

Sawbones 489: Bad Bugs

Published March 12th, 2024

[Listen here on mcelroy.family](https://www.mcelroy.family)

Clint: *Sawbones* is a show about medical history, and nothing the hosts say should be taken as medical advice or opinion. It's for fun. Can't you just have fun for an hour and not try to diagnose your mystery boil? We think you've earned it. Just sit back, relax, and enjoy a moment of distraction from... that weird growth. You're worth it.

[theme music plays]

Justin: Hello everybody, and welcome to *Sawbones*: a marital tour of misguided medicine. I'm your cohost, Justin McElroy.

Sydnee: And I'm Sydnee McElroy.

Justin: Happy Friday to ya, Syd.

Sydnee: Thank you, Justin. Happy Friday to you as well.

Justin: Folks. You gotta understand how wild it feels, as a married couple, to try to improv some like light things that you— [chuckles] We've been talkin' all day, folks.

Sydnee: Yeah, we—

Justin: To pretend that we haven't been— [chuckles]

Sydnee: We've been talking to each other all morning.

Justin: [chuckles] Pretending that we haven't.

Sydnee: And so now we're just sort of...

Justin: Yeah, continuing to talk to each other.

Sydnee: Mm-hmm.

Justin: But now we are recording the conversation, and it will be more medical-centric than our usual conversations, but there's still quite a bit of medicine discussed in our house pretty much every day, so.

Sydnee: Well, you— Like you usually aren't willing to engage with me on it, 'cause I wanna tell you about gross stuff. Or sometimes I accidentally... casually share a story that is maybe sad, or even like...

Justin: Say, "tragic."

Sydnee: Yeah. Or— Well, I was gonna say almost traumatizing.

Justin: A little bit.

Sydnee: I— Like I feel little guilty about it, 'cause I don't—

Justin: A little guilty.

Sydnee: I don't always realize.

Justin: Yeah.

Sydnee: Let's not unpack that here. We don't— You don't need this.

Justin: No, no no no. Basically, Sydnee takes all of her mental garbage and dumps it on my stoop, and then wanders off, not a care in the world.

Sydnee: I—

Justin: And leaves me to sort through the rubbish.

Sydnee: [chuckles] I've gotten better about that though.

Justin: Have you? [wheezes]

Sydnee: I think so!

Justin: [laughs]

Sydnee: I have—

Justin: [snorts]

Sydnee: I have a dear—

Justin: Maybe, let's say I have just gotten tougher.

Sydnee: I think I've—

Justin: Maybe I'm harder to shake.

Sydnee: I think I've gotten better. I have a dear friend in a similar line of work, who I can commiserate and share.

Justin: Right.

Sydnee: Right? So, it's not as bad now.

Justin: It's important to find your people, you know. [chuckles]

Sydnee: But this is where I can talk to you about medicine in a non-traumatizing way. [chuckles] And then—

Justin: That was the original—

Sydnee: And you can laugh at our—

Justin: That was the original subtitle for the podcast. Let's— "Sydnee talks to you about medicine—"

Sydnee: [chuckles]

Justin: "— in a non-traumatizing way."

Sydnee: "And Justin can laugh and learn."

Justin: Yeah, "And Justin can laugh and learn." But it wouldn't fit in the logo.

Sydnee: No. Justin, this is a topic that we created not necessarily for our listeners, but we are also sharing with our listener.

Justin: Yes, that's right. Who did we create it for, Syd?

Sydnee: For the Entomological Society of America, the eastern branch.

Justin: Yes, they were very, very nice to have us to come talk to them about their favorite topic, which is bugs. I'm assuming it's all their favorite topic. Otherwise, it's a wild career pull, but still.

Sydnee: I don't know. You know, you always assume that about people in science. And like it's true about me, right?

Justin: Right.

Sydnee: Like I was passionate about... I always say like, "I like the gooshy sciences."

Justin: The gooshy sciences?

Sydnee: The gooshy sciences. Physics seems not gooshy. It's a more— [chuckles] It's a more sterile science.

Justin: Mm-hmm.

Sydnee: Chemistry can be somewhere in the middle there, and I feel like biology's the gooshiest of sciences, right?

Justin: You know, what science do you think I should have gone into? Like if I had to have gone into a science, what do you think would've gone well for me? What would've been the best science field for me to go into, do you think?

Sydnee: Well, of the three that I just mentioned.

Justin: No no no, of all.

Sydnee: Like without going into— Oh my gosh.

Justin: Of all.

Sydnee: Well. I mean I was immediately gonna say like you love baking, and you like— the reason you like baking is 'cause there's very clear, precise instructions, and if you follow them exactly right.

Justin: Mm-hmm.

Sydnee: You get a predictable outcome.

Justin: Mm-hmm.

Sydnee: That's very chemistry. That's a very chemist— chemical approach to things. It was why like I liked chemistry, I found it fun, but it wasn't my final. I like the thing in biology, especially when you get into medical science, where there's a little bit of unpredictability.

Justin: Right.

Sydnee: Like, "I thought I did everything right, but then woah. Why did that happen?" Chemistry is a lot less like that. Generally speaking, if you do it right, you get the same answer every time.

Justin: We were actually looking for sociology. The runner up was statistics.

Sydnee: Oh.

Justin: That's what we were looking for her.

Sydnee: Okay.

Justin: It was a trivia question.

Sydnee: I wasn't thinking about those sciences.

Justin: It wasn't a thought starter. [wheezes]

Sydnee: You can tell this is— I'm gonna get emails about this.

Justin: I think statistics are fascinating. And I understand them—

Sydnee: Well of course that's science.

Justin: — just enough to be dangerous. Like I— A bad— Someone who barely understands statistics is actually worse than someone who doesn't understand them at all. [wheezes]

Sydnee: It's funny, statistics I think, you could argue, is a very dangerous science in that sense.

Justin: Yeah.

Sydnee: 'Cause you can manipulate it for evil.

Justin: [in a deep voice] Yes, but who would ever?

Sydnee: But of course, if—

Justin: [in a deep voice] Who would do such a thing?

Sydnee: That is true about all the sciences.

Justin: Mwa-ha-ha-ha.

Sydnee: Let's talk about bugs.

Justin: Yes.

Sydnee: This episode, for your entomological friends, is about like a greatest hits of bugs in medicine. We're gonna talk about some bugs and some illnesses we have discussed previously on the show.

Justin: Mm-hmm.

Sydnee: But we're focusing on the top ten most wanted bugs.

Justin: Top ten most wanted bugs. Now not—

Sydnee: From a medical standpoint

Justin: Right.

Sydnee: I'm talkin' about like their relationship with us humans.

Justin: Yes, us people. Us folks.

Sydnee: Right. Number one, you could— I'm gettin'— I'm dispensing with the biggest offender of all, 'cause it's the most obvious, and I feel like we've discussed the most thoroughly on the show.

Justin: Yes. If there's a villain of *Sawbones*, other than humans.
[wheezes] If there's a villain of *Sawbones*, other than people. People are both the protagonist and a villain of *Sawbones*. [chuckles]

Sydnee: Can I tell you— So like, I wanted to confirm that this was still— I don't know why I thought that this would've shifted, the most dangerous animal. The most dangerous when it comes to like...

Justin: Mosquitoes.

Sydnee: Yeah, mosquitoes.

Justin: Mosquitoes.

Sydnee: Right? Like you worry about sharks, 'cause there's movies about 'em, but there should be movies about mosquitoes, 'cause they're scarier.

Justin: But harder to make movies about.

Sydnee: [laughs]

Justin: [chuckles] Inarguably. [wheezes]

Sydnee: [chuckles] *Jaws* would've had a very different feel if it was just one mosquito.

Justin: Yeah, yeah.

Sydnee: Just one big mosquito!

Justin: Yeah.

Sydnee: The size of the mosquito's really not the issue with a mosquito.

Justin: No, no. Any mosquito.

Sydnee: This— It's almost worse that it's small.

Justin: Yeah.

Sydnee: Right?

Justin: It would— Well, if it was a movie about a mosquito.

Sydnee: The size of Jaws.

Justin: And it's notable— I mean, the mosquito has to be notable in some way.

Sydnee: [chuckles]

Justin: Size is a huge differentiator. Maybe it can talk, I don't know, I'm just brainstorming here. [chuckles]

Sydnee: Mosquitoes kill—

Justin: A malicious mosquito, yeah.

Sydnee: — the most humans.

Justin: Yes.

Sydnee: They're— Yeah. They're the worst. By far. If you look at lists, by the way, of the most deadly animals, the savviest out there include humans.

Justin: Really?

Sydnee: We're on there.

Justin: Yeah, we gotta be.

Sydnee: Yeah. So. There you go.

Justin: But maybe—

Sydnee: Anyway.

Justin: But now we almost got a woolly mammoth back. I don't know if you heard about that.

Sydnee: Oh.

Justin: So maybe, you know, the us giveth and the us taketh away. Like we—

Sydnee: We— Are we—

Justin: We may extinct you, but you don't know, if you're really cool, maybe we'll bring you back.

Sydnee: Will bring you back and then it can become one of the deadly— Is that what you're proposing?

Justin: Yes. [chuckles]

Sydnee: Like maybe it'll take over and kill more humans?

Justin: We need a new number one.

Sydnee: Mm.

Justin: And it's woolly mammoths! They're back, baby. [wheezes]

Sydnee: Good, I'm glad.

Justin: They're everywhere.

Sydnee: I'm so glad we're focusing on that.

Justin: [chuckles] Stanley— Woolly Mammoth is the new Stanley Cup.

Sydnee: Mosqui—

Justin: Everybody's gotta have a woolly mammoth. [chuckles]

Sydnee: Mosquitoes are in a class of their own. They kill around 725,000 humans a year.

Justin: [exhales heavily]

Sydnee: And they do that, not because they bite you, but because they spread disease.

Justin: Right.

Sydnee: I feel like that was... understood.

Justin: Yeah.

Sydnee: But I'll say it anyway. The number one problem is malaria, that's the big offender that is spread by mosquitoes. There are obviously a lot of other mosquito-borne illnesses that contribute to their... harm.

Justin: Mm-hmm.

Sydnee: To their danger they can cause, but malaria is the big reason that mosquitoes are so deadly. Mosquitoes may be responsible... for the deaths of half of the humans who have ever lived.

Justin: Woah.

Sydnee: Yes.

Justin: What?! That's so many. [chuckles]

Sydnee: That's so many.

Justin: That's so many people.

Sydnee: Yeah. And I mean, that's like extrapolating out all the diseases mosquitoes can cause, and malaria's impact on society, and trying to tease— I mean like— Yeah, it's not—

Justin: But it's like a lot.

Sydnee: Like the point is.

Justin: It's a lot, a lot.

Sydnee: Mosquitoes are really dangerous. They are so— They have changed— They have dictated the course of human history on multiple occasions. Like you can read—

We've talked about it on the show before, but you can go back and read articles about elections and wars and... I do— All kinds of human events that were drastically altered by, I mean, largely malaria.

Justin: Yeah.

Sydnee: But other mosquito-borne illnesses. And they are so deadly to us that we have debated removing them from existence.

Justin: [makes a removal sound effect]

Sydnee: We've debated intentionally extinguishing them. [chuckles] Because they're that dangerous, which what else have we— I don't think, is there anything else we've talked about, like, "Let's wipe that off the face of the planet? That insect?"

Justin: No.

Sydnee: No.

Justin: But like if I was a mosquito, I'd be pretty freaked out about that. "Honestly, like listen, we've had our fun. Tormenting these people, but like did you see what they did to pandas? And they looove pandas. [wheezes] They're wild about pandas, and they almost wiped them out accidentally!"

Sydnee: Mosquitoes seem harder to get at. We have talked about—

Justin: Yeah. There's probably more mosquitoes than pandas, if I had to guess.

Sydnee: Absolutely.

Justin: [chuckles]

Sydnee: Absolutely. I am not an entomologist, but absolutely. The— We have talked about ways to introduce like knock out genes, making them

sterile basically. Introducing those mosquitoes, genetically engineering mosquitoes that will then breed with other mosquitoes, that will then become infertile and then.

Justin: Boop. Yeah.

Sydnee: We will eventually have no more mosquitoes.

Justin: Mosquitoes.

Sydnee: We've also talked about infecting them with a bacteria called "wobaccia." This automatically infects mosquitoes.

Justin: Yes.

Sydnee: Like they already— Some of them already carry this bacteria.

Justin: Yes.

Sydnee: It can live within them, and it actually does not allow viruses to replicate inside them. So, we could infect them with that little secret bacteria.

Justin: I feel like if you—

Sydnee: And then they wouldn't carry viruses.

Justin: I feel like if we wiped them out, maybe that's the— maybe we win.

Sydnee: We win?

Justin: Like. Maybe that's it.

Sydnee: We think—

Justin: Maybe that's the whole point, that— It's been us versus them the whole time.

Sydnee: There are people whose job it is to study to see if we wipe out all the mosquitoes, will— like will we be okay? Is that cool?

Justin: Is that fine?

Sydnee: That's their question. If you wipe out all the mosquitoes, is that cool?

Justin: Are we cool?

Sydnee: [chuckles]

Justin: [wheezes] Is that alright?

Sydnee: Is that alright? Like what will that do to the, you know, food web and all of human existence. Anyway, so mosquitoes are in a class of their own, so let's talk about some of the other big bad bugs.

Justin: Big bad Beetle Borgs.

Sydnee: [chuckles]

Justin: They're number two.

Sydnee: There is a beetle on here.

Justin: Okay.

Sydnee: Not this. This is an assassin bug.

Justin: Oooh.

Sydnee: What I like is that— Okay, thi— I had to untangle this, because what— When I was looking through the lists of like the big offenders, some of these I knew from our show, but then I wanted, you know, entomologists to weigh in on this.

Justin: Right.

Sydnee: What are the scariest bugs? And I kept seeing assassin bug. Which... is an alias, of sorts, that's like its scary name. And so you need like— it needs to like be undercover and not be so scary—

Justin: Mm-hmm.

Sydnee: To get away with all of its tricks. [chuckles]

Justin: Mm-hmm.

Sydnee: So this is what I'm talking about is usually called the kissing bug.

Justin: But sometimes it's the assassin bug?

Sydnee: And that sounds— But that's the— So okay. The assassin bug can be used for members of the reduviidae family of bugs.

Justin: Ah yes.

Sydnee: Or reduviid bugs. I've also heard them called the reduviid bugs from that. And they— Most assassin bugs in this family kill other bugs.

Justin: Okay.

Sydnee: So, they assassinate other bugs. Which we humans care less about, I'm learning. [chuckles]

Justin: Yeah, no problem.

Sydnee: But there is one that is the cone-nosed bug in this family.

Justin: Okay.

Sydnee: Also called the triatomine bug.

Justin: The triatomine.

Sydnee: And anyway, this is the kissing bug.

Justin: Alright.

Sydnee: I'm gonna call it the kissing bug. And that sounds so, oh it's so cute, it's a kissing bug. It's not cute. It's in the southern US, it's in

Mexico, it's in America, South America, it is not at all harmless because it carries a parasite. Again, most bug's danger to us is through the—

Justin: They can't eat—

Sydnee: The infections, in theory.

Justin: They can't eat us. [chuckles] Unless there's a lot of them.

Sydnee: They could.

Justin: Yeah, in like a lot at a time.

Sydnee: If they wanted to. There's a lot more of them than us.

Justin: Thank you.

Sydnee: But they carry the parasite, or they can, tripanasoma cruzi, which causes Chaga's disease. We've done an episode on this before. Chaga's disease is a very serious disease. It causes chronic illness for thousands of people, around 10,000 a year. It causes some severe heart issues, it can lead to heart failure and death.

The way the parasite is spread from the bug... is partic— I think this adds insult to injury. Like how— Like when you think about how you get something from a mosquito. It's... sucking your blood, and while it's in there, it's leaving behind one of the malaria parasite, or whatever, right? That's how you think about getting something from a mosquito.

When it comes to the kissing bug, the way that it spreads the parasite is that it poops on you. And then that poop gets sort of like ground into the wound that it's created, 'cause it's also biting you, and you like rub the poop into the wound.

Justin: Great.

Sydnee: Or it gets absorbed through like your mouth or nose.

Justin: Oh great, yeah.

Sydnee: The poop.

Justin: Great.

Sydnee: And the poop has the parasite. The bug poop.

Justin: Great, so this is your non-traumatizing episode.

Sydnee: Was that— Was the traumatizing?

Justin: No. [chuckles]

Sydnee: Anyway. And there are a lot of efforts. With a lot of these that we're gonna talk about, we're getting into the realm— Not malaria, but some of these other illnesses, of what we call "neglected tropical diseases."

Justin: Mm-hmm.

Sydnee: And these are— These cause a lot of either morbidity, meaning a lot of illness or, you know, people who are like unable to carry out their activities of daily living as a result. Or mortality, meaning they kill people.

Justin: Right.

Sydnee: And we don't have enough research or efforts to eradicate them, or to treat them more effectively, or to get to the root causes. You know, and there are a lot of efforts being made to like construct houses and things that are not as likely to have the kissing bug nesting in the rooves.

Justin: And you— We're making it unpleasant for them to hang around.

Sydnee: Yeah, try to keep the bugs away, is the main thing.

Justin: Right.

Sydnee: So it's kinda like with mosquitoes, standing water is a big risk.

Justin: Right.

Sydnee: You don't want places with standing water, 'cause that's where mosquitoes lay their eggs and breed malaria, you know.

Justin: We gotta make a—

Sydnee: Yeah.

Justin: Less than ideal to— for them to inhabit.

Sydnee: We're gonna talk about another culprit that carries a similar parasite.

Justin: Okay.

Sydnee: This is another form of tripanasimiasis. This is a— This category of parasites. But this is a different bug.

Justin: The way you can say that is so cool. I would never say that with such confidence.

Sydnee: [chuckles]

Justin: You're amazing.

Sydnee: There are plenty of things I say on the show with less confidence.

Justin: Okay.

Sydnee: So I won't ever brag about that. The tsetse fly.

Justin: Ah.

Sydnee: Which I just said, "the fly fly." I didn't know this. "Tsetse" literally translates... in Swana, one of the Bantu languages that is spoken in southern Africa, literally translates to "fly." So when I say, "the tsetse fly," I'm saying "the fly fly."

Justin: I did not know that.

Sydnee: Yeah.

Justin: That's fascinating.

Sydnee: So, I don't really need to say that.

Justin: I—

Sydnee: We could say the tzetze.

Justin: And then that would be enough, we would get that.

Sydnee: That is a specific kind of fly.

Justin: Huh. Well, look at that, that's good to know.

Sydnee: You could say the fly fly.

Justin: Sure.

Sydnee: That is a pleonasm.

Justin: Pleonasm.

Sydnee: I learned this word.

Justin: Okay.

Sydnee: That's when it's a repetitive phrase.

Justin: Okay.

Sydnee: Did you know that?

Justin: No.

Sydnee: There, I just— That has nothing to do with science.

Justin: "Pleonasm" is what repetitive— Is a repetitive phrase.

Sydnee: It's like saying "tzetze fly."

Justin: Oh.

Sydnee: It's— You're saying, "fly fly."

Justin: Or like... Oh, what's a good example of that?

Sydnee: I always use the example when people say, "Mount Fujiyama."

Justin: Oh yes.

Sydnee: Instead of "Mount Fuji" or "Fujiyama."

Justin: Or "ATM machine."

Sydnee: Yes. Yeah. That's a— Yes, that is a good example. And there are other— Like it doesn't have to be something where it's an abbreviation or a language issue. It can also be like you just said the same word twice.

Justin: Mm.

Sydnee: But different— You said synonyms.

Justin: Okay.

Sydnee: We do that. I mean like you find that in your— Sometimes you'll write something and you'll be like, "Why did I put both of those? I don't need to."

Justin: Mm, like if you said something is "totally unique."

Sydnee: Yes. There you go. Anyway, the tsetse can carry a different kinda tripanosome, brucei, and this is the parasite that causes sleeping sickness.

Justin: Aw, man.

Sydnee: Yeah.

Justin: That's too bad 'cause "brucei," that's a fun name. That one feels a little more avuncular to me.

Sydnee: I don't— We've done an episode on it before. It is almost certainly referencing a guy—

Justin: Named Bruce.

Sydnee: Or, well that's not fair, it could be a last name. So it could be any gender.

Justin: Okay.

Sydnee: We can't assume a guy, but somebody with the name Bruce, almost certainly referencing a Bruce.

Justin: Actually, if someone female presenting went by the name "Bruce," I would think that was pretty cool too, honestly. [chuckles]

Sydnee: That would be. Well, we could be—

Justin: We shouldn't talk too big of a game.

Sydnee: — I could be a last name is my point.

Justin: We get— Yeah.

Sydnee: Yeah, so it could be anybody. I don't wanna assume anything. But yes, it is probably someone's name. This is a very severe illness, it can start with some relatively common symptoms, but then sleeping sickness can progress if untreated to severe neurological disease. And if it isn't treated, it is pretty much 100% fatal.

Justin: Wow.

Sydnee: It's a very severe disease. It's important to catch it early. Because a lot of the treatments that we have for early disease are more effective, and also less toxic. This is one of the big—

Again, when you get to illnesses like this that... I mean there's— It's inequitable. We don't spend as much time and money and research dollars on illnesses that don't affect people who are in the— who are the wealthiest and, you know, who are in the majority.

Justin: Mm.

Sydnee: And so in this case, there's not enough research into late-stage disease, and a lot of the treatments are pretty toxic, and can also cause death. So it's important to catch it early.

Justin: How did we settle on sleeping sickness, do you think, for this? 'Cause I would say, "dying sickness" is probably a more accurate term, it sounds like.

Sydnee: Well, and it's interesting 'cause it— while certainly anything that's gonna cause like this systemic response, inflammation, like fevers and chills and headaches and all those kinds of things that tends to make you feel fatigued.

Justin: That wear you out, yeah.

Sydnee: And wear you out. So like the sleeping— But with the neurological symptoms, it all— it actually can, in the later stages, lead to this like inability to sleep. Like this constant...

Justin: Mm.

Sydnee: Irritability, wakefulness things. So it doesn't necessarily always cause, but yes. When I think sleeping sickness, we're using this euphemistically.

Justin: Okay, got it.

Sydnee: So the tsetse, that's another big culprit in the bug world. One more that I wanna talk about before we take a pause.

Justin: Okay.

Sydnee: Is the black fly.

Justin: Mm.

Sydnee: It's from the simuliid family of flies. They— I— There are some things that you just learn in medicine as like a collection, and like in my head, I have a visual, because I do not have aphantasia, I can visualize things in my head. I have a swift moving river, with a black fly flying around it, and then... someone losing their vision.

Justin: Mm.

Sydnee: That's like in a little composite in my head. Because I was taught that [chuckles] in medical school, that black flies, they reproduce around swift-moving water sources.

Justin: Okay.

Sydnee: Like rivers. And they bite you, and if they bite you, that— well that hurts.

Justin: Mm.

Sydnee: And then they might transmit a parasite to you. And uncocircavovulus is this parasite, it causes oncocircaiasis, which is the second biggest cause of infectious blindness in the world. Because this little worm can just crawl all over your body, including into your eyes.

Justin: I would imagine—

Sydnee: That's called "river blindness."

Justin: I would imagine Alanis Morissette with two glasses of chardonnay, each with a black fly in it, and she's handing one to Rivers Cuomo, and one to Taylor Swift. And then I could remember swift rivers, black fly. That's how I would remember it.

Sydnee: How do you remember that it carries the worm oncocirca, that can cause blindness?

Justin: Well, what I would do is I would put the— me in it too, and I would say, "Wow, this seems pretty wild. Just remember that you're remembering this because of the parasitic nematoad of oncacervulvos. So I would be in there two to remind myself.

Sydnee: You would be in there too.

Justin: [wheezes]

Sydnee: I don't know that we should have you creating medical pneumonics anytime soon.

Justin: Doesn't seem that way, no. It doesn't seem like my strong suit.
[chuckles]

Sydnee: Alright, Justin, we're only four in.

Justin: [chuckles]

Sydnee: We've got six more to go, and some honorable mentions, so before we do that, let's take a quick break and go to the Billing Department.

Justin: Let's go.

[transition music plays]

[ad break]

Justin: Alright Syd, who's next? I wiped out all the mosquitoes during the commercial break.

Sydnee: Oh, thanks.

Justin: And now [chuckles] I gotta know who to knock out next.

Sydnee: Let's see what happens!

Justin: Yeah, interesting.

Sydnee: To all of— all living things on Earth now. So this one was one that, as I was looking up different lists of like— [chuckles] By the way, if you Google... what bugs kill the most people, like does that put you on a list?

Justin: [laughs] Maybe. Maybe. It does seem to be— Why? Why, Sydnee? Why do you need to know this information?

Sydnee: It doesn't feel like something that a— like a human, like a real human in real life, would do to like murder other people, but it does feel like a *Batman* villain.

Justin: Yah. Yah.

Sydnee: You know?

Justin: Yeah.

Sydnee: Anyway. Locusts kept cropping up, and I was thinking "Why locusts? What do loc— Like locus— What are they transmitting? Are they biting people? What are locusts doing?" I mean like, I know some people get freaked out by 'em.

Justin: But.

Sydnee: They can be loud.

Justin: You're right.

Sydnee: I collected many a locust shell in my youth. But it is because it's an indirect reason. Locusts can be responsible for a lot of famine.

Justin: Ohhh.

Sydnee: And have been, at times where one of the years where the locusts—

Justin: Crop destruction?

Sydnee: Yeah, exactly. If they swarm in large amounts in a certain area, they can completely devastate crops. I mean, completely. And they can lead to a lot of famine in those areas. So I feel like locusts belong on our list indirectly.

Justin: Mm.

Sydnee: Maybe—

Justin: So are they on the list?

Sydnee: Yeah.

Justin: Okay good.

Sydnee: Yeah, no I'm putting them on the list.

Justin: I didn't know if this was one of the honorable mentions.

Sydnee: No no no, I'll get to those at the end. But I believe that they deserve a mention.

Justin: Okay.

Sydnee: The next one... probably could be a whole episode of *Sawbones* that we haven't done. We have never talked about blister beetles.

Justin: Never?

Sydnee: Not that I can remember. Have we ever talked about blister beetles?

Justin: Gosh Syd, you know, I don't know. I don't know if we did talk about blister beetles. No, it doesn't— I don't— Maybe I don't know what blister beetles are. I'm sorry. I was just pretending.

Sydnee: Have you heard of Spanish fly?

Justin: Um... Yeah?

Sydnee: Okay. So, you've heard of something related to blister beetles.

Justin: Okay.

Sydnee: Or cantharidin. Cantharidin is what I always said, but it doesn't look like it should be pronounced that way, 'cause there's an "a" in there. But cantharidin, cantharidin is a compound that is secreted by a type of beetle that we call the blister beetle. And it has a long... history of being connected with humans, both good and bad.

Justin: Oh yeah?

Sydnee: So, first of all, it is secreted [chuckles] by the male blister beetle. And the way this is worded is I was reading descriptions of like, "What is its function?" Every— Like it— I found numerous articles where it is called a gift.

Justin: A gift?

Sydnee: As a gift to the female, which I guess I understand what is happening.

Justin: No, we don't like that.

Sydnee: But the word "gift" here feels so... weird. I don't know. I do this too though, like I put these narratives on top of the weird science stuff that I like, so whoever decided it was a gift.

Justin: Gift.

Sydnee: I understand you.

Justin: It's a gift.

Sydnee: We are alike. They give this as a gift to the female blister beetle to put on her eggs. To protect them.

Justin: Okay.

Sydnee: Because it is a toxic substance, and it will kill things.

Justin: Okay.

Sydnee: So if you put it on the eggs, the eggs won't be attacked by— they won't be eaten by other bugs.

Justin: But as a side effect, we— it's bad for us.

Sydnee: It will also severely damage our skin, so it's a blistering agent, that's why they're called blister beetles. If you touch this substance that is inside these blister beetles, which by the way, even after the beetle is dead, it can like be stable [chuckles] for a very long time.

Justin: Mm.

Sydnee: So like—

Justin: Chilling. [chuckles]

Sydnee: — if you crush a dead beetle and it's in there, it can like burn— cause chemical burns on your skin.

Justin: Woah. Yikes.

Sydnee: Basically. It can kill you if ingested. Now there are not a lot of cases, to be fair, if we're talking like sheer number.

Justin: Mm-hmm.

Sydnee: There aren't a lot of cases of humans eating this.

Justin: Okay.

Sydnee: Right?

Justin: [chuckles]

Sydnee: And it would only take 10 milligrams, by the way, that— to kill you.

Justin: Oh wow, sheesh.

Sydnee: Yeah, that would be a fatal dose of cantharidin.

Justin: Yikes.

Sydnee: So. But I think it's interesting because it does— First of all, it is more responsible for the deaths of animals. Like horses specifically, because these beetles can like live in hay.

Justin: Mm.

Sydnee: And if they get like crushed up in there. And the horses eat the hay.

Justin: Oh, the horses consume them, yeah.

Sydnee: Yeah, especially since even dead beetles can still carry the, you know, stable compound that can be fatal. So they do have like they do kill things.

Justin: Mm.

Sydnee: Pretty regularly. They don't kill humans as much, but it will hurt your skin. We have used them both as a blistering agent intentionally. And you know, we've talked about that in a lot of like older like folk medicine traditions, and then it used to be the mainstay in like what common medicine traditions.

To like, if you had something— If you had a fever, we would try to like, blister your skin. Or if you had a wound, we would try to irritate it somehow.

Justin: Mm-hmm.

Sydnee: To like, cause it to get red and swollen, and maybe even stimulate infection, right?

Justin: [simultaneously] 'Cause that was kinda part of the—

Sydnee: [simultaneously] We used to make things secrete pus.

Justin: — part of the process.

Sydnee: Yes. We thought that was part of the healing process.

Justin: You had to, right.

Sydnee: And so it was used intentionally as a blistering agent at times. It is also, has now more recently been approved for use to treat things like maluscum contagiosum.

Justin: Maluscum contagiosum.

Sydnee: Maluscum, which is this... illness that—

Justin: It does sound like a spell, but go on.

Sydnee: — mainly [chuckles] kids get. They cause these little like... bumps. Like you can look up a little picture of the small bump.

Justin: Go on. Treat yourself.

Sydnee: [chuckles] It is— That it can cause. They can be used to like remove those, or like warts. You could use certain like preparations of this. Obviously, you don't wanna squeeze it out of a dead beetle and put it on a wart, you'll just burn your skin and that would be very bad.

Justin: Right.

Sydnee: But there are like formulated preparations using this. It also is what is contained in the... supposed aphrodisiac, Spanish fly.

Justin: Alright.

Sydnee: Which is not, to my knowledge, Spanish or a fly. It is a blister beetle compound.

Justin: Okay.

Sydnee: Our next big bad bug is a little bad bug. Very little.

Justin: You can't keep saying "big bad" and not giving me Beetle Borgs, Sydnee. If the Beetle Borgs— If the big bad Beetle Borgs are not on the list, I think you owe it to me, and the listeners, to just say that. Like I don't know why you're dancing around it.

Sydnee: The Beetle Borgs are not on this list.

Justin: Okay! Thank you. Was that so hard? Sheesh!

Sydnee: I wanna talk about fleas.

Justin: Oh, okay. No, now chili peppers I can get into. [chuckles]

Sydnee: [chuckles] This is—

Justin: Now I'm back. I'm back. [wheezes]

Sydnee: I feel— Our cats are in the room staring at me, and I feel like when I said, "fleas," they looked at me like, "Why? Why you gotta bring that into it?"

Justin: "Why? Why right now?"

Sydnee: "I don't have those. We— You treat us for those." You gave Olive her flea medicine, didn't you?

Justin: Yeah.

Sydnee: Okay.

Justin: Yeah, every month.

Sydnee: I saw the alert on... Yeah. So fleas.

Justin: This is a weird time to do that. [wheezes]

Sydnee: Well, it made me think of it.

Justin: [laughs]

Sydnee: Fleas can carry— One thing that fleas can carry which is less important is typhus.

Justin: The bass. [wheezes]

Sydnee: [sighs heavily] The siphon optera.

Justin: Yeah.

Sydnee: The fleas, they like to carry— they like to feed on all kinds of animals and they spread germs around when they feed— when they feed. Fleed. If they fleed.

Justin: Fleed.

Sydnee: On animals. Typhus is one of them, but the— but that's not the worst kind of typhus that fleas spread. The— So we're gonna get to that in a minute.

Justin: Okay. [laughs]

Sydnee: Typhus. We're gonna talk about plague.

Justin: Awww...

Sydnee: Fleas spread the plague!

Justin: Yeah.

Sydnee: You know, it's interesting because like obviously mosquitoes still continue to be the big threat.

Justin: Mm-hmm.

Sydnee: But like fleas really had a heyday there.

Justin: Fleas had their—

Sydnee: Like fleas—

Justin: Fleas had their moment, huh?

Sydnee: Like fleas did some damage, because plague caused more than 50 million deaths! Like famously devastated Europe, plague!

Justin: The wor—

Sydnee: Yeah!

Justin: They're the worst.

Sydnee: Yeah! I mean...

Justin: You know what it is, is it's—

Sydnee: There are books and poems and plays and songs written about plague.

Justin: It's 'cause— because they can't fly.

Sydnee: You think that's why?

Justin: I think that's it. I think it's 'cause they can't fly, and mosquitoes are cooler because of that.

Sydnee: I think fleas don't seem very scary. And I mean, I will say, the other thing is fleas are not as scary anymore, because we can treat plague with antibiotics.

Justin: Right.

Sydnee: Right? Which, I mean, I don't know. You could make— We also can of course treat malaria. I don't mean to say we can't treat malaria, but you know. Plague is not the big danger it once was.

Justin: Right.

Sydnee: You don't see plague very much, right? I don't.

Justin: I mean, who knows, the way things are going. [wheezes]

Sydnee: I don't know. We're trying to forget about vaccines in West Virginia. Not that we vaccinate against plague, but who knows what we'll bring back.

Justin: Yeah.

Sydnee: Maybe plague someday. It really saw its heyday back in the 1300s, but basically what happens, the flea bites a rat, it gets *Yersinia pestis*, which is plague.

Justin: Right.

Sydnee: It lives in the rat. The flea carries it and bites the human, the human gets plague.

Justin: Gotcha.

Sydnee: We can treat that now, we couldn't back then. Like I said, typhus is also carried by fleas, but the kind of typhus that is carried by the flea is not as dangerous, as the kind of typhus that is carried by another bug. The body louse.

Justin: The body lou— Oh, lice?

Sydnee: Lice.

Justin: Is that lice?

Sydnee: Well, this is *pediculus humanus*, which is the body louse, as opposed to *pediculus capitus*, which is the head louse.

Justin: Of course, yeah.

Sydnee: The body louse. Yeah, you— I mean most of us have not been exposed to the body louse. Some people have, certainly. You may have been exposed to the head louse. That is a pain in the butt to get rid of.

Justin: Oh real— Yeah.

Sydnee: Yeah. But the body louse carries epidemic typhus. This is the typhus that has really caused a lot of illness and death, especially in times of like war and displacement. Like you think about people in like trenches or in refugee camps, people who are not able to like routinely access, you know, showers and washing services.

Justin: Yeah.

Sydnee: Hygiene.

Justin: Hygiene services, yeah.

Sydnee: You know, clean water. You know, and so like these lice can live on your body, in your clothing, in a way— in those sorts of, you know, horrible situations that they wouldn't, if you are able to wash your clothes on a regular basis.

Justin: Right.

Sydnee: And take a shower whenever you need to and that kind of thing. And so that form of typhus has definitely caused a lot of impact on humanity. And is carried by the very, very small body louse.

Justin: Good to know.

Sydnee: Yes.

Justin: See, I had no idea.

Sydnee: Mm-hmm. Our next mention. Now here's what I like about this one.

Justin: [wheezes]

Sydnee: Well, not much.

Justin: [laughs]

Sydnee: Actually, I don't like anything about this one. But while it has not done the kind of damage, certainly, that the mosquito has in terms of sheer numbers.

Justin: Right.

Sydnee: I would propose that it is... more creative.

Justin: Okay.

Sydnee: I think there's a lot more variety.

Justin: Okay.

Sydnee: And the timelines and illnesses can be confusing.

Justin: Oooh.

Sydnee: So, they're tricky.

Justin: Yeah.

Sydnee: Those are the ticks.

Justin: Ohhh.

Sydnee: Ticks can carry a lot of stuff, right?

Justin: Yeah.

Sydnee: Like they're working overtime.

Justin: They're packing— They're packin' heat. [snorts]

Sydnee: Like they seem— Like mosquitoes have malaria, they just do— Well, they do lots of things, but they do that one thing that makes them at the top of the list always. Ticks are like, "We have Lyme disease. We have arliciosis. We have arbesiosis. We have anaplasmosis. We have Rocky Mountain spotted fever."

Justin: "We're also like hugely unpleasant."

Sydnee: Yes.

Justin: At least the mosquito has the dignity... the restraint to top off, to fill up, and then head out.

Sydnee: Ticks just sit there.

Justin: Ticks just stay there.

Sydnee: Engorged.

Justin: If you've ever taken a tick out of your own head, and you thought it was a chunk of marshmallow because you just went camping, and then you find— you pull it out. That will stick with you. I'm not a fan of ticks.

Sydnee: I agree that ticks are creepier and grosser in that way. I also think that if you see a mosquito flying by, there's an elegance to a mosquito.

Justin: [snorts]

Sydnee: You don't think that?

Justin: No, I've never— It's never—

Sydnee: Ticks do have elegance.

Justin: Ticks don't have any elegance, that's true Sydnee.

Sydnee: And the little teeny ones. Ugh. With their little legs wiggling. Ugh.

Justin: Uuugh.

Sydnee: I hate ticks. Anyway.

Justin: [chuckles]

Sydnee: And I think like the best example, and we've talked about it on the show before, but like all of these illnesses, which by the way can be very hard to diagnose, they have confusing like time courses, so like the symptoms change throughout the time that— You know, from the moment you're actually infected.

Justin: Mm-hmm.

Sydnee: To later on. And so depending on when you catch those symptoms they're gonna look different, so the time course and presentation can be— So they can be really hard to diagnose.

Justin: They're slippery.

Sydnee: And I mean I think like when you get to Lyme disease, there's so much misinformation that also surrounds—

Justin: Right.

Sydnee: — some of these illnesses. There is no entity called "chronic Lyme disease." That is not a thing. Year-long course of antibiotics are in

no way ever necessary, you know, for this entity that does not exist called “chronic Lyme disease.” So with that— With all of that, ticks have really thrown humans for a loop.

Justin: Mm-hmm.

Sydnee: And then you consider that they have alphagal, which we recently did an episode on.

Justin: Makes you allergic to red meat.

Sydnee: But I mean think about that! You get bitten by a tick.

Justin: Mm-hmm.

Sydnee: And you don’t think anything of it. And you don’t get a rash or anything, so you think like, “[sighs] I dodged all that other stuff that everyone sort of understands.”

Justin: Right.

Sydnee: And then you eat a hamburger and you get sick.

Justin: Unbelievable. You can’t even comfort yourself with a delicious hamburger.

Sydnee: [chuckles] Stealth. Creativity. Diversity.

Justin: It’s an inspiring bad guy.

Sydnee: Yes. So I wanna propose a tie for the last couple that I’m gonna talk about. I’ve— We haven’t talked about wasps or bees or hornets because, I mean, it’s a little more—

Justin: They’re not that bad.

Sydnee: Well they’re— I mean it— It sucks to get stung.

Justin: Yeah.

Sydnee: And certainly like have you seen *My Girl*?

Justin: I— That—

Sydnee: I think they've traumatized a generation.

Justin: Yeah, we're all always skittish about blackberry patches, because who knows what bees may lurk.

Sydnee: We all saw what happened to Macauley Culkin and it like scarred us for life, so.

Justin: Yeah, us.

Sydnee: So, bees have done some damage.

Justin: The royal us there.

Sydnee: In that sense. There's a few other. There's the assassin caterpillar.

Justin: Okay.

Sydnee: Which... I appreciate—

Justin: Not quite as scary, I will say.

Sydnee: It isn't— It— So the moth that it turns into is not dangerous, but the caterpillar itself, the lunomi oblica, which is native to South America, it has these little spines on them that can deliver a small amount of venom. And while a little bit is not going to kill you, it interrupts your blood's ability to clot, that's how it harms you.

Justin: Ooo.

Sydnee: If you were stung by enough, it could harm you. And they like to chill together, so you could get stung by a lot.

Justin: Oh.

Sydnee: If you like stumbled into a bunch of these caterpillars.

Justin: That's great, Syd.

Sydnee: So, I think that's kinda scary. There's the monarch butterfly.

Justin: What?!

Sydnee: Now, okay.

Justin: [chuckles]

Sydnee: I can't imagine that people eat monarch butterflies very often. But.

Justin: But.

Sydnee: But if you did... It could make your heart stop.

Justin: Okay...

Sydnee: Well, I imagine you'd have to eat more than one, but maybe just one. They— The reason is that monarchs exist almost entirely on milkweed, and milkweed contains substances that affect the way your heart beats. These glucosidic substances called "cardenolides." Anyway, the point is don't eat monarch butterflies.

Justin: [chuckles]

Sydnee: [chuckles]

Justin: Kids.

Sydnee: And— So I guess it's like an honorable mention then.

Justin: Okay.

Sydnee: In that sense. The one thing I will say, at the end of all this. All of our relationship with insects is not antagonistic, right?

Justin: Right.

Sydnee: Like we have had good bugs. [chuckles]

Justin: Good bugs and bad bugs.

Sydnee: We've had—

Justin: Just like people.

Sydnee: And I kinda mentioned that. The blister beetle, you can use cantharidin to treat molluscum, and to treat warts, so like it's not all bad. And I— And in that sense, I'd like to mention the humble maggot.

Justin: Oh yeah, we love the maggot. What?

Sydnee: Okay. So, maggots. We have observed for years that if a wound— And I lot of this came from like battlefield wounds, where people might be like wrapped up quickly and then transported somewhere.

And there might be a long period of time before it's unwrapped and looked at and tended to again, because of you know war and all that. Military surgeons observe that the wounds that got infested with maggots, those patients tended to fare better.

Justin: Huh.

Sydnee: Than the wounds that weren't infested with maggots.

Justin: They eating the diseased tissue?

Sydnee: Exactly, and up until the 1930s, we routinely used maggot therapy to treat wounds.

Justin: Oh.

Sydnee: Put some maggots in there.

Justin: Mm-hmm.

Sydnee: They eat all the dead tissue, leave the healthy tissue behind, the wound heals.

Justin: Okay.

Sydnee: We used to do that. What happened in the 19— late 1930s and into the early 1940s?

Justin: Antibiotics.

Sydnee: Antibiotics. And so we stopped using maggots so much 'cause, I mean, you can kinda understand that. [chuckles]

Justin: Got I'm glad that was right. I'm so glad that was right. I said it with such confidence, God.

Sydnee: I was really proud of you.

Justin: That was harrowing.

Sydnee: I was really impressed.

Justin: [muffled] Wooo.

Sydnee: You're right. Antibiotics came along, we stopped using maggots so much.

Justin: [exhales heavily]

Sydnee: What did we do? Dumb doctors like me. We overused antibiotics.

Justin: Oh no.

Sydnee: And then we rose resistance to those antibiotics, and so in the 80s we started reconsidering, maybe we bring back the maggots. And so now there are ways that we can use maggot therapy in certain wounds, chronic wounds that we're having difficulty healing.

It's a special dressing. So they— [chuckles] Which I like this— I found this description, "It prevents them from leaving the wound unescorted."
[chuckles]

Justin: [through laughter] Ew, gross.

Sydnee: If the maggots are gonna leave the wound, you wanna be escorting them out of the wound.

Justin: [chuckles]

Sydnee: You don't want them to leave on their own. So— And of course there's specific kinds of maggots, we breed them, we make sure they're not carrying any sorts of diseases. There's a certain strain that we use, in the US, the LB01 strain of *phinecia lucillia serocada*.

Justin: Alright.

Sydnee: And they're applied to the wound in a dose of 5 to 10 larva per square centimeter of wound surface. And they're left there for [chuckles] 48 to 72 hours. And they are removed!

Justin: How, Syd?

Sydnee: When the maggots are satiated. [laughs]

Justin: Oh, boy. We love that. That's great.

Sydnee: Maggots are our friends, they can— But please do not use maggot therapy without the supervision of a physician or medical professional who knows how to use maggot therapy. Any old maggot won't do the trick.

Please don't go find maggots and put them in your wounds. There are maggots who eat living tissue, and those would do harm. And you don't know. I don't know.

Justin: There's—

Sydnee: None of us know the difference.

Justin: There's—

Sydnee: Well, some of us know.

Justin: Special maggots.

Sydnee: They're special maggots. You gotta get the medical maggots. Prescription maggots only. Please.

Justin: [laughs]

Sydnee: Please don't go—

Justin: They are professionals, okay?

Sydnee: [chuckles]

Justin: You want maggots that have some restraint, they're not gonna leave a big mess. They're not gonna leave their cigarette butts everywhere, you want—

Sydnee: These are—

Justin: The real deal.

Sydnee: — maggots that went medical school. They've got their little white coats. They've got their— [laughs] their red books in their pockets, and they're ready to do work.

Justin: Yeah.

Sydnee: You want the right maggots, so please don't go freestyle this and try to put maggots in a wound on your own.

Justin: Yes.

Sydnee: Please don't, that would be bad, don't do that.

Justin: Yes. [laughs] Thank you so much to maggots. And thank you for listening, so much. And thanks again to the eastern branch of the Entomological Society of America for having us as their guests.

We always love to come talk to some people where they are, especially talkin' to other science folks from different disciplines. It's... always fun, so we're really appreciative of them, thank you.

And thanks to The Taxpayers for the use of their song “Medicines” as the intro and outro of our program. And thanks to you for listening! You’re the best.

[theme music fades in]

Justin: That’s gonna do it for us. Until next time, my name is Justin McElroy.

Sydnee: I’m Sydnee McElroy.

Justin: And as always, don’t drill a hole in your head.

[outro music plays]

Maximum Fun.
A worker-owned network...
Of artist-owned shows...
Supported directly by you.