# Entomophagy Anthropology with Dr. Julie Lesnik
# Ologies Podcast
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Oh Heeeyyy**,** it's that lady who wants to sample three gelatos but can only bear to make the gelato person give her two samples, and then just buys the flavor that she always gets, Alie Ward, back with another episode of Ologies. Okay, so speaking of eating, actually, you're about to change the way you look at food and the future. Finally, the power to change the planet—it's in your hands, dawg. And it's in your smoothies, and it's in your mouths. Get ready for some bug science, some human history, and some, dare I say, hope.

But before hope comes business. This is the part where I thank patrons at Patreon.com/Ologies for making the show possible, which has its challenges but I love making it. Thank you to everyone getting merch at ologiesmerch.com. Thanks to everyone hitting that subscribe button; just mash it up. And thanks for rating the podcast, even leaving reviews that you know that I read, in the dark, with a candle, and a monocle. And I softly weep, because y'all are so nice.

So I read you one each week, for proof. This week's, Dray J. Lane [phonetic] says:

> *I've been bingeing on this lovely podcast. It's like tapas, but if the tapas were a taste of all the different Ologies that you've ever wondered about, or never knew existed.*

Tapas made of bugs. For this episode, at least. Okay. Enotomphagy Anthropology. Let's just get the heck into it. So, 'entomon,' Greek, means insect, 'phage' means to eat, and anthropology of course is the study of human peoples. So I'm *so* stoked about this episode. And this ologist is perhaps the leading expert on planet earth about this topic.

She got her bachelors at Northern Illinois University in Anthropology, she got a masters and a PhD in Anthropology at University of Michigan, and she's an assistant professor of Anthropology at Wayne State University in Detroit. She wrote the literal book about humans eating bugs. It's titled *Edible Insects and Human Evolution.*

Not only does she speak at seminars, she organizes the seminars. I first saw a video of hers where she referred to eating insects as "just eating very tiny animals," and I was just charmed, and I needed to make her my friend. So she came by my hotel room one morning when I was last in Detroit, and we had a lovely time chatting about gateway bugs, grasshopper tacos, abandoning learned cultural fears, unctuous scorpions, termite farts, food security concerns, and spider bullshit. So open up and say "*Ants"* for Entomophagy Anthropologist, Dr. Julie Lesnik.

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**Alie:** Okay cool. So here is your microphone—yup, you hang onto it and just kind of talk into it.

**Julie:** I can do that.

**Alie:** So, we were emailing about this. You would be an Entomophagy Anthropologist?

**Julie:** That's right! Yeah. So, I'm an anthropologist, but there's so many subfields of anthropology and I focus mostly on biological anthropology, but I really focus on insects as food, and I come to it from all different anthropological angles. And so I decided the best thing to do was kind of name it my own thing, and Entomophagy Anthropology is the name of my website. That's really kind of how I identify myself, is that I study edible insects from every anthropological perspective.

**Alie:** Do you guys all know each other, people who study Entomophagy Anthropology? Is it kind of like a clique of people who all really study it at a high level?

**Julie:** So, I would say that I'm probably the only truly Entomophagist Anthropologist? There's a lot of people who study insects as a food source, like in primates, or for people, but they tend to study it as one component of the bigger picture. So, what is food for this population? And then bugs are part of it. There are people who have definitely written on insects as food before. I'm far from the first but I'm the first to really dive into it to this detail.

**Alie:** That's so exciting. How do you describe this at cocktail parties? Someone's like, "Julie, what do you do?"

**Julie**: I generally say… Well, it's really funny 'cause it really depends on who I'm with, and if I'm trying to impress them, *[crowd: Ooohhhh!]* and what I think their comfort level with different sciences are. Because my background's really in archeology, I came into this through tool use, understanding how early hominids used tools. So, understanding tools makes me an archeologist.

If I'm trying to sound really cool, I'll be like, "I'm an archeologist." If I'm trying to sound really smart, I'll say I'm a biological anthropologist [*laughing*] 'cause nobody knows what that is. And then if I think that I can use the word 'evolution' without having issues, [*Alie laughs*] I will say I study the evolution of the human diet and I focus primarily on insects. So it's really hard; I have to read the room.

I do a lot of public communication, and I think this very multi-faceted background that I have, and needing to read the room and figure out what to tell people I do, has been sort of a first step in public communication; being able to know what pitch, what sell, what description is gonna work in a particular crowd. I've been doing that for 10 years, trying to explain what I do so I think it was pretty easy to just, kind of, take it to bigger audiences.

**Alie:** And so how long ago did you go from studying tool use to studying bugs, and was there a lightbulb moment when you were like, "You know what…"

**Julie**: I started studying tools first. I was an archeologist as an undergrad. I worked in Europe just because that's where field schools that I could get on to were. And then going into graduate school I had this very philosophical, existential moment of, 'as archeologists

we dig up garbage all the time—that's essentially what we do'; it's what's left behind. And I was like, "Why do we have garbage?" [*both laugh*] It was very existential.

I really wanted… This is gonna sound like a complete tangent, but I used to train horses, and so animal behavior was always very natural to me; I've always been an animal person. And so at some point I wanted to relate humans back to that biological being that we *are,* as opposed to, sort of, this 'elevated god that we pretend to be sometimes'? *[celestial choir, record scratch]*

So that was really the driving question for me going into grad school. I kind of wanted to study the origins of the genus *Homo*, and when did brain size expand, and when did we start having the ability to think these bigger questions? My application was so existential; it was really funny. But I was like, the one thing I can look at is how tools gotten more complex. That is the one thing in the archeological record that I could use.

And then it just became available to me to study these bone tools that are from South Africa, that were demonstrated to have been used to dig into termite mounds. Researchers had done experiments on their own bone fragments to find the best match for the wear pattern on these ancient tools that are about 1.7 million years old and their conclusion was termite mounds.

This came out right before I started grad school. So while I was in grad school… and I had no idea what I was going to do. My advisor was wonderful. He's very similar to me and is interested in everything, and so he was like, "We'll just throw a bunch of things at you and see what sticks." Clearly this existential question, *[echoey] "*Why do we have garbage?",*]* you need to narrow this down a little, but we'll give you the time.

**Aside:** So Julie had the chance to go to South Africa, and she was looking at tools used to dig into termite mounds. And then, because of her love of animals, it got her interested in chimpanzee behavior around termite mounds. She was like, "What is happening with primates and termites?" Primites... Termites. Let's get into it.
I like to imagine her standing on a termite mound, in khaki shorts and dusty field boots, just pumped as hell and then sprinting into a library, maybe.

**Julie:** But the funny thing is, in reading all the work, it was like, well, hominids probably ate termites. Well, what termites? So I started thinking about it, started looking into it, and there's 85 genera of termites in sub-Saharan Africa.

**Alie:** What?!

**Julie:** Yeah! They're crazy diverse and they eat a bunch of different things. We think of 'em as eating wood, but they can eat grass, they can eat soil; and then they're social insects, so they have a caste system, If you eat the queen, that's different than eating the soldier, which is different than eating the worker. So this whole, 'hominids ate termites' just didn't sit well with me. I was like, "That's like, 'hominids ate food.'"

It didn't tell us, really, anything. And so that's where my dissertation went off in an angle I never expected, was to learn more about termites and reconstruct which termite genus

were hominids eating. So that was my dissertation. It all kind of made sense to me, because I wanted to study brain size, and you needed to understand tools and food in order to understand brain size. So it took this turn towards termites that might seem like seem like it came out of nowhere, but for me it made sense at the time.

**Alie:** Did you like bugs before this?

**Julie:** I just liked nature. I was not necessarily a bug lover, but my mom raised me to, like, if there's a bug in the house you get a glass and a postcard and you take the bug outside. And so I definitely had a respect for them that I didn't realize was unique until I started studying them.

And termites are just fascinating. The social behavior of them; they communicate through pheromones; they were spectacularly wonderful to just sit there and read about. It was just something new, and I think that was a big thing. I was studying human evolution, so now to see evolution on a totally different scale. It happens so much faster because generation times are so much smaller and they get so specialized. And the termites that chimps eat and, the ones I focus the most on, are fungus farmers.

**Alie:** Oh my god! How do they have their lives together so well to farm?

**Julie:** I know! [*laughs*] They're architects. So they build these nests, so that the heat and everything can be regulated, it has chimneys; so they're architects. And then inside that structure, they have a symbiotic relationship with fungus. The termites don't even eat their own food; they harvest food, bring it into the fungus, that digests it partially, and then the termites eat the by-product. I mean, they're just endlessly fascinating.

**Alie:** I can't keep a house plant alive! How are they doing this?

**Julie:** They're so much better than us. They're much more talented. [*laughs*]

**Alie:** And how many termites would an ancient hominid have to eat in order to be healthy, and have enough protein, and really be satisfied?

**Julie:** I did some calculations where I said if they're eating 100 grams of termites they'd be getting a really significant of the protein that they need in their diet.

**Aside:** Quick question. How many termites is 100 grams of termites? I had to look this up because, one, I live in metrically-challenged America, and two, who would know this? Probably not even termites.

So the average weight of a fresh termite is around 2 milligrams. And of course this varies species to species, worker to worker. But it would mean 100 grams of termites is about 50,000 termites. And the average colony size? Looked it up, it starts at around 60,000, but it can go up into the millions.

So, termite fun fact, they outweigh humans on planet Earth by about 100 million tons. So termites: They roll deep. And probably every termite in the world has more friends than you. Or me.

**Julie:** And I think that, based on some observations from chimps, sitting at a termite mound for an hour and kind of fishing and pulling 'em out, you could get about that much. It's a concentrated hour, it has to be probably a good, active mound, for that day, but yeah, you can get quite a bit with just a little bit of effort. *[Bing Crosby sings: On my door I'd hang a sign/Gone fishin']*

**Alie:** And what kind of tools do chimps use? Do they just dip a stick in there, kind of like it's a corndog batter or what?

**Julie:** [*laugh*] It's amazing, actually, how refined the tools are.

**Aside:** Some chimps will use a long blade of grass, or a stick that they strip of leaves with their teeth. And just like there are regional cooking trends, like how an iced oatmilk lavender vanilla latte might be easier to come by in LA than maybe Oklahoma, which hosts a festival dedicated to eating bull testicles, different chimp populations have different strategies and perhaps preferences.

**Julie:** But some run it through their pre-molars, so it shreds, and then that one blade of grass turns into a lot of, basically, hairs, which increases the surface area, which means more termites can attach to it.

**Alie:** Oh my god**,** like a feather duster.

**Julie:** Yeah, it's like a mini broom. So the termites they're going after with this method are the termite soldiers, and these are the Macrotermes termites. Macrotermes have more of a mechanical defense. So the soldiers have pincers, and because the soldiers don't reproduce, they're actually a dispensable caste, so the pincers are pretty unilateral. They bite and they don't let go. That's why they can then drag 'em out of the mound, 'cause the soldier does its job; it attacks the breach in the mound and then doesn't let go, and the chimps can drag 'em out.

**Alie:** Ohh! Boned by your own defense.

**Julie:** Yes! Chimps have spectacularly worked around this. What people do is they did a hole into the mound, and dip a whole broom in. It might just be from the vegetation, grab handfuls of grass, and so it increases the surface area so you just get all these termites out in one big dip. That's basically what the chimps are doing when they're running that grass through their teeth and fraying it; they're increasing the surface area.

**Alie:** And how long did you study this before you, like, dipped into a mound, like, "Let's pull up a chair?"

**Julie:** Let's see. I started grad school in 2004, and it was 2008 that I was doing my dissertation fieldwork. My PhD advisor told me that I was not allowed to come home from Africa without being able to tell him what a termite tastes like *[Alie laughs]* and I was *not* excited about this. I was squeamish. I think I got out of it one year. I think he told me that in 2007, and I came home without doing it, but I had also gotten malaria in 2007, so I was a little scared of insect-borne illnesses! I didn't feel like eating a termite. And that's

just my justifications and post-rationale. I just didn't want to eat a termite, and I made an excuse.

**Alie:** Did you get a pass, though?

**Julie:** So in 2008 I was *not* allowed to come home without... So, I ate one termite off the stick, straight out of the mound, bit it right away, and it just tasted like dirt. I was all squeamish. It tasted like dirt, 'cause there was probably more dirt than termite. *[both laugh]* It wasn't until 2014, I'd say, that I started eating bugs.

**Alie:** Oh, so relatively recently? So it took you like another 6 years to really be like, "Okay, alright. I'm studying it."

**Julie:** Yeah, so I was totally just studying it for academic purposes. This was not something I thought was gonna save the world. And fortunately by the time of my dissertation, I had the internet, and I could google things. I would google 'edible insects', or 'edible termites', and I would see things come up about people who were saying insects were a sustainable future of the food.

But all of the clips were kind of… facetious, almost? A lot of times it was somebody who *was* serious about it, but then the reporter was kind of mocking it. *[anxious female voice: "I can't! I can't do it! I can't do it! I can't do it, I'm sorry, I can't!"]*

So that was sort of my first introduction into it, and of course, the reporter was telling me these people were crazy, so of course I thought they were crazy. So I never really gave much more thought to it. Then in 2013, the UN Food and Agriculture Organization came out with a big statement detailing the benefits of insects as food, saying if we need to feed this growing population, the 10 billion that we're supposed to have by 2050? We need to start rethinking food.

And so they offered insects as an option and it got a lot of media attention. I was at that time already preparing my book. I was in talks with editors about a book on edible insects and human evolution. I was just gonna reconstruct the insect portion of the hominid diets, and I was really gonna focus on the female forager in hominids.

And then this UN statement came out, and I was like, "Oh, I can now frame this. This now matters!" And it came out and I saw also on the statement that there wasn't a social scientist; it was entomologists, and agricultural scientists, and people who worked with the UN; wonderful, amazing, smart people, but there was very little appreciation for the cultural sensitivities of this, and why don't we eat bugs here, and that's really rooted in a deep colonial history.

And so I realized that I knew a lot about edible insects, I was an anthropologist, I had a lot I could offer this conversation, and so I stepped up, and I started going to conferences, and I started reaching out to these people. I hosted my own conference, I brought everybody to Detroit in 2016 for the first US-based conference dedicated entirely to insects as food.

**Aside:** So, some seminars at last year's *Insects as Food* conference include: *Ethics for Insect Eaters; Eating Insects in Western Culture: A Unique Approach*; and my favorite, one that I would very much like to crash in the future, *What's Hoppin'? Impact of Edible Cricket Consumption on Gut Microbiota in Healthy Adults: A Doubleblind, Randomized, Crossover Trial.*

If you ever lament that Americans only care about scandalous tweets and cable programs featuring catfights over trays of champagne, just remember, somewhere, maybe in a Detroit ballroom, people are gathered to save the future, one cricket-studded scone at a time.

**Julie:** And so that statement was really that sort of moment of calling, that I can do so much more than what I'm doing.

**Alie:** Did you, kind of, get butterflies in that moment—no pun intended—realizing that, "Oh, this is my perfect 'in' for this; I'm gonna be the person that does this?"

**Julie:** At first I just saw it as this strategy, like, "Oh, maybe I'll get a job," because there's people interested in bugs. It was my first thought, and then it became my crusade. Then I was 100% on board and, "This is what I'm meant to do."

And now I'm like, "Everybody needs to make sure their work matters." Start from the beginning when you come up with your project; figure out how you can take it out to the world and to the communities and show that it matters. It's important to understand early hominids, and knowing where we came from is really cool and really fun, and people love to know about it. But the best way to tell them about it is if we can sneak it into a climate change discussion, or a food-security discussion, or a population movement discussion. All of these things that really matter today, if we can frame these questions like that, then people will hear us more.

**Alie:** And as an anthropologist, walk me through, in what cultures, it's not okay to eat bugs. Because I feel like it's really inverse. Or maybe not?

**Aside:** So there are more people on earth who eat bugs than who don't, right?

**Julie:** Yes and no. It's hard to calculate the numbers. But a lot of people eat bugs. More countries have cultures that eat insects than countries that have zero insect consumption. The people who don't eat bugs are really "The Western world," because Western's really hard to define.

Basically, Western is Europe, and then the areas around the world that've been continually impacted through colonization and continual migration. That leads us to the United States and Canada especially, but Australia and New Zealand can get designated as Western. But countries like Mexico and South Africa that *had* European colonization, and some European migration since, we don't always call them Western, but the cities are Western.

If you look at Mexico and South Africa, they don't eat bugs in the cities. It's a rural thing. It's in the cities that got Westernized and globalized and play on that economic and

political scale. But then the rural areas have been much more where the traditional foods have lingered. It's all unique, the colonial history of each of those countries.

And so it's a very Western idea to not eat bugs. That was where my research took a turn, and I wasn't expecting this. I wanted to understand that more. The first thing I thought was, if Western is stemmed in Europe, then I was thinking human evolution and the first hominids in Europe, or at least the Neanderthals who were well established in Europe, it's like, "Okay it's the Pleistocene, that's the Ice Age. They probably weren't eating bugs." And so if we trace our ancestry in Europe all the way back to Neanderthals, the very first occupants were not eating bugs.

**Alie:** Ooh! I have never thought about this! This is exciting.

**Julie:** And so the way you make life for yourself in these northern latitudes is, you have to eat meat, because we can't eat the bark off the trees, or the dead grass under the snow, but you can eat the deer that can eat those things.

**Alie:** Were they not eating bugs because it was too chilly for bugs, or why weren't they?

**Julie:** Both. I think for the majority of the time, they wouldn't have been available. Think of snowy, glaciated Europe. In the lower end of their range, below the glacial cover, or in the seasons, in the summers, there might've been insects available, like a swarm of locusts that came through *[Homer Simpson: "Locust. Mmmmm"]*

They might have appreciated a reprieve from needing to hunt that day because there were locusts. But at the same time they would've been nutritionally redundant because insects are animal foods. They offer us pretty much the same things meat does. So, if Neanderthals were super great at hunting the insects wouldn't have necessarily offered them much.

And then I look through European history, and there are instances of people writing about eating insects in Europe, but it wasn't very widespread. And that started making me think that's it's a latitude, it's an environment thing. So with basic statistics… There's this great database of number of insect species consumed per country that came out with the UN statement. So I used that, and using basic statistics I was able to show that insect consumption follows latitude. It is a much more tropical resource, and as you leave to higher latitudes insect consumption reduces.

**Alie:** Oh my god.

**Aside:** So it's colder, fewer bugs chilling on branches, like, "Hello, I am a tiny, crunchy hotdog for you." So people eat fewer bugs, that gets passed down for generations; so simple. This is so simple, but it blew my mind.

**Julie:** So there's a very strong environmental signal, *but* that doesn't say why we hate insects, right? Just because you're not in the right environment for them, and you don't eat them we shouldn't have the super-strong negative responses that we do.

And so then I started thinking, well, if you're in Europe and you don't eat bugs, and then Christopher Columbus travels to the Caribbean and travels across the latitudes in a way

that's never been done before, and ends up in the tropical islands and sees insect eating, what's the response?

And so I was like, I wonder if there's anything in letters. Are there any journals or… And oh my gosh! There's a companion of Columbus who's like, "They're beasts for eating bugs! I can't imagine anything more beastlike than these people who eat the grubs and the spiders!"

These immediate negative reactions, that's what goes back to Europe, immediately "othering" this population, which they needed to do and wanted to do because they wanted to take their land and enslave these people to take care of their plantations. So, I read it as propaganda; the more we can talk about these people like beasts, the more we can treat them like beasts of burden, is how these letters came across to me.

**Alie:** Wow. Christopher Columbus—what a hater.

**Julie:** Right? Every Columbus Day I'm just like, "This is so awful."

**Aside:** Kind of like sending food back because it has shards of glass in it, Columbus Day has been swapped out in many cities and states for Indigenous Peoples' Day. Now, this is in part due to the efforts of Lynn "Smokey" Hart, who is an African American and Lakota civil rights activist, and a rodeo hero of South Dakota, who lobbied for his state to change the focus of the holiday, as well as to recognize Martin Luther King Jr. Day.

Now, did I google him and watch a trailer for his documentary, *Just Bucking Crazy*? And then find and follow him on Facebook? I sure did. And so can you. He seems cool as hell.

Anyway, Julie's research about why some cultures are freaked out by bugs continued.

**Julie:** So then I was looking into psychological disgust and, basically, a 2-year old will put anything in their mouth. We have to teach kids what's sanitary, what's gross, what's disgusting. But when we teach it to them while their brains are developing, it then becomes programmed. They grow up to think that garbage is gross and toilets are gross.

If we go, "Eww, don't put that bug in your mouth!" they think bugs are gross. And so we can take our cultural stigmas and turn them into real disgust mechanisms if we train them to our kids at young ages.

Getting over this is going be a generational change. It's going be changing our attitudes towards kids putting a bug in their mouth and being like, "Nonono, not that bug; that one's dirty. Let me go get you some crickets that were farmed at a facility just for human consumption."

That's the change I think that needs to happen for this to really take off.

**Alie:** How often do you have to cite the change in attitudes toward lobster in your work?

**Julie:** Right? Oddly, I don't. It might be my hipster thing, like, "I'm not gonna cite the thing that everybody else cites." [*laughs*]

**Aside:** Okay, I'll take the hit; I'll be the uncool one to throw this in, but lobster, which by the way gets its name from the Old English word for spider, used to be food for

the poor. Just a shameful dish. So, lobster would wash up on New England shores in piles; sometimes 2 feet deep, and it was fed to orphans and indentured servants. There was even a law that prisoners shouldn't be subjected to it more than a few times a week. Anything more would be torture.

And then the railroads came along, in the mid-1800s (see the Ferroequinology episode). And they figured, "These idiots out West, they don't know that this is trash food! Let's pretend it's fancy!" And so we out West loved it so danged-tootin' much that lobster became more scarce. We were just gobbling it up. So the price went up, and now eating these scavenging seabugs is still a marker of luxury.

Soon, this will be the fate of cricket burritos.

**Julie:** What also gets cited a lot is sushi, actually. So lobster's great, but the thing is, because we tend to shell the lobster, they still don't associate it with a large arthropod. But now it's reached such an elite status that now they forgive it when it is a full lobster.

But it is amazing how we can just have one opinion about something that is huge and stares at you when it's on the plate *[woman's voice: "A lobster is an excellent choice"]*

But the thing that we do talk about a lot is sushi, because raw fish was disgusting. But we got over it. And it took hiding that raw fish in the rice, in a sushi roll. And before even getting to the raw fish, using avocado, that had a similar texture, using the California roll.

And so grinding up crickets or mealworms into a powder, that you can't see the eyes, you can't see the legs, you don't legs get stuck in your teeth. You can put it in things, like protein bars or chips or cookies, or just put a scoop in a smoothie, making it familiar, making it foods we already eat, making it fit our lifestyles. I think that's really the way that this is gonna take hold here in the United States.

**Aside:** Some other bugs that might make an appearance on menus of the future: beetles, caterpillars, bees (dead, of course); locusts; grasshoppers; stink bugs; and perhaps even flies. Those that feed on cheese taste like cheese. Hmmm? Yeah?

Your old Dad Ward right here has eaten grasshopper tacos, graciously prepared by lepidopterologist Phil Torres. Plus, a whole menu of other bugs, which we'll get to later. Just admit it, [*[helium voice]* you're intrigued.]

**Alie:** When it comes to getting Americans and the westernized world on board with crickets, do you think that with climate change being such a pickle, to put it mildly, do you think that's what's gonna push people over to try things?

**Julie:** I'd hope so, but actually what we're seeing now… Gosh, 2013 was five years ago, so we've had five years of people being really excited about this stuff, so I'm not the only one. I had 200 people at my conference in 2016. There are a lot of us working on this. The thing that we're seeing - a lot of the data's coming out - is telling people it's environmentally friendly is not getting us anywhere.

**Alie:** Really?

**Julie:** Yeah.

**Alie:** I thought that would be such a draw!

**Julie:** You'd think so.

**Alie:** I mean, I ate a cricket bar in the airport a couple weeks ago, and I was like, "You know what? This is better than eating beef jerky!"

**Julie:** And it's not that it's not drawing *some* people in, but it's just not drawing in the numbers that are going to make the change. And there's been a lot of people saying this since day one, and I absolutely believe it to be true, is they just need to be so delicious that people need it. [*Alie laughs*] Like, they *need* to try that whatever cricket thing. *[Martha Stewart: "Delicious!"]*

And that requires having chefs, and food scientists, and everybody on board to experiment and come up with these amazing, delicious things. Because in my opinion, no protein bar's really that good. We eat them 'cause we have to, it's convenient, it gets us the protein we need right after a workout, or we forgot to eat.

You have protein bars that taste better than others, but they're not candy bars.

**Alie:** They're not Snickers!

**Julie:** No. They're just not. [*laughs*] And so those aren't gonna change the world. I think they're a wonderful opportunity, I think it's great that they're there, but what we need is… I don't know, just that thing that everybody must have because it tastes so good.

**Alie:** Like popcorn crickets or something? Deep fried something?

**Julie:** Exactly. Make it unhealthy, just to get it on board. Crickets do have their own unique flavor. For the most part, most animal proteins we just cover it up with seasoning and flavor anyway, but there is a flavor in crickets that's… unfamiliar.

**Aside:** So according to bug chef Aly Moore, not to be confused with me, Alie Ward, crickets taste like popcorn or nuts. And Aly's site, Bugible.com, has a whole list of bugs and their flavors. She also throws bug and wine pairings and insect dinners. So you can find a link on Bugible.com to her chef site. She is a human delight, this Aly Moore. And, having eaten her bugs, she's a great chef.

**Alie:** So, what are some beginner bug-eater strategies?

**Julie:** Finding that deep-fried thing that gets everybody on board and makes everyone more familiar with that flavor, and then you're more willing to use that flavor in other areas of your life.

**Alie:** And in terms of the environmental impact, if that is motivating; maybe you're trying to cut down on your red meat consumption, your factory farming, and you wanna go, as you said in one of your talks, to eating tiny animals, [*Julie laughs*] as opposed to bigger animals… I love that you referred to them as tiny animals, because they are just…

**Julie:** They're just animals! They're just very tiny animals!

**Alie:** But if you were to try to sketch out the difference between eating 100 grams of insects versus 100 grams of meat, what is the difference environmentally? What are we talking?

**Julie:** Oh, my gosh. Maybe this is my Detroiter in me. Actually I think it was my husband, who is from Detroit, who gave me this metaphor originally. Thinking about the scale of the different livestock; cows, to pigs, to chickens, to insects, they're very similar to the fuel efficiency of different vehicles on the roads.

Cows are your very large trucks that are just eating up resources and the turnover on that is awful. *[long low 18-wheeler* horn*]* And then, pigs might be your SUV, *[slightly higher and shorter SUV horn]* and then chickens might be your sedan, *[short car horn]* and then crickets are your smart car. *[Road Runner beep beep!]*

Everything scales with size. So the smaller you get, the more efficient those animals are at converting the feed you give them, converting that to energy and nutrients for us.

**Aside:** I'm gonna repeat that, because it's my podcast, I can do whatever I want, and also because it's important.

> *Everything scales with size. So the smaller you get, the more efficient those animals are at converting the feed you give them, converting that to energy and nutrients for us.*

Y'all, boom. We can't each drive a Mack truck around town to run errands. It's not a good look.

**Julie:** So crickets and insects are at the absolute smallest end of that scale. The most striking numbers, the one I definitely have in my head, is the thousands of liters of water it takes to cultivate traditionally raised livestock, and then insects are 50 liters of water.

**Aside:** So according to one cricket retailer, ChirpsChips, one pound of beef takes 2,000 gallons of water to produce. A pound of whey protein, 1000 gallons; one pound of lentils, 700 gallons of water. A pound of eggs takes about 375 gallons of water to make: soy, 215 gallons of water per pound. But a pound of crickets? Are you ready for this? I don't think you are. One gallon of water for a pound of crickets. *[male voices: "Just one?" "Just one."]*

Of course, every farm's a little different, those numbers are broad, but if we start to dress in tuxes and just belly up to all-you-can-eat cricket buffets, will it stay sustainable?

**Julie:** When we scale up crickets to the level of producing chickens, how efficient are they gonna be? That is an important question we need to ask that people are working on. But in general, just their physiology as biological beings, is more efficient than any of the other livestock we eat.

**Alie:** Is there any flimflam about eating bugs that you would want to debunk first and foremost?

**Julie:** Disease vectors is one. People always think they carry diseases, and they don't, unless they're exposed to them. When I offer insects to people, or the insects I eat, are produced at facilities just for human consumption. Those facilities are clean to the

standards of anything, whether you're processing cheese, or vegetables, or meat, there's a certain standard of cleanliness that we have to have in our food production facilities.

And so as long as you get your insects from there, you don't have the contaminants. As opposed to if you're wild-foraging insects, you don't know where they've been. You don't know what runoff they went through, or any of the contaminants they could have walked through.

But when they're produced at a facility for human consumption, there is nothing, there is no vector in the insect themselves. If they're not exposed to any of our pathogens then they're completely safe for us. So that's one of the things. I think people think of them as disease salient, as vectors, and they're really not. We have much more issues with romaine lettuce, for instance, than we do with crickets. [*both laugh*]

**Alie:** Romaine! It's true!

**Julie:** The sad thing is, we're scared of romaine or spinach, it's always spinach, but it's all just coming from the pigs. It's runoff from the livestock going into those fields. That's where the contamination is coming from, or from cows. It's our meat that we're eating that's producing that. It's not the lettuces' fault. And crickets aren't producing that.

**Alie:** Yeah. There's not just rivers of cricket shit just going into fields. [*laughs*]

**Julie:** They produce this fine, powdery… it's called frass.

**Aside:** P.S. Frass is bug shit, which sounds [*slowed down*] so cute!*]* It looks just like sand, or tiny seeds.

**Julie:** And it's easy to deal with. It's a great fertilizer. It's not that disgusting, toxic stream of shit running down the road, you know?

**Alie:** And what about cockroach milk? I'm fascinated by this.

**Julie:** *I'm* fascinated! I've not had it, I don't even know if I *could* have it. I don't know where to get it.

**Aside:** Okay. I looked this up, and you can't buy it at Whole Foods, or anywhere, yet, but it's a crystalline substance. It's produced by mama Pacific Beetle Cockroaches, and it has triple the nutrition that cow milk has by weight, and it looks like silver glitter. According to one researcher, it tastes like any other milk. But once again: Cockroach Milk. The future.

**Julie:** But to me it was just fascinating… It doesn't bother me at all. I wanna try it. In the Bible, when they're talking about manna from heaven, and it's associated with insects; they're not eating the insects themselves, they're eating a secretion. The locusts secrete a sugary substance, and in translations, that is thought to be the manna. And so when I read about this cockroach milk, I was like, "Oh, they're producing a sugary excretion; it's manna!" And it made me excited to think about it.

Now, I could be wrong, it's been a while since I read the paper about this cockroach milk, but it's a sugary secretion that I believe the cockroach mother uses to feed her

young. I'm pretty sure it's a food source, 'cause why else would she be producing a sugary secretion?

It made cockroaches more relatable, because mom is taking care of her kids in a way that we do, and that our mammal relatives do, and so it actually endeared cockroaches much more to me than I had before, when I started thinking about cockroach milk.

**Alie:** I mean it's just funny that we eat cheese all the time, from so many different mammals, but then the idea of like, "Uhh! God, no!" from a cockroach. What we will eat the secretions of varies so much.

**Julie:** "Gimme a glass of milk!"

**Alie:** Yeah, without even thinking about it. So what insects have you personally eaten? And how were they?

**Julie:** I've had crickets and mealworms the most, because that's what's farmed here in the US. I've had a lot of termites, which are my favorite, because I've had them the freshest. Besides live from the mound, I've had them straight from the mound, boiled for a minute, salted, consumed, and they tasted just like popcorn. It was *delicious.* But I always like to put this little asterisk caveat, is that termites are kind of like mini cows, and they produce a lot of methane. *[a cow moos, then, with no sense of propriety, belches and farts]*

And so for as delicious as termites are, I really do not ever want to see them scaled and produced on a large-scale production for human consumption, because we're just going to run into the same greenhouse gas issues that we do with cows.

**Alie:** Why are they so farty?

**Julie:** It's because of digesting cellulose dense… When you break down really dense cellulose matter, whether it's wood or grass; that's what cows are doing, and so it takes so many levels of digestion, and the symbiotic relationships with the bacteria that breaks it down. So it's really the bacteria in the guts that's creating the gases. *[Bronx raspberry-like fart]* They have a very similar diet to cows, and so they produce a very similar byproduct.

**Alie:** Oh god! So maybe those would be at the bottom of your bug list?

**Julie:** Yeah. They're delicious, but get 'em in a marketplace when you're traveling. And surprisingly, I had a June bug. And June bugs are creepy, 'cause they hit you in the head, and they're basically like a little flying helmet; they're just solid! But it was a nice crunch to eat, actually! [*laughs*] It was a very pleasant crunch. [*crunch*]

**Alie:** You eat the shell?

**Julie:** Yeah. They were whole.

**Alie**: Okay! It's like a soft-shell crab! It's like a spider roll.

**Julie:** Yeah, and the other thing is, thinking of chitin, of the exoskeleton, as animal fiber. We're kind of obsessed with fiber in our diets, because it fills us up without giving us excess

calories, and it keeps our digestive systems moving. If a large cat is eating a gazelle, it's the bone and the cartilage, and that's fiber for them. The same thing that cellulose is in our diet is fiber, bones and everything is fiber for these carnivores. And so it started making me think of exoskeletons as animal fiber. It's a beneficial part of the diet.

We do have chitinase in our system. We do have the genes to produce chitinase, which is the enzyme necessary to break down chitin. We don't really have a great idea of how much energy we can extract from it, and so for a long time I was like, "Oh, we don't really know, maybe insects aren't as good as we thought, because maybe we're not getting as much protein or energy, 'cause we don't know how much chitin we can break down." And then I started thinking, "It doesn't matter how much chitin we can break down. We need the fiber anyway!" It's still a useful resource to have that. So yeah, June bugs. Great source of fiber.

**Alie:** What about silkworms, or…I'm trying to think of the things I've eaten. I've eaten Water bugs.

**Julie:** Oh, I've not had a giant Water bug! Those are *tough*.

**Alie:** Those were a little tough. It was just the meat of it, and it was cold. It tasted a little bit like bananas.

**Julie:** Oh, interesting.

**Alie:** Scorpions tasted like amaretto. They tasted like marzipan to me.

**Julie:** Oh, yeah! Scorpions have a very weird, like, sharpness to them, too. I don't know what the word is.

**Alie:** We'll just say *unctuous.*

**Julie**: Unctuous. Sharp. Scorpions were surprising to me. Again, a flavor I had never really tasted before. Amaretto is pretty interesting, or more almond. But I feel like it had… Gosh, I wish I had a word for this.

**Alie:** Like a tannin?

**Julie:** Like a tannin or a tang that just resonated for a while? I felt like it stayed with me, and not in a bad way, but just in a very different way.

**Aside:** Some other folks describe scorpions as fishy, like a little shrimpy, and again, chef Aly Moore says they're her favorite. To her, they are beef jerky.

**Julie:** Silkworm is delicious. I've had it mostly in soups, and what I liken that to is if you have bubble tea. [*laughs*] Finding silkworms in the bottom of my soup is like getting the bubble in my bubble tea, through the straw. To me that's what silkworm larvae is like.

**Aside:** So what else has Julie, um…grubbed? [*slowed down*] Oh boy.

**Julie:** Japanese beetles, which were just less crunchy June bugs; oh, mopane worms are common in South Africa. I don't really like them. I've eaten them because I have to, but

they're kind of weird. They're hairy caterpillars, and when you cook 'em, the hair kind of singes off, but it's still kind of, like, particulate.

**Alie:** Little bristly, there?

**Julie:** Little bristly. And the flavor, they're just very grassy.

So yeah, mopane worms is not my favorite. You make them in a tomato sauce, and similar with everything else, if everything else around it's delicious, they're just a vehicle for getting the rest of that good stuff in your mouth. But the worm itself, the caterpillar itself, is not my favorite.

**Alie:** I hear that some ants can taste like lemons?

**Julie:** Yeah! And that's the defense mechanism, if they have the formic acid defense mechanism. They get that real tangy, lemony affect from them. But their eggs, escamoles is a delicacy in Mexico, which are ant eggs. Ant eggs are eaten, probably everywhere ants are, so in Southeast Asia they eat ant eggs as well.

It's crazy—I've only seen it in a video, but they have a whole frying pan of these ant eggs. And so the ant eggs themselves are only a half a centimeter in diameter, but they fry 'em up and it turns into one big omelet! It looks amazingly delicious! And I've had them in a dip, and they're just kind of savory, and interesting texture, and they're delicious. Ant eggs are really one of my favorite things. But the fact that they're eggs—they cook a lot like eggs, blew my mind.

**Alie:** Oh, that is so nuts! It's just a lot of little teeny tiny eggs!

**Julie:** Teeny tiny eggs! You cook enough of them, you have an omelet.

**Aside:** So this delicacy, aka escamoles, aka Mexican caviar; it's pricey, because the ant eggs are small. D'uh. And they're dug up from the root systems of agave plants. But I hear that it has the consistency of cottage cheese, with a nutty, buttery finish. If given the chance, I would hella try this. Please do not tell the ants.

**Alie:** Do you think that the way to get people to maybe curb their meat consumption is to just scale smaller and smaller animals? Do you think? We're not gonna stop eating animals.

**Julie:** We're never gonna stop eating meat. No. And I think that just being a reducetarian, or a flexitarian, or any of these new words that have come out, which is where I consider myself... I don't eat a lot of meat, but I haven't eliminated meat from my diet, partially because I go to South Africa and they're like, "Here, here's some meat with a side of meat." And it's harder to say, "I'm a vegetarian," and that's just the anthropologist in me. It's hard for me to be like, "Oh, I'm from a country where I have the luxury to choose a vegetarian option, so please appease me, and give me a vegetarian option."

So, I try really hard to make sure that I maintain meat in my diet, because I personally feel awful if I have to ask for something special when I'm traveling. I've reduced my meat a lot, and I think that the one thing… There's been this resurgence of Meatless Mondays. So Meatless Mondays was World War II, just trying to get more resources

available, and having food to send overseas. [*clip: WWII propaganda reel, "With most meat going to feed the biggest army in US history, a series of Meatless Tuesdays went into effect."*]

**Aside:** They changed it to Meatless Mondays, because Ms. They're like, "Oh, d'uh. Meatless Tuesdays is so stupid."

**Julie:** And so now there's been this resurgence of a Meatless Monday, and the thing I think it does, it reduces your consumption of meat by a little bit, but by making yourself go meatless one day, you start exploring. You're like, "Oh, I wonder what seitan tastes like?" Or, "I wonder what I can do with just cheese?" Or, "I wonder what a vegan dish might taste like?" And so it allows you to explore because you need to find something to eat that day that doesn't have meat in it.

And you can eat cheese pizza every Monday too, but it also does encourage you. Like, you might get sick of that eventually, and encourage you to look for something else. So I think insects are one of those something elses. You're trying to find something to just reduce your impact.

Insects are a really interesting option, because there's problems with our soy products, too. You took a green bean [*laughs*] and you turned it into *that*. You turned it into a *burger,* or you turned it into a turkey, and it's like, how much processing and how much energy goes into *that*? And is that really more environmentally sustainable? I know that we didn't hurt an animal, and that's great, but when we're talking about impact of resources, I'm not sure that's necessarily the best option.

So an insect, to me, is all of the benefits of the animals foods, you don't have to over process it to get it. And ethically, crickets, they already thrive in dark and cramped spaces, so to farm them you're not really changing the quality of their life that much, like you are a chicken, or a pig, or a cow, when you put them into confined spaces to raise them in large amounts. So to me insects just represent the right balance.

**Alie:** Do you know anything about the insects' ability to suffer pain at all? Is their ganglia smaller? I'm really reaching here.

**Julie:** That's a really great question. I don't have a wonderfully eloquent answer. Their central nervous system is incredibly simplified compared to a higher order organism. But they will evade pain. If you go in there with something hot, they will move away from it. So they are self-protective, so therefore they do experience pain and negative reactions to stimuli.

So because of that, they are sentient. So there are vegans, for instance, who will not consider insects part of their diet because you are killing lives. I've dabbled a little bit in food ethics philosophy—and this goes back to when I was an undergrad, so I'm kind of reaching here—but I have a colleague I want to work on this with more—but some people quantify minimizing your harm by the number of individuals you affect. So to 'murder' one cow is one life, but it produced a ton of food, and so to eat crickets, you

have to 'murder' many, many lives. So if that's how you quantify your impact, insects are not gonna be the answer for you.

Everybody comes to it with a very different perspective. There are vegans who don't eat milk, eggs, meat, and DO eat insects, because similar to what I was telling you about the soy products and such, there are ethics behind eating soy, and the animals that are killed when we're farming the fields, and the amount of energy that goes into it.

As an anthropologist, we culturally stigmatize meat so much, like, "I am a fervent vegan, and I am going to criticize anybody who eats an animal product." I just criticized the world's cultures. And there's a lot of people here in the United States and around the world, that that's the only nourishing food they have access to. And so to be so demonizing of it, when people need it, bothers me. And so I think a lot of ento-vegans, the people that are really trying to reduce their meat consumption but look at insects as an appealing option, are thinking along those scales too. That this is an important food for people, and it really ticks a lot of the boxes of minimally harming life and the environment if you choose to eat them.

**Alie:** Right and when you kill one cow, you're not killing just one. Think of all the microbes, and mites, and ants, and insects that live on the cow that you also just killed. What do you determine is life? We're filled with trillions of lives.

**Aside:** How one determines a life might be personal, but according to some models of biology, and you may have learned this in school, under the device MRS GREN, a life must involve movement, reproduction, sensitivity, growth, respiration, excretion, and nutrition. Although NASA's astrobiology institute defines life as a self-sustaining chemical system capable of Darwinian evolution.

So, we're constantly killing things, just by breathing them in and washing our hands and cooking our vegetables. And not to get too existential, but we're really, maybe, no better than a dirty turnip, only to be uprooted to death and roasted, sacrificed alongside innumerable silent, tiny creatures that relied on us for life.

Isn't that liberating though? Nothing matters. Tell someone that you love them; sign up for ukulele lessons. Live your life. Wear clothes you're not supposed to. We're all gonna die.

P.S. Before we do, how much protein do we need in a day? Much less than people think; only about 50 grams a day for the average person.

**Julie:** And you read protein shakes and it's like 50 grams! And it's like, why? You don't need that. Most people over consume their protein.

**Alie:** I'm sure there's some brosefs out there that are like, [*dude voice*] "Minimum 200 grams a day! By breakfast!"

When someone is like, "Okay, I'm gonna do it, I'm on board, I wanna try it," what do you suggest? Do you suggest that they go online and get cricket flour and start putting it into their cakes and such? What do you think?

**Julie:** I think that experimenting with the powder yourself is a great way to start. For me, the very first thing I did was put it into a cake, so I take about ¼ of the white flour and I replace it with the cricket powder, and then the cake has a little bit nuttier of a flavor and otherwise you would not notice any different. Yeah, side by side taste tests you could tell, but just serving a piece of cake, most people generally can't tell.

**Alie:** Surprise! [*DJ airhorn*]

**Julie:** So that's actually where I started. I wish I drank smoothies for breakfast. I don't. I've tried. I need something to chew in the morning. But a lot of my colleagues that are very committed insectivores put a scoop of cricket protein powder into their shakes in the morning, or their smoothies. So that's a great way. If you're already using a protein powder, just trying to replace it with the cricket powder instead. If you eat protein bars, give cricket protein bars a try.

My favorite product—people always ask me how many bugs I eat—how much do I eat bugs—and I truthfully don't. Like I said, I wish I drank smoothies, because then I'd eat a lot more. But the one thing I do eat regularly are Chirps Chips, which are tortilla chips. They advertise it as one cricket per chip. It's so cute. It's so great. But they're delicious! They're just heartier tortilla chips. They have sriracha flavor… They're just heartier Doritos. They're my favorite. That's how I eat my bugs.

**Alie:** A Doritos-adjacent tortilla chip.

**Aside:** This company by total coincidence had just reached out to ask me about advertising. But I told them that they had legit just come up during the recording of an episode all about eating bugs, so just like, don't worry about paying me. And I did ask if they could hook up any discounts for Ologites. And y'all, I don't make a dime off this, but I just wanted to help 'em out, because they seem like they're doing great stuff, and I figured you might want to try eating bugs.

So if you want to try Cricket Chips, you can go to EatChirps.com and you can order the 5 oz party size bags, and you'll get 10% off using the code Ologies10. So, EatChirps.com. These are the chips that Julie was just talking about. Free ad for them, a few bucks savings for you, and good karma for me. Unless you count all of the cricket ghosts that will haunt my underpants.

**Alie:** Are there any movies or TV shows about eating bugs that you hate or love?

**Julie:** That I hate or love... So there have been a couple of documentaries in the last couple of years, about insect consumption. *The Gateway Bug* is a really good documentary, and it's available on iTunes and Amazon.

*[clip from The Gateway Bug YouTube trailer: "80% of our water goes to agriculture, and over half of that is watering feed for livestock. Put down everything! Like, put down your… Everybody stop what you're doing! Just stop! Let's figure out our water and our food. Whatever you're doing is not as important as our water and our food."]*

The thing I really love about *The Gateway Bug* is it shows the reality of the industry, because it's hard to start a life as a cricket farmer, it's uncertain, and it doesn't work out for everybody who tried it. But we need more. We don't have enough farming for the demand that there is. All of the farms for the most part are supplying the protein bars and the Chirps Chips, so the straight-to-consumer price is really pretty high, because they need their supply to go to their contracts.

So we do actually need more farming, but it's really hard to get off the ground, because it hasn't gone mainstream yet. *The Gateway Bug* really shows the reality of cricket farming, that there's all this potential and all this great opportunity in the future, but it doesn't always work out as you hope it would.

*Bugs on the Menu*'s another documentary. I think that there's a lot out there. There's… on YouTube, it's called *Can Eating Insects Save The World?* You can just stream that and that's really good. He travels throughout Southeast Asia.

**Aside:** Please do not try to write that down while riding a horse or giving someone a close shave. I'm gonna put all the links up at AlieWard.com/Ologies. They're there for you. Dad just wants you to be safe.

**Julie:** So there's lot of things out there, and I think there's less fear-factory type things out there now. It's still there. I still catch it and it just makes me cringe.

**Alie:** I think of an older white due in a Tommy Bahama shirt, hosting a food travel show, being like, [*douchey voice*] *"Uh oh, about to eat some grubs; wish me luck!"*

**Julie:** Yes!

**Alie:** And you're like, "Ewww."

**Julie:** And it's so funny how I hear these things and it just like courses through my body, this rage, of like, could you just keep that opinion to yourself? We didn't need that. We have the great loss of not having Anthony Bourdain anymore, because he was the most amazing food journalist there was, because he was so accepting of other cultures. There was none of that. It was all, "Let's celebrate their food, because people are worth celebrating."

And so, going back and just watching more Anthony Bourdain, and even if he's not eating bugs, just anything that seems weird to us and just seeing it as food was just such a beautiful way of portraying it. We need more of that.

**Aside:** So embracing different foods and cultures, it's not merely a better, fuller way to experience what it means to be human, but also, maybe we can stop the apocalypse by eating more grasshoppers? Okay. Onward.

**Alie:** Can I ask you some Patreon questions?

**Julie:** Yeah!

**Alie:** Okay. Christopher Brewer wants to know: Is bug protein the best protein for muscle recovery? Any idea?

**Julie:** It is good for muscle recovery, just 'cause it has all the amino acids, so it is a complete protein, so it's as good as any for muscle recovery.

**Alie:** Killer. Jordan Werme wants to know: Highest protein insect, biggest bang for the buck in terms of eating the creepy-crawlies? Jordan, let's call 'em not creepy-crawlies.

**Julie:** Yea, stay away from the c-words. [*both laugh*] The only thing I can really give you is from my specific research, but don't eat termites. Don't farm termites. But termite soldiers—so it's really interesting that all the castes have their own kind of nutritional profile—the soldiers are the most protein rich, compared to workers, or the flying reproductives.

So anything in its more adult phase is probably going to have more protein, and anything in its younger phase—like a caterpillar or a beetle larvae—is going to have more fat. So crickets are going to be more protein rich than your mealworms, and mealworms are going to have more fat.

**Alie:** So, from buttery to meaty. Just like us! 'Cause we get sinewy as we get older.

Rosario Neyra wants to know: What are the best bug recipes?

**Julie:** I think that the best thing to do with bugs, for me, to start, is to put them in a taco, because in your taco you have all the things you already love and are super familiar with, so your salsa, and your guacamole, and your sour cream; and so you just toast up your crickets with some chili powder and a little bit of lime and put 'em in there and it's a wonderful place to start.

**Alie:** I've had 'em!

**Julie:** You have?

**Alie:** It's a great crunch. It's like a bunch of little softshell crabs. It was great.

**Aside:** Thank you Phil Torres for that, and for adding cricket powder to your Norwegian wedding cake, which was, I can attest, so good. It was dense, chewy, nutty; I very much regret not stuffing more of it into my purse.

**Alie:** AJ Chlebnik wants to know: Are there any insect fine dining experiences?

**Julie:** There are! In Brooklyn, Joseph Yoon of Brooklyn Bugs does amazing events, fine dining events. That's where I've had his catering. I've had scorpions on crab cakes, and he always is garnishing with caviar, and really trying to make it an elevated experience. So that would be one example. And then in addition to Joseph Yoon at Brooklyn Bugs, Noma in the Netherlands, they have served it at their restaurant, but also they have research scientists specifically that are their chefs, and research scientists that work with bugs.

**Alie:** Oh my god**.** So, easy to get a reservation there?

**Julie:** Oh, easy. Check it out. Tell 'em I sent ya.

**Aside:** P.S. Right after this interview, Julie texted me saying she meant Noma in Denmark, not the Netherlands, and I was like "Girl, I got you. Don't worry." But either way, plan on a few months lead time and, like, $400 a person, if you're going to go to Noma. Otherwise you can google your city plus edible insects. You're bound to find a few places, unless you move somewhere that trends towards testicle festivals, in which case you can order your own ingredients, or pencil in a grasshopper taco on your next big city business trip. Or just move. I don't know.

Ellen Alexander wants to know: Why would eating bugs be better than, say, a vegetarian or a vegan diet? Assuming you're properly meeting your nutritional needs.

**Julie:** That's a really great qualification, to say assuming your meeting your nutritional needs. 'Cause that's the hardest thing. When you're a vegetarian or vegan, people worry about their protein, but it's not protein as it's listed on a label. It's getting all of those essential amino acids. And insects offer you all of those essential amino acids in a one-stop shop, so you don't have to make sure you're pairing all your foods correctly.

But the thing that they do offer is that if your vegetarian or vegan diet is really reliant on those processed foods, if you're eating fake foods that are derived from a vegetable, the processing and energy that goes into that is extreme. Eating insects, they're a whole food, as opposed to those processed foods, so that is another benefit of them.

**Alie:** Lauren Eckert wants to know: Given recent studies showing that insect populations are in massive decline in some areas, do you think insect protein is still a sustainable option moving forward?

**Julie:** I love that question. And yes. I do think it is, because if you're focused on eating the insects that are farmed for human consumption—so the cricket populations at Entomo Farms in Toronto, who's producing them—that's not at all affecting global ecology and insect loss.

For us here in the United States, eating the farmed insects is not a problem. Increasing insect consumption around the world, where it might increase wild harvesting, can potentially be problematic, but I don't think that's going to be the reason why insects go into decline. It's more of the climate, and then the climate change that we're inducing or at least contributing to; that's the problem.

**Alie:** May Jernigan wants to know: I was told by an entomologist that Goliath beetles taste a little nutty, and also a bit like lobster, and have a ton of protein. Is farming beetles like this feasible for future humans when resources are scarce? Those are some big ass beetles.

**Julie:** Those are some huge beetles.

**Aside:** Goliath beetles, by the way, are like the size of a golf ball. They're so large that if one enters the room, it's rude not to say hello to it.

**Julie:** I don't know much about farming Goliath beetles, but Palm Weevil beetles… Palm Weevils are pretty large, and their larva are really large, and actually that larva is the

most consumed around the world, and one that you see the most on Fear Factor. So it's like a 2, 3-inch big, fatty larva. *[male voice: "This is Fear Factor! This is what we do!"]*

And those are already semi-cultivated. How people around the world eat those is, the beetle lays its eggs in a fallen palm branch, and if you're going out and you want palm hearts, or palm leaves, or anything else from the palm tree that you use as a resource, you leave the branch on the ground, and you know when you show up a couple of months later, that a beetle has probably laid its egg there, and now there are larva.

That's how it's consumed around the world. It's already semi-cultivated. So, taking that process and cultivating it is what people are really working on now, especially in parts of Africa that are less food secure, where this is a natural resource for them, where continually wild harvesting could be detrimental. So if they can start cultivating them on site, as opposed to semi-cultivating, is one way that they can then control the reproduction of them and have that continual abundance of them.

**Alie:** Those things are just like little squirming hot dogs.

**Julie:** Yeah, they are. I always think of it as… I haven't eaten one yet. Full disclosure, I've not. It'll be hard for me, but I've heard that they're just big packs of butter. They're just fat, is what they look like to me. But then the little beetle face of them, apparently tastes like bacon.

**Alie:** Do people eat 'em raw?

**Julie:** Most people fry everything up a little bit. And that's the nice thing. They fry up in their own oil. You don't even need to add anything.

**Alie:** Butterball!

**Julie**: 'Cause they're butterballs!

**Alie:** Molly Mickelson wants to know: What are some of the worst-case scenarios if someone were to eat a bug while it was still alive and moving? I guess you wouldn't eat a chicken while it was alive, right?

**Julie:** The thing is it's gonna die as soon as it hits your stomach acid. And probably your esophagus swallowing's gonna crush it. So it's not gonna have much of a life once it hits your mouth.

**Alie:** It's no way to live.

Sophie Cousineau wants to know: A friend of mine is super allergic to all shellfish and claims this means they're probably also allergic to insects. Does that make sense, or are they just trying to find an excuse not to try eating bugs? I think a lot of people had that question.

**Aside:** Aki, Henry Strong, Ryan Moore, Gayle Klassens [ph.] and Sophie Cousineau, specifically, had that question, just for the record.

**Julie:** That's a really great question, and truthfully, we always say if you have a severe shellfish reaction, you're gonna want to be careful around insects. However, I am not sure it's

ever triggered, at least that same severe, like, anaphylactic response in someone who had a shellfish allergy. The thing is, people might have specific insect allergies, so if you're just a person who's allergic to everything, you might not want to try them. To me, there's less concern of allergies because we do consume insect parts regularly. There are insect parts in all of our processed foods.

**Alie:** Now, how does that work? I know peanut butter… Fig Newtons are just like wasp central, right?

**Julie:** So we already eat bugs. If you're thinking about things on an industrial scale… I remember learning about this well before I studied eating bugs. I was in high school and somebody told me about a cockroach that fell into a vat of custard for a Boston cream doughnut at Dunkin' Donuts *["ohhh nooo"]* and you just, kind of, have to scoop up everywhere around that cockroach, 'cause you're not gonna throw out that hundred-gallon vat of custard. That's not economical. So that's why the FDA says, "Oh yeah, some bug parts are fine, because we know you're gonna try to get that whole cockroach out, but you're probably gonna miss a leg." [*"Go on, git! Aww—Oopsie daisy. Oh well"*]

It's not economical to start from scratch every time you think a bug contaminated it. So they've come up with a number of allowable insect parts, and yeah, peanut butter is one of 'em that has a lot; Fig Newtons, because the insects live in those figs and you pick it, you eat it.

And that's how probably most of our ancestral insect consumption started. Our non-human primate cousins eat lots of bugs just by eating fruit and leaves. We have that too, so it means that we have the chitin. We have a lot of insect parts in our system, and our system knows it's not harmful and it doesn't cause a reaction. So, we should be primed to where insects should not cause too many problems. But, everybody is individual, and people are allergic to all things these days.

**Alie:** Olaf Doschke wants to know: If insects taste like nuts, why don't we just eat nuts? I guess we do eat nuts…

**Julie:** We do eat nuts. I would say two things. One, I'm not sure of the complete amino acid profiles of nuts. I'm sure some of them have it, but not all. But two, nuts are pretty water intensive to cultivate. So, actually when it comes to water resources, crickets and insects are probably a better idea.

**Alie:** Good answer. Do we eat any spiders while we sleep?

**Julie:** I don't know. Yes, I'm sure, but probably not the quantity that people think. I don't think as many as the scare tactics say that we do.

**Aside:** I could do a whole 10 minute aside about the research I just did about swallowing spider statistics and the conspiracy theories behind it, but it boils down to: It's a myth. Spiders are terrified of you. They do not crawl in your mouth. You should be so lucky, 'cause free snack. [*helium voice*] C'mon, man!*]*

**Alie:** Greer Nelson has a question: How are the bugs that are sold as edibles killed?

**Julie** Oh that's a great question, and this is something I was gonna mention earlier. The insects will be fasted for a while, so they aren't fed, so they then clear out whatever was in their intestinal system, so you get a clean bug. And then most commonly they are then frozen, so you put them into a freezing chamber; freezer, I think we call them. [*laughs*]

But you put 'em in a freezer and basically they go into a natural state of hibernation. They go into a torpor, and then you keep 'em in there and they will ultimately die. So that is pretty much the most common way that they are killed, slaughtered, right now.

**Alie:** Which when you compare that to mammals and chickens, oy.

**Aside:** So, it's more humane, but is freezing feasible for the future?

**Julie:** That's how it's done most commonly. Most people starting out, everybody has a freezer, it's pretty easy to get a freezer. But as we scale up, that's getting harder. You're losing efficiency as you scale to larger scales. So, farms are looking for other ways that are going to be less humane. And so I want to talk to the farmers and be like, "Okay that's fine if you're scaling up that way, but can we make a certification or something that lets people know that insects are consumed in this more humane way when they are, because that's how we're gonna get the vegans."

Because the vegans, we're on the same mission. We really are. So fighting against each other is so counterproductive. And by having slaughter ethics is a way that we can get more of them on board, and then we can have more of a symbiosis in our goals instead of fighting with each other.

**Alie:** I wonder if running freezers is energy…

**Julie:** Yeah, that's part of it too. A lot of energy, and I think it's the time. I've definitely heard whispers of, "We need to change this as we scale up," and I'm like, "But no! That's one of my favorite things to tell people!"

**Alie** What about people thinking, "I'm just gonna farm my own crickets," kind of like having chickens in your back yard.

**Julie:** Truthfully, I think that's the best idea. I think for actual food security, the best thing to do is to control your own food, and crickets use very little resources. There are both mealworms and crickets at-home farms that you can buy. A Kickstarter right now… LIVIN Farms just launched a Kickstarter for their smaller, easier to manage home farm for mealworms. *[clip from LIVIN Farms. Female voice, "With our hive, you can grow healthy mealworms in a small space in your home."]*

And to me that's where the greatest impact is actually gonna be.

**Alie:** Ah, that's kinda cool. I guess if you have dreams of, like, owning a goat farm, like, you could really scale it a lot smaller than that.

**Julie:** Yeah; if you're somebody who's interested in backyard chickens, who can commit the time to caring for them; the wonderful thing is they eat our food scraps. So you're

cooking, you cut the top off the carrot, and you give it to the crickets. It's so great. And also, eat the whole carrot. Don't just get the processed baby carrots. Just… cut.

**Alie:** That's a good point. [*laughs*]

**Julie:** Let's streamline our processing here, people. Get the whole carrot, peel it, cut off the top, give it to your crickets, and you just channeled your food stream a lot.

**Alie:** And while they're peeling the carrots they can always listen to podcasts.

**Julie:** Exactly.

**Alie:** That's what podcasts are for. Last two questions I always ask. What's the shittiest thing about your job? What's the hardest thing, the most annoying thing? It can be anything.

**Julie:** The hardest thing… And it's so funny because I commiserate with so many academics on this, and I get it, I understand. Our research is funded by grants, we get grants. They're like "Julie, that's a wonderful idea! Here's 20,000 dollars!" It is so hard to use my money! The red tape through universities to have access? I do so much bureaucratic paperwork to prove that I'm using the money how I said I was gonna use it in my grant. It is a nightmare.

And the hardest thing I have to do is wire money overseas. I do work in Tanzania, so I need to send money; the university cannot figure that out. It's the same everywhere. Some are better than others, but in general, it's really hard. You would think, "Oh, you won this grant, you trust me to use my own money." Nope. That is the hardest part.

**Aside:** Even if she's out there nibbling raw termites, I imagine she enjoys being outside way more.

**Alie:** Do you like the fieldwork aspect?

**Julie:** I do, and that's kind of what got me into this. I always tell people that I'm happiest when I'm dirty. [*Alie laughs*] If I can't shower for the week 'cause I'm camping, that's where I'm happiest.

**Alie:** So many microbe friends.

**Julie:** So many microbe friends! And then if we're all not showering, we don't all realize we smell.

**Alie:** Just acclimate the herd. What is the best thing about your job? What do you love so much? Or about entomophagy anthropology?

**Julie:** My favorite thing about entomophagy anthropology is the fact that I get to teach it. I love talking about it, I love teaching my students, I love giving public talks, but I love being able to do so much science outreach and science communication on both human evolution and on food sustainability, and cross-cultural issues and biases. I hit all of these issues that, to me, are so important, with just this little topic of eating bugs.

**Alie:** Tiny animals.

**Julie:** Tiny, very tiny animals.

**Alie:** You're really great at what you do. This is one of my favorite interviews.

**Julie:** Yay! Thank you so much!

**Alie:** Now I'm slightly hungry for crickets.

**Julie:** Right?

**Alie:** I am!

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You can find Dr. Julie Lesnik at EntomoAnthro.org, and I'll put a link in the show notes. She's @JulieLesnik on Twitter, and she and her awesome husband are launching a YouTube channel. I'm very excited for them. It launches in March, it's called *Octopus & Ape*. You can go to OctopusandApe.com now. You can also find them on YouTube; there's already a teaser up, so you can subscribe now and then you'll see the first episodes as they premiere. Already, it's adorable and super well done.

More links, of course, always in the show notes and at AlieWard.com. *Ologies* is on Twitter and Instagram, @Ologies. I'm @alieward on both. For Ologies merch like hats, and totes, and shirts, and pins, and beanies, you can go to OlogiesMerch.com. You can also tag your photos of you in your merch with #ologiesmerch on Instagram. And then I creep those pictures, and I repost them.

Thank you Shannon Feltus and Boni Dutch, as always, for managing that; you guys are awesome. Thank you to Erin Talbert and Hannah Lipow, who manage the very wonderful Ologies Podcast Facebook group. Thank you to Jarrett Sleeper of the *My Good Bad Brain* podcast, and just of general internet charm and hilarity, for some editing help this week. As always thanks to Steven Ray Morris for giving the episodes wings; he pieces all the parts together for me. He is also the host of the *Purrrcast*, which is all about cats. He's gonna like next week's! Felinology, you guys. Get pumped.

Now, if you listen to the end of the episode, you know I tell you a secret. This week I have two secrets. One: Beginning next week there's going to be a few changes to *Ologies*. Please listen to a bonus episode coming out in a few days to hear more about that. Also, another secret is I really want to make and play with Slime, but number one, I don't have any children, and I haven't found a way to make this an activity that I somehow just found myself in the middle of. Also, it seems like such a waste of glue. But I will watch slime videos on Instagram and just be momentarily transfixed. [*whispers*] Like, "What does this squoosh feel like? What's it feel like? I bet it's so good!" And I don't know, maybe I'll make the dream come true.

Can I just be a person who's just making slime for herself? In an apartment? Can I do that? I dunno. Maybe I will. Maybe I should live my dreams. As should you. Happy 2019. Be nice to people. Kick ass. Eat a bug, if you want. Okay, berbye.

*Transcribed by Agnieszka Stachura*

***Some links which you may find of use:***

*Get yourself a lil' mealworm farm*

*Lynn "Smokey" Hart seems hella cool*

*South Dakota: not so into Columbus*

*"Just Bucking Crazy" trailer*

*Oklahoma's "Testicle Festival"*

*Aly Moore describes bug tastes*

*How much water per protein source?*

*The science of cockroach latte*

*Thirsty for details? Backstory of the cockroach milk discovery*

*Seriously though, crystalline cockroach milk looks like glitter, so*

*United Nations is like, let's just all eat bugs ffs*

*Lobster histories: juicy as hell*

*Trains + lobsters = rebranding*

*Scorpions are bit fishy, in a good way*

*NASA defines "life"*

*Watch "The Gateway Bug" (spoiler it's crickets)*

*"Can Eating insects Save the World?" on BBC*

*"Bugs on the Menu" doc*

*Dr. Lesnik's' new YouTube channel, Octopus & Ape*

*For comments and enquiries on this or other transcripts, please contact OlogiteEmily@gmail.com*