LONG ISLAND MYCOLOGICAL CLUB

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FINDINGS AFIELD

Although the genus Galerina is known to many of us only via the toxic *Galerina autumnalis* (now *marginata),* there are a myriad of tiny species which mostly escape our notice. The species discussed here *G. vittiformis* is widespread in both North America and Europe, but has only two collection listed in NYS in Mycoportal, and none from Suffolk county.

This, our first collection, was encountered on June 8 earlier this year, in the Rocky Pt State Forest, growing among Haircap mosses, whose sporangia it vaguely resembles.

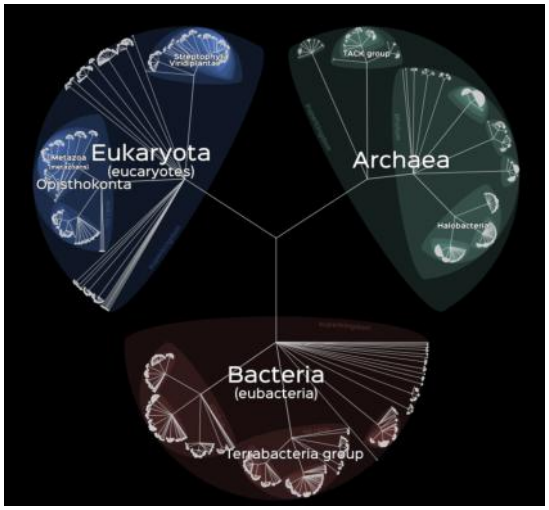
Galerina vittiformis. **Sporangia.**

Although many of the smaller Galerina grow in mosses, they are, like Inocybe, confusingly alike, and require microscopic scrutiny to confirm their identity. Indeed, an extensive study, "A Monograph on the Genus Galerina Earle", by AH Smith and Rolf Singer is available online at

(Continued on page 6)

Visualizing the Tree of Life

The relationship of one fungus species to another, one genus to another, or one family to another, is information not easily obtained and even more difficult to visualize. A new online tool, Lifemap, is now available that permits the user to visually explore the evolutionary relationships linking all organisms in a complete representation of the Tree of Life. The creator, Damien M. de Vienne, of the University of Lyon, has made it available free of charge as a public service to professional biologists and to the general public, in three separate versions, at http://lifemap.univ-lyon1.fr An Android version of the general public version is available as a mobile app and an iOS version is planned in the near future.



Lifemap Public Version opening page.

The public version is a simplified reduction of the NCBI (National Center for Biotechnology Information) professional version which contains 1.4 million species (based on DNA sequences deposited at NCBI) while the public version has 800,000 species and does not include unidentified species, or taxa below species level. A description and a picture from Wikipedia is displayed when clicking on a particular spot on the fractal type display; unfortunately Wikipedia at this stage lacks information or pictures of many fungi. The program does offer the opportunity to contribute material to Wikipedia, and it is hoped that these contributions will improve the quality

(Continued on page 3)

PRESIDENT'S MESSAGE

This spring has not produced a lot of edibles but some interesting fungi have turned up as is reported on page 1 and 4 of this issue. I want to add that I have found the usual species here in our mossy backyard in Ridge.. We have had Leccinum, Chanterelles, Russulas and Lentinus (growing out of our pine retaining wall.) Also, *Chlorophyllum molydites* (poisonous) appeared in grass verge by Smithaven Mall. It appeared there last year in very dry grass and has now returned just a few yards away from where it was first sighted.

If you look at our Board of Directors below, you will notice that members have taken on new responsibilities. Thank you all for lightening the load.

Changes are taking place in many fields of biology, and a new book out called "The Hidden Life of Trees" by Peter Wohlleben, a forester in Germany. is a pioneer effort to change our thinking about competition versus cooperation in the battle of life. It tells about trees and their relationships with each other, and with their fungal associates, one more of cooperation than rivalry.. It is written in an accessible, conversational style that all can understand and enjoy. Even those familiar with the concept of mycorrhizal symbiosis will find much that is startling and enlightening. The occasional lapses into anthropomorphism are delivered tongue in cheek and have their charming aspect. An excerpt on page seven will give you a preview of the contents.

Although no harvests are to be expected now, there is always something of interest, so venture out along the trails and let us know...

EDITOR'S NOTE

.Mark Twain famously said "Everyone talks about the weather, but no one does anything about it.: He might just as well have said "Everyone complains about the weather" which would have applied in spades to mushroomers. We grouse about the lack of rain throughout the seasons, always on the lookout for a dose of nature's plenitude. Well, this year we have it, with above normal levels throughout Long Island, with Brookhaven Nat'l Lab reporting 24 inches through May, whereas the average is about 21, and June recorded an additional 4.6 inches on my home weather station.

While this abundance has had demonstrated results, as reflected in our foray species totals (see page 4) as well as individual reports from our intrepid foragers, it has not stimulated many species to make a premature appearance. In other words, phenology (seasonality) trumps environmental influences. Fungal species appear to be genetically programmed to reproduce (fruit) at specific times of the year and are slow to change. But change is sure to occur, and like the record keeping of naturalists such as Thoreau helped to document the increasingly early budding of plants and arrival of migratory birds, our recording of the fruiting of fungi may play the same role.

MATERIAL FOR THE AUTUMN 2017 EDITION SHOULD REACH THE EDITOR BY SEPTEMBER 1ST.

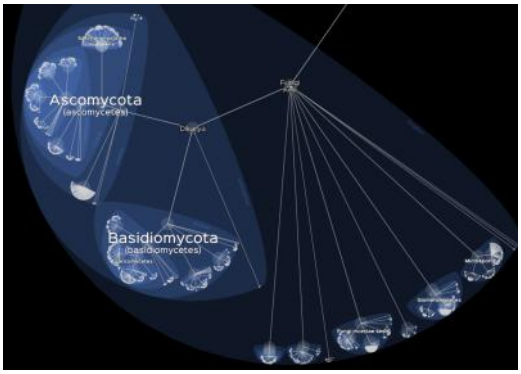
(Submissions may be forwarded by email in any format or typed.)

(All unsigned articles authored by editor.)

Visualizing the Tree of Life

(Continued from page 1)

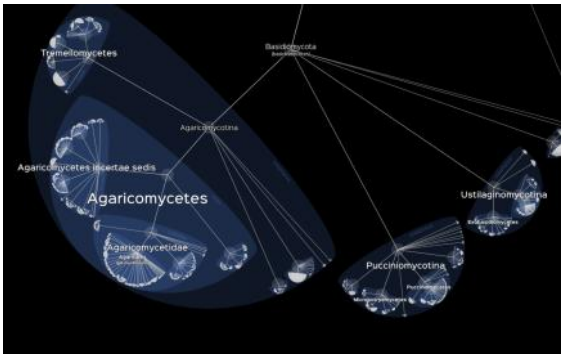
and quantity of Wikipedia species information. The NCBI version is updated weekly and can display "taxid" (a stable unique identifier for each taxon), number of species, as well as connect to the NCBI page to download the corresponding subtree and visualize at each node the number of fully sequenced genomes.



Lifemap at the level of the Fungi.

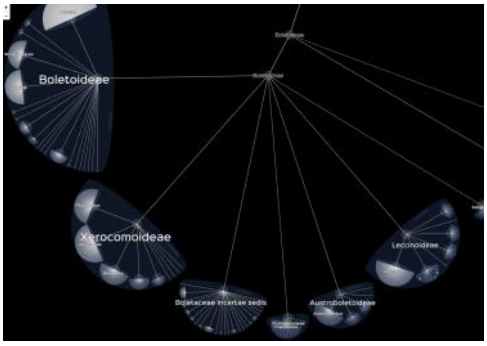
The third version, Lifemap OTOL ("Open Tree of Life" online community project), combines phylogenetic and taxonomic information, displaying the latest OTOL synthetic tree. At the terminal nodes clicking will transport you to the OTOL information base, where the information available varies widely, from nonexistent to complete, with photos and links to Wikipedia.

All these programs have a search engine, and entering a species name will drill down to the species node, enabling the user to see the particular taxa and its phylogenetic placement. The NCBI Lifemap will provide the NCBI accession number along with the submission data including the submission date and place, the authors of any research papers, its title, and the journal name, if published. The complete molecular sequence is also available, and that can be analyzed and a phylogenetic tree generated using the NCBI BLAST program to show the taxa's relationship to its closest relatives.



At the Basidiomycete level.

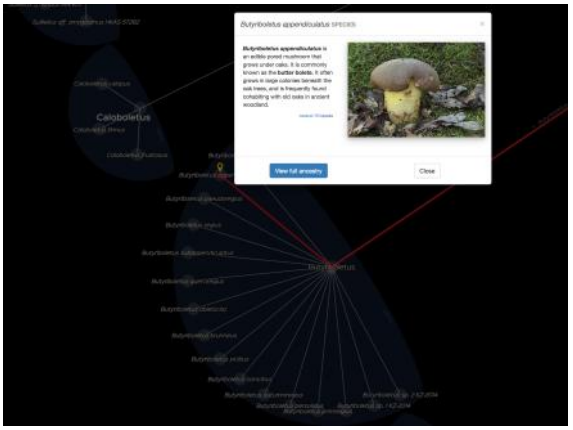
Each of the three versions have their strong points, the OTOL version having the most species, but not, to my mind, as neatly organized into higher taxa , the publc version (as seen above) excelling in that respect. All three versions permit the user to visualize the path of a species' evolutionary descent by clicking the "view full ancestry" button associated with each node. Instantly, the path is highlighted in red, the most recent common ancestor indicated, and the intervening taxa shown. There is also a downloadable virtual machine which knowledgeable users can run on their computer to upload their own trees.



At the Boletales level.

The experience of using this program is very much like using Google maps, choosing a street address, and then zooming in step by step, to the country, then the city, until you ultimately arrive at the house number, at which point it is often possible to utilize Street View, and see the house and its environs. If you recall the first time you tried this, and were amazed, the Lifemap experience will give you the same feeling. .

The illustrations show the process of zooming in from the global Tree of Life to increasingly more fine grained levels: Opistokhonts to Kingdom Fungi, then Subkingdom Dikarya, Phylum Basidiomycota, Class Agaricomycetes, Order Boletales, Family Boletaceae, Subfamily Boletoideae, Genus Butyrboletus, Species appendiculatus. When the ultimate destination is reached, clicking on the species name then brings up the available data and photo, while the diagonal line highlights the ancestral path.



Butyrboletus genus, showing individual species and target node photo.

This procedure can be carried out at any level, not only with fungi, but with any existing taxa, from Bacteria to Birds, as well as those already extinct, such as the Tyrannosauridae. Start zooming, clicking and learning!

FORAY RESULTS SUMMARY

WELWYN PRESERVE, APRIL 15: Cancelled. No Morels appeared. A scattered few were found elsewhere on L.I. by persistent foragers.

PLANTING FIELDS ARBORETUM, APRIL 29: A total of 17 species was good for this time of year. Most numerous were *Agrocybe putaminum, Helvella acetabulum, Hypholoma fasciculare, and Megacollybia rodmanii.* A large group of Wood Ear, *Auricularia americana* provided the only edibles. New to our list was the diminutive purple *Chromosera cyanophylla*, identified by Aaron Norarevian.

Helvella acetabulum

BETHPAGE STATE PARK, MAY 13: Spring Oysters failed to make their expected appearance here, but they showed up shortly thereafter at:

EDGEWOOD PRESERVE, MAY 16: A mid-week, afternoon foray which produced few species, but abundant Spring Oysters, *Pleurotus populinus*, plus *Leccinum aurantiacum* (now *vulpinus)* which makes an increasing Spring appearance. .

Spring Oysters—*P. populinus*

MUTTONTOWN EQUESTRIAN, JUNE 3: Twenty-eight species represents the second highest total for this time and place, which included 3 slime molds, and 4 asco's. *Psathyrella condolleana* was widespread with one bunch growing vertically on a tree trunk. Of the remaining, 15 were wood dwellers. A bedraggled specimen resembling *Coprinopsis lagopus* turned out to have rhomboid spores, perhaps of *C. geesterani.*

Polyporus squamosus "buds"

Psathyrells condolleana

Peziza repanda & Pluteus cervinus

OUR FRAGILE FORESTS

The Pine Barrens of Long Island, which are generally ranked as having very high to outstanding biodiversity status, with some globally rare biomes, are presently under multiple threats. We have previously written about the battle to halt the invasive Southern Pine Beetle, and DEC efforts continue, particularly in the Rocky Pt State Forest, where a demonstration forest project has been established on a 27 acre area located on Whiskey Rd., marked by a new public parking lot. Nine acres will serve as a control, where no treatment is administered. The DEC announcement continues, "The other 18 acres will be thinned according to silvicultural guidelines. The area will be broken up into three blocks of three-acre sections. Each block will receive different treatments in order to determine their effectiveness. The three treatment options are: control, thinning, and thinning and burning." Evaluation will be carried out to determine which is most effective.

Another threat is the Asian Longhorned Beetle, whose infestation of hardwoods in NYC and LI resulted in the removal of over 10,000 trees on both public and private land by NYS Dept of Agriculture and Markets to limit the spread of this pest. Restoration efforts have been supported by a $300,000 grant from the US Dept of Agriculture, and thus far over 1,000 trees have been replanted in the past two years.

The third invasive is the latest, the fungus *Ceratocystis fagacearum,* known as Oak Wilt, which in 2016 was found in New York, in Brooklyn, Babylon, Islip, Riverhead and Southold, after an earlier appearance in upstate counties. There is no known treatment, the only remedy being the removal and destruction of the infected trees and any surrounding host oaks. An emergency order forbids the removal of any Oaks out of the protective zones, which encompass Brooklyn and all of Suffolk county. Additional staff has been assigned to monitor trees in these zones, and aerial surveys will be conducted more widely to discover infected trees.

DEC is encouraging the public to be on the lookout this summer for oaks that suddenly lose all

(Continued on page 6)

GLEANINGS.. from the research literature

■**MYCORRHIZAL MENU**: The standard homily regarding mycorrhizal exchange posits the delivery of water and minerals by fungi to their plant hosts, for which they are rewarded by sugars to sustain them. Two recent research projects (in China and the UK) expand the picture to demonstrate that more is involved, at least in the case of arbuscular mycorrhizal fungi (AMF). Although these studies overlapped somewhat, together they demonstrated that 1) AMF do not produce their own fatty acids, despite using triacylglycerol as their major carbon source 2) The host plant (*Medicago truncatula,* a legume) synthesizes fatty acids and transfers them to the AMF via highly branched hyphal structures called arbuscules that form inside plant roots 3) This process is necessary for colonization of plant roots by AMF (a signaling function) 4) The lipids delivered are a major source of carbon for the fungus 5) pathogenic fungi (such as *Ustilago maydis*– Corn Smut) take advantage of this pathway to infect susceptible plants. Additionally, particular chemical pathways and factors are involved.(*Science **356** June 16, 2017, Fatty acids in arbuscular mycorrhizal fungi are synthesized by the host plant, LH Luginbuehl et al, p. 1175-8; Plants transfer lipids to sustain colonization by mutualistic mycorrhizal and parasitic fungi, Y Jiang et al, p.1172-5.)*

■**A NEW EASTERN SPECIES OF BOLETE, ALSO FOUND ON L.I:** *Alessioporus rubriflavus,* only the second species in this genus, is newly described in the Feb. 28, 2017 issue of North American Fungi, following shortly on the heels of the newly published *Boletes of Eastern NA* by Alan Bessette et al. Apparently, previous collections of this bolete have evaded precise identification, but its phylogenetic position has now been determined by molecular analysis. Although its genus is unique, it will appear as one of many robust, yellow-pored blue-staining, reticulate species, even to the seasoned observer. Distinguishing it from *Butryboletus brunneus* or *Boletus roseopurpureus* in the field will not be a trivial task. The Long Island specimens were collected in Sound Beach, Suffolk County, so that we may legitimately add it to our checklist. If you encounter it in the field, kindly contact us. (*Alessioporus rubriflavus (Boletaceae), a new species from the eastern United States, JLFrank, Arleen R Bessete, Alan E Bessette)*

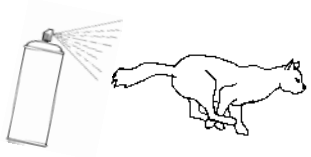

from NA Fungi,V12, #2

■ **BEWARE OF CORTINARIUS:** In 2008 headlines across the U.K. spread the news that Nicholas Evans, author of the Horse Whisperer, had accidentally poisoned himself and members of his family by picking and eating *Cortinarius speciosissimus/rubellus,* a known toxic species containing orellanine, which causes liver failure. Two years later a woman in Michigan was found to have developed kidney failure after ingesting a Cortinarius, the first such case in N. A., which led to the discovery of *Cortinarius orellanosus,* so named for its resemblance to the European orellanine containing *C. orellanus.* Now another N.A. species, the familiar *C. armillatus,* has been shown to contain orellanine, but in much lower concentrations, although the authors caution that this may vary with geographical and environmental factors. The authors have devised two test methods for detection and quantification of orellanine. (As an aside, we note that the early 20th century mushroom author Charles McIlvaine considered *C. armillatus* an excellent edible and decried the fact that it could not be found in quantity. Since as orellanine may be cumulative in its effects, he may have been lucky that it was not.) ((A novel orellanine containing mushroom *Cortinarius armillatus, D.Shao et al, Toxicon, Vol. 114, May 2016, pp.65-74))*

■ **LITTER-TRAPPING FUNGI:** A study in a Malaysian tropical forest demonstrated the widespread presence of an intricate network of marasmioid "rhizomorph-forming fungi that ramify through the vegetation of the lower canopy and intercept falling leaf litter" in substantial quantities, as much as 57 kg per hectare. 70 per cent of the arthropod population in the lower canopy was shown to be supported by such fungal networks, said to be widespread throughout the tropics, including South America. Presumably, the fungi are digesting this leaf litter, although this is not specifically mentioned.(*Biodiversity hanging by a thread:: the importance of fungal litter-trapping systems in tropical rainforest. JL Snaddon et al, Biology Letters (2012) 8 pp. 397-400.)*

OF CATS AND CHRYSANTHEMUMS: HOW A COMMON TICK SPRAY CAN TURN TOXIC

by Anthony Sama



Permethrin is a popular anti-tick liquid that is used by many mushroom hunters. While perfectly safe for humans and dogs, it could have possibly disastrous effects on cats should they come into contact with the liquid form. It should reassure cat owners that it is thought that clothes treated with the liquid, once dried, pose no risk to cats. Chemically speaking, permethrin is really closely (just a few atoms difference) related to a powder that is extracted from a plant in the genus *Chrysanthemum*, commonly known as "Persian Powder". While the fact that this whole class of molecules is toxic to cats may come as a surprise at first, it makes quite a large amount of sense when looked into further. Cats are obligate carnivores and as a result have none of the enzymes needed to break apart common plant toxins, like the ones we happen to apply on our clothing to paralyze and potentially kill bacteria and virus laden ticks. Permethrin is unique among tick preventatives in that it does not repel the ticks by odor or any other means – it simply paralyzes (and ultimately kills) them should they come in contact with it. The molecule achieves this by lowering the voltage threshold needed to cause a neuron to fire, thus causing paralysis in ticks and seizures and tremors in susceptible vertebrates like cats and certain freshwater fish. For this reason the spray should only be applied to clothing outdoors far away from any natural bodies of water. (I personally recommend drying the treated clothes in the shade as sunlight breaks apart the molecule.) I would also recommend that cats not touch any freshly treated clothing for roughly 2 or 3 days. If a cat comes into contact with the liquid you should attempt to wash the cat with shampoo and bring the cat to the vet if any signs of tremors occur, taking care to tell the front desk that your animal was exposed to permethrin.

FRAGILE FORESTS ***(Continued from page 4)***

or most of their leaves, and report this to the Forest Health Diagnostic Lab through the toll-free information line, 1-866-640-0652 or by email, foresthealth@dec.ny.gov. Such loss must be distinguished from that caused by the current Gypsy Moth depredations in the Northeast, including Long Island, one clue being the presence of leaf fragments on the forest floor. Luckily, although massive damage has already been done, there has been a massive die-off of the moths, with as much as 75% dead, due to the *Entomophaga maimaga* fungus or the Nuclear Polyhyedrosis virus, which they are prone to.

Dead Gypsy Moth larvae

For mushroom collectors, the question arises as to whether infected trees or those that have lost much of their leaves, resulting in impaired photosynthetic capacity, will be able to supply the requisite nutrients to their mycorrhizal partners in sufficient quantity to encourage fruiting.

FINDINGS AFIELD ***(Continued from page 1)***

the Univ. of Michigan website, which emphsizs microscopic features.

The keys are exacting to use and require scrutiny of every part (stipe, pileus, gills) to determine the presence or absence of clamp connections, cystidea, etc. As a shortcut, I entered salient characters into Matchmaker, which spewed out several possibilities, among them *G. vittiformis,* whose photo was an exact match for our specimen. I was then able to verify the presence of clamp connections, abundant pleurocystidea, and roughened ovate spores, which rules out others on our list, such as *tibiicystis* and *sphagnorum*, which lack pleurocystidea.

Macroscopically, this species can be identified in the field (with less than complete certainty) by the conical shaped cap, striations to the disc, which becomes contrastingly lighter colored (near white), extremely long stipe which is pale yellow above and brown toward the base. Said to also occur on mossy logs as well as moss beds.

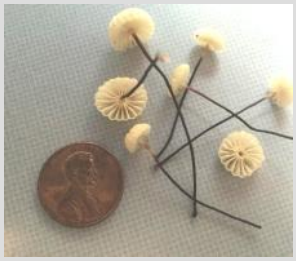
The monograph lists a half-dozen varieties, most of which have now been synonymized. In Europe it is perhaps one of the commonest species. It will be added to our list and deposited in the NYBG Herbarium as part of the Mycoportal Project.

FROM OUR MEMBERS:

Just another *Pluteus cervinus,* despite its reddish coloration– by Andy Greller

***Polyporus squamosus,* Dryad's Saddle– by Ernie Martinez**

A lone Morel– by Chris Nellen



***Marasmius rotula*– by Les Falcone**

***Coprinus comatus*– by Maria Saffioti**

***Boletus reticulatus* harvest– Roger Eklund**

***Agrocybe putaminum* - by JC Mas**

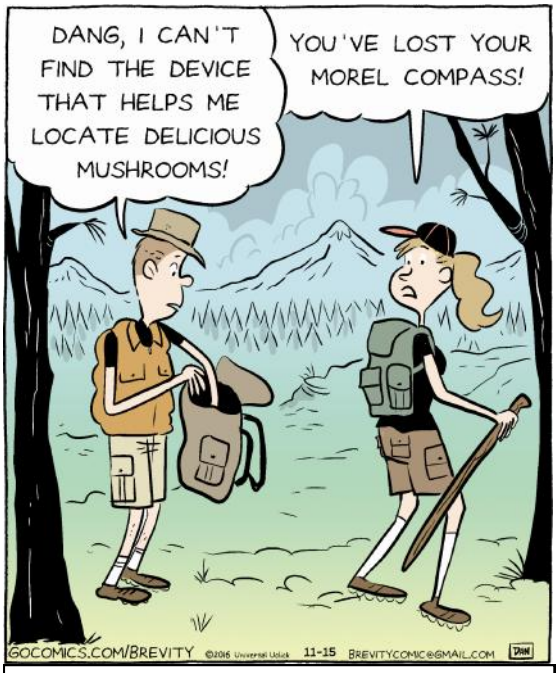
THE WOOD-WIDE WEB

"Over decades, a fungus's underground cottony web, known as mycelium, expands. .Their thin filaments penetrate the groung, weaving through it in almost unbelievable density. One teaspoon of forest soil contains many miles of these "hyphae". Over centuries a single fungus can cover many square miles and network an entire forest…With the help of mycelium of an appropriate species for each tree—for instance, the Oak Milkcap and the Oak—a tree can greatly increase its functional root surface so that it can suck up considerably more water and nutrients..You find twice the amount of life-giving nitrogen and phosphorus in plants that cooperate with fungal partners than in plants that tap the soil with their roots alone...In doing so, it extends the reach of the tree's own roots as the web grows out toward other trees. Here it connects with other trees' fungal partners and roots. And so a network is created, and now its easy for the trees to exchange vital nutrients and even information—such as an impending insect attack.

This connection makes fungi something like the forest internet..Science has adapted a term first coined by the journal *Nature* for Dr. Simard's discovery of the "wood wide web" pervading our forests….And such a connection has its price. As we know, these organisms-more like animals in many ways-depend on other species for food. Without a supply of food, they would, quite simply, starve. Therefore, they demand payment in the form of sugar and other carbohydrates, which their partner tree has to deliver. And fungi are not exactly dainty in their requirements. They demand up to a third of the tree's total food production in return for their services. ..

In exchange for the rich sugary reward, the fungi provide a few complimentary benefits for the tree, such as filtering out heavy metals, which are less detrimental to the fungi than the tree's roots. These diverted pollutants turn up every fall in the pretty fruiting bodies we bring home in the form of porcini, cépe, or bolete mushrooms. .."

from *The Hidden Life of Trees, Peter Wohlleben, English translation 2016, Greystone Books, CAN*



IN THIS ISSUE

A true account of the actual is the rarest poetry…

Henry David Thoreau ***A week on the Concord and Merrimack Rivers***

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