Speaker for March MSSF Meeting

Steve Trudell

Mycorrhizal Fungi: Foundation of Our Forests

We're used to thinking of fungi as the great decomposers. However, without the mycorrhizal fungi, there would be no plants, none of the things that eat them, and thus very little to be decomposed. Yet, mycorrhizal fungi and their critical importance are usually overlooked, unless of course they are large fresh matsutake, ceps, or chanterelles! Come and be introduced to the diversity of mycorrhiza types, and the plants and fungi that form them. Learn a little of their function and ancient history. And then be treated to glimpses of the fascinating things that mycorrhizal fungi do in our fields and forests, such as feasting on insects and delivering the goodies to the trees.

Steve Trudell is a "return-to-school" graduate student in Forest Ecosystem Analysis at the University of Washington, where his PhD research deals with the roles of mycorrhizal fungi in forest nutrient cycling. He has been teaching about mushrooms for over 2 decades, at Santa Barbara Community College, the Evergreen State College, the University of Washington, and through local mushroom clubs. Steve is a life member of NAMA, chair of its Literature Committee, and a member of the Photography and Education

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Mycena News

Mycological Society of San Francisco *March, 2003, vol 54:3*

MycoDygest

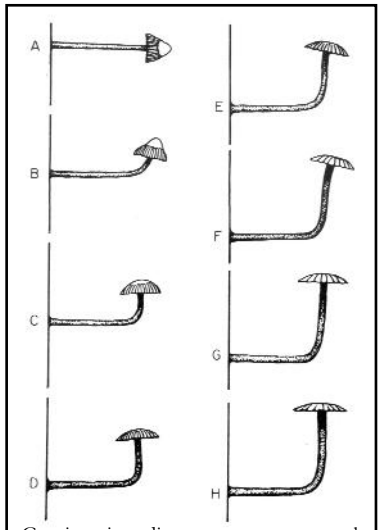
MycoDygest is a section of the Mycena News devoted to the scientific review of recent mycological information

Mycomorphology Part 2: Basidiocarp Keeps its Balance

By Peter Werner pgwerner@worldnet.att.net

In my last column, I discussed how the characteristic umbrella shape of a mushroom is an integral part of a suite of elegant adaptations for the dispersal of spores. These adaptations ensure that the maximum number of spores are successfully released from the hymenophore (that is, the gills, tubes, teeth, etc), and that they fall clear of it into the airstream below.

These adaptations, however, are entirely dependent upon a mushroom's being oriented perfectly upright, with the gills or other hymenophoral elements being completely parallel to the vector of Earth's gravity. Since spores fall along a gravitational vector, any deviation of hymenophore alignment from the normal will lead to an increased number of spores becoming entrapped within the gills. At the beginning of the last century, the eminent fungal physiologist AHR Buller observed that when a basidiocarp of *Agaricus campestris* was tilted a mere 5° from the normal, spore dispersal was cut in half.



Gravitropic adjustment over several hours of a basidiocarp placed perpendicular to the direction of gravity. (Adapted from: Buller AHR. 1909. *Researches on fungi*. Vol. 1. In: Moore-Landecker E. 1996. *Fundamentals of the fungi*. (4th ed.))

Clearly, a mushroom must have a way of keeping its hymenophoral elements aligned to the normal. However, mushrooms are incapable of locomotion and cannot simply move their gills into the correct position. Mushrooms deal with this problem in a similar way as do plants, through mechanisms known as tropic responses. In a tropic response, the organism grows toward or away from a stimulus rather than moving toward or away from it. Tropic responses include phototropism (response to light), gravitropism (response to gravity), thigmotropism (response to touch or contact), hydrotropism (response to water), and many other such responses. Tropic responses can be either positive (growing toward the stimulus) or negative (growing away from it).

At first, mushroom primordia grow perpendicularly away from the surface from which they arise, independently of the direction of light or gravity, a response that may be some kind of negative thigmotropism or negative hydrotropism.

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Mycomorphology

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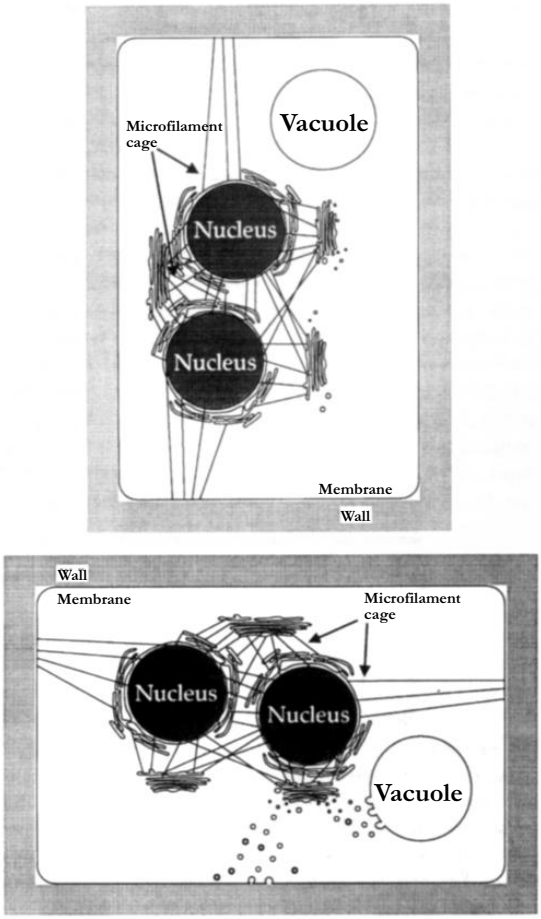
Soon after emergence, gravitropic and (in some species) phototropic responses become active.

The majority of mushroom species exhibit growth that is negatively gravitropic along the stipe and positively gravitropic in the hymenophore. If a mushroom is tilted from the normal, it will grow in such a way that a bend will develop in the stipe until the mushroom is again realigned. This bending is key to the gravitropic response - once the mushroom stipe is aligned away from the normal for a specific time interval (an interval known as the "presentation time", which varies from one species to another), the hyphae on the lower surface of an apical zone on the stipe begin to elongate more rapidly than those of the upper surface, leading to bending of the stem and ultimately the correction of the mushroom's alignment.



Diagrammatic model of hypothesized gravity perception mechanism in a fungal cell. Top diagram shows vertical orientation of a cell while the bottom shows horizontal orientation. Stress on microfilament cage stimulates the endomembrane system to release growth (or growth-suppressing) factors, membrane and wall-building materials, and possibly hormones or other signaling factors. (From: Moore D, et al. 1996. *Mycological Research* 100:257-273.)

In the last decade, it has been discovered that this response actually has two parts involving two apical zones. The initial bending response, which originates at the base of the stipe, often overcompensates and by itself would tend to leave mushrooms tilted in a direction opposite to the initial misalignment. There is therefore a "curvature compensation" growth response which takes place in the upper part of the stipe - this represents a "fine adjustment" and serves to better align the stipe with the normal. The positively gravitropic response of the hymenophoral elements represent a further layer of "fine adjustment".

Other tropic responses may modify a mushroom's gravitropic growth. Most mushrooms have some kind of negative thigmotropic response, so that if a mushroom encounters an object as it is growing, responses such as stipe bending, bifurcation, or change in the pattern of pileus growth will cause the mushroom to grow out of the way of the object. (This in contrast to fungi such as *Hydnellum* that are characterized by indeterminate growth and simply envelop foreign objects within the fruiting body.) Many lignicolous and coprophilous species show strong positive phototropism throughout their fruiting cycle, a response that overrides the gravitropic response. (In one experiment, a *Polyporus brumalis* basidiocarp was illuminated from below - the stipe curved 180°, resulting in an upside-down pileus with tubes growing upward.)

How can we be sure that a mushroom's main tropic responses are in fact responses to gravity? The most obvious way is to deprive them of gravity by placing them in the microgravity conditions of spaceflight. Such an experiment was, in fact, carried out in 1993 when cultures of *Flammulina velutipes* were sent into orbit on the joint Space Shuttle Columbia/Spacelab D-2 mission. These cultures produced fruiting bodies with a random orientation, while similar control cultures on Earth produced regular vertically-aligned fruiting bodies.

Since it is clear that mushrooms respond to gravity, how then do they sense it? How do they know "up" from "down"? At present, this is largely unknown, though it has been surmised from what is known about the gravity-sensing mechanisms of animals and plants that it probably involves some kind of statolith. A statolith is an organ or cellular organelle that is more dense than its surrounding matrix and hence tends to exert pressure along a gravitational vector. This pressure is sensed by a network of fibers, hairs, cytoskeletal elements, or the like, which transmit this impulse, and ultimately trigger an ionic, hormonal, or nervous signal.

Our bodies have a complex system of statoliths in our inner ears. This vestibular system consists of small calcium carbonate-filled sacs known as otoliths that are surrounded by a network of nerves and fibers known as the maculae. Pressure on the macula generates nerve impulses, and these signals, when processed by the brain, give us our sense of balance. Vertical and horizontal movements are detected by separate otoliths, known as the saccule and the utricle, respectively. (There are also non-otolithic vestibular organs which contribute to the sensation of movement.)

Plant root cells contain starch granules that act as statoliths - the pressure gradient of these granules upon the plasma membrane is thought to in some way trigger a reaction which leads to the differential distribution of auxin in the root, which stimulates the upper surface to elongate more rapidly, bending the root downward.

The gravitropic mechanisms of fleshy fungi are even less well

Correction

Last month we mistakenly re-printed the text of an article written by Robert Mackler, "Mushroom Poisoning in Pets" and gave it the title "Beware! Be Wary! We Are Surrounded by Deathcaps." That title should have been published with the following article written by Dr. Bill Freedman. Our appologies to both authors and to the readers.

Beware! Be Wary! We Are Surrounded by Deathcaps

By Dr. Bill Freedman, Toxicology Committee Chairman, loufreed@aol.com

The suggestion that we don't feed mushroom left-overs to our pets was made in the January 2003 Mycena News article on *Amanita phalloides* poisonings. Well, we're still doing it.

The following summary represents an up-date on accidental Death Cap experiences from the Bay Area down to Santa Cruz for the past 5 years. Since displaying our poison mushroom poster, only 14 incidents have been reported to me. Plus two dog cases.

Wherever Louise and I have traveled in the past week, we encountered clumps of gorgeous lush green, brown, grey, yellow and white *Amanita phalloides*. It seems to us that at this time there are more of these mushrooms than any other single kind to be found. They must tempt those who forage fungi for food. As members of the MSSF, we should be warning those less informed that there are a number of phalloides look-alike edibles. All white mushrooms with a partial veil should be suspect or avoided. Many varieties of Amanita can appear pure white, without pigments to help identify them.

In 1998 and again in 1999 groups of four young men ate phalloides raw for psychedelic purposes on the recommendation of an older man in the area of Watsonville. We don't know if it was the same man. They did take trips to Bay Area hospitals. They were observed and discharged in a few days.

In 2000, Dr. Bob West, a Marin member of our Toxicology Committee, reported that a woman in Marin County was hospitalized at Marin General and I believe was given thioctic acid, (alpha lipoic acid sometimes used in Europe for amanitin poisoning), and recovered.

A couple from Jordan collected and ate Death Caps in Watsonville in January, 2002 and were admitted to the California Pacific Medical Center for treatment with: mucomyst (N-acetyl cysteine, presumably to coat the liver cells' surfaces to prevent contact with alpha amanitin); penicillin G (to prevent the amanitin from binding to albumin in the blood and thus to avoid transporting the chemical to the liver, although amanitin does not bind to albumin, but is circulated freely throughout the body) and an oral Spilt Milk Thistle seed preparation (to protect liver cells? An IV treatment favored in Austria and Germany, and a folk remedy sponsored by herbal therapists for "liver disease"). Not having eaten enough mushroom to destroy her liver, the woman recovered easily. Her husband required renal dialysis when his kidney function faltered. He improved and returned home.

Readers of the Mycena News will recall January's article by longtime MSSF member Bob Mackler about a dog who, in October 2002, discovered some "strong" delectably smelly dessicated fungi below dry leaves under oak trees. The dog developed gastro-intestinal symptoms, 103º temperature, low blood sugar and very elevated liver transaminase levels (from initial 15 to 8292 units). Treatment with mucomyst, penicillin G and milk thistle failed to stop his downward course and sadly he was euthanized. Bob and Mike Wood studied specimens and concluded that they were either *Amamita phalloides* or *ocreata*, California's nearly all-white Spring Death Cap.

On Xmas day 2002, a 24 year-old Salinas man was lucky to receive a new liver at the UCSF Medical Center after he had poisoned himself with what he thought was a kind of mushroom he had previously eaten in Mexico. Perhaps he thought that he was eating *Volvariella speciosa* or another of that genus. It is difficult to get specific details from that hospital.

This January, a couple, experienced in collecting edible fungi, harvested what they thought were Gypsy Mushrooms (*Rozites caperata*) from a darkened oak woods in Ben Lomond, near Santa Cruz. Cooked with rice at 7:30 p.m., he found them irritating and not too agreeable, she enjoyed them and they fed the left-overs to their dog. By 9:00 a.m. they were all experiencing nausea and vomiting. I referred them to Phil Carpenter, a well-informed member of the Fungus Federation of Santa Cruz in Aptos. He met them at the Dominican Hospital in Santa Cruz and quickly identified their collection as phalloides. Mucomyst and penicillin were begun and they were sent to Stanford Hospital for observation. The man's ALT transaminase levels only rose to 548 on the 4th day of the illness. Both recovered uneventfully. The dog had severe vomiting, diarrhea and confusion, but was better by the 4th day.

Examining the photos and the written description of the "Gypsy Mushroom" in the book, *Edible Wild Mushrooms of North America* by David W. Fischer and Alan E. Bessette, the couple concluded that the yellowish fungi with the partial veil and no volva were Gypsies. Readers may review that book to see for yourselves how they may have gotten into trouble. The photos of phalloides and caperata are very similar, the former is a little more yellow than usual and the latter has a tinge of green in the cap. In the dark woods, they thought the gills were white. They disregarded the fact that they were tan when they returned home and did not test for the rusty-brown spore print. David Arora points out that one of the distinguishing features of the Gypsy cap is its wrinkledness. Phalloides is nearly always smooth and shiny and sometimes metallic in sheen. The guide book describes many other differences between these mushrooms which were overlooked in the eagerness to enjoy their treasure.

This week, Phil Carpenter reported that on January 6th, a 20 year-old man in the Santa Cruz area ate some phalloides for a psychodelic trip, thinking they were the yellow variety of *Amanita muscaria*. Fortunately he didn't eat enough to become uncomfortably ill, had unelevated blood tests at a local hospital and did not get his trip to a Bay Area hospital. I have asked Phil to request members of the Fungus Federation of Santa Cruz to saturate the Santa Cruz/Salinas/Watsonville areas with our warning posters. Isn't it

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The Foragers' Report

By Patrick Hamilton, MYCOCHEF@aol.com

A problem for a report about what's currently happening but appears only once a month is its lack of timeliness when read by those seeking the information. We who write for the "MN" must get our news in way before you read it (this being put together February 8-9). That might be okay for an article regarding what we ate or how to prepare or grow this or how much fun it is to go aforaying, how I got lost, my favorite mushroom, that kind of stuff. In this column it would be real nice if we were able to get hot off the press news flashes of where and when to go pick that which is out there, now. Can't do that but at our yahoogroups Internet discussions site real news-announcements are posted that do tell what is going on right now. Here we offer data on what was being found several weeks ago and still might be coming up when this is read.

At the end of December Golden Chanterelles started being found in Marin. By mid January a 20 pound find of the Golden beauties in the Santa Cruz Mountains was recorded. Blewits soon followed and still might be out there now. At the end of the month Man on Horseback (*Tricholoma flavovirens*) was picked during the NAMA foray in Mendocino county and Debbie V. and David R. ate it for the first time. The delectable Equestre grows in the same habitat as Porcini, but usually a little later in the season.

While doing cooking demonstrations at Breitenbush 10 years ago or so David Campbell and I were brought a large cardboard box half full of those Canary Trichs picked under Shore Pines (*Pinus contorta* Douglas). They do taste great but few mushrooms can get as dirty and become so difficult to clean as those sand dwellers (another name for them is "Sandy Trichs"). I remember that we sort of thanked the givers and asked them next time to please "leave the beach on the beach," a variation on the mindful theme that when picking mushrooms "leave the forest in the forest" and bring home clean culinary specimens.

In early February at Salt Point State Park the usual mid to late winter much sought after mushrooms started very slowly. Folks willing to crawl on their bellies like some saurian stalkers and chance becoming huckleburied within entanglements of that cord-like branched shrub found Hedgehogs, mostly the bellybutton *Hydnum umbilicatum*, brightly presented yet lonely looking on the dark forest floor. In the nearby pines *Hydnum repandum*, the Sweet Tooth, was also gathered in what so far has been a whimpy season. These both are easy to pick clean so keep them that way for your pot. A favorite method of cooking is to pair these with caramelized leeks or onions, fresh peas, and a little thyme.

Winters or Yellow Foot, whatever you call *Cantharellus tubaeformis*, also began to fruit along and under decomposing logs but not yet in quantities that make collecting a pile easy. Lots of folks allow as how this little mushroom is better dried than fresh. Black Chanterelles-so favored by many-are showing in commercial quantities west of Willits and also for the casual picker further down south down into Sonoma and Marin. Next they will be in the hills of San Mateo and Santa Cruz counties. I've heard said that if your butt is not being supported by a Tan Oak to keep you from falling down a steep hill then you really aren't deep into a good patch of Blacks. Maybe so but I have seen "black outs" around Huckleberry bushes on flat ground so spectacular that years of dreams have been caused ever since.

Those that have picked on a sheer slope have gotten to probably enjoy one of that pastimes particular pleasures-picking your fungus twice. Once, and then again after your basket falls down, down, down. After gathering yourself and your mushrooms up an always fine and fast repast is easily had back at home by putting Provolone over good thick tomato sauce on a Boboli then sliced red onion, chopped Blacks par-cooked in olive oil, some fresh spinach and thinly sliced garlic. A Lodi Syrah or Zinfandel makes for an inexpensive indulgence and will help forget the bruised body and toppled ego.

Agaricus smithii has been seen along the Sonoma coast. This very tasty mushroom is similar in appearance to the well known Prince but is smaller, smooth stalked and more often is found under Sitka Spruce further north. In the foothills east of the Cotati Plain the first reported spring coccora was seen February 1. For some this signals another phase of our season. Kind of the late middle period. By early March the *Agrocybe praecox* will be fruiting, especially in wood chips, and for the same some this means the beginning of the end of our season down here near the sea. But we all know what that means-spring Sierra mushrooms soon to follow.

The Mushroom of the Month has yet to be seen this year but will be coming up right around the time you read this. It is the Springtime Amanita (*Amanita velosa*). This favorite of knowledgeable Amanita eaters (are there any other kind?) is found by first spotting its common habitat-lonely and not the best looking Live Oaks usually surrounded by open meadows or fields. I once was hiking with David Arora around The Lakes District (of Marin) and he noted several such oaks too early in the season for the velosas but that later did prove to provide these. You are not allowed to pick there so each year I would go and just stare at them and think about how good they would be in my kitchen and on my plate and in my belly. This mushroom deserves to be sautéed in good unsalted butter, no alliums please, and served simply with toast.

That's all for now folks.

Foragers Report Foray Finds

This is the new feature of the column. The lists that are received at the Mushroom Information Center will be included here.

From Robert Mackler on January 17. The following fungi were identified to species on a Marin County Open Space District naturalist walk at Tomales Bay State Park: *Agaricus praeclaresquamosus, A. subrutilescens, Amanita constricta, A. franchetii, A. gemmata, A. gemmata var. exanulata, A. muscaria, A. novinupta, A. phalloides, A. vaginata, Bolbitius vitellinus, Boletus chrysenteron, Clavariadelphus occidentalis, Crepidotus mollis, Cryptoporus volvatus, Dacrymyces palmatus, Dermocybe phoenicea var. occidentalis, Galerina autumnalis, Ganoderma applanatum, Hydnum umbilicatum, Inocybe geophylla, I. sororia, Laccaria amethysteo-occidentalis, Lactarius alnicola, L. deliciosus, L. rubidus, L. xanthogalactus, Leccinum manzanitae, Lenzites betulina, Lepista nuda, Leptonia parva, Marasmiellus candidus, Marasmius plicatulus, Mycena capillaripes, M. elegantula, Omphalotus olivascens, Phaeolus schweinitzii, Pleurotus ostreatus, Pluteus cervinus, Psyathyrella longipes, Russula amoenolens, R. sanguinea, R. silvicola, Stereum hirsutum, Stropharia ambigua, Trametes versicolor* and *Xylaria hypoxolon*.

Mycomorphology

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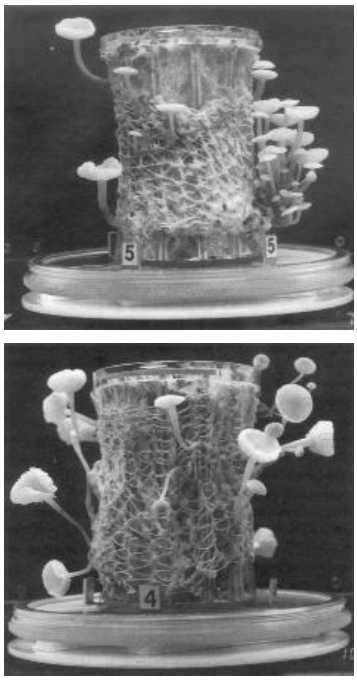
understood. Fungal hyphae typically do not contain starch granules nor has auxin been shown to play any role in fungal gravitropic bending. Several experiments have demonstrated that the stipes of *Flammulina velutipes* and *Coprinus cinereus* show a dramatic decrease in the magnitude and rapidity of gravitropic bending when treated with drugs known as cytochalasins, which act by disrupting the formation of actin microfilaments. This demonstrates that the cytoskeleton likely plays a critical role in gravitropism and points toward an intracellular statolithic mechanism.

Fungal physiologist David Moore has hypothesized that in the fungal cell, the nuclei act as the statoliths. The nuclei bear downward upon a "cage" of actin microfilaments, which are in turn connected to the endomembrane/vacuolar system. Pressure on the microfilament cage could in turn stimulate the release of growth factors and wall- and membrane-building materials from the endomembrane system in cells at the sites of increased elongation (and possibly growth-suppressing factors in cells at the sites of decreased elongation). The question of how differential cell growth is coordinated throughout the stipe and hymenophore is another open question - it is clear that auxin is not involved, but the hormone or mechanism that is responsible remains to be discovered.



Experiment showing gravitropic orientation of *Flammulina velutipes* fruiting bodies grown in culture under different gravitational conditions. Top: fruiting bodies grown for 5 days on Earth, as a control for fruiting bodies grown in orbit. Bottom: fruiting bodies grown for 7 days in orbit during Spacelab D-2 mission. Note the regular vertical orientation of the fruiting bodies produced in the control culture (top) and the random orientation of the fruiting bodies produced under conditions of microgravity (bottom). (From: Kern VD & Hock B. 1996. *Advances in Space Research* 17:183-186. In: Moore D, et al. 1996. *Mycological Research* 100:257-273.)

Further reading:

Moore D. 1991a. "Perception and response to gravity in higher fungi - a critical appraisal." *New Phytologist* 117:3-23.

Moore D. 1991b. "Mushrooms in microgravity - mycology at the Final Frontier." *The Mycologist* 5(1):11-18.

Moore D, Hock B, Greening JP, Kern VD, Novak Frazer L, and Monzer J. 1996. "Gravimorphogenesis in agarics." *Mycological Research* 100(3):257-273.

The Foragers' Report

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Again from the indefatigable identifier Robert Mackler. The following fungi were identified to species on the Jan. 25 MTIA foray at Pan Toll on Mt Tamalpais: *Amanita franchetii, Amanita pachycolea, Amanita vaginata, Caulorhiza umbonata, Clavulina cristata, Clitocybe deceptiva, Dacrymyces palmatus, Daldinia grandis, Dermocybe phoenicea var. occidentalis, Helvella lacunosa, Inocybe geophylla var. lilacina, Inocybe sororia, Laccaria amethysteo-occidentalis, Lactarius rubidus, Lactarius rubrilacteus, Lactarius xanthogalactus, Lenzites betulina, Lepiota roseifolia, Lepiota rubritincta, Leucopaxillus gentianeus, Lycoperdon perlatum, Mycena aurantiomarginatus, Mycena haematopus, Mycena leptocephala, Omphalotus olivascens, Phylloporus rhodoxanthus, Pleurotus ostreatus, Pluteus cervinus, Pseudohydnum gelatinosum, Rhodocollybia butracea, Rimbachia bryophilum, Russula amoenolens, Russula brevipes, Scutellinia scutellata, Stereum hirsutum, Trametes versicolor, Tricholoma myomyces.*

Available is also the list from NAMA and from the SOMA foray in Navarro. If anyone wants these, email me and they can be yours.

Scholarships Awarded

By Fred Stevens (fstev@dnai.com) & Robert Mackler (Rdmackler@aol.com)

The Mycological Society offers a scholarship/s each year to graduate students in mycology. Three students share the scholarship this year, which is named in honor of Esther Colton Whited and Dr. Harry Thiers. The recipients are Matthew Keirle and Peter Werner from San Francisco State University, and Luz (Betty) Gilbert, from U.C. Berkeley. Matthew Keirle is studying Coprinus species of Hawaii, many of which also occur in California. Peter Werner is studying the fungal consequences of Sudden Oak Death. Betty Gilbert will use molecular techniques to study the ecology of *Rhizopogon salebrosus*, a species that is mycorrhizal on pine, but also parasitized by a flowering plant, *Pterospora andromedea*, Pine Drops. As the scholarship recipients complete their research, we can look forward to presentation of their findings at meetings of the society.

Steve Trudell

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Committees. Previously, he chaired the Photography Committee and served as Vice President. He is a member and former President of the Pacific Northwest Key Council, and a contributing editor of *Mushroom: The Journal of Wild Mushrooming*. A native Californian, Steve first became interested in mushrooms and mushroom photography during a field trip to the Mendocino area, while a student at UC Davis. It was on that trip that he first met Harry Thiers, whose knowledge, enthusiasm, and encouragement provided the impetus to embark on a life of mushrooming. Before moving to Seattle in the late 1980s, Steve was a member of LAMS, MSSF, and the Fungus Federation.

Culinary Corner

By Alvaro Carvajal, alvaro.carvajal@att.net

We had our monthly culinary meeting at the Hall of Flowers on Monday, February 3rd. A capacity crowd showed up to enjoy an evening filled with good food and good company. It was a very enjoyable affair. The attraction for the evening was Cioppino. This wonderful American fish stew was originally made by Italian-American (and some say Portuguese) fisherman along San Francisco's coast. In any case, Cioppino means "fish stew" in Genoese dialect. As with most fishermen stews, the ingredients aren't cast in stone--but rather a result of the day's cast. In the *Dictionary of Italian Cuisine*, Howard Isaacs wrote: "There is an Italian-American dish called cioppino, undoubtedly based on the Ligurian ciuppin, which means nearly any sort of fish or seafood zuppa". In the *Editore's Ricette di Osterie e Genti di Liguria*, Diego Soracco said: "We're dealing, in essence, with a fish soup put through a food mill that's closely related to the soupe of the French. However, it shouldn't be confused with bouillabaisse. Ciuppin's roots, common to all fish stews, lie in the use of the leftovers of the catch or the market stall. It's therefore a mixture of a number of kinds of fish, all of limited commercial value, cooked with greens, herbs, and olive oil. Only with time did it develop into the refined, rich dish we know today." Cioppino has become the trademark dish of the waterfront restaurants in San Francisco.

We started the evening with a collection of marvelous appetizers. Most of the wild mushrooms that are in season at this time of the year were well represented: we had a *Suillus luteus* and cream cheese dip made by George Collier and a really stunning mushroom pâtè made with three layers of mushrooms (black chanterelles, golden chanterelles and "Man On horseback" (*Tricholoma flavovirens*)) prepared by David Campbell. Ken Litchfield prepared a wondeful golden chanterelle dip made with mushrooms collected in the East Bay hills, where they are appearing in great numbers; the same hills being the source of the chanterelles used by David Eichorn in his wonderful mushroom fritatta.

Cultivars were well represented in the appetizer table with exquisite portabello squares topped with cheese and crab (Sue Wingerson), a portabello and salmon dip (Liz Crumley), buttons stuffed with Andouille sausage and mixed cheeses (David Bell), mushroom chutney (Paul Manyharts) and some tasty wontons filled with shrimp, shiitake and spinach made by Bennie Cottone. Young Dasha Bell prepared a wonderful mushroom guacamole made according to her grandfather's recipe. It appears that Dasha is following a family tradition of excellent cooking. For the seafood appetizers Carol Reed prepared a delicious pizza topped with fresh porcini, wild mussels and jack cheese (a very California pizza!), Leon Ilniki made a wonderful ceviche and Fred Kron made a salmon roulade in garlic crostinis. We also had olives in truffle oil (Patrick Sasaki), sushi (Roy Yakote) and Vietnamese style vegetarian sushi (Yaffa Mieners). There was also a smoked trout, a mushroom and bean casserole, and a guacamole that were delicious but I didn't find the names of the cooks. To accompany the appetizers, Carol Hellums made a very refreshing orange, lemon, strawberry and rum punch. Totally cool and according to Carol, extremely easy to make. Two large vats of the stuff were gone in no time flat.

For the main meal, Honoria Sarmento prepared tasty green salad that was beautifully presented while Lucia Paulazzo and David Eichorn teamed to prepare a terrific crab cioppino. It was made with San Francisco Bay dungeness crab, scallops, clams, mussels and red snapper combined with industrial quantities of garlic, onions and tomatoes. It was served with a marvelous polenta and chanterelles topped with a basil pesto made by Phil Brown, and Boudin's San Francisco style sourdough bread brought in by yours truly. The combination was perfect. The cioppino set in my mind the standard of how cioppino should taste and by which all later cioppinos will be judged. We closed the evening with Monique Carment's refreshing coconut-pineapple cake and a great decaf coffee make by Remo Arancio. What a banquet! It was an evening to remember.

For March, to celebrate Mardi Grass, we are planning to have a Cajun feast. The dinner will be centered on Jambalaya. So put on your chefs hats and figure some New Orleans style appetizers to bring in. This is going to be fun. I will not be able to attend, but David Campbell will be taking notes.

Calendar

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Come and join us for the monthly culinary group meeting and dinner at the Hall of Flowers Library, Golden Gate Park in San Francisco. We will be having a Cinco de Mayo Fiesta. For reservations or information, please contact Alvaro at (415) 695-0466 or at alvaro.carvajal@att.net.

Beware, Be Wary

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strange that nearly all these cases arose in that area?

A word about the therapy that poisoned patients have been given. We lack convincing evidence that any of the medicines or other treatments such as flushed-in charcoal slurries really affect the medical course of these persons. We are hampered by lacking good experimental, well controlled data in humans. Having studied this for some time, I must conclude that the course of these patients is determined by the dose of alpha amanitin ingested and the ability of the liver to grow new cells faster than the poison is destroying them. Attempts to divert the flow of poison cycling through the intestinal-liver loop such as draining the bile as it comes from the gall bladder and flushing blood plasma through activated charcoal or cultivated pig liver cells to remove the poisons have so far been inconclusive at best.

We hope this review will act as a warning to all who collect fungi to eat them or have them eaten. Even with quite adequate field guides we can make mistakes. Relying on photographs alone is hazardous. John Lennie recently found a phalloides which had the same color as the brown of the oak leaf litter from which it was erupting. Phalloides stems commonly lack volvae this season. Color values in shadowy woods may be deceptive. The photograph of phalloides on the instructional Poison Poster prepared by Kit Skates have long stems and dark brown caps. There is much to mislead us. Perhaps we should approach the promise of edibility with a thorough knowledge of the seriousness of the poisons fungi can produce. Let's learn and teach about the poisonous ones and their look-alikes before we begin to enjoy those delectable freebies that we stumble upon in the woods.

Cultivation Corner

By Ken Litchfield, © 2003, *klitchfield@randallmuseum.org*

Being as our speaker for February was the national expert on morels and that morel season is coming up I figure it might be nice to give a little consideration here to morel cultivation. It will give you an incentive to think about trying out a few more convenient things while you are slogging through the muddy muck looking for morels.

I have heard some interesting techniques from cultivators of morels that are not generally known. I share them here so that like-minded and interested folks can put more brains to work figuring out the best morel cultivation techniques. Hopefully, if you try these out you will share the fruits of your experiments, both the knowledge and the morels.

The first is a technique that you could use in a garden situation. Dig a pit in a sandy area or an area with crappy soil low in any organic matter. The size of the pit can be from 2 to 4 or more feet long and/or wide and about a foot deep. Into the pit can go any kind of organic matter - compost, wood chips, raw kitchen garbage, sawdust, wood ashes - preferably a diverse buffet, mixed together. Snagging the contents of one of those green recycle bins full of grocery or restaurant compostables would be good. A morel spawn kit, or the paper towels that you wipe out the morel spores from your drier with, or the basal portions that you normally cut off your forayed morels, can be scattered over the surface of the mounded mix and the whole thing covered with a few inches of soil or sand. Surrounding the pit, dig a trench 1-2 feet larger than the pit and bury cinderblocks in the trench to make a continuous cinderblock wall underground in the sandy area.

Then wait a few months for the morels to eat up all the food in the pit. After they have eaten everything they will send out rhizomorphs from the pit through the sand in search of more food. When they run into the wall of cinder blocks they will stop and form a sclerotium. When moisture conditions in the sand are right the sclerotium will sprout and send up a morel so that all your picking will take place around the inside perimeter of the cinderblock wall. Alternatively you can pull out the wall of blocks and pick off the sclerotial nuts or sift them out from the sand on the inner wall of the trench. Then put them in a tray of sand and water them to keep the sand moist but not soggy. They will sprout and you can pick them like button mushrooms.

It is important to make sure that the pit is completely surrounded by foodless sand and a continuous wall of cinderblocks so that the rhizomorphs running out in search of more food don't find any. Instead they encounter a wall that is too difficult in energy expenditure to breach and there they will make a dormant sclerotium until conditions are better for spreading to new food. If there is a gap in the wall so that a rhizomorph can run out and find another stash of food, the whole colony of mycelium will suck its life energy out of the used up pit and move into the new area. Something like an octopus squeezing itself through a crack to get to a crab. In that case probably no sclerotia will be produced in the old area.

The other technique uses the same principle in a more commercial warehouse type setting. Spread the organic matter on trays, inoculate, and cover with a layer of sand. When the morels have eaten all the food they have no place to go but up into the layer of sand where they make their sclerotia. Then the sand can be poured off into other trays where they are covered with crushed ice and kept refrigerated for three weeks after which the temperature is raised to melt the ice. The morels then sprout in the simulated spring and can be harvested like button mushrooms.

If you don't want to try these techniques yourself, then, when you are out foraying or cleaning out your drier of morel spores, bring the stuff to me and we'll try some experiments in our mushroom gardens. Incidentally, besides the Deer Mushroom, *Pluteous cervinus*, and Shaggy Parasol, *Macrolepiota rachodes*, we now have growing wild on the grounds of the museum the "*ikea*" morel, first discovered in the landscaping of the IKEA store in Emeryville. They aren't the rich smoky flavored Sierra types but, hey, a morel is a morel.

Mycena News is the newsletter of the Mycological Society of San Francisco and is published monthly from September through May. Send or e-mail newsletter submissions by the 12th of each month to Lorrie Gallagher, 129 Tucker Avenue, San Francisco, CA 94134, phone: (415) 467-1868, e-mail: lorriegallagher@ hotmail.com

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Membership and Subscription Information

To Join the MSSF and receive this newsletter, send a $25 check, payable to MSSF ($20 for seniors 65 and over and full time students), to MSSF Membership, Attn: Jane Collier, c/o The Randall Museum, 199 Museum Way, San Francisco, CA 94114. Please include contact information: home and/or work phone numbers and e-mail address. New and renewal memberships will be current through December of 2003. To change your mailing address, please notify Jane. MSSF members may also join or renew membership in the North American Mycological Association at a reduced rate by including with their MSSF check a separate check for $32 payable to NAMA. Send it to Jane at the same address. For further information, e-mail Jane at jcollier@stanford.edu or call (415) 641-6068.

MSSF Mushroom Day at the Randall Museum

By Ken Litchfield

The 2nd annual Mushroom Day at the Randall was a great success with over 650 members of the public showing up. We had mushroom exhibits and demonstrations throughout the museum and outdoors, and the weather was beautiful and sunny.. Carol Preston of the Randall Museum did an outstanding job of organizing and coordinating the event and getting the Randall's publicist Genevieve Antacky to announce it in the media. We had a nice mushroom display in the lobby and some well attended cultivation talks in the newly renovated mushroom garden.

Sherry Carvajal did a wonderful job of putting together the food service of wild mushroom soups and lasagna with lots of assistance from Al Carvajal and Bill and Carol Hellums. Stacey Barros and Robert Espinosa showed off the medicinal mushroom table and Mark Lockaby and Dan Long put on the edibles table. They also led a foray to Salt Point to pick mushrooms for the show on Friday while Tom Sasaki led a foray locally with Paul Borchardt and Jean-Jacques Lambert. Terry Sullivan and J.R Blair identified the mushrooms that were brought in. Enrique Sanchez worked with Chris Boettcher of the museum's carpentry shop to help the public plug logs with shitake dowels. Norm Andresen manned the book sales table and provided his special brand of mushroom expertise. George Collier sold T- shirts while Jane Collier handled membership affairs.

Helping Julie Dodd Tetzlaff with mushroom rubbings and mushroom clay pendants on chains for kids were Carol Opotow, Jenee Todd, and Amy Crieghton of the Randall Friends with Melinda and Alexandra Adams, Spencer Stamats, and Dan Springer. Dorothy Beebe, with her mushroom dyes table, came all the way down from Forestville to join us. Loren Garrone and friend Robbie Desanto sold Toby's mushroom growing kits. Robin MacLean sold mushroom related foods and items for the MSSF from her Mushroom Market booth. Helmut Will and Henry Schott of the San Francisco Microscope Society provided microscopes and expertise to look at mushrooms under higher power with the help of John Dillon of the Randall staff. Austin and Diane Lau, and Gabriella and Patricia Heldman helped Susan Way of the Randall staff to send the kids on the mushroom treasure hunt. Cindy Fu and Aaron Kinan helped Dennis Treanor in ceramics to make mushroom collages. Jack Laws from the California Academy of Sciences taught a mushroom drawing class and roved around the exhibits drawing on the fly. Nancy Ellis in the Randall Animal Room brought in Nancy Hom for a Story Hour reading in the theater. Janice Alexander worked the Sudden Oak Death table. Randall's Margaret Goodale showed how to use a mushroom key. Stan Zeavin put on two tasty cooking demos.

Dean Galloway, Randall's volunteer emeritus, answered phones and handled museum business behind the scenes. Karen Thompson, another regular Randall volunteer, worked the reception desk while Alex Kutik, Sandy Shaw, and Carolyn Dulay of the Museum Friends sold Friends memberships. Jessica Wheeler and Amy Dawson did parking.

Special thanks go to Erick Soll for spotting various people all day so they could take breaks and to Anne Marie Donnelly, Jeff Northam, for all their miscellaneous duties and for helping Louise and Bill Freedman, Quinn McFrederick and others with cleanup after the event.

Foray Revisited - Salt Point State Park

By Tom Sasaki, sasakitom@aol.com

I returned from the foray led by Mark Lockaby at the Salt Point State Park held on the weekend of February 8-9, in time to make the Mycena News deadline. While driving up Saturday morning, the weather for February and the scenery along the coast was so beautiful, it didn't seem to matter whether I found any mushrooms. But my interest perked up as I arrived at the designated time and meeting place and seeing others arrive with basket in hand.

By the time Mark started us off there were about 20-25 of us. Some had come quite a distance. Rose Flaherty, our Co-editor, drove 5 1/2 hours from Redding, Darren Murphy and friend came from Reno. The group even included a couple visiting from an East Coast mycological society who were delighted to be finding mushrooms at this time of the year.

Mark took us to two different locations in the park, one place in the morning and another in the afternoon. We were finding mushrooms here and there and of course some were finding more than others, but nothing prolific that I could see. But at the end of the day, some mushrooms I had observed were: *Amanita francheti, Cantharelles infundibuliformis, Craterelles cornucopioides*, several *Cortinarius* species, *Dentinum umbilicatum, Gomphus clavatus, Gomphus floccosus, Hygrocybe punicea, Lactarius fragilis, Russula albonigra, Russula brevipes, Russula rosacea, Sparasis crispa* and many others that were not identified.

Saturday night we enjoyed a potluck dinner with some dishes prepared from the day's find as most people were camped out. A few, wanting to enjoy the more civil qualities of life, had gone to stay at the old Gualala Hotel. David and Jeanne Campbell prepared one of the more exotic dishes, duck with sauteed mushrooms which included *Tricholoma flavovirens*, *Craterellus cornucopioides* and others. Also enjoyed were a pasta dish with fungi, mushroom flavored spreads and dips, sausages, a salad with no mushrooms but everything else in the kitchen, and others which I cannot seem to retrieve from my storage cells. Of course, no dinner is complete without wine and there was plenty of that.

Ken Litchfield, besides collecting garbage bags of mushrooms to take back to the Museum's mushroom garden, displayed his pyrotechnic talent that night by keeping the camp bonfire properly lit up. Even though Ken's talent may have been called into question, the fire was enjoyed by all as the night was a little nippy.

San Francisco Flower and Garden Show

MSSF Mushroom Garden Display and Educational Booth

By Ken Litchfield, klitchfield@randallmuseum.org

It's March and time for the San Francisco Flower and Garden Show at the Cow Palace March 19 through March 23. About 60,000 people interested in plants, gardening, and landscaping attend this event that fills the whole palace and all the exhibition halls and some accessory tents. At the show the MSSF has an educational booth and a Mushroom Garden display, this year located around the corner from each other.

The educational booth is set up on Tuesday morning, March 18, and taken down on Sunday evening, March 23. From Wednesday to Sunday the booth needs to be monitored by MSSF members who talk to the public about mushrooms and the society and its events, sell memberships, give tours of the mushroom display, etc. Generally, you teach the horticultural public that fungus doesn't mean fungicide and that the mushrooms in their garden aren't the same as the mildew on their Monarda. There are a few additional duties like misting the mushroom garden exhibit, and generally it is a fun and educational experience for you and the public. The days are divided into four-hour volunteer shifts for morning and afternoon on Wednesday, Thursday, and Sunday, with an additional evening shift on Friday and Saturday. For volunteering for a shift to monitor the booth you get a volunteer pass into the show for free (a $15-20 value), and you can spend the rest of the time before or after your shift seeing the show.

The "Mushrooms in Your Garden Exhibit" is an eight by sixteen foot vignette where we place mushroom logs and kits and gathered mushrooms among appropriate plants to show the public how to incorporate fungi into their own garden, and generally just show off mushrooms. It is set up on Monday and Tuesday and taken down on Sunday evening and Monday morning. If you would like to help with the setup, take down, or foraying for the vignette or you would like to setup, take down, or monitor the booth for one or more shifts, contact me with your interest and I'll get you the logistical info. We expect to need some people with transport vehicles, also.

For the most current Calendar information, call the MSSF hotline at 415-759-0495 or check the MSSF web site at:

www.mssf.org

Note that our web site (http://www.mssf.org/) has some new additions to it that you may not be aware of. It now lists the minutes of the council meetings, the MSSF library catalog, and the Oakland Fungus Fair species list. The photos are always fun to browse through, especially when you're feeling fungally deprived.

There will be a spring soon, and that means morels!

A Woodland Aventure and a Mycological Fruitcake

By Dan Long, danlong@speakeasy.net

My day started at 4:30 am in order to pick-up Mark Lockaby at 6. We're off to Salt Point for three reasons - to find edibles, to scout out the area for the February foray Mark is instigating and to collect specimens for Mushroom Day at the Randall Museum. We come up here fairly regularly and the drive isn't all that bad. We always stop at the 76 Station in Guerneville for a pit stop. This is the cleanest gas station in California and has to be witnessed. When we arrive at 7:30 there is always steaming soapy water with 2 kinds of cloth towels to wash your windshield. If you wipe your feet on the mat just inside the door for half a minute you will be on this guy's good side.

We arrive at the Stump Beach parking lot and I start scouting the perimeter for shaggy manes where they repetitively show. I have to humor Mark because he is adamant that other people are going to come, even though rain is in the forecast. 20 minutes later we head up the trail alone. We find a only handful of *Craterellus cornucopioides* and a few *Cantharellus tubaeformis*, which isn't too shocking, as we know we are early yet. We do manage, however, to fill our baskets with numerous other mushrooms. I kept thinking of that Millet painting "The Gleaners" but we weren't wearing long dresses. Just rain gear. We'd had enough and started back to the van when we found huge flushes of *Gomphus clavatus*. Mark said that they were edible and they would be great filler for the mushroom display at the Randall, so we fill our backpacks in 5 minutes.

On our way back down the hill we ran into a fellow from Sebastopol and his dog Oreo. I don't remember the man's name but I do remember Oreo. The guy was boasting that Oreo was a Matsie sniffer. This is how it worked. You call Oreo five or six times to get his attention and say "Oreo, find the Matsies, Oreo, find the Matsies" Then Oreo would come over to get his ears scratched. There were no Matsies in this guy's basket needless to say, and we didn't look alarmed when he held up a candy cap and asked, " Is this one of those Muscaria things?" We told him where he could find some nice Pig Ears further up the trail.

When the Mushroom day at the museum was over and I arrived home I got an e-mail from Mark. He was either informing or warning me that there was a bag with 10 lbs. of Pig Ears in the back of the van. He told me that David Bartolotta had a great recipe for Pig Ears in the MSSF archives, I thought "Great," I've eaten David's cooking before and thought I was on easy street. Not!!! The "Recipe" was a practical joke that ended up with the Pig Ears in the trashcan. I really didn't want to throw these things away, so I gave a pound or so to my neighbor at work that is always bugging me for Porcini and Morels. I told him that Pig Ears were in the ID books right after Chanterelles and he wanted all I would give him. Great, life is good! He owed me 75 bucks and he showed up the next day with a gallon of Pig Ear soup and my 75 bucks. He said "I never had to pay anybody to eat my cooking before". I kept my mouth shut at the obvious joke and thought about how people give away fruitcakes at Christmas time and never eat them, just keep giving them to other people. David and Mark - I ate the soup and it wasn't that bad. It wasn't great, but it wasn't bad!

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MSSF Calendar, March, 2003

2nd and 4th Thursday of every month, CALS Workshop: Ongoing Lichen Identification Workshops Darwin Hall, Room 201, Sonoma State University, 5 pm. to 8:30pm. contact Judy Robertson at jksrr@aol.com or 707-584-8099.

Saturday, March 1, Salt Point Foray: Meet at the Woodside campground parking lot at 10:00 a.m. We will go out looking for Black Trumpets, Hedgehogs, and Winter Chanterelles. This will be rain or shine so bring rain gear if rain is likely. Some of us may spend Saturday night at the Gerstle Cove campground and fix up our finds for a group dinner. For information call Mark Lockaby at 510-412-9964, cell 510-847-0817, or e-mail pozer900ss@aol.com.

Saturday, March 1, CALS Field Trip: Fairfield Osborne Preserve, 6543 Lichau Road, Penngrove, Sonoma County 10 am. to 3 p.m., contact Judy Robertson at jksrr@aol.com or 707-584-8099.

Monday, March 3, Culinary Group's Monthly Dinner: 7:00 p.m. Come and join us for the monthly culinary group meeting and dinner at the Hall of Flowers, Golden Gate Park in San Francisco. We will be having a Louisiana Cajun Celebration. For reservations or information, please contact David Campbell at (415) 457-7662 or at yogidog@attbi.com.

Tuesday, March 18, MSSF General Meeting: Randall Museum, doors open at 7:00 p.m., lecture starts at 8:00. Steve Trudell will speak about the "Mycorrhizal Fungi: Foundation of Our Forests".

Wednesday, March 19 - Sunday March 23, S. F. Garden Show: The MSSF will have their traditional booth and display at the Cow Palace in S.F. as part of this annual event. Come and volunteer! See article inside newsletter.

Monday, April 7, Culinary Group's Monthly Dinner: 7:00 p.m. Come and join us for the monthly culinary group meeting and dinner at the Hall of Flowers, Golden Gate Park in San Francisco. We will be having a Leg of Lamb Roast. For reservations or information, please contact Alvaro Carvajal at (415) 695-0466 or at alvaro.carvajal@att.net.

Saturday and Sunday, April 19-20, Exploratory Morel Foray: Location to be announced later as conditions develop. Since no large burn area is centrally located in Northern California, join the leaders for an exploratory romp through forests of their choice. See next newsletter. Leaders are Norm Andresen (510) 278-8998, n.andresen@attbi.com, Jeanne and David Campbell (415) 457-7662, yogidog@attbi.com .

Friday - Sunday, May 2-4, Annual San Jose Family Camp Foray: Come for a fun and carefree weekend where lodging and meals are provided. Stay in tent cabins with electric lights and where separated bathrooms have hot water and showers. Enjoy hunting morels in its natural environment. Spring boletes too have been found in the past. Cost not yet determined but expected to be around $95. Leaders: Mark Lockaby and Tina and Thomas Keller. For reservation and information, contact Tom Sasaki, Foray Coordinator (415) 776-0791, sasakitom@aol.com.

Monday, May 5, Culinary Group's Monthly Dinner: 7:00 p.m.

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