*LONG ISLAND MYCOLOGICAL CLUB*

***http://limyco.org***

# L.I. SPOREPRINT

**VOLUME 11, NUMBER 3, AUTUMN, 2003**

## MUSHROOM DAY OCT. 19, 2003

## PLANTING FIELDS ARBORETUM

All LIMC members are invited to join us at our annual public mushroom exhibit– the highlight of the season. The public display will run from 1 to 4 PM, but **if you wish to help, arrive around 12 noon to help in setting up the exhibit.** Mention your membership to the gate attendant to avoid the entrance fee. Bring any interesting specimens that you find for identification and exhibition.

Although no elections are scheduled for this year, the annual membership meeting will be held after the display, when members can bring up any new business they wish the board to address.

We particularly encourage new members, and others who have not joined us at our Saturday forays, to join us and introduce themselves.

## WHY I NEVER MET A FUNGUS I DIDN'T LIKE

by Ed Mena (e.mena@uconn.edu)

*[Reprinted from Spores Illustrated, Summer, '03, by permission of the author.]*

Whoever said, "Nature is the world's best chemist" has been proven correct time and time again. But why are there such a variety of chemicals in nature? And why have I decided to look at fungal fruiting bodies as a source of new and useful compounds?

All living organisms produce an extremely varied list of chemicals, which fall into two very large (and arbitrary) groups. The first types of chemicals are those that are needed by the organisms for their basic cellular functions such as metabolism, energy production, breakdown of damaged molecules and synthesis of new ones. Cells also need the chemical machinery to make proteins, DNA, RNA and many other complex molecules that are absolutely essential for all life: "primary" metabolites. Producing each of these large molecules is a complicated process that can include 50 or 60 different chemicals and a similar number of enzymes (large proteins).

If there are "primary" metabolites, then there also must be "secondary" metabolites. We hear about this class of compounds usually in association with plants, fungi, bacteria and other "simpler" forms of life, such as invertebrates. The term "secondary" was originally given to this class of compounds largely because no "primary" role was known for most of them. They were chemicals that didn't seem to have any essential role for the organism. If the organism or cell did not produce these compounds, there was no reason to believe it would not continue happily onward. Most researches now believe that they play a critical role in the organism's life, it's

*Leotia lubrica,* one of the ascomycetes the author is researching. You can help. See p.6.

***(Continued on page 5)***

## PRESIDENT'S MESSAGE

Where are all the mushrooms? Autumn is almost here and yet there are few boletes and other edibles to be found. There are some Sulphur shelves but not in the abundance that we have come to expect. On the other hand, on the last few forays, many new species for our Long Island list have turned up. It just goes to show that fungi are not predictable. Maybe the next few weeks will turn out better. (BTW, have you noticed, as Jean Held points out, that the blueberry plants in a lot of areas have dropped their leaves? Very strange.)

Don't forget Mushroom Day. Bring specimens in good condition to display and don't worry about naming them. It is a fun day and I'm sure you will enjoy it. There will be a general meeting afterwards so also bring any ideas or questions.

It is not too soon to think about the upcoming luncheon. If you have a mushroom related item you no longer want or use, please consider donating it for our raffle. Thank you to those who have already given.

To make sure that you continue to receive email from the club, kindly check that we have your correct email address. A recent foray cancellation notice showed that five people no longer used the address shown on the membership list.

Happy hunting to all and hope to see more of you at future forays.

## EDITOR'S NOTE

Autumn, the zenith of the mushroomer's year, has officially arrived. While this year has been rainy throughout, we nevertheless anticipate its arrival just as keenly, knowing that nothing can hurry those species whose ordained time does not come before the cool temperatures and shortened daylight hours of Fall. Deciduous tree will be shipping a final transport of nutrients to their roots before shutting down for the winter, and these changes will usher in the fruiting of many desirable species such as *Grifola frondosa,* the Hen-of-the-Woods, a delicacy we take for granted but which is absent in oak deprived states such as Kansas, Colorado, Nebraska, etc. *Grifola* is safe, plentiful, easy to identify, and delicious; it should be elevated to iconic status. A recipe incorporating its many delectable qualities is included in this issue.

This issue is also privileged to run an article by Ed Mena, a biochemical researcher, who is asking for help in collecting certain fungal species. His article explains why fungi have medically active compounds, and will reward close reading. The sidebar will explain which species are being sought and how you can help in this quest.

**Material for the Winter, 2003 edition**
**should reach the editor by Dec. 10th**
(Submissions should preferably be typed or submitted in Rich Text Format on PC floppy disk or by e-mail)



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## MID-SUMMER RUSSIAN MUSHROOMS

*by George Davis*

This past June, Karen and I visited our friend, the Russian artist Alexander "Sasha" Viazmenski, in St. Petersburg, Russia. This was at the time of both the celebration of the 300th Anniversary of St. Petersburg, and the annual White Nights celebration. At mid-summer it remains light nearly throughout the night and the newly refurbished palaces and churches made a brilliant display of vivid colors with their golden domes and ornamentation. We spent two weeks sight seeing with Sasha as guide in this exciting environment. In this account I can touch lightly only on some of the events in our trip which involved mushrooms.

On the banks of the Neva River at the end of June we found the climate cool and were comfortable wearing a sweater or windbreaker. We had some precipitation every day, usually only a brief shower or mist, with blue skies and sun for the rest of the very long days. The tulips were fading, but lilacs, bleeding hearts, wild lilies of the valley, and roses were beautiful in full bloom. Since Sasha paints mushrooms, the time for our visit was chosen to be before the main mushroom season so that he could entertain us without losing opportunities to create his beautiful pictures.

Some mushrooms we found indoors; the huge bookstore, Dom Knigi, on Nevsky Prospect had a large selection of books on mushroom identification, in Russian (of course), at very reasonable prices. We enjoyed a full day's exploration of the Hermitage, St. Petersburg's art museum that rivals the Louvre, where we discovered a beautiful mechanical clock topped by a golden peacock, whose dial is a mushroom! A painting of a seventeenth or eighteenth century marketplace showed a wheelbarrow full of boletes in the foreground.

One day we rode the hydroplane along the shore of the Gulf of Finland to Peter the Great's summer palace, Peterhof, about 30 miles from St. Petersburg. This palace rivals Versailles in scope and grandeur with golden domes and miles of cascading fountains. Here next to the crowded path we found a tree with a beautiful untouched *Laetiporus sulphureus* growing on it, which Sasha informed us Russians don't eat.

The next day we went by bus to Novgorod, the ancient capital of Russia. We returned by a local passenger train that made frequent stops at many villages along the way. At most of the stops, vendors would board the train selling food, drinks, farmer's cheese, clothes, hats, batteries and wild mushrooms. The train made other stops at what were literally wide spots in the road--where a road through a birch forest crossed the railroad. Here people would board carrying large buckets of mushrooms, mainly species of Leccinum, one of the Russian favorites for salting. Evidently the rainy summer had caused them to fruit earlier than usual.

Sasha was eager to learn if the mushrooms were also fruiting north of St. Petersburg where he has a dacha. Sasha's dacha was a modest but comfortable contemporary board and batten construction cabin with a small fenced yard containing many lilacs, birch trees, and bleeding hearts. Later in the season, Sasha spends most of his time here creating his mushroom paintings. The woods were beautiful, mainly birch and poplar with wild lilies of the valley, heather and a small shrub resembling huckleberry blooming on the forest floor. The mushrooms were indeed beginning to fruit in this area also. Sasha picked a spectacular *Agaricus* that was nearly one foot in diameter. We also found species of *Leccinum* and *Suillus*, as well as *Boletus edulis* and many other small mushrooms that we did not identify. In St. Petersburg the next day I watched him create a beautiful painting of the Agaricus which he had picked.

Leccinum water color by Sasha Viazmenski.

On our walks through parks, gardens, cemeteries, and along the river we saw a number of species including *Ganodermas*, puffballs, *Agaricus, Coprinus*, and *more Laetiporus sulphureus.* The last mushroom Karen found was a tiny blown-glass one at an artists' cooperative shop in the Summer Garden which we brought back as a souvenir.

After two weeks, we had to say goodbye to our friend Sasha and return to Long Island. Our trip was fantastic and filled with unforgettable memories of a country and people who were welcoming and friendly in spite of our many differences, a people who share many desires and interests with us including an appreciation of the beauty of mushrooms.

**Skidegate Scalloped Potatoes with Chan-**

## NAMA QUEBEC FORAY 2003

*by Joel Horman*

From LI, the drive was over 600 miles, but still the closest foreign locale on the NA continent. Five members of the LIMC and about an equal number from NYMS made the trip, and were not disappointed. Other participants came from as far as Washington, Oregon, New Mexico, and California. The weather was very fine, barring one showery evening, and the surrounding forests inviting. A good percentage of the area has been converted to agriculture, however, and only forest remnants remain outside of the national parks. The city of Quebec itself, particularly the old city, situated upon the ramparts overlooking the Champlaign River, is a wonderful vista, while the old quarter, with its charming colonial structures and churches, its vibrant street life and outdoor cafes, is very seductive.

Display tables at NAMA 2003, at Campus Notre-Dame-de-Foy.

The foray was hosted by the *le Cercle des mycologues amateurs de Quebec* and le *Cercle des mycologues de Montreal,* and many of the participants were French speaking, so that addresses were given first in French, and then translated into English. As you can imagine, this made for extensive sessions, but a good humored spirit prevailed nonetheless. The dual language requirement also meant that most lectures had to be delivered twice, which curtailed the amount of time available for such presentations by approximately fifty per cent. These lectures included such topics as the ecology of Quebec region forest, medicinal mushrooms (Paul Stamets), harvestible Canadian mycorrhizal mushrooms (Scott Redhead), "Where have all the Hydnums gone?" (Tom Volk), and Mushrooming in Museums (Moselio Schaecter).

Tom Volk's lecture dealt with the splitting of what was originally one genus- Hydnum- into many genera such as Hydnellum, Bankera, and Sarcodon. His graduate student's MA thesis investigated the genus *Hydnellum* via morphological, DNA and chemical (pigment analysis). One finding was that, via DNA, *Cantherellus* is related to *Hydnellum*. The gist of this study can be seen by accessing Tom Volk's website (http://botit.botany.wisc.edu/toms_fungi/) and clicking on the August, 2003 fungus of the month, *Hydnellum caeruleum*. Moselio Schecter has erected a website dealing with the topic of his lecture, mushrooms hidden in works of art, and this can be reached at: http://members.cox.net/mushroomsinart/. Links are provided to works of art in various museums, which can be clicked on to enlarge and search for the sometimes obscure mushroom figures.

The most dramatic lecture was given not by a mycologist, but by Yves Chretien, an archaeologist specializing in mastering prehistorical techniques. His nighttime outdoor demonstration of prehistorical fire-starting with the use of dried polypore (*Phellinus rimosus)* powder engaged a rapt audience.

Forays took place in various types of Northern forests, which range from mixed deciduous to almost entirely coniferous. We mostly seemed to find ourselves in spruce/sugar maple/white birch domain, carpeted by deep, rich sphagnum moss. Hygrophorus species were common, their bright colors unusually vivid against the green moss background. Occasional flocks of migrating warblers flitted by, enlivening the scene even further. Boletes were few, as were edible species in general, so our dehydrator remained packed. We did hear tales of immense fruitings of such desirable species as *Agaricus arvensis* a short while prior to our arrival, but whether these are "fish tales" or not is indeterminable- perhaps better so.

The days were very full, and for those with sufficient energy, extended into the early morning hours; our French Canadian hosts are a party loving lot, and their bonhomie is infectious. All too soon, the last evening and its celebratory Banquet arrived. Gary Lincoff gave the closing address and award presentation in his best stand-up manner, to the audience's unrestrained laughter. Token awards were given to the collectors of the most interesting, beautiful and rare mushrooms. *Hypholoma radicosum* won the rarest mushroom award, a splendid specimen of *Cortinarius violaceous* the most beautiful, and *Omphalina erictorium* the rarest.

NAMA forays are invariably enjoyable from all aspects- environmentally, mycologically, recreationally and socially. Will we see **you** at NAMA 2004?

***Never met a Fungus I didn't Like (Continued from page 1)***

just that frequently the function of these compounds may be difficult to ferret out among other activities that are being studied. For example, moth sexual pheromones are considered secondary metabolites. The individual moth does quite well without them. However, they are vitally important to the survival of the species. Another classic example of a secondary metabolite is the antibiotics produced by some fungi and bacteria. When growing as a sterile monoculture in someone's laboratory, the organism has little use for them. However, in its natural habitat, their production is not a luxury.

The pheromones and antibiotics are examples of what I believe are the two major functions of all secondary metabolites made by simpler life forms: defense and communication. If the production of these compounds was not carefully regulated, there would be an enormous liability - those individuals that wasted such resources on their unnecessary synthesis would be rapidly squeezed out. So, instead, their production is turned off and on by environmental cues. It could be a communication from another mating type of the same species, contact with a particular food source, or attack by a predator. If we restrict our study to fungus, we are discussing organisms that can't see, smell, hear, or feel. So how do they detect their surroundings? How do they become aware of essential events such as moisture in their surroundings or the presence of friendly and not-so-friendly companions? These events are likely mediated by chemical communications.

**HOW YOU CAN HELP**

Ed Mena is conducting pharmacological research into the anti-cancer and other medical properties of various ascomycetes, some of which have produced promising in-vitro results. LIMC has sent him almost a pound of *Leotia lubrica,* most of which was collected at the Muttontown North foray. If you wish to help, and find any *Leotia* species, or earth tongues, cups or elfin saddles, please refrigerate them in a plastic bag. Telephone or email Joel (see p.2 for contact info) and we will make arrangements to pick up and ship them.

**Defensive Chemicals**

Let's first consider fungal fruiting bodies and their defense. Fungi live in very intense environments, surrounded by other fungal types, bacteria, and all manner of predatory soil inhabiting invertebrates. Chemical warfare among organisms with clearly different agendas is the rule, not the exception. I'm sure that everyone is familiar with the story of the discovery of penicillin. With the benefit of hindsight, it seems obvious that soil microbes would be synthesizing antibacterial compounds. They are literally surrounded by billions and billions of bacteria. By now, thousands of antibacterials have been identified from soil microbes. So do these bacteria that are being slaughtered by antibiotic producing fungi respond? You bet they do. Fungi may be clever chemists, but so are bacteria. When this warfare was getting started a few hundred millions years or more ago, some bacterial enzyme that split proteins modified itself to split an important chemical bond in penicillin, making it harmless to bacteria. The code for the enzyme, penicillinase (also referred to as beta-lactamase) ended up on a piece of DNA called a plasmid. A plasmid can be spread through bacteria populations rapidly and even be transmitted to different species of bacteria. The result was that the party was over for penicillin-producing fungi. They were back on the defensive. Over the course of an eon or two and after probably many chemicals were synthesized and found wanting, a fungus hit on the compound, clavulanic acid. This compound was an inhibitor of the bacterial enzyme penicillinase. With the clavulanic acid in its chemical arsenal, their penicillin was now once again a potent weapon. There are many other examples of chemical warfare and coevolution combatants.

The full appreciation of this process is also important for the medical treatment of bacterial infections. Initially, few human pathogenic bacteria carried the penicillinase plasmid. These bacteria were concentrating on more important issues, such as how to combat our immune system, and not penicillin resistance. However, the widespread use of penicillin created strong selection pressure for a pathogen that managed to pick up the penicillinase plasmid from a soil bacterium. This eventually occurred, and the plasmid rapidly spread through pathogenic bacteria, severely impairing the effectiveness of penicillin. Between 1941 and 2002, penicillin resistance in *Staphylococcus aureus* rose from less than 1% to greater than 99%. It took fungus millions of years to come up with clavulanic acid. Luckily, the pharmaceutical industry found a fungus that produced it a lot sooner. Beecham introduced it as Augmentin (clavulanic acid plus amoxicillin, semisynthic penicillin) in 1981. I think we would be discounting the creativity of bacteria if we did not assume that for

***(Continued on page 6)***

***Never met a Fungus I didn't Like* (Continued from page 5)**

every naturally occurring antibacterial, there is a bacterium somewhere that has figured out a way to beat it. Bacterial resistance to antibiotics has been around for a long time; it didn't evolve because of our use of antibiotics. Pathogenic bacteria are simply learning new tricks from soil bacteria.

Some compounds from fungus that are used as drugs don't seem to have a ready explanation. For example, the first cholesterol-simplering agent, mevalonin (lovastatin, Merck) came from a fungus. This might initially seem odd, because there seems to be little if any reason for a fungus to make this compound (we all know that mushrooms are cholesterol free). The secret is that the fungus needs a chemical named ergosterol which, as it turns out, is very closely related to cholesterol (which means that mevalonin is also an ergosterol-simplering agent). Nearly every cell in a human body needs cholesterol for proper membrane functioning and has the ability to manufacture it. Humans are also fortunate (and sometimes unfortunate) enough to be able to obtain significant amounts of it from dietary sources. All fungi cells need ergosterol and can also make it. If a fungus can't make ergosterol, it dies. It does not possess the ability to go out and consume the fungal equivalent of a Big Mac. So if one fungus releases mevalonin on its neighboring fungi and blocks their ergosterol synthesis, it ends up with a bigger piece of the pie; the neighbor dies, so the fungus has fewer competitors for the food supply.

In the next issue, I'll continue with the answers to the original questions I asked in the first paragraph. I'll start with chemical communication in "simpler" forms of life and why these compounds have specific biological effects on mammalian systems and see where it takes me. I hope you enjoy the ride.

## FORAY HIGHLIGHTS

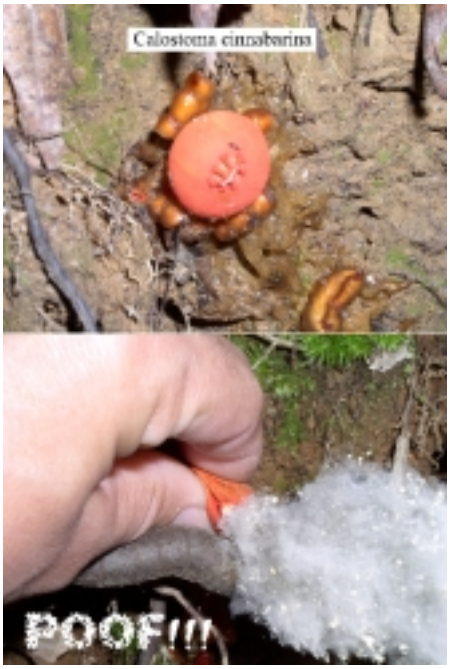
**Bethpage State Park, July 26th**:
Fifteen species, *including Boletus edulis, Canterellus cibarius, Cantherellus cinnabarinus,* and *Laetiporus cincinnatus.*

**Muttontown North, August 9th:**
Thirty-nine species, including *Craterellus fallax, Lactarius hy grophoroides, Laccaria lacata, Russula variata,* and *Strobilomyces floccopus.*

**West Hills**, **Sept 6th**: (actually Gwynne Park, south of West Hills)
Twenty species, including six new species for the L.I. list*: Ama nita daucipes, Calostoma cinnabarina, Podostroma alutaceum, Paneolus retirugis, Thelephora palmatus,* and *Stecchirinum ochraceum.*

**Caleb Smith State Park (BioBlitz), Sept. 13th:**
Thirty-eight species, including 2 new to the LI list: *Hohenbuehe lia atrocaerulea and Gymnopilus sapineus.*

*(Photos and captions by Sue Gaeta)*




**WELCOME NEW MEMBERS**

**The Long Island Mycological Club is pleased to welcome the following new members:**

**Peter Engel** **Jack Finkenberg** **Jerry Hynes**

**Doug Rokaw** **David Tysz**


**A VERSATILE HOOF:** If you've been following this column, you know that the genus Phellinus is handy in many ways: it has been used by primitive man as fire-starter (tinder), and has been added to tobacco by Alaskan natives for recreational drug use. Now, *Phellinus rimosus,* has been demonstrated to show anti-tumor activity, in-vitro cytotoxicity against select cell lines, as well as preventing certain induced tumor activity in mice, with an effect comparable to the clinically used standard reference drug, Cisplatin. (*"Cytotoxic and antitumor activities of a polypore macrofungus.. Phellinus rimosus T.A. Ajith and coauthors, J Ethnopharmacol, 2003;84(2-3):157-162).*

■ **CONOCYBE LACTEA CONTAINS TOXINS.** A recent study found small amounts of phallotoxins present in this species, which is described as edible by many guidebooks. Prior to this finding, only Amanitas were known to contain phallotoxin. Although this toxin is rendered harmless by cooking, the authors conclude that it may be advisable to avoid consuming this species, although it is so insubstantial that most gatherers have probably not bothered to try it, and I know of no one who has actually consumed it. When injected, it retains its toxicity. Its congener, C. filiaris, contains amatoxins, and is deadly. (*Taxonomy and toxicity of Conocybe lactea and related species, Heather E. Hallen, Roy Watling, Gerard C. Adams, Mycological Research Volume 107, Number 8 ,August 2003.)*

■ **GROWING LACTARIUS DELICIOUSUS:** It is entirely appropriate, and perhaps inevitable, that the first experimental efforts to raise *Lactarius deliciousus* have been reported from the province of Catalonia, Spain, where this is regarded almost as an iconic species. During the season, mountain roads there are clogged on weekends by avid mushroom hunters. Different methods to inoculate pine seedlings with edible Lactarius species under standard greenhouse conditions were evaluated; the most successful method was the direct application of inocula in the greenhouse. Commercial application seems far in the future, so this national pastime is in no immediate danger. (*Evaluation of mycelial inocula of edible Lactarius species for the production of Pinus pinaster and P. sylvestris mycorrhiza seedlings under greenhouse conditions, Javier Parladé , Joan Pera and Jordi Luque, Departament de Protecció Vegetal, IRTA, Cabrils (Barcelona), Spain)*

## terelles

( Patrick Hamilton, Mycochef, in *Mushroom: the Journal of Wild Mushrooming,* slightly altered for NE.)
Preheat oven to 350
Cook in salted boiling water: (you want the water boiling first to gelatinize the carbohydrates on the exterior of the slices)

- 4 medium peeled and thinly sliced potatoes

Cook them just enough to be almost cooked through--about 8 minutes. Be careful not to allow them to become close to mushy-not even mushrooms should be mushy. Drain well.
Chop coarsely, sauté for 10 minutes in olive oil and butter, set aside:

- 4 oz Chanterelles (substitute Hen-of-the-Woods)
- 4 oz. Boletes (Optional)

Chop coarsely:

- 1 large onion and begin to sauté it with:
- 2 tbl. of butter
- 1/4 tsp. dried thyme

Make a roux in the same pan as the onions with:

- 2 tbl. of flour and 2 more tbl. of butter and a little salt.

Cook 'til golden brown and the onion is softened then "break the roux" (this means add the liquid) to make a sort of Bechamel sauce with a mixture of:

- 1/2 cup vegetable or chicken stock
- 3/4 cup whole milk

Continue to cook until the whole thing is beginning to thicken--about 5 minutes. set aside.
Grate and set aside:

- 1/3 cup white cheese (Jack, Fontina, etc.)

Assemble the dish by layering the potatoes in a buttered casserole dish. After one layer toss in some of the cheese, a little sauce and some of the mushrooms. Continue until all the stuff is gone but save some sauce and cheese for the top. Bake 'til bubbly. Six servings.

**The Sonoma County Mycological Association (SOMA) invites you to the 7th annual SOMA Camp Wild Mushroom Retreat. January 17-19, 2004 a beautiful new facility, located near Occidental, Sonoma County, about one hour north of San Francisco.**
**Fees: $175 until Nov. 15, $195 after that. Registration closes on Wednesday, January 7. Fee includes lodging, meals, and all activities. Special Sunday only fee: $90 includes lunch, dinner feast, and all the day's activities. To obtain a registration form, you may visit the SOMA website at www.SOMAmushrooms.org, where you can also view photos and info from past SOMA Camps. Information and registration forms may also be obtained from Linda Morris, the Camp registrar, 707-773-1011 (or lamorr@pacbell.net) or the Camp coordinator, Charmoon Richardson,707-887-1888 (or charmoon@sonic.net).**


**IN THIS ISSUE**



**Trees calm me…..**

Thomas Packenham, Earl of Longford, author of, " *Remarkable Trees of the World*."

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