

Environment in Asia series featuring Michael J. Hathaway – What a Mushroom Lives For: Matsutake Mushrooms and the Worlds They Make, April 22, 2022.

– Sherry Belcourt, she's a Metis painter, and she paints with these dots that are in a way of like, bead work. So it's kind of like bead work as painting.

– Oh.

– [Mark] Hello, everyone, and welcome to today's talk. We will get started momentarily, after we give people another minute or so to log in. We thank you very much for joining us.

– Fantastic. Okay, I see names of many of our common friends.

– Oh, good. It's a big party.

– Yep. So let's give people two more minutes to log in. How's that?

– Yeah, that's great. Do you have a saguaro cactus behind you? Is that what that is?

– I guess so. Where is it? I'm literally living–

– Behind.

– Yeah. I'm living in a minsu, a BnB, in a small town right now. And I've been struggling with the internet for days, so. But they managed to reset it, so let's hope it works.

– Okay, okay.

– Yes. It's a lovely place. And, honestly, this is pandemic time, it's a tourist town, literally nobody. So I am alone living in this building.

– You are the sole representative.

– I know. I know, exactly. It's a wild time.

– Mhmm, yeah, yeah.

– Okay, let's see. There is a Q&A. Oh, okay. Somebody said, "Thank you for presenting, Michael." Great. Awesome. Okay, we have 60 attendees that come in already. I think we should get started. And other people will come in afterwards, that's fine. So, alright. Welcome, everybody. Thank you so much for tuning into this event. My name is Zhang Ling, Ling Zhang. I am environmental historian for China. I'm teaching at Boston College. And as the research associate for the Fairbank Center

for Chinese Studies, I'm convening this researcher series called "Environment in Asia," and this is the ninth year we are doing this series. So for those of you, if you are interested in issues related to environmental issues, ecological issues and related subject matters about China and East Asia in general, please follow us. You can easily found our event on the website for the center, the Fairbank Center for Chinese Studies. And you may also know that we are streaming this event, along with other events on the YouTube. So you can look for our events from the Fairbank Center for Chinese Studies on the YouTube channel. So thank you for coming to join us. So today we are very lucky to have Michael Hathaway, our friend and colleague for studies of China and environmental issues that I just mentioned. Michael Hathaway is anthropologist in the department of sociology and anthropology at Simon Fraser University in Canada. He is a award-winning author. He wrote his first book, "Environmental Winds," which many of us, I believe, many of the attendees for our event, have already read and got inspired by that book. Now Michael is here to talk to us about his new book, "What a Mushroom Lives For: Matsutake Mushrooms and the Worlds They Make." So I'm very, very excited about today's conversation to learn about this new book. But before I turn to Michael, I have three things I wanna mention very briefly. So two things to mention, and one thing I wanted to show. So the first thing is, today is the Earth Day. And I think this is our event is extremely relevant for this particular day. And what is the best candidate, right, the subject matter, mushrooms, to talk about when we talk about Earth, and Earth and world-making, right? The second thing is, I want to say congratulations to our friend, Michael Hathaway. Congratulations for winning the Guggenheim Fellowship. What amazing award. And it's richly deserved. Congratulation, Michael. And you may have a notice in the chat box of this webinar. You must have a notice in this message that Mark Grady have sent to us. There is a 30% discount code if you decided to listen to this talk and get inspired and would like to get copy of Michael's new book, "What a Mushroom Lives For." So please use the code HAT, H-A-T, 30, for the discount. So the third thing I'd like to mention... Before that, I should quickly mention that this is a webinar formula. So that means we can see you, but you cannot see us, and you cannot see each other's questions and comments. So if you wanna share your comments, if you want to raise questions, please type them out in the Q&A box. At the end of the talk, I will function as the voice to read out your questions and comments. So Michael and I both can see them, but I will read them out just for the sake for our audience. The audience will hear the question and comments, too. So that is how we are gonna do it. The third thing, okay, before I turn to Michael. Michael, I read your manuscript and I was just so amazed by the very first page. You quote Neil Gaiman, one of my favorite authors. And I wanted to show this little video clip, about one minute, to share with you. That is a part of the poem you actually quoted, so. Mark, do you mind enabling me as a host so I can share my screen? Sorry, I should have mentioned this earlier. Oh, yes, I can do that. Alright, so Michael opens his

book by quoting part of the poem called "The Mushroom Hunters," which was composed by a renowned author who I love dearly, Neil Gaiman. He wrote this poem for his newborn baby, Ash, and this poem was read and performed by his partner, Amanda Palmer, who is a performer, a performance artist. So here we are gonna listen just to how Amanda Palmer performs this particular part of the poem that Michael Hathaway quote in his book. Oh, sorry, I don't think you can hear.

- Yeah, I can't hear it.

- You can't hear the sound.

- [Amanda] See what they observe. Observe everything.

- [Ling] Can you hear me?

- [Michael] Yeah.

- [Amanda] And the mushroom hunters walk, they walk and watch the world, and see what they. And some of them would thrive and lick their lips, while others clutched their stomachs and expired. So laws are made and handed down on what is safe. Formulate. The tools we make to build our lives: our clothes, our food, our path home, all of these things we base on observation, on experiment, on measurement, on truth.

- Mm.

- So when I read the first page of your book, I thought about this poem and I found this video. And the animation and drawing were particular made for this poem, so I was really touched. So with this imagery and the sound, so I think we are perfectly set in the mood for hunting, for mushrooms. So here you are, Michael.

- Yeah. Wow, thanks so much, Ling. Yeah, I love that poem. And then when I saw the animation and the way that Amanda Palmer spoke, it blew me away. And it was interesting. I had, for the book, to get permission from Neil Gaiman to reprint a little bit more than usual. And he was so gracious and instantly said that he was in. So that was the real treat for me. So thanks so much to you for the invitation to speak here today and to talk about my new book that will be coming out Tuesday. And also thanks so much to all of you who are here listening from all around the world, and to Mark Grady, who's in the background, who's been wonderful to work with in organizing this event. And thanks so much for the kind introduction, Ling. And you're just such a force of nature in doing all these kind of events all the time, and we also appreciate it. And so I'm glad to be talking to all of you. As Ling mentioned, I'm in Vancouver, in British Columbia, in Canada. And many of you may know that the term "Canada" comes from indigenous origins, but certainly Vancouver and British Columbia are decidedly not. And I

want to acknowledge that I am speaking here today from indigenous territory, on lands that were never ceded by treaty with the colonial powers. And this is the land of the Musqueam, the Squamish, and the Tsleil-Waututh people. And I'm here today as an uninvited guest on these beautiful lands. And I am slowly learning about the deep histories of the indigenous presence, ancient and ongoing, and working with others to educate myself and the public around what it might mean to be a good guest in this place. And so, as Ling mentioned, I was thrilled to be able to speak to you on this day, which is Earth Day. And I really didn't know much about its origins, other than I had heard that, you know. Yeah, I was born basically around a month within its first origins. And I looked into it a little bit and it turns out that Earth Day was an organizational miracle and happened virtually overnight. It was first proposed by a US senator in the fall of 1969 in Seattle. And then within half a year, it rolled out. And the first idea was for a, quote, national teach-in on the environment. And this, of course, was inspired by a new strategy at that time to protest the Vietnam War, the teach-ins. And I remember being shown the site of the first teach-in, in Ann Arbor, when it was started by the anthropologist Marshall Sahlins when he was a professor at the University of Michigan. And there was talk of a teacher strike against the Vietnam War, and, of course, the administration was pushing back and criticizing the teachers. And Sahlins said, "Well, they say we're neglecting our responsibilities as teachers. Let's show them how responsible we feel. Instead of teaching out, we'll teach in, all night long." And so they had their first all-night teach-in there. And then that just kind of rippled all across the world. And one other just quick thing I would say about this time that's so interesting to me, it was such rapid and widespread change. And according to the Environmental Protection Agency, and this statistic seems kind of wildly high but also possibly plausible, that public opinion polls indicate that a permanent change in national politics followed the Earth Day. When polled a year later, in May, 1971, 25% of the US public declared that protecting the environment was an important goal, which, from 1969, just two years before, was a 2,500% increase. So just to think about that for a minute. But I think one thing that's interesting is that so many of the themes in this are wrapped up in what I'm going to say today about new ways to understand our non-human kin, the role of anthropologists in social and political life, and, of course, the ways that Asia and North America were so deeply implicated in this case through war. Okay. Okay, so now I'll move on to my book. So this book was a labor of love. I just got one of the advanced copies last week. Very excited to see that. And I owe a lot to my larger posse, which is the Matsutake Worlds Research Group. And some of you know that we are a collaborative group of anthropologists who have carried out joint field work in North America, Japan, and China. We go out to the woods, we go into the laboratories, we go into the markets and the green grocers, and we talk to amazing people all over. So this group includes Tim Choy, Anna Tsing, Shiho Satsuka, Lieba Faier, Miyako Inoue, and, more lately, Elaine Gan. And so we started

our field work together in 2004, going to Japan. And there we met the scientists who had dedicated much of their lives to understanding the matsutake mushroom. And we have been deeply involved in the world of this mushroom ever since that time. And, as many of you know, Anna Tsing wrote a beautiful book, "The Mushroom at the End of the World." This book has now been translated into, I believe, nine languages and has been engaged with by so many different people, and that's been very exciting to see. So my own book is a second in the trilogy, and then Shiho Satsuka is working hard on the third book. So my own research on this has been mostly in the high mountains, on the edge of the Eastern Himalayas in Southwest China's Yunnan province. And this is a place that I began living in and learning about since I spent my first year there in 1995. But it was more than a decade later that I really began to delve into this world of this special mushroom. And I found out that it had become the province's most important agricultural export good, although, as we might talk about, it's not really agricultural. But they sent many millions of dollars of these mushrooms to Japan, and so it became this kind of critical thing for the functioning of that larger provincial economy. And so for those of you in the audience who haven't yet met the matsutake in person, let me describe it a little bit. It emerges in the fall, but only in very special situations, as it requires quite specific species that are often called host trees. In the language of mushroom science, they are called mycorrhizal mushrooms for they form intimate ties for these living plants. And the matsutake is exchanging the moisture and minerals that it can mine from the earth and giving it to the trees, and then, in return, it receives photosynthetic sugars. Perhaps you have also heard that not only does it exchange food and drink, but these underground connections can sometimes make vast networks, what some call a kind of underground internet, or what others have called "the wood-wide web." And then in this web, there are many forms of communication going on. And we just have so much more to learn about this kind of structure, largely invisible structure, that has so much effect in shaping the wider world. So we have this mushroom here along the west coast of North America, and it occurs in a sprinkling of places along the east coast as well. When I was out in the east coast one time, Zach Chavez who's here today, I think, he went and showed me a friend of his who had found a matsutake on the East Coast that I was delighted to see. It's mainly white, fleshy, and a robust mushroom, and it can be confused with others that can look similar, but the thing that makes it so distinctive is its amazing smell, which is kind of cinnamon-like and spicy at the same time. And there's nothing else like the smell. And the chemical that makes it has its own particular scientific name. Some people really hate the smell. And so there's a related species in Europe that has a Latin species name of *nauseolum*, that which makes you feel nauseous, but others totally love it. And in Japan there's a lot of matsutake love. And it's a tradition of writing poetry about this mushroom that goes back more than 1,000 years. And historically, it was reserved only for the elite classes, and hunting matsutake in the fall was regarded as a delightful activity, something

of leisure and pleasure. There's some beautiful paintings showing these groups out, doing their picnics, and hunting up in the hills. And the world's matsutake economy is now this major global force, and it all centers on Japan. But in Japan itself, the mushroom is harder and harder to find. In Japan there are these high-end grocers which only deal with the domestically-gathered matsutake and sometimes the prices can be astronomical, up to a \$1,000 a pound. And at these grocers, people talk in mournful ways about the once-famous matsutake mountains that existed in the area, but where these special mushrooms have completely vanished. Okay, so now that I've told you a bit about the mushroom, I'll give you a brief description of the book, and then I'll read from a few short passages. So the book started in a more conventional way, as an anthropologist, and I was planning that the whole story take place in the heart of matsutake territory, in Yunnan, and work with Tibetan and Yi people who pick them. So I did that, but I was very curious to see how the rise of this profound source of wealth was changing their lives in dramatic ways. And I explored how it worked out differently for people of several generations and genders. But yet, one day, when I was working with an Yi mushroom hunter, he told me about how he and his peers engage with some of the main insect species that I had been looking before as pests. And he told me that they weren't really pests, but they were hunters, and that these insects hunted the mushrooms just like they did. He said that these insects were smart, but they learned from what they noticed within their lifetime. And that as much as he tried to trick them by hiding sometimes small, growing matsutakes under some leaf litter, like some leaves and things, or even sometimes using piles of sand, that some of these might be able to learn from other species that hunted not by sight, but by smell. And so, for me, this encounter helped to reorient my project. And then I spent a number of years trying to understand what Western science might make of this notion. So in this time, I read a lot of mycology and also studied ideas that did not assume that only humans actively interpreted the world, that only humans actively made conscious choices, what is sometimes referred to by using the term "agency." So first I was thinking of insects as agented beings, and then I expanded it to thinking of mushrooms in this way. So in the final outcome, the first half of my book explores how the world might look if we explore the incredible capacities of fungi as a kingdom, and how they might have actively shaped the planet's history. And in doing this, I both draw on a lot of scientific studies that fascinated me. And then, two, I apply my anthropological training to understand how these scientists, like all of us, are cultural beings, how they use their own assumptions about how the world works, and about how this may have affected how they carry out their experiments and how they draw their own conclusions. And then in the second half of the book, I turn to Southwest China where I show how looking at Tibetan and Yi engagements with matsutake looks like when the mushrooms are not just seen as a passive commodity, as a passive resource. And here, too, I was inspired by an amazing conference that Ling organized many years ago, where we looked

to think about other beings not purely as resources, but to imagine them as having other forms of presence. And in this way, in the book, I was trying to look at what I'm calling their own world-making capacities. So I was asking, how does this change, for example, people's relationships with other key animals and plants that they rely on for food, such as the yak or corn or barley? And so you can see that it turned out into a bit of a different kind of a book than what I had originally intended, so. Now I'll just grab the book and read from a few passages. Okay. So this is from the first half of the book. It's a short section called "Challenges Within the Current Scientific Orthodoxy." So when I was exploring the scientific literature, hoping to find lively fungi, I was reminded of a group activity I had engaged in many times with other microphiles, or mushroom lovers. This activity is called a foray, wherein members of a mushroom club try to find as many species as possible, whether edible or not, to see which species of fungi are fruiting at a certain time and place. It's kind of like a treasure hunt, an exploration into the unknown, and the participants must have the capacity and readiness to be surprised. Yet, in my forays into the scientific literature, I was reading many specialized mycological books and articles and numerous introductory biological textbooks, but I had a hard time discovering any good examples of fungi as being lively beings. And I wondered, why was this so? So I thought there were a number of challenges, and here I would explore two. The first is specific to fungi and relates to how they had been relatively ignored, stigmatized, and feared in England, a country that has had, since Darwin's rise in the late 19th century, a disproportionately powerful influence in shaping contemporary theories of evolution and in scientific writing more generally. Might, I wonder, this culturally specific attitude play a role in what science emerged? The second is that the biological sciences are structured by a mechanistic framework that tends to work against my interest in understanding the liveliness of fungi. I did, however, find a handful of exceptions to this trend, and I highlight a few examples below. So within the world of mycology, there is a now famous story about an Anglo-American investment banker and a Russian doctor taking a walk in the woods. This event, which sounds like the beginning of a classic joke, turned into a series of events that precipitated the Western fascination with psychedelic mushrooms and expanded interest in fungal powers. And it also revealed the diversity of cultural attitudes towards fungi and a particularly strong and specifically British antagonism toward our fellow beings. In 1927, Gordon Wasson noticed that his fiancée, Dr. Valentina Guercken, rushed from the path to exclaim over a cluster of mushrooms that seemed to her like some of her beloved edibles from Russia. Wasson, however, was fearful and refused to eat them. They were puzzled by the stark difference in their attitude. And this event launched their joint lifelong quest to better understand the diversity of human relations with mushrooms. After several years of research, they coined the terms "mycophobic" and "mycophilic" to describe two distinct cultural attitudes, mushroom fearing and mushroom loving. They were surprised

to note that while many cultures love mushrooms for diverse reasons, Britain stood far on the mycophobic side; and indeed, many assert that the British are the most mycophobic of all the world's known cultures. Since learning about this widespread negative attitude of the British, I've wondered how such mycophobia might have influenced scientific understandings of the role of fungi in the field of ecology. Further, does such a sensibility continue to haunt biological studies, and has it also become embedded in the English language? The possible influence on English is especially important because it is the world's dominant scientific language, with 80% of the world's scientific findings published in English these days, and all 50 of the top-ranked scientific journals are also written in English. As well, I found that a number of influential biological textbooks in other languages were also translated from the original English. So researchers in British settler colonies, such as Canada, the United States, Australia, New Zealand, confirmed that widespread mycophobia remains strong among laypeople, which certainly resonates with what I know from my own upbringing. I grew up in an Anglo-American context where few knew much about mushrooms, and many felt uneasy about them, certainly too nervous to try eating wild mushrooms at a restaurant, let alone those found growing along a trail. And still, the origins of British mycophobia are perplexing, given that neighboring countries such as France, Italy, and Russia show a great love for mushrooms and mushroom hunting. Now, the Wassons' depiction of British mycophobia was not a surprise within the UK itself, where fungi had often been associated with death and rot and referred to as, quote, the pariahs of the plant world. Going back to the 1850s, Miles Berkeley was an important explorer of fungal lives and described his fellow citizens' negative attitude towards fungi in this way. And he says, "From the poisonous qualities, the evanescent nature, and the loathsome mass of putrescence presented in the decay of many species, fungi had become a byword among the vulgar and are frequently regarded as fit only to be trodden underfoot." What some people today call mushroom-kicking. 30 years later, William Hay, a fellow of the Royal Geographical Society and a student of mushrooms himself, reconfirmed Berkeley's writings about British attitudes. And Hay says, "All mushrooms are lumped together in one sweeping condemnation. They are looked upon as vegetable vermin only made to be destroyed. No English eye can see their beauties, their office is unknown, their varieties not regarded. They're hardly allowed a place among nature's lawful children, but are considered something abnormal, worthless, and inexplicable." Now, when British mushrooms were not simply lumped together, they were described into two categories, mushrooms and toadstools. The former term described the edible variety and the latter described poisonous mushrooms, indexing their strange nature and affiliations with other poisonous organisms, like toads, that had long been associated with witchcraft. And in that same essay, Hoy coined the term "fungophobia" to describe the fear of toadstools. Now this existing fungophobia was reinforced after it was realized that microscopic fungi created powerful diseases that killed important crops in Europe. Fittingly, as

if to reconfirm and extend the existing British mycophobia, the first major breakthrough in discovering fungal diseases took place in the UK. After many years of British colonial expansion into Ireland, much of the population consisted almost entirely on potatoes. The potato blight, from 1845 to 1846, caused at least 1 million Irish people to starve and 2 million people to emigrate. And I was surprised to hear that, even today, Ireland's population has still not recovered fully from the blight. Eventually, the disease was attributed to a water mold that scientists first saw as fungi. This relationship, discovered by Miles Berkeley, who I just mentioned, and others, was one of the earliest wake-up calls for the power of fungi, or what we would now consider fungi-like organisms, to quickly kill off a large number of plants. And soon, this created a trend where most of the studies in both agriculture and in forestry would look at fungi as pathogens, as things to be feared, as elements of disease and death. And so the vast majority of this work and of this kind of brain power was directed in that way. And so I began to wonder, too, what is the origin of thinking about fungi as having possibly beneficial effects, and how difficult was that to eventually emerge? So I'll end that first section there. And then, from the second half of the book, I will talk about this kind of way of thinking about the inner relations of different species, what I'm calling seasonal timing, about, in particular, the yak, the barley, and matsutake. And so here, it's up in the Eastern Himalayas, working with Tibetan folks here. So once a family committed itself to harvesting matsutake, it meant that these entanglements to yaks and barley... And here I'll say that barley is grown and roasted to make tsampa and other goods. It's one of the key plants, both for people to eat the seeds and also as a source of hay for the yaks. These relationships were reconfigured, and the entry of a new organism changed the family's relation with all the other organisms that they were in deep connection to. Likewise, the exit of an important organism also created important changes. So when some Tibetans sold off their yak herds to devote themselves to finding and to selling matsutake, this meant that their yearly round changed in a drastic way. For some families, this was their first year without yaks within memory of many generations. I had heard of some cases where family members cried inconsolably when their yaks were sold off and handed over to someone else. I heard of grandmothers who were giving away yaks that were the great, great, maybe even great grandchildren of yaks that they had cared for when they were young children. Because such entanglements require intense and repeated caretaking, and because people and yaks often create emotional bonds, these relationships are special in particular, in a certain way. Now, compared to the kinds of relationships between yaks and humans, understanding mutual entanglements between humans and matsutake is more difficult. We cannot easily see matsutake changing its own behavior, or their own behavior, in relation to human activity over the long term, let alone in the moment. Here, I'll just interject that I was attempting to not refer to matsutake as an "it," but more as a "they" in the book, but it's really hard to break out of certain

habits. And yet, if we imagine other organisms as having agency only in terms of their reaction to human presence, this is an impoverished notion of agency that defines it in anthropocentric terms. So only in relation to humans. Instead, if we think of the broad range of world-making activities that the species carries out every day, whereat some point in the annual cycle, at a certain point in its life, like mating, then we see a lot that looks like agency, even if these activities don't always reach a particular threshold based on certain notions of intentionality that we often apply to what we think of or what we notice as the agency of non-human beings. So unlike a deer fleeing from the hunter, matsutake do not hide from the mushroom hunter, even if that is what the people doing the hunting might think when they can't find the mushrooms whose presence they seek. From the perspective of many mushrooms, mammals can be spore vectors, carrying mushrooms' potential progeny to new places that might not be reached by the wind. For many humans, matsutake are food, but few people imagine themselves as vectors. And if we defecate in sewer systems, the chances are low that we will become vectors ourselves. Fruits are one way that plants invite animals to eat their flesh and, most importantly, eat their seeds. Animals become the seeds' vector for travel and for fertilizer, what you could call animal friends with benefits. Mushrooms are a fungi's way to spread their spores, using the wind or the rain, or to be eaten by animals. But we know little about the role that animal transport plays in the life of matsutake, and I hope we learn more. So matsutake remain elusive not only to mushroom hunters, but also to scientists that are trying so hard to domesticate them. This elusive quality is one way in which people experience fungal agency. Although so many scientists have worked for so many years and spent millions and millions of dollars in the process to try to encourage matsutake to make relations with pine tree and to fruit, to make the actual aboveground mushrooms in the lab or the forest, it seems that matsutake have always refused. Despite many people's efforts to domesticate matsutake to make them reproduce and grow where we desire them to, the proposals for domestication we have made have all been rejected. This is despite humans having learned and provided for the needs of many other edible fungi that we often find at the store, from shiitake to portabella to oyster mushrooms. They are the ones that mostly decompose dead matter, rather than the mycorrhizal relations that I mentioned earlier that form relations to living plants that are far more complex in their relationships. And this is the last paragraph here. Matsutake's mating season, which is misdescribed in botanical terms as fruiting, as if the mushrooms contain fertile seeds, but what it really is is a form of sporulating, or the release of spores, takes place at the same time that Tibetans are bringing their yaks back from summer pasture, harvesting grain, and storing hay for the yaks over the winter, as well as gathering animal bedding and collecting firewood. As plants wind down after a vigorous summer of growth, the matsutake burst forth from the forest soil, sending waves of spores into the cooling air. They are hoping to get their potential progeny out into the world before the killing

frosts sink deeper through the canopy. As the top layer of ground freezes, so do the matsutake. Other mushrooms can withstand a solid freeze, like the perennial shelf fungus that grows from the side of trees, but like almost all of the soil-based large mushroom, matsutake freezes solid and then, at some point, as the sun warms the air, it turns limp and mushy and returns to the ground. And soon, if you go by later, there is almost no trace of the mushrooms, that they were ever there. Matsutake's timing is part of their world-making and has a certain rhythm. Hunters slowly attune themselves to this beat and to the series of temperatures and rains that might foster the mycelia underground to knit together into a beautiful mushroom that pops up from the earth, filled to the gills of spores, ready to be sent out into the atmosphere. And I will end the section there, and I will turn it over to Ling to continue the conversation. So thanks so much.

- Thank you, Michael. So beautiful. Such a beautiful passages that you read out. It made me think so much. I don't really have well-formulated thoughts, but I just wanted to put down several keywords that popped into my mind, and this really reminded me in the past that we had a extended conversation. I remember one day, at EAs, literally, right, sitting in the hallway at one particular EAs, talking beyond midnight, talking about these issues. So while I am just putting out my random thoughts, which are really just inspired by Michael's talk, I encourage our audience to share your thoughts, your comments, if you have questions, just to type them out into the Q&A function. And then later I will do my best to read them out to the entire group and Michael will respond and gave his answers. So, Michael, what you just read from your book, and earlier your comments in the first parts of your talk really reminded me of so many things. So one thing so important, just at the end, you talked about the seasonality, the issue of a time. And this is the issue, I think, as environmental historian, I am not anthropologist, I'm an environmental historian, but we have to grapple with, at the same time, how to go beyond human time to bring in non-human time, and even go beyond organism to look at a non-organism's different times, how do they entwine, and to bring about different worlds, the plural worlds, that you intentionally put down in your writing. So this is so important. I just wanted to mention just how important and inspiring this is. And then the second thing is, there's that one part of your talk towards the end when you talked about how scientists and how the global capitalism literally pumped millions and millions of dollars in order to produce or reproduce this mushroom, which can generate so much value, right, for mushroom-craving, rich people, let's say, right? And you use these verbs, right? To make them grow, right? To cultivate them, to make. And yet the mushrooms, for whatever reasons, they refuse. And I just found this kind of language you use not only in terms of the actual actions that people do and a mushroom choose to do, but I hear the language that you use in order to frame the story in such a way, right, in a kind of a non-human centric way, I think it's extremely interesting. So if it's possible, I would like, actually, to ask you

to talk more about how you actually write the book in such a way in order to, through your own performance, right, writing as a act, how to counter the conventional norms, the human-centric, human linguistically, you know, our norms, the human linguistic regime, how to battle that, I think it's very important. And I really love this little part you talk about the yaks and how the family had to let it go. And you talked about these generations of yaks have been living, right, with the human generations. So the entwinement of these particular two entities, if we don't use the species-based language, right, two species, let's say, these two strands of entities, the yak and their human partners, and how to think about these entwined lineages, even as if this is kind of the two strands of a DNA, right, they're deeply entangled with each other. And that there's such emotions, affection, and also trauma, right, because of the loss. As the time changed, they have to be broken apart. Some part of this entangle, the lineage, has to be sold, had to be taken away. The relationship had to be broken. That will drive the human partners into tears and perhaps into a lifelong trauma. So I just think this is really beautiful. I don't really have a well-formulated thought, but I just think of this is so beautiful. And I really want you to tell us a little bit more about your interactions, honestly. Here is one thing you told me before, a little bit, but I wanted to know more. Your interactions with the different communities, especially the communities of scholars or such, as a scientist, right, and how you work with them and how you interact with them. And I also recall that you talked about your projects, right? Your project. So this particular project with different audiences. And there are scientist-based audience, a biologist-based audience, and you perhaps also talked to maybe Chinese scholar-based, East Asian scholar-based audience. How did they receive your perception, your conception of the project, your effort to go beyond the human-based, the human-centric, conventional anthropological research, right? Yeah, tell us more. Just, yeah, please.

- Oh, so many great points and questions there. Let me just try to start with the most recent one and then I'll try to work back. For those of you who don't know Ling, this is classic Ling with so many great questions and ideas. So in terms of audiences, yeah, it's so interesting to us to think about, in terms of giving talks and things, like those kind of audiences first. And I remember realizing that we were coming into a new social moment when a group of us gave a talk, this is probably seven years ago, at Stanford, and the room was really packed and we were so surprised. And we thought, "Oh, there's a few anthropologists here, but most of these people don't look like anthropologists." And we asked around the room and a lot of them were materials engineers. And we thought, "Why are they possibly coming to hear about this one kind of unusual wild mushroom species that many of them probably never eaten?" And it turned out a number of them had become totally under the spell of mycelia as a material to build with. I had just heard a little bit about this possibility, especially in

terms of growing the mycelia in a base of wood chips or some other kind of medium and then, at which point, it is killed, but it becomes like a substitute for styrofoam or building blocks or something like this. And now they're talking about actually keeping it living as a responsive material, which is kind of amazing to reconfigure architecture from that of dead trees and to that of living fungi. But I think that was so interesting for us to realize that it wasn't just a bunch of mushroom heads that were interested in this kingdom, but it was spreading across a wide terrain. Also in terms of mycologists, I had people like Zach, who, at an early version of this talk, kind of set me straight on a lot of the different basic scientific understandings, which I'm still new to. I haven't been really formally trained and just trying to understand the science as best I can as an anthropologist. And then in terms of this kind of interesting dynamic of thinking about agency, I once had this one mycologist really push back at a talk I gave in Hawaii. And the person said, "Well, you're talking about fungal agency, Michael, but I really don't get it." He said, "For example, a lot of them are genetically simple and we can now manipulate their genes. So this shows that humans have control over these and the mushroom doesn't, then." And I thought, oh, it's such a fascinating question and statement about the very presumption of kind of what counts as agency. And so it helped me to think further through it. Just thought like, mm, there's a few maybe yeasts or other fungal organisms that humans can do some genetic manipulation to, but does that mean that humans have 100% monopoly on agency and the fungi have none, of all their many millions of species? And just to try to think through this a bit differently. And in terms of trying to rethink the language and to rethink not only in scientific language, but in our common language there, and like how I pointed out I used the term "it," this kind of objectifying of fungi, when in fact I had wanted to use things like "who" and "they" to put it on the same kind of playing field as humans and other organisms. But it's still just so relentless, this kind of language of keeping it outside of the zone of personhood. But someone, of course, who I was really influenced by is Robin Wall Kimmerer's work and her specific writing on this language of objectification and distancing, and reading those passages really helped me get a different sense. And she's a Potawatomi scientist who is thinking about what Potawatomi epistemologies might mean to her work, and is also so insightful into thinking about the kind of so deeply-embedded paradigms of scientific thinking that kind of separate out humans as an exceptional species that is different in kind from all others, and how that doesn't even need to be stated explicitly, but that's just embedded in these tiny choices we make about language that we don't even think of as choices because they're already presented to us as separate, we just follow it. And so to try to push against that and to open up another space was a really interesting element of the project for me. And then getting back to the question of the kind of that entanglement with yaks. And I have a colleague here who talked about the yaky landscapes of these areas, and just thinking about, right, right, that humans are maybe, you know, having

this very small amount of agriculture, which is lands not that they totally control, but that they manage directly, and up in these high elevations. But it's the yaks, these thousands or millions of yaks that are covering this fast terrain, through their everyday eating and engagement with the ecosystem, that they have made that into a totally different landscape. That in those places, the yaks' presence is a far bigger aspect in a direct way than direct human engagement. And so I think it helped, the project helped to kind of rethink a little bit of human hubris, this idea that we have this mastery, this control, and to think about how other species are playing a role. So whether it's the matsutake kind of refusing to be domesticated, or it's about the thousands of years of yak presence and how that shaped the landscapes in such powerful ways. And then you had an other earlier question, but I'll just leave it there for now 'cause I think getting some other questions, but, yeah, those-

- Exactly, exactly. Oh, so fabulous. I really love this yak landscape idea, thousands of years yak presence. It's a fabulous way to rethink, reorient our views, honestly, into that particular world, right? That's beautiful. Thank you for sharing.

- Actually, one more little thing.

- Sure, go ahead.

- And this is something through a conversation with you, which was thinking about how rivers become different entities based on the living organisms that are within them. The fungi, the plants, the animals. I mean, we often think of the fish, but how are they different in kind because of this, these living presences? How do they shape the very river itself? And I have a friend who's a sound ecologist who talks about the idea of putting little microphones in and hearing the distinctive sound signatures that every fish makes, every species makes, so as it swims through the water, that these... But not only the sounds, but that their active eating and predating and their whole life cycle somehow is shaping the river. And I've been haunted by that idea for many years now.

- Wow, now you get me haunted. So we have to talk about this particular point. I'm really interested. Alright, let's turn to... There are quite many questions and comments, so we will do our best in trying to cover as many as possible. So how about let's go to the very first one. So first one comes from Jenna Harris who says, "I never realized the matsutake is also plentiful in Tibetan area Himalayas. How very interesting. Thank you for talking about this. I'd love to be connected to lands and areas. I admire fungi. Let me be part of learning about certain lands. I will need to get your book." Great. "Usual talk about matsutake is about Japan." Great, fantastic. Thank you, Jenna Harris. So, Michael, you just get one reader here, at least.

- Thanks.

- Would you like to say a little more about this?

- Sure. I mean, one thing that's really interesting is that some people wonder about its history, the history of matsutake in this area. And the one person who I've ever seen write about this, and this was just in one sentence, was Daniel Winkler who's an expert on many things fungal, especially cordyceps. That's that amazing kind of zombie caterpillar that's infected by a fungus. So there is a little bit of talk of the older history, but a lot of engagement with matsutake, but a lot of people said it was something that wasn't really that important to them. It wasn't really a priority mushroom. And up there, people eat a lot of different mushrooms. And, you know, it's not something that grows up out in the grasslands. It's something that's growing in the piney areas, in the forested areas, the matsutake. But it's only in the last few decades really, since the '80s, that it's become a big thing. So it's interesting. Like compared to cordyceps, that fungal-insect relation, that history goes back centuries and centuries. And it's part of this whole, you know, before more of a Tibetan-focused medicine and now used by so many people all around the world, whereas matsutake is so, so recent and it's something that, though that now really has created both a lot of conflict, as people like Emily Yeh have talked about, between the different villages that have a lot of matsutake and those that don't nearby. It grows in a very heterogeneous way, but it's a new player in an important way, but it's having such a major, major effect. So thank you.

- Great. Okay, we will turn to an anonymous attendee. I think the next two lines are both from this attendee. So this person says, "I collect lots of East Coast mats in Maine. Sometimes I found them by smell. Last year was an extraordinary year. I found them in fairy rings where previously I only found a few. I thought they were not the same species as the Japanese one." And also I think the same person says, "Curious refreezing. Here they are the very last one to bloom and seem to tolerate and even require some frost."

- Mhmm, yeah. Yeah, that's really interesting. Yeah, sometimes they're called matsi's. Like it's kind of the cute name for matsutake and-

- Ah, uh-huh.

- And then it's interesting, too, to think about the magic of them, how they are, you know, and when they're growing in that circle, that's this European terminology of the fairy ring, like the idea that the fairies are the ones bringing them up out of the soil. One thing I like about that, the comment is that it shows, too, that their

incredible responsiveness and plasticity, so that sometimes they'll just pop up a few. And depending on the rains and the temperature, they often do need some kind of frost, in a way, to trigger them, or some kind of soil temperature. And it's something that, in Japan, that you have these farmers up in the hills who have all of these underground thermometers and they're making these very careful records of the matsutake fruiting with the temperatures and really trying to figure out these relations. But that still remain a bit enigmatic, like we can't really predict it well. Then sometimes there'll be a year where almost nothing will come up, and then the next year will just be total bonanza. And so that's one of the other interesting things about it in terms of trying to industrialize them to make them predictable, to make them consistent, and all of these things. But matsutake's relationality to not only the trees that has to be there already, but to these really divergent rainfall patterns and temperature regimes will really affect how they emerge. And I love that, too, that they can find them by the smell. And I'm really jealous because I can smell them up close, but Anna Tsing is very attuned to the smell. So sometimes she can smell them before sees them. And I talked about a friend, she would find the mycelia growing. And you can find the mycelia because, well, if you know a patch there, or there's this one kind of parasite organism, that parasite's only on matsutake mycelia. And so if you find this organism, you can go underneath and pull back the ground and smell it. And that will give you a kind of a search image equivalent of smell. So it'll kind of attune your nose to the smell. And so some people are lucky enough to be able to wander through the woods and use their nose to locate them, so.

- Right, wow, this is just so amazing. So not only time, not only the temperature, but also smell. All these different kinds of associations. And I love at the beginning when you mentioned the mats, matsi, matsutake, these nicknames, in a sense. Obviously, this is the kind of insider's unique vocabulary, right, which isn't shared by the communities, but not the people or whatever, the beings outside that community. So this is a secret language, and I really like that. Okay, let's go to, yeah, your friend, Zach Chavez. I think this is your friend that you mentioned many times, who says, "I notice you use the term 'yaks,' whereas Dan Winkler, who you also mentioned, another ethnomycologist who has worked with the Tibetan, likes to name these explicitly as 'yak-cow hybrids.' Can you speak to why you favor the term 'yaks'?"

- Sure. I just use the term 'yak' here for its more easy general audience reception. But Zach is totally right, that it's interesting. Down around where I'm doing most of my field work there, it's a lower elevation, and so the yaks are interbred with cows and that helps make them produce more milk. But what's one of the things that's really interesting about the yaks is that they are so intertwined with these high elevations that they cannot really thrive at lower elevations.

And I was really interested just to think of. Usually I imagine it the other way. There are a lot of species that can only go so high. And especially in the plant world, there are these upper limits to where plants can survive. But for yaks, 4,000 meters, no problem, you know? They are up there. And as they go down, they start to suffer. So it's another way, too, in which they are so deeply entangled with that land. And what we call a lack of oxygen, the yaks actually relish. And just one more little thing on yaks, 'cause you were asking about that earlier. It's interesting, where I first did research along the tropical rainforest, along the Mekong River. There, the people were starting to get rid of their water buffalo and they were replacing them with these small handheld tractors. And the grandfather where I lived, he was saying, "Oh, Michael, this is so sad for me because I knew the 101 diseases," and this is more of a metaphorical expression, "of the water buffalo. I knew how to diagnose them. I knew what plants, what herbal medicine to do to care for them." And he said, "And now I don't know a single thing about how to fix these tractors. This is something for the younger generation." It's been interesting to be there at the moments of these transformations of relationships that had been established for centuries or millennia. And I had honestly never really thought about the idea that people raising these animals, of course, would have this knowledge that I thought of as more veterinary knowledge, like that of separate experts. But, you know, the same kind of thing as the water buffalos for the yaks and people knowing what kinds of foods they love and don't love, and how to notice things about them. It's like in the poem, the Neil Gaiman poem around observation. And so it's this kind of keenness of observation that really interested me, that I feel like a lot of times we aren't as reliant on distinguishing between the eating the species of mushroom that kills us or the ones that make us feel healthy. And so it's also paying attention to other organisms, like the water buffalo and the yaks, and what they need to thrive in the world.

- Mhmm. And I wanna really quickly pick up one thing that you mentioned earlier, actually related to what you just said here. That's the thing, when you wanted to replace the word, the pronoun "it" with "they." And because in most cases, as you are talking about, we're not talking about kind of enlightenment ideal of individual beings, right, as the agency-carrying entity. But we are talking about community-based, we're talking about lineage-based. And for instance, around the water buffalo, you have this entire knowledge system which is populated by generations of human being and other species around. So by displacing water buffalo, one particular water buffalo, you are displaying this entire community that generated and sustained this knowledge system and the relationships. So "they" is a really proper pronoun for all this sort of world-making and world-crushing or collapsing experiences. I really appreciate why you wanted to use "they." I'm sorry that you failed the fight, I hate to say. You failed the fight for that pronoun.

- Well, sometimes, actually the editors were happy with it in some ways, but I failed as an individual to always remember to do so, being so trained into it and nobody else. So, you know, caught it in reading. So it's just interesting, too, where just that deep embeddedness just sets us so far in a way that we often cannot see to orient the world in a particular way, but, yeah.

- Great. Alright, let's move on. I think the next question asks you to share some pictures, and I think maybe we can. We can either leave it to the very end because I would like us to cover the other questions, as many as we can. And if it's possible, at the end of our conversation, maybe you can look for a few pictures to share with. So if that's okay, let's quickly move to the other question, the next question. I can tell Michael is looking for pictures right now, so I can read out the next question, which comes from Hyden who says, "Michael, thank you for..." Oh, here. Alright, everybody, so for those of you, if you are interested in looking at pictures, any multimedia representation of Michael's book, here is a link to his personal website. Awesome. So Hyden asked Michael, "Thanks for the wonderful presentation. Looking forward to reading your book and using it in my anthropology of China course in the fall." Fantastic. "Can you discuss your methodology specifically? Did the research require you to collaborate with a non-anthropologist, for instance, a scientist and an artist?"

- Oh, that's a great question. Thanks so much. Yes, it did. So it was interesting 'cause, right, we usually think of the anthropology field work as being, you know, you often go to a certain site and work with those local people within that realm. But ours was part of this multi-sited ethnography. And so we spent a lot of time with Chinese scientists, with Japanese scientists, with American and Canadian scientists. And in part they would teach us about this science, but also we were part of conversations, as anthropologists, trying to also look at their own work anthropologically, like I mentioned a little bit. So I was so interested in that. And since the time I mentioned, 2004, and we were meeting in Japan with one of the biggest experts on matsutake in the world. And we said, "Oh, and we can't wait to see your incredible personal archive of decades of research and material." He looked at us, he said, "Oh, you guys should have got here just the other day. I threw away everything, all my papers, thousands of papers." And we were just so shocked, but he was saying that, yeah, he felt that the matsutake had such a hold on his life, he actually needed some space and some breathing room from that and he had gotten rid of everything. So it was kind of like a tragedy to us, but now it's also something that we realize, how it infuses kind of everyday just being in this way. But we got to meet with a number of his colleagues who worked in the laboratories and then we went out to the field. So it turns out there are these field experimental sites all through Japan. And then we were part of an organizing committee to create the first scientific conference between scientists from North

Korea and from China and Japan that all got together in China. And so that was a really fascinating workshop to be part of, where everything was translated and brought together that became part of our work. There's so much more that we've done that we haven't written about, but that was very influential. And then Shiho Satsuka and Anna Tsing wrote this brilliant paper comparing some of the science that was produced in Japan compared to that that was done in North America by looking at how they had fundamentally different understandings of nature, and human's role in nature, that ended up generating different kinds of experiments in Japan, compared to in North America. And later I heard from some of these scientists. They said, oh, they were so fascinated to actually read this. And some of them said, "Oh, we felt like there was something different going on when we were speaking together, but we never really thought about it as something of epistemology." And so that was really interesting. So trying to dig into some of the presumptions and, like I mentioned a little bit today, against that kind of very particularly British antagonism towards mushrooms. And I don't have it all figured out. It's still a very open question about the role of these histories and how this shapes the present. But certainly this kind of pathogenic bias, this kind of way of assuming their threatening nature to our crop species, whether they are annual plants, like rice or wheat or corn, or whether they are trees, there's often been a very deep sense of fear and antagonism towards them that I hope will become more balanced over time, a more ecological view will emerge.

- Thank you for really a thoughtful answer. Alright, let's move on to the next question coming from Shuchang Zhang who says, "Hello, professor. My question is, as anthropologist, what do you think of drawing on scientific research, that's related to your previous answer, to develop your writing? Do you think it's advantage for anthropology anthology, or retreat into or recourse to science? Thank you. By the way, I'm a PhD candidate in science and technology studies from Tsinghua University in China. I'm really looking forward to reading the new book."

- Ah, thanks. That's great. So this person already is, yeah, deeply in the STS, science and technology studies, world. And for me, when I was a graduate student at Michigan, I had this amazing class by Sharon Stevens, it was one of her last classes before she died, but it was the anthropology of science. And it really opened my eyes to this way of understanding scientific practice, thinking, writing in an anthropological way. And we were, of course, very interested in works by people like Emily Martin and Sharon Traweek and others that really kind of started me down this path. And that's a good question and a good possible warning about what does it represent, what are the different ways to do this, and I do think that I do want to remain skeptical of just using scientific claims, just in and of themselves, assuming their total truth value. And I think we need to be careful with that, especially as anthropologists. But on the other hand, one

can't make an anthropological aside with every single statement, so it's also a challenge in writing about this in a way that really engages science. And I'm trying to move beyond just a critique of science that's been a dominant part of some veins of the kind of anthropological STS work, but to have more of a conversation and engagement. And so part of the book also explores what kind of creative interventions are being done by various scientists. And it's something actually I wanna work on later as well and find the scientists who are also really interested in a kind of lively understanding of organisms, that aren't so afraid exactly of anthropomorphism, which is a big thing that scientists try to be really careful about. But I think, actually, a lot of times what is called anthropomorphism is not. And we can talk about that later. But I do think it's a risky but worthwhile endeavor to engage, as anthropologists, with science. Oh, and I just noticed, Ling, that I just wrote the link to my website that has all the photos. I think it's only sent to the host and panelists, so if somebody could send that out to everybody, that would be great.

- Okay, let me send here. Okay, so everybody has it now.

- Okay, thanks.

- I wanna push you little bit here. So it's called anthropomorphism, but it's not. Say something, say more. I wanna learn, I wanna learn.

- Well, okay, so anthropomorphism, as you know, right, is a very taboo term in scientific practice. And so a lot of times people say, "Oh, I will use this term, but I don't want to be anthropomorphic, or to imbue other organisms with a set of assumptions that usually pertain to humans." And so, for example, saying, talking about the jealousy between two different animals would be often considered anthropomorphic, because sometimes we assume that jealousy is a human-only emotion, that other species cannot feel jealousy. And that may be or may not be true, and I wouldn't challenge that one. But what I do see a lot is that people talk about fearing anthropomorphism for different things that are not specific to humans, that they are sometimes being animal-morphic, which is not really a term so much, but in terms of thinking about how plants and fungi behave in the world. And so we often create this categorical difference between how we think of animals behaving in the world compared to plants and animals, er, sorry, compared to animals. And so there's even pushback that plants do not have behavior, by plant scientists, which I find really fascinating, because often the way that we define behavior is an animal-centric modality. And so I was really influenced by some people, like the book "What a Plant Knows" where he talked about how to think about senses and how to think about seeing the world or smelling the world or engaging the world in ways that goes beyond a human-based model, or even an animal-based model, but how to think about how plants themselves may have certain capacities. So if we

define seeing as based on an eye, then we have always limited that question to only those organisms that have what we call eyes. But if we think about seeing in terms of a visual perceiving in a different way, then we can open it up to a much bigger repertoire of beings. And so I think that there are these deep tendencies towards a kind of animal-centrism, and that sometimes when we become fearful of anthropomorphism, that actually we need to think carefully, is what we're saying very specific to only humans, or is this part of a wider thing? Because there are often wider capacities. I mean, humans share so many capacities in so many ways of being with our fellow mammals and with many other animals. So I think we've been kind of trapped in some ways by this kind of fear of avoiding anthropomorphism that has had really deep effects on stymying a lot of possibly really interesting scientific work.

- Mmhmm, mmhmm, this is really insightful. Great. Well, I would like to hear more, but let's leave our conversation to the future. I just get so excited, you got me thinking. Let's move on to our next question. I'm gonna skip the next two question or put them later because I think we heard some questions from these two from the audience, so we will just put them later. So let's jump to the question by our friend, Brendan. Brendan Gallico. So he says, "Thanks for this delightful presentation, Michael. Can't wait to read the book, which I'm sure will now need to be edited and cited in mine in progress on Tibet and in Vietnam. So on that note, you mentioned about the abandonment and the selling of yaks in exchange for matsutake economy. And I've seen the same thing happening with the Tibetan farmers here, both the selling of yaks and also abandoning barley, wheat, buckwheat, corn, et cetera, to monocrop wine grapes. We've also talked about this with the water buffalo before, so I'm wondering if you think these transformations are representative of a broader reconfiguration of a species relations in rural China, perhaps in these particular ethnic minority regions with quite complex agroecological and human ecology processes developed over generations, as you mentioned. What does the future look like here to you under these new world-making regimes of the matsutake? Why? Caterpillar, fungus, et cetera.

- Oh, thanks so much, Brendan, for that. Yeah, it's a kind of dizzying world in this way. And certainly, too, it's just a good reminder I don't want to pin all the agency on people selling off their yak herds to matsutake. There are many, many reasons why this is happening. This is happening not only in China, too, but throughout the larger Himalayan Plateau in many places. And so I think, too, we need to be careful for jumping to a kind of universal reason for what's happening, because there may be really different reasons for different groups in different places for this. So that will be interesting. Then there may even be places, right, where there's increasing numbers of yak herds. There may be, you know, where there's part of like a touristic yak meat economy that is being brought up, but the whole way

of looking at these species assemblages in motion, and the way to think about how the... I'm really interested, the ways, the particular needs of the organisms themselves, both in terms of the kind of land they need, the kinds of either nutrients for plants or the diseases that they're susceptible to. And I was very interested to see, too, like for barley up in these regions, one of the main diseases is caused by a fungus there. So people are both building this incredible fungal wealth up through the caterpillar fungus, through matsutake, through a handful of others sometimes. But fungus is one of the main elements that can wreck total disaster upon the crops, too. So looking at these, too, in the way of the organisms and people's entanglement, but both as world-makers, I think, is really interesting me, kind of moving away from a, these are just passive things that become easy commodities, easy resources, or preexisting resources, really. As much, I think, opens up a whole new set of questions and a whole new set of concerns. So I'm excited to see this kind of perspective of flourish, and there's so much more to be done. Thanks.

- Fabulous. We have a pressure, so three minutes left, and I think we still have many questions. So I'm gonna just quickly jump to the Jerry Zee's question, because I think the several other questions are asked by people who already raised their hand before. So let's just try to manage to finish, answer Jerry's question. So Jerry asks and says, "Thanks, Ling and Michael. I have a question about how the extensive world-making entanglements of the matsutake and other mushrooms might help us think the relation between living and dead matter. It strikes me that so much of the materialism discussion in the last couple of decades equates agency with, quote, quote, liveliness. If not, a lifeness or animacy as a vitalism. I'm struck by your description of the mushrooms, and not only their support of life, but their relation to dead matter. Can you help us thinking about this?" This is an awesome question. Yes, death. Mushrooms kill.

- Very Jerry question. So fantastic. Yeah, and, I mean, that gets it to the heart of one of my big puzzles. Like early on in the work where I was going to try to take on in part this relationship of what we call living to what we call dead. And I think it's interesting, too, to sometimes just step back from it and not just assume it's an already existing category that is definable and neat and preexisting. And that's something I would attribute to my wonderful colleague, Kim TallBear, who has a lot of interesting things to say about the recent kind of STS turn in thinking about animacy and how much it owes to a long history of indigenous intellectuals and scholars, and pointing out that this kind of line between the living and the dead is far more complex and nuanced and rich than we may tend to think. I really love how Jerry points out that the verbs that we use kind of rely on this idea of the living. And I'm really fascinated by the matsutake's utter reliance on the things that we call dead, like these minerals underground that it can somehow drill through and mine and absorb. And really curious about how sometimes these minerals are actually the

graveyards of the once living, like the limestone that was once these kind of marine organisms that build up, but then they have new layers of engagement with other living beings later on. So it's something certainly very rich to think about, yeah.

- So can I quickly add just a couple of sentence in relation to this issue? Life giving and life killing, these capacities of these organic and non-organic matters. So this remind me, partly because, as you know, my partner works on religion so I constantly think about this issue. And I think you open your talk for the first part of the book, when you read about the mycophobia, for instance, in England.

- Yeah.

- A lot of that is associated with religious beliefs. And I think, as a Chinese and historian, right, in the context of China, mushroom plays a specific role. And for instance, and that was the practice, you always have these beliefs that certain mushroom are magical mushrooms. And actually, last week when I was doing my field work, I saw one. I don't believe that's a real one, but one local scholar pointed out to this huge, gigantic, dry mushroom, telling me this is the most magical mushroom that he collected in his personal collection. I think that's a fake, but, anyway, people believe in that. So the magic mushroom, right, and when you talk about minerals, cinnabars, all these stuff were used partly, sometimes as a medicine for healing. And also other times are used, if you use excessive dosage, you can use them for the purpose of killing. So the boundary between life and death, the boundary between healing and killing seems extremely blurry. And according to, based on what I know from your research, right, this boundary cannot be easily grappled with, it cannot be well-controlled. And a lot of times things go beyond your anticipation, right? So go beyond the control, just like a mushroom refuse to grow, right, for the purpose of nourishing human appetite. So, yeah, so this is just what you make me think. So with this line, I would like to express my gratitude to you, Michael. Thank you so much for your wonderful, this talk, and extremely insightful and inspiring conversation with us. I personally and, I believe, all our audience have benefited greatly from this conversation. Thank you for being here. And I look forward to finishing reading your book.

- Oh, great. Thanks so much. It was fantastic as it was to talk to you and to have everybody tune in. I really appreciate it and love the questions, so.

- And, everybody, especially several of you, there's several questions that we don't have enough time to cover. So I've copy paste all of them into the chat box. So for those of you, if you are interested, you can take a look. And I believe Michael can be reached by his email. You can easily found him out by Googling his name. And so if you have question and comments, contact him directly, and certainly

get a copy of his book and read it and even teach it. So I haven't finished reading it, but I've done about a 2/3. Extremely beautiful. It's beautifully written, so everybody should read it. Alright, so with this note, thank you, everybody, for being here. Happy Earth Day, and enjoy mushroom hunting and enjoy alternative world-making in your own life. Thank you for being here.