



**MARCH 15**  
General Meeting Speaker  
**John Muir Laws**



***How to draw mushrooms***

Come and draw mushrooms with the San Francisco Mycological Society. Fungi are a delight to sketch and paint. Learn a simple approach to sketching mushrooms and some of the most common errors that can creep into your fungus sketching. Learn how to draw mushroom gills and how to foreshorten the shapes of the caps. Then give your mushroom character.

Bring a sketchbook and pencil.

**About the speaker:**

Naturalist, educator and artist John (Jack) Muir Laws is in love with the natural world and has lived his life sharing this passion with others. He is trained as a wildlife biologist and is a Research Associate of the California Academy of Sciences. Jack has taught nature education since 1984 in California, Wyoming, and Alaska. He teaches the tools to help people develop as naturalists and stewards, including ways to improve your observation, memory and curiosity, conservation biology, natural history, scientific illustration, and field sketching, all while having fun and falling more deeply in love with the world. In 2009, he received the Terwilliger Environmental Award for outstanding service in Environmental Education. He is a 2010 TogetherGreen Conservation Leadership Fellow with the National Audubon Society. He was the 2011 artist for International Migratory Bird Day. Laws has written and illustrated books about art and natural history including *The Laws Guide to Nature Drawing and Journaling* (2016), *The Laws Guide to Drawing Birds* (2012), *Sierra Birds: a Hiker's Guide* (2004), *The Laws Guide to the Sierra Nevada* (2007), and *The Laws Pocket Guide Set: San Francisco Bay Area* (2009). He is a regular

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**Mushroom of the Month:**  
***Morchella : Morels***

by *Ken Litchfield*

When most folks think of mushrooms they generally think of the stemmed and capped mushrooms of the basidiomycetes, which are distinguished by their microscopic characteristic of four spores borne crown like on spikey sterigmata at the end of a "club" or basidium. Not that you may have a handy microscope app to use as you traipse through the woods. Those basidia might be borne on hanging gills, pores, or teeth depending upon what it looks like under the cap of the stemmed and capped mushrooms, or on a number of other forms besides that classic mushroom shape.

Morels are also stemmed and "capped" mushrooms but their



**Typical find at Lower Carlon, Stanislaus NF**

© *Ken Litchfield*

"caps" don't "hang" the microscopic spore-bearing entities like the basidiomycetes. Instead, being ascomycetes, the other main group of fungi that produce mushrooms, they bear their spores in long sausage like sacs each packed with a line of eight spores capped at the end with an operculum. Each ascus sac is packed side by side in a fertile layer over the surface of the top of the

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## PRESIDENT'S POST

by Brennan Wenck

Hello MSSF Members,

February has been a decent month for mushroom hunting. Early February was pretty dry, and there was a void of fungus, but then with the late rains things are looking good again. I hope you have all been able to get out and enjoy the late winter weather.

We were fortunate to have Stefan Catona as our guest speaker during the February general meeting. He gave a wonderful and fascinating talk on *Armillaria gallica*, and his research on the fungus on Exe Island in Ontario, Canada. Mr. Catona was very entertaining both in describing his scientific research, and in his guitar playing. We were even swooned by the Tabernacle leader Eric when he and Stefan sang a couple of duets. This month we'll be dazzled with another fungal artist, John Muir Laws, who will be demonstrating the finer points of mushroom drawing. All are encouraged to bring your paper and pens or pencils to take part in this cooperative lecture but please leave your easels at home as we are expecting a packed house. Big thanks to Enrique Sanchez, MSSF Program Chair, for putting together a great selection of speakers this season.

Also on the horizon is the annual Morel Foray. This will likely take place in early May, and we are looking at Eldorado County to take advantage of the fruits of the King Fire that happened in 2014. Details about the location and exact dates will be made available via the MSSF Calendar, and there will only be a couple weeks notification due to the brevity of the morel picking window. Pack a bag, a sleeping bag, and even a tent (some years we have woken up to snow on the ground), and come join us for some good times in the Sierra Foothills.

The MSSF is continuing to develop a broader social media presence thanks to the ongoing efforts of Pascal Pelous, MSSF Social Media Chair. If you've missed any past speakers' talks, Pascal has created a MSSF Youtube channel, <https://www.youtube.com/user/mycossf>, that catalogs a number of our presenter discussions from the previous two seasons. I also want to remind everyone that [mssf@yahoo.com](mailto:mssf@yahoo.com) is a great way to communicate with fellow members about all things mushroom related, including foray opportunities, identification questions, articles, etc. We purged the Yahoo group several years ago to make it a forum for MSSF members only so if there's something mushroom related that you'd like to share with fellow MSSFers, I encourage you to use this ongoing resource. You can also join our Facebook [page](#) or [group](#).

Thanks again to all of you who continually contribute to make the Society a great organization. Remember to share your love of the forests and mushrooms with a friend, and bring them to the next meeting if you can. We'd love to meet them!

Happy foraging,

-Brennan - [president@mssf.org](mailto:president@mssf.org)

## ANNOUNCEMENTS / EVENTS

The *Mycological Society of Marin County* next meeting will be held at the

**Mill Valley library** on

March 9, 2016 at 6:30 PM

**Mike Wood** will be giving a talk on

**"California Mushrooms"**

Check for the speaker and Register for this event [online](#)

For more information call Kevin Sadlier at 415-389-8333.

## Herbal Mead Making

7pm-10:30ish Every Wednesday Night

at Omni Commons Lab

[4799 Shattuck Ave, Oakland](#)

Contact Ken Kitchfield

[litchfield.ken@gmail.com](mailto:litchfield.ken@gmail.com) for more info

## MUSHROOM OF THE MONTH



Look at all the little pine cones - not!

© Ken Litchfield



MSSF Morel Camp in the Stanislaus NF

© Ken Litchfield

cap of the morel. This fertile surface area is enhanced by undulating folds that give the morel its distinctive appearance. Imagine a bowl of three to four inch long vegan breakfast sausage links, each containing eight big peas end to end, and all the sausages packed vertically side by side. Proportionally to the sausage links, the bowl might be several feet across. Then imagine the bowl being flexible like a sheet of pizza dough with the links stuck vertically to it. Then imagine pushing both surfaces of the link pizza to make undulating ridges and pits in the surface similar to a honeycomb. Then imagine pushing the whole pizza from the bottom surface up to make a hollow pointed balloon covered with sausage links and then attaching the rim of the hollow pizza, or blowing end of the balloon, to a hollow stem. When the conditions are right the sausages shoot off a cannonade of spore peas out of their opercula into the air from the outside surface of the morel, rather than dropping them from the underside of a capped and stemmed Basidiomycete.



A late, spring snowfall covers already growing morels at no man's land between Stanislaus NF & Yosemite NP entrance © Ken Litchfield

The true morels belong to the genus *Morchella*, in the family *Morchellaceae*, of the order *Pezizales*, named after the genus *Peziza*, the cup fungi. Other well known mushrooms in this order are the elfin saddles, an edible morel lookalike, and the truffles. The layer of asci sausages that make up the hymenium or fertile layer of the cup fungi conform to the bowl structure already described, whereas in the truffles this fertile hymenium is intensely convoluted into a subterranean nugget and can't shoot off the spores. They are distributed by foraging animals. With a morel, or an elfin saddle, or a cup fungus, you can hold the mushroom against a dark background in the light of "gods' rays" shining through the woods and then blow gently on the mushroom and it will puff out a cloud of scintillating microscopic spores that you can witness with your naked eyes.

Since 2010 quite a bit of taxonomic revision has been performed on *Morchella*, so that there could be as few as three to six species or as many as fifty to sixty species, depending upon how lumpy or splitty the researchers get. As with many other mushrooms lately, the European names apparently don't apply to what you may find in North America so we apparently don't have the delectable sounding *M. deliciosa* or *M. esculenta*.



*Cornus nuttallii* as the snow finishes melting at Upper Carlon © Ken Litchfield

As with many other mushrooms, rather than getting bogged down in the official Latin and Greek scientific nomenclature we can be quite definitive, or at least descriptive for practical normal people purposes, with the English vulgate. As a mushroom gardener, one of my favorite morels to grow, the garden morel, is what a number of folks call *Morchella ikeensis*, named after the type specimens found in the wood chip landscaping around the Ikea store in Emeryville back a few years ago when they first built it. These look a lot like the pale pointy things they call *M. rufobrunnea* at [mykoweb.com](http://mykoweb.com) but there they say that *M. rufobrunnea* is delectable while our *M. ikeensis* is quite a bland tasting mushroom. You will often find it growing around the edges of cardboard sheets at abandoned homeless sleepspots in Golden Gate Park, or sometimes in the paint chip detritus in the back of a house painter's pickup, or in the grunge of a damp carpet remnant in the floorboard of a car. Some morels seem to have an affinity for carpool habitats. Since morels are known to concentrate heavy metals in the fruiting bodies, these may not be the best for eating anyway. But they are cool to show off for gardener's bragging rights.

There is a similar garden morel that often appears in new landscaping, generally known as the fir bark morel, which looks rounder and darker than *ikeensis*, but has a bit more flavor. We have often conjectured that perhaps when trees are felled in the forest they pick up dormant morel sclerotia in the fissures of the bark when they smack the ground. When the bark is rolled off the trunks before milling to lumber, the sclerotia are possibly germinating and growing in the bark piles before being distributed to soil products companies.



These will be ready in one week from now. Lower Carlon © Ken Litchfield

The most primo of the vulgate morels is the burn morel, prolific in the Sierra forest burn zones the spring following a summer fire. There are apparently several legitimate species that make up the vulgate burn morels. Here in California, and out west generally, we have a different situation from morel picking than back east. Back east you might spend all afternoon foraging for morels in grassy areas or under elm trees or apple trees in abandoned orchards in spring and maybe find twenty or thirty nice specimens, especially if you happen on a patch of what are generally known around here

as “naturals.” “Naturals” are a vulgate taxonomic category of morels that come up just as a matter of course when non-fire or disturbed-ground related conditions manifest. Unlike back east, hunting for “naturals,” out west we can go also “burn morelling” and find twenty or thirty pounds, or maybe even twenty or thirty grocery bags full, in the same time period.

For serious burn morellers, planning and activities start during the previous summer fire season. California fire season isn't looked upon by morellers with the same tragic demeanor as rangers and forest managers may exhibit. We aren't talking about commercial pickers here; these are serious amateur hobbyist pickers that know how to focus their skills and resources from experience to maximize their brief window of opportunity for primo conditions that may not converge again for years. Morellers track potential Sierra fires with particular interest for convenience to road access and diversity of elevations and mountainside exposures. These are mapped with GPS coordinates and cataloged for further monitoring of the burn zones after the fires and before the winter snow season starts. Press releases from the various forest service or management bodies are gleaned for likelihoods of easy access come the spring snow melt.

There is a good deal of lore that burn morellers utilize to note the spring indicators for morel fruiting at various elevations. The brilliant blood red snow plant, *Sarcodes sanguinea*, is in full bloom at the beginning of the morel season just as the snow melts. This achlorophyllous, blood fleshed plant attracts hummingbirds to feed on its aerial parts while its roots are parasitic on *Rhizopogon* fungi. When *Cornus nuttallii*, the Sierra dogwood, is in full bloom, that is prime morel season at those dogwoods' elevation. You can tell whether the season is early, mid, or late by the stage of the little clump of flowers in the middle of the four big, white, long lasting leaf bracts. When the central flowers are still in bud the season is early, fully open the season is high, and wilting and turning brown is late for picking morels at that elevation. The miners' lettuce is still tender and succulent but also seeding out. Any of these plant indicators for morels may possibly be found in the actual burn zone but certainly within “fingers” of unburned green forest that jut into the burn zone. Typically, the ground temperature has reached fifty degrees Fahrenheit or more as measured by inserting a spike thermometer into the ground.



*Sarcodes sanguinea*, the  
snow plant  
© Ken Litchfield

At any particular elevation there may be burn morels erupting on the south facing slopes of hills or mountains while wrapping around to the north face of the same hill may find the same conditions about two hundred feet in elevation lower down the slope. And typically a burn has covered thousands of feet of elevation in some areas, so that you can return to roughly the same areas weekend after weekend at about two hundred feet higher in elevation, but on the same exposure side that you were the previous weekend.

Alan Rockefeller has observed that morels tend to fruit three weeks after the snow melt at an elevation and the spring king porcinis at six to nine weeks after snow melt and the butter boletes at seven to ten weeks after snow melt. So at any particular elevation where burn morels in burn zones are fruiting at their earliest to latest, you can find spring kings earliest to latest at six hundred to twelve hundred feet lower in elevation among non burned *Abies* (fir) trees. And you can find butter boletes at eight hundred to fourteen hundred feet lower in elevation on living *Abies*. While burn morels like the disturbance and devastation of burn zones, these boletes like pristine undisturbed habitat not in the vicinity of logging operations. (Further discussions about the details of the new species names and their lore can be found at “Clarifying the Butter Boletes” on [David Arora's website](#):

The classic ideal conditions for burn morels are moist ground, covered in conifer needles from the canopy being killed, but the trees still standing, providing shade and windbreak to the morels on the ground. The needles' falling is delayed from being singed to death in the fire but not actually burned in the fire. This needle mulch carpet keeps the gritty ashy soil from splattering up onto the morels which would make them much harder to clean after harvest. It also holds the soil moisture uniformly over a longer period of time and makes traipsing in the forest more pleasant without the caking of wet muddy ash on the bases of hiking boots or slipping and getting mud smears on your butt – not that you mind all that much when out burn morelling in primo territory.

It takes a while to get your experienced mushroom eyes “on” at the beginning of a new mushroom season. This is even more true for burn morels because they are so well camouflaged by their honeycomb pattern and singed and charred colors. It's almost as if they evolved as cinder mimics so browsing animals would confuse them with charred pine cones and burned branch snags. One method of detecting the morels from the background scenery is to squat down to the level of the morels on the ground and sway back and forth like an owl performing parallax viewing or hearing of its prey. You can then distinguish the morels more easily as they hover across the background. When squatting it is also easier to see the white stipes of the morels as a contrast to the bodies of the morels floating above.

When the proper convergence of conditions for burn morel mass fruitings coalesces, it can be an extraordinary

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experience for the burn morellers who witness it drop jawed. For as far as the eye can see the only living thing on the devastated hills, besides a few scattered fern fiddleheads, are the little rubbery Gumby Christmas trees foresting the needled ground by the thousands. At the sight, overgrown adults have been witnessed to fall on the ground in rolling fits of ecstatic giggles.

Harvesting the morels entails pinching them just above the base so as not to include any basal dirt in the skillet bag. But if you are a proper mushroom cultivator/moreller, then you know to carry a second bag for the bases. Therefore you can pull up the whole morel, break off the dirty base, and drop that into the cultivation bag and the top into the skillet bag. Sometimes, you may pull up an extra large base indicating you may also have the sclerotium the morel sprouted from. For more on morel cultivation please see this month's Cultivation Quarters.

Often the situation isn't knock-you-down cornucopic, but just OMG exciting. You can follow tracks of morels along gentle ravines that guide underground moisture. Or find hordes in the shade of fallen logs. Or come upon massive burned out stump hole hollows loaded with humongous hollow stuffer morels.

Because burn morel fruiting zones are essentially a single season "patch", they are the one mushroom for which mushroomers will share spots with other mushroomers. Burn morels are the mushrooms of community. They are the perfect mushroom to test out new friends' collecting and stewardship behaviors before maybe sharing "your" long term perennial mycorrhizal mushroom patches. It depends upon how much immediate-gratification-mercenary or long-term-investment-sharing behavior you witness. Of course, in the heat of the moment of collecting there may be times when you don't want to share some of the biggest and most primo burn morels that you encounter. For those moments, or when visiting your best porcini patches during daylight hours, you may want to partake of this product: <http://www.morelcamo.com/products.php>

While most burns are most lucrative the first spring following the summer fire, often there is a comparatively good second spring of "disturbance morel" habitat in the same burn zone that is still being logged and disturbed, perhaps in the form of big shady log piles that hold the humidity and break the wind from the surrounding parched landscape. Always checking for "slash" or "disturbance" morels in the slash piles of logging operations may not be as lucrative as finding first season burn morels, but is usually much more lucrative than seeking out "naturals" any day. Do be careful about climbing around these log piles not to dislodge the stack. It could be more deadly than a death cap.

There are some false morel lookalikes that can be confused with true morels. These are primarily in the genus *Gyromitra* but could also be in *Verpa* or *Helvella*. Often these can be found right among the burn morels. These could have gyromitrins in them that could be converted into monomethylhydrazine, also known as rocket fuel. This volatile compound can be off gassed in the cooking pan where it can be dangerous to breathe, or it can off gas in the digestive tract if not cooked thoroughly. Supposedly, raw morels also have a certain amount of this in them and should never be eaten raw. As is well known, all mushrooms should always be cooked before being eaten, if for no other reason than that even the most innocuous edible mushroom has chitin in the cell walls, which, uncooked, is difficult to digest for most people. While you may be able to adapt to the chitin over time, other constituents that may be in the raw mushrooms, including morels, may not be so adaptable. And besides, most mushrooms taste way better when cooked in butter, cream, and sherry anyway. Though I myself have never had any problem with cooking and eating dried morels or with combining alcohol and morels in any form, and I don't know of anyone who has, I have encountered warnings about this online. Personally, I think these are erroneous sources, but I would be interested in reliable information about this.



**Rain drops create a morel honeycomb splash pattern in the barren ash**

© Ken Litchfield

There is one other mushroom that is sometimes confused with morels, that being the *Phallus hadriana*, stinkhorn. Most likely this would be only on stumpy specimens and later in maturity when the gooey smegma coating has been carried away by flies. Since there is nothing actually toxic about them, except the thought of eating them, you wouldn't be risking anything by a mistaken stinkhorn-for-morel ID.

My favorite method of cooking morels is to slice in half vertically the largest in my harvest and arrange the open-faced morel boats in a casserole dish. Into the morel boats I stuff a mixture of mashed potatoes as a binder to hold chopped canned crab and shrimp, chopped black olives, shredded cheeses, crushed garlic cloves, bacon bits, and other savory ingredients. In the casserole dish under the morel boats I add butter-, bacon fat-, and/or duck fats and a little smoked salt, and bake the whole thing covered at 350 degrees until the morels are softened and gooey on the bottom. Take out, uncover, and wait until the morel boats have cooled just enough so that you can put one on your tongue to savor.

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Below are two stereographic pairs of photos. To view the 3D image that they produce, scroll the page so the images are centered on the screen. Then cross your eyes far enough to see the one pair of two images become two pairs of four images side by side. Then uncross your eyes so the middle two images become superimposed upon each other and this superimposed image will pop into 3D. You may have to cock your head back and forth gently while crosseyed to better align the 3D image.



**Lower Carlon, Stanislaus NF**  
© *Ken Litchfield*



**Lower Carlon, Stanislaus NF**  
© *Ken Litchfield*



Here is a typical burn landscape with dead but unburned conifer needles mulching the forest floor. There are at least a dozen morels in the foreground of the original high res photo. Within the whole landscape area of the photo there were over fifty morels picked © *Ken Litchfield*



Here is a bag of burn morel bases and sclerotia a few days after harvest, sprouting and growing in the bag, before planting in the compost pile and garden mulch © *Ken Litchfield*



Here's several burn morel bases in situ with the tops cut showing the convolutions of the morel basal stem walls © *Ken Litchfield*

## CULINARY CORNER *by Heather Lunan*

The February Culinary Group dinner was a sumptuous feast designed to pay homage to chef Yottam Ottolenghi.

After a delightful prelude of mushroom-themed appetizers contributed by the attending members, the Team Captains David Eichorn and Jeanette Larsen, assisted by their friends Bill Durkin and Erica Gimbel, prepared roasted chicken thighs with sumac, za'atar and lemon, served on individual pita breads and bejeweled with pomegranate arils. Fragrant saffron and coriander rice accompanied the chicken with additional sumac and za'atar, and a trio of lemony marinated olives from a specialty deli in the Mission, completed the entree. Polly Shaw prepared the vegetarian entree of polenta, seasoned with rosemary, Parmesan, black truffle oil, parsley, and Taleggio cheese, and topped with a sauce of shiitakes and chanterelles. Al Carvajal created a hearty and savory mushroom ragu of mixed mushrooms, including a special addition of porcini provided by Bill and Carol Hellums. Karen Rusiniak created a salad of baby arugula from Star Farms in Hollister and miner's lettuce foraged from the Berkeley hills, garnished with cucumbers, cherry tomatoes, and honey vinaigrette. Carol Hellums' refreshing dessert of malabi, a creamy milk pudding topped with nuts, and coffee service by Paul Lufkin, provided the perfect conclusion to the bountiful evening. Virgilio Cardona-Sanchez provided the setup and cleanup for the hardworking volunteer cooks. Congratulations to the February team for such an amazing dinner!

The next Culinary Group dinner is March 7th, featuring Team Captains Laura Parker and Leslie Stansfield and their team, who will prepare a menu titled "Spring in Venice".

After the recent and most welcome rains the forest magic occurs and we spy the stealthy morel peeking its head above the duff, but only if you have the eye to recognize what lies delicately underfoot. Many feel the best preparation for the rich, woody, loamy, and unmistakable morel is to simply sauté them in butter or olive oil and eat on toast. Why not elevate this experience by making this version of biscuits and gravy, a rich morel sauce spooned over light, tall and fluffy sour cream biscuits. This is a quick and foolproof meal that will highlight your morel haul.

### SOUR CREAM BISCUITS AND MOREL GRAVY

#### **Ingredients:**

The biscuits:

2 cups all purpose flour, plus 1/4 cup more for biscuit assembly

1 Tbl. + 1 1/2 tsp. baking powder

1/2 tsp. baking soda

1 tsp. salt

1 1/2 cups sour cream

1 Tbl. + 1 tsp. Vegetable oil (I like grapeseed oil), plus more for the baking sheet

3 - 4 Tbl. Very soft butter

The morel gravy:

2 cups (or more!) of cleaned, trimmed morels, halved or quartered if large

2 Tbl. unsalted butter

1 - 2 minced shallots (approx. 1/3 cup)

1 pint heavy cream

Salt and white pepper

1 scrape of fresh nutmeg

1/8 tsp. Aleppo pepper or strong paprika

Minced chives, if desired

Preheat the oven to 425 F. Lightly oil a baking sheet. I use a 10" x 12" nonstick baking tray.

In a medium-sized bowl, stir together the 2 cups of flour, salt, baking soda, and baking powder. Using a spoon, dollop the sour cream evenly over the top of the flour, pour over the oil, and mix until a soft dough is formed. Then mix with your hands until all of the dry bits from the bottom of the bowl are incorporated.

Knead gently on a floured surface 5-8 times, then re-flour your board and hands and pat the dough into a round about 1 1/4" thick.

Dip a round biscuit cutter (or a glass with straight sides that is 2" in diameter) into flour and cut out the biscuits, and arrange 2" apart on the oiled baking sheet. Reform the dough and cut out about 2 more biscuits. I usually get 8 to 10 biscuits, plus a bonus bigger biscuit for the cook.

Using a small silicone brush or your fingertips, gently spread a bit of the very soft butter on top of each biscuit, being careful not to squish them.

Bake until the biscuits are golden brown on top and bottom, about 12 - 15 minutes, watching them after 12 minutes. Remove them from the oven and brush again with the butter for a little sheen, then pile into a cloth-lined basket.

While the biscuits are baking, make the morel gravy:

In a large skillet, melt the butter over medium heat and sauté the minced shallot until softened, about 5 minutes. Add the morels and cook until they are hot to the touch, add dashes of salt and pepper. Pour in the cream and reduce by half at a high simmer and taste again for salt and pepper. Add the nutmeg and the Aleppo or paprika. Add chives if desired.

Spoon the sauce over halved hot biscuits and eat with a spoon. A glass of dry Prosecco or strong coffee would go nicely with this rich treat. Serves 2 with leftover biscuits to slather with jam.

These biscuits are my "go to" weekend recipe, and one could, with a clear conscience, eat the morel sauce just as it is.

contributor to *Bay Nature* magazine with his “Naturalists Notebook” column. He is the primary author and editor of the curriculum *Opening the World through Nature Journaling*. This free teaching guide is kid tested and teacher approved and integrates science, language arts, and visual arts through keeping a nature journal. He is the founder and host of the Bay Area Nature Journal Club, which holds monthly free nature sketching workshops, field trips and events, connecting people with nature through art.



*Boletus edulis*



*Amanita vaginata*



*Entoloma bloxami*



*Cortinarius ponderosus*



*Agaricus subrutilescens*



## FUNGAL DREAMS

by Bob Sommer

Mushroom dreams are common for me before and after forays. Depending on the season, I have fantasies of bringing home a basket overflowing with morels or chanterelles, or perhaps a few beautiful nonedibles to paint. (*Amanitas* are among the most attractive mushrooms.) Even when nothing is found, there is always hope for the future. These fantasies are wish fulfillments, as I rarely find prime edibles in the quantities described in club newsletters.

Living in the Central Valley, a foray means driving to a national forest or the coast, a minimum 90-minute trip in either direction. Almost all our club forays are done on public lands. Although individuals with backpacks can forage discreetly, a group of 20 carrying baskets attracts attention. Gaining access for a group foray is a recurring problem. We have been chased by deputies from land we thought was public but had been leased to individual ranchers.

Occasionally I have scary dreams of getting lost in unfamiliar terrain, traversing forest hillsides looking for the correct path. Having organized forays for our local mushroom club, I worry most about my role as guide or mentor, of getting others lost or not knowing the latest technical names of species found by beginners. Even with three years of high school Latin, pronunciation of technical terms is problematic, as professional mycologists differ among themselves in pronouncing *Amanita*, *Russula*, and other technical names (but no one living has ever heard Latin when it was a spoken language). Professionals also vary as to whether they use a singular or plural format (dryophilus or dryophila).

Occasionally I have problem-solving dreams about fungi I wasn't able to identify during the foray. I knew I had seen the mushroom before but the name was not forthcoming. Dreams can also produce genera names where clues such as cap color and spore color are in conflict.

There are dreams I've never had. As a cautious mycophagist I've never dreamed about poisoning myself or anyone else. Nor have I dreamed about discovering a new species that I could name after myself, my spouse, or Steve Jobs. This never penetrated the unconscious processes that control my night dreams. This strikes me as odd, because over the years I've collected fungi that are listed in no field guide and not registered in the GenBank, and that professional mycologists to whom I showed specimens called "an unknown type of *Amanita*" or a "*Russula* never before documented." I have two folders of mushroom paintings marked "Unknown ID," one with spore color indicated and the other without. Drought conditions make it difficult to obtain spore prints, as mushrooms are cautious about dropping spores in dry weather.

I have come to accept mushroom dreams as part of my mycophilia. After retiring from my day job, avocational interests keep me intellectually alert. Recently I had a mushroom dream unlike any of the previous ones. I imagined I owned forested land on which I could forage any time. On my land I was familiar with all the mycorrhizal and seasonal associations. It was a comforting dream and I awoke relaxed and happy. I wasn't nervously listening for the sound of rangers approaching or irate landowners chasing me away. In this dream I carried an attractive, colorful open basket rather than a drab knapsack for furtive collecting.

My pleasant fantasy recurred over successive seasons until the time arrived to consider allowing our mushroom club to forage in my fantasy land. Imagine 25 intent mushroomers traipsing every corner of my dream property, and now it was property, from the Latin *propius*, one's own. I was ambivalent about sharing my good fortune with others who would know its location, invite strangers to join them, return when I was not present, and harvest all my imagined fungi. I realized this was a childish, churlish response but it was sufficient to dampen the pleasant dream of owning forested land. The fantasy illustrates territoriality, the need to defend one's space against intruders. It was legitimate for me and my family to collect on my fantasy property but not strangers. I experienced empathy for those landowners who in the past rejected our seemingly innocent request to collect on their land, and for the rangers following the dictates of the slippery slope theory or the camel's nose under the tent -- that is, if you let some collect fungi, others will come to gather wildflowers, harvest Christmas trees, cut firewood, and remove fossils with no end in sight.

**ACADEMIC QUADRANT** by Jackie Shay*Featuring Dr. George Carroll – University of Oregon (UO) Institute of Ecology and Evolution Professor Emeritus*

Dr. Carroll received the Mycological Society of America (MSA) Distinguished Mycologist Award this past year. Awarded annually to an individual who has established an outstanding mycological career, this is one of the highest awards bestowed by the MSA and marks a distinguished career. He began in 1967 as an assistant professor at the UO (Brown, 2015).

Throughout his nearly 50-year career, Carroll has been intensely interested in endophytic fungi found on living needles and conifer twigs. In the late 1970s, when Carroll began his groundbreaking research and while the rest of the mycological community was studying endophytes in grasses, his work set the standard in his area of interest.

**Research Interests**

Symbiotic associations, in which two or more organisms live in intimate contact, are now recognized to be extremely common throughout the biological world.

Dr. Carroll has worked with a group of microfungi, termed fungal endophytes, which live completely asymptotically within leaves and stems of healthy plants. At the moment the following general questions about these associations interest him.

Using hierarchical sampling schemes, how is the variance in fungal infection frequencies partitioned among leaves within plants, among plants at a given site and among sites in a given habitat? Do fungal endophytes play a role in deterring herbivory and thus function as mutualists? Have fungal endophytes evolved in parallel with their hosts? How can we explain the nearly ubiquitous presence of wood-decomposing Ascomycetes as endophytes in leaves of plants where the active phases of the fungi are never seen?

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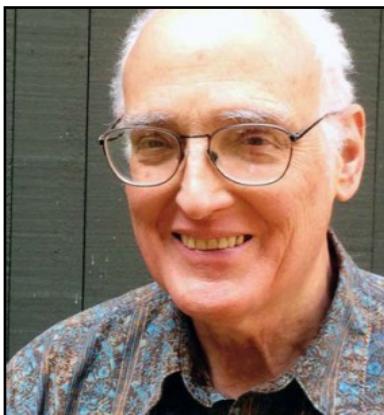
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George Carroll



George Carroll, Jeremy Burdon &amp; Roo Vandegrift near Tamolitch Pool BR

## REVISITING CALIFORNIA'S DEADLIEST WEEK OF MUSHROOM POISONINGS: 19 DEAD AND 27 HOSPITALIZED, INCLUDING THE GOVERNOR

by George Caughey

The week beginning February 26th, 1934, included possibly the single deadliest mushroom meal recorded in the Americas, and is momentous in the annals of poisoning by fungi by any standard. At this point, few now living can have experienced these events first-hand. Curiously, this tragic week is seldom referenced or mentioned. Indeed, I have yet to encounter a member of the MSSF, a medical colleague, or a toxicologist who knows of it. This is unfortunate, not only because of the disaster's sobering dimensions, but because of the lost opportunity to learn how to prevent and respond to similar events.

Of several independent "toadstool poisonings" reported in California 82 years ago at the beginning of the month of March, by far the most significant was a mushroom dinner on a coastal lettuce ranch 3 miles south of Arroyo Grande near San Luis Obispo. After the meal, 24 individuals were hospitalized and 16 died. The fungi were foraged by Filipino farm workers, who were described as being delighted by their discovery of mushrooms emerging in the wooded hills near the fields after a series of rains. They invited the two owners of the ranch to share the feast. Although sickened and hospitalized, their employers survived. These events follow patterns repeated several times in the later 20th and early 21st century: an immigrant group picking fungi with which they are unfamiliar. The mushrooms foraged in this instance remain unidentified. In terms of fatalities, the Arroyo Grande feast may have been the single most significant mushroom poisoning event in the history of California, and also of the rest of the Americas and Europe. Although it is certainly the case that some deaths from fungal ingestion go unattributed, unrecognized or unreported, it is unlikely that a cluster of poisonings involving so many individuals would fail to be linked to fungi and reported by the press. If others know of more significant events, I would like to hear of them.

Additional California victims of toadstool toxins appeared elsewhere during the same week, as reported in newspaper accounts of the time. These victims included two children, ages 3 and 5, who were hospitalized in Salinas after consuming fungi from Monterey County near Pacific Grove. Their parents, who may have picked and prepared the fungi, also were hospitalized, and apparently survived. In a separate event, an adult woman from Tulare County died in Woodlake Hospital 5 days after consuming foraged mushrooms. In total, 19 fatalities attributed to ingestion of toxic fungi were recorded during this one week. An additional death occurred March 8th, 3 days after eating wild mushrooms picked on a grape ranch in Sierra Madre, near Pasadena. Thus, at least 20 deaths were logged in newspapers in early March of 1934. In addition to this, California governor James "Sunny Jim" Rolph, Jr. was reported on March 3rd to have ingested toxic mushrooms while on a speaking tour and to have been "saved" by vomiting soon after. Although he survived, he had chronic health problems and died in office less than 3 months later. Ironically, it may have been the governor's affliction, which was unrelated to the week's fatal poisonings and was not definitively linked to mycophagy, that propelled the story of California's fungal poisonings onto the pages of the national and international press. The headline in *The Mail* from Adelaide (Australia), for example, trumpeted "Toadstool Eaters Die in America: ESCAPE OF GOVERNOR".

From a perspective more than 8 decades after the events in question, having sifted through newspaper reports and other available facts (which do not include identification of the offending fungi), how willing are we to attribute the deaths to mycotoxins? And if mushrooms are to blame, from which specific fungi did the toxins originate? For the feasters at the Arroyo Grande lettuce ranch, the evidence implicating fungi is persuasive. First, there is the clear history of eating mushrooms that were locally foraged and that were the focus of a meal of which every person poisoned partook. The harvesting of the mushrooms in late February is consistent with typical fruiting season for endemic deadly amanitas in California. Furthermore, the mushrooms in question were harvested not in agricultural fields but in the surrounding hills, which then as now one can presume were forested with coast live oaks (*Quercus agrifolia*), which is a favored ectomycorrhizal host of amanitas containing deadly amatoxins. The timing of symptoms and the manner of death also provide important clues. Onset of gastrointestinal symptoms was delayed by many hours—long enough in fact for some to make a reported second meal of the mushrooms—but when the symptoms took hold they were severe, triggering hospitalization. Delayed onset of ultimately severe gastrointestinal symptoms is typical of poisoning by amanitas containing amatoxins. In Arroyo Grande, deaths generally occurred in 2-5 days, with autopsies, as reported in newspaper accounts, showing "yellow atrophy" of the liver, which is also typical of amatoxins, which can destroy liver cells, while also damaging kidneys and other organs. The high case fatality rate, with two thirds of the feasters dying over the ensuing 5 days, is likewise consistent with ingestion of amatoxins, which cause far and away more mushroom-related deaths than any other class of fungal toxin. For the other fatalities attributed to toadstool ingestion during that week, there is less information available from press accounts, but it

[Continued on Page 12](#)

seems likely that these too were due to deadly *amanitas* foraged at other locations in central to southern California, given the similarly delayed symptom onset and high case fatality.

Regarding the suspected poisoning of governor Rolph, the meager facts gleaned from available accounts are insufficient to implicate deadly *amanitas* (or indeed any mushroom). His symptoms occurred after eating “two mouthfuls” of the offending meal, after which he was called away to the telephone, leading 2 hours later to vomiting, from which he soon recovered. I found no record of others in his party being similarly affected. Although accounts disseminated over wire services speculated that vomiting probably “saved his life”, it is unlikely that he consumed highly toxic fungi. As noted, onset of vomiting so soon after ingestion is atypical of a toxidrome caused by amatoxins. Therefore, if mushrooms played a role in the poisoning of the governor, they were probably a different variety. It should be noted that the governor had had, or was about to have, a series of heart attacks and he did in fact die about 3 months later, June 2, 1934, during his third year in office. Governor Rolph was well known within and outside of California. Prior to becoming governor he was San Francisco’s longest serving mayor, having held office from 1912 to 1931, and having played a major role in rebuilding the city after the 1906 earthquake and fire.

If the deaths during late winter of 1934 were due to mushrooms containing amatoxins, as seems almost certain based on the course, features and severity of the illnesses, what species of fungus was involved? Absent descriptions or species identifications in press accounts, we are left to speculate. The offending toadstool, at least in the mass poisonings in Arroyo Grande, was almost certainly NOT the death cap (*Amanita phalloides*), which became California’s deadliest fungus in the late 20th and early 21st century, and is deservedly the focus of educational campaigns targeting would-be mycophagists. The poisonings in 1934 occurred prior to the first confirmed collections of this largely European mushroom in California, where it is thought to have been introduced in imported nursery stock—and likely more than once—and has since “jumped” from its customary ectomycorrhizal hosts to native trees, especially coast live oak, as reported by Berkeley’s Tom Bruns and others. In our state, *Amanita phalloides* tends to fruit in late fall or early winter, whereas the poisonings in 1934 occurred in late winter. Furthermore, the masses of mushrooms needed to produce a “feast” for 24 adults would seem to exclude non-*Amanita* amatoxin-producers, including *Galerina autumnalis*, which is a rather diminutive wood-rotting mushroom unlikely to tempt foragers looking for fungal food, although it has poisoned foragers looking for psychedelic mushrooms.

It seems highly probable that the lethal toadstool was the western destroying angel, *Amanita ocreata*, a native white *amanita* with toxins similar to those in *A. phalloides*. Unlike *A. phalloides*, *A. ocreata* tends to fruit in late winter to early spring, which fits with the events occurring in late February and early March. Although the early 1930’s were a period of severe drought in California and in the West generally (contributing to the dust bowl), rain was average in the San Obispo area in the winter wet season of 1934 (according to records compiled by the Cal Poly weather station), and there had been a generous 6 inches of rain that January, plus rain in the week preceding the mushroom harvest at Arroyo Grande, plausibly creating good conditions for fruiting. *Amanita ocreata* is an ectomycorrhizal fungus for which the host is most commonly coast live oak, which, as noted, would have grown in the coastal hills of Arroyo Grande from which the foraged fungi were harvested. For similar reasons, *A. ocreata* also is likely to be responsible for the other reported deaths in California from toadstools in early March of 1934, when conditions may have supported fruitings in multiple locations.

Filtering the press reports of 1934 through 21st-century eyes gives a picture of what has and has not changed about attitudes towards mushrooms. The deaths in California received particular attention in the press of England and Australia, which are mycophobic nations lacking strong traditions of mushroom foraging and fungus-based cuisine. Perhaps they saw a measure of cultural vindication in these poisonings—after all, even the governor of California was foolish enough to eat mushrooms! It is curious that none of the many reports identified the offending fungi by genus and species (though *amanitas* were suspected), nor was there any mention of an attempt to do so, which is a priority in latter-day group poisonings. The implication was that to eat any foraged mushroom was to invite death, with one report wrongly stating that the fungal family of agarics, with its “thousands of species,” are “mostly fatal to man and plant alike.” At least one reporter wondered if the mushroom pickers had used the tarnishing of a silver coin in the cookpot to determine whether the fungi were edible (which is a test that would not have tagged *A. ocreata* or other deadly *amanitas* as being poisonous and is a practice that had been debunked in Europe by the mid-1800’s following its deadly misapplication). In the case of the victims at the Arroyo Grande lettuce ranch, serial reports appearing during the first few days updated and named those who had died from the “toadstools mistaken for mushrooms”, and stated that all were expected to succumb, which is a prognostication probably based not only on the severity of illness but on the lack of an antidote and the popular assumption that ingestions of this sort were uniformly lethal. Indeed, funerals for those who died in the first 3 days were delayed in preparation for a mass funeral, in the expectation that the entire group of feasters would share the same fate. Fortunately, 8 of those poisoned in

the Arroyo Grande group defied the grim predictions and survived.

How does the 1934 outbreak of mushroom poisonings compare to others that occurred elsewhere at other times? One notable series occurred in the New York City area, including New Jersey, in early September of 1911. The Boston Journal of Surgery and Medicine (precursor of The New England Journal of Medicine) reported 22 deaths, which is certainly remarkable by today's standards. The mushrooms involved were not identified, but were suspected to be amanitas. Unlike at Arroyo Grande, the poisonings involved not a single meal but multiple separate incidents. Some of the mushrooms were picked on Labor Day (when people were off from work) and were sold in markets or house-to-house by enterprising individuals. Some of the victims were said to be recent immigrants from Italy, Bohemia, Russia and perhaps other parts of mycophagic Eastern Europe. Reports of the time speculated that A. phalloides in its white form (probably actually A. bisporigera/virosa) was mistaken for the meadow mushroom Agaricus campestris.

Another substantial cluster was reported just 4 years later in Journal of the American Medical Association, featuring 30 illnesses and 7 deaths in and around Baltimore. The mushrooms linked to these illnesses were foraged in August and September. One of the survivors had personally harvested some of the mushrooms, and supplied fresh examples, which were identified by Dr. William W. Ford (Professor in the Bacteriology Laboratory of Johns Hopkins) "on morphological grounds" as A. phalloides, which then were fed to a dog and injected into guinea pigs. All of the animals died. An autopsy of one of the affected humans revealed liver as well as kidney damage, consistent with what we recognize today as manifestations of poisoning with amatoxins, which likely in this case were derived from A. bisporigera/virosa. Dr. Ford was involved in trying to develop an anti-toxin for A. phalloides based on his estimate of 12-15 deaths per year in the United States from the A. phalloides species of mushroom alone—which, if accurate, is much higher than present rates in the United States. He also developed a classification system for mushroom poisoning, a.k.a. mycetism, of which his Type 2—"Mycetismus Cholericiformis"—included the cholera-like illness linked to ingestion of A. phalloides, and he systematically collected reports of mushroom poisonings from the late 19th and early 20th century. In a 1909 article in Science based on this research, he wrote "the most horrible of all epidemics ever reported occurred in France at the Orphanage of St. Louis near Pont de la Maye, Gironde, where 11 children died from one meal of Amanita phalloides gathered by the ignorant attendants". If this is indeed the most lethal consequence of a single meal of mushrooms as of 1909, then the toll of 16 deaths in Arroyo Grande looms very large in any century and may well have been the most ever reported from one meal anywhere. Be that as it may, one hopes that no events of this magnitude recur. And yet the accounts of poisonings in the late winter of 1934 remind us that large fruitings of deadly amanitas do occur episodically, now including A. phalloides in addition to A. ocreata, with tragic results when fungal abundance is encountered by the mycologically uninformed.

Selected links to newspaper accounts of the poisonings in 1934:

Berkeley Daily Gazette Mar 1, 1934

Spokane Daily Chronicle Mar 2, 1934

Spokane Daily Chronicle Mar 3, 1934

**Poisonous Toadstools Prove Fatal**  
**NO HOPE HELD OUT**  
**Report Filipinos Dying at Rate of One Each Two Hours**

San Luis Obispo, Calif., Mar. 1.—(AP)—A community dinner of 22 Filipino lettuce pickers, to which their two American employers were invited, today had resulted in the agonizing death of nine workers.

Fifteen others, including the two white employers, who partook of what they thought was a delectable dish of mushrooms, were expected to die. No hope for recovery of any of the men was held by Dr. F. Hilton Smith, county physician.

The Filipinos were employed on the ranch of Walter Huber, three miles south of Arroyo Grande. Heavy rains last week brought up large beds of fungi in the hills surrounding the ranch and the men spent Tuesday gathering what they believed were mushrooms and invited Huber and his brother Jack to a dinner in the camp dining hall.

**Become Violently Ill**  
 All ate heartily. Late Tuesday night they became violently ill and were brought to the county hospital here.

Yesterday Victor Tabalian, 23, died in agony. His compatriots were too ill to discuss the dinner and their plight.

Since late yesterday, the men have been dying at the rate of one every two hours, Dr. Smith said.

An autopsy over the first victim revealed acute yellow atrophy of the liver as the direct cause of death. This is the primary symptom of toadstool poisoning, the county physician said.

The dead: Simon Avalis, 48; Francisco Tabaldo, 25; M. Pasqual, 34; Saturno Arilano, 24; Ignacio Estivado, 20; Leo Soria, 35; Karyen de la Cruz, 27; Victor Tabalian, 23, and Alfred Orovano, 26.

A mass funeral for the Filipinos will be held when and if the remaining men die, it was announced.

**FRANCE ADOPTS ROOSEVELT IDEA LIQUOR ST**

**Coming Year**  
 Editors Note:—On the eve anniversary of the New Deal, 7. T. Kellner of the house review of the year, "Twelve Months of Progress," by United States, Mar. 1, — seems proper now to rev the vivid legislative hist first year of the admini Franklin D. Roosevelt.

The president and con been making history j making it. In the histor tive bodies in all the ncing has occurred, th the legislative record of t congress.

On the fourth day of an agrarian revolt was i from Pennsylvania to U were failing. We were rapidly towards a colla time had come to do thin

The new cabinet was a March 4. The next day co called in special session a holiday was proclaimed. 9 the extra session of con vened and in one day pass eney banking legislation. ony bill was passed an legalizing beer. It went a minute after midnight.

The banks had commen open. During the rem March stock exchanges hoarded gold poured bank. The federal farm abolished and all farm ercies were united in one a tion. The civilian conserv was set up to employ 3 young men.

In April gold exports w good. The farm aid bill ed, including amendment unprecedented powers to dent in the matter of reval gold dollar, and the gold since been revalued and

The historic conferenc Donald, Herriot and the many nations with refer approaching economi... occurred in Washington.

In May the farm bill or agriculture adjustment a tion and carrying \$500,0 unemployment relief and 1 000 for farm mortgage r (Continued on page 1

**FIFTEEN PERISH AFTER FEASTING**

SAN FRANCISCO, March 2, (AP)—Deadly fungi had taken a toll of 15 lives in California today and was blamed partly for the illness of Governor James Rolph Jr.

The latest victim was Mrs. Herman Oeschinger of Kaweah, who died in Woodlake hospital today after eating toadstools which she believed were mushrooms. She had been ill since Monday.

Twelve deaths had occurred at San Luis Obispo, where 22 Filipinos and two white men sat down at a death feast of the fungi. Physicians said they hoped to save the lives of the other men.

Two children also were victims of toadstool poisoning. They were Geraldine Ebersoll, 5 years old, and Betty Frazer, 3, and their parents were seriously ill at Salinas.

**CAFE ANNIVERSARY HAS 2140 PATRONS**  
 Max Ackermann was host to 2140 patrons at the 34th anniversary dinner given at the Model cafe from 11

**BED CATCHES**  
 ALMIRA, Wash., March 2.—Mrs. Hannah Chat this city, narrowly escape burns or possible death e morning when an over-h trie blanket caught the t during her sleep. Mrs. C resides alone, awoke befo gained much headway and neighbors to extinguish l Little damage was done, burned bedding.

**NAME ALLEN 1**  
 BOISE, Idaho, March 2, appointment of Allen B. E attorney, as NRA labor officer for Idaho was ann day by Will Simons, Idat for the National Emergenc

**Bob Claypo Union Mar**  
 1125 Washington Phone Main 1022  
 The Place Where Q Costs No More  
 Fresh (all month) Ham...

## ROSEMARY, ALMOND, CANDY CAP AND HONEY BREAD *by Dony Hia*

### Ingredients:

- 1 tablespoon white sugar
- 1 cup warm water
- 1 package active dry yeast (.25 ounce)
- 1 teaspoon salt
- 2 tablespoons butter softened
- 3 tablespoons honey (I melt the butter and honey together when I soften the butter)
- 2 tablespoons rosemary
- 1 teaspoon Italian seasoning (I use 1 teaspoon Herbs de Provence from Morton & Bassett)
- 2 tablespoons slivered almonds
- 6 medium sized dried candy cap mushrooms
- 3 cups flour
- 1 tablespoon olive oil
- 1 egg (optional, but I believe needed for a beautiful golden crust)

### Directions:

1. Place the rosemary, almonds and candy cap mushrooms in a coffee grinder and grind to a medium powder.
2. Dissolve the sugar in warm water in a medium bowl, and mix in the yeast. When the yeast is bubbly, mix in salt/honey mixture, rosemary, Herbes de Provence and candy cap mixture. Mix in 2 cups of flour. Gradually add remaining flour to form a workable dough in bowl kneading for 10 to 12 minutes (I feel you need to knead the dough by hand. You can transfer love from your heart to the dough through your hands, which will not happen with cold steel kneading).
3. Coat the inside of a large bowl with olive oil. Place the dough in a bowl, cover and allow to rise 1 hour in a warm location (if our house is cool I start the oven on low and place bowl on top of stove).
4. Punch down dough and divide in half. Line a baking sheet with wax, or parchment, paper. Lightly grease paper. Shape dough into 2 round loaves (or in my case hearts, or anything else I feel like), and place on the baking sheet. Sprinkle with any remaining rosemary. Cover with wax paper and let rise another hour.
5. Preheat oven to 375 degrees F.
6. Brush with beaten egg. (Optional but necessary for a beautiful golden crust.)
7. Bake 15 to 20 minutes in preheated oven.

Dony Hia, author of [\*Fresh Morning Breaths, Spiritual Journey of Dony Hia\*](#).



## CULTIVATION QUARTERS

*Ken Litchfield*

Successful morel cultivation is one of the aspirational goals of the mushroom cultivation aficionado. So often folks have told me of their or someone else's secret method of growing morels - that truly does work, so they have reliably produced multitudes of morels repeatedly - just not so that there is a fresh or dried specimen to show for it. Maybe they actually have pictures to show me, with hordes of pristine morels shown with what appears to be appropriate lighting and proper proportions to the pleasantly posed people smiling happily at their production. So often these gangbuster hordes of morels are reputed to be being produced in China or somewhere else that has figured it out for their local market, but for some reason those folks haven't thought to try selling those in our more lucrative American marketplace. Possibly, and most likely, they actually have great sales patter from their marketing department but haven't really been able to make the actual close on the deal because they don't actually have the engineers in the R&D department on board with a fully fleshed out production line. Or most likely they just have really good Photoshop people.

This isn't to say that there aren't a number of techniques that have been running around for a few years that will successfully produce morels by some relatively unconvoluted process. But for some reason there seems to be a hold up somewhere in the production process that keeps them from actually making an impact in the marketplace. It could well be that someone, or ones, has been successfully growing very tasty cultivated morels, indistinguishable from wild morels, and selling them at wild prices while keeping their proprietary process secret. Or not. I believe that most of the folks who have come up with some sort of workable processes are striving to figure out the species that has the most delectable flavor and that hasn't yet been a marketable proposition due to technical difficulties understanding the culture of tasty morels. There are folks in China and elsewhere that have produced mass morels for the market but that also still aren't a marketable proposition - because they are flavorless. Not only flavorless, but the ones I've tried are flavorless and odorless, in a really distinctively disappointing way. Perhaps because I'm so used to having the rich morel flavor from wild morels, my brain has a reaction to how bland the cultivated morels I've tried have been. It is as if they chose a cultivar, like probably what we jokingly call *Morchella ikeensis*, that has absolutely no flavor or smell, or else they have figured out something in the cultivation process that completely eviscerates the nature of the morel. This is not the characteristic you would expect from a morel you're familiar with from the wild. What's the point of a mass cultivated morel if mass cultivated button mushrooms have more flavor? You would have a more marketable product by dusting the fresh morels with cheap dried powdered button mushrooms to give them some mushroom essence.

It is possible to grow morels in the home cultivation situation and obtain a perfectly gourmet culinarily useful product even if it isn't quite all the way to producing fully fledged morels. Here is the process, from capturing a tasty wild morel to growing it out and preparing it for a culinary experience.

Next time you are burn morelling in the Sierras and have a nice harvest of plenty of tasty morels, high grade several of the most appropriate for cultivation capture. They should be of the type you have been cooking and eating and know that they are delectable. Or you could even take part of the mushroom and cook it to verify its flavor but reserve some of its tissue for agar capture back home, or maybe even in camp if you have a portable transfer hood.

Morels are hollow and so are quite thin walled with not much flesh to sample compared with other fleshier mushrooms. If any of the morels you select for capture have not been broken so the interior hollow has been exposed to exterior air and contamination, then it is easier to break it open under the sterile filtered air of the hood to sample from the interior surface of morel flesh, as long as the flesh sampled doesn't get cut through to the outside surface of the morel. Or it is possible to break open the base of a large morel and likely find a thicker sterile ridge or fold from which to sample.

Several wild morel samples should be captured on kitchen made agar spice jars so there are a number of cultures to choose from for further culturing. As you grow out the morel mycelium, note that, like the blewit with laven-

[Continued on Page 16](#)

der mycelium, you can recognize the morel mycelium by its brown color and very wispy texture. Once you have several viable agar spice jars of morel cultures you can transfer them to grain to ramp up the mycelium. However, rather than any old substrate grain, it is best to use a nicely flavored culinary grain like barley, which can make barley soup. As the grain grows out in the barley jar it can be quite as aggressive as a white oyster mushroom mycelium but turning the barley brown grain to a morel brown. You now have precooked, morel-mycelium-impregnated, barley grain that you can pour into a saucepan and simmer into morel barley soup. Not only that, but in a typical quart jar of morel barley grain you'll find as much as or more than a half cup of morel sclerotia, from pea to walnut sized, scattered through the grain. They have a very rubbery texture like each nugget is a highly twisted conglomeration of rubber bands.

When you simmer the morel mycelium impregnated barley grain and periodically taste it, it will have a very fibrous texture like pieces of lint in your mouth, not very appetizing. However after about 30 minutes of simmering the mycelial lint breaks down and becomes part of the soupiness of the barley. The larger nuggets of morel sclerotia can be sliced and diced to distribute some morel texture throughout the soup. A little butter and smoked salt and others of your favorite ingredients and you have a gourmet bowl of morel barley soup. It isn't actually necessary to try to figure out a method to get the sclerotia to make mature morels. You have a morel product straight from the grain jar than can even be dehydrated and ground to a powder for a more instant soup.

The method I just outlined is something that the average home kitchen lab cultivator could accomplish pretty simply. Compare this with the more complicated discussion of preparation that Tradd Cotter outlines in his recent book, *Organic Mushroom Farming and Mycoremediation*, and who believes is needed along with the association of certain microbes, casings, floodings, and freezings that require considerable nuanced conjurings for incomplete success.

Morels are one of the species of mushrooms that could be saprobic, mycorrhizal, or parasitic, so it belongs to the fourth mushroom lifestyle of opportunistic. Perhaps different species have different lifestyles, but some probably are versatile so that they could have a rhizomorphic mycelial tentacle running to a saprobic wood chip pile, another tentacle mycorrhizing with a tree, and another parasitizing a different tree, at least theoretically. Back east when an elm dies of Dutch elm disease, frequently the tree's death is accompanied by the concurrent flush of morels from the root zone that were living with the tree mycorrhizally or parasitically.

It may well be that when the Sierra forest burns, and the morel sclerotia flush so prolifically, this is a similar situation to the elms back east. Perhaps the sclerotia are being produced all the time, and they lie dormant until the forest dies in a burn and the conditions are aligned for mass fruiting. Or perhaps they are produced after the trees die in the burn. In talking to Alan Rockefeller, he said that he has made observations around Mt. Shasta and Pipi that sometimes a solitary *Abies concolor* tree, the white fir, dies from pine beetles or borers so the whole tree turns to bright orange needles that still cling to the tree, noticeable at a distance like a banner in the green, unburned forest. These needles might cling to the tree for a year or two. While they still cling bright orange it is possible to find flushes of morels at the base root zone of that freshly dead tree during the regular spring burn morel season. He thinks this also happens with red fir, *Abies magnifica*. It may well happen with most any conifer and is worth further observations in the woods, but he thinks it is with those firs only.

I have believed for some time that there may be the possibility that the morels are constantly producing sclerotia, whether from mycorrhizal nutrition from the forest trees or saprobically from the forest detritus, and that they are stimulated to fruit all at the same time by the smoke extract in the ashy soil of the burned woods. In the regularly burned Mediterranean fynbos of South Africa there are plants that have evolved to need the smoke extract of the fire to stimulate their seeds to germinate. It was once believed that it was the heat of the fire that did this but after more refined observations it was determined that it was the smoke extract. So now it is possible to order smoke extract treated seeds for ready germination and smoke extract to treat your own seeds.



**MUSHROOM SIGHTINGS IN FEBRUARY 2016**



*Hellvella acetabulum* - Oakland, CA



*Amanita gemmata* - Oakland, CA



*Amanita velosa* - Oakland, CA



*Cantharellus californicus* - Oakland, CA



*Hygrocybe flavescens* - Oakland, CA



*Amanita pantherina* - Point Reyes, CA

Send photos of your findings to [mycenanews@mssf.org](mailto:mycenanews@mssf.org) to be published in the next newsletter.

## MSSF Calendar March 2016

### Monday, March 7, 7:00 p.m. - Culinary Group Dinner

**Theme:** Spring in Venice - [details](#)  
Hall of Flowers, County Fair Building  
Golden Gate Pk., 9th & Lincoln, S.F.  
Advance registration required at [mssf.org](http://mssf.org).  
Email [culinary@mssf.org](mailto:culinary@mssf.org) to volunteer.

### Tuesday, March 15, 7:00pm - 10:00 pm - General Meeting

7pm - Mushroom Identification, mushroom appetizers...  
8pm - General Meeting  
**Speaker:** John Muir Laws

**Topic:** How to draw mushrooms  
Hall of Flowers, County Fair Building  
Golden Gate Pk., 9th & Lincoln, S.F.

Check the MSSF online calendar at:  
<http://www.mssf.org/calendar/index.php>  
for full details, latest updates  
and schedule changes.

## MSSF VOLUNTEER OPPORTUNITIES

Join the Council leadership, learn the inner workings of the MSSF and help make decisions that shape the future of the society. Do your part by contributing your time to this 100% volunteer organization!

To learn more about all council and committee positions, go to: [www.mssf.org](http://www.mssf.org) members-only area, file archives, council member position descriptions. Or email [president@mssf.org](mailto:president@mssf.org).

## HOSPITALITY

The Hospitality Committee gives a shout-out to two of its own hard-working and dedicated members, Ginny Garrett and Theresa Halula, for their excellent appetizers at the February general meeting. Ginny made a hearty porcini and cannellini bean soup, very flavorful. Theresa made bite-sized pastries stuffed with sautéed mushrooms, cream cheese and ricotta. Much appreciated!



YOU TOO can be a guest chef for a hospitality hour. Just e-mail George at [george\\_willis@sbc-global.net](mailto:george_willis@sbc-global.net), or Eric at [mullew@comcast.net](mailto:mullew@comcast.net). You will have an \$80 food budget from the MSSF, and Hospitality Committee members available for advice and support.



## Mycena News

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Please e-mail photos, comments, corrections, and correspondence to [mycenanews@mssf.org](mailto:mycenanews@mssf.org)

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Mycological Society of San Francisco  
The Randall Museum - 199 Museum Way, SF, CA 94114

Submit to *Mycena News*! The submission deadline for the April 2016 issue is March 15th. Send all articles, calendar items and other information to: [mycenanews@mssf.org](mailto:mycenanews@mssf.org)

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