

The Mycological Society of San Francisco October 2010, vol. 61:07

October 21st MSSF Meeting Speaker



Derek Woods *What is a Lichen?*

Derek will give a general introduction to lichens, including their morphologies, reproduction, roles in ecosystems, and human uses. He will also discuss the more abstract question, "what is a lichen?", and pathways this question opens to evolutionary theory and metaphor.

Derek Woods has studied biology and forest ecology at the University of British Columbia, and holds a BA and MA in English Literature from the same school. In 2004 he met Trevor Goward (British Columbia's preeminent, and more or less only, lichenologist) on Haida Gwaii, and hasn't looked at a lichen the same way since. Derek has assisted Trevor with a number of publications, including scientific articles, endangered species reports, and, most recently, a series of twelve essays for *The Bryologist* which can be considered under the heading "lichen theory."

In addition, Derek will be the second author of an upcoming field guide to the lichens of cordilleran North America and coauthor of the forthcoming book *The Ways of Enlichenment*, both with Trevor Goward. He has delivered lectures on lichens in forestry and conservation courses at UBC and to the Vancouver Mycological Society. Derek's research is currently focused on the intersections between literature, philosophy, and ecology.

MycoDigest: Farmer Ant and his Fungi

Else Vellinga

A mere 10,000 years ago, *Homo sapiens* started planting and tending crops. This was at that time a stellar innovation, and a huge change from the gatherers' way of life. It enabled the formation of permanent settlements, which ultimately developed into cities, and a division of labor was established. However, humans were preceded in these cultural developments by ants and termites.



Attine ants occur in the (sub)tropical regions of America, and as far north as New Jersey on the east coast of North America. They cultivate fungi in the *Leucoagaricus/Leucocoprinus* clade of the mushroom family Agaricaceae. Pictured above: *Atta colombica*; photo courtesy of Wikimedia commons.

One group of ants, the new world ants in the tribe Attinae (attine ants for short), started farming at least 50 million years ago (that is, long before humans were around). The ants cultivate fungi for food in their nests, groom, manure, and weed their patches, and ultimately harvest the fungi. They also bring material to the nest to serve as substrate for their fungi. The plant material as such is unpalatable for the ants, and they depend on the fungi to turn it into something they are able to digest. The so-called lower attine fungi live in very small colonies, and bring mainly humus and plant debris to the nests; they cultivate a variety of parasol mushroom species (in the genera Leucoagaricus and Leucocoprinus in the family Agaricaceae). Other ants, in the pilosum-group of the genus Apterostigma, cultivate coral fungi of the genus *Pterula*, using dead branches and twigs as a substrate. The higher attine ants comprise two genera of leaf-cutting ants (Atta and Acromyrmex), which cut pieces of leaves from living plants and bring them to their nests, thereby causing considerable damage to human crop plants. These nests are huge underground caverns that can

Continued on page 7

MycoDigest is dedicated to the scientific review of mycological information.

PRESIDENT'S POST

October is upon us. While the rains have not yet begun, we look forward to the start of our local season right around the corner. September was a busy month getting the activities of the society started for the season. Our culinary group got off to an auspicious start with their annual pot-luck opening event and we enjoyed learning about the heterotrophic relationship between *Sarcodes* and *Rhizopogon* species from Valerie Wong who spoke at the general meeting.

The meeting started with upgraded snacks from our very capable hospitality committee (foie gras with morels, anyone?). Before Valerie's talk we held a memorial and moment of silence for recently deceased and long-standing MSSF members Larry Stickney and Miriam Rice. Special thanks go out to those of you who spoke or contributed historical memories to the event and to all who attended.

Also in September, the new MSSF Web site (ww.mssf.org) was brought to its full potential of not only looking great but also serving as a club management tool for our members and volunteers. By now, most of you have probably logged on to the new site with the credentials that were e-mailed to you and discovered some of the new features including the ability to update your own contact information, renew your membership, upload photos, search the member roster, and sign up for events. I encourage any members that have taken photos of MSSF events over the years to please take a little time this month to upload some of your favorite ones to the site from the Members Only area. Please don't hesitate to contact me personally if you have any questions about the Web site functionality. You can expect that in the coming months we will add more features to the site such as sign up for additional forays, culinary group dinners, and volunteer opportunities.

As you will see announced in this newsletter, plans have been finalized for Mendocino including gourmet meals and featuring David Arora as our presenter on Saturday night. In case any of you missed David's presentation at the general meeting last spring, you don't want to miss this! Sign up on the Web site or using the form in this newsletter. Please avoid the use of the paper form and sign up online if you can, I know from personal experience that receiving paper forms and typing in the registration information is an arduous process.

Before I close, let me remind you that MSSF is still in need of two board-level volunteers, one to take over our library and a second to manage our merchandising activities that play a key role in our fundraising. I expect that both these roles will be made easier this year as we put our merchandise in the new online store and publish the library catalog on the Web site. Please contact me if you have interest in either of these positions, it's a great way to help the society and I would greatly appreciate your participation.

In closing, it was great to see those of you that were able to join in our activities in September. I look forward to seeing you this month at the general meeting and next month in Mendocino!

MENDOCINO WOODLANDS FORAY

November 12-14, 2010



Photo courtesy of Wikimedia commons.

Featuring David Arora, author of *Mushrooms Demystified* and *All That the Rain Promises and More...*

Deep in the Mendocino Woodlands, MSSF members, fellow mushroom enthusiasts, friends and family, gather once again for our annual north coast fungal rite of autumn. This weekend-long spectacular mycological event includes guided forays, a variety of classes, cooking demonstrations, workshops, presentations, activities, and special programs for children, and of course plenty of mushrooms.

All on-site meals and lodging (Friday night through Sunday lunch) are included in the basic \$180 per person member rate; \$90 for children 5-12 years (if accompanied by a paid adult). A reduced rate of \$110 per person (\$55 child) is available for those staying at off-site lodging. Non-MSSF members, please add \$25 per adult / \$15 for children. (You might as well become a member, see www. mssf.org/http://www.mssf.org/membership/join.html).

Event details and sign up are on the Web site linked from the calendar or on the members-only section under events. The link to register is http://mms.mssf.org/members/evreg_view.php Please register online if you can to save paperwork for the registrar. Online registrations may be paid with a credit card or a check can be mailed after you register. A registration form is included in this issue of the *Mycena News* for use if you cannot register online. The schedule of events will be posted to the Web site and sent to registered participants soon.

For registration questions, please e-mail mssf@prestia.com. This address can also be used if you need help with the online reservation process.

Important Notes: We are back to our usual location in Camp #1 this year with more room for campers and not-as-rustic-as-last-year cabins with fireplaces. If you would like wine or beer with your dinners on Friday or Saturday night it will be BYOB. Also please note that it is very important that every camper bring a flashlight for safely getting back and forth to the cabins after dark. A complete list of what to bring, and directions to the camp will be sent to registered attendees in October.

Additional information about the Mendocino Woodlands Camp can be found at:

www.MendocinoWoodlands.org

Thanks for your support. -Lou (president@mssf.org)

(Look under FAQS, and MAPS & DIRECTIONS)

Coming in January: Huge Used Book Sale!

The MSSF library storage capacity has been exceeded due to the numerous book donations in the last several years. Monique Carment, the current MSSF Librarian, and I are in the process of purging the library of excess copies of books, publications and magazines to make room for the donations of new and used books not previously available to members. Every new book reviewed in "What's Bookin?" over the last two years will now be in the library.

At the January MSSF general meeting, we will hold a huge used book sale to raise needed funds for the MSSF treasury. Make sure not to miss this special, one-time event! There will be numerous, vintage, out-of-print mycology books available for sale at reasonable prices. MSSF members have first choice from 7 to 7:30 pm and nonmembers from 7:30 to 8 pm.

Monique has done a great job as the Librarian over the last several years and is stepping down soon. A great opportunity has opened up for an active member to step forward and fill this invaluable position. Remember, our great organization depends on volunteers.

Another great new mushroom book will soon be available to MSSF members. Michael Kuo has written another colorful and interesting book, "100 Cool Mushrooms", to accompany his two other great books, "Morels" and "100 Edible Mushrooms". This book will be reviewed in Mycena News and for sale at the Fungus Fair in December and in the Library in January 2011. New books will also soon be for sale to members via the MSSF website.

IN MEMORIAM



Photo by Dorothy Beebee.

of the Mendocino Art Center and founder of the International Mushroom Dye Institute. A memorial service for Miriam will be held on Sunday, October 17, 2010, 3-5 pm, at the Mendocino Art Center, Mendocino, CA. For more information on her life and work, see: http://www.mushroomsforcolor.com

ANNOUNCEMENTS

October 21-24th - 25th (OR) Mushroom Gathering: The Incredible Mushroom

Breitenbush Hot Springs, near Portland, OR, hosts their annual mycological conference. For reservations and more info see: http://www.breitenbush.com/events/oct21-24.html

Nov. 26-28 - David Arora's Thanksgiving Weekend Mushroom Workshop & Foray

Join David Arora for his 21st annual Mendocino mushroom gathering. Mushroom hunts, cooking, lecture, discussion, ID, etc. To register, see davidarora.com for details.

ID workshops in October at SFSU

Thursday, October 28, 7 pm, Beginning Mushroom ID Workshop.

San Francisco State University, Hensill Hall 401. This workshop will introduce participants to the macroscopic features and descriptive terms used in the identification of mushrooms. Prerequisite for Intermediate ID Workshops. Instructor: J.R. Blair. Sign up by contacting J.R. at jrblair@mssf.org or calling him at 650-728-9405. Cost: Free to MSSF members, \$5.00 for non-members. Limited to 15 participants.

Thursday, November 28, 7 pm, Intermediate Mushroom ID Workshop.

San Francisco State University, Hensill Hall 401. This workshop will utilize popular field guides to identify fresh mushrooms (bring both if you have them). The Beginning ID Workshop is a prerequisite for this workshop. Instructor: J.R. Blair. Sign up by contacting J.R. at jrblair@mssf.org or calling him at 650-728-9405. Cost: Free to MSSF members, \$5.00 for non-members. Limited to 15 participants.



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Editing and Layout:

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Mycena News is the members' newsletter of the Mycological Society of San Francisco, published monthly from October to May.

Please e-mail photos, comments, corrections, and correspondence to mycenanews@mssf.org.

To subscribe, renew, or make address changes, please contact Alvaro Carvajal: alvaro.carvajal@ sbcglobal.net or (415) 695-0466.

Past issues of Mycena News can be read online at www.mssf.org.

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Miriam C. Rice 1918 – 2010

Noted Mendocino artist and author Miriam Rice died

at home on Aug. 30 of natural causes at age 92. A lifelong artist, feminist, and educator, her work was

heavily influenced by the Mexican art movement,

including her friends Diego Rivera and Frida Kahlo. While she travelled widely for her work and studies,

she spent the last half of her life in Mendocino, where she did pioneering research and became an authority

on mushroom dyes and pigments, using them in her

own work and authoring several renowned books on the subject, most recently Mushrooms for Dyes, Paper,

Pigments & Myco-Stix with illustrations by Dorothy Beebee. Miriam was a founding faculty member

Alaska Dreaming

Hugh Smith aka Phalluscybe

There were so many tasks to accomplish before the trip! I don't know when I fell asleep. And I don't remember if I dreamed.

This can't be! There are so many mushrooms! Am I dreaming? (No) Am I sure? (Nope) Where am I? (Alaska!) The land of the midnight sun? (Yes) What time is it? (Daytime) Still? Over 16 hours now. Where IS the sun then? Over there, behind those glacier-covered mountains. Who is this? (Yes?) Who? (That's right) Are you sure I'm not dreaming?

It's August, the peak of summer. It's 100 degrees at home. Here, it's like late Autumn on the California coast. There's a lot to do. One week would never be enough! Two weeks would be a good start, "start" being the key word.



Twelve of us were there at Bill White's Alaska Sports Lodge for the big foray. Bill's lodge is primarily for fishers and hunters, but not this week. Our awesome hosts, Bill and Jerri, have a place right on the Kenai (KEE nye) River. This is the fastest and largest river I've ever seen. The volume of water that flows by their lodge is astounding! And the many kinds of fish that live and migrate to this place are giants by any standard. The record King Salmon is now 103 pounds! Gosh, just think if that was edible! If you like to fish, this is the place. And then there's the other wildlife... Eagles, Seagles, Hawks, Otters, Black Bear, Brown Bear, Caribou, Porcupine, Moose, Mice and Bunnies. There are no Skunks, no Raccoons, no Ticks, no Reptiles.



And the forests... these woods are not like what we're familiar with. The bogs and swamplands control the height of the trees. The wetter the land, the shorter the trees. You can see exactly where the land is the wettest, and driest. A lot of the forest has a Dr. Seuss appearance...like another world. There are deciduous trees, too, and many types of berry bushes. There's Slime Molds, and fungus.

On your mark, get set, HUNT!

Mushrooms, mushrooms everywhere. DON'T STEP THERE! Everywhere! WATCH WHERE YOU'RE STEPPING! At the beginning of this trip, everyone is yelling, "STOP THE CAR!" Later in the trip everyone would be saying, "Quit looking and drive."

Mushrooms, mushrooms everywhere! I understand there are 12 types of *Leccinum* here. And Dimitar, I'll bet 1 out of 2 mushrooms are *Cortinarius*. Yes, one out of two. But I am deceiving you. Just because every other mushroom is a Cort and half of what's left over is a *Leccinum* doesn't are because you could in many place.

mean you couldn't step from one King Bolete to another, because you could in many places. From one *Boletus edulis* to another. Why pick'em or kick'em when you can just walk on' em? Think about it. Walking on Boletes.

Bill took us to a place he had recently discovered. It's what I would call a "secret laughing place". You just fall down on the ground and laugh. I've seen very few places like that. And here's one of them. This must be a dream. "WATCH OUT, DON'T STEP THERE, YOU MIGHT MISS STEPPING ON ONE!"

Recently some of us had been conjecturing on how Moose can be so large (7 feet at the shoulder!) that they must only lumber about, being too heavy for their own legs. So here I am, layin' on the ground... laughing, when something large and dark thunders the ground as it goes running by me. I jump to my feet and run after it (wouldn't you?), reaching for my camera like a gunslinger as I go. I still have no idea what ran by. It must've been a deer to move that fast. I don't see anything. And then, there she is. I'm 87 feet (about) away from her. She's looking at me and standing perfectly still. I position a tree between her and me and move in. Now I'm 53 feet (approximately) away. I stand out from behind the tree. We're on level ground and even from this distance I can sense that I have to look up at her. I take a picture. Then I move to the other side of the tree. She's standing between me...and her baby! OH. I get it! I take another photo and walk away.



There are many things here named King something. There's King Bolete, King Salmon, King Crab, King, Burger...All are robust by definition, and nutritional too. I think there may be two kinds of King Boletes here in this secret laughing place. Some of the Kings have their lower recticulations as deep valleys and ridges. They probably taste the same. But how would I know? I don't eat them. Like fish, they are not something you would want to put in your mouth, unless there are good chefs around, which there were. (We had many great chefs). They DO have good trading value though, and there is chicken about... So why am I here then? I guess what I meant to say is, why aren't YOU here?

Here's some verses I wrote for a song you may be familiar with. These lyrics are written to the song "North To Alaska" by Johnny Horton. I am currently considering quitting my day job. What do you think?

Way up North..... Way up North.....

North . . to Alaska, we're goin' north,

the rush is on.

North . . to Alaska, we're goin' north,

the hunt is on.

Ol' Hugh left the city, in the year of twenty ten, with Sandi, his partner and some other mushroom friends. They found the Kenai River, and they went where they were told.

They found Cort caperatus, Lec Si Num, and Boletes, big & bold.

Where the river is windin', Bill's Boletes we're findin', North . . to Alaska, we're goin' north, the hunt is on.

Well, Hugh turned to Phil with a Bolete in his hands. Said, "Phil, you're a lookin' at a hungry hungry man. I'd trade all these Porcini,

that are found in this here land, for some

good ol' deep-fried chic-ken, an' a chocolate dessert, man." Where the Kenai is windin', big Boletes they're findin', North . . to Alaska, we're goin' north,

the hunt is on.

I know, I know, it still needs a little work. But what do you think? Should I quit my day job? No, not to be a songwriter, to hunt mushrooms!



(All photos by the author)

Mushrooming is not all we did though. We went to Seward (SOO word) and did some mushroom hunting on the way there. The gift shop and information center in Seward has two mushroom books available, "Mushrooms of North America" by Schalkwijk-Barendsen and "All That The Rain Promises And More" by David Arora. We then went to the Exit Glacier and hunted mushrooms. We stopped at vista points and hunted. We went to where the Salmon were being counted as they run up Hidden Creek to spawn. Bears are known to frequent this place because it's an easy meal. We didn't see the bears but there were mushrooms. We stopped at some bathrooms and hunted. We stopped for lunch and hunted. We hiked to a reat full and cascade on the Buseian Biver where the fish were also working their you upstream, and hunted. We went clam great fall and cascade on the Russian River where the fish were also working their way upstream, and hunted. We went clamming on a low tide for Razor Clams (no mushrooms on the mud flats but they WERE in the parking lot). Yes, we did many things that were not mushroom related. One day Bill said he could take us to a place where we might find some mushrooms. I said, "Bill, can you take us to a place where there AREN'T any?"

I startled myself awake. Was it all just a dream?



If you're interested in photos, here's the Mushrooms and Slime Molds. http://groups.yahoo.com/group/mssf/photos/album/1834302049/pic/list And here's the people, places and things.

http://groups.yahoo.com/group/mssf/photos/album/915978333/pic/list



Mycological Society of San Francisco MSSF Mendocino Foray Registration Form November 12-14, 2010

Name:				
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Phone: ()	E-mail:			
MSSF Member registration:				
Adult (on site lodging) #		@\$1	80.00 ea.	
Adult (off-site lodging) #		@\$1	10.00 ea.	
Children (on site lodging) #	(Ages 5-12)	@\$9	0.00 ea.	
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MycoDigest continued

be as big as a mansion, and contain millions of ants in a strictly and highly organized society. They cultivate only one mushroom species, *Leucoagaricus gongylophorus*. The other two genera in the group of the higher attine ants, *Trachymyrmex* and *Sericomyrmex*, are also highly organized. Instead of cut leaves, they bring freshly shed flowers, insect frass and soft leaf fragments to the nests. Their fungal crop consists of a group of different Leucoagaricus species.

In short, there is a variety of substrates for the fungi to grow on in a range of ant settings. The question is, of course, how do the fungi handle this? Do they all have the same enzymes to break down the plant material, or does the species cultivated by the leaf-cutting ants have enzymes specifically tailored to the fresh leaves, and are these enzymes missing in the cultivars of the ants that bring dead plant material to the nest?

The main findings of enzyme assays conducted in the field, are that the leaf cutters' cultivars are good at breaking down amylose, the higher ants (leaf cutters and flowerringing ants) have a lot of endoprotease that breaks down



Leucoagaricus amanitoides is a free-living, noncultivated species, which is closely related to the species that are grown for food by the ants; it grows in the UC Davis arboretum.

Photo by Else Vellinga.

casein, and the fungi grown by the lower attine ants are much better at breaking down xylan while all are about equally good at breaking down cellulose (though there are differences among the cultivars). What we had expected was, of course, that the fungi of the leaf cutting ants would be good at breaking down the plant cell walls, and have cellulases in abundance. However, the ants themselves are very active in this task and this may explain why there is no need for the fungus to have its own enzymes that chemically break down the plant cell walls; the big worker ants cut the leaves and bring them to the nest, where an army of smaller and smaller ants chew the leaves into progressively smaller and smaller pieces,. The lower attine ants, on the other hand, do not have such organized labor forces, and for them the fungi themselves have to break down the (dead) plant material. The cultivated Pterula species differ considerably from the *Leucoagaricus* taxa, especially in the absence of a pectinolytic enzyme, and the low activity of the xylanases. Of course, only a small set of enzymes have been tested, and it may be possible

that the fungi have different enzymes that do more or less the same job as those tested.

This beautiful system of agriculture is open to influences from outside – some bad, some good to stem the bad. Every plant is host to many fungi – harmful pathogens, accidental commensals, and a host of fungi that just hang out inside the plant tissues, awaiting their turn. These endophytes do not do any harm to the plant, and may in fact play a role in defense mechanisms against pathogens, stress, and environmental damage. Yet inside the ants' nest they could be competitors to the fungi already there, or a downright threat to their existence.

In some tightly controlled experiments, in which plants were either kept free of endophytes or inoculated with a fixed amount of fungi, Atta colombica ants were given a choice between these differently treated plants. It turned out that the ants spent more time cutting leaves from plants with endophytes than from endophyte-free plants. They also reduced the number of fungi during their manipulations of the leaves and the cultivar fungi themselves can fence off accidental newcomers. These ants can also discriminate between seedlings with a high load of endophytes (high both in numbers of taxa and in numbers of individuals) and plants with very few commensal fungi. The ants do more damage (by cutting more leaves) to plants with only a few endophytes, than to plants with a lot of fungi. This observation might be helpful in reducing the damage leaf cutting ants can do to human crops and cultivated plants.

These results show once again how sophisticated this agricultural system of attine ants and their fungi is. Human farmers can still learn from the ants and the fungi!

Background reading:

De Fine Licht, H.H., M. Schi;tt, U.G. Mueller & J.J. Boomsma, 2010. Evolutionary transitions in enzyme activity of ant fungus gardens. *Evolution* **64**: 2055-2069.

Bittleston, L.S., F. Brockmann, W. Wcislo & S.A. Van Bael, 2010. Endophytic fungi reduce leaf-cutting ant damage to seedlings. *Biology Letters* [advance online] doi: 10.1098/rsbl.2010.0456

Van Bael, S.A., H. Fernandez-Mar'n, M.C. Valencia, E.I. Rojas, W.T. Wcislo & E.A. Herre, 2009. Two fungal symbioses collide: endophytic fungi are not welcome in leaf-cutting ant gardens. Proceedings of the Royal Society, *Biology* 276: 2419-2426.



Else Vellinga, Ph.D., is interested in mushroom taxonomy and has been studying parasol mushrooms from California and beyond for years. A frequent contributor to Mycena News, she is also fascinated by interactions between fungi and other organisms. In her free time she knits, and knits, and knits! See more of her work at: http://mollie.berkeley.edu/~bruns/people/ev.html.

Mycological Society of San Francisco c/o The Randall Museum 199 Museum Way San Francisco, CA 94114



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MSSF Calendar October 2010

Monday, October 4th, 7 pm - Culinary Group Dinner

San Francisco County Fair Building, Golden Gate Park, 9th and Lincoln, SF. The Culinary Group dinners are open to MSSF members in good standing and their guests. This month we will have a Southwest cuisine. Reservations for the dinner are required and must be made no later than Friday, Oct. 1st. To make a reservation or for more information contact Pat George at (510) 203-9130 or plgeorge33@yahoo. com. We accept up to 60 reservations for our dinners.

The cost for our dinners is \$16, \$15 for students and seniors. This covers the cost of the venue, ingredients and the security guard required by the venue. Remember to bring your own tableware as the venue does not provide dishes, etc., your favorite dinner beverage and an appetizer to share. We will resume our fabulous raffle. Bring an interesting item preferably relating to mushrooms and you will receive 5 free tickets for the raffle.

Tuesday, October 19th, 7 pm - MSSF General Meeting

Randall Museum, 199 Museum Way, San Francisco.7 pm, mushroom identification and refreshments.8 pm, Derek Woods of the Univ. of British Columbia addresses the question *What is a Lichen?*

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CALL FOR VOLUNTEERS

We have two remaining volunteer positions to fill:

Book Sales Chairperson - Be the first to read and review all the books the MSSF sells. To assist in the transition the former chair (Curt Haney, now our VP) will help the new chairperson during the transition. If you are interested please talk to Curt at the next meeting or call (415) 640-6233.

Librarian - Monique Carment will also be moving on soon. Please contact her at moniquecarment@yahoo.com if you are interested in taking over this important position, or talk to her during Library hours at the October General Meeting (7-8 pm in the basement of The Randal Museum).

Don't be shy, we'll help get you started. Remember, our great organization would not survive without volunteers!

New Mycena News Editor

Max Garrone has graciously agreed to take on this important job. He brings a wealth of experience as a writer and editor for the past 14 years for Salon.com and SFGate.com, among others. Please join us in welcoming him to the position.

The submission deadline for the November, 2010 issue of *Mycena News* is Sunday, October 17th. Please send your articles, calendar items, and other information to: mycenanews@mssf.org