

SPORE PRINTS

BULLETIN OF THE PUGET SOUND MYCOLOGICAL SOCIETY
Number 599 February 2024



UNCOVERING THE MYSTERIES OF THE BOOK OF KELLS—FROM MYOPIC MONKS ON MAGIC MUSHROOMS TO SUPERHUMAN DETAIL

<https://theconversation.com/>, Jan. 19, 2024



Trinity College Dublin

Detail from *The Book of Kells*, folio 291v.

The Book of Kells is a late-eighth century illustrated copy of the four gospels of the New Testament, traditionally associated with the affiliated monasteries of Iona in the Inner Hebrides of Scotland and Kells in County Meath, Ireland.

Seeing the book at Trinity College Dublin is on the bucket list for most visitors to the city, although many are perhaps unaware of what, exactly, makes it so important. One easy way to explain its importance is to compare the so-called Chi-Rho page in Kells which celebrates the first mention of Christ's name in the gospels by enlarging the first two letters of his name in the Greek alphabet, χ (Chi) and ρ (Rho), with a similar page in any other contemporary manuscript from the milieu of the Irish Church.

Not infrequently, the response to the Book of Kells page will be: "Monks on mushrooms!" This was also the reaction of *Guardian* art critic Jonathan Jones recently, when he visited the newly opened Book of Kells Experience, an immersive exhibition at Trinity College Dublin that showcases some of the extraordinary creative highlights of the manuscript.

There is a long history of substance-enhanced art, particularly in association with some of the 20th century western greats—Picasso, Salvador Dali, and Jean-Michel Basquiat—and of course an entire counterculture movement in the late 1960s connected with LSD. But this is not typically something we would associate with eighth-century monks.

The pages of the Book of Kells certainly contain some of the elements that have been used to identify drug use in modern and contemporary art.

The figures of Matthew and John introducing their respective gospels have creepily vacant stares. Letters are formed from distorted men, birds, and beasts, their bodies and limbs extended

and entangled to create decidedly surrealist openings to important gospel texts. One panel on the page that opens the Gospel of Luke appears to depict an all-male bacchanalian gathering.

Kells Under the Microscope

Although now faded by 1,200 years of use, the colors in the manuscript still retain some of their original psychedelic intensity. The yellows and purples practically vibrate on the page. The variety and layering of colors is not found in any surviving contemporary northwest-European manuscript.

Scientific research into the origins of the pigments conducted by Trinity College Dublin's library conservation department have revealed some of the alchemy involved in their creation.

The intense yellows were created using the poison arsenic sulfide, the reds are toxic red lead, and the purples are made from lichen, the purple color extracted using ammonia, traditionally obtained from urine.

We know that contemporary metalworkers used mercury gilding—a technique that would have led to neurological issues from the inhalation of mercury vapor. Might scribes too have been exposed to side effects from the tools of their trade?

Against this argument are some of the other secrets that the Book of Kells has revealed when studied under a microscope.

Underlying some of the most complex—and psychedelic—pages are tiny grids of pin pricks, used as a carefully prepared guide to ensure that the artist maintained perfect symmetry in his work. While at a macro level the art of the Book of Kells appears exuberant and uncontrolled, at a micro level it is an object lesson in pure symmetry, often at a minute scale.

For example, a panel measuring just 80 mm × 45 mm (page 3) near the center of the Chi-Rho page incorporates three lions, four humans, four snakes, and 13 birds. Although all are extenuated and locked into a tight mesh of limbs, bodies, wings, and heads, the anatomy of each is complete and a symmetry of the bodies is maintained throughout. The precision of planning and control of design does not suggest a scribe under the influence of psychedelic drugs.

Unsolved Mysteries

It is only since the digitization of the manuscript in 2014 that most of us have been able to properly appreciate this aspect of the Book of Kells' mastery, as much of this detail is nearly invisible to the naked eye.

Artificial lenses are an invention of the late 13th century, so aside from the possible use of the magnifying properties of rock crystal (for which there is no direct evidence) the question does arise as

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Spore Prints

is published monthly, September through June by the
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CALENDAR

- Feb. 13 Membership meeting, 7:30 pm, CUH
- Feb. 19 Board meeting, 7:30 pm, CUH Board Room
- Feb. 20 *Spore Prints* deadline

BOARD NEWS

Carolina Kohler

Greetings, fellow PSMS members!

The first meeting of 2024 found the board deeply engaged in discussing what this new year will bring.

After the usual approval of the minutes and discussion of the treasurer's reports, the conversation turned to the Golden Mushroom Award and the 2024 Wild Mushroom Show, which already has a date! Mark your calendars for the last weekend of October (26–27) and make sure to check with the Show Committee for volunteering opportunities.

President Colin Meyer has been working on the negotiations to renew our lease at the CUH, and there is a chance that we will be

getting a larger space, which is very exciting. This is still a few months away, but discussions are under way.

We are also thrilled with a project that our immediate past president, Randy Richardson, has been busy with. It involves a very special set of 3-D slides that were donated to PSMS right before the pandemic began. Randy is checking that everything is in working order, and hopefully we will be able to take a peek soon.

The board then had an interesting conversation regarding ways in which PSMS can better welcome new members at meetings and other events. If you are one of our new members, please feel free to come and say "Hi!" after our general membership meetings! We'd love to get to know you and answer any questions you may have. And you can also reach out to the chairs of the different committees by email. You will find a lot of useful information on the Members' Page our website, which you can access by logging in with your username and password.

And last, but definitely not least, election time is upon us! The official list of candidates was announced to the board, and we were delighted to see such a wonderful roster. A huge thank you to our elections committee for their hard work. Voting couldn't be easier, so make sure to cast your e-vote. You can find more information on the candidates and on the election process in this issue of *Spore Prints*.

See you all at our next membership meeting on February 13!

MEMBERSHIP MEETING

Scott Maxwell

The membership meeting on February 13, 2024, will be a "hybrid" meeting both in-person at the Center for Urban Horticulture and virtual on Zoom. We will start letting people into the CUH meeting hall at about 7:00 pm and into the Zoom meeting at about 7:15. The lecture will begin at approximately 7:30 pm.

Looking outside this time of year we find the occasional cold weather mushroom, but much of those fruitings have passed. We now see broken branches after our winter storms covered with many colorful lichens. Did you know that lichens are part fungi! Come to February's meeting and learn from an expert about these extremely interesting organisms.



Dr. Katherine Glew.

Dr. Katherine Glew, current Associate Lichen Collection Curator at the University of Washington Herbarium, will be presenting an update to "What Everyone Should Know About Lichens."

Lichens are a vital yet many times overlooked part of our forest ecosystem, rangelands, and rural environments. Katherine will provide us insights into their environmental, ecological, and commercial value as well as their biological makeup, diversity, and beauty. An entity that goes by one name, a lichen is actually the symbiotic relationship of multiple organisms.

Katherine has taken part in lichen studies around the world and curated the lichen collection at the Field Museum of Natural History in Chicago. After a 20 year career as a high school biology teacher, she returned to the University of Washington for her Ph.D. researching lichen taxonomy and alpine vegetation ecology in the Olympic and Cascade mountains. Following graduation, she

completed post-doctoral research in Bergen, Norway. In addition to research, Dr. Glew has taught biodiversity, ecology, and cryptogamic botany at the University of Puget Sound. She currently heads a lichen study group at the University of Washington. Katherine has supported PSMS for many years, hosting lichen forays and ID clinics and supporting our annual show, adding to the exhibit diversity and contributing to public knowledge surrounding these interesting symbionts. We are looking forward to learning more about these interesting organisms when they are so accessible for investigation.

The Book of Kells, *cont. from page 1*

to whether the scribes' ability to see and work at such a minute scale was enhanced by other means.

Although more than 400 medical texts survive from the later medieval period in Ireland, relatively few date back to the period when the Book of Kells was made. However, we do know that many monasteries had physicians.

Indeed, a Life of St Columba, written at Iona about 100 years before the Book of Kells was made there, describes a man coming to seek medicines at the monastery. Unfortunately, though, specific references to "cures" for eye ailments or for enhancing near sightedness are not forthcoming. That is except for St Manchan "the wise" of Lemanaghan, County Offaly, whose hagiography (books written on the lives of saints) describes how his protruding eyes were cured by contact with the corpse of St Molua.

Assuming that this particular cure is an apocryphal one, the mystery of the enhanced myopia and the steady hands of the Book of Kells scribes remains unsolved, unless of course, one sides with one 12th-century commentator who declared that such intricacy could only be the result of "the work of angels."



Trinity College Dublin

Detail from *The Book of Kells*, folio 291v.

FUNGI FIREFIGHTERS? A BOULDER MUSHROOM COMPANY'S SOLUTION TO WILDFIRES IS QUINTESSENTIALLY COLORADO

Emma VandenEinde

<https://www.kunc.org/>, Jan. 17, 2024

More than 3 million Coloradans live in the Wildland-Urban Interface, positioning their homes at greater risk from the smoke and flames of wildfires. As more people live, work, and play in these areas, preventing wildfires becomes increasingly important. Now, one Boulder resident is confronting the heat, but he's not using the typical mitigation measures you might expect.

"We believe by using fungi and biological solutions, we can help facilitate carbon sequestration, we can facilitate creating healthy soils, and do so in a way which is ecologically sound and sustainable," said Zach Hedstrom of Boulder Mushroom. His company studies the benefits of mushrooms from their medicinal qualities to their surprising potential to, yes, prevent wildfires.

Hedstrom points to saprophytic fungi, which he calls "nature's recyclers" because of their ability to break down wood—a fuel for wildfires.

The process involves applying the fungal root, or mycelium, via a fine spray to the wood. The resulting enzymes from the mushrooms break apart the molecules in the wood and turn it into healthy soil.

Still, the mycelium takes many months to grow. Hedstrom says that time line is insignificant when you consider what traditional fire mitigation involves.

Hedstrom said that after applying the mycelium to wood, in 16 to 20 months those wood chips are rich soil. Normal wood chips could take anywhere from 20 to 50 years to decompose otherwise.

Also, many foresters will cut down trees that pose a threat and haul the extra biomass away so that fires do not spread as quickly. But that comes with its own environmental issues—trucks add more emissions into the environment, and they usually have to haul chips to waste disposal sites that are hours away. And when the terrain is extreme, many trucks can't get access to the area.

Meanwhile, slash piles can only be burned when the weather allows. Finding that safe window can take a long time—often years. The cost of doing this is high—sometimes more than \$3,000 per acre—and the wood remains a fire hazard while it sits on the forest floor.

THIS COFFEE HAS GONE TO THE DOGS

Zac Cadwalader

<https://sprudge.com/>, Jan. 19, 2024

In the pantheon [sic] on things in this world that humans don't deserve, dogs are somewhere near the top of the list. Those goofy fluffballs possess a loyalty and affection that we have in no way earned, and still they give it freely. My dog is one of the only living things on this planet I would consider sharing my morning coffee with, which of course I can't because the caffeine wouldn't be good for him. And I could give him a cup full of whipped cream,

cont. on page 4

Coffee Has Gone to the Dogs, cont. from page 3

otherwise known as a puppaccino, but he's already a husky so he doesn't need those sugar calories.

Enter Barkista, a new line of dog-friendly "coffee" to share with man's best friend. Because sure why not.

This is not the first attempt at a coffee-like product one could share with their canine pals. Back in 2017, we reported on a Kickstarter for a similar product known as Rooffee. It failed spectacularly, for obvious reasons. Luckily, Barkista had the good sense to not decide on the worst possible name imaginable.

Barkista contains no actual coffee and is instead a mix of dehydrated goat's milk, natural flavors, and medicinal mushrooms—lions mane, cordyceps, chaga, shiitake, maitake, red reishi, and turkey tail. It's a chow chow chagaccino. Per the brand's website, these

mushrooms are a "dog superfood" and are said to boost your dog's immune system, improve gut health, reduce inflammation, promote hydration, and relax and calm your furry friend. All ingredients are "100% human grade," which sounds nice, but I've seen how some of you eat and my dog would never.

And Barkista has a variety of flavor options for the most discerning canine palate. Their Instant Dog Coffees come in Mocha Latte, Caramel Latte, and even Pumpkin Spice Latte. The Caramel Latte is available in pod form, also known as K9-Cups, which is super cute. Terrible for the environment, but cute.

So if you've ever wanted to share a cup of coffee with your teacup poodle, there's Barkista. Or, you know, you could just pet them. They like that too.



Election

Election

Election

Election Instructions

Marian Maxwell

Elections are held electronically online. Voting opens February 1 and will end on March 10 at midnight. This year we will be voting for Vice President, Treasurer, and five Trustees for the years 2024–2026. Please read the following candidate profiles carefully. An email with the link to vote will be sent out on Feb. 1 to those on the PSMS mailing list. Those not opting into the mailing list will need to go to the PSMS website at www.psms.org and click on "Members' Page" under the heading "Membership." You will need to log in with your username and password. Scroll to the bottom of the member's area page to "Member's Area Features." Under the heading "Engagement" click on the link "Elections." This will open the ballot for the 2024 PSMS election. You may now make your selections. Be sure to click on "submit" on the bottom of the ballot when finished. If you have the PSMS app downloaded on your cell phone, it is also possible to vote via

the app. If you have forgotten your password, please fill out the section "Forgot your password?" at the bottom of the page and click on "Reset your password." If you cannot remember your username, contact Pacita Roberts at membership@psms.org or Marian Maxwell at outreach@psms.org.

Please note that some biographies in *Spore Prints* may have been abbreviated owing to space considerations. Online bios are as originally submitted. It will be helpful to have your *Spore Prints* issue with the candidates' photos and bios available to view when voting since there is no option to post photos in the online election area. You may only vote once. There are two votes per family membership; each person has to log in separately and use their individual user ID to vote. There is one vote for single and student memberships. Please direct questions about voting to Marian Maxwell at outreach@psms.org. Election results will be announced at the annual membership meeting on March 12.

Officers

Joe Zapotosky

Vice President

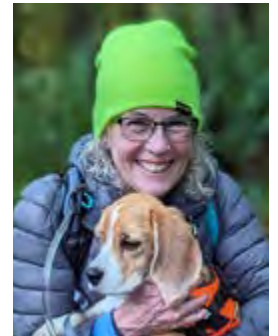
Joining PSMS in 2002, I have enjoyed participating in the various activities of this wonderful club. I have assisted in set up for the annual show, attended ID clinics, taken many of the mushroom classes, and on occasion helped out as a field trip guide. In short, I believe I have benefited greatly from this organization and would like, in some small way, to repay some of this debt.



Treasurer

Cindy Brewster

I joined PSMS in 2020 and have participated in many of the fun and educational opportunities that PSMS offers. I became a field trip guide in 2023. My background includes accounting and finance. I'm looking forward to giving back to this fantastic organization.



Trustees

Peg Rutchik

A member since 2017, I have taken classes, hosted field trips, and participated in the Bridle Trails Study and at the mushroom show. I joined the board in 2023 after serving as an alternate trustee. My experience in leadership and nonprofit boards helped to prepare me for this role. I would like to support PSMS by continuing to serve on the Board of Trustees.



Vern Hodgson

My wife and I joined PSMS in 2021 to learn more about N.W. mushrooming. We have been impressed with the membership, the activities, and the field trips. It has been a rewarding experience, wonderful people all with like minded interests. I am interested in learning more and participating in the activities of PSMS.



Clay Dawson

My wife and I became members of PSMS about 7 years ago. This year we took the training and became field trip guides. I consider myself a beginner at mushroom ID and finding good habitat, but I'm learning. I have been looking for ways to become more active in the club and hope to contribute as a board member. I would appreciate your vote. Thanks.



Megan Brewster

As a new member (since 2020) and field trip guide (2023), I am excited to give back more to this amazing organization that gets me outside year-round. I bring extensive leadership experience with volunteer organizations (women in STEM, science policy). I hope to focus on scalability and safety as PSMS's impact and membership continue to grow.



Amy Foster

I have always been fascinated by fungi and their alienness. I have been a member of PSMS since 2020. I am running for trustee to be a more active member of PSMS and hope you will give me the opportunity to assist in furthering the PSMS mission.



Kelsey Hudson

I joined PSMS in 2018 and currently serve as a Board of Trustees member. I started volunteering for the shows and field trips my first year, and have a lot to offer the organization. I'm an IT security manager who's passionate about mycology and the outdoors. I love sharing the knowledge I've learned being part of PSMS.



Shaojun Wang

Meet Shaojun, our enthusiastic board member candidate. Recently settled in our vibrant community, Shaojun is eager to forge connections, explore our region, and share his love for mushrooms. As an IT professional, he blends technology with his passion for fungi. Join Shaojun in cultivating a fungi-friendly community!



Tara Henry

After joining PSMS in 2017, my interest in mushrooms has blossomed from a small hobby to a major part of my life. Today, I give back to the group as a field trip guide and Fall show volunteer, but would love to contribute more. As a trustee, I will bring positivity, open-mindedness, and new creative ideas that will help enliven the club.



Andy Iwata

A member since 2014, I have enjoyed helping at the mushroom shows and helped guide during various forays. I grew up hunting Matsutake and chanterelles in Washington. Since joining the club I have learned so much more about mushrooms. I have a passion for helping newcomers get excited about collecting mushrooms.



PSMS FIELD TRIPS: A Look Behind The Scene

Wren Hudgins,¹ Julia Benson,² and Brian S. Luther³

Field trips are a long standing tradition with PSMS. Our first field trip was in May 1964. At that time we had 108 members.

As far as we're aware, no other mycological society regularly offers educational/social field trips of the caliber we do at PSMS, in both spring and fall.



Brian, Julia, and Wren, scouting field trip sites on Jan. 7, 2024.

Nowadays, most members come to the PSMS field trips without realizing the extensive and detailed planning that goes into making these a successful experience. We recently spent a day together looking for potential field trip sites and scouting for collecting areas nearby, and we thought it might be good to inform our members about all that goes into the field trips.

Selecting, and Securing Field Trip Sites

The scouting for, selecting, and reserving the field trip sites is a job in itself. An important part of this involves maximizing the timing of each location with the potential availability of collecting, taking into consideration the elevations of these sites as the season progresses, going higher for spring field trips, and lower as fall advances. For some locations, there's a lot of application paperwork that's required. Field trip sites need to have at least water, bathrooms, and sufficient parking. A shelter and/or power and a fire pit are also desirable amenities.

Frequent complications attempting to select sites include venues that may fulfill our needs in one regard, but then may have a limit on those attending, or the perfect site and timing are found, but another group has already reserved it ahead of us. Our best laid plans easily and quickly get disrupted, causing scheduling dilemmas that take a lot of time to resolve. This is why Brian (along with his wife, Pam) has to start scheduling the next season's field trip venues right after the current season ends.

You might think that when we have a reservation, we could relax. We have learned not to take things for granted, but to call (which Brian does) to make sure gates will be open, the water and power will be turned on, and the bathrooms are open and stocked with toilet paper.

Conducting the Trips

This is just the beginning, because then our devoted members of the Hosting Committee and the Field Trip Safety Committee (the field trip guide program) have to recruit volunteers for these events. Then afterward, field trip reports have to be written and sent to the *Spore Prints* editor for the membership to see.

Field trips are not only educational experiences but also social events. They include morning coffee & snacks, potential for col-

¹Wren is a current PSMS board member and Co-Chairman of the Field Trip Safety Committee (along with Dave Weber); Wren and Dave are responsible for the field trip guides.

²Julia is a field trip guide.

³Brian is both the PSMS Field Trip Committee chair and the Field Trip Identification chair.

lecting together, delicious potlucks on Saturdays, and free camping or RV parking at some group camps at least once in spring and fall.

Many field trip sites have fire pits or shelters with fire places. This requires loading up firewood ahead of time or bringing chainsaws to go cut some at the site. Then the fire needs to be started and kept going. Several members have regularly helped with this for many years. Brian wishes to especially give credit to Wren, Julia, Ben Moore, and Jamie Rumbaugh for assisting me in this function. Brian has had many members come to him over the years, grateful for the camp fires we take the time to make. They are especially welcoming in early spring and fall.

Mushroom ID represents one of the most critically important, anticipated, and appreciated aspects of the field trips for members. If members can't get what they've found identified, it defeats much of the learning experience. As far as doing this important function, only a couple of us are qualified and willing to devote a whole day or weekend performing this duty consistently at virtually every field trip.

Finding New Field Trip Sites

Many years ago, from the 1960s and well into the 1980s, we could go to a larger number of field trip venues. Many of these locations at the time were not only free, but didn't require reservations, restrictions on the number attending, or collecting regulations to deal with.

We still have several long-time "tried and true" locations that we go to every year. With a burgeoning membership, however, there's a never-ending quest to find new and appropriate field trip locations. This, in particular, has become a real challenge.

Summary

Between organizing the initial field trip sites, hosting, field trip guide programs, and all-day identification, we hope you now have a better understanding of all that's involved in putting together our field trips.

VOLUNTEERING HELPS THE CLUB RUN

Wren Hudgins and Brian S. Luther

It's always only a tiny fraction of members of nonprofit organizations such as ours who regularly volunteer to make things run smoothly. Field trips are only one of the educational opportunities PSMS offers. Volunteering can be as little as a one time job lasting just a few hours all the way up to ongoing commitments requiring several hours weekly.

For example, we welcome members who are interested in helping with mushroom identification, but this role requires a significant commitment of study and taking all of the mushroom classes offered by PSMS, as well as closely working with us at the field trips, at the fall wild mushroom exhibit, etc., to improve your knowledge and skills. Of course, there are other helping roles, such as field trip hosting, that require no prior knowledge and last only a few hours.

Please consider volunteering and feel free to contact us if interested in contributing. As always, Brian will have the spring field trip agenda available in early April and the fall outings posted in early September, but only in the secure Members' Page of

our website, www.psms.org. If you're a new member of PSMS, you'll need to experience one of our field trips to see how things work, and we know you'll enjoy it. At PSMS field trips we can never guarantee you'll find good edible fungi because there are too many variables we can't control, but you probably will find some and with more experience you'll do better and better. But, what we do assure our members is that they'll have an excellent educational and social experience.

The co-chairs of our Field Trip Hosting Committee are Carolina Kohler (who's also our PSMS Secretary) and Debbie Johnson. To learn about field trip hosting and/or to volunteer for this important part of our field trips, please contact www.host@psms.

OCEAN FUNGI FROM TWILIGHT ZONE COULD BE SOURCE OF NEXT PENICILLIN-LIKE DRUG

Sophie Kevany

<https://www.theguardian.com>, Jan. 16, 2024

Large numbers of fungi have been found living in the twilight zone of the ocean and could unlock the door to new drugs that may match the power of penicillin.

The largest ever study of ocean DNA, published by the journal *Frontiers in Science*, has revealed intriguing secrets about the abundance of fungi in the part of the ocean that is just beyond the reach of sunlight. At between 200 m and 1,000 m below the surface, the twilight zone is home to a variety of organisms and animals, including specially adapted fish such as lantern sharks and kitefin sharks, which have huge eyes and glowing, bioluminescent skin.

"Penicillin is an antibiotic that originally came from a fungus called *Penicillium* so we might find something like that from these ocean fungi," said Fabio Favoretto, a postdoctoral scholar at the Scripps Institution of Oceanography at the University of California, San Diego. The twilight zone is characterized by high pressure, a lack of light, and cold temperatures, which presents an extreme environment "where fungi might exhibit unique adaptations," he added. "That could potentially lead to the discovery of new species with unique biochemical properties."

The new ocean DNA catalogue, launched on Tuesday, contains more than 317 million marine organism gene groups compiled from samples collected on voyages including the four-year Tara Oceans expedition which started in 2009 and the 2010 Malaspina Circumnavigation expedition.

Advances in technology meant existing samples could provide much more data than before, while the process of cataloging helped open new doors into the understudied ocean, said the marine biologist and the paper's lead author, Elisa Laiolo.

The marine biotechnology sector, which relies on ocean organisms and their genes, is worth an estimated \$6 billion, a figure expected to almost double by 2032.

Laiolo was surprised to see so many fungi living in the ocean's twilight zone. "There have been some indications of it [fungi abundance at this level] before, so this is another piece of the puzzle."

Another critical discovery made during the cataloging process, said Carlos Duarte, a marine science professor and senior author

of the study, was the role viruses played in boosting gene diversity. "The viruses insert themselves and move genes from one organism to another. That means viruses create genomic biodiversity and that accelerates their evolution."

One result of that acceleration, he said, were genes that had evolved to enable organisms to chew through plastic. "They can degrade synthetic polymers, derived from hydrocarbons, which are very recent as a pollutant in the ocean, showing that evolution happened in a few decades."

The catalogue also highlighted gaps in our understanding of the ocean floor, said Laiolo. "It is easier to sample the water than the ocean floor and what we underline in the paper is the need to increase studies targeting the seabed in the future."



Alexis Rosenfeld/Unesco

The twilight zone is the part of the ocean just beyond the reach of sunlight.

GLOBAL DEATHS FROM FUNGAL DISEASE HAVE DOUBLED IN A DECADE—NEW STUDY

David W. Denning

<https://www.manchester.ac.uk/>, Jan. 14, 2024

Eleven years ago, my colleagues and I estimated that about 2 million people around the world were dying from fungal infections annually. My latest estimate puts the figure today at nearly double that: around 3.8 million deaths.

To put this in perspective, it accounts for around 6.8 percent of total global deaths. Coronary heart disease is probably responsible for 16 percent of the world's total deaths, followed by stroke at 11 percent. Smoke-related lung disease (COPD) comprises 6 percent of total deaths, with fungal infection being responsible for about one-third of these 3,228,000 deaths.

Other comparative global death statistics put pneumonia at 2,600,000 (some fungal) and tuberculosis at 1,208,000 (of which mostly undiagnosed fungal disease probably comprises 340,000 deaths).

To arrive at these estimates—published in *Lancet Infectious Diseases*—I made a judgment about the proportion of fungal cases actually diagnosed and treated, and those that are missed. While fungal disease diagnostics have improved greatly in the last ten to 15 years, both access to and actual usage of these tests is limited—and not only in low-income countries.

cont. on page 8

Twilight Zone Fungi, cont. from page 7

For example, South Africa has an enviable diagnostic service for fungal (cryptococcal) meningitis and bloodstream fungal infection (*Candida*), but has no diagnostics for infections caused by another very common fungus, *Aspergillus*. These gaps contribute substantially to unnecessary deaths. In particular, timely diagnosis of severe *Aspergillus* infections, ideally within 48 hours, could save millions of lives each year.

The most important lethal fungi are *Aspergillus fumigatus* and *Aspergillus flavus*, which cause lung infections. Among the people affected are those with lung diseases, such as asthma, TB, and lung cancer, but also people with leukemia, those who have had an organ transplant, and those in intensive care.

Many of these people die because their doctor does not recognize that they have fungal disease—or they recognize it too late. But also, many of the deaths are due to slow or absent diagnostic testing and a lack of effective antifungal drugs. Tests based on fungal cultures only identify about a third of people who actually have a fungal infection.

Unfortunately, as with antibiotic resistance, antifungal resistance is a growing problem too. Spraying crops with certain types of fungicides is greatly increasing resistance rates to a group of antifungal drugs known as azoles.

Candida infections are one cause of sepsis and are found in the bloodstream. They are also linked to diabetes or renal failure—or both—and can also take hold after major surgery or trauma. This fungus is a normal part of the gut microbiome, but when we are very ill, it travels across the gut wall into the bloodstream.

With over 1.5 million people affected globally by life-threatening *Candida* infection, and nearly 1 million deaths annually, we urgently need better diagnostics tests. Current blood culture tests only pick up 40 percent of life-threatening *Candida* infections.

About 50 percent of the approximately 600,000 deaths from AIDS are attributable to fungal infections. There are major efforts globally to eradicate cryptococcal meningitis as a cause of death, partly led by the US Centers for Disease Control and Prevention and the World Health Organization.

Also in AIDS, much more work is required on histoplasmosis in Africa and southeast Asia, using the better tests. Too many of these patients are misdiagnosed with TB or have a dual infection with TB, without the lethal *Histoplasma* infection being recognized or treated.

Black Fungus

The world's first large-scale outbreak of mucormycosis followed COVID in India—the so-called black fungus. The fungi causing mucormycosis block off tissue blood supply causing dead tissue, hence the popular name “black fungus.”

In 2012, my colleagues and I estimated about 10,000 cases of mucormycosis globally. The COVID pandemic in India led to at least 51,000 reported cases—a massive increase attributable to factors including excess steroid usage for COVID (too high a dose and for too long) and poorly controlled diabetes.

Aspergillus and *Candida* infections were also much more common in COVID patients in intensive care around the world. Indeed

the COVID spike in fungal disease was not taken into account in assembling these newly published incidence and mortality figures from the fungal disease, so they could be even higher.

Double Whammy

People admitted to intensive care with influenza also have a high incidence of life-threatening *Aspergillus* infection, doubling the risk of death, even if *Aspergillus* is diagnosed. Indeed, doctors and scientists are fearful of a double whammy epidemic of fungal infections and influenza or another respiratory virus.

There is also a strong association between fungal allergy and severe, or poorly controlled, asthma.

Asthma is common and increasingly problematic as people get older. People with fungal asthma usually need several medications and endure flare-ups, emergency room visits and hospitalizations.

Despite all the efforts to control asthma, an estimated 461,000 people die from it each year or with it as a component of their final illness, worldwide.

Fungal diseases are here to stay. We are surrounded by them, and they live in our guts and on our skin.

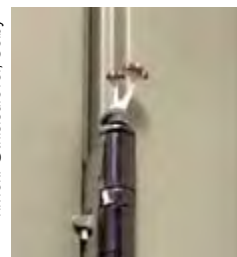
There are no vaccines for fungi. Severe fungal disease strikes when people are already ill, with only a few exceptions in healthy people and in those living or working in moldy homes or work environments. That is why accurate and timely diagnosis is desperately needed, and why we need to take fungi very seriously.

2024'S NEWEST BIZARRE INTERIOR CRAZE IS MAKING TINY MUSHROOMS TO COVER YOUR DOOR HINGES

Andrew Lloyd

<https://www.businessinsider.com/>, Jan. 17, 2024

TikTok: @thisiscolby



A DIY creator blew up on TikTok with a crafty decorative trend that maximizes the tiny space on doorway hinges with homemade figurines.

On December 29, a TikToker who goes by Colby and regularly shares DIY decor suggestions, posted a video with an on-screen caption that asked viewers if they'd ever heard of “hinge heads.”

In a video voiceover, Colby said people would either love or hate the trend she had discovered, which involved adding “little trinkets” to the tops of door hinges. She said it “sounds ridiculous” but thought they were cute, and showcased some homemade examples that resembled mushrooms.

She also attached a small magnet to the bottom, so they would remain on the metallic surface of the hinge without falling off.

