

☐ Manage the environment

☐ Foster growth.

In Pennsylvania, “mushroom doubles,” large, dark greenhouse- or barn-like structures filled with beds, trays, blocks, or bags are the norm in the industry. Vast amounts of compost materials (that “smell like money” to Ellor) are trucked in, mixed, heated and pasteurized before spawn is introduced and allowed to grow. A “casing layer” is added, and small buttons form and grow until they are picked by hand. The entire process requires large-scale heat management, and air conditioners run year-round because the doubles support so much bioactivity. The mushrooms are growing, but so are bacteria, actinomycetes, yeasts, and other fungi.

While the process seems simple, it involves many variables that Ellor says keep her busy.

“There’s still an awful lot of art to mushroom growing — smelling and testing compost,” she says, emphasizing that the substrate used is *not* soil or manure but compost. The raw materials from this compost vary from operation to operation and might include brewer’s grain, chicken litter, hay or straw, chalk and gypsum, horse manure, soybean meal, cottonseed hulls and meal, or other natural waste products. The compost process itself is complex. Cultivators ensure compost is properly heated and turned to provide aeration so the materials can break down and begin to caramelize.

June 3 — MAW Scholarship Recipients Share Newfound Scientific Knowledge

Three MAW members who received scholarships to take a mushroom laboratory course at the National Institutes of Health’s Foundation for Advanced Education in the Sciences, along with instructor and MAW Webmaster Martin Livezey, presented some of the fruits of their labor to the membership June 3.

Paul Bulow shared with MAW members his transformation from someone with an interest in mycology into someone who could reliably determine a mushroom’s identity using mostly morphological characteristics. Bulow also presented some of his photos of a blewit (*Clitocybe nuda*) specimens he found and described in his field notebook during the laboratory course.

Willow Nero showed club members the mushrooms she had found most interesting to study in the laboratory — and using online tools like the Mushroom Observer website (www.mushroomobserver.org) to network with other mycologists. She said those that seemed almost too common to look at twice like *Amanita citrina* or *Amanita fulva* often turned out to be those that prominent mycologists are studying as potential new species. Nero shared a few photos she took of her best efforts to grow mycelium in agar and identify structures under the microscope.

Dave Zuchero rounded out the scientific portion of the presentation with a clear explanation of the process of extracting, amplifying, and analyzing mushroom DNA

Upcoming Events

Aug. 5 — monthly meeting. Tovi Lehmann, a scientist with the National Institutes of Health and an instructor for the Audubon Naturalist Society will speak about mushroom lifecycles and habitats.

Aug. 8-10 — Third Annual Joint Appalachian Foray, 4-H Center, Front Royal, Va. (See page 6 for details.)

Aug. 16 — MAW Tasting Event. This year’s tasting again will be held at the GMU Nutrition Kitchen in Fairfax, Va.

Sept. 2 — monthly meeting.

Sept. 26-28 — Annual Camp Sequanota Foray, Camp Sequanota, Jennerstown, Pa.

Unless otherwise noted, monthly meetings are held on the first Tuesday of each month at the Kensington Park Library in Kensington, Md.

Oct. 7 — monthly meeting.

Forays

MAW regularly holds forays in the D.C. area. Many forays are announced on short

notice. Check the listings at Meetup.com/MAWDC-Public or email forays@mawdc.org to receive email notices. Members also can network with one another and volunteer to host impromptu forays via Meetup.

Finding chanterelles everywhere?

Share your photos with fellow club members on Facebook (www.facebook.com/MycoDC), Meetup.com, and/or the MAW-Mail Yahoo group (find the link at www.mawdc.org).

Consider joining the board. MAW’s board of directors is always open to input from members and would be happy to see new faces among its members. Talk with any board member about your interests.

□ A mushroom sample is mixed with sodium hydroxide and agitated to ensure DNA is released into the solution.

□ The sample is diluted, and primers, which mark the segments of the DNA to be copied, are added. Taq polymerase, an enzyme that replicates DNA, is also added.

□ Samples are added to the thermocycler, and the polymerase chain reaction (PCR) begins. Zuchero recommends this video for an explanation of how this works: <http://bit.ly/1tjVgGv>. This process should result in many copies of a certain segment of the DNA.

□ The replicated sample is added to a gel electrophoresis to separate DNA fragments according to their weight. This step provides proof that enough DNA was replicated and is ready to be analyzed.

□ Samples are sent to a lab for DNA sequencing.

□ The resulting DNA sequence can be adjusting using special software and then compared against existing sequences in GenBank and other repositories.

Livezey also showed several slides to illustrate laboratory interactions and the microscopy results of the approximately 300 specimens he looked at. He recommended several ways for the club to pursue mycology, including working with researchers who sometimes solicit information from amateur mycologists.

July 1 —Michael Beug Celebrates the Quite Delicious Division Ascomycota

Dr. Michael Beug, co-author of the recently published *Ascomycete Fungi of North America* (with Alan and Arleen Bessette), professor emeritus at Evergreen State College, and a prominent NAMA member and chair of NAMA's Toxicology Committee, began his presentation "For the Love of Ascomycetes: Morels, Truffles, and More" with an explanation of the lesser known division of fungi that bear spores inside a sac, rather than on a club-like structure. He explained ascomycetes develop these sacs of four to eight spores and often release all the spores from each sac at once. Ascomycetes can further be categorized by the presence or absence of an operculum, or a flap that releases spores.

Beug then got down to the exciting business of talking about some of his favorite

ascomycetes, many of which also happen to be edible and choice.

Unfortunately the names of many members of the genus *Morchella* have yet to be sorted out, Beug revealed. Two teams recently tackled the task, yielding different results, and an international team is still resolving the nomenclature. "The good thing about morels is they're all edible," he said, reassuring the audience. Just be sure they're cooked and weren't growing somewhere potentially toxic.



Dr. Michael Beug tries to get a specimen of *Galiella rufa* to eject a cloud of spores. Many ascomycetes will emit spores when disturbed.

Addressing the rumor that some morels can cause stomach upset when eaten with alcohol, Beug said, "I have served morels to thousands of people, and I *always* serve alcohol with morels. And not one of them has had problems."

Among the American truffles, Beug favors are the pecan truffle (*Tuber lyonii*), which he described as garlicky and cheesy; the "excellent" *Imaia gigantea*; and *Geopara cooperi*, which has tight interior folds like a exterior of a morel and is culinarily similar.

"Just know not to be throwing away those little turd-like things," he said, reminding mycologists to be on the lookout for the pecan truffle and mixed in with fallen pecans.

Beug's closing joke reminded the audience of the two divisions of fungi: "My favorite edible mushrooms are ascomycetes — morels and truffles — and if I want to eat a king bolete or a chanterelle, I have to eat a basidiomycete and suffer," he said.

Beug's newly published book is the first to be written about ascomycetes since 1951. It contains 550 species, 350 images, and an extensive pictorial dichotomous key that relies heavily on photos in each step.

STEM Festival



Several volunteers from MAW and NAMA helped staff a mycology table at the 2014 Science and Engineering Festival in Washington, D.C., April 24-27. Described as "the ultimate celebration of science and engineering in the country, designed to inspire thousands of people of all ages to explore careers in STEM (Science, Technology, Engineering, and Math)". Over four days, approximately 325,000 people visited the festival.

Visitors to the NAMA



booth could learn about NAMA educational materials for educators and homeschoolers, watch a powerpoint about mushrooms, peek at spores through a microscope, and find out about mushroom lifecycles. Local participants interested in mushroom forays were referred to MAW or encouraged to look up their local NAMA-affiliated club.

MAW-NAMA Liaison Connie Durnan, who worked at the event the entire weekend, estimates 400 reusable grocery bags were handed out along with 200 Phillips mushroom brochures, 265 NAMA 2-sided cards, and 250 MAW brochures.

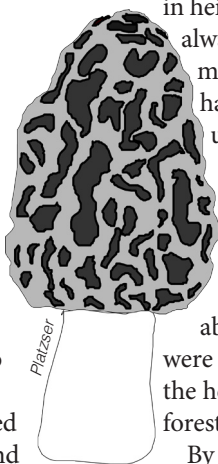
MAW extends special thanks to everyone who stopped by the booth and to volunteers Ophelia Barizo, Danny Barizo, Connie Durnan, Colin Gore, Willow Nero, Martin Livezey, and Cody Waisanen. NAMA volunteers present included Jerry and Sandy Sheine and terraBrie Stuart. Martha Gottlieb, Tina Ellor, and David Rust contributed presentation materials.

On Morel Growth Idiosyncracies

Jim Sherry
MAW Member

In 2002 we received a telephone call from our neighbor, Peggy, who was excited about spotting, in a small section of her front yard, a group of mushrooms, she recognized as morels because she had just read a story about morels in *The Baltimore Sun*. A friend and her son rushed over to Peggy's yard and came back with 40 morels. The next year we picked 40 again, then 10 the next year, and since then we have picked about 2 to 5 a year — except for this year.

On May 1, I visited Peggy's yard and saw no morels. It was cold, and I thought the season for morels was over. I went back to the spot a few times but saw no morels. On May 8, I reluctantly forced myself to take a quick look at the morel spot (reluctantly because who wants to look for something one doesn't believe is there?), and found seven morels, but very satisfyingly the morels had grown up: Instead of the grey-black or 2-inch mushrooms we had been picking in previous years, these morels were four and five inches



in height and were brownish-yellow. I had always wondered if the so-called yellow morel was the more mature grey one but had never confirmed so by my experience until that moment.

Of course, it's only natural that one would pick the morels when one finds them. There is no tomorrow when hunting down at Front Royal. In this connection, I reported a while ago about a couple of mushroomers who were aggrieved because someone had taken the hen-of-the-woods they had left in the forest to grow bigger.

By the way, one has to give some credit to the rainfall for the bigger morels. At the time I found them, the rainfall for Maryland was up seven inches year-to-date.

Between May 5 and May 21, I picked 19 morels at this spot, which is about 40 feet by 40 feet; has a mature spruce in its center; and is bounded by the street, a row of pines, an open yard, and a tulip poplar and a white oak.

Finding morels is still a magical experience for me. I never seem to see one — and then one appears. It's like a seeing and believing experience where there is a moment of synchronization when an invisible veil is lifted and voila — a *Morchella*.

Stamets (cont.)

Continued from page 1

"Forget politics, this is not about job security," he warned.

How will fungi save the world? It's not entirely clear yet, but mushrooms are making excellent headway (with Stamets' help, of course).

His experiments have yielded potential fungi-based treatments (and preventive measures) for Alzheimer's, cancer, tuberculosis, and other diseases. He found mushrooms can help solve vitamin D deficiencies as well.

Outside the medical realm, mushrooms can be useful in cleaning up oil spills and other hazardous materials, they're an effective water filter, and they make for an excellent (and environmentally friendly) pesticide.

One of Stamets' newest ventures is simply growing the massive garden giant or King Stropharia (*Stropharia rugosoannulata*) in large bins to address hunger problems and the destruction of once-fertile lands in the developing world.

To show his audience it will take more than himself and his team to solve these problems, Stamets had the audience pass around several balls of yarn, illustrating the interconnectedness of fungal mycelia to all things.

"It's not how many toys that you collect but it's the heritage you leave," he said in closing.

Mushroom Bao

- 1½ teaspoons instant dry yeast
- ¾ cup lukewarm water
- ½ teaspoons white vinegar or lemon juice (optional)
- 1⅙ cup low-protein ("hong kong") flour*
- ½ cup wheat starch**
- ⅓ cup confectioner's sugar
- ⅛ cup shortening or vegetable oil
- ⅔ tablespoons baking powder
- 2 teaspoons cold water
- 1½ cups mushroom filling

Create a mushroom filling from your favorite mushrooms. Chop and sauté them with onions, garlic, and traditional Asian flavors like soy sauce and sesame oil. Set aside.

Sift the flours and confectioner's sugar together in a large mixing bowl. Make a well in the center. Fill the well with lukewarm water, vinegar (or lemon juice), and yeast. Stir the water, dissolving the yeast, and slowly mix in the flour. Add shortening



Martin Hindel

or oil, and knead for about 15 minutes. A soft, smooth dough should form.

Cover the dough with a damp cloth and allow to rise for 30 minutes or until it is doubled in size.

Combine the baking powder and cold water, and sprinkle this mixture over the dough. Knead until well combined. Divide the dough into 16 equal portions. Flatten each portion with a rolling pin to make a 3-inch circle. Add a generous teaspoon of filling to each circle; wrap the dough over to create a bun. Arrange buns on parchment paper squares, seal turned up.

Place buns in a steamer about 1 inch apart. Steam on high heat for 12 minutes. Cool on a baking rack.

*All-purpose flour can be substituted.

**Wheat starch sometimes is sold in Asian markets under the names "wheaten cornflour" or "nonglutinous flour." Corn starch is a poor substitute but can be used.

(MAW Culinary Chair Cody Waisanen still is experimenting with his own bao recipe, but he has made bao based on this adapted Bee Yinn Low recipe for MAW's 2013 tasting event and other events. Get Low's original recipe at www.rasamalaysia.com/char-siew-bao.)

Psilocybe cophrophila (cont.) *bon Society Field Guide to North American Mush-*

Continued from page 3 321, the Food, Drug and Cosmetics Act known as the Staggers-Dodd Bill “to increase the penalties for unlawful acts involving lysergic acid diethylamide (LSD) and other depressant and stimulant drugs, and for other purposes.” This essentially made psilocybin, along with LSD and many other drugs, illegal. The full force of federal jurisprudence was brought to bear with the passage of the Comprehensive Drug Abuse Prevention and Control Act, which required the pharmaceutical industry to maintain strict control over certain “controlled substances.” Title II of the law is the Controlled Substances Act, which divides all drugs into five categories according to their potential for abuse. Psilocybin and psilocin are listed, along with LSD, peyote, cannabis, heroin, and various opioids as Schedule I substances that: (1) Have a high potential for abuse; (2) Have no currently accepted medical use in treatment in the United States; and (3) For which there is a lack of accepted safety for use of the drug or other substance under medical supervision.

Internationally, the law is murkier. The 1971 United Nations Convention on Psychotropic Substances also lists psilocybin and psilocin as Schedule I drugs, but it does not regulate psilocybin-containing mushrooms; consequently they are available in some countries, notably the Netherlands, where half a million dried mushroom packets were sold in 2006. That was until Dec. 1, 2008, when the Dutch Legislature banned psilocybin mushrooms as a result of the public outcry when a young French woman jumped to her death from a rooftop while on a mushroom-induced fantasy. It is clear there are some justified public policy concerns about the ethics of the distribution and use of psychoactive substances, including mushrooms.

The psychological effects of psilocin and psychoactive drugs like LSD in particular are based on empiricism, relying on testimonials from individuals who characterize their personal experiences as everything from ineffable to awful; reactions have ranged from Hofmann’s panic in fearing a loss of sentience altogether to Wasson’s apparent rapture. In *FUNGI Magazine* (Vol. 4, No. 3, p. 20), the well-known mycologist Gary Lincoff (author of *The National Audu-*

rooms) relates many personal experiences with the use of psilocybin mushrooms. The descriptions range from the intoxicated “We spent hours sitting around mostly responding to what everyone else was saying” and “We were convulsed in laughter the whole time, incapable of controlling our movements or communicating with one another” to the wildly phantasmagorical “I looked into her eyes — they were glowing a kind of emerald green, a color that seemed to come from an ancient forest on the shores of a deep green sea” and “The grass beyond the path had tips that were glowing yellow, and in the distance there was a line of tall trees that became giant prehistoric birds ... with heavy bodies moving back and forth in the wind.”

His summary, in pondering whether psilocybin-induced psychedelia is “the sense of connectedness with all life, with all creatures, great and small, as well as all plants and all fungi” concludes with “in addition to being a college-age (and middle-age) ‘party drug,’ it has the untapped potential for understanding (or misunderstanding) human behavior.” The Manichaeon contradictions of psilocybin’s effects are implicit.

Scientific research into the effects of psilocybin mushrooms on psychology is necessary to advance medical knowledge to inform public policy. The opinion shift on medical marijuana, also a Schedule I substance, cracked the portals of legal purgatory to the extent that cannabis is now legal in

two U.S. states, and as of December 2013, one country (Uruguay).

In 2006, researchers at Johns Hopkins completed a seminal study on the psychological effects of psilocybin. In a rigorously controlled comfort environment after extensive pre-briefing, 30 middle-aged volunteers were administered capsules of psilocybin. Their reactions were monitored during, immediately after, and two months following the sessions. While one-third expressed feelings of fear and paranoia during the testing, two months later 79 percent self-reported a more positive psychological life view, a perception that was independently corroborated by their

closest relatives and friends.

In 2010, independent studies at UCLA and NYU found psilocybin lowered anxiety levels in advanced cancer patients, suggesting a psychopharmacological role. While tentative,

these studies auger more advanced trials on the psychedelic and spiritual causes and effects of psilocybin. Perhaps Wasson had it right after all.



National Institute on Drug Abuse

Are these Mayan mushroom statues evidence that psilocybin was the source of religiosity?

Register for the 3rd Annual Joint Foray

This year’s Joint Appalachian Foray is in MAW’s neck of the woods — Front Royal, Va. Don’t miss this great event hosted by MAW and the New River Valley Mushroom Club.

Date: Aug. 8-10

Guest Mycologist:

Jay Justice, founder and scientific advisor, Arkansas Mycological Society, Cumberland Mycological Society; NAMA past vice president; with special interests in *Amanita*, *Cordyceps*, and boletes. Presentation: “Not your Grannie’s Chanties,” a look at the current taxonomic concept of members of *Craterellus* and *Cantharellus*.

Location: NOVA 4-H Educational Center, Front Royal, Va.

Registration fee/person: \$104-\$299 (varies by lodging selection). Prices include 5 meals, two nights lodging, facility fee, activities, walks, and talks. Rooms are air-conditioned.

Register: Download the registration packet at www.mawdc.org.



The 2013 Joint Appalachian Foray held at the Mountain Lake Biological Station near Blacksburg, Va., was a great success. Participants identified more than 200 mushrooms.

Willow Nero



Damn, Looks Like 'what his name' has
discovered my chanterelle site. Jim Sherry.