SPORE PRINTS

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FUNGUS TURNS WOOD PIEZOELECTRIC, ALLOWING IT TO POWER LEDS

Michael Allen

https://physicsworld.com/, Apr. 9, 2021

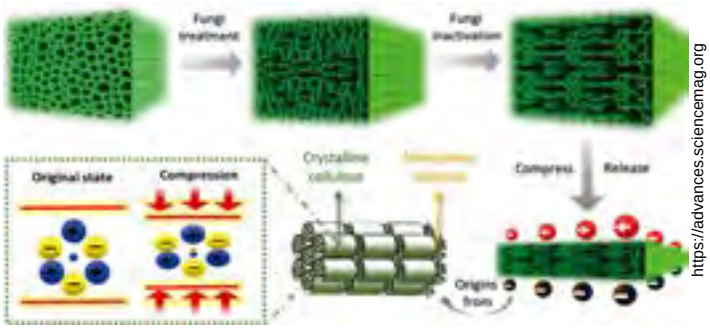
Infecting wood with wood-decay fungus can boost its piezoelectric output by 55 times, researchers in Switzerland have discovered. The material scientists found that after 10 weeks of infection, blocks of decayed wood could power LEDs. They say that floors built from fungus-treated wood could generate renewable electricity from people's footsteps.

Decades ago, scientists discovered that wood generates an electrical charge under mechanical stress. This piezoelectric effect is caused by the displacement of crystalline cellulose when it is deformed, whereby shear stress in one plane produces an electrical polarization perpendicular to it. But the piezoelectric effect is not very strong—around twenty times smaller than that of a quartz crystal—and wood does not deform easily.

Despite this, some researchers are keen on exploiting this property by creating piezoelectric construction materials that could help make buildings more energy efficient. Globally, buildings are responsible for around 40 percent of our energy consumption and nearly 25 percent of our greenhouse gas emissions. Current attempts to minimize emissions involve reducing energy consumption or fitting buildings with solar panels so they generate their own electricity. While this can be effective, it is weather dependent and does not work everywhere. Piezoelectric construction materials could offer another source of clean energy.

Dissolving Lignin

The piezoelectrical performance of wood can be improved by changing its structure. Recently Ingo Burgert, at ETH Zurich, and his colleagues found that placing wood in a mixture of hydrogen peroxide and acetic acid increases its piezoelectric output. This process dissolves the lignin in the wood leaving behind a cellulose framework that is much more flexible and elastic. When squeezed, 1.5 cm cubes of this acid-treated wood generated an output of 0.69 V, which is 85 times higher than untreated wood. This perfor-



https://advances.sciencemag.org

Graphical illustration of the structure evolution of wood upon fungal treatment.

cont. on page 2

GOLDEN MUSHROOM AWARD FOR 2021

Brian S. Luther

Wren Hudgins

The 2021 Patrice Benson Golden Mushroom award is going to a very deserving member of PSMS—Wren Hudgins.

Wren is originally from Virginia, then moved here and joined PSMS in 1974. But his life took him away from the area, and he lived in France for several years studying the French language, which he's fluent in. There he met his wife, Leigh, who was also a student of French. He has a PhD in psychology, which was his life's work. He and his wife have two adult sons. Retired now, he's also an avid skier, naturalist, birder, and mushroomer. He has been very involved as a member of the American Red Cross, especially relating to mental health issues and first aid, and has offered classes through that organization for years. He and his wife have always enjoyed doing world travelling, and recently special ordered a pop-up Mercedes RV van fitted with amenities so they can take road trips throughout North America in self-contained comfort.

Around 2010 Wren was coming to the PSMS field trips and starting to ask me how he could help. He had a real interest in mushroom ID and good skills to match, but he was also competent in many other areas he could share with us, such as first aid and not getting lost in the woods. He started working with me regularly and had really good ideas for improving and/or streamlining many functions. Some of his ideas included organizing formal groups to lead members out on field trips, especially new members, to make them feel welcome and give them a personal introduction into mushroom hunting. This morphed in a few years into a formal PSMS committee, which he chaired and now co-chairs—the PSMS Field Trip Safety Committee. He recruited a good number of experienced members willing to serve as field trip guides—a great addition to our educational field trips. He's also helped the field trip hosts by coordinating the transfer of supplies. He was acutely interested in assisting me in field trip ID and mushroom table tours. I asked him to be on the Identification Committee several years ago, and he's been doing mushroom ID at our annual show, on field trips, and assisting at the Monday ID Clinics at CUH. He also helps Danny Miller teach introductory mushroom classes, as well as offering classes on first aid and orienting using GPS and compasses. He has also helped me look for potential new field trip sites.

For the past many years (prior to Covid-19), he's been coming to virtually all of the PSMS field trips. Basically, wherever help is needed, he's always been willing to pitch in. Now, he's getting even more involved as a member of the PSMS Board of Trustees.

Thank you, Wren, well done. Keep up the good work and congratulations!

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CALENDAR

May 11 Membership Meeting, 7:30 pm, via Zoom

May 17 Board Meeting, 7:30 pm, via Zoom

May 18 *Spore Prints* deadline

June 8 Membership Meeting, 7:30 pm, via Zoom

BOARD NEWS

Luise Asif

Jeremy Collison presented the program for this year's virtual Mushroom Maynia on May 2. We hope members take advantage to log in and participate in his outstanding presentations. The board is working on preparing for fall events such as the PSMS annual mushroom show and the Ben Woo Foray. Outgoing trustee Derek Hevel has volunteered to take over the vacant chairmanship for Publicity with the full support of the board. We still have two committees that need chairing, *Sustainability & Ecology* and *Mycophagy***.** Interested? Contact president@psms.org. Marian Maxwell is researching an additional group-communication platform for membership. More information next month.

MEMBERSHIP MEETING

Marion Richards

Tuesday, May 11, 2021, via Zoom

Once again we will be offering our monthly meeting online. The meeting will begin at 7:30 pm PST. We will open early around 7 pm for an ID session with our ID committee. Please submit any mushrooms you would like identified to info@psms.org two days prior to the meeting. The link for the meeting will be on the PSMS homepage at www.psms.org. Hope to see you all there!

Leah Bendlin

Our speaker for May is Leah Bendlin, who will discuss some of the most common and memorable mushrooms found in spring in the Pacific Northwest. We will focus on common edibles like oysters and morels, as well as less commonly noticed, but interesting and beautiful species. We will learn how to tell edible from poisonous or just otherwise tricky potential look-alikes, noting particular physical features and habitats that will help you to identify them on your own.

Leah Bendlin is a Portland-based mushroom and community science enthusiast. She caught the mycology bug after her first outing hunting chanterelles with a friend. She was amazed at the diversity of other mushrooms that day and set out to learn the science of identification. Now, 9 years later, she is an expert taxonomist who aspires to learn the name of every mushroom she encounters and delights in teaching others. Leah has special interests in taxonomy, uncommonly known edibles, mycoheterotrophic plants, slime molds, ascomycetes, and social justice. She regularly leads mushroom ID classes and walks for various Pacific Northwest organizations and has volunteered as a teacher, identifier, and board member of the Oregon Mycological Society. You can find her Instagram page, focused primarily on teaching mushroom species of the Pacific Northwest, at https://www.instagram.com/leah_mycelia/.

Fungus Turns Wood Piezoelectric, *cont. from page 1*

mance was stable for 600 cycles and 30 connected blocks powered light-emitting diodes (LEDs) and a simple liquid-crystal display.

Keen to create the same effect, but without the harsh chemicals, Burgert and colleagues turned to a natural process that alters the structure of wood: decay by fungi. In their latest work, described in *Science Advances*, they infected balsa wood with the white rot fungus *Ganoderma applanatum* for 4–12 weeks. After 10 weeks the wood had lost 45 percent of its weight, and the researchers found that at this point it showed the best compressibility performance while still returning to its original shape once the stress was released.

A single 1.5 cm cube of this decayed wood produced a maximum voltage of 0.87 V under 45 kPa of stress, while uninfected balsa wood generated 0.015 V. The treated wood maintained its performance for 500 cycles. Electrical output increased with mechanical stress, rising to 1.32 V at 100 kPa. Nine of the decayed-wood blocks connected in parallel were able to power an LED, when pressed strongly.

Cellulose Remains Intact

Infrared spectroscopy and X-ray diffraction analysis of decayed and untreated wood showed how the fungus altered the wood. "The selected wood decay fungi secrete enzymes that enable degradation of lignin and hemicelluloses in the wood, whereas cellulose remains intact," Burgert told *Physics World*. "This type of wood decay is also known as selective delignification. This process changes the structure and chemistry of the wood cell wall enhancing the natural piezoelectric properties of wood."

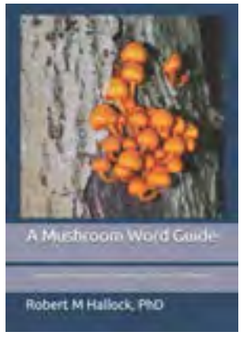
The researchers say that their results indicate that the material could be used to produce large-scale wooden floors, such as those in ballrooms, that could generate electricity from human activity.

"We are currently working at the demonstrator scale with delignified wood that can be used for sensors integrated into wooden floors," Burgert says. "For instance, these systems could be used as security systems in wooden floors for detection of any kind of applied stress. In terms of power generation, it is on the level of lighting up LED lights, and therefore, at present the application as a sensor is more suitable. However, it is a first step and we are currently optimizing towards wood-based systems better suited for energy harvesting."

Due to its lignin composition, delignification during fungal infection is much faster in balsa than other woods such as spruce, pine and fir. "The next step is to use this concept for native wood species and incorporate the generated materials in future smart buildings," Burgert adds.

BOOK REVIEW: *A Mushroom Word Guide*

Dick Sieger



Robert M. Hallock's *A Mushroom Word Guide: Etymology, Pronunciation, & Meanings of Over 1500 Words* is hard to put down. Use the glossary and your eyes will wander from one reference to another. The book gives pronunciations, derivations, and definitions of mycological terms in a friendly manner. For example:

> **fraud** (L.): A cheat. *Hydnellum fraudulentum* (fraud you LEN tum) is a fraud! It masquerades and takes the identity of *H. caeruleum*, yet the only reward for its capture and proper identification is the realization of a job well done.

Knowing the meaning of a mushroom's name may tell something about its characters or maybe its habitat. Thus knowing what the name means can be a big help in keeping the mushroom in memory.

The first few pages of this book define some jargon found in field guides. That's followed by a section that gives a rundown of chemicals used by mycologists. I have some friends like Brian Luther who douse mushrooms with phenol. It turns out that phenol stains Russulas, and the color of the stain can help species identification. And we learn that phenol is available from EBay for $25. Who knew?

Dr. Hallock offers brief biographies of people who have had mushrooms named after them. Here's someone you may know:

> "**Allen, Alissa**: Alissa discovered *Pouzarella alissae* (uh LISS ay) on a November day in 2013 in California. Noah Siegel recalls her saying 'I found this thing that looks sorta like an *Inocybe*, but has pink spores.' Noah knew it was a *Pouzarella* , but it was indeed a new species."

Go online, run a search for *A Mushroom Word Guide*, and get a copy. For $13 you can't go wrong.

AN ARRAY OF BACTERIA AND FUNGI HELP LEAFCUTTER ANTS BREAK DOWN TOXIC LEAVES

Sophia Friesen

https://massivesci.com/, April 21, 2021

The diverse vegetation of neotropical rainforests is full of a wide array of toxic and repellent chemicals. In this forest of poisons, one group of herbivores reigns supreme: leafcutter ants, which account for 25 percent of all herbivory in neotropical rainforests, including plants that contain pesticides. They accomplish this remarkable feat by outsourcing plant digestion to "gardens" of a subterranean fungus. The fungus grows on the leaves, the ants eat the fungus, and everyone is happy.

But researchers at UW Madison and Universidad de Costa Rica recently found that the compounds in harvested plants are toxic to the fungus, too, which lacks the necessary genes to break down many common plant toxins. How can leafcutter colonies thrive with a constant influx of poisonous leaves?

The answer may lie in a third player in this cooperative system: a diverse bacterial community associated with leafcutter fungus. Scientists had known for years that microbes in fungus gardens benefit the colony by synthesizing otherwise-rare nutrients. But these researchers suspected that they might also help break down plant toxins that neither the ants nor the fungus could handle.

In the genomes of dozens of fungus-garden bacterial strains, the researchers found many of the genes required to break down plant toxins—and an analysis of "metagenomes," containing all bacterial DNA from fungus gardens, uncovered even more degradation pathway genes. This suggests that toxin breakdown may be a task shared between multiple strains of bacteria.

To directly test garden residents' abilities to degrade plant toxins, the researchers exposed bacteria, fungus, or intact garden communities to two plant compounds that reduce fungal growth and repel insects. They then measured the levels of each compound over time. Intact mini-gardens could degrade both compounds, and so could some varieties of bacteria, but the fungus alone couldn't.

While many plant compounds remain incompletely explored, this research suggests that the incredibly broad foraging ability of the ants is enabled by cooperation with an equally diverse set of fungi and bacteria. Together, the community can deal with a set of poisons no single organism could handle alone.

BOOK REVIEW: Brian S. Luther

Polypores of British Columbia (Fungi: Basidiomycota). James Ginns. 2017. *Technical Report 104,* Province of B.C., Canada, 260 pp. Spiral bound.

I only recently became aware of this excellent publication and wanted to tell you about it. The author is an internationally known mycologist, who moved to the PNW (British Columbia) after retiring years ago. He's contributed many valuable scientific publications and books for decades relating mostly to wood inhabiting (lignicolous) fungi, such as polypores and resupinates. I was fortunate to meet him at a mycological foray years ago.

The polypores ("many pores" in Latin) represent a very large assemblage of genetically unrelated fungi (in over 20 different families), but what they share in common is that their fruiting bodies (basidiocarps or basidiomes) are mostly lignicolous (with a few being terrestrial) and are mostly tough, leathery, or woody (rarely fleshy) and have some form of a poroid hymenophore (a spore-bearing layer forming pores). The pores are always on the underside if mushroom-like or with pileal conks; otherwise the pores are formed on the fruiting body resupinate on or underneath woody substrates. Based on the species, the pores vary from being large and obvious, to being very small and inconspicuous at first glance without magnification. So, the category polypores is a catch-all term.

Most mycophiles are familiar with at least a few of the polypores —some of which have substantial fruiting bodies that are usually obvious, such as Chicken of the Woods (genus *Laetiporus*), or the Red Belted Conk (*Fomitopsis pinicola*). However, there are a large number that are either exclusively resupinates (forming crusts, often confluent on the woody substrate and/or frequently growing underneath on woody debris, facing the ground) or have features making them unnoticed or not obvious. Fortunately, even all of these much more obscure polypores are fully covered in this book.

"Introduction" and "How to Use this Report" sections give the reader a basic understanding of this group of fungi, along with examples of macroscopic and microscopic features. As pointed out by the author, polypores are a very economically and environmentally important group of fungi. They not only result in critically essential forest debris decay, with a few being mycorrhizal, but cause significant diseases that damage or destroy timber resources or man-made wooden structures,. A few can even be eaten or are used in traditional medicine.

Initial keys are provided to get to the genera and groups. The genera are presented and listed alphabetically throughout, with keys for the species, once you get to a genus. Descriptions are provided for most species, including habitat, substrate, and macroscopic and microscopic features. Good color photos are provided for many, but not all, of the species covered. Some key leads going to a specific genus may have the genus as a catch all group. For example, if you go to the genus *Albatrellus*, it also keys to the related genera *Neoalbatrellus* & *Xanthoporus*, which are covered separately. Also the genus *Polypus* is mentioned only under Notes in the text at the end under a similar fungus, but not in the key, nor is there a separate generic listing for it. To use and appreciate this book fully, you'll need to have a microscope as well as basic mycological microscopy skills, but even without this you'll still find the publication very useful.

Prior to this book being published, references focusing specifically on PNW polypores were limited. An earlier publication by Ginns (2019) covers about 80 of the 230 species of polypores found in the PNW, which helped, but doesn't cover everything. Lots of mushroom books cover a few of the miscellaneous polypores found here, but nothing all inclusive as this one. Previously, to identify all of these fungi you had to go to classic monographs covering these fungi for North America, like Overholts (1953, 1967) or the two volumes by Gilbertson & Ryvarden (1986 & 1987).

Subsequent to those publications, and others, new genera and species have been described based on DNA analysis, as well as many nomenclatural changes. Just one of many examples is the old genus *Phellinus*. Although the genus still exists with many species, DNA studies have resulted in much of the genus being split into many other genera, such as *Fomitiporia*, *Fuscoporia*, *Phellinidium*, *Phellinopsis*, *Phellopilus*, *Porodaedalea*, etc. Fortunately, the author of this book brings us up to date on all these and similar changes within the polypores.

Some distinctly toothed fungi are also treated in this book, even though they're not poroid at maturity, such as the Indian Paint Fungus *Echinodontium tinctorium*. This fungus has traditionally been treated with polypores and has a hard polypore-like fruiting body, or conk, and does go through a very brief poroid stage, but only when first developing and very young.

Both a glossary and bibliography are provided at the end, covering some relevant and current literature, especially in light of all the recent changes.

The fact that we finally have a complete and contemporary publication on polypores found in British Columbia is a big benefit for those of us who study fungi and live in the Pacific Northwest, but it's definitely worth consulting by anyone living anywhere who has an interest in these fungi. The author has given us a very welcome and valuable addition to our knowledge of the polypore flora.

This is available through Crown Publications, Queen's Printer, Victoria, B.C. (crownpub@gov.bc.ca) for $54.41 US, including shipping and handling. The price they quoted me was in Canadian dollars, which was $67.78.

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PSYCHEDELIC EXPERIENCE MAY NOT BE REQUIRED FOR PSILOCYBIN'S ANTIDEPRESSANT-LIKE BENEFITS

https://scienceblog.com/, Apri.14, 2021

Researchers from the University of Maryland School of Medicine (UMSOM) have shown that psilocybin—the active chemical in "magic mushrooms"—still works its antidepressant-like actions, at least in mice, even when the psychedelic experience is blocked. The new findings, published this week in *Proceedings of the National Academy of Sciences* [PNAS], suggest that psychedelic drugs work in multiple ways in the brain, and it may be possible to deliver the fast-acting antidepressant therapeutic benefit without requiring daylong guided-therapy sessions. A version of the drug without, or with less of, the psychedelic effects could loosen restrictions on who could receive the therapy and lower costs, making the benefits of psilocybin more available to more people in need.

In all clinical trials performed to date, the person treated with psilocybin remains under the care of a guide, who keeps the person calm and reassures them during their day-long experience. This can include hallucinations, altered perception of time and space, and intense emotional and spiritual encounters.

Researchers in the field have long attributed psilocybin's effectiveness to the intense psychedelic experience.

"We do not understand the mechanisms that underlie the antidepressant actions of psilocybin and the role that the profound psychedelic experience during these sessions plays in the therapeutic benefits," says Scott Thompson, PhD, Professor and Chair, Department of Physiology at UMSOM and senior author of the study. "The psychedelic experience is incredibly powerful and can be life-changing, but that could be too much for some people or not appropriate."

Several barriers prevent the widespread use of psychedelic compounds. For example, there is fear that the psychedelic experience may promote psychosis in people who are predisposed to severe mental disorders like bipolar disorder and schizophrenia, so the clinical therapy sessions performed to date have been limited to a highly selected screened group without a family history of these disorders.

Thompson adds that there may also be an equity issue, because not everyone can take several days off work to prepare and engage in the experience. The costs of staffing a facility with at least one trained guide per treated person per day and a private space may also be prohibitive to all but a few. He says it is conceivable that a depression treatment derived from psilocybin could be developed without the psychedelic effects, so people can take it safely at home without requiring a full day in a care facility.

For their study, led by UMSOM MD/PhD student Natalie Hesselgrave, the team used a mouse model of depression in which mice were stressed for several hours a day over 2–3 weeks. Because researchers cannot measure mouse moods, they measure their ability to work for rewards, such as choosing to drink sugar water over plain water. People suffering from depression lose the feeling of pleasure for rewarding events. Similarly, stressed mice no longer preferred sugar water over plain water. However, 24 hours after a dose of psilocybin, the stressed mice regained their preference for the sugar water, demonstrating that the drug restored the mice's pleasure response.

Psilocybin exerts its effects in people by binding to and turning on receptors for the chemical messenger serotonin. One of these receptors, the serotonin 2A receptor, is known to be responsible for the psychedelic response. To see if the psychedelic effects of psilocybin were needed for the anti-depressive benefits, the researchers treated the stressed mice with psilocybin together with a drug, ketanserin, that binds to the serotonin 2A receptor and keeps it from being turned on. The researchers found that the stressed mice regained their preference for the sugar water in response to psilocybin, even without the activation of the psychedelic receptor.

"These findings show that activation of the receptor causing the psychedelic effect isn't absolutely required for the antidepressant benefits, at least in mice," says Thompson, "but the same experiment needs to be performed in depressed human subjects." He says his team plans to investigate which of the 13 other serotonin receptors are the ones responsible for the antidepressant actions.

"This new study has interesting implications, and shows that more basic research is needed in animals to reveal the mechanisms for how these drugs work, so that treatments for these devastating disorders can be developed," says Albert E. Reece, MD, PhD, MBA, Executive Vice President for Medical Affairs, University of Maryland Baltimore, and the John Z. and Akiko K. Bowers Distinguished Professor and Dean, University of Maryland School of Medicine.

This work was funded by the National Institute of Mental Health (R01 MH086828) and the National Institute of General Medical Sciences (T32 GM092237).

Although it is not approved yet, Thompson and the University of Maryland Baltimore have filed a patent on using psilocybin with drugs that block serotonin 2A receptors to treat depression.

ADIDAS TO RELEASE SNEAKER MADE FROM MUSHROOMS

Sarah Dewberry

https://www.thedenverchannel.com/, Apr. 16, 2021

Adidas has released a new sneaker, which it calls the Stan Smith Mylo, that is made from a mushroom-based material.

Adidas

Adidas said that the shoe is the first to use renewable mycelium, which is the underground root of mushrooms, and was created in partnership with the biotechnology company Bolt Threads.

"Mylo is created using a highly efficient growth taking less than two weeks,"Adidas said in a news release. "The process takes advantage of a cutting-edge vertical agriculture technique, allowing the mycelium to be grown in a space-efficient system that increases the yield per square foot."

The company said it's soft, supple, and looks and feels like leather.

Adidas said the outer upper parts of the sneaker—the perforated three stripes, heel tab overlay, and premium branding—are made with Mylo. The shoe's midsole is made with natural rubber.

No word yet on when the shoe will be available for purchase.

ALICANTE, SPAIN'S, "MUSHROOM STREET" GOES VIRAL

https://www.theleader.info/, Apr. 14, 2021

https://www.theleader.info/

Some of the most popular images of the city are currently being shared across the world as the mushrooms on Calle San Francisco seem to have suddenly attracted the attention of many popular pages on social networks.

But the mushrooms that sprouted in the pedestrianized C/San Francisco, in the traditional center of Alicante, transforming the area into a whimsical, fantasy wonderland of yellow brick roads, toadstool houses, and towering mushrooms, were initially not without controversy.

https://www.theleader.info/

The installation of these large mushrooms in 2013, during the government of Sonia Castedo, with the objective of revitalizing the area, provoked criticism from the opposition for its cost—about 66,000 euros. Their installation was subsequently branded as "botched."

The controversy did not stop there, and a year later the City Council put metal bars on the children's mushrooms due to the emergence of urine and excrement. However, since those early days, these ornamental figures on the pedestrian pathway that connects the Portal de Elche with the Plaza de Calvo Sotelo have become one of the most popular images of the city.

Now known as "mushroom street" the area has attracted the attention of tourists and it is not unusual to find people walking up and down the street taking "selfies."

https://www.theleader.info/

Recently, however, these gigantic mushrooms seem to have made the international leap ,and images captured in the street have begun to be shared on social networks in Italy, France, and the United States.

One American radio host, Delilah, with almost 2 million followers, wrote, "I would love to take a walk down this funny and peculiar street. I wonder what magical creatures we could find under the mushrooms."

THE FUNGI SCULPTURES THAT BEND STONE INTO SOFT, FLOWING FORMS

https://www.countrylife.co.uk/, Apr. 16, 2021

Fleshy. Squidgy. Succulent. These are not words one expects to hear when talking about stone and sculpture, but Ben Russell's creations of fungi, cacti, and roots are far from ordinary themselves.

Think about it—how many stone sculptures of plants have you seen in your life? For sure, you've seen carved acanthus capitals, floral bosses, palmettes, and arabesques, particularly in Islamic architecture. Perhaps you've spied the odd two-dimensional floral cornucopia or sheaf of corn.

But freestanding sculptures? In a field dominated by statues of gods, people (usually men), and animals (usually powerful)? These pieces are remarkable not only for their subjects, but for the wonderful incongruity between their soft, flowing forms and the hard nature of the stone in which they are carved.

"If there was a material that I was going to fall in love with, it was going to be stone," says Mr Russell, describing his childhood in Charmouth, Dorset, known for its fossils and less than an hour's drive from the quarries of Portland, stone from which built much of London.

"I was always down at the beach hacking at rocks with my chisels or looking for stones to sculpt."

It was the Dorset landscape, too—the holloways, sunken lakes, and rolling hills—that gave Russell his love of nature, especially mushrooms, his longest-lasting passion.

"Because so much of the land around here has never been ploughed, you get such a variety of mushrooms popping up," he explains. Parasol mushrooms, Parrot Wax Caps, and even "magic" mushrooms (*Psilocybe azurescens*) have all inspired both large pieces and his latest miniature "Terrariums" collection.

As his recent "Roots" series shows, the sculptor is equally as interested in what goes on beneath the soil in their mycelia—networks of tiny fungal threads that interact with tree and plant roots to share nutrients, trigger immune responses, or, in some cases, to release harmful toxins. "I love that sense of everything being connected and alive," he shares. "It's quite incredible."

Realizing it was unlikely he could simply set up a studio and start selling work, the teenage Russell decided to learn his trade, studying applied architectural stonework and conservation in Weymouth, followed by a post-graduate diploma in historic/architectural stone-carving in London.

His first job was restoring the listed monuments at Highgate Cemetery in north London, still one of his all-time favorite locations. In some places, Nature had completely taken over. I remember one chest tomb totally encased in great, chunky ivy roots, as if they were trying to contain some sort of evil."

Other commissions were memorable more for their historical significance. Over the years, he has worked on nationally significant buildings, including the Tower of London, the Houses of Parliament, and the Albert Memorial, as well as making large limestone reliefs for the capital's County Hall, sculpting an armadillo grotesque for St George's Chapel, Windsor, and carving a commemorative plaque for London's Goodenough College, which was unveiled by The Queen.

In spare moments, Russell continued to make his own work, mainly mushrooms, and then, in 2017, inspired by a trip to the glasshouses at Kew, where he'd noticed the sun refracting through the flesh of a cactus, he made a trio of potted alabaster cacti.

"The plants I'd seen almost looked as if they were illuminated from within," he remembers. "Alabaster has that same sort of translucency and I felt it could replicate that succulent, squidgy look a cactus has. After all the detailed repair work I'd been doing, it was really nice to be working on big, bold, organic forms, too.

He posted a picture of the completed piece on Facebook and, within a few days, a Mayfair sculpture gallery ("the kind of place I'd thought I might get into when I was 65," he laughs) had called. In less than a week, the sculptor had a date for his first solo show.

Now, as then, the work starts with a visit to a supplier or a quarry, depending on the kind of stone he is seeking. As well as alabaster, Russell likes to work with Carrara marble for its consistency and ability to handle detail; Ancaster, a hardy limestone that's good for bigger, outdoor forms; and local Portland stone, with its subtle fossil content.

Whichever it is, he rarely goes with a pre-formed idea or design: "I can quite often see the form in the stone. I just have to take the excess away."

Working from his studio, an old cowshed back in Dorset, he starts with an angle grinder to remove the waste, cracking off large pieces with a hammer.

This stage is highly physical and a far cry from most people's romantic notions of stone carving. "I'm in a PVC onesie with a hood, a full face mask to protect me from the dust, ear defenders for the noise, and gloves for the vibrations," he elaborates. "It's not the most pleasant way to work."

He much prefers the moment he can start using chisels to refine the shape, which he does partly out of a love for the tradition of the craft and the attachment to the work it gives him, but also for the element of control.

"With a chisel, you can get so much more tension and movement into the forms," he explains. The piece is then filed with diamond rifflers to smooth out any unwanted marks and sanded, often for days, with a series of papers from a very coarse 24 grade and to a super-fine 7,000 or more.

Each grade takes out the grooves left by the last until, where Russell wishes it to be so, none are visible. "That's what gives that really lustrous finish. By the time a piece is well polished, it's almost like looking into a sheet of glass—you're able to see through the surface."

A final coat of wax adds a protective layer and brings out any colors, some of which may have lain hidden right to the end. "That's what I love about stone," the sculptor says. "There's so much variety in it, so much of the unknown. It comes to life as you make it."

TWO NORTHWEST MORELS

Dick Sieger

Until very recently you could apply almost any morel name to almost any morel and your choice would be hard to dispute. Now mycologists use DNA barcoding to assign reliable names to dozens of morel species.

That said, you may be able to identify two of our local morels without too much trouble. First, make sure your mushroom is indeed a morel and not a look-alike. Think of a morel as being a collection of small distorted cups that have distinct rims, all of them welded together to form a cap. Look-alikes have blunt ridges and no depressions.

Try making an identification by going the wrong way around—pick a name and then see if the mushroom fits it.

Nine out of ten times those "naturals" you find in conifer forests in the mountains are going to be *Morchella snyderi*. They may be growing by themselves, in patches, or in clumps. Their overall color can be pale yellow to black but is usually quite dark. Their ridges are darker than their pits and are aligned vertically with cross walls. The bottom of the cap slightly overhangs the stalk, the stalk develops some groves and pits, and with a hand lens you can see that it is covered with grains.

http://biology.burke.washington.edu

***Morchella snyderi**. Our most common black morel outside of recent burns (and to complicate matters, sometimes in landscaped areas). Pale colors when young. Turns dark later after exposure to sunlight. Stem often with ribs and holes, even when young. May grow in clusters. Early spring.*

Say you or your neighbor had a delivery of beauty bark, and mushrooms came up. See if they are *Morchella elata* (aka *M. importuna*), the landscape morel. These start off round and gray but soon become long brown cones. The main ridges are vertical and are less sinuous than those found in most morels. Between the ridges are cross walls that form little ladders. Like *Morchella snyderi*, the cap on has a little lip that isn't quite attached to the stalk. The stalk is covered with granules, and it becomes ridged as it ages. *Morchella elata* can fruit in astounding quantities, and it can be huge. Big clusters of five-inch mushrooms aren't uncommon.

A. Sieger

***Morchella importuna* (*"elata"*)** *aka "landscape morel." May be found in gardens in the spring after the ground is covered with commercial bark or compost. Often clustered and large.*

There are some wonderful resources on line for identifying Northwest morels. Check out Danny Miller's picture key at www.alpental.com/psms/PNWMushrooms/PictorialKey/Morels.htm#Morchella or download Ian Gibson's MatchMaker from https://www.mycomatch.com/.

FLAMING MORELS *Oft Told Mushroom Recipes* PSMS, 1969

Ingredients

1 qt morels, halved
4 TBs butter
Salt, pepper, Accent
½ cup sherry
2 TBs brandy
¼ cup scalded cream

A. Sieger

A. Sieger

Directions

Cook mushrooms in butter in chafing dish. Sprinkle with salt, pepper, and Accent. Add sherry. Simmer until almost dry. Add brandy. Ignite. When flame is out, stir in cream. Heat. Serve in patty shells or toast cups or on toast.

MUSHROOMS IN RAMEKINS *Oft Told Mushroom Recipes* PSMS, 1969

Ingredients

1 qt sliced morels
3 TBs butter
Salt, pepper to taste
2 TBs lemon juice
2 TBs flour
¼ cup Parmesan cheese
3 egg yolks, beaten lightly
1 cup cream
4 TBs bread crumbs
Butter

Directions

Sauté mushrooms in butter on medium heat. Stir and cook until lightly browned. Add salt and pepper to taste. Add lemon juice. Stir in flour and Parmesan cheese. Place in ramekins. Beat egg yolks. Add cream. Pour over mushrooms. Sprinkle with bread crumbs and dot with butter. Bake in 425°F oven for 10 minutes.

May is Morel Month!

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