WILD MUSHROOMS
a taste of enchantment

On meadows, where were wont to camp
White mushrooms rosy gilled,
At dawn we gathered dewy-damp
Until the basket filled.

Anonymous

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INTRODUCTION

> Many do fear the goodly mushrooms as poisonous damp weeds; but this doth in no way abate the exceeding excellence of God's Providence, that out of grass and dew where nothing was, and only the little worm turned in his sport, came, as the shaking of bells, these delicate meats.
>
> Anonymous[i]

There are few things as enchanting in late summer as a walk in the woods. For this is when the rush of green subsides, the rain soaks the ground, and mysterious mushrooms emerge.

Bright red umbrellas from under fallen leaves… snow-white icicles and purple sea corals… giant puffballs and tiny fairy fans…

Kids of all ages love mushrooms. From the jack-o-lantern (which glows in the dark) to the velvet earth tongue, chicken lips, and the club-headed beetle-eater, nature's premier recycling system is a source of endless fascination. What many don't know is that most mushrooms are symbiotic; nearly every plant on earth, in fact, depends on partner fungi to survive.

But what about the danger of poisonous mushrooms? Here's a chance to check your myco-literacy. True or false:

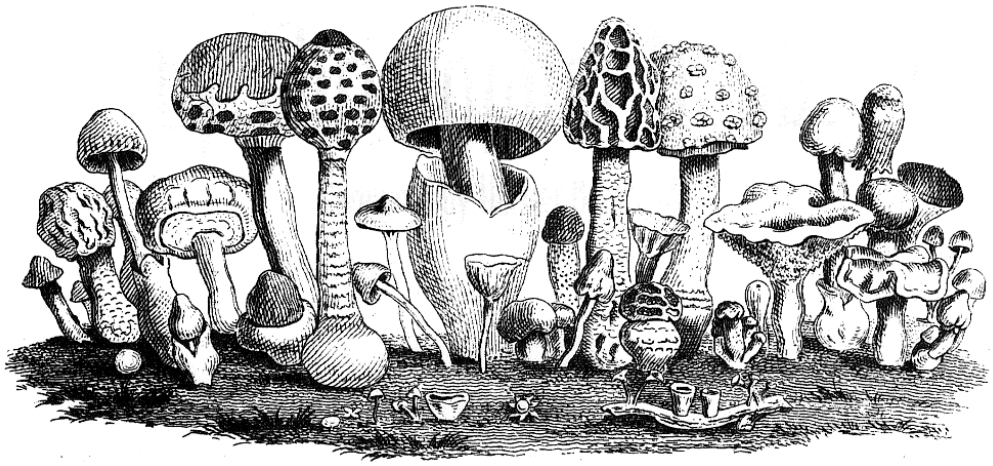
- ☐ Most mushrooms are poisonous.
- ☐ Even experts often cannot tell the edible species from poisonous look-alikes.
- ☐ All poisonous mushrooms are deadly and all edible ones are safe to eat.
- ☐ It is dangerous to touch or smell a poisonous mushroom.
- ☐ There's no need to cook mushrooms.
- ☐ Mushrooms have little nutritional value.
- ☐ Wild mushrooms are better than ice cream.

The truth is that mushrooms are much more beneficial and far less dangerous than many Americans believe. For starters, it's perfectly safe to handle or even sniff *any* mushroom. You'll find that mushrooms can smell like almonds, anise, cucumbers, garlic, raw potatoes, seafood, maple syrup- you name it. The *matsutake*, prized for its flavor and medicinal value, smells like a cross between red hots and dirty socks!

Fungophobia aside, the fact is that of the several thousand types of mushrooms on this continent, only five or six are deadly poisonous. Once you know what to look for, these are as easy to pick out as carrots from cauliflower.

This leaves over two hundred species known to be edible, quite a few of which are incredible: the chanterelle, morel, porcini, meadow mushroom (or wild portabello), and chicken-of-the-woods, to name a few. Each is as nutritious as it is delicious, and they're all local, organic, fresh, and free. Learn to gather your own; you'll be glad so few people do!

Although this booklet will focus on lookin' and cookin' in the mountains of Western North Carolina (or WNC), most of it will apply wherever you are. So stick around…



PART 1: EDIBILITY

> But, however they may be served and eaten, mushrooms you must make yours at any cost... Learn to like them; *will* to like them, or else your sojourn on this earth will be a wretched waste.
>
> Pennell, *The Feasts of Autolycus*, 1896

Aren't most mushrooms poisonous?

> Few mushrooms are good to be eaten and most do suffocate and strangle the eater. Therefore I give my advice unto those that love such strange and new-fangled meats to beware licking the honey among the thorns, lest the sweetness of the one does not contervaile the sharpness and pricking of the other.
>
> Gerard, Herball, 1597

Out of the fifty thousand or so mushroom species identified on the planet so far, maybe a dozen are known to be deadly. But before you cast caution to the wind, know that the "destroying angel" is quite common, at least in my area. I find it all the time. This name actually covers four species that are nearly identical. These, along with the "death cap" (which looks quite similar) are responsible for nearly all mushroom-induced fatalities.[ii] So although there certainly are deadly mushrooms out there, there's very few to watch out for.

What about the ones that won't kill you but will make you *wish* you were dead? Oh yes, there are a few of these as well. However, the vast majority of "poisonous" mushrooms merely cause mild to severe stomach upset. Granted, this is enough to make some of us not want to ever eat wild mushrooms again. So how many mushrooms are, like mycologist Dave Arora says, "better eyed than fried?" Out of ten thousand species identified in North America, only four hundred are even *suspected* of being poisonous. Of these, only twenty are common.[iii]

What about the other 9,600? As far as we know, they're harmless. But then again, we don't know everything (see page 7). But most people agree that at least two hundred are worth eating. In fact, Colonel Charles McIlvaine in his landmark *One Thousand American Fungi* (1902) says at least half of them are "second to none!"

Don't a lot of the edible mushrooms have poisonous look alikes?

He's not vicious or malicious
Just lovely and delicious

Dee-Lite, "Groove is in the Heart," 1990

Several common edibles certainly do have poisonous species that people have frequently mistaken for them. But how familiar were these people with the mushrooms, and how careful were they being?

Two strangers may look the same to you, but I doubt you'd get someone else confused with your wife or husband– at least on close inspection! Once you've seen a friend (human or fungus) on good and bad hair days, in sickness and in health, you *know* them. It takes time, but as you become familiar with mushrooms, "look-alikes" look less and less alike.

It can be harder to get acquainted with a mushroom than with, say, a plant or a bird, for two reasons. For one, mushrooms are complicated. The number of details to consider can be overwhelming at first. And second, many of these features are variable, weather-sensitive, and short-lived. Unfortunately, this is not the place to practice your intuition. Like Gary Lincoff says, every mushroom is edible– once. That's why, when it comes to

choosing the benign from flocks
of glitterers, sorcerers, *Russulas*, panther caps,
shark-white death angels in their torn veils
looking innocent as sugar
but full of paralysis

Mary Oliver, "Mushrooms," *American Primitive*, 1983

even do-it-yourself herbal guru Susun Weed won't say 'you too can follow your nose.' Get yourself a good field guide (human or hard copy; see page 36) and some experience under your belt before you put the wrong mushroom there.

Remember, it's perfectly cool to learn just the five most common edible species in your area and their toxic "look-alikes." In fact, that's what most fungus hunters around the world do (for a list of the most common edible species in WNC, see page 25). If you want to learn more, you might want to learn to identify the most poisonous ones first. The list is a short one! (See also next question.)

What about those experts that you hear about in the news killing themselves?

Dance! Bum rush the speaker that booms
I'm killin' yo' mind like a poisonous mushroom

Vanilla Ice, "Ice Ice Baby," 1990

What "experts?" Only one professional mycologist is known to have died from eating mushrooms, and it was not from misidentification. He had an allergic reaction to a commonly eaten mushroom, on top of a pre-existing condition. Of all the members of amateur mycological societies (i.e., mushroom clubs), there is *not one* case of fatal poisoning on record.[iv]

Even so, when it comes to eating wild mushrooms, being an expert is not about knowing a lot. It's about being careful. Amateurs can easily avoid the deadly species and mycologists can easily get poisoned. Most of us are expert drivers, yet anyone can have a moment of carelessness.

Granted, as you get to know a mushroom, spore-printing it (see page 24), keying it out (by answering a series of yes or no questions), and reading about its look-alikes over and over again can certainly get tiresome. It gets to be like working at a bar and having to card someone who comes in all the time.[1] There *does* come a point when you can just look at something and know what it is. Just don't get sloppy. Know what you don't know; leave your ego out of it. Otherwise, here are at least two ways to put a "cap" on your mushroom consumption:

1. Not watching what you're doing. There are certain edible species that often fruit in the hundreds, sometimes with a deadly mushroom growing right in among them. It's easy to tell the two apart, but if you were gathering quickly, you could conceivably throw the wrong one into your basket.

2. Not doing as the Romans do. When you hear in the news about entire families killing themselves, most of the time it's not because they were amateurs. It's because they just moved to the States and they assumed that the mushrooms here are the same as the ones back home. Of course they found out that there are look-alikes in the land of the free lunch that don't exist overseas.

To sum things up: eating wild mushrooms can be far safer than driving, but only if you're careful. They say there are old mycologists and bold mycologists, but no old bold mycologists.

What's the difference between "poisonous" and "not edible?"

> Mushrooms: there be two manners of them. The first are deadly and surely slay any who eat of them and are called toadstools. Them that are not deadly have a gross slimy moisture that is disobedient to nature and digestion, are perilous and dreadful to eat, and therefore it is best to eschew them.
>
> Grete, *Herball*, 1526

In between "edible" and "poisonous" are large groups of mushrooms classified as "inedible." This apparently means the authors deem them too tough or unpalatable to be worth eating. A piece of wood, for example, isn't toxic, but it isn't exactly 'good-eatin' either. Now sometimes the authors really mean "edible with caution" (see below); but unfortunately, they seldom give their rationale. That's too bad, because large groups of mushrooms often written off as "not edible" (the *Russula* and Polypore families in particular) are regularly eaten in other cultures. More frugal or inventive societies know, for instance, that a flavorful (not to mention

[1] Take for instance this mushroom I met in my bartending days. He would always be hanging out with folks, telling stories and cracking jokes. Invariably, however, they would get up and leave. He would go over to another table, introduce himself, buy them drinks, and they too would manage to wander off. One night, exasperated, he finally asked me, "what's with these people? I don't understand it. I'm a fun guy!!"

highly medicinal) stock or tea can be made by simmering many mushrooms, including ones that are otherwise too tough to be eaten.[2]

In my quest to eat as much wild (albeit repulsive) food as possible, the main question is this: in what cases is edibility merely a matter of personal taste (e.g., mature puffballs, inky caps, and stinkhorns)? When edibility is a matter of "personal tolerance" (as with hot sauce), what does that mean? I may not get sick, but am I still taxing my liver, for instance (as I do when I drink alcohol), and is it worth it? What about cumulative toxicity? This brings us to...

"It's definitely either midlife crisis or poison mushrooms ."

What about when it says "poisonous to some" or "edible with caution?"

What are you, chicken? Actually, one of the most common folk tests for edibility in Nigeria (not to mention North Carolina) involves

> ...giving the mushroom to a fowl, usually a chicken. If the chicken eats the mushroom, it is regarded as edible; if the fowl rejects the mushroom, it is regarded as poisonous. If the fowl eats the specimen and later vomits, it is considered to be "edible with caution"– which makes as much sense to the Yoruba as it does to the American reading some of the guidebooks in the United States.
>
> Benjamin, *Mushrooms: Poisons and Panaceas*, 1995

Before you consider such fowl play, see "*Aren't there any rules-of-thumb about edibility?*" below.[3]

No one can 'prove' that a mushroom is 100% edible or poisonous. It's mostly a matter of statistics: trial and error. "Edible" simply means that no one has eaten this species and complained about it (unless we've never heard from them again). Or maybe only one or two people have had a problem with it. One or two cases can be written off as idiosyncratic or "allergic" reactions. Milk, wheat, corn, chocolate, etc. are all considered "edible," and yet there are plenty of people who are allergic to one or more of these. Also, whether someone reacts to something depends on the amount, and practically everything is poisonous in excess.

"Poisonous," then, means that enough people get sick from a species that the publisher doesn't want to risk you suing them for calling it "edible with caution." Maybe only 10% of the population react negatively to it and there's no specific toxin identified. Sometimes this discouraging designation is based on a single report! According to one authority, when it comes

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[2] *All* mushrooms contain the immune-boosting water-soluble polysaccaride (i.e., "many-sugar") Beta glucans (see note viii).

[3] A student told me that one time he and some friends ate some mushrooms which they generously shared with their cat. A few hours later, the cat began to strangely growl and walk in circles with her belly distended. Trusting the instinct of animals, they all went and got their stomachs pumped. The next day the cat had kittens.

to wild mushroom intolerances, "it is safe to assume that absolutely no reliable information is available."[v]

This is the sad state of affairs that gives rise to everyone's favorite labels, "edible with caution" or "not recommended." Note that these can *also* mean that the mushroom is quite harmless, yet the author feels that it is too easily confused with a truly dangerous species. A given book may or may not spell this out for a given mushroom: this is one reason I recommend owning more than one field guide.[4]

In my classes, there's always some bloke with the audacity to ask me, THE MUSHROOM MAN, if I've ever made a mistake and gotten sick from it. The answer may surprise you. *No* to the first question and *yes* to the second!

Oddly enough, once I correctly identified and ate a well-known "edible" mushroom and got sick anyway. Luckily, since I'd had only a few bites I simply got nauseous. My eager housemate was not so lucky. The strangest thing is that two other friends ate the mushroom without complaint (lucky for them: there was thirty pounds of it). This was the famous chicken of the woods, *Laetiporus sulphureus*, often called "foolproof" (see page 27).

L. sulphureus, also known as the sulfur shelf, *is* practically unmistakable, but it also makes people sick about 2% of the time (no one knows why; aliens, perhaps). In any case, a week later I was chowing on chickens again, and I haven't had a problem since (at least one I could trace to a mushroom). I figure it's better odds than eating out.

On that note, another species I would be careful with is honey mushrooms (see page 28). One book describes them as "edible with reservations." Be sure to call ahead!

What does "edibility unknown" mean?

We study fungi; we do not eat them.

Battara, *Fungorum Agri*, title page, 1755

There is no high-tech 'toadstool-tester' out there that tells NAMA, The North American Mycological Association, which mushrooms are poisonous. For one, you can't test for a chemical until you know which one to test for. So basically the only way our shamanically-impaired culture learns what to eat and what to stay away from is the hard way. Somebody bites the bolete and we hear from them… or we don't. That's why the edibility of some mushrooms will be listed as "unknown." Nobody's willing to find out![5]

The fact is, we can't possibly know every mushroom that's out there, much less its edibility. Life is too gloriously complex. That's why the books won't say something like "all polypore mushrooms are edible." They'll say, "no polypores are known to be poisonous." Every mushroom is different, and every week or so the Halls of Science decide that two mushrooms we

[4] If you want to ride the recommendation roller-coaster, just look up *Amanita citrina* in several books.

[5] Once I was lecturing about the destroying angel. Someone raised their hand and asked, "is there an *anecdote* for that?" Actually, NAMA has a sadly underused Poison Registry for recording our collective mushroom experience (visit **namyco.org**).

thought were the same species actually have some important differences. Sometimes that even includes toxicity (though I've heard the new *Amanita strangulata* is to die for).[6,vi]

Why don't I just be normal and stay away from wild mushrooms?

Russians give thanks for finding mushrooms

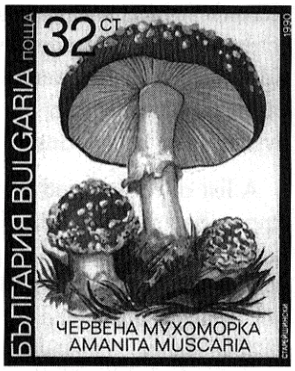
Is all this disheartening? Is nothing for certain? The bottom line is that eating wild mushrooms (like driving and having sex) has some measure of risk. Then again, practically everybody does it anyway! If you stoop so low as to pick mushrooms, rest assured you're not alone.

> The individual who desires to engage in the study [of wild mushrooms] must face a good deal of scorn. He is laughed at for his strange taste among the better classes, and is actually regarded as a sort of idiot among the lower orders. No fad or hobby is esteemed so contemptible as that of the "fungus-hunter" or "toadstool-eater."
>
> This popular sentiment, which we may coin the word "fungophobia" to express, is very curious. If it were human- that is, universal- one would be inclined to set it down as instinct and to reverence it accordingly. But it is not human- it is merely British...
>
> W.D. Hay, *British Fungi*, 1887

If wild mushrooms are so dangerous, why, after thousands of years, does most of the world continue to eat them? For example, take all of Southern France and Spain:

> These are the areas where mushrooms are considered friends, where children gather them for fun before they can read and write, where no adult feels the need for a mushroom manual, where immense quantities of mushrooms are prepared for the table in innumerable ways, and where accidents are unknown. The gentle art of mushroom-knowing is a universal accomplishment. Mushrooms are a conversation piece among men and women. Novelists introduce them into their narratives, poets into their verses; and they recur in proverbs and ditties. Moreover- and here is the telling thing- all the references are friendly, favorable, and wholesome.
>
> Gordon Wasson, *Soma: The Divine Mushroom of Immortality*, 1968

[6] The false Ceasar's mushroom (*Amanita parcivolvata*), which I've eaten many times, is now considered poisonous. And the tawny grisette, *Amanita fulva*, which I've picked hundreds of, now has a look-alike that's "possibly poisonous" (Roody, 239, 240). Oh well; live and learn, right?



These folks are still around, and so am I.[7] Still, mushroom hunting is not exactly our national pastime. What's our culture's problem?

Apparently, there's an Anglo-Saxon taboo around mushrooms that obscures their great value. This may well go back millennia to when mushrooms were considered a divine sacrament, something not to be taken lightly. According to some ethnomycologists, what's really scary about mushrooms may not be that a few are deadly but that some are *entheogenic*, which literally means "that which helps one see God inside them."[8]

So how can I be careful eating mushrooms?

If you have identified several "edible" species that you have never eaten before, pick one. Put a recognizable piece if not a whole specimen aside just in case (i.e., for whoever finds you… just kidding). Cook as much of the rest as you want (see how below), but eat only about a tablespoon of it. Like the sign at the buffet says, "we encourage small portions, many trips"- to the food, not the bathroom!

Typical reactions to mushrooms, including nausea, upset stomach, delight, exultation, etc., usually appear within two hours. If you *do* get sick in this time frame, and this is the only wild mushroom you've eaten in days, the good news is that it probably won't kill you. The hallmark of the deadly varieties is that their initial symptoms, if any, are quite mild. By the time you feel sick, it's usually too late!

It'll take'ya two days to get da' scoop
That I put a poison mushroom in yo' soup

You'll be on a stretcher, I'll be on the road
You just ate a toadstool and you're the toad

The Mushroom Man, "A Fist Full of Fungus," 2000[9]

Of course in this wonderful world of change, even a species you've had many times before can get you sick, depending not only on what it's growing on but the fact that your allergies can change (see "What about when it says 'poisonous to some' or 'edible with caution?'" above).

I'm not trying to scare you away from wild mushrooms; there's plenty for everyone.[10] But on that note, it is unwise to eat something you're afraid of, and worse yet, to bully someone else into trying it. When in doubt, throw it out; or your body might do it for you!

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[7] *From an evaluation form filled out after one of my classes:*
"Would you take another course offered by this instructor?"
"Yes, if he continues to live."

[8] Hopefully my next book will also help, the product of a ten year study in theology. I majored in philosophy, by the way, not mycology. I learned what I know about mushrooms on my own, having gotten into forgaging after college (with student loans like mine, every bit helps).

[9] Please report any adverse reactions to **www.namyco.org**. You can report any favorable reactions to me.

[10] I remember soon after I started teaching, I ran into an officer of the local mushroom club. She seemed a bit upset about what I was doing. I said, "isn't the club about sharing the joy of mushroom hunting?" She said, "yeah, but we don't want *that* many people doing it!"

Is it really necessary to cook mushrooms?

> [A dish of mushrooms] should be followed with a draught of bird's dung and vinegar... for even the edible sorts are difficult of digestion and generally pass whole with the excrement.
>
> Dioscorides, *De Materia Medica*, 65 AD

Mark Twain said that part of the secret of success in life is to "eat what you like and let the food fight it out inside." The other part must be "avoid raw mushrooms."

When the books say a mushroom is "edible," they mean edible *when cooked*. And that means well done, not medium rare. Softer mushrooms may take five or ten minutes. Patience pays!

The reason for this is two-fold. For one, many species have volatile toxins that are only destroyed by heat. The books don't always say which, but morels are a prime example. Every year or so some Italian drops dead from exceeding the recommended daily allowance of monomethylhydrazine (a.k.a., rocket fuel) courtesy of undercooked *Gyromitra esculenta.* That's-a one spicy meatball!

There are probably quite a few mushrooms that are OK to eat raw in modest amounts, but the only one I'm sure about is the beefsteak fungus. So *no "al dente"* for the rest, or you too will be singing "On Top of Spaghetti."[11]

The other thing you should know, even if the only mushrooms you decide to ever eat are the ones at the salad bar, is that all mushrooms are indigestible raw. A mushroom can be as soft as a piece of cheese, but it won't break down in your stomach any more than that cheese will dissolve in a glass of water.[12]

Yes I *KNOW* you've always eaten button mushrooms raw. That doesn't mean wild ones will be as forgiving. The honey mushroom, for instance, is known in German as *halimasch* (supposedly short for 'hell in the arse').[vii] Not exactly a movable feast. The culprit in this and probably many "allergic" reactions is a compound called *chitin*.

Chitin is the key ingredient in mushroom cell walls, insect exoskeletons, and lobster shells. It's what makes mushrooms able to push their way through asphalt.

> Soft fists insist on
> Heaving the needles,
> The leafy bedding,
> Even the paving.
>
> Sylvia Plath, "Mushrooms," 1959

Mushrooms vary as to their chitin content, and reactions to it are very dependent on the individual, how well the mushroom is cooked, and how much is eaten in one sitting. A few might make you more "musical." Enough and you might end up painting the town– or at least the toilet.

I'm all about raw foods, but here I must take exception. In fact, the tougher the mushroom, the longer I recommend cooking it. Otherwise, you're not adding good fiber to your meal

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[11] Chris Hobbs does say raw turkey tails make good "trailside chewing gum," but I'd say the medicinal value is at least double the pleasure!

[12] If my childhood folk wisdom is correct, the same is true for bubble gum and *Cheetos*.

because fiber is supposed to be a mush, not chunks. And if your body can't get into the cells, it can't get to the nutrients either. When well cooked, on the other hand, even the cell walls themselves are highly medicinal.[viii] So boil'm like grandma would! Practically all mushrooms taste better cooked anyway– and not just because of the added oil and salt. For more on the nutritional value of mushrooms, see page 34. [13]

PART 2: GATHERING

I creep through the valleys
And I grope through the woods
'Cause I know when I find it, my honey
It's gonna make me feel good.

Cat Stevens, "Miles from Nowhere," 1970

[13] I don't know if chitin can be broken down through fermentation. If so, old *mighty 'scorides* may be right, and bird's dung, probably packed with beneficial flora, might make a great starter for this purpose.

When should I go mushroom hunting?

> "Mushrooms!" exclaimed Kamba the Tortoise, joyfully. "Do I see mushrooms? REAL mushrooms?"
>
> Yes, they were real mushrooms, little, white mushrooms that had pushed all night at the dark brown earth above them, and had struggled through its hard crust just in time to see the sun rise, just in time to make a fine breakfast for a hungry Tortoise.
>
> Malawi folk tale in G. Elliot, *The Long Grass Whispers*, 1957

Francis Bacon said there are two peculiar things about mushrooms: one, that they taste so good, and two, that "they come up so hastily, as in a night, and yet they are unsown."[ix] [14] Most mushrooms don't really pop up overnight; the best time to go looking is about five days after a good rain. It is a good idea to go hunting early, though. You're less likely to get rained on yourself (since it tends to rain more in the afternoon), and the mushrooms will still be relatively cool when they go into your basket. That is, if you find any…

Robert Heinlein said that "climate is what we expect; weather is what we get." This seems to be getting truer every year. Take the mushroom season, for instance. It used to run from June through October– except for morels, which come out in late April and early May. Now I'm seeing all kinds of mushrooms out in May. I don't know what to expect. However, the old African proverb still holds true: "no rain, no mushrooms."

If convenience is king in your life, you might want to consider growing your mushrooms (see page 40). However, if you're like me and Type O blood runs in your veins, and the thought of watering logs and picking the same old *shiitake* every year gives you the willies, you'll have to follow the rain.

Let's say you've been out of town for a week, or better yet, sitting at your computer. How do you know if it's rained? You look it up on the net, of course! At **www.wunderground.com** you can pull up monthly precipitation reports for up to dozens of weather stations in your area. That's important because in my area rainfall is *incredibly* patchy. When it rains, it spores, but here in the mountains it can be pouring in one spot and dry as a chip just a few hundred yards away.

Of course the real question is not "where it has rained?" but rather, "where are the mushrooms?" And the folks most able to answer that question are your fellow mycophiles.

Where should I go mushroom hunting?

Are you kidding? That's the *last* thing any mushroom hunter is going to tell you! In general, the more mature the forest, the more mushrooms you'll find. But what type of woods you go to depends on what you think is out there. If people are finding chanterelles, I go to deciduous woods. If boletes are out, I go to pine (for more specifics, see page 26, below). However, the same mushroom won't necessarily be coming up in different locations, even if they're both the same habitat (e.g., mature oak/hickory forest) and it has rained in both, unless the soil temperature is the same, which depends in part on elevation and orientation.

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[14] The Chippewa call mushrooms *puhpohwee*, which means "to swell up in stature suddenly and silently from an unseen source of power." From a review by Richard Doyle of *Puhpohwee for the People* by Keewaydinoquay Peschel, in *The Mushroom Log*, newsletter of the Ohio Mushroom Society (date unknown).

Basically, there's dozens of factors that make up the microclimate of a given location. And then there's differences in age between mushroom populations, which also plays into fruiting patterns. All of this makes the art of mushroom prediction pretty challenging (like that game whack-a-mole). But that's the fun of it.

When I'm foolishly feeling focused on finding fungus, I go to the spots I know have been fruitful before. I keep a record of where and when. But the soil temperature on a given date varies from year to year, so… well, you get the picture. Like they say, if you find the Buddha under a poplar tree, don't look there again.

When I started picking mushrooms to sell, I wouldn't confer with other mushroom hunters about what people were finding. I was getting $15-18 a pound from over a dozen restaurants, I was the only one doing it, and I didn't want to stimulate competition. So instead, in my crazed, Loraxian greed for fungus, I called every landscaping, mulch, and tree maintenance company in town, every trail maintenance and hiking club in the area. I had a mushroom hotline listed in the paper. I posted "WANTED: MUSHROOMS" flyers offering $25 to anyone who could tell me where the wild things are. None of this worked, however, because in this culture, mushrooms are basically invisible.[15]

That was back in '99. Even today, to my knowledge, there's still nobody hunting mushrooms commercially in WNC, though it's a $50 million a year industry in the NW. With a lot of public education, I could see a sustainable gourmet and medicinal wild mushroom economy in WNC, one based on cooperation (see also page 35).

Until then, join a club– or start one. I don't have to give away my secret spot to say, "I found chanterelles around Mt. Mitchell yesterday." Everyone benefits from this info-sharing– except maybe the mushrooms themselves.[16] I recommend setting up a listserve (an email group mailing list) for this purpose. An example can be found at **www.sunflower.com/~pilott29/Alert.htm**. To find the nearest mushroom club in your area, see page 40.

What do I take with me?

> What a delight it was to ramble through the clean, fragrant woods, filling our baskets. [When I was almost eight and my sister was nearly seven]... we were already proficient mushroom gatherers... When we were naughty, our mother would punish us by forbidding us to go mushrooming.
>
> Valentina Wasson, *Mushrooms, Russia, and History*, 1957

A Japanese haiku says "Mushrooms: they don't run away, but everyone's in such a hurry." Well keep your pants on! There's plenty of prickers, poison ivy, and stinging nettle in the woods. You don't have to be Thich Nhat Hanh to avoid them, but it's certainly easier to wear long pants, socks, and shoes. I keep an extra set in the car, along with a nylon rain jacket and pants.

The big three things to take mushrooming are…

---

[15] I *have* been on more than my share of wild goose chases, though. Take my advice: if someone unacquainted with mushrooms says, "I saw tons of mushrooms on the xyz trail recently," don't just run out there. "Tons" usually means a dozen *Russula,* and "recently" usually means one or more *weeks* before. People don't realize that mushrooms don't last. Also find out exactly– I mean *exactly*– where they're talking about. Otherwise these tips rarely pan out.

[16] Actually, like other fruits, mushrooms are probably designed to be eaten. Spores are unaffected by animal digestion, and most animals conveniently 'spit out the seeds,' so to speak, in a fresh bed of fertilizer. Alas, if it weren't for indoor plumbing…

1) A basket. The ones that peaches come in (often available free at produce markets in season) are best. They're light, straight-walled, and just the right size and depth. Just watch out for any staples sticking out of them. When you inevitably *schmutz* one up or bust a corner out of it, no problem. You just get another. The old one makes a good paper recycling bin.

Your basket will get less stained with spores & mush if you line the bottoms with paper before using (remember that mushrooms will soak up any ink on the paper, which forms confusing if not toxic stains on your specimens).

2) The official (s)he-knows-what-(s)he's-doing mushroom hunting tool. Leave your pocketknife in your pocket; or better yet, at home. Go buy a few steak knives (preferably double-edged; no stilettos please) and one inch paint brushes (your old toothbrush will work: it's time to replace it anyway). Tape the two together. Paint or tie something neon to it if you're worried about losing your creation. I'm on my third.

What is the brush for? For cleaning off each edible mushroom before it goes in the basket (by "edible," I'm assuming you know what it is; if not, *don't* brush it and see #3, below). In theory, you do this so that dirt and debris don't spread all over everything else in the basket. But in my experience, the opposite is true. As soon as you pick a mushroom it starts to dry out. This causes the schmutz to bond to it even more. If you wait to do your cleaning at home, you may have to rinse or even trim them later (see also *"How do I store wild mushrooms?"* below).

3) Paper sandwich bags, wax paper, or best of all, wax paper bags (which I've only been able to find in CA). These are for keeping different collections of unknown species- even those that appear to be the same- separate.[17] Another reason to do this is that mushrooms can be stained by other mushrooms (the "old man of the woods," for instance, will stain whatever it is lying against black), and this can be mistaken for a bruising reaction. The bags will also help keep your mushrooms in one piece, so you don't come home with tossed mushroom salad. Remember, it only takes a bean-size bit of toadstool to put you on ice. *Hasta amanita,* baby.

On a lighter note, you might want to take along a shopping bag for berries, edible plants (foragers must diversify!), or the occasional mushroom motherload. I do keep a set of field guides (and a pair of binoculars) in the car, but luckily, since you can pretty much judge a field guide by its weight, I don't need to carry any with me. No offense, but *you* might want to. It's not nice to pick a whole bunch of mushrooms you don't know, especially of *one* species, only to find out they're better chucked than plucked (I have a great story about this). If I don't know a mushroom, I'll bring back a sample.

If you take a book, I would put it in a plastic bag. I laminate my books with clear contact paper available at the drug store. Other optional items include index cards, tape, and a pencil (see below), water, a compass, and some mint candy (a "lifesaver" for acrid tastings).

[17] By "different collections of what looks the same," I mean, roughly speaking, similar mushrooms farther than a few yards from each other, although mushrooms closer than that are still not necessarily the same species.

What are some safety precautions and guidelines for gathering mushrooms?

> My father was a great lover of mushrooms. If he saw one on the side of the road, he stopped the car. Of course in those days there was not much traffic, but when he saw one special mushroom, he stopped the car and he backed up right on the big road. My mother screamed, we all screamed, we thought we would be killed, and out he jumped and got his mushroom and jumped back in.
>
> Susan Fromberg Schaeffer, *First Nights*, 1993

Usually it's not the mushrooms but getting to them that's dangerous. You can spot mushrooms from the car, but you can also kill yourself and/or someone else trying. It's not worth it; I wouldn't eat anything within twenty feet of a busy road anyway. Mushrooms *love* to soak up toxins, including heavy metals and radioactive nucleotides. In fact, they're being used by environmental cleanup companies for just this purpose (see *"What do mushrooms eat?"* below).

Steer clear of all weedless lawns and landscaping. That's a clear sign that these areas have been sprayed. Parks, golf courses, cemeteries, schoolyards, railroads and power line cuts– even campsites– have probably been liberally doused with Round-Up. And the next time you go into an old apple orchard looking for morels, I trust you'll test the soil first for those old time farmer's favorites, Paris Green and London Purple (a.k.a., arsenic and lead).

Unfortunately, mushrooms can accumulate heavy metals (including cadmium and mercury, which is 5000 times more toxic than lead[x]) in significant amounts *even in relatively unpolluted areas*.

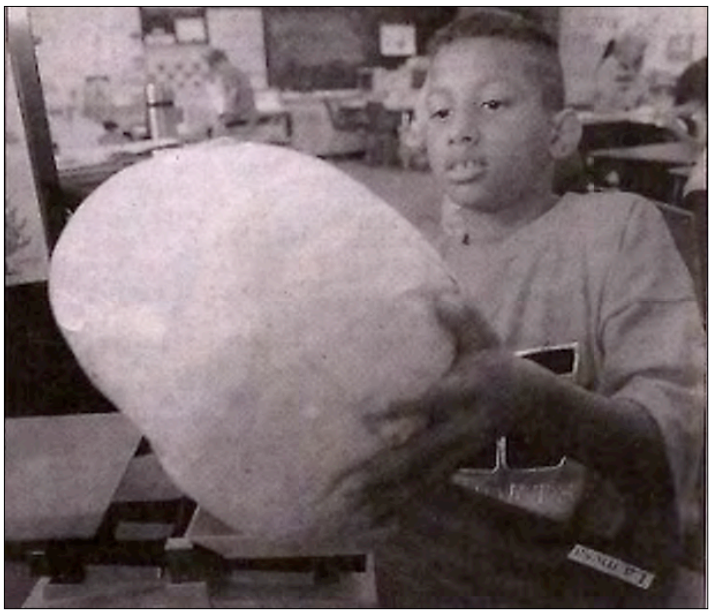
> Some common species which accumulate more than 50 mg of cadmium per kilogram of dry weight under these conditions include *Agaricus campestris* [the meadow mushroom], *A. augustus*, and *A. arvensis*. A meal of a half a pound of such mushrooms would contain nearly five times the amount of cadmium generally considered as safe for consumption during an entire week
>
> Species which accumulate appreciable amounts of mercury even when grown in uncontaminated areas also include some fine edible species. Those with concentrations of more than 10 mg of mercury per kilogram of dry weight include *Agaricus arvensis*, *A. campestris*, *Boletus edulis*, *Calvatia gigantea*, *Lepista nuda*, and *Marasmius oreades*. Less than three-quarters of a pound of these would contain an amount of mercury generally considered as maximal for consumption in a one-week period. Keep in mind, however, that the *Agaricus* species accumulate both cadmium and mercury. Further, if mushrooms grow in areas contaminated by large amounts of toxic heavy metals, the consequences of eating large quantities could be serious; this also applies to species not generally considered heavy-metal accumulators.[xi]

The author advises that one should avoid collecting "near mines, smelters, metal refining plants, electroplating facilities, *coal-fired generating plants*… and the like" (my emphasis). Do you know where these are? Ashevillans, do you know how far the coal-fired plant in Skyland blows its 40 tons of mercury into the air each year? [xii] Think about that next time you're hunting in Bent Creek.

Let me make this clear. I don't provide this information so that you can steer clear of "dangerous" or "bad" areas or mushrooms. Trying to save yourself from this poisoned world is like a fish jumping out of water. In fact, it's the same self-centeredness that created all this pollution in the first place. We are all in this together. Support groups like Appalachian Voices and the Canary Coalition (**www.appvoices.org** and **www.canarycoalition.org**).

Now back to hunting and gathering:

If you notice parasols in someone's yard or mushrooms in their meadow, do ask permission. It's not only good manners (which are often taught in these parts with a shotgun), but you might learn something useful, like the fact that they spray, that their fence is electrified, or that there's five hundred more mushrooms *behind* the house. I've experienced all these things. After an illustrious decade of scrounging, I can tell you that you always get more, in the long if not the short run, when you ask.[18]



Chris DiDominic found this humongous fungus just in time for Halloween

If you're in the woods and you spy a mushroom on the ground ten or fifteen feet away, it's wise to take note of where it is in relation to something larger. Often when you get to where you thought it was, you can no longer see it from that angle.

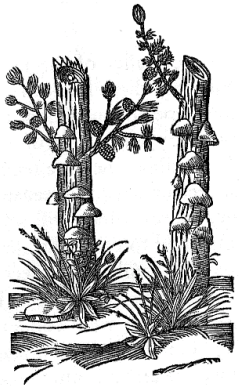
When you finally come within reach of one or more tasties, you may want to take some notes first. An index card makes a good place to write down what you may not remember back home, such as: *where is the mushroom growing (under what trees)? What is it growing on (the "substrate")? How is it growing (in a bunch, alone, etc.)?* Another way to keep track of the habitat and/or substrate is to place a sample of it (a leaf from the predominant tree, a piece of the log, etc.) in the bag along with it. You can even start a spore print by taping a cap to the other side of the card, placing it in a bag or envelope, and resting this at the bottom of your basket (see *"What is a spore print?"* below).

On that note, I generally place mushrooms in the basket gills or pores up. It's not as pretty, but that way I don't end up with spore deposits everywhere. If you know what you're harvesting and there's a lot of it, you can pack a lot more into a basket by "stacking fungus" (i.e., separating the caps and stems). Do save the stems, by the way. Most are as flavorful and nearly as tender as the cap.

For many years, I kept a log of almost every mushroom I found. This was a great learning tool. Now I just keep track of my key spots, which I check around the same time each year. This often works, but don't count on it (see *"Where do I go mushroom hunting?"* above).

Finally, unless you want to bring home "a loathsome mass of putrescence,"[xiii] don't leave your mushrooms (or your dog) sitting in the car. Cracking the windows is not enough! if you haven't brought a cooler along, hide them under a bush or elsewhere in the shade, and if you're like me, put a note on the dashboard reminding you not to forget them. Then get thee to a fridgedaire ASAP. This will greatly slow down their metabolism and more importantly, that of their "tenants" (see *"Why is my mushroom moving?"* below).

[18] After a year of us picking chickweed at UNCA, my friend Corinna asked if they spray. Sure enough, they did. But after talking to her, they stopped! One time I asked someone if I could go pick in their field. I forgot to ask about the fence. I was carefully stepping over the barbed wire when I got zapped. I won't say where, but I sure got PUFFBALLS from it!



Is it safe to touch or smell poisonous mushrooms?

"There's nowt like this wood in the world, sir," the old man asserted doggedly. "The bottom's rotten from end to end and the top's all poisonous. The birds die there on the trees. It's chockfull of reptiles and unclean things, with green and purple fungi, two feet high, with poison in the very sniff of them. The man who enters that wood goes to his grave."

E. P. Oppenheim, *The Great Impersonation*, 1920

One day my girlfriend's nephew Cameron came running inside with his mouth open, arms waving, and trying to speak without moving his tongue. Finally he grabbed a scrap of paper and wrote out "POISONOUS MUSHROOM." Grandma gave him a glass of water to wash his mouth out with. Close call!

Apparently, Cameron had learned why they call them "puffballs" (see cover illustration). The mushroom he plucked for a closer look probably sent several thousand spores into the air– and into his mouth. He was afraid to talk lest he swallow some.

It reminds me of a horror book I once found at a yard sale, *The Fungus* by Harry Adam Knight. People waking up dead (or half-dead, rather) with mushrooms literally coming out of their ears (not so far-fetched; see page 19). Well anyway, it *is* safe to smell or touch any mushroom. That doesn't mean breathing in a big cloud of spores– or any dust– is a good idea. But don't worry about reusing bags that have held poisonous mushrooms (after you've emptied them). And don't be surprised if you have to *taste* a mushroom to find out what it is! Tasting means you spit it out again; you don't swallow it.

Taste mushrooms only when directed or when you're sure your mushroom is in a family with nothing known to be "dangerously poisonous" (see *"Aren't Most Mushrooms Poisonous?"*). Remember, it only takes about a quarter teaspoon of a deadly mushroom to kill you (or your neighbor, in case you're wondering).

Why is my mushroom moving?

Touch him, and you'll find he's all gone inside
just like an old mushroom, all wormy inside, and hollow
under a smooth skin and an upright appearance.

D.H. Lawrence, *"How Beastly The Bourgeois Is,"* 1923

If you haven't found out the hard way (you know the joke about biting into an apple and finding half a worm, right?), humans aren't the only critters that love mushrooms. You'll find mouse nibbles, turtle bites, millipedes, burrowing beetles, slugs, and slimy slug trails on mushrooms: all those nasty things that pesticides protect us from. That's nothing, however, compared to what's *in* the mushrooms. Even more so than plants, rarely can you pick a mushroom without displacing a substantial resident population.

Some mushrooms have creepy-crawlies in the gills or stem. Fortunately you can just tap and blow on the mushroom and they'll abandon their comestible condo like it's Armageddon. If that doesn't work you can smoke'm out with incense or the herb of your choice.

If you don't meet the beetles, you're sure to encounter sooner than later everyone's favorite *mycophage*, the ever-present fungus gnat larvae. You can see their tunnels by slicing across the stem. Since these little buggers eat their way from the ground up, you can try to avert them by slicing off successively higher pieces of stem. More often, they've beat you to the munch.

Luckily, these little competitors are harmless. Some books actually suggest removing them. *Good luck!* I say if you can't beat'em, eat'em. Granted, you may want to leave badly infested caps behind (the ones that seem to vibrate when you crack them open). The worms are not a problem, but the secondary bacterial infection they can cause, i.e., rot, can be (see page 32 for details).

To sum things up, fungi and insects are a package deal. You can't pass up every inhabited mushroom or you'd be left with *bubkes*. So let's go get some grub...[19]

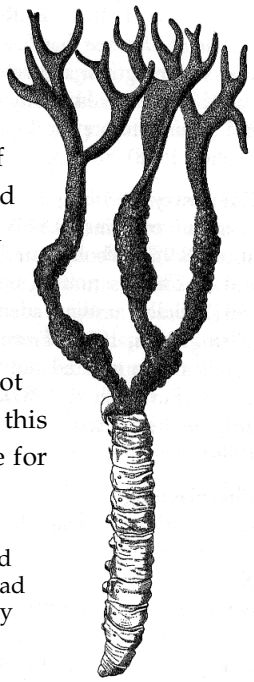
What do mushrooms eat?

> It's all a stage set– we know this– a temporary stage on top of many layers of stages, but every year fungus, bacteria, and termites carry off the old layer, and every year a new crop of sand, grass, and tree leaves freshens the set and perfects the illusion that ours is the new and urgent world now.
>
> Annie Dillard, *For the Time Being*, 1999

Fungi are nature's clean-up crew. You've probably already noticed that mushrooms aren't usually green, like plants. Mushrooms can come in all different colors because they don't rely on the sun for energy. Rather,

> On the wreck of the year they flourish,
> suck strange life from rotten sick and hollow tree…
>
> Eden Phillpotts, "Children of the Mist," 1896

[19] Chlorophanatics take note: Mushrooms may not scream any louder, but they are not vegetables. "Fungi have been classified in their own Kingdom for nearly a half a century, and recent molecular evidence has actually shown that fungi and animals are more closely related to each other than either is to plants! This result in part explains why fungal infections such as athlete's foot and other human pathogens are so difficult to cure; human and fungal biochemistry is much more similar than human and bacterial biochemistry (remember, fungi produce many of our antibiotics)." From a review of *Carnivorous Mushrooms: Lassoing Their Prey* at Amazon.com.



My friend's dad says, "I don't eat mushrooms. They grow in the DARK!" Sho' nuff, instead of using chlorophyll to make food from light, fungi have powerful enzymes that can break down the toughest substances into something the fungus can eat– including hydrocarbons, the main component of petroleum, pesticides, and PCBs. That's why mycoremediation is being used with great success at toxic waste sites. Imagine cleaning up an oil spill with oyster mushrooms, and then *eating them!*[20]

Since humans are making the oil spills, why not just eat the humans? Guess what "the corpse finder" *Hebeloma syriense* munches on? When a mushroom decomposes dead things, it's called a *saprophyte*. Of course, this is not the best way to endear one's self to mortali-terrified humans.[21] Mushrooms like this parasitic caterpillar-eater on the right (now there's a fruiting body) set the stage for some big fun in murderdom, like this scene from the Sherlock Holmes series:

> The fields were spotted with monstrous fungi of a size and colour never matched before– scarlet and mauve and liver and black– it was as though the sick earth had burst into foul pustules. Mildew and lichen mottled the walls and with that filthy crop, death sprang also from the watersoaked earth.
>
> A.C. Doyle, *Sir Nigel*, 1906

Fungi's necrophagous function wasn't always this revolting. Along with vultures, mushrooms were once revered as *psychopomps*, "those who carry souls forward." Rather than being merely torn apart, the dead were being brought to the womb of the Mother to be put back together again, i.e., reborn. Helping carrion to carry on, I suppose.[22,xiv]

While mushrooms take away the dead, they also give to those who are living.

> Among us humans, fungi have an unfortunate reputation as freeloading or fatal parasites- we tend to notice them only when they appear on the soles of our feet or in our refrigerators, or blight a country's worth of potatoes. But, without a fungus, bread would be *matzoh* and beer would be barley juice. Without penicillin and other antibiotics produced by fungi, infections would have claimed millions more lives in this century. Without fungi in the soil, most plants would die, because they are joined with fungi in life-giving symbiosis...
>
> Fungi form underground networks that unite forests of different plant species. Sometimes a network acts like a nervous system. When a plant is attacked by insects, some species of fungus can pump pesticides into it. If one part of a stand of trees is poor in nitrogen and another is short of water, fungi can transport the substances needed. And if the plants are starving, fungi can give them lumps of oil to feed on...
>
> Fossil sacs of spores demonstrate that by 400 million years ago, mycorrhizal fungi and plants were on intimate terms.
>
> Zimmer, "Hypersea Invasion," *Discover*, 1995

Most mushrooms are *mycorhizzal* or symbiotic with specific plant partners (one of the first mushroom lovers I ever met called himself Mike O. Rhizza). *Myco* means fungus and *rhiza* means root. The fungus's web-like body, or *mycelium*, connects to the plant's root system, trading water for sugar and other nutrients. That's why you can find many mushrooms by looking for certain

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[20] In just four weeks, fungi turned a mulch pile soaked in motor oil into harmless compost; the mushrooms themselves were completely free of petroleum products (see www.fungi.com/mycotech/mycova.html).

[21] some say the word *fungus* comes from *funus ago*, "I go to a funeral"(Bauhin, 1650, in George McCarthy, *The Wild Mushroom*, 46). Of course the big question is "whose?"

[22] What did one vulture say to the other? "I've got a bone to pick with you!"

trees and why those mushrooms are so hard to cultivate without them. It's also one reason why trees are so hard to transplant.

They say "He that high grouth on cedars did bestow, gave also lowly mushrumpes leave to growe."[xv] But it's probably the other way around. Nearly every plant on earth depends on fungal friends to survive. [23] In fact, it's beginning to look like fungi were not only the first life on land, but that they may have "invented" trees to give themselves some shade![xvi] So much for this theory:

Under a toadstool crept a wee elf
Out of the rain, to shelter himself.
Under the toadstool, sound asleep,
Sat a big dormouse, all in a heap.
Trembled the wee elf, frightened and yet
Fearing to fly away lest he get wet.
To the next shelter- maybe a mile!
Sudden the wee elf smiled a wee smile,
Tugged till the toadstool toppled in two,
Holding it over him, gayly he flew.
Soon he safe home, dry as can be,
Soon woke the dormouse- "Good gracious me!
Where is my toadstool?" loud he lamented.
And that's how umbrellas were first invented.

Oliver Herford, "The Elf and the Dormouse," 1919

Can you hurt the mushroom population by gathering them?

Now some people be complainin' that I'm rapin' the woods
Because they never been acquainted with my personal goods

If they came to my classes then they'd start to see
That pickin' mushrooms off the ground s'like pickin' fruit off a tree

Just like a monster from a storybook I'm tellin you
You cut off one mushroom, s'gonna grow back two

So I might be castratin' but they still get to matin'
Cause the fungus still be growin' down in the substrate

The Mushroom Man, "A Fist Full of Fungus," 2000

A mushroom is only the fruiting part of a fungus. The rest of the creature is living in and eating whatever the mushroom is growing on, be it the ground, a stump, or your bathroom floor (see my photo album). It looks like cobwebs, and these are called *mycelium*. When a fungus wants to sow its wild spores, it sends up a mushroom.

Picking mushrooms, then, is like gathering berries; that's why it's legal in the National Forest. Of course, it's not nice to tear off a branch each time you pick a berry. For this reason I often neatly cut a mushroom off with a knife at the base, leaving the mycelium undisturbed.

[23] Actually, when it comes to nature, human or otherwise, the difference between "friends" and "reciprocal parasites" is not always that clear. It's nice to think of plants and fungi as being mutually supportive, but this community is not necessarily intentional. Take lichens, for example. Lichens are part fungus, part algae. This odd couple may have hooked up not because they took a *likin'* to each other but rather because neither one manage to kill and eat their neighbor. Now, 400 million years later, they're still an item (till acid rain does them part). Politics aside, if two beings can't exist separately, can we really say they are separate entities?

However, *don't do this unless you're positive about what you're picking*. The key to avoiding deadly Amanitas, for instance, lies in seeing what the base is like, and this is often one or two inches underground.

Lately I've taken to just pulling up mushrooms that come out easily and then trimming off the dirty bases. When it's a bunch of chanterelles, I save the ends for soup stock (see *"How do I cook mushrooms?"* below). Remember that the mycelium isn't just a little bit of "roots" at the base of a mushroom. It's usually a vast network covering at least several yards.[24] A piece of mushroom left behind (with the occasional exception of certain polypore mushrooms) will not grow back, so I feel it's more efficient to use as much of it as you can.

But what if you pick *all* the berries? What about leaving one or two mushrooms behind to spread spores? You can do this, but keep in mind that there are millions of mushrooms out there. And each patch will usually fruit several times in a season, with mushrooms coming up at different rates in the course of several days. In short, I don't think you could pick every mushroom in an area even if you tried. In any case, make sure you bring home several specimens for identification, ideally at different stages of growth (especially boletes and puffballs).

Let's put all this into perspective. If you're not gathering and cooking your own food, who is? How careful do you think *they're* being? In the Pacific Northwest, where mushroom hunting is big business, people are literally raking the forest floor (not to mention killing each other) to get at mushrooms first. On the other hand, there are chanterelle patches in Europe that have been carefully picked over every year for hundreds of years, and they keep coming back. Apparently, as long as their habitat is undisturbed, wild mushrooms can be harvested indefinitely.

However, now those ancient patches in Europe *are* dying.[xvii] Why? Not from over-harvesting, but from acid rain. And what causes more acid rain: people walking into their backyard or driving to their local forest to gather their own food, or trucks shipping air-conditioned produce across the country from California?

All this said, I do my best not to waste mushrooms. When I pick a mushroom, I make sure that somebody either eats it or at least learns from it. You might make a pledge to either identify or eat every mushroom you pick (hopefully both). If you choose to follow this guideline, don't overestimate how many mushrooms you can sit down and struggle with identifying for an hour or more. Without help, identification can be incredibly tedious!

[24] The largest creature on earth is not Walmart but another virulent parasite: a single honey mushroom fungus in Oregon's Blue Mountains is no less than 3.5 miles across and is estimated to be possibly 8000 years old. It has decimated an area of oak forest the size of 1,800 football fields. And it's heading this way (*Discover*, January, 2004).

PART 3: IDENTIFICATION

"Basidisium!" breathed Mr. Theodosius. "How that name haunts me. Basidium, of course, means a form of spore-bearing organ having to do with basidiomycetous fungi–"

"And fungi are rusts and smuts and mushrooms," finished Chuck, knowing all this by heart long since."

"Yes, a perfect name for that little planet– a perfect name," exclaimed Mr. Theo, "for such a damp, cool, misty place as it must be. Tell me," he begged, "tell me, if you can, *exactly* what it is like."

Eleanor Cameron, *Stowaway to the Mushroom Planet*, 1956

Aren't you going to explain how to identify a mushroom?

You wish! Identification is just too much to cover here. Besides, this booklet is meant to complement field guides that are already out there, including myself. And if you *are* taking a class with me, don't bother taking notes about each mushroom. That's what databases (i.e., books, CD-ROMS, web sites, etc.) are for.

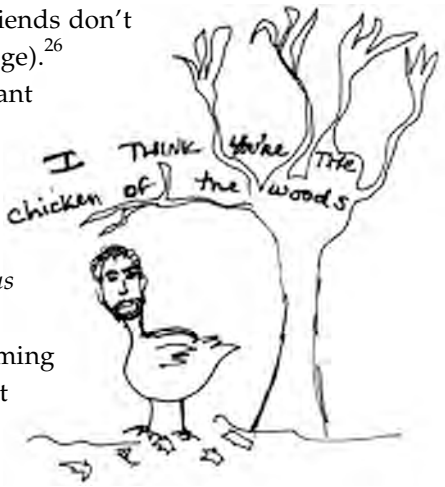
In fact, before you bother writing down *anything*, ask me if it's already in this booklet; chances are that it is. That way you don't have to be distracted by taking notes. And if you ask me something that's already in here, I may just say, "read the book." That way I don't have to be distracted by teaching. The important thing is that you experience as much as possible while we're together– and that we all have a great time.

If you're not taking a class with me, let me repeat: GET HELP! One time I tried doing my own tune up. The book said, "don't screw in the spark plugs too tightly." The next day the car starts knocking like it swallowed a cat. All the plugs were falling out of their sockets. This is the folly of DIY.

What does a field guide mean when it says that a mushroom's gills are "distant," "close," or "crowded?" They don't always say. When one mushroom is supposed to bruise blue "quickly" and the other is supposed to turn "slowly," one is delicious, the other pernicious, and the two mushrooms you're holding both take less than two seconds to change color, who you gonna call?

This is a real example. Thank goodness customer support in this country is so good. I spent years struggling with this particular question until I ran into the former president of the local mushroom club in the woods. He asked me if I'd seen any of a particular mushroom that always gives him flying dreams. As a matter of fact I had. Then– if I can manage to put this in writing– he showed me, with a motion of his hand, the difference between a second and a fraction of a second. The books said nothing about this. And I'm talking about one of the five most common boletes in WNC, *Boletus bicolor* and its look-alikes.

Get the picture? Get help! Find a friend, join a club. Email digital photos of your unidentified fungal objects to people. If you don't have a digital camera, take regular photos and scan those or the mushrooms themselves.[25] If your good friends don't seem to help at all, then call on your rainy day man (see back page).[26]



By the way, I hate to ring the school bell, but it's important that you learn mushrooms by their weird scientific names. This is because several different mushrooms can have the same common name, and this can be confusing if not dangerous. For example, "chicken of the woods" and "hen of the woods" are not the same mushroom! But's going to confuse *Laetiporus sulphureus* and *Grifola frondosa*?

On that note, the mumbo jumbo often make sense, assuming you speak Greek or Latin. For those of us with less than perfect scores on the SAT, there's a great myco-dictionary in the back

[25] just lay them on the glass and put a shoebox over them. For more on scanning mushrooms see *The Mycophile*, Nov/Dec 2000, 12-14.

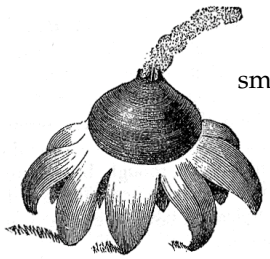
[26] It turns out my girlfriend's girlfriend's boyfriend– and my girlfriend's ex-boyfriend– are also into mushrooms. Small world. So my girlfriend's girlfriend (who also knows my girlfriend's ex-boyfriend) and her boyfriend are taking us to the beach and she says "how come it seems like people into mushrooms are mostly geeky, bearded guys in purple t-shirts?" Now you see she's driving, see, and she turns around and realizes that I happen to also be bearded, wearing a purple t-shirt, and, well, geeky too. Small world! (see also illus., pg 37).

of *Mushrooms Demystified*. It's fun for the whole family. *Lycoperdon*, for instance, means "wolf farts."

What's a "spore print?"

> Adorned with dead stumps and rotting logs, my landscape is now perverse. Leaf mold and humus are my jasmine and honeysuckle, compost and cow dung my flowerbeds. The same two weeks of rain that fill my friends with despair fill me with joy and expectation.
>
> There are no glasses left in my kitchen cupboard. They are all on the dining-room table keeping the draft from incipient spore prints. There is no longer any room to eat on the table...
>
> Sara Ann Friedman, *Celebrating the Wild Mushroom*, 1986

Spore printing can be a crucial part of the identification process. A given species can vary widely in color from mushroom to mushroom; a given mushroom can change color with age and humidity; but the spore color will not vary between specimens or change over time.



Practically every mushroom's job in life is to drop spores into the air (like this earthstar is doing). Spores are basically tiny seeds. They're so small that you can't see each one, but you *can* see a pile of them when they all fall in one place. That's a spore print.

Spore prints can be white, tan, pink, brown, reddish, greenish, purple, black, and a lot in between. The main thing to understand is that even though spores usually drop out of the underside of a mushroom, the gills, pores, teeth, etc. are **not** necessarily the color of the spores! Young meadow mushrooms, for example, have pink gills but brown spores (see poem on cover page).

Sometimes several mushrooms are growing so closely together that the caps overlap. In that case, if you look carefully, you may find where one cap has already spore-printed onto another. If you know what you're looking for, the smallest smudge may be all you need. You may have to carefully scrape at it to make sure it's spore dust and not a stain or mold. This can be very tricky, so be careful.

For a more reliable spore print, pick one or two virile-looking candidates, cut off their caps (ouch) and lay them flat on a non-glossy sheet of paper. Brown paper bag paper is good because both white and black will show up on it; paper with both white and black areas is also good.

Trace the outline of the cap(s), so that when you lift it you know exactly where to look for the spore print. Then cover the cap(s) with a cup or bowl. You may not think the inside of your house is particularly windy, but those spores weigh next to nothing. In *dead air*, a spore would take ten minutes to fall from the table to the floor!

Most prints take at least forty minutes. Some never happen. When they do, you'll have to distinguish them from where the mushroom may has merely rotted onto the paper. A true print, if it's from a gilled mushroom, will follow a radially-lined pattern. However, sometimes the gills themselves stain the paper in this pattern.

Don't worry, the more you do spore prints, the easier it gets to recognize them. Better yet, the more you get to know mushrooms– or mushroom hunters (see previous section)– the less you'll have to do spore prints.

Aren't there any rules-of-thumb about edibility?

> My grandmother would boil a big pot of mushrooms to can. My grandfather would shine a silver dollar and throw it in the pot. If it came out black, supposedly there was at least one poisonous mushroom in the pot. But it came out black every time, and they ate them all anyway.
>
> David Janos, mycologist[xviii]

Everybody wants rules of thumb. It's human nature to want easy guidelines, principles to live by, like: 'all mushrooms growing on trees are edible,' or 'stay away from red or white mushrooms.' But these are like saying, 'all Cubans are trustworthy'[27] or 'avoid anyone wearing sneakers.' Every fungus, like every person eating them, is a unique individual. Mushrooms are people too!

At least one 'tree mushroom' is known to be deadly. And there are no mushroom colors that are always poisonous or edible. Also, just because you see that some animal has eaten part of a mushroom and isn't lying beside it, it doesn't mean the mushroom is edible. Squirrels and rabbits are immune to the death cap, *Amanita phalloides* (lucky them; I've heard it's delicious).

There *are* some pretty good rules of thumb, and practically every mycologist I know is extremely hesitant to share them. They want you to get to know each mushroom, or at least each species, personally. We prevent poisoning and prejudice pretty much the same way.

All that said, since I'm such a push-over, here are a few pointers I've put together about the most common mushrooms, at least in WNC. Like this booklet as a whole, these notes are meant to complement the field guides, NOT replace them. That means I am assuming you have a certain degree of familiarity with the mushroom or group in question or that you are looking it up in *at least* two books.

Like I've said above, *don't* assume that what I have to say applies outside of the Eastern U.S.! Also remember that picking from polluted areas (see page 15) is just as important an issue as edibility. I partook of parasols from a local bank's lawn several times before I noticed a distinct lack of weeds. Newly mulched landscaping is also often sprayed. God Bless America!

And finally, remember that rules of thumb are never entirely reliable because we just don't know everything that's out there (and who knows what monsters our agricultural and pharmaceutical runoff is creating). That's why for a given group I'll say, "nothing with these characteristics is *known* to be poisonous." So without further ado:

What are the top ten wild mushrooms to look for?

In my fungal opinion, the ten tastiest and most easily found and identified varieties *in the Southern Appalachians* are:

1.	The Lobster Mushroom	*Hypomyces lactoflorum*
2.	Boletes	*Boletaceae* family
3.	Chicken of the Woods	*Laetiporus sulphureus*
4.	Chanterelles	*Cantharellus lateritius*
5.	Honey Mushrooms	*Armillaria mellea*, *A. tabescens*

[27] something my parents like to say. Guess where they're from?

6.	Leatherbacks	*Lactarius volemus/corrugis*
7.	Meadow Mushrooms	*Agaricus campestris*
8.	Oyster Mushroom	*Pleurotus ostreatus*
9.	Maitake (Hen of the Woods)	*Grifola frondosa*
10.	Puffballs	*Lycoperdon* and *Calvatia cyathiformis*

Other mushrooms worth getting to know include:

	Russula spp.
The Blusher	*Amanita rubescens*
Parasols	*Macrolepiota americana, M. rachodes, M. procera*
Platterful Mushroom	*Tricholomopsis platyphylla*
The Beefsteak	*Fistulina hepatica*
Brick Tops	*Hypholoma sublateritium*
Smoky Gills	*Hypholoma capnoides*
Coral Mushrooms	*Ramaria* genus
Cauliflower Mushroom	*Sparassis* genus
Black-staining Polypore	*Meripilus sumstinei*
Shaggy Mane	*Coprinus comatus*

Medicinal mushrooms that can easily be found in my area include:

Artist's Conk & Reishi	*G. applanatum, tsugae, curtsii*
Turkey Tails	*Trametes versicolor*
Maitake	*Grifola frondosa*

Here are some details on the top ten:

1. **Lobster Mushroom** (*Hypomyces lactoflorum*): I can't imagine what someone would mistake for these, *after* encountering them at least once. The white powder you often find on them is just spores. So are "dots" when they appear. I would not eat soft red or crusty white and wet areas, however. Semi-white specimens are OK to eat. In fact, several of the big white mushrooms that this fungus parasitizes (turning them orange) are edible (see also *Russulaceae*, below).

Lobsters in this area are almost always under hemlock trees. Like all mushrooms, however, they will come out in different spots at different times depending not only on rainfall but on elevation as well (see "Where should I go mushroom hunting?" on page 12). If you do see one, however, look for more. "Mushrumps" abound just under the surface, making lobsters one of the funnest mushrooms to find. They seem to keep sprouting for at least a week too, even if it hasn't continued to rain.

2. **Boletes** (*Boletaceae* family): Boletes are generally a later group (August to October) found more in conifers. Although 95% of them– *by species*– are edible, at least 40% of the ones I actually find around here are not (they're unboleateable). Contrary to popular misconception, you can't simply avoid the ones that bruise blue. The rule of thumb is:

IF it's a bolete,

AND the pores are not red or orange and stain blue within ten seconds of being scraped (note: some of these are edible; *B. frostii* is the one common example),

AND it's not red at all on top and yellow on the bottom and blue-staining

(I'm talking about *B. bicolor* and its look alikes, which are very difficult to distinguish although some are edible),

AND it's not *Tylopilus eximius* or *Leccinum insigne* (which have made a handful of people sick),[xix] UPDATE: a number of Leccinum, especially but not just the orange-capped species, have caused serious illness in some people

AND it's not *Boletus huronensis* (which is only in the NE US),

AND it's not rotten,

THEN it may be bitter (please don't pick a basketful of the very common *Tylopilus felleus* without tasting it first!), but no boletes with these characteristics are known to be poisonous.

Before you eat a bowl of boletes, however, know that some species of *Suillis* (the Slippery Jacks) give some people the runs. Also, *Suillus punctipes* smells great but it stains my fingers brown with something that itches like the Dickens. I've learned to wear finger cots when handling them. These look like little condoms and can be bought at the drug store. Note that if you leave them in a hot car they tend to melt.

3. **Chicken of the Woods** (*Laetiporus sulphureus*): First make sure you know what a polypore is and that this is one (see Polypores, below). Then make sure it's not growing on Black Locust or Buckeye (Horse Chestnut), both toxic trees.

This particular polypore, a.k.a., "Sulfur Shelf," is bright yellow underneath. It can fruit anytime from June to September. There is a pink and white "albino" variety, but then again, you may be looking at an old, faded, regular "chicken."

> [He] compares the flavor to diluted spirits of vitriol… It is strongly purgative, according to the same experimenting authority… Nothing can be more beautiful than this Aurora-tinted Fungus; the most dull must be struck with it, the most prejudiced admire it. On the question of utility, which is sure to be asked- that it is not fit for table use we need scarcely state, but it need not therefore be condemned, being probably not more poisonous than medicinal things in general. Whether in that light it be worth attention, we leave to wiser heads.
>
> Mrs. T. J. Hussey, *Illustrations of British Mycology*, 1847[xx]

Nowadays chickens (including the kind with feathers) are considered edible even though people regularly get sick from them (see page 7). And I'd be leery of the chitin in older collections. Borderline specimens might pass as "chicken salad." Beyond that, you might as well be eating cardboard.

If you're early, on the other hand, and find baby chicks, come back later. They grow about an inch a day, usually irrespective of rain because they have plenty stored in the log/tree. Then again sometimes they do dry out or get ravaged by insects.

Also, sulfur shelf ranks at least a five in ten on the "simultaneity scale." That means that if one is out, it's worth checking your other known spots. Just don't count your chickens before they hatch.

4. **Chanterelles** (*Cantharellus lateritius*): How much you'll find varies from year to year, from handfuls to basketfuls. And they certainly don't come out everywhere at the same time. Don't eat the Scaly Vase chanterelle (*Gomphus flaccosus*), which hangs out with lobsters. All others are fine, but the main one here is the Smooth Chanterelle. It certainly will *not* have gills, like its most common "look-alike," the very toxic Jack-o-Lantern (*Omphalatus olearius*). The Jack-o-Lantern looks like a giant chanterelle, but it should only fool you from a distance. Field guides discuss the many differences between them.

5. **Honey Mushroom** (*Armillariella mellea*): This mushroom is very variable in color; there's at least a dozen varieties, mostly yellowish, brown, and greyish. I think the yellow taste best. Look for the little black dots around the center of the cap, a feature that's not very emphasized in the books.

It's not unusual to find fifty to a hundred honey mushrooms on one stump. However, watch out for the deadly *Galerina autumnalis*. They say it can be growing right in there with the honeys, and just one will put a cap on your mushroom consumption.

Honey mushrooms are difficult to digest, so cook them well. Drying first may be a good option in this regard, because you tend to find a lot of honeys anyway, and as is the case with plants, this may help weaken or even rupture the cell walls.[xxi]

A. tabescens is a smaller, terrestrial, *ringless* honey mushroom also known as the friendship mushroom (possibly because they're always in big bunches). I usually find the stems to be quite bitter, so I recommend tasting them first.

6. **Leatherbacks** (*Lactarius volemus/corrugis*): Got milk? You should have plenty when you break this mushroom. It should stain the mushroom *and* your fingers brown within ten minutes, and make both smell like old fish. *Yum!* Watch out for *L. peckii*, with a darker underside and vague concentric circles on the cap, often growing near water. Its milk burns on the tongue (see quote under *Russulaceae*, below).

7. **Meadow Mushroom** (*Agaricus campestris* and other *Agaricus* spp.*)*: When dining at 'the meadow mushroom,' watch out for deadly Amanitas, which are also white. The farther you are from trees, the less likely you'll encounter one. There are other *Agaricus* that grow in fields and are toxic, but I've never come across them in this area.

The rule of thumb for *Agaricus* (assuming that's what you have) is to avoid those that stain first yellow and then reddish/brownish, especially at the edge of the cap or the inside or bottom of the stem. These will also smell like phenol, ink, or library paste, especially when you crush the base. The ones that stain yellow and *stay* that way and smell sweet like almond candy are considered safe. Don't base your decision on whether the smell is "pleasant." In my rage to phage, I've almost convinced myself at times that the smell of ink *is* pleasant!

8. **Oyster Mushroom** (*Pleurotus ostreatus*): There are several other whitish, gilled "bracket" mushrooms, and though I don't know of any being poisonous, a few taste god-awful nasty, and one should be careful with gilled species in general.

Oysters get a bright yellow mold I would cut out. Tapping them before or after you pick them will motivate most of the many beetles in the gills to abandon ship.

9. **Parasols** (*Lepiota americana, rachodes, procera*): A considerably dangerous group, as some smaller related species are deadly and the green-spored *Chlorophyllum molybdites*, which looks exactly like *L. rachodes*, makes more people green in the gills than any other mushroom in the country (note that I sometimes find a little green in the gap between the cap and gills of *L. rachodes*). Still, *L. rachodes* and *L. americana* taste like roast beef (and no, you don't have to be vegetarian to think so), and *L. procera*, which tastes halfway between that and walnuts, is one of my all-time favorites. The first two crop up in garden beds, landscaping, or anywhere with mulch (with or without pesticides). Picking piles of them will stain your fingers, though, so on my third trip back to the same mulch pile I brought finger cots.

10. **Puffballs** (*Lycoperdon* spp. and *Calvatia cyathiformis*): Not everything that looks like a puffball is edible. First and foremost are *Amanita* "eggs." When in doubt, slice your specimen in half from top to bottom. Amanitas and other gilled mushrooms will show the outlines of cap, gills, and stalk.[28] Puffballs will look like a marshmallow (and I've actually used the big ones in desserts). If they're as soft as marshmallows, though, they will keep ripening quite quickly in the fridge, and they definitely lose flavor with age. However, there really are no definite cases of toxicity associated with puffball maturation. I think people say don't eat older puffballs just because they can taste dry and bitter. [29]

Other main groups:

The ***Russulacaea*** (*Russula* and *Lactarius*): Many members of this family are considered poisonous in North America or at least inedible, although pickling supposedly helps. In Russia and Eastern Europe, on the other hand, people eat all kind'a *Russula* with relish, pickled or not. What gives?

Well, for one, this ain't Russia. The species here are not necessarily the same, so I can't recommend playing *Russula* roulette.

> It gives no warning by its scent or by any other external circumstances of its deleterious quality; if the ignoramus should be tempted to taste, for a few moments all appears harmless... but it fully makes up for the delay, as the tortured investigator, with burning lips and fauces, and tearful eyes, seeks in vain for alleviation. It is an agaric unlikely to prove fatal, because the acrimony is not lost in cooking, and they who would eat enough to harm themselves seriously must have fire-proof palates.
>
> Hussey, *Illustrations of British Mycology*, 1847

Actually, the pepperiness *does* cook out, but the mushroom can end up tasting "metallic" and some *Lactarii* have given people stomach trouble even after being well-cooked.[xxii]

I also wonder about cumulative toxicity, including the harmful effects of taxing your digestion repeatedly. In 1996, Gary Lincoff, worldwide authority on mushrooms and their edibility, told me that "the only *Lactarius* I worry about (in terms of cumulative toxicity) don't grow in the U.S." The next year, when I reminded him of his answer, he said, "*I said that?*"

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[28] see photos in Arora, 679 and *All the Rain Promises*, 63.

[29] you can eat stinkhorns at any stage too, if that appeals to you.

With regard to acute toxicity, at least, here are a couple *Lactarius* rules of thumb I've collected: "Species with a strongly acrid latex and/or those in which the latex soon turns yellow or purple when exposed to air are not recommended for eating" (Smith, *Southern Mushrooms*, 116).

What about the mild-tasting *Russula*? Assuming you can draw the line between mild and acrid when most *Russula* fall somewhere in between, Smith says "although we counsel against eating any mushroom whose identity cannot be accurately established, many people do eat those species of *Russula* that have a mild flavor" (131). Likewise, Licoff's Audubon guide says, "the rule of thumb for eating Russulas is not to eat any with a sharp, acrid taste" (680). However, here is what Denis Benjamin, former NAMA toxicology chair, had to say to me in 2002:

> While it is true that most of the really toxic *Russula* and *Lactarii* are bitter, foul or peppery, this is not universal and I would NOT rely on a simple raw taste test to decide. In addition the edibility and the toxicity of many of the species has not been well studied in the USA, with much of the information been extrapolated from European species. While you might find self-experimentation acceptable, I would be concerned about naive mycophagists to whom you are feeding these mushrooms.

Don't be so naïve.

In conclusion, I recommend learning to pick out *R. brevipes* and the big white *Lactarii* that are considered edible, because there are so darn many of them and because one time I went hunting with a bunch of chefs and they said these were the best!

Polypores: "Most [like this herniating Berkely's Polypore] are too tough and/or bitter to be palatable; a few may actually be poisonous (e.g., *Phaeolus schweinitzii*) and even edible species are difficult to digest unless cooked thoroughly."[xxiii] Again, "none is known to be fatally poisonous, although a few that are tender enough to eat can cause indigestion, and some people do have allergic reactions to well-known and popular edibles."[xxiv] That's encouraging!

This is still a relatively safe– and medicinal– family for the stock pot. As far as *Phaeolus schweinitzii* goes (a.k.a., the Dyer's Polypore), it's is supposed to be too tough and hairy or just plain ugly to eat anyway. It sure isn't cute as a button mushroom, but I've enjoyed it several times without incident. And finally,

The ***Hydnaceae*** (Toothed Mushrooms): "Although some family members are too bitter or tough to be palatable, none is known to be poisonous."[xxv] As with polypores, I would use the tough cores for soup stock.

PART 4: SERVING AND PRESERVING

What brutishness is this? When friends you treat,
They looking on, alone you mushrooms eat?

Martial, Epigrams, ca. 90 AD

How do I store wild mushrooms?

> "I couldn't find any mushrooms," she said mournfully, slipping past me and putting the potatoes on the table. "We'll just have to suffer."
>
> Gary Krist, "An Innocent Bystander," 1998

First I clean my mushrooms with a brush as much as I can without breaking them. If they're going to need washing, I wait till I'm ready to cook them.

Store mushrooms in paper bags or in a basket with a damp towel over it, *not* in plastic (notice that the plastic tubs button mushrooms come in usually have air holes in them). Mushrooms are 90% water. In a sealed container, they may sweat and the resulting condensation can cause them to rot. Sitting in the fridge in an open container or in a paper bag, mushrooms will gradually dehydrate, but this is better than rotting.

Things that are *not* decay include: **a**. spore prints (see page 24); **b**. stains or bruises (usually brown, black, or blue). Some mushrooms change color at the slightest touch; and **c**. light or dark areas. These are often caused by leaves or other mushrooms partially covering the cap.

Other than that, a rotting mushroom looks just like a rotting vegetable. It softens, darkens, or gets moldy.

Speaking of putrescence, let's say the mushroom you find in the woods or behind your car seat is already *fungi imperfecti* (don't laugh, my car still smells a year later). How do you know whether to chew it or eschew it? Often spoiled areas can be trimmed off with a knife. Then again, I'm frequently surprised– flattered, even– at what fledgeling fungus hunters are willing to eat. But unless you're on the primal diet, an edible mushroom is no longer edible *once it is rotten*.

Firmer mushrooms keep for up to two weeks, softer ones for only a few days. Don't postpone the joy of cooking them, however, because on the seventh day, the eggs of the ubiquitous fungus gnat unleash their contents. And boy are they hungry.

Like I said, these squirmy wormies are harmless (see "Why is my mushroom moving?" on page 17). But they *will* enjoy your mushrooms if you don't. Even worse, they tend to strike out in search of warmer climes. And a plate of *porcini* garnished with grubs not a very fun-gustatory experience.[30]

For long-term storage, I prefer to sauté & freeze chanterelles, while chicken and hen of the woods keep better dried.[31] In general, mushrooms dry easily and often gain flavor (by being concentrated) in the process. Older boletes that would otherwise cook up slimy or at least "sluggy" (which, by the way, is what *myco* means) are better off dehydrated and powdered into soups, dips, and sauces. The *Suillis* ("slippery jack") genus is especially good for this. Don't knock it till you dry it!

After drying mushrooms, put them in the freezer to kill any bug eggs. This can take up to a week, depending on the temperature in your freezer (which can range from –5 up to 29° F). Otherwise, you may find a month or twelve down the line that stowaways have turned your souvenirs into sawdust.

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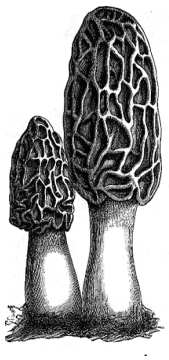
[30] maybe not in the "first world," but it looks like the first shall be the last to enjoy entomophagy: see *Man Eating Bugs* by Peter Menzel and Faith D'Aluisio (Ten Speed Press, 1998) and quote on page 34.

[31] when chopping chickens and other polypores, watch out for embedded twigs. Also note that older chanterelles often have dirt *inside* the stem.

How do I cook mushrooms?



> Morels are ugly in the skillet. The caps look like the scrotums of leprechauns, the stems like the tusks of fetal elephants. Aromatically, the report is more positive. From the pan rises the smell of the whole North Woods stewing in butter. The morels grow friendlier to the nose. But in the mouth, now there is where these dangerous-looking plants prove themselves. My God, I must confess it: Their deliciousness exceeds the normal limits of restraint. They taste similar to mealy sweetbreads, to eggplant, to country-style steak, to all three at once. As I munch on these delectables, my fearful toadstool prejudices dissolve in a glory of saliva…
>
> Tom Robbins, *Another Roadside Attraction*

It's commonly said that mushrooms should not be washed because they will soak up water and get soggy. But I know that at least the firmer ones do just fine with a rinse. After all, mushrooms are made to withstand rain (at least when they're whole). In any case, unless they've been touched by people or pets, there's no need to wash wild foods anyway; they're *organic*. Plus, most vitamins and minerals dissolve into water quite readily.

Mushroom flavors vary as much as vegetables do. For that reason, you may want to cook different varieties separately. In fact, for many years I was content to simply sauté my catch of the day. After all, I read that the wild mushroom "is so self-sufficient in its chaste severity that it allows but salt and pepper to approach it."[xxvi] This way the flavor wouldn't be lost in more complicated dishes; I could experience each morsel on its own terms. Plus I was lazy.

Over time, however, I found many mushrooms either too weird (e.g., *Armillaria caligata*), too mediocre (e.g., *Russula compacta*), or even too flavorful (*Lepiota americana*) to be eaten straight. Once you get to know the mushrooms yourself, you might want to get more creative (e.g., now I add garlic).

If you're serving wild mushrooms to others, it's nice to display one of each type to show people just what comely fungal flowers they're consuming.[32]

The *Tao Te Ching* says that ruling a large empire is like cooking a small fish. The same goes for mushrooms. You'll need a careful hand and a cute little pan, because with only one or two mushrooms in it it's easy to add too much oil, salt, or flame.

Heat the oil first (so the mushrooms don't just soak it up). I recommend olive, coconut, or palm. Then add the mushrooms and salt. Toss the contents to spread the oil and salt evenly. Softer mushrooms are like pancakes, however; you don't want to fuss with them too much, especially at first.

Cook these for a while; the amount of heat and time depends on the mushroom. The salt will help the mushrooms "lose their water." Covering the pan will help retain this moisture, which will steam the mushrooms and cook them more thoroughly without the need for extra water. If you do find that the mushrooms are browning more than you want you can add a splash of water, wine, or *Pabst Blue Ribbon* and re-cover. This will speed up the process.

I find that things taste better the less water you use. Softer mushrooms soak up water and get mushy, while others can handle it. In fact, some need a little added moisture if you don't use much oil and they're a little dried out to begin with. Other mushrooms, like chanterelles, may

[32] It's also good for showing the doctor in case you just donated your friends' livers to science (see *"So how can I be careful eating mushrooms?"* above).

release too much water. You can uncover the pan to evaporate it, pour it off and use it for stock, or add something like cornstarch to thicken it (try irish moss, a seaweed, or dried sassafras leaves, the fîlé in gumbo).

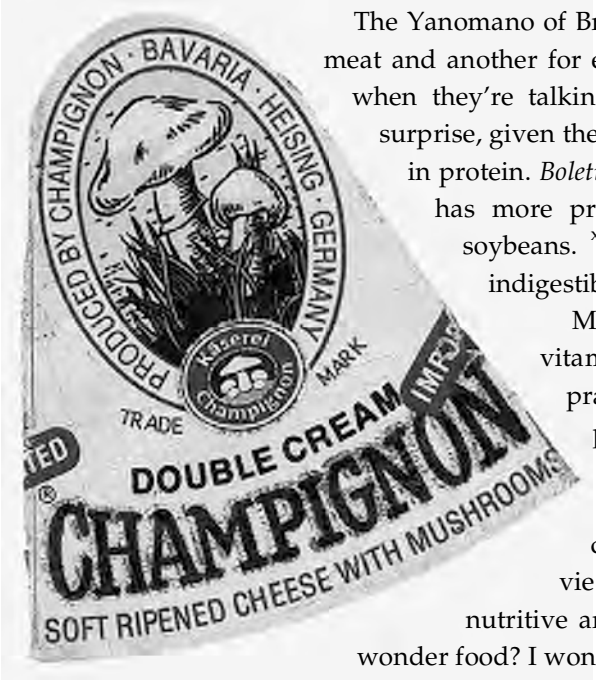
If mushrooms or their bases are really dirty, don't bother struggling to clean them. Just throw the dirty parts in a pan, sauté (optional), and add enough water to cover. Simmer for twenty minutes, adding water as needed to cover. Then discard the mushrooms and put the liquid through a fine strainer (or pour off all but the last bit, which where the dirt will have settled).

You can use this as stock or cook it down even further into a concentrate you can "Bragg" about (and you'll know what's in it!). Using one or more shallow pans and having a fan blow lightly across the top helps speed the process.

If you make this delicacy, please call it *duxelle* and not a "reduction"– yech! You can then freeze it with an ice tray into little beefy bullion blocks. Move over Martha; roll over Heloise!

What nutritional value do mushrooms have?

> Mushrooms play a major role in the diet of rural Zambia and Zaire... A nutritional survey in the 1950s demonstrated that they were second only to insects (mainly caterpillars) as a food source during the rainy period.
>
> Benjamin, *Mushrooms: Poisons and Panaceas*



The Yanomano of Brazil have two words for eating: one for eating meat and another for eating everything else. They use the first term when they're talking about eating mushrooms. It should be no surprise, given their beefy flavor, that many mushrooms are high in protein. *Boletus edulis*, the porcini (which means "little pig") has more protein by weight than any vegetable except soybeans. [xxvii] And it sure beats eating tofu (which is indigestibly processed food). [33]

Mushrooms are low in calories and high in most vitamins, especially B and D. They contain practically all the major minerals, especially potassium and phosphorus (the precise amounts vary with species and habitat). The most comprehensive study to date concluded that the most nutritious mushrooms vie with meat and milk, whereas the least nutritive are on par with carrots and turnips.[xxviii] Vegan wonder food? I wonder if they bothered to take out the maggots...

[33] For more info on the dark side of soy, see Sally Fallon's *Nourishing Traditions*. Quorn, by the way, the best-selling meat substitute in the world, is made not from a mushroom but a fungus of the genus *Fusarium*. It is grown in huge vats, heated to 150 degrees (see **http://web.ukonline.co.uk/webwise/spinneret/edexcel/biotechnol/myco.htm**) and dried via centrifuge. That much doesn't sound too *children of the quorn* to me, but I don't know what they do next to make it into MycNuggets, etc. Anyway, I'm sure you can make healthier stuff easily at home; see Sandor Katz*'s Wild Fermentation* (at **www.wildfermentation.com**). I'm looking into grasshopper burgers, myself.

APPENDIX

Sometimes a part of me gets lost
And I am all distraught
And can't think why
My smallest undertaking goes amiss
And my day is spent feverishly
Doing things I had forgotten,
Redoing things I had done wrong,
While other things accumulate.
But if some errand take me through the woods
All at once I know there is no hurry.
I sense the obscure, unhurried rhythm
Of growing things,
And I am whole again,
And go with quiet sureness to my work.

Faith Johnson, "Woods Healing"

Why am I doing this?

> Many times I have entered a timber and found morel immediately, erroneously leading me to believe the whole woods was full of them. The fact was that I had luckily walked in at the only location in the woods where they existed.
>
> V.V. Thompson, *Morel: A Lifetime Pursuit*, 1994

That is all too familiar. Take it from me: don't go in the woods just to fill your basket. Like life, mushroom hunting is great exercise in non-attachment, in letting go of expectations, because you never know what you will or won't find. Like the rain, mushrooms can be covering a hillside and yet be completely absent a mile away. And many mushrooms are literally here today and gone tomorrow. You might have a bonanza one week, then nothing for two months.

But a bad day for eating is a good day for learning. Once I led a walk during a dry spell. I thought I'd have nothing to show. I even scoped out the place and found next to nothing. To my amazement, the class found plenty of fascinating little fungi, including a miniature "puffball in aspic" as well as the "bird's nest" fungus, complete with tiny "eggs"). Had there been larger species, we certainly would have overlooked them.

Key words for me in *any* context are respect, appreciation, and trust. Over a period of five years, I picked mushrooms more and more to sell and less and less to eat. And the more I counted on mushrooms to pay my bills, the more I lost the joy in finding them. As you can imagine, rushing through the woods on a schedule or with a quota to meet, I didn't enjoy my time in nature; I couldn't see the forest for the fungus. Sometimes I think it's better not to go "mushroom hunting" at all. That way whatever you come across will be a pleasant surprise.

That's one the reasons I finally quit the mushroom business. Actually, I was spending more energy selling the mushrooms than finding them. And this was just too hectic to do on a small scale. Restaurants prefer a steady supply, and a hundred heads are better at providing it than one. That's why I don't recommend selling mushrooms.

On the other hand, I *do* see a successful mushroom marketplace, a clearinghouse where anyone can buy, sell, or trade wild mushrooms, like they have in Europe. People get instant access to an expert, and maybe a little spending money. It's safer for everyone, and it frees up each picker to do so casually: for fun, exercise, and of course, a tasty dinner.

Here in WNC, this could be a way to keep our forests uncut and create more lasting employment at the same time. We may not have anything like the volume of wild mushrooms coming out of the NW, but we do have the greatest *diversity* of mushrooms in the country. And there's always the option of growing them (see Help! below).

But for now, while my mushroom-hunting basket is not the one I would put all my eggs in, it certainly has its rewards. Doing things yourself gives a satisfaction that money can't buy. Your food *tastes better* not only because it's more nutritious, but because *you* gathered it.

And wild food makes you wild, that is, free. Gathering your own food is a lesson in self-esteem that you can carry over into other areas of your life. Can you come to trust yourself enough to eat what you alone have identified, or will you always need an "expert's" approval?

Finally, mushrooms teach us the ultimate in letting go: they give us an opportunity to come to terms with death by appreciating the circle of life.

> Life is essentially a process… and this process follows a cyclical pattern that endlessly repeats itself… just as a decaying fruit produces from its dying the medium that enables the hidden seeds within it to sprout…
>
> Kathie Carlson, *In Her Image*, 1989

Think of that next time you find your favorite mushroom two months too late.

So what field guides do you recommend?

> The quickest way to accomplish the object, of course, is by having some person who is an expert give practical lessons in the field; but in most cases this is not possible, not to mention the fact that some who think they are expert are not.
>
> W. G. Farlow, "Some Edible and Poisonous Fungi," *USDA Yearbook*, 1897

My first choice is a qualified human being, if you can find one. My second choice is a comprehensive database, either online or on CD-ROM (see next section). My third choice is *at least three* of the following field guides. I recommend more than one for at least two reasons. First, even the biggest field guides only cover one to two thousand species. Believe it or not, this is not enough! There are at least ten thousand species of mushrooms identified in North America alone. Imagine trying to find someone in the phone book if it only covered about 20% of the population. You might have to look in five different phone books. This is how it is with mushrooms. This is especially true in our area code, possibly the most biodiverse in the country.

The second reason I urge you to splurge is that field guides vary significantly, especially in the pictures. Rarely can I confidently identify a mushroom with just one book. I must have over a dozen and it's still not enough!

On that note, flipping through the pictures might be the fastest way to start looking, but you should never rely on pictures alone; always read through the verbal description of what you think you've found.

Besides, picture-surfing won't always work anyway. Remember, mushrooms are not clones; they are individuals, like us. One time I looked for a mushroom in six different books and didn't find it in any. I would have had to "key" it out at that point (which means answering a series of yes or no questions), except I somehow managed to remember what it was called. I found that it was not only listed but *illustrated* in five of the six books![34]

I have listed the books I recommend roughly in order of preference. Each has benefits that the others don't, however, and choosing among them depends on your own preferences.

Some of these books are out of print or will be in a year or two. That doesn't mean you can't find them at some discount store or on the web. If you want to support local business, we're lucky to have a nature books distributor right in Asheville, and they keep most of these books in stock. Call Common Ground at 828-274-5575.

And it was a face that, strangely enough, now that he was on the mushroom planet, seemed faintly greenish– greenish as is the flesh of all mushroom people– and his thin, long fingered hands as well.

Stowaway to the Mushroom Planet

Edible Wild Mushrooms of North America (David Fischer & Alan Bessette, 1992, $35). Lovely combination of field guide and cookbook. It's not comprehensive (only the 100 most common species; no, that's not a lot) and is a bit overpriced, but it covers the few edibles in it and any similar poisonous species quite thoroughly. Pretty ideal for the strict mycophagist (in it for the eating only).

North American Mushrooms: A Field Guide to Edible and Inedible Fungi (Orson & Hope Miller, Falcon Press, 2006, $26). The long-awaited update to Orson's 1987 *Mushrooms of North America*. About 600 species fully described and another 1000 or so mentioned. Many are listed under their new scientific names while very few common names are included. Pretty good edibility info. Dry as a chip, but at least it doesn't crack like Roody's tome (see below).

Mushrooms of West Virginia and the Central Appalachians (Roody, 2003, $35). Very up to date. Short on *Russulas* but otherwise pretty comprehensive for a regional guide (400 species Fantastic photos, nice organization, a little bit technical but it does tell you what the scientific names mean. The binding always falls apart, but still a better choice than Weber and Smith's *Field Guide to Southern Mushrooms* (250 species, 1985).

[34] Despite that stroke of luck, it is estimated that "only about two fifths of North American mushrooms have *ever* been illustrated using color photographs" (Roody, Sporadic News, Dec 95, my emphasis). Granted, a number of good field guides have come out since then. Also, field guides tend to cover the most *common* two fifths. But that's no consolation when a rare mushroom you mistook for an edible one in the book turns out to be poisonous.

Mushrooms: The Eyewitness Handbook (Thomas Læssøe and Gary Lincoff, 1998, $19). Like other DK guides, well illustrated and easy to use, except that for some reason they didn't put a handy index on the inside cover like other guides do. 500 species is not bad; however, the scope is worldwide. Even so, it's more useful than most regional books out there.

The Audubon Society Field Guide to North American Mushrooms (Gary Lincoff, 1981, $19). 700 species with a Northeastern slant. Hundreds more briefly mentioned and 750 photos. If you had to pick just one to start out with, this may be it, since it's smaller, cheaper, and organized by looks, which is good for beginners but gets to be a drag later on. It's the most liberal about edibility (I call that a plus), but the photos aren't great.

All that the Rain Promises and More (David Arora, 1991, $18). Certainly the best overall introduction, especially for kids. It actually fits in your pocket because it only covers about 200 species. But the concise descriptions are good and it's got a nice little graphical key on the inside cover (a branching "tree" of choices) that everyone loves. Plus it's packed with funny pictures, poems, and stories on medicinal mushrooms, crafts (like how to dye your dog yellow), and more.

Mushrooms of Northeastern North America (Alan Bessette, 1997, $45). Big: 650 species are fully described and illustrated with lovely little photos, and another 850 are at least mentioned. Relatively new, and does cover NC. I find it somewhat unbalanced though, with a lot of species in some genera and only a few in others. Listings are arranged alphabetical by genus, which more advanced students find convenient.

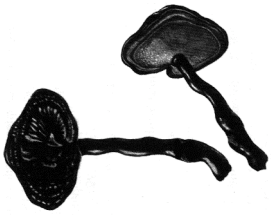
Mushrooms Demystified (David Arora, 1986, $40). The most wordy, informative, humorous, and fat field guide available (I do skim a few puns off it on occasion). Very few color pictures, though; very key-dependent. West Coast slant but quite comprehensive (2000 species).

Mushrooms of Northeast North America (George Barron, 1999, $20). With 600 species, 875 nice photos, and a handy photographic index on the back cover, you get a lot for your money (and it does cover WNC). If you want to learn your genera, it has simple keys for this. But I've found at least two mistakes and it's definitely the least informative about edibility.

Peterson's Field Guide to Mushrooms (Kent and Vera McKnight, 1987, $18). About 1000 species and 700 color drawings. Many botanists actually prefer illustrations over photos because they show the 'ideal' or 'classic' form, emphasizing the key features. But I don't like drawings for mushrooms. It's also the second most uptight about edibility. But it has good, detailed descriptions (with cute little cooking pot and skull and cross bones icons).

Mushrooms & Other Fungi of North America (Roger Phillips, Firefly Books, 2005, $40). Over 1,000 species described. This reprint of *Mushrooms of North America* (1991) is hardly "revised and updated" like they say (except for fixing some color problems with the original and changing a few names), but it's still one of my favorites. Then again, the same info is available– and searchable– for free online at **rogersmushrooms.com**.

Growing Gourmet and Medicinal Mushrooms (Paul Stamets, 1993, $40). Why shlep all over kingdom-come? Grow them yourself– then send me some!



Medicinal Mushrooms (Christopher Hobbs, 2003, $19). *The* guide to the subject (including the "mushroom of immortality," *Ganoderma lucidum*, on the left). Technical yet friendly. Most of the charming illustrations herein are from this book. Don't be fooled by the recent publication date, however. I believe this is just a reprint of the 1995 3rd edition.

Mushrooms: Poisons and Panaceas (D.R. Benjamin, 1995, $35). Very practical, readable, and entertaining, at least for the advanced enthusiast. A lot of my material comes from this book. Not much on medicinals, but detailed info on toxicology.

Treasures from the Kingdom of Fungi (Taylor Lockwood, 2001, $30). Not a field guide but a gorgeous photo book. Flipping through it will cure anyone who's forgotten how to appreciate mushrooms for their beauty and not just for food. Also available as an awesome DVD slide show ($20 at **www.fungiphoto.com**).

A Fist Full of Fungus (Alan Muskat, 2000, $10). Completely ludicrous music video available from me. Parental discretion is advised!

What's available online?

The best database I know of, even though it's geared toward the Pacific NW, is free online at **www.pfc.cfs.nrcan.gc.ca/biodiversity/matchmaker/index_e.html.** The CD-version is even better. It covers over 2500 species and is available for a small fee. I include it in my classes.

The next best database I know of is at **www.rogersmushrooms.com**. This is basically an online combination of Roger Phillips' field guides plus a handy search form (called "Easy Key"). This form is not as comprehensive as Matchmaker (see below) but the site covers all of North America and the U.K. It includes several images for each mushroom, even recipes.

The simple database at **www.agarics.org** covers only 174 species. Backed up with field guides, however, this can give you an easy head start. Finally, the Discover program covers over 1000 species and can be downloaded for free at **https://www26.addr.com/~chuck/download.htm**. I haven't tried it but the preview looks really good.

There's a few keys online, although none that I know of are exclusive to the Eastern U.S. If your mushroom grows in California, **www.mykoweb.com** (that's with a "k") not only links to various photos of it, it tells you what page it's on in a number of books (I wish I knew *that* ten years ago). Another site that indexes photos on the web is at **www.in2.dk/fungi/imageframe1.htm**. But remember that Eastern mushrooms can look quite different than their distant counterparts. Duke University at **www.biology.duke.edu/fungi/mycolab/DFMO/dukefungi.html** has some good local photos.

Tom Volk's website (at **http://botit.botany.wisc.edu/toms_fungi/**) is chock-full of goodies. I have an article at **www.susunweed.com/An_Article_mushrooms.htm** (basically a synopsis of this book) and another at **www.newlifejournal.comaugsep03/muskat/0803.shtml**. Info on mushroom cultivation and marketing can be found at **www.attra.org/attra-pub/mushroom.html**

(see also below). And finally, you'll find my fearsome visage and more links at **www.alanmuskat.com**.

Help!

Sibbuzya takolwi bowa
"The one who asks is the one who does not get poisoned by mushrooms"
Tonga African adage

Membership in NAMA, The North American Mycological Association, is $35/year and includes a video library that's free to members. Their website lists regional clubs throughout North America and has a few incredible photos too (see **www.namyco.org**).

The Asheville Mushroom Club meets monthly March through December every second Wednesday at 7 PM at The WNC Nature Center. Only $18 a year (less for students and families) gets you a chance to go on forays (i.e., mushroom hunts) with those 'in the know.' Visit **www.ashevillemushroomclub.com** for more information.

If you're interested in mushroom cultivation, you can call Hardscrabble Enterprises in Franklin, WV at 304-358-2921; Mushroom People in Summertown, TN at 800-692-6329 (also online at **www.mushroompeople.com**); or Fungi Perfecti in Olympia WA at 800-780-9126 (online at **www.fungi.com**).

Last but not yeast, you can e-mail me at mushrooms@alanmuskat.com or call 828-252-2797. Leave me a message; I'm probably out hunting!

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[i] Findlay, *Fungi: Folklore, Fiction and Fact*, 1982.

[ii] Arora 1991, 65 (for full citations see above recommended book list).

[iii] Benjamin, 153.

[iv] Benjamin, 162. The mycologist, Dr. Schaeffer of Germany, died in 1944 after eating a dish of *Paxillus involutus*.

[v] Benjamin, 353-4, 117.

[vi] For *Amanita strangulata*, see Lincoff, Audubon guide, 538.

[vii] Hobbs, 70.

[viii] "About mushrooms: Why a Hot Water Extract," **www.jhsnaturals.com/store/about_mushrooms.html**. As I understand it, mushrooms actually contain relatively small amounts of chitin (except in the spores). Their cell walls are mostly made of *beta glucans*, a complex, water-soluble, immuno-stimulating polysaccharide also found in baker's yeast, oats, and barley.

[ix] *Sylva Sylvarum* (1561).

[x] Maya Muir, "Current controversies in the diagnosis and treatment of heavy metal toxicity," *Alternative and Complementary Therapies*, June 1997, 175.

[xi] Varro E. Tyler, "Mushroom Poisons," in Margaret McKenny, *The New Savory Wild Mushroom*, 1987, 226-7.

[xii] This is a figure for coal-burning power plants in general in Dr. James Biddle's "Toxic Metals: Pandora's Box," at **www.integrative-med.com**. For more info on heavy metals (like the fact that the computer screen I'm staring at contains at least five pounds of lead) and other holistic health info, see **www.mercola.com.**

[xiii] Berkeley, source unknown (1857).

[xiv] Barbara Walker, *The Women's Dictionary of Signs and Symbols*, 270, and Carl Jung, *Symbols of Transformation*, in *Collected Works*, v.5, 237. I have a lot more related material in an unpublished work on *excarnation*, the practice of letting vultures eat the deceased. It's called "Prey to the Mother."

[xv] Robert Southwell, *Spirituall Poems*, 1595.

[xvi] Robert Messick, personal communication, 8/28/02. To catch this new wave of appreciation for fungi, see Mark and Dianne McMenamin's *Hypersea: Life on Land*, 1994.

[xvii] "In European forests a mass extinction of mushrooms may be taking place... in test plots the number of viable mushroom species declined from thirty-seven to twelve over a twenty-year period. In general, European researchers believe that the mushroom decline is bound up with the decline of forests from acid rain, excess nitrogen, ozone, and related causes." Charles E. Little, 1995, at **http://www.earthwitness.com/Learn/articles/Article-quotes.htm**.

[xviii] David Janos, U.M. mycologist, in "Mushroom boom," *Miami Herald*, 26 June, 2002, B1.

[xix] Roody, 296, 333.

[xx] Benjamin, 365.

[xxi] Susun Weed, **www.susunweed.com/an_article_weed_self-help2.htm**.

[xxii] Benjamin, 364-5. The Hussey quote is on 369.

[xxiii] Arora 1986, 550.

[xxiv] Lincoff, 440.

[xxv] Lincoff, 426.

[xxvi] E.R. Pennel, *The Delights of Delicate Eating*, 1923 (a later edition of *The Feasts of Autolycus*, 1896).

[xxvii] Benjamin, 23, and Arora 1986, 30.

[xxviii] Benjamin, 63.

Illustration credits

	page(s)
C. Hobbs, *Medicinal Mushrooms*	1,3, 4, 12, 17, 19, 24, 33, 38
Saturday Evening Post, c. 1986, in *Sporadic News*, 3/97	6
Common Boundary, July/August 1995	8
Todd Elliot-Fischman, by Yanna Fischman, 7/99	11
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yours truly, by Sandi Ford, 2001	23
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me and Berkeley's Polypore, Chama Woydak, c. 2001	30
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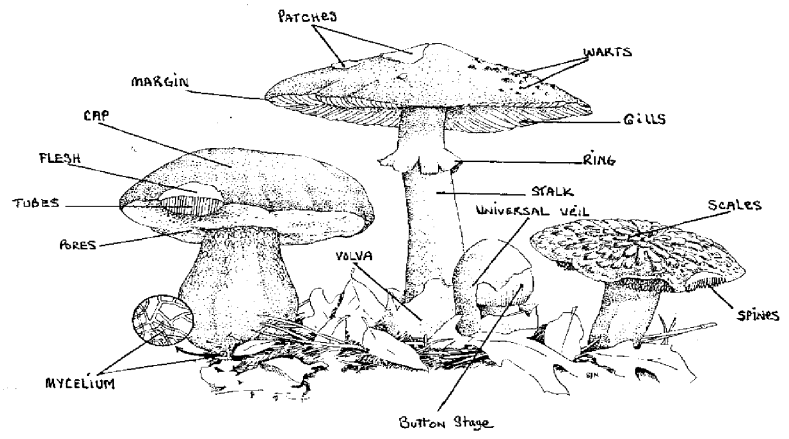
Special thanks to Doug Elliot, Sandi Ford, and Dan Debettencourt for their suggestions, and to Theresa Rey for collecting a number of the "bibliomycetes" (literary mushroom cameos) quoted herein.



To the Mistress of Mushrooms

This pine wears her needles
In a healthy shimmer,
While a somewhat vacant fungus
Sits sipping, sharing, feeding,
Silently beneath the earth
Upon the tree's umbilical roots
It is this mutualism
Nature's balanced marriage
That sends the mushroom up like a flag.
The fruit that whispers, "All is well"
For the caretakers down below
Are steady at their work.

So we pack and say good-bye
To the mountains, trails and pines
Remember Russula mushroom caps
That mark your hurried path
As signals to check your hurried pace.
Reflect– take time– relive
These days from mid-October,
For they will feed us from within
And send a strength to help us
Shimmer like that stately pine.

Ann Yochem and Diana Wiseman, *Sporadic News*, May 1996

Alan Muskat, mythic mycologist and epicure of the obscure, has persuaded thousands to sample rather than trample the toadstools. From coast to coast, this taxonomic troubadour has enchanted audiences of all ages with mushroom poetry, music, folklore and flavors from around the world. He's recently popped up at the The California Academy of Sciences, The University of North Carolina, and The New York Nature Conservancy. As anyone who knows the Mushroom Man will tell you: when it comes to bringing out the fun in fungi, he's the *champignion*.