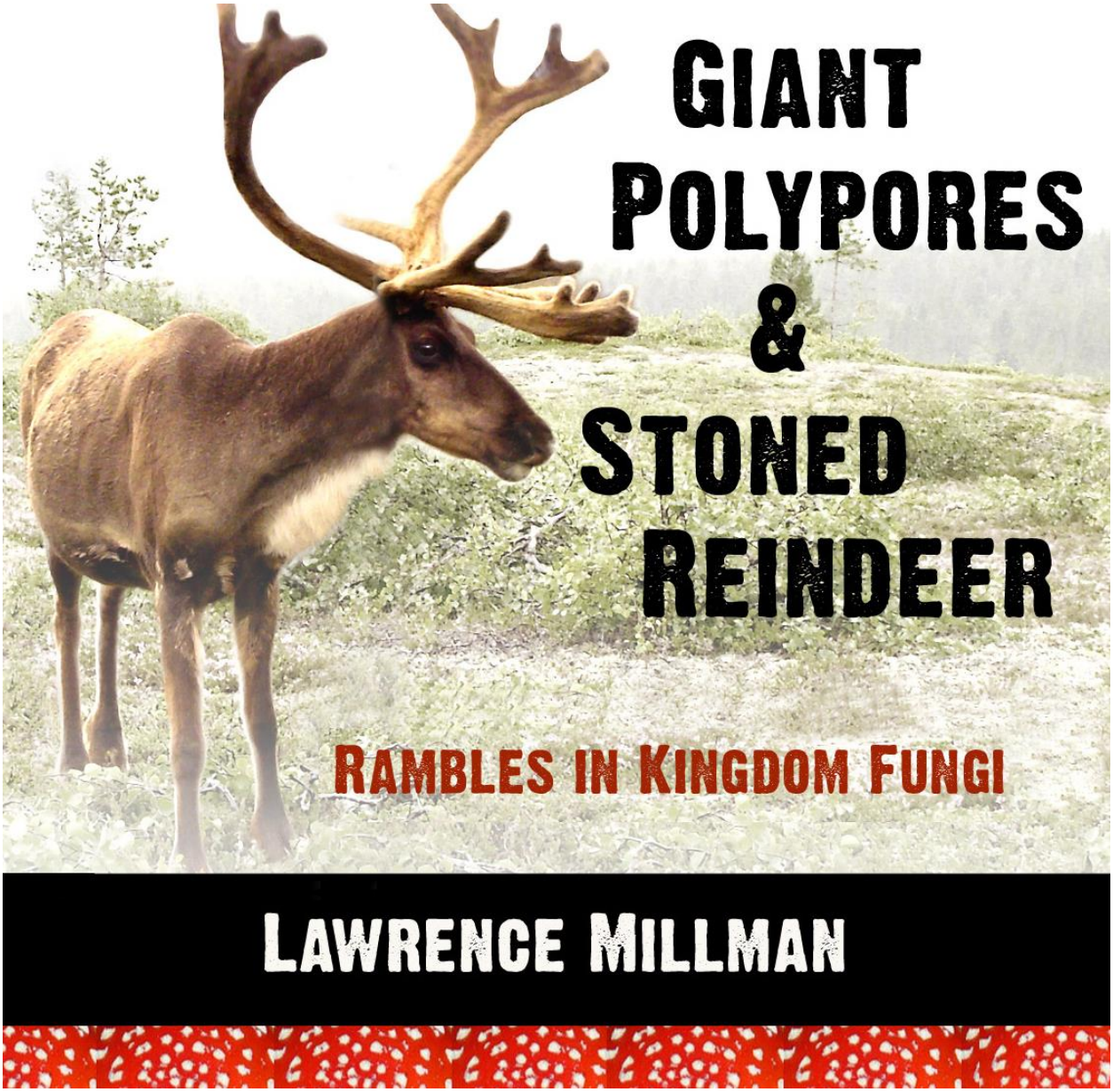

The Noble Polypore

Here's a riddle for you: what's large and furry, more or less hibernates during the winter, and inhabits forested areas in the Pacific Northwest?

I know what you're thinking, and one day in the fall of 1948 Emory Simmons was thinking exactly the same thing. He'd spent that day searching for cup fungi on the wooded slopes of Washington's Mount Rainier, and now the late afternoon light was quickly fading. Suddenly, he spotted something large and furry near the base of a fir tree. His immediate thought was "*Bear*!"

Simmons and fellow mycologist Alexander Smith somehow managed to transport the not inconsiderable object back to their camp; then they placed it on top of the heap of meshed shelves that served as their field dryer. During the night, these shelves collapsed with a resounding crash, and Simmons awoke to find himself staring at what he thought was, again, a bear.

But the robustly strange object was not a bear, although bears were common around Mount Rainier. It was, in fact, an extremely rare polypore whose elongated binomial, *Bridgeoporus nobilissimus*, hints at its incredible bulk. Specimens have been known to tip the scales at 300 pounds and likewise exceed the girth of a sumo wrestler. I might add that *Bridgeoporus*, which was named for William Bridge Cooke, a mycologist and sewage treatment specialist who himself possessed significant girth, is completely inedible. It's also an endangered species, the first fungus ever to be so designated, and thus even if it were edible, you would be subject to a day in court if you decided to take a bite out of one.

Emory Simmons wasn't the first person to stumble on one of these furry giants, but he was almost the first. Just five years earlier two brothers, Frank and Ali Sandoz, found a *Bridgeoporus* in Oregon's Mount Hood National Forest, and that specimen was the first. The brothers brought the polypore to the local office of the U. S. Forest Service, where one employee declared that it was the first fungus he had ever seen that had a "sisal doormat appearance." When mycologists learned about the fungus in question, they began referring to it informally as Fuzzy Sandozi.

At present *Bridgeoporus* has been documented at twelve sites in Washington and Oregon, but it remains more or less an unknown species. For example, it obstinately refuses to be cultured. It may or may not be associated with brown rot. Indeed, it may not be degrading the wood of its host at all, but simply using the wood as a convenient substrate. This suggests that it might be mycorrhizal, with the mycelium living in the soil and invading the wood only to produce its massive fruiting body. On the other hand, it could just be a typical saprobic or even parasitic polypore. But it has cystidia, which makes it atypical for a polypore -- saprobe, parasite or otherwise. And thus far it hasn't been particularly eager to relinquish data about its life history. In fact, *Bridgeoporus* is so reticent about giving up its secrets that it almost seems to be telling us, "I'm smarter than you are."

Now back to our giant polypore. To explore its mysteries, study its intelligence, even just to find it, you need a guide. And if you're lucky, that guide's name will be Paul Stamets. If there's ever a Nobel Prize in Mycology, Paul would be the odds-on favorite to get it. He is a mushroom missionary, a man dedicated to the belief that fungi can be instrumental in helping or even saving our beleaguered planet. In the past decade, he has pioneered new technologies that employ fungi ("the world's most efficient molecular disassemblers," he calls them) to decompose toxic waste sites. In one experiment, he cleaned up a site contaminated by a diesel oil spill by inoculating it with mycelia from that supermarket favorite, the oyster mushroom. One of his recent projects focuses on the use of mycelia to filter biological pollutants from surface water. If this latter project turns out to be successful, it could not only be a major environmental coup, but also help cure what Paul calls our "mycological myopia."

As it happens, Paul is fascinated by *Bridgeoporus*, which he calls "the noble polypore." Through tissue clones and spore samples, he's tried repeatedly -- and unsuccessfully -- to culture it. "It's the most mysterious polypore, no, the most mysterious fungal entity I know," he told me when I visited

him at his mushroom-cultivating facility near Olympia, Washington. He likened the noble polypore to Raven, the trickster deity of the Northwestern Indians.

Paul wanted to collect more spore samples of *Bridgeoporus*, and so it was that we found ourselves in Mount Rainier National Park, driving through a mist that gave a spectral quality to adjacent stands of Douglas fir, noble fir, and mountain hemlock. Near Nisqually Glacier, he stopped the car and said, "We're in the zone."

Before we got out, Paul made me promise not to reveal our exact location, for it would be difficult to protect such a rare and exotic organism as *Bridgeoporus* if everyone knew its whereabouts. So I should warn you in advance that my description of this site, as well as other *Bridgeoporus* sites in this article, will be somewhat vague.

We began by hiking down a nearly vertical slope. Downed logs, moss-covered and slippery, gave us almost no purchase, and soon I went flying off one of them, only to find myself draped unceremoniously over another. When not falling off the logs, we circumnavigated their living brethren, some of which were eight feet wide and over 300 feet tall. At one point, we seemed to be lost. I asked Paul if this was a subterfuge to keep me in the dark about where exactly we were. He shook his head and said that Trickster was playing games with us.

At another point, I stopped to readjust my rucksack and, looking around, I noticed that mushrooms were everywhere; coral fungi, delicate *Mycenas*, indelicate *Amanitas*, red-belted polypores, *Russulas*, *Gomphus floccosus*, brightly-colored *Hygrocybes,* Pine Spikes, and boletes—they were by far the most diverse organisms in the forest. They were so diverse and so numerous, in fact, that I felt like revising geneticist J. B. S. Haldane's famous remark: The Creator possesses an inordinate fondness not for beetles but for fungi.

And then we were standing in front of their king.

So here's another riddle for you: if evolution rewards success, should an organism be considered a failure when logging practices dedicated mostly to the balance sheet render it homeless?

Paul was running his hand over the polypore's furry surface. "I don't know of any other mushroom that's so sensual, so animalistic," he told me. "When I first discovered *Bridgeoporus*, my wife was a little worried. 'Enough, Stamets,' she said."

So here was a grown man, over 50 years old, petting a mushroom. Or to be more precise, petting the fruiting body of a mushroom. Given Paul's passion for growing fungi, I suspect he would have petted the polypore's mycelium too -- if we had been able to locate it.

"It's difficult to find something that's always running," I observed, referring to the title of Paul's latest book, *Mycelium Running*.

Ignoring my paltry joke, Paul said: "I think the mycelium of *Bridgeoporus* might extend over thousands of acres."

"So we don't actually know when it gets into the host tree?"

"Not yet. But it could exist in that tree -- assuming, of course, that the species is not mycorrhizal -- for centuries before it produces a fruiting body. The mother mycelium itself could be older, much older. After all, there's an *Armillaria* mycelium in eastern Oregon that might be 7,000 years old."

But no *Armillaria* species could ever be mistaken for a bear. Paul told me that he often wondered what sort of potent enzymes the *Bridgeoporus* mycelium might have that would allow it to create a fruiting body even remotely similar to a large mammalian. He also said that there was a chance that this mycelium might be alive and well (assuming, again, that *B. nobilissimus* is not mycorrhizal) in a few young noble firs, although we probably won't know for sure until those trees achieve an advanced age themselves. Unfortunately, the popularity of noble firs as Christmas trees usually keeps them from growing beyond the sapling stage.

I wanted to see more noble polypores, for I felt that the more I saw, the less inscrutable the species would seem. So after Paul and I left Mount Rainier, I headed south to Oregon, where *Bridgeoporus* has attained a status not only worthy of its rarity, but also a status rare in a largely zoocentric world: since 1995, it's been listed as an Endangered Species under Oregon's Natural Heritage Program. Thus each polypore, together with the 600 acres surrounding it, is protected by state law.

In Salem, I met Terry Fennell, a botanist with the Bureau of Land Management, and Tina Dreisbach, a local mycologist. A few hours later, we were driving up a steep mountain road whose multiple switchbacks suggested a giant intestine. Fog and drizzle, the *pas de deux* of Pacific Northwest weather, made it almost impossible for me to see where we were going or even where we had been, although once, when the clouds parted briefly, I noticed Yosemite-like cliffs in the distance.

Higher and higher we climbed, until at last we reached the top of a 5,000 foot mountain that I'll call Polypore Peak. Here the fog had dissipated somewhat, and I looked out on a landscape quite different from the ancient forests of Mount Rainier. There were stumps everywhere, along with cut logs, heaps of skeletal branches, terminally rusted metal, and slopes eroded into facsimiles of elephant hide. According to Terry, the area had been logged until the mid 1960s. Actually, the word he used was "harvested." I would have used a word like "attacked" myself.

"We're going to find a *Bridgeoporus* here?" I asked dubiously.

My companions nodded in unison. "There are more of them at this site than anywhere else I know," Terry said.

Now we began bushwhacking through perhaps the most Amazonian tangle of brush I'd ever encountered this side of the Amazon itself. Vine maples lassoed us, logs tripped us, and rhododendron thickets stopped us dead in our tracks, with the result that nearly every step we made was either backwards or sideways. At one point, I saw a purplish mat of bear scat and felt a sudden rush of sympathy for a creature obliged to find its forage here.

Then, at the base of a stump, we came upon our first *Bridgeoporus*. It seemed to be having a very bad hair day; its fibrous surface was alternately droopy and disheveled, and none of the usual epiphytes seemed to be growing on it. Also, it looked as if it were going to drop off the stump at any moment.

"Once they exhaust all the nutrients from their substrate, they're goners," Tina said.

"What's the life expectancy of a typical *Bridgeoporus*?" I asked

"Twenty-five or thirty years," she said, "although much older, of course, if you count the mycelium."

We trudged on through the choking vegetation. There were no trails, not even game trails, and no other trudgers with whom we could commiserate about the sadistic behavior of secondary growth in a logged area. The skies became leaden, and then delivered a fleece-like substance halfway between rain and mist. I reached into my rucksack for my anorak, only to discover that I'd left it back in Salem. I ended up getting wet -- a not uncommon condition in this part of the world.

All at once Terry announced: "We're getting close to a *Bridgeoporus* that, whenever I'm about to visit it, the clouds always lift and the sun shines down."

And strange to say, that's exactly what happened. Just after he made this remark, the sun suddenly blazed forth from its hideaway in the clouds, and we found ourselves standing beside the noblest polypore of them all. It was fully 56" in diameter and looked more like a bear, although a somewhat compressed bear, than any of the other specimens I'd seen. It also hosted an extraordinary variety of botanical life -- Alaska huckleberry, *Trillium ovatum*, hemlock seedlings, two types of unicellular algae (*Characium* and *Coccomyxa*), several lichen species, and an ericaceous shrub I couldn't identify There were three of four fungal species too, including *Galerina autumnalis*, a mushroom whose diminutive sizes belies its deadly nature.

A blanket of spore dust covered the ground beneath this leviathan. How many individual spores are here? I wondered, and then made a stab at answering the question myself: a number so great that it would make our country's national debt seem microscopic. Yet even that number would be microscopic compared to the trillions of spores one *Bridgeoporus* might produce in its lifetime. Of

those trillions, however, it's extremely unlikely that any of them would ever produce a noble polypore in a stump-ridden place like this; a place miles from the nearest living old-growth noble fir.

"*Bridgeoporus* may well be an evolutionary dead end," observed Tina. "It seems to have coevolved with the noble fir, and now that all the ancient firs are disappearing, it has nowhere to go…"

"But ancient firs are disappearing mostly because our species won't allow another species to become ancient," I said.

"It amounts to the same thing, no host..."

But this story doesn't end quite yet. A day or two later, I was back in Washington at a place I'll call Noble Ridge. A parcel of Federal Land within spitting distance of Mount St. Helens, Noble Ridge probably has the oldest noble firs of anywhere in the Northwest. My guide, John Parsons, knew this neck of the woods as intimately as anyone. He was a specialist in fires for the Forest Service, and he also happened to be another person eager to save the noble polypore from extinction.

Less than one tenth of the ancient forests that Lewis and Clark would have seen still exist, but you would never know it in a place like Noble Ridge. The only disturbances were natural -- fires, woodpecker excavations, and volcanic eruptions. In fact, there was still ash on the ground from the 1982 eruption of Mount St. Helens. Walking on this ash, John and I searched high and low for the *Bridgeoporus* specimens he'd found here a few years ago. We didn't have much luck, although we did discover one very dead polypore in a squirrel midden. After several hours of fruitless searching, we decided to call it quits.

The next day I went back to Noble Ridge by myself. I suppose that I just wanted to experience its unusually pristine habitat again. Certainly, I didn't expect to find a *Bridgeoporus*. Walking on more volcanic ash, I noticed something small, russet-colored, and furry clinging to the trunk of a tree. My first thought was -- a bat. Maybe a little brown myotis. But it wasn't a bat. It turned out to be a noble polypore growing on an old noble fir. What's more, its resupinate fruiting habit, lack of algal symbionts, and relatively small size indicated that it was a quite young noble polypore.

I was, in a word, elated…as elated as I might have been if I'd discovered a California condor chick. For here was positive evidence of a new *Bridgeoporus* generation. In a decade or two, perhaps, someone wandering through these woods might see the grown-up polypore and mistake it for a bear. Whereupon this person would know that giants -- or at least one particular giant -- were still abroad in the green earth.