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Strathern beyond the Human: Testimony of a Spore

Anna Lowenhaupt Tsing
University of California, Santa Cruz, USA, and Aarhus University, Denmark

Abstract
How might Strathernian comparison extend anthropology beyond human exceptionalism? This essay explores how a fungal spore might guide attention to more-than-human nature. The exercise allows us to reflect on knowledge tools we use for understanding human as well as nonhuman social relations.

Keywords
anthropology, comparison, fungi, human–nonhuman relations, Strathern, writing experiments

> Comparison is [a] game in at once the most serious and the most playful sense – not to be given away, but to be played. (Marilyn Strathern, 2002: xvii)

* *

I haven't always had the pleasures of a flying spore, able to experience the world on the back of the wind. Before that I hung precariously in the gills of a mushroom, waiting for a breeze to lift me. What a sense of anticipation! What longing I felt to fly. But before that, I was the mushroom, or, at least, a part of it, feeling the tension and joy of our great expansion as we coiled together, filled out, and at last emerged from underground shelter to the bright world all sharp and vast.

Corresponding author:
Anna Lowenhaupt Tsing, University of California, Social Science I, 1156 High Street, Santa Cruz, CA 95064, USA.
Email: atsing@ucsc.edu
http://www.theoryculturesociety.org

Spreading our parasol under the blinding daze, disconcerted by new smells – and the fresh wind – yes, I can remember; there were so many forms of excitement then. But before that, we were underground in the wonderfully mysterious dark, exploring finger-like to find new tastes among the soils and rocks, stretching in thin threads and looping in fat noodles, ever joining our friends, the roots of trees, in self-extending embrace, giving and receiving life's sweet juices. That was bliss, the more than one and less than many.

People admire ducks for their abilities to swim, walk, and fly: three separate modes of experiencing the world. But I have already done as well. I have excelled in adventures underground; I have stood quietly on the surface, taking it in; and now I am lofted into the air. Do you know what a faint puff of air it takes to carry me? I am so light; I might go anywhere. I might be carried farther than any duck or goose, despite their famed migrations. Did you know the stratosphere is full of fungal spores, circling around the planet? I might go anywhere! They say my kind has only 26 days before I must either germinate or shrivel. There is a lot they don't know, and I may outlive their expectations. And 26 days! That can be a gloriously long time to see the world. Who would despise such a weightless journey, the chance to contemplate and study and add to one's experience. I will go everywhere and see everything. I might even tell you about it.

Don't be shocked that I feel joy. After all, I exist only as an awkward relation; an American human made me up. She reads Ursula Le Guin and science blogs such as 'Not exactly rocket science' as well as Marilyn Strathern, and she wants to explain more-than-human sociality not just to twist your mind around but to offer vivid images and stories. So she has made me a tinny but usable voice and reminded me that we all come into being as figures through unfaithful translation. It's what all storytellers do, she says. Besides, there is no need to get hung up on problems of agency right away; there is more to sociality than that question, and besides, we'll get to that later. For the moment just consider that the 'I' that tunnels, erupts, and flies is neither singular nor plural, so don't assume you have my number.

But perhaps I am too eager to babble; you were not prepared. Let me give her the chance to speak.

This essay offers a meditation on the thinking of Marilyn Strathern that moves beyond Strathern's imagined lifeworlds even as it engages in a

Strathernian mode of analysis: reification for the work of comparison. Strathern has argued that reification to create comparisons is useful if it serves critical reflection. Strathernian reification must be both 'serious' and 'playful'. It must interrupt the mind-lulling presence of common sense. It must show off difference where we might otherwise see only connection. Comparison at its best, Strathern suggests, is an interruption, a refusal of connection to show the gaps through which we can rethink our categories. It creates 'the hesitation that makes one pause (the thought that is already an act), in order to allow a second thought' (2002: xvi).

Reification – and the comparisons reification allow – requires simplification and stereotyping. Many late 20th-century anthropologists rejected comparison because of its necessary reifications, which made the world seem too easy to 'capture'. Instead, Strathern introduced a genre of comparison that works simultaneously against the hegemony of comparison as knowledge. Strathernian comparison heightens disorientation. In the forced juxtaposition of a Strathernian comparison, research objects reveal the practical circumstances and habits of thought that produced them. The point of a Strathernian comparison is thus to show the limits – and possibilities – of forms of knowledge-making, even as it sheds light on the situations and objects forced awkwardly into comparison. Strathernian comparisons open questions rather than leaving future analysts with the solidity of categories. Scholarly categories are always at stake in Strathernian comparisons.

My comparison pushes the boundaries of anthropology, Strathernian and otherwise, by introducing a fungal spore as an ethnographic subject. My spore belongs to the genus *Tricholoma*, the genus that includes matsutake, those aromatic and much-valued wild mushrooms sent through global commerce to Japan. The experiment here considers the promise of a multispecies scholarship in which ethnographic and natural history insights and knowledge-making apparatuses play back and forth in the analysis. The experiment forms part of a larger argument for *critical description*, that is, arts of noticing the entwined relations of humans and other species across multiple non-nesting scales (see Tsing, 2013). Critical description considers how worlds are made in the intersecting trajectories of many species living in common. Neither an anthropology that merely wants to prove it is up on philosophy, nor an anthropology of 'add-and-stir' nonhuman actors, critical descriptions of relations among many species could show us how looking more closely both shakes up our tools and extends our knowledge of the world. For this, Strathernian insights are a useful guide – even as the project reaches in untried directions.

In multispecies landscapes, social persons of many species interact, variously shaping each others' lives. Critical description addresses how world-making occurs in the oxymoron of 'unintended design', as many species' lifeways come together with or without intentionality, goodwill,

enmity, or even noticing each other. What biotic and abiotic forms and histories come together in a multispecies world? World-making occurs as organisms find niches within which they live with others; it is fine to call this process a result of nonhuman 'agency', but that label does not illuminate much.

'Agency' is a knowledge tool that has too often assumed a certain kind of intentional and bounded human action in the world; as Strathern shows throughout her work, this is often not the best way to imagine social action (see, for example, Strathern, 1988). The actor-network school pressed beyond this model by showing agency that emerges in interactions between humans and nonhumans and that distributes itself across sites of potential and realized action. This is important work, but there are other ways of moving beyond individualized agency. Strathernian comparison offers an alternative by showing us how the work of reification allows surprising comparisons. The 'social connections' of distributed agency are disrupted in Strathernian comparison by 'cultural analogies' crafted to take us up short, forcing us to rethink how we think (1991: 94). Strathern calls up a 'state of shock' through which social connections in-the-making may be broken, allowing a moment of reflection on the angles of our vision.

Thus, although I make use of the first person to bring you into the story, I am not trying to argue that mushroom spores are individual agents. The talking spore is a device, a reification, for making what Strathern called cultural analogies. Yet I spread the field of inquiry beyond the fence that has cordoned off studies of humans from studies of all other species. Indeed, once we allow ourselves to cross (or flatten) the fence, the possibilities for making usefully shocking analogies multiply exponentially.

In this role, the spore can offer a critically reflexive view of our tools for knowing action and agency. Thus, for example, I have imagined a spore that 'remembers' its earlier existence as a reproductive body (a mushroom) and as a pre-parental underground fungus. It is vegetative clone, parent, and also child: hardly a common-sense unit of action. Strathern's mode of generalization, the reification of 'Euro-Americans' to consider intersections between scientific and vernacular knowledge tools, can take this even further. In considering how fungi disrupt our assumptions about individuals, one might notice that Euro-American humans imagine their offspring as different individuals from themselves, and scientists add fuel to this popular belief by pointing to the genetic distinction of parents and offspring, and the segregation of germ cells and body cells that keeps even eggs and sperm from 'experiencing' any of their parental histories. In contrast, fungi do not segregate germ cells and body cells. Body cells become mushrooms, which further differentiate into spore-bearing organs and spores. These spores are genetically distinctive, but they also carry all the environmental history of the parental body (e.g. horizontal gene transfers; epigenetic histories). So a spore does

'remember' its part in being a parent – and before. Memory embedded in the flesh is continuous across generations.

Things only get stranger from here, and I will try to take you through a little of it in this essay. But perhaps this detail illuminates the mix of science and fiction that guides my account. Even as I posit, counterfactually, a spore that can experience the world in ways that communicate with Euro-American humans, what it tells us is as right as I can make it, based on my readings, observations, and interviews with mycologists. Just as Strathern relies on ethnographers of Melanesia for her thought experiments, I rely on mycologists and ecologists for mine. My goal, following Strathern, is to use what might otherwise be presented as merely 'scientific facts' to upset what we think we know – and thus what we can imagine. The radical potential of anthropology has always been this: other worlds are possible.

And where else to start again but kinship, gender, and sexuality, those staples of the anthropological canon? Strathern (1988) made us rethink those topics, showing how they shape what everyone from scientists to ordinary folk just 'know' about how to be and how to act. I follow her lead.

> *Perhaps you would like to know something of my life history. I don't remember all of this as myself, but as all the layered selves I have been before I became a spore. You see, my kind reproduces through spores – and we are closest to a singular 'self' as spores. When a spore germinates, it must find another spore with which to mate in order to produce new fungal life. Lots of fungi have exogenous moieties, or even more complex classes, which resemble human genders and kinship groups in assigning appropriate mates. Those fungal spores shouldn't even* flirt *with a spore of their own moiety; it's just not considered right.*
>
> *But my own former selves are not ashamed of polymorphous perversity. We can mate with whomever we please. Indeed, lots of spores I know chose to mate with their parents. When I was younger, a part of that body myself, we mated with lots of our own spores. We don't think of it as incest; it expands the genetic repertoire of the parental body. And you don't have to mate with your own parents; you can go join some other spore's parents. In either case, the germinated spore mates not with another spore, but with the fungal body itself. It's called 'di-mon' mating. The parental body gains the genetic materials of the spore, which only adds to its resourcefulness in dealing with environmental stress.*[1] *I know; it's different from you animals. You might think of it as having a child together with your own arm, which*

could expand your potential abilities. The resulting mosaic body, stuffed with heterogeneous genetic material, has all kinds of possibilities: you, and you, and you, and me, all in one.

It's how we like it. Two of the four of us spore siblings who emerged from our basidium dropped straight back on the parental body as soon as they could manage it. I saw them go while I was hanging, waiting for a breeze. By now, they may have already been reabsorbed in our collective body, and indeed I'm a bit jealous. But I guess I was ready to travel. Before I had time to think, a puff of air came through and lifted me up and out. Now I'm an adventurer. I don't know what happened to our fourth; riding that wind, I was so excited I forgot to look back. Perhaps that one is flying too, like me.

But I am soaring so high, already far from home! Most of us, even the adventurers, are happy to find a place quite close to where we grew up. There are new folks to be with, but not a whole new way of life. But now I look down on the countryside, and I have already crossed a great river and seen plains and cities the likes of which I never imagined. There is so much to take in. But don't worry: I have extended family across the northern hemisphere. I think they will take me in and help me find a good mate.

Going out by oneself is fun, but it's a bit frightening too. One of the advantages of di-mon mating is that the germinating spore does not have to find a new tree friend. An established fungal body already has tree friends aplenty; a spore that mates with it just joins. To explain I should start a whole new story about eating together. But maybe I would like to feel the wind and look around at the landscape for a while first.

Strathern did something strange with the practice of comparison: she developed a method for making comparison always provocative. For most of the 20th century, analysts had been working to make social comparison more reasonable, or at least less wild than in the work of 19th-century 'armchair' evolutionists. Comparisons should be controlled, they argued, to pair like against like and exclude the unlike. Of course, declaring things 'like' flattened out radical differences. It imposed the power of the analyst to form a grid of comparability. When this involved dividing the globe into comparable portions, this power smacked of colonialism. Besides, once the comparability of analytic units had been established, it became impossible to gather data within these units that might challenge the comparison. The comparability of the units blocked disruptive

insights. I grew up with a cohort of students who thought social comparison was altogether useless, since by making things comparable, all the interesting questions had already been squashed. This was one of our defenses of ethnography: good ethnography, we thought, refused comparison.

Strathern challenged us, making us consider how comparison was already inside the best ethnography. We would not be able to ask questions without it, she argued. Our frameworks of analysis were always already comparative. We can't even pick a domain of study (e.g. 'gender', 'kinship') without evoking a history and method of comparison. Instead of trying to avoid comparisons, she proposed, we should make the comparisons embedded in our analytic tools explicit. But this also freed her from 'controlling' her comparisons, that is, making them reasonable and appropriate.

An effective Strathernian comparison is one that exposes the specificity of one's tools as well as one's objects. Often it is the very incompatibility of the units being compared that illuminates the relationship between tools and research objects. This is the insight that brought her work into a series of comparisons between ways of living documented by ethnographers in small communities in New Guinea, on the one hand, and the united canons of Western civilization, on the other. How unbalanced and unreasonable the units! Yet this procedure made explicit what many ethnographers do: we show our research communities to be an exception. If an elephant can't even squash a pea, this kind of comparison argues, it hardly explains and manages the universe. Strathern (1991) showed us how unbalanced and unreasonable comparison works.

Such comparisons are often also self-consciously disingenuous. When Strathern (1980) argues that people in Mt Hagen (a community in highland New Guinea), unlike Euro-Americans, have no concepts of 'nature' or 'culture' with which to craft an opposition to know the world, she is pointing not just to a contrast between Hagen and the West, but also to the inability of the nature/culture opposition to operate as well as users imagine in European and American settings. This is not, then, just a contrast. It is a fly in the elephant's nose.

In this spirit, cross-species comparisons seem perfectly fair game. Of course, comparisons between humans and other species are often anthropocentric in a way that makes both biologists and humanists cringe. But if the point is to show us the relationship between research objects and tools, such inappropriate comparisons may sometimes be useful. How do we know about growth, individuality, generation, community, and change in understanding life – human and otherwise? How do we recognize freedom? Perhaps stories of fungi can straighten a few things out.

I promised to tell you about how my kind of fungi and our companion trees eat together. You probably know that tree leaves make carbohydrates in photosynthesis stimulated by sunlight. Those carbohydrates flow through the tree's body, from its tips to its roots, nourishing it. They also nourish us, for we are wrapped around the roots, drinking with the tree. But we aren't parasites, taking without giving. We make it possible for the tree to gain water and nutrients from the soil. With our help, the tree extends its underground exploration. We dissolve minerals from rock and soil, making them available for the tree's growth. We eat for ourselves and for others.

Thus, too, we become ourselves partially indistinguishable from another. We form joint organs of fungus and root called mycorrhiza, 'fungus' and 'root' together. Through those organs, nutrients pass in both directions. We feed each other and thus become a bit more of each other.

We evolved together. My own clan's favorite tree friends are pines, which evolved 'short roots' for fungal companions at least 50 million years ago. If no fungi come to colonize those roots, they shrivel and fall off. Those roots are there for us, and only for us. And we help the pines. Pines colonize the bare mineral soil of newly disturbed ground. But there are no nutrients there that they can find by themselves. To eat well they need us, just as we need them.

Of course, it's not all peace and happiness. The pines give away a lot of their sugar, and we are not always easy on them. Sometimes we give it away to other plants in the forest. We connect many trees, transferring carbohydrates and other nutrients from one tree to another. Sometimes we kill roots with our exactions. The tree can slough us off too, or get chopped down by you, and without another companionate tree nearby, we die of starvation. You know all those mushroom blooms you love to see? Some are our last-gasp hopes to spread ourselves as spores when all else fails and we are dying. We produce children when we cannot live well in our bodies. Reproduction is not always a sign of good health.

In *Partial Connections* Strathern quite outrageously compares trees, canoes, and flutes, exploring how these long, thin forms might variously be wholes and parts, persons or more than persons (1991: 61–76). Consider a similarly outré comparison of trees and intestinal villi: tree leaves make fungal 'persons' as intestinal bacteria make humans.

Humans and ectomycorrhizal fungi both require other species to be able to eat. Neither is capable of eating alone. Fungi and humans each have many kinds of what Donna Haraway (2007) calls 'mess mates', that is, companions in eating and being eaten. But they share a subset within this that is more extraordinary: an obligate association for eating that draws the companions so closely together that it is difficult to know where one leaves off and the other begins.

For ectomycorrhizal fungi, this is the association between fungus and tree. Consider a line of trees with their associated underground fungi, wrapping around the roots. The leaves make the carbohydrates, which are passed to the roots and the fungi. From the fungal point of view, the trees are food-gathering structures that stick up in efficient lines to collect sunlight and send usable food to the fungi.

This image of trees as food-gathering structures is reminiscent of human intestinal villi (see Figure 1). Our intestines are lined with food-gathering structures, sticking up for efficient uptake like lines of trees. The villi-trees are covered with bacteria, which transform what we eat into something that can be used by human bodies. From the human perspective, the bacteria, like the leaves of trees, gather the nutrients we need. Bacteria and leaves, respectively, feed other species. The main difference is that the villi are human tissue, so that the cross-species transfer happens before the food goes down their trunks, 'underground', as it were. Still, we are more alike than different from those fungi. We can't eat without those bacteria, just as the fungi can't eat without trees. We evolved together; we live to eat together.

Consider the implications. Who are we? Ninety percent of the cells in our bodies do not have a human genetic signature; they are bacteria. Yet

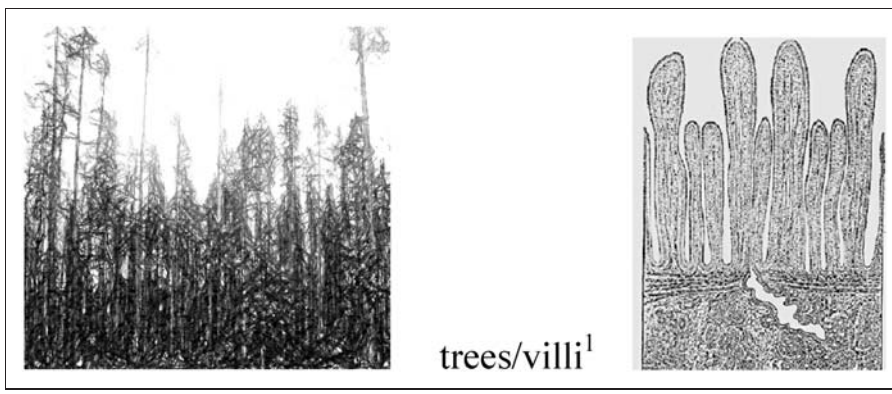

Figure 1. Trees modified from photograph by the author. Villi modified from Figure 1058, 'The small intestine', *Gray's Anatomy of the Human Body*. Available at: http://education.yahoo.com/reference/gray/subjects/subject/248.

they are with us, and we need them. Our bodies come to be through them. Beyond our bodies, we cannot survive without multispecies landscapes. We become who we are through multispecies aggregations. We are more like mycorrhizal fungi than we imagine. This makes an enormous difference for our theories of 'human' action in the world. How can humans act as an autonomous force if our 'we' includes other species that make us who we are? If we are not an autonomous force, what about freedom – and must we then be slaves of natural compulsion? What might it mean for a multispecies aggregate to act upon the world?

There's no need to get panicky. Right now I am a spore, floating above it all, as autonomous as I'll ever be. And even when I was a mosaic fungus among companionate trees, it wasn't so hard to figure out what action meant to me. Action was adventure, curiosity, and growing into new things, separately and together. We explored. You couldn't stop us! Do you know that fungi are wonderful at solving mazes? Have you seen the intricate patterns we make in wood or underground? Don't think you can predict us. We seize opportunities. We colonize new spaces with new patterns. We innovate. No one can say we just repeat ourselves in a pre-set plan. We grow.

Indeterminacy is one of the most important things we have as fungi. In some ways, we are much more creative than humans. Look at you, stuck in the same body all your life. All you can do after you reach adolescence is deteriorate. Try growing a new arm or a new brain. Hah! We do the equivalent. We grow and change our whole lives. Our shape reflects our experience: extending here or there; clumped or web-like or linear; symmetrical or uneven. For those of us who become mosaics, we add new genetic potential through which we design further creative forms and responses. You think nonhumans are automatons, capable only of pre-programmed action. Nothing could be farther from the truth. We, like you, help make the world through indeterminate action.

Yes, you move around. But all that leaping and squirming just makes up for what we do in growing: it gives you the chance to develop indeterminate action. Of course, most of you follow pretty regular routines every single day. Still, you wander out of them at times, going to a new place or trying a different pattern. That's your indeterminacy. That's how you explore the world and make new things happen. We do it through our bodies, growing into new situations. Our forms of action are not so different.

> *How do you imagine the history of your life? I'll bet you think you have a distinctive personality, like an interior soul, which accounts for your biography and all your achievements. 'It's just who I am', you say. Consider what you could learn from fungi, who make a life course not of some pre-formed essence but rather of all the things we become. Do you want to talk about freedom? Consider fungi.*

Not all fungi are alike. *Armillaria* root rots do not form mycorrhizal relations with trees; they are eaters of dead and living wood. They are famous as the biggest organisms on earth; 'one' *Armillaria* sometimes extends under a whole forest. But 'individuals' are genetically heterogeneous, continually adding new genetic material to their bodies. This is probably how they manage to be so adaptive, and thus live so long. Here is what one team of mycologists (Peabody et al., 2005) concludes about *Armillaria gallica*:

> In most organisms populations adapt over time as fit individuals contribute disproportionate numbers of genes to future generations. In long-lived species of plants and fungi capable of indeterminate growth, however, this view of the individual and of individual fitness may be too narrow. … In the case of fungal individuals in particular, it might be more accurate to think of individuals as 'continuous, indeterminately growing … interactive trajectories … [that], purely by responding to local circumstances, and without any central administration' (Rayner, 1997a) are able to reconfigure themselves during their lives in ways that let them adapt to changing conditions.

Take it in more slowly: individuals are continuous, indeterminately growing interactive trajectories. Without any central administration, they are able to re-configure themselves during their lives in ways that let them adapt to changing conditions.

Again, this is both a contrast and a fly in the elephant's nose. What might it mean to consider ourselves, as actors, to be continuous, indeterminately growing interactive trajectories, adapting to changing conditions? There is a lot to recommend this point of view in regard to human life histories. And central administration? Euro-American elites often overrate their cognitive functions in setting action into motion. Rarely do we humans move from a blueprint to action; most of the time we merely do what we can, and, at our best, seize the time. This does not mean we act as automatons. But neither do other species. Reimagining ourselves as interactive trajectories might get us thinking about how we act together with other species to make the world.

The internal quotation in the passage cited above is from mycologist Alan Rayner, who has written about freedom from the perspective of indeterminate growth patterns of fungi. Rayner's *Degrees of Freedom* (1997b) considers how life forms of all sorts make their lives in indeterminacy. Botanist Francis Hallé's *In Praise of Plants* (2002) offers related observations about indeterminacy in plants as a mode of living in freedom. Such comments do not sit easily with powerful currents in Western philosophy. But consider those currents' limitations. Thus Immanuel Kant, living under a repressive regime where many kinds of action were forbidden, imagined freedom as the human transcendence of nature through reason. Reasoning was one of the few kinds of actions he could get away with; other forms of action were blocked. Under another regime, might he have imagined freedom not just in passive thinking but rather in a fuller sense of living?[2]

Living in indeterminacy is a form of freedom we share with other species. If we want to know how multispecies aggregates act, this is a better place to start than reason. In our interacting trajectories, within and beyond the individual, within and beyond the species, we make patterns, ecosystems, and worlds: design without central administration.

I haven't introduced myself properly because I have too many names. If you like Latin binomials, you can call me Tricholoma matsutake. *We've had other Latin names before; those scientists are fickle. But this one at least tells people how much Japanese people respect us: matsutake is a Japanese name for us. But I'm not from Japan. My former selves grew up in a fragmented village forest in a mountainous township in Chuxiong Prefecture in Yunnan Province, China.*

Our forests are not quiet, cool, and stately, but scrubby, rowdy, and full of life. If you want to know how species act together to make worlds, I'll tell about our forests. The details matter: I'll explain how multispecies aggregates act *in making worlds and what 'freedom' might mean if you took multispecies worlds more seriously.*

Of course, there are the tree friends; they are the best. My younger fungal body joined not just with pines but also with oaks, tanoaks, and chinquapin. We liked them all. My folks are famous for our cosmopolitan friendships with trees.

But trees were hardly the only ones making our world. It's a lively place. I can't help but mention the goats, since you can't ignore them; they are so hungry. They eat everything. They crop pine seedlings down so far they look like mowed grass. Don't worry about the pines; with our help

their roots are growing even when the goats are eating their tops, and then they spring up quickly above the goats' heads. Besides, you humans are even more destructive.

Not only do the farmers who live around our forest chop down trees for posts and boards, they also continually cut back the living ones. They cut broadleaf branches and stems for firewood. Besides, their pigs also eat cooked food, and pig food is cooked on special outdoor stoves, requiring additional firewood. So a lot of wood is harvested every day. They cut pine branches to harvest pine nuts and pollen, and they rake pine needles for the pigs' bedding. When the needles are coated with pig feces, they are brought to the fields as fertilizer. Broadleaf leaves make a green manure that goes directly on to the fields. Those people are out there every day looking for things: medicinal herbs, wild vegetables, and every kind of mushroom they can get their hands on. We are the most valuable, so they have a special regard for us.

You might think we would be unhappy with all this activity, but actually we love it. Don't get me wrong: we wouldn't want you to clear the forest altogether, as you have in so many places. We want the forest. But we like the disturbed forest full of farmers and goats. We love it when you rake away the leaves and needles: that keeps the humus from building up. Pines hate it when there is too much fertile earth; their seedlings can't survive it. The bare mineral soil that is left from your raking is good for us too. We are strong in dissolving rocks for nutrients. But we don't like it when nutrients are too easily available: other fungi take over.

We like it too when you open up the forest by cutting branches. We are creatures of disturbed forests, and your disturbances help us out in living. Farmers would harvest no matsutake without that disturbance. But, of course, they are not doing all those things for us. We are just taking advantage of the situation – and adding our part to a world in which pines, broadleafs, goats, humans, pigs, and matsutake mushrooms live together.

Do you want to see species working together to build intricate but unintended designs? Do you want to observe the promise of interacting trajectories without central administration? Our village forest is a good place to look.

Matsutake grow in disturbed forests, including those disturbed by humans. Anthropogenic forests (forests shaped in part by human actions) were once almost invisible to the disciplines because they fell between natural and cultural stools. But with increasing attention to humans in the environment, anthropogenic forests have become an important research object. How should we study them?

There is a Strathernian challenge here: the challenge of discrepancies across scholarly approaches. Strathern's most exciting work emerges from playing with such discrepancies. She is willing to simplify and stereotype just to amplify the differences between approaches. Those differences work for her.

I appreciated this first in Strathern's (1987) comparisons between feminism and anthropology as two ways to approach gender. Another thinker would have showed how feminism and anthropology might merge. But Strathern worked them into 'an awkward relationship', and the awkwardness was her tool for thinking. It required some simplification of both sides to create antagonists. Thus she characterized anthropology as cultural relativism and feminism as politically motivated universalism. This allowed her to pit the approaches against each other. Not for Strathern the dialectic in which such differences called out for a new synthesis, transcending the opposition. Instead, the whole point was to ride the awkwardness, using it to reflect on the relationship between research objects and tools. Surprisingly, the simplifications harmed neither antagonist, instead dignifying them both. Feminism gained philosophical heft in Strathern's hands, just as anthropology extended itself into a whole new game.

How might such an approach work in thinking about more-than-human landscapes? Oversimplifying, I might contrast two divergent ways to look at landscape: ecological and cultural. What are the presuppositions of each?

For landscape ecologists, landscape is a unit of difference within. The whole point of studying a landscape is to appreciate its heterogeneity. A landscape is a mosaic of patches, that is, aggregates of life forms that live around each other. It is in the different dynamics of each patch that landscape heterogeneity comes into its own.

For cultural geographers, in contrast, a landscape is a cultural and political system. The point is to understand its singular and distinctive systematicity, that is, the set of structural principles that hold it together. Aesthetic principles may be important; political histories play a role. The key thing about a landscape, however, is that it is a unit that can be contrasted with *other* landscapes, composed on different principles.

For landscape ecologists, contrasting one landscape and another is much less interesting; all landscapes are composed of similar elements. It would be counterproductive to assume the landscape's singular unity. It is the patch structure of the landscape, the difference within,

that fascinates. The distinction here usefully recalls a debate that has interested anthropologists of late: are there many cultures and one nature or many natures and one culture (see Latour, 2002)? On the one side, animism is one cultural option among many for classifying what everyone knows as nature; on the other side, animism challenges Western classification systems by positing that animist perspectives on the personhood of animals are equally true. The first posits 'cultural' difference; the second posits cultural homogeneity and 'natural' difference (Viveiros de Castro, 1998).

Landscape does not raise the same question, but there are connections. Landscape ecologists see the same elements combined in patches through which difference comes into being. The difference that matters is within the landscape, not of landscape A vs. B. Cultural geographers see ontologically varied elements, each created by the cultural structures of landscapes. For them, the elements of a single landscape, however, always have something in common: culture. Differences within are limited by the unifying structure of culture: they cannot disrupt the landscape's holism without bringing the landscape into a new holistic configuration.

One could put this dilemma in matsutake terms as follows: is matsutake that grows in China the same matsutake as that which grows in Japan or North America? Since matsutake grows in anthropogenic forests in each region, one might take up this question from either a cultural geography or a landscape ecology point of view. Is Yunnan matsutake constituted in any way by what Yunnan people (or other species) think and do? Do landscape scale differences *between* these places matter – or should we think more about the elements of difference *within* each of these landscapes? And is anything to be gained by not resolving these questions – following Strathern's trajectory?

Amazingly, these turn out to have been productive questions in matsutake studies, and there are some good arguments for keeping the answers unresolved. Consider two interviews I conducted with matsutake scientists concerning the question of matsutake's species identity within and across landscapes.

Young Dr A had proved through PCR analysis that the DNA of Yunnan matsutake matched that of Japanese matsutake, despite the fact that the former, unlike the latter, associate with broadleafs as well as pines. Thus Yunnan matsutake are the same as Japanese matsutake. But his elder, Dr B, demurred. 'It depends on what question you ask', he explained. Could spores from Yunnan matsutake actually mate with Japanese matsutake spores, producing viable fungi whose spores, in turn, were also viable? No one knows, he pointed out, and it is just such questions that make the difference between life and death on real landscapes. Species identity depends on what question you ask: a Strathernian thought. As Strathern continually reminds us, we cannot ask questions without considering our tools for asking questions.

The history of questions and the history of living landscapes get tangled together here.

The one species difference many scholars accept among the mushrooms that enter the matsutake trade is the difference between 'American' matsutake, *Tricholoma magnivelera*, and Eurasian matsutake, *Tricholoma matsutake*. But Dr C was skeptical even of that. 'In fungi', he explained, 'we have no idea what a species is.' The organisms themselves are so strange that we cannot keep up with them in our categories. The best we can do is speak of 'matsutakes', the mushrooms that enter the Japanese trade. Self-conscious simplifications, and continuously erupting questions: a Strathernian matrix.

A comparative study of more-than-human landscapes might require both adherence to and skepticism about difference.

May I tell you of the places I'm traveling? A strong wind from the south lifted me, blowing me north until I joined the westerlies. After crossing over many uncomfortable-looking regions, where I could hardly sense a tree, I suddenly smelled the tempting pines of the Jilin Mountains of northeastern China. They say the matsutake there are exceptionally aromatic. For a while, I hoped I would fall there to seek my mate. But I soared on, and worse yet, I joined the yellow dust – the desert soil and pollution pouring out of China's north – and, my senses muffled, it became harder for me to know where I was going. I must have passed over Korea, where they say the matsutake are abundant and delightful. But I couldn't even tell when I crossed the Japan Sea.

Then the air began to clear, and I passed in a series of gusts over Japan. For a long while I hoped I might fall in Japan's northeastern mountains. But when I passed over, I could smell it: radioactive cesium. Fungi don't do too badly with radioactivity, at least in the short run. We absorb it with our nutrients; we grow with it. But it causes mutations in us as well as you. I'm glad I didn't stop.

Yet now I've overshot Asia; I'm over the Pacific Ocean. Oh my! I've never heard of any of my kind who has traveled so far. Of course, we hear stories about the cousins who live in the American lands beyond, but I've never known how much was myth.

Suddenly I feel both frightened and elated. Will I make it to the other side, and will I know what to do if I succeed? Will I know the fungi there – and will they recognize me as one of their kind? Will they help me transition from a spore to a multicellular, multinucleate self? I am

filled with a sense of my inexperience. What do I know of other forests, other fungi?

But if things work out, imagine: I may be the first in centuries, perhaps millennia, to cross this ocean and survive! My story will go down in fungal histories. I will give rise to a line of brilliant successors, each carrying the experiences of separated continents. I am an explorer. I am taking indeterminacy to its limit. Let me indulge in this moment of uncharacteristic hubris before I have to go back to being 'just' a spore. Besides, I have several days before I have to worry about my biological clock.

In thinking across geographically scattered landscapes, I find myself powerfully drawn to history. How did things turn out that way there, or there? Perhaps this attraction springs from one of the most profound surprises of my fieldwork among Dayaks in Indonesian Borneo: landscapes are always historical. Where I saw a verdant hillside, they taught me to see a palimpsest of human and nonhuman movements: a communally intersecting biography (Tsing, 1995, 2004). Now history is like an itch for me in studying landscapes; it stimulates an urge to track down details and put together tales.

But what kind of pleasures in history might Strathern condone? For Strathern, history as an explanation is just another detour to evade coming to terms with tools of thought. After all, doesn't history take for granted the directional sequences through which we know time? Instead of explaining through history, Strathern goes out of her way to juxtapose what might be considered the old and the new, working from their discrepancies.

There is one role for history in this practice, however; history can be the *mise en scène* through which discrepant practices are brought together. It is not the flow of history that is relevant here, but rather the sudden upwelling of a contingent opportunity for awkward juxtapositions. Strathern's work is full of figures who embody the cultural interruptions of their times, such as Port Moresby domestic servants who commodify their labor even as they participate in highland kin exchanges (Strathern, 1985). More-than-human landscapes are also full of such figures. For example, one might consider how different matsutake forests on each side of the Pacific emerge in historical conjunctures. In such moments of juxtaposition, *comparison* and *history* simultaneously oppose each other and grow into each other like mycorrhiza joining fungi and roots.

American advisors brought in by the Meiji government pushed afforestation with red pine in central Japan, thus putting into motion a distinctive 'Japanese' landscape aesthetics of 20th-century village forests

with their unintentional cultivation of matsutake. Mid-century abandonment only made such 'traditional' landscapes more dear, and by the end of the century Japanese conservationists were ready to challenge American wilderness aesthetics with claims that biodiversity best flourishes in cherished cultural forests of human disturbance.[3] Differences between American and Japanese landscapes emerge here – but also differences within. A shipload of American pine logs in the early 20th century unintentionally brought the American pine-wilt nematode to Japan, resulting by the end of the century in the death of so many of the same red pines American advisors had once wanted Japanese to plant (Suzuki, 2004). Until recently I would have said that if Japanese claims to promote a world-historical 'Japanese' model of sustainability do not succeed, it would be because of that miserable nematode. But now bigger problems loom. Conceived in the overlap between international casino capitalism and the secrecy of the state, there was this low-cost American-Japanese reactor, which cracked and then spewed radioactivity over the reconstructed model landscapes of northeast Japan (Fujioka and Krolicki, 2011).

Meanwhile, across the Pacific, Japan's decision to import cheap wood from China and Southeast Asia in the late 20th century depressed the prices of American wood from the Pacific Northwest, driving timber companies to leave the region and thus drying up funds for timber regeneration. The national forests of the eastern Cascades malingered into a state of little usable timber, but fire was still excluded (Robbins, 2010). This turned out to be an excellent, if unintentional, prescription for matsutake. Japan's late 20th-century economic boom set high prices, which drew thousands of matsutake pickers into the forest, and, at least for a while, matsutake was worth more than timber (Alexander et al., 2002). But this is 'American' matsutake in more ways than one, and the debate over its status in Japan continues.

All this does not 'explain' anything, but perhaps it can provide a backdrop for considering practices of comparison – Japanese and American – on both sides of the Pacific. In what ways are American and Japanese matsutake different – or the same? Landscape histories open the scenes in which both scholarly contrasts and those of our informants rise and churn.

I made it! I am over the American coast. I was worried, with nothing below me for so long except whitecaps and circling gulls, and my remaining days ticking quietly away. But the westerly winds have been sure, and I am now blowing inland, over farms and cities. Now an updraft: I am climbing above a mountain range, and now descending, and below me are pines, beloved pines. I hope I will be set down in this place. Think of all the trees I will meet, not to speak of other species. Will there be bears? I'm sure some germinating spore, my

mate-to-be, is waiting for me already. The desire to feel the soil again wells up in me. I will grow into this new soil and trace out new lines of connection, my history and theirs.

Yes, a downdraft, and even a cooling rain. I am falling. As I fall, I sense the smell: the spicy aroma of matsutake. It is everywhere; this must be a good place. The odor knocks me around and invigorates me. This land must be full of matsutake. I will join them, a real cosmopolitan.

Rain: I am swelling as I fall. I am no shriveled, dying spore. I am still healthy and ready now to germinate. Yes, I will germinate here, among American opportunities. I already feel my insides developing, ready to send hyphae exploring. It feels good. I can already taste that sharp, new soil in my imagination.

Bang! Where am I? I have landed, under a big raindrop. Now it's time to extend myself, to grow, and to find my mate. But what is this surface on which I lie? This isn't soil; it's a rock. I'm already growing; I have to get down. This isn't a very big rock. I can sense the soil; it's only a few centimeters away. All around me, whew, is the smell of matsutake. It's my friends and family, so close I can almost touch them. All I have to do is get off this rock.

The rain has stopped. Some small breeze will lift me down now. Unfortunately, I've slid into a bit of a crevice, and it's wet here. That makes it harder. But I'm not one to give up. Here I am germinating; I won't give up now. I will make it to the ground. I will mate and create new life. There will be a stiff breeze; I know. It can't stop here. Listen, a bird has landed nearby. Maybe its footsteps will knock me off this rock. I know it will. I will find the soil. I can wait a bit. I know how to be patient. Night now; now day: it doesn't matter. I'll just wait until I get my opportunity. I will. I will. I will create new life on this new continent. I will.

In a tragedy, the death of the protagonist allows the reader to reflect on how the small force of one's will is most often thwarted by the fates. In a detective story, the death of the protagonist opens the mystery, stimulating a cascade of questions. Which will it be?

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Notes

1. See Murata et al. (2005).
2. This question was stimulated by Talal Asad's (1993) reading of Kant.
3. See 'The Satoyama Initiative'. Available at: http://satoyama-initiative.org/en/. See also Takeuchi et al. (2008).

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Anna Lowenhaupt Tsing is Professor of Anthropology at the University of California, Santa Cruz, and director of the Aarhus University Research in the Anthropocene (AURA) program. Her forthcoming book on matsutake worlds is titled *Living in Ruins: Precarity and the Search for the Elusive Matsutake*.