



Our field guide to the peculiar and  
extraordinary world of fungi

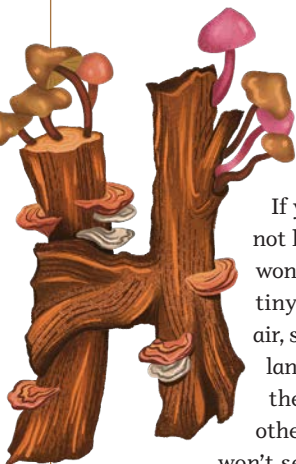
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ILLUSTRATION MEEGAN LIM

# MUSHROOMS

Foraging for mushrooms is like uncovering  
thousands of secrets in the soil.





HERE IS WHAT I've learned.

If you walk through the forest not looking for fungi, you probably won't see them. You won't see their tiny spores swirling through the air, searching for a friendly place to land, a place to grow—even though their spores outnumber every other living particle in the air. You won't see their mycelial threads that stitch the soil together under your feet and weave themselves into some of the largest and oldest organisms on earth—even though these interweavings among plants and roots are what makes life on land possible. You won't see these not-animal, not-vegetable creatures hunting for nutrients in soil and rock, deciding (yes, deciding) which trees will get vital nutrients and when. And you might not even see their gorgeous fruit: the mushrooms that sprout suddenly, after a rain, pushing up through pine needles and leaf litter and rotting wood.

But just because you don't see something doesn't mean it's not there.



It's a long drive from Toronto to Lake Panache, Ont., on the far side of Killarney Provincial Park, where I've been invited to join a mushroom hunt. There's just one problem: the earth in this part of the world is as dry as a sun-bleached bone, and my hosts have warned me that the old-growth boreal forest behind their camp has been parched for weeks.

Mushrooms are a direct expression of weather. In his book, *Entangled Life: How Fungi Make Our Worlds, Change Our Minds and Shape Our Futures*, Merlin Sheldrake describes toadstools that can appear seemingly out of nowhere after a rain, growing with enough force to lift 285-pound rocks and tear apart an asphalt road. But these strange "fruits" don't actually appear out of nowhere. It just seems that way because the fungal body that produces them lives unseen underground. Dig a teaspoon into the forest floor and you'll find evidence of the body itself: a tangle of thin white threads running through the soil, lacing the forest world together. If you could untangle these mycelia, they might unspool over 10 kilometres.

Sheldrake calls mycelia "ecological connective tissue," and there is growing evidence to suggest that common mycelial networks share valuable resources among trees. The more that we learn about fungi, the more we begin to understand how deeply intertwined

The blewit (right) has purple hints that deepen with age, starting as subtle smudges and growing to what looks like a bruise. They sometimes sprout in fairy rings, darkened circles of grass created by the growth of fungi. The blewit is edible when fully cooked but hard to differentiate from several poisonous species. For experienced foragers only!



our lives really are with fungi—and the less that life makes sense without them.

Lake Panache is a popular cottaging spot for Sudbury residents because it lies just beyond the Sudbury Igneous Complex, the lucrative rock basin that was mined within an inch of its life for copper and nickel. You've probably seen pictures of what happened there: the blood-red tailings, the barren landscape so devoid of life that NASA conducted moon landing trials. The basin became a poster child for environmental degradation; now, Herculean efforts at reclamation are busily re-greening the landscape. In 2022, Sudbury planted its 10 millionth tree.

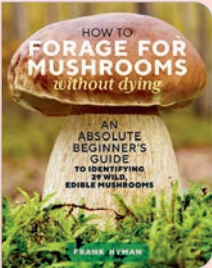
Planting trees is one thing, but ensuring their survival is quite another. It's not easy for a sapling to take root in the disturbed soil of old mines, in part because their fungal partners may no longer be living in it. Saplings, like 90 per cent of the world's plants, depend on a symbiotic association among mycelia and roots, called mycorrhizae. To get the greatest chances at a successful planting, the soil must first be amended to make life possible again—not only for the saplings themselves, but also for their fungal partners. There's even a company out of Timmins, Ont., called Micro-Tek,

that offers a service to inoculate saplings with mycorrhizal strains to help trees grow better in these disturbed sites.

Around Panache, where the people who work for the mining companies go to unwind, the old-growth forest is still intact. "It is a postcard," writes geographer and amateur mycologist Erin Gordey in an email before we meet, "almost a U.S. parks office image of what this whole area must have been like before the Sudbury Igneous Complex was found."

Diane McLean and David Wood live in Sudbury and have invited Gordey to lead a group of cottagers to hunt for mushrooms in the woods behind their camp on nearby Panache. They have been hunting for edible varieties in the area for years; although they themselves are amateurs, they can identify more than a few species delicious enough to eat: chanterelles, hedgehog mushrooms, and boletes—what Italians call porcini. Several people in our party, like David, are trained as geologists; nearly everyone is connected to the mining world in one way or another. They are people used to going hunting for treasure, and the geologists have come prepared. They have brought their loupes, the teardrop magnifying glasses normally used to examine rock. »

YOUR FORAGING FRIENDS



*How to Forage for Mushrooms Without Dying* by Frank Hyman is an excellent beginner's guide—and small enough to fit in a large jacket pocket. **\$24**, [amazon.ca](https://amazon.ca)



*Mushrooming: The Joy of the Quiet Hunt* by Diane Borsato is pretty enough to display on a coffee table but also works well as an introduction to some of the weirdest and most wonderful mushrooms in the forest. **\$39**, [douglas-mcintyre.com](https://douglas-mcintyre.com)



A BRIFE

A knife with a brush for wiping off excess dirt and pine needles. Opinel makes a beautiful wooden-handled version. **\$37**, [leevalley.com](https://leevalley.com)



HANDS-FREE BASKET

Just as you'd never bag a supermarket mushroom in plastic, you don't want to asphyxiate a wild mushroom either. Wooden baskets allow air to circulate. This White River Fly Shop wicker "creel" basket works well. **\$40**, [cabelas.ca](https://cabelas.ca)

PHOTOS COURTESY DIANE BORSATO AND AMISH MORRELL



By the time we are gathered, the autumn sun has burned the steam off the lake. People help themselves to Diane's homemade muffins while Gordey introduces herself and walks us through the basics of mushroom identification. She warns against anyone looking to eat the mushrooms we find; there are 13 basic characteristics to consider in trying to identify any fungi and most have plenty of poisonous look-alikes. It can take hours, she says, to positively identify a mushroom, especially if you plan to make use of spore prints—leaving mushrooms upside down on black or white paper under a glass until the spores settle out into an identifiable pattern. What Gordey hopes to impart is “a basic scientific methodology for getting to know the characteristics of mushrooms.”

We head into the woods, towards Newton's Bay, which strikes me as aptly named since Isaac Newton is often held up as a symbol for understanding the universe as rational and mechanical—a clock that can be pulled apart and studied in its constituent parts to be known. But fungi, as Shel-drake observes, challenge rational interpretations of the world and our place in it. Are individuals still individuals when they are so intricately woven into the lives of others, when they cannot survive alone, separated out from their environment?

Kneeling down, Gordey shows us how to “screef” around the base of a mushroom, pulling away the pine needles and leaf litter so that we can see how it attaches to rotting wood or soil: this is the first clue in identifying a fungi. It's important to use a sharp knife to harvest this strange fruit; if you pull a mushroom out of the ground, you risk pulling the rest of the mycelium with it. This is akin to cutting down a whole tree to harvest one apple.

Old growth forests are refuges for all kinds of organisms and may host important fungi that do not grow anywhere else. But today, the forest floor appears almost empty—it's too dry for the fungi to fruit. The only edible mushrooms we can find are three types of puffballs, each the diameter of a loonie: gem-studded, pear-shaped, and spiny. Puffballs are relatively easy to identify. Even so, Gordey cautions us to always cut a puffball in half to confirm its identity: if it's not uniformly white inside and instead reveals the shape of a nascent

stem and cap, it could in fact be a young destroying angel, one of the most poisonous mushrooms growing in these woods. If the interior is black, it's probably a poisonous pig-skin.

True puffballs are snow white and uniform inside and fairly numerous, once our eyes learn how to see them; soon Diane has a basket of them. They are by no means the choicest edibles in the forest—some people say they smell like volleyballs—but at least we know what they are.

Game to try anything edible, Diane and David will heat up a cast iron pan and then add in the sliced puffballs for their dinner. “Once most of the water has evaporated,” explains Diane, “we add butter and salt and pepper and cook a little bit longer. Eat right away!” (It's important to always cook any specimen you do positively identify before eating: even the “edible” ones can be hard on the stomach when eaten raw.)

The mushrooms we collect but can't identify will be left unknown and uneaten on the table in Diane and David's screened-in porch. Most are what mycologists sometimes call LBMs, or “little brown mushrooms”: they grow plentifully and in great variety in forests and are next to impossible to name, even for veteran hunters.

It's a humbling thing, hunting for mushrooms—a reminder of how little we know about the world around us, how little we see of it at any moment, how little control we have over the wild in our lives. It's also a reminder that just because we are looking for something does not mean we will always find it.



When Suzanne Simard, now a forest ecology professor at the University of British Columbia, first published her ground-breaking

PhD thesis on common mycelial networks in 1997, her research challenged a dominant narrative in ecology, one that saw trees in the forest in competition with each other. The idea that trees could be sharing resources and working together—even communicating—through a fungal network was so revolutionary that it made the cover of the journal, *Nature*. The concept of a “wood wide web” was born.

Since then, many more studies have been conducted and books written, both within the academic world and the mainstream. People have made documentaries and podcasts and even TikToks about the phenomenon. “Fungi are having a moment,” agrees Justine Karst, an ecologist who studies mycorrhizal interactions in the forest at the University of Alberta.

Sometimes these claims become overly fanciful. Karst worries that exaggerated, incomplete, and incorrect narratives may be used to inform policy and the management of forests. A 2023 literature review in *Nature* found that about half of the citations of influential studies such as Simard's are now inaccurate. “We risk turning the wood wide web into a fantasy beneath our feet,” she cautions.

This is because scientists, like everyone else, can fall prey to something called positive bias: we favour (and publish) the evidence we look for and ignore the evidence that contradicts.

Karst is not saying that the more fanciful claims—such as the suggestion that “mother” trees use the common mycelial network to protect their “babies”—can be clearly disproven. What she is saying is that we don't have enough evidence to demonstrate them.

At least not yet.

This speaks volumes about the limitations of scientific knowledge and the ways in which mycelia “challenge our animal imaginations,” as Sheldrake observes. “In practice,” writes Sheldrake, “it is impossible to measure the extent to which mycelium perfuses the earth's structures, systems, and inhabitants—its weave is too tight.” We cannot comprehend fungi, and their common mycelial networks, without completely upending the way we know the world. “It's a way of life that challenges the scientific frameworks we rely on to make sense of the world.”

The more time we spend looking at fungi, the more life cannot make sense without them—and the less life makes sense the way we know it. »

The author (opposite, far right, with husband, Anton, and Diane Borsato) notes for herself the olfactory similarities between a puffball and an old volleyball. These sometimes giant fungi appear almost surreal in the open spaces they inhabit, but taste bland, and are sometimes called the tofu of the mushroom world.





# Look DOWN and you might



## BOLETES

Called “porcini” in Italy and “penny buns” in the U.K., and found among pines, fir, and spruce, bolete caps can grow to the size of dinner plates.



## DEAD MAN'S FINGERS

This demonic sounding (and looking!) fungi is often found on or near the stumps of rotting wood. They are inedible—and, to most, unappetizing.



## INDIGO MILK CAP

Rare in eastern Canada but obvious when present due to its electric blue colour, “milk” from these mushrooms (also blue) oozes from cut stems.

# FIND...

The forest is full of wonders, if you know how to look



## BIRD'S NESTS

Nature really excelled with the small and rarely seen *Cyathus striatus*. It features small bowls of tiny, round spheres, hence their charming name.



## FLY AGARIC

These “pop culture” mushrooms, depicted in everything from Grateful Dead posters to video games, look cute but are deadly poisonous.



## BLEEDING FAIRY HELMET

*Mycena haematopus* ooze purple juice when pinched and grow on well-rotted wood, particularly on beech. Toxic to eat.



## RED BRACKET

Notable for their standout orangey-red colour, which remains long after it's been picked. The flesh is dense and tough, and it's not good for eating.



## SATAN'S BOLETE

With a smell that calls to mind rotting meat (eeww!), foragers can easily avoid these devilish fungi, which can grow as large as a serving platter.



## LITTLE BROWNS

Called “LBMs” in popular parlance, these are probably “too small, too inedible, or too boring to spend much time fussing over,” says Borsato.



## HEDGEHOGS

These are often mistaken for faded chanterelles and easy to identify by their spines, which lay beneath their caps in place of gills or pores.



## GEM-STUDDED PUFFBALL

When these get old, they release their spores from a hole on top when squeezed, like a puff of green smoke. Google it, it looks cool!



## ARTIST'S CONK

Easily spotted attached to tree trunks, *Ganoderma applanatum* turns brown when scratched, making a fine—but unforgiving—doodle canvas.



## DELICIOUS MILK CAP

The beauty of this mushroom can be fickle; it turns green when handled, bruised, or cut. For advanced foragers only, as many look-alikes are toxic.



## SHRIMP OF THE WOODS

Also called “aborted entoloma,” this curious specimen is actually a combo of two mushrooms whose relationship is not entirely understood.



## OX TONGUE

When cut, ruby droplets bleed from the ox tongue's wide, flat cap. Italians call them “poor man's meat,” while others call them beef steak fungus.



## CHANTERELLES

Adored the world over, delicate “chantys” have a mild, peppery taste. But be careful: there are evil twins, including bioluminescent jack-o-lanterns.



## DESTROYING ANGEL

It's all in the name: although these mushrooms look elegant, they are nasty, accounting for the majority of mushroom poisonings. Steer clear!



## CHICKEN OF THE WOODS

“It's a joy to find a bright young specimen bulging out of a tree like leaking sunshine,” says Diane Borsato. New foragers note: nothing else looks like it.



## SKIRTED STINKHORN

Another deceiving species, *Phallus dulicatus*, with its almost impossibly fine white skirt, smells horrible and is hence considered inedible.



## POISONOUS PIG-SKIN

Cutting into the *Scleroderma citrinum* reveals its true nature: its centre is a scary dark purple to black (it's sometimes called “earth ball”). Avoid.





Examining the colourful haul of a hunt is a bit like sorting candy after trick or treating, and just as pride enducing. Given the life-or-death stakes, even experienced foragers (including Diane Borsato, far right) cross reference their fungi finds with multiple ID guides.



A few weeks after my visit to Panache, I am in a boat heading to our cottage on Moon River Bay, Ont., near the edge of Massassauga Provincial Park. Anton, my husband, is driving; foraging enthusiasts Diane Borsato and her partner, Amish Morrell, have brought mushroom knives (with brushes on one end for removing dirt) and baskets. They've also brought a picnic, including a teapot for hot chocolate and a flask of scotch from Cape Breton, where Morrell grew up.

Like so many mushroom hunters, Borsato first became interested in fungi because she wanted to eat them. Or rather, because she didn't want to be poisoned by them. Whenever they visited Morrell's family in Cape Breton, people would offer her wild chanterelles; she wanted to know how to identify them herself. But she soon found herself loving the mushrooms for themselves. There were so many gorgeous forms and textures and colours and smells! "To practice

mushrooming," she writes in her first book on the subject, "is to develop an impressive sensory literacy."

*Mushrooming: The Joy of the Quiet Hunt* is by no means an exhaustive compendium of mushroom identification. Rather, it is a gorgeously illustrated collection of what Borsato calls "charismatic mushrooms": mushrooms that are easy to identify and fascinatingly named and beautiful to look at. For her, mushroom hunting is about finding beauty in unexpected places, slowing down enough to pay attention to the overlooked and the ephemeral. "You see what others dismiss and tread upon, what is reviled and unlovely."

Borsato, like Morrell, is an environmental artist and educator interested in exploring and challenging the way human beings relate to the natural world. She teaches studio art at the University of Guelph, which usually involves taking her students on at least one foray each term; in her own work, which tends towards performance art, she might throw a bunch of astronomers together with a band of mycologists, for example, as she did for a performance piece titled "Celestial/Terrestrial." The astronomers taught

the mycologists how to stargaze, and the mycologists introduced the astronomers to fresh worlds in the forest floor. Each group came away with a new understanding of the parallels between the two disciplines.

"Looking for mushrooms is also an exercise in recognizing unseen worlds," explains Borsato, "something you can only do with an openness to mystery and surprise."



Mystery and surprise is all very well, but what if we can't find any mushrooms? It's dry in these parts too. But I needn't have worried. Every few feet on the trail brings new surprises. Borsato points out a fallen tree, rotting into distinctive cubes. I've seen this a thousand times in the forest and never stopped to wonder what was going on. Brown rot, she explains, a fungus that attacks the tree's lignin.

Just imagine a world where we didn't have fungi to break down everything that's dead in the forest, she says. "We'd be drowning

in death." Morrell calls us over to a tree stump. A large red bracket mushroom is growing out of it. It glows supernaturally in the dappled light. A single drop of ruby "blood" oozes out.

"That's the nicest bleeder I've ever seen," says Borsato, excitedly, explaining that what we're looking at is an ox tongue or *Fistulina hepatica*. "It looks like a liver," agrees Anton, who is a doctor and knows that *hepatica* means liver in Latin. She cuts it away from the tree, and we all palpate the alien creature, which jiggles when you touch it and seeps with red liquid when you pierce its membrane. "That's a joy," says Borsato, with a laugh that's infectious. "Isn't that a cool, weird thing?" In Italy, she says, they call it "poor man's meat." Sliced, the striations in the flesh resemble cooked tongue. People do eat them.

Next we find dead man's fingers—"more like ischemic," says Anton, "if you want to get technical." They are black and wizened, like digits with their circulation cut off. We find fungi frilled with delicate eyelashes. Another species, nicknamed "bird's nest," look like tiny bowls holding a clutch of even tinier egg-like spheres. We cut into "milk" mushrooms, which ooze latex; some varieties are considered edible. Purple-grey "shrimp of the woods" are said to have the texture of shellfish when you cook them, but they are a lot of work to clean. Their other name, "aborted entoloma," is not exactly appetizing.

Borsato strides over to a tree trunk and cuts off a buff-coloured artist's conk. She shows me how the flesh turns sepia when she drags a twig across it—perfect for drawing on. Then we find a real prize: yellow-orange chicken of the woods. Borsato trims off a few brackets and hands them to me. I will fry them up when we get home.

Two hours into the hunt, and we have only walked about 20 minutes along the trail. We are astonished by how much there is to see! Anton, who is an avid mountain biker and trail runner and used to moving quickly, has been warned that we will be moving slowly; he has brought a book in case he gets impatient. But he finds himself as absorbed in the hunt as everyone else. "You won't be able to stop, once you start looking," warns Borsato. "It's addictive."

For Borsato, the art of mushrooming is really the art of learning to see, becoming "literate in the tiniest details." It's a practice of radical stillness, a slowing down, and a reminder to look for beauty in unlikely places—among the rot and shit that nourishes plant life and, by extension, the rest of us who depend on it. "You have to show up to see beauty," Borsato muses. "You have to look for it." 🐸

*Sasha Chapman always stops to admire the mushrooms when she is hiking through the forest. (She stops a lot.) One day, she hopes to find a secret patch of chanterelles.*