

Testudinology with Amanda Hipps

Ologies Podcast

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Oh heeeyyy, it's that lady in front of you at the grocery store who didn't realize she was holding up the line 'cause she's reading a magazine, Alie Ward. Okay, this is kind of two episodes of Ologies because over the next two weeks you're gonna get up close and personal with those wizened, slowly ambling boulders: tortoises and turtles and sea turtles. What is their deal? Why do they live to be one million? Do they need us to save them? Are they misanthropes or just introverts? Etcetera, etcetera...

But before we take a deep dive in a turtle burrow - and we will kiddos - per usual, a thanks to all the friends on [Patreon.com/Ologies](https://www.patreon.com/Ologies) who help support the making of this show and contribute so many good questions for the ologists. Thanks to everyone who is buying shirts, and totes, and hats, on [OlogiesMerch.com](https://www.ologiesmerch.com). Thanks to all the new subscribers - heyyy!- and folks leaving ratings and even reviews, which you know I read like your grandma going through old birthday cards. Like this week, this one from @putaburkeonit says:

This is the type of binge-worthy podcast that makes you sit in your driveway after a 90-mile commute home from work at 4 am just because you HAVE to finish the episode. Not that I've done that. Okay yeah, I have.

So thank you @putaburkeonit! Thanks to anyone who has ever left a review. If you've written one, I've read it, and it made me happy, probably.

Okay, so turtles. Hooo! Boy howdy are you about to fall the hell in love with turtles. Okay over the next two weeks, turtles will be digging a gentle burrow in your heart where they will sleep like little cozy potatoes for the next, I don't know, 140 years. So this week is testudinology, which comes from the Latin 'testudo' for tortoise. I was introduced to this testudinologist through reptile hero Dr. David Steen, who you may remember from the herpetology episode. Remember him? Right? Dope. I was like, "Steen, you got any turtle people?" And he was like, "hot damn, do I." And he introduced me to one of his favorite turtle people on maybe planet Earth.

She did her undergrad at the University of North Florida. She had an internship at the Jacksonville Zoo Animal Hospital, and is now getting her master's at Florida Atlantic University studying gopher tortoises and what critters share their burrows. And, doing some digging, it turns out that her tortoise love goes wayyyy, wayyyy back. So we talk about: turtles versus tortoises versus terrapins, what's up with those big heavy shells they're toting, and how Team Turtle is affected by humans, her feelings on *Teenage Mutant Ninja Turtles*, their very crazy... ummm... anatomy, let's say, and how they live so long and more.

Also, I feel I must warn you that these two turtle interviews, this week and next; I'm a little too excited about turtles. I was just legitimately, very earnestly pumped. But, pull up a stump and have

a sit for the infectious dedication of tortoise advocate, wildlife biologist, and testudinologist, Amanda Hipps.

Alie Ward: Okay, so welcome. Hello!

Amanda Hipps: Thank you!

Alie: Welcome to L.A.

Amanda: I'm excited to be here. *[laughs]*

Alie: Now, where are you from?

Amanda: I'm from Florida, from South Florida.

Alie: Oh you are?

Amanda: From a little fisherman town, Stuart Island.

Alie: Did you grow up going to beaches a bunch?

Amanda: I did!

Alie: Or romping in swamps?

Amanda: Both.

Alie: Okay.

Amanda: I liked the beach. It's fine. But mostly I was in the woods or the swamps, so yeah. My family really loved hiking so that was a lot of what we did, was just hike.

Alie: What are the Florida swamps like? Take me to...

Amanda: They're so smelly... *[laughs]*

Alie: Are they?

Amanda: It's so great, I love them! *[laughs]*

Aside: She loves a smelly swamp. How much do you like her already? So much!

Alie: I don't think I've ever been in a proper swamp.

Amanda: Oh my gosh, you gotta come!

Alie: Yeah?

Amanda: Yeah, so just even like hiking in a swamp, it's called slogging, and... [laughs]

Alie: I love this.

Amanda: I dunno... It's super creepy. You never know what you're gonna bump into. There's alligators, and snakes, and just tons of mosquitos which is maybe the most unpleasant part of all of it. I don't know, it's just a very mysterious place and it's very little-hiked there's, you know, not too many people that you'll run into out there.

[clip from "Bird Box": Sandra Bullock asking, "Is anybody out there? Hello, my name is Mallory."]

Alie: How in danger of getting chomped are you?

Amanda: You just have to watch where you're going. Just be cautious. I've never really bumped into an alligator and they're so scared, they usually kinda disappear if they see you coming. But you have to be careful.

Alie: What's the craziest shit you've ever seen in a swamp? I'm sorry, I'm just gonna start another podcast called *Swamp Talk*. [laughs]

Amanda: No it's so great. [laughing] Oh my God I love it! I got a really cool picture of a cottonmouth when I was in the swamp, and he was just chillin...

Alie: And cottonmouths are the ones that, they can bite you bad, right?

Amanda: Yeah, they can. They are venomous.

Alie: Those are the ones that everyone... They see a dirty hose at a gas station and they're like, "It's a cottonmouth!"

Amanda: Yes, yeah, that's exactly it. [Alie and Amanda laugh]

Aside: So side note, if you've listened to the Herpetology episode with Dr. David Steen, you may remember the hashtag *#NotACottonmouth*, in which he educates the public about the snakes that are frequently, in fact, *not* cottonmouths. And he sometimes educates someone so hard that I am in a good mood for days afterward. He just owns them.

Alie: Do you think that your swamp romping kind of contributed to your wanting to be a herpetologist of some kind?

Amanda: Yeah, absolutely. What's crazy is that I'd never considered being a wildlife biologist, actually going to school and doing my undergrad. I was so lost. I knew I wanted to work with wildlife, but I didn't really have exposure to any of the sciences, and so I kinda just thought, "I wanna work with animals, I should probably go to vet school." And that's

kind of the guidance I got, I think that's what everyone told me was just, "Go to vet school." No one really suggested, "Why don't you go be a wildlife biologist?"

Aside: Okay, buckle up for a winding backstory that proves no-one's life is linear and that is beautiful and awesome.

Amanda: I did my entire undergrad kinda just gearing it towards going to vet school and that's really... I planned my entire life around vet school. I did all of my undergrad courses with that, and I ended up working for the Jacksonville Zoo as an intern at the Jacksonville Zoo Animal Hospital.

Alie: Awwww!

Amanda: I know, it was so great! It was very cool. It was very hard. In some circumstances it was dealing with mostly wildlife and native wildlife, and doing rehab and then releasing, so it was pretty cool, but I was dealing a lot with gopher tortoises. Most of them were hit by cars.

Alie: Ohhh no!

Amanda: Yeah. And so it was really awful. We were really euthanizing a whole bunch. [*sad trombone*]

Aside: Quick rundown. Gopher tortoise territory is in the eastern, southern United States, but most remaining gopher tortoises are in fact Floridians. So they're about a foot long, they're between 8 and 12 lbs - the ladies are bigger, hello! And they have these strong, scaly legs that are like live garden trowels. And Amanda was also helping rehab injured tortoises, working sometimes for months with individuals whose shells had been split, until they healed, and then releasing them back into the wild. But that didn't seem like enough. She was like "Dammit, I love these little mo-fos!"

Amanda: I feel like I should try to figure out how to help them in other ways, I would really like to get to know them from the wildlife perspective. I started reading about gopher tortoises because I just was fascinated by them.

Alie: What kind of game do these gopher tortoises have? How does a gopher tortoise slowly burrow its way into your heart?

Amanda: [*laughs*] I don't know, it's so crazy! I think it was more just feeling like there were so many that were coming in. And I... I don't know how they did it. How did they do that?

[*clip from Lady Gaga's Why Did You Do That To Me: "Why did you do that do that do that do that do that to me?"*]

Amanda: As far as how they stole my heart I'm really not sure.

Alie: Aww!

Amanda: Don't know how that happened.

Alie: So you started reading and reading about them and you're like, "Oh, no! I've become obsessed with gopher tortoises!"

Amanda: *[laughing]* Yeah, that's exactly what happened. I don't know, I started just looking into them because I was like, "Ohh!" They're what's called a 'keystone species' and that's where I started learning all about gopher tortoises and I went, "This is a really incredible animal!" I was learning about their burrows and how so many other animals will share their burrows. So they're really important for the ecosystem.

Alie: So they have stowaways?

Amanda: Yes!

Alie: Is that what a keystone species is?

Amanda: Not necessarily. So, the beaver is considered an ecological engineer and a keystone species because they're rearranging the habitat. They're taking these trees, they're building dams, they're altering hydrology of rivers and that's ultimately affecting the wildlife that's coming. That's affecting the entire ecosystem. Same thing with a gopher tortoise. They dig these massive burrows.

Alie: Oooh!

Amanda: They can be up to 40 feet long.

Alie: Their burrows? Or the tortoise? *[Alie and Amanda laughing]* No, I'm kidding. Just a really stretch limousine tortoise. They're like, "Damn! No wonder why it's getting hit, man! This thing's 40 feet long!" Okay, so their burrows can be just like a catacombs?

Amanda: Yeah, they dig these massive burrows. They're the size of the tortoise. The shape of it is just like a tortoise, but they can be up to 40 feet. On average they're like 15 to 20. But I've definitely seen ones that are bigger.

Alie: Damn!

Aside: So side note: I just went and looked up videos of these turtles with these badonka-butts, just flinging sand like little machines behind them, and it's the adorable-est. Their burrows are kind of like if you had a tortoise silhouette from behind that was a cookie cutter that you just bored deep into a hillside like, *[slowed speech, like a cute derp voice]* "pa-dew, pa-dew, pa-dew... I live in a tunnel."

Amanda: These other animals are using it. There's some species that have just co-evolved with them and are fully reliant on them.

Alie: I want to live in a gopher tortoise burrow.

Amanda: Yes, me too!

Alie: That sounds more spacious than my apartment in Los Angeles, to be honest. *[laughs]*

Amanda: It probably is.

Alie: Like square footage-wise? Damn!

Amanda: But then you'd have all those roommates.

Alie: That's true. There's moles and weevils, you're like, "ughhh."

Amanda: Everything is just coming in and taking over.

Alie: And so you started learning that they're this keystone species because the work that they do lets other animals kick it with them. They're the kinda people that buy a big house in Tarzana and they're like, "Pool party on Sunday, come over!"

Amanda: Literally, that's exactly it. *[laughs]*

Alie: That's what they do!

Amanda: They do! *[clip from Frozen: Elsa, "This is what a party looks like."]* And it's used for many different reasons. Some animals are coming in to feed. Some of them are coming to... It's just a site for reproduction. There's a number of insects, which is actually what I'm studying, that are living in these burrows and they're fully reliant on the gopher tortoise. But they also have this mutualistic relationship where they're feeding on dung, so they're the house keeping service. *[laughs]*

Alie: *[laughing]* Can you imagine if your maid is like, "I ate your garbage"?

Amanda: Yeah! They come in, clean it, they're eating, they're just living their life and rolling around in shit. They're not just any dung beetle though, they're very specific. They might be eating poop, but they're really particular about what they're eating, like what kind of poop they're eating. And I was like, "This is fascinating." And then just researching it I found that at my university, University of North Florida, there was an advisor who was studying them, a professor named Joe Butler. So I contacted him and was like, "Hey, I heard you're doing some field work with gopher tortoises, can I jump in on this?" *[clip from The Hunger Games: Katniss, "I volunteer as tribute!"]*

Yeah, that's kinda just how I got started. And then that's when I was like, "There's this whole field, wildlife biology? Oh my God, what am I doing here??"

Aside: So Amanda had been working on projects studying the reproductive success of gopher tortoises and she still had plans to go to vet school. She even applied, and she was accepted, but she just like, "gehhhh." She just wasn't really sold on it.

Amanda: I ended up just being like, "I don't think I wanna go. I don't really wanna work with just cats and dogs." I kinda got involved with exotic animals and working with a vet in Colorado, and he worked mostly with reptiles. And I just really didn't like it. I was like, "I don't wanna be in a hospital." I really wanted to be outside.

Alie: Oh! That's such a difference I guess! Having your parking spot, and your coffee mug, and you know when you're going to sleep, you know what time you're waking up. Some people probably couldn't handle what I am now calling, 'swamp-romping' [*wet squishing sounds*] or you know, burrow-recording or whatever. I guess it really depends on what kind of lifestyle you want, right?

Amanda: Exactly!

Alie: How clean you want your fingernails to be.

Amanda: Oh my God it's so true! I wanted to be dirty! [*Amanda and Alie laugh*] It's true, yeah, I didn't love working inside. I liked working with the animals but I didn't really love the work itself. That's when I was like, "Ok, I don't want to do this anymore." So I went to Madagascar.

Alie: Whoa! That's not Florida! [*laughs*]

Amanda: That's not Florida at all. [*laughs*]

Alie: You're like "Bye, Florida!"

Amanda: So I went to Madagascar and kind of got on to this internship where I was studying reptiles, but mostly snakes. And that was amazing! [*heavenly angels singing*] It was a really, really, great experience and that's what got me into it. I was like, "This is it. This is the best that I've felt."

Alie: You were like, "ectotherms are my people"?

Amanda: Yeah! Yeah.

Alie: [*record scratch*] Are they ectotherms?

Amanda: They are.

Aside: Oh, man. For a second my brain froze, and I thought I got that wrong and I was mortified, but yes, yes, okay. Of course. Turtles are ectotherms. That means they rely on external sources of heat, which is why you'll see turtles just basking on a log, like pasty Florida spring breakers. And also, why it's so important to dig out burrows, which are pretty much like walking into an air-conditioned movie theater in July, but darker and full of dirt and cool bugs that eat your poo.

Alie: When you are starting to get obsessed with turtles, what kind of books are you reading? What kind of chat groups are you in? What kind of group texts? Talk to me about the turtle world.

Amanda: Honestly, [*laughing*] when it comes to connecting with people in the turtle world it's social media.

Alie: Really? Turtle Twitter??

Amanda: It's Instagram, it's Twitter [*laughing*]... Turtle Twitter. I mean there are so many turtle groups on Instagram.

Alie: Okay, when you say "turtle groups" are these the sea turtle people, the tortoise people, the turtle people?...

Amanda: Yeah, yeah.

Alie: Okay. So there's different factions.

Amanda: I mean they're all like... I kind of think if you're a turtle person you're a tortoise person and vice versa.

Alie: Alright that is a good segue because we need to get to this right now.

Amanda: Okay, ready.

Alie: I mean I should have asked this the second you walked in the door. Turtle versus tortoise... what's the deal??

Amanda: Okay, well, tortoises are turtles. They are turtles, but they are just adapted to living life on land. So their limbs are different, their legs are built for walking and digging.

Alie: So a sea turtle really should have... Should a sea turtle have a different name like a "surtle?"

Amanda: Surtle? I love it!

Alie: Like a turtle is just like a whatever, we're all turtles. And then you're fully sea? You're a surtle. You're fully land? You're a tortoise. You're maybe a little bit of both? You're a turtle, but you're all turtles.

Amanda: I think we need to talk about this. [*Alie and Amanda laughing*] This needs to be... this needs to maybe be a change we make.

Alie: I mean I just feel like, let's get specific about turtles! Give me some overall anatomical facts about turtles, because here's the thing about turtles: We know there's stuff going on under that shell.

Amanda: Oh yeah!

Aside: What is happening under that shell? It's like if there's a silver dome over a platter of food and it's just a mystery cloaked in fancy armor.

Alie: We don't know. What kind of organs? Do they have five hearts? How many butts do they have? Y'know, do they even have a liver? What's going on in there?

Amanda: Well yeah, that's where it all happens. That's where everything's happening. [*laughing*]

Alie: The party is under the shell!

Amanda: So with the shell, the ribs and the spine are, like, built into the shell... into the top of the shell. So it's part of it. The tortoise can't leave its shell, I mean that is everything. A lot of people really do think that they can just walk off and find a new one if they're growing.

Alie: Ooooh! Well there's some flimflam we debunked!

Amanda: Yeah!

Alie: They're stuck with that shell for life. And how is it growing?

Amanda: Okay so the shell is bone. It's bone and it has a cover - keratin - so it's like our fingernails or our hair, but it's bone, and so it's growing with the tortoise. And you can age a tortoise by looking at the shell, and it's got rings on each of the scutes, so it's basically like trying to age a tree.

Alie: Oh my God! So each scute, which is like those parquet floor tiles, kind of gets a new ring every year?

Amanda: Yeah, it's every season.

Alie: Is that partly because of conditions, like in a tree, the rings happen when there is a lot of water and growth? Is it similar?

Amanda: Yeah, exactly. It's sort of seasonal. So it really does depend on location. If you're further north, like the gopher tortoise is further north, they are very seasonal. They do have a winter. They're disappearing into the burrow during the winter, they're not eating for months and they're just underground, they're just hiding.

Alie: Is their heart rate like one beat a year?

Amanda: Probably! [*laughing*]

Alie: It's like the lowest metabolism ever!

Amanda: Yeah! It's why they live so long.

Aside: P.S. Not only is next week's episode about sea turtles, a.k.a. surtles, but you'll want to hold onto your butts my friends, because in researching, "How the fuck do turtles get so old??" I came across an ology called biogerontology and the best biogerontologist in the world, Dr. Caleb Finch, is based in L.A. Hot damn, yes, we recorded an episode on aging! So stay tuned for that the week after sea turtles. Oooh!

Also, the material tortoiseshell, which has been banned in many places, was most commonly made from scutes of the hawksbill turtles, which are sea turtles and not tortoises! So not only is it mean, it is factually incorrect a lot of the time. Okay, back to tortoise shells, which are the spine and the ribs all fused together into a dome that says, "Don't even try to touch me, you jerks."

Alie: And so they have ribs that are fused to the bone of their shell.

Amanda: Correct.

Alie: And then what kinda guts they got?

Amanda: Everything is just under that shell.

Alie: Do they have crazy hearts? Is their reproductive system indoor or outdoor? What kind of plumbing is happening?

Amanda: For tortoises you can flip them over, and there at the bottom of their belly, the bottom part of their shell, is called a plastron. You look at the plastron, and that's probably the best way to tell. The male is gonna have a dip, and then the female is gonna be flat. The male is kind of concave so he can fit on top of the female.

Alie: Ohhhhh... got it. Like nesting bowls.

Amanda: Exactly.

Alie: Um, I shouldn't ask this so early on but I'm just...

Amanda: I'm ready for this question, I think I know what's coming.

Alie: Do they have crazy dicks, or what?

Amanda: Yes! Okay I'm so happy! I'm so happy right now! [*Alie and Amanda laugh*]

Alie: Someone tried to send me a video of a turtle making love to a shoe [*high-pitched squeaking noises*] and I was like, "What?? What is that??" I don't understand what's happening. What is it?

Aside: By the way, those noises were from a turtle making love to a Crocs shoe in a YouTube video entitled, "A Turtle Makes Love to a Crocs Shoe." So cursory search returns were almost too copious. Also including other hits such as, "Turtle Makes Love to a Sneaker", [*turtle lovemaking squeaks*] "Turtle Sex with a Shoe", [*different turtle*

lovemaking squeak] and another involving a brief but impassioned romance with a roller blade. Now if you need a visual for this part of turtle anatomy... oh boy. Think of an artichoke heart, but long-stemmed and stripped of all the leaves, but alive and throbbing. Um... it's a lot.

Amanda: Yeah, I still look at it and I'm like, "What??" [*Alie laughs*] They're incredible! I mean, okay, let's start from day one. Quite often, when we're doing research with them we have to mark them, we have to weigh them, and measure them, and so they will expose for us. I think it might just be displacement. They're just uncomfortable and, "I don't know what's going on."

Alie: They're like, "I'm uncomfortable, this is awkward, what would help? A boner." So they display as a greeting.

Amanda: Yes, so their dicks are massive. [*Alie laughs*] They can be. They're huge! And they have to be big because you know, the shell gets in the way. It's just hard to access the females. It makes it hard, so they need to be big. It can be up to half the size of their shell.

Alie: Oh my God!!

Amanda: It's huge!

Alie: What?! Is it all stored inside?

Amanda: So what happens is, when it retracts inside the cloaca, it lays on top of itself.

Alie: And then they whip it out... and then...

Amanda: And then they whip it out. It's different for different species. With tortoises, it's so strange, it looks like a flower.

Alie: That's what I thought! I was like, "Is that pancake??".

Amanda: Yeah, it's very odd.

Alie: How does that behoove them? Because that's gotta be more than just distance. Why a hockey puck on a stem? Why a weird inverted mushroom? Like, what is it??

Amanda: I'm honestly not sure how that evolved because it's different for different species. So with a soft shell turtles, they have five lobes, so theirs is even more crazy looking and I'm not sure why they need that.

Aside: Of course I looked this up and yes, it has five lobes with like, let's just say, four nozzles. And the textbook line-drawing I saw looked kind of like an abstract outline of an orchid, which is fine, but then you imagine it alive, and greenish-purple and you know what? Actually, let's not do that. Let's get back to the romance of it.

Alie: Do they mate for life? Are they friends for a long time or is it just like, "I'll see you next season"?

Amanda: I don't think we really know the answer to that. What we do know is that they have... You know, we always think of tortoises as just being solitary animals and not having friends, or talking, or hanging out with anybody. That's really not the case. We have found as far as studies with gopher tortoises go, and I'm sure it applies for other North American tortoises, but they have cliques. They have friends. I don't know if we can call them friends, but what we have found is that the females will travel to hang out with other females.

Alie: Oh, I love this!

Amanda: Yeah, me too! But the interesting part is that they're not just hanging out with any other female, they're visiting the same ones. And so they might travel farther to go see a female that, I don't know, perhaps they connect with them? I'm not really sure what's going on there, but if there's a female directly next door they might not like her. I'm not sure what's going on.

Aside: Okay, I'm pretty sure what's going on is these turtles have friends. They're either friends, or they're drug dealers poppin' by the burrows.

Alie: And so, same with males?

Amanda: No, I don't think that's anything that they saw. Males are visiting females. But if there's another male around, they're pretty territorial, so they're probably not really hanging out with other guys.

Alie: Who's digging all these burrows?

Amanda: Everybody.

Alie: Really?

Amanda: Yeah, they all have their own. They all have their own and maybe a couple; maybe a summer home and a winter home. They might have more than one.

Alie: And they might go in there 10, 12 feet... stay there on their own, and then come out during the day time mostly?

Amanda: Yeah, so they spend probably over 80% of their time underground. They come out to meet another tortoise that is hanging out. So I'll see the males... They work so hard. They're going from burrow to burrow, female to female, and they will bob their head and try and get her to come out of her burrow. And this happens all day long.

Alie: Like horny politicians canvassing.

Amanda: So terrible. Yeah, I feel bad for the females because if they don't want anything to do with him they can't come out, they're stuck inside. *[Alie and Amanda laugh]* But at least they have a good escape. So even if they're out of their burrow and they're grazing and they don't want anything to do with the male, they'll just take off and head back to a burrow and knock them off.

Alie: Is this all year round or are they seasonally horny?

Amanda: Well, I believe that if it wasn't cold it would be all year round. In South Florida, where I am working right now, they are at least courting all year round. I don't think we really know beyond that, but they are courting. I don't know if they're double nesting, we aren't really sure what's going on there.

Aside: So from what I understand, double nesting means having another nest in the same breeding season. Kind of like when you find out that your grandpa has a second family he hid for decades, except it's your mom and it's a bunch of siblings. Also, okay, let's get back to the nomenclature because this still feels a little... murky, kind of like swamp water to me.

Alie: Okay, turtle versus tortoise. So turtles are partially aquatic like, they'll go dip into a pond for a bit, come back up... What's their deal?

Amanda: Well it depends on what we're talking about. If we want to talk about box turtles, they are mostly land turtles, but they are not a tortoise.

Alie: Ohhhh shit man, break this down for me.

Amanda: I'm sorry to open this door. *[laughs]*

Alie: Break it down, I don't get it! So what, they're mostly land but they're a little bit aquatic, is that the difference? Or is it just that their legs go out more than they go down?

Amanda: They're still near water, they just aren't very good swimmers. So they'll still hang out in water, in shallow areas, but they're not really swimming very well. Not as if you were to look at a slider, or a cooter or something like that.

Alie: Does that disqualify them from being a tortoise, because sometimes they take a dip?

Amanda: I think it really comes down to how closely related they are.

Alie: Oh, that makes some sense. There's actual evolutionary lineage. Talk to me a little about the evolution of turtles and tortoises, because I know that a lot of people are hung up. Did they outlast the dinosaurs? When did the planet develop turtles? When did they split off into sea turtles and tortoises? Can you walk me through some of that?

Amanda: I can try. I don't think we really have solid answers for any of that but the theory, one theory, is that the link to turtles was a lizard that, I think it's called the Eunotosaurus.

It's a stout lizard, short legs, kind of like a tortoise body but without the shell. They were burrowers and they were, I guess, a little bit slower. From there, there's a turtle that didn't have a shell, but it had a plastron. The plastron is the bottom part of the shell, the belly, but it didn't have a full shell.

Alie: The benefit of the shell is protection, mostly.

Amanda: Yeah, I'm not sure that's why it evolved. It might have been for digging.

Alie: That was my other question! Because if they make the burrow in the shape of themselves, is it kind of like a cool borer into a mountain, or is it more like, [*higher-pitched small animal voice*] "Hey, I'm withdrawing, please do not bother me."

Amanda: We don't know. It could have been that it was for burrowing, for digging, and then it sort of just ended up being a form of protection.

Aside: So up until a few years ago, we thought turtles went back about 220 million years, until a paper came out in 2016 about this 260 million-year-old lizard in South Africa that developed a shell, scientists believe, just for the purpose of burrowing. The protection? Just a bonus. Kind of like a shovel but you're like, "Oh hey look at that! I could also use it as a shield." P.S. The person who discovered the proto-turtle fossil was then, 8-year-old Kobus Snyman. And also, just to hammer this home, turtles include tortoises *and* sea turtles *and* terrapins, which are smallish turtles that live in fresh or brackish water. Although, in the UK, turtles mean water pals, tortoises mean land friends, so it's kind of regional.

Alie: Where do turtles and tortoises sleep at night?

Amanda: Well, it depends on the species. Tortoises, like gopher tortoises, are native to the coastal plains of the United States, so they are using burrows. They're gonna be underground. The other North American species like the desert tortoise out here, they are hiding out. Some of them do have short burrows, and some of them are hanging out under rocks or things like that.

Alie: Why are they so goddamned cute?

Amanda: [*whispers*] I know!

Alie: What is it about a turtle, like who doesn't trust a turtle? Do you know what I mean? Okay I will amend that, because I have seen a picture of an alligator turtle and I was like, "Oh my God!"

Amanda: Oh my god I love them though!

Alie: This thing has a hellmouth. What's happening with it?

Amanda: It is terrifying!

Aside: Okay, the alligator turtle is not a tortoise, but it is a nightmare. Imagine a stout turtle - the largest ever recorded is said to have tipped the scales at over 400 lbs. - and it has three ridges along its back, like giant punk rock studs. And then its mouth... hooo its mouth, y'all! Okay, a spiky beak that could crush bones! And a little wormy, doohickey, dingle-dangle on its tongue that lures a live fish into its mouth! These things look like if the biggest dude on the football team had anger issues and also a falcon beak... and was made out of wet kelp.

Alie: Have you ever seen... Do they have them in Florida?

Amanda: Yeah.

Alie: Really?

Amanda: But they're very northern Florida.

Alie: Okay, I did a little bit of research on them for the food anthropology episode, we talked about turtle soup. And they talked about obtaining... And so I looked it up and was like, "Oh my God, what is that? That looks like God's dingleberry. Get it out of here. What is it? What is it?!" But other turtles are so adorable.

Amanda: They are.

Alie: Now how big can turtles get?

Amanda: Well, if we're talking about tortoises, there's the Galapagos tortoise, which is the largest.

Alie: Oh, is it the largest?

Amanda: I think so.

Alie: I believe you!

Amanda: It's the Galapagos, and the Aldabra, and then the African Sulcata, so like the three largest that are extant that are living today.

Aside: While turtles can reach 2000 lbs., the biggest tortoise ever recorded, it seems, was a fellow named Goliath, who weighed over 900 lbs. but passed away in 2002. Also dead, Lonesome George, a Pinta Island Galapagos turtle who was the last of his species, and the longtime 'George Clooney' of tortoises - eligible but single. Lonesome George, despite trying, sadly never produced any offspring. Passed away in 2012 of natural causes. He was found by his keeper of over 40 years, Fausto Llerena Sanchez, who is a park ranger, who retired not long after George's death, and he said, "I feel like I've lost a best friend. There's a void and there's a sorrow, especially when I see the photos. In my heart I'm not convinced he's dead." But he's dead. I mean he was taxidermied and put in a museum, so he's pretty dead.

Now alive, and perhaps the oldest living land animal, is a tortoise named Jonathan, who has double cataracts but a pretty good sense of hearing at 187 years old. 187 years old! Yes. You heard that right.

Alie: Do turtles have ears? What's the deal?

Amanda: Oh, wow. So they... I wouldn't call them ears. What is the term for it... They are called...

Alie: Nubbins. [*Alie and Amanda laugh*] I'm feeling that's incorrect.

Amanda: Can we call it that?

Alie: Yeah, we'll call them nubbins.

Amanda: Okay! They're hearing mostly through vibration, it's internal. Yeah, you're not seeing an ear.

Alie: If you were to whisper to a turtle how much you liked it, do you think it could hear you?

Amanda: I don't know.

Aside: Okay, I looked it up and they are not, sadly, called nubbins, but rather tympanums, which is a disc membrane at the back of the face. Now, could a turtle hear you if you whispered how much you love it? I looked into it, and... probably. In one paper that lamented the lack of auditory knowledge of turtles, I did find that what is known is that turtles have a higher hearing threshold than other reptiles with best frequencies heard around 500Hz. Now, according to *Sataloff's Comprehensive Textbook of Otolaryngology*, it is noticed that a noise band for whispers begins at 500Hz. So yes! Whisper your love at your tortoises, if you have tortoises.

Amanda: I know that with my tortoise he...

Alie: Wait a second!

Amanda: Oh gosh...

Alie: You have a tortoise?? Oh my God!

Aside: Wait what? This was a huge revelation!

Alie: So you're a tortoise owner!

Amanda: I am.

Alie: You're a tortoise lord!

Amanda: I am.

Alie: That's exciting! Who is he? Is he a boy or a girl?

Amanda: Oh my goodness. He's a boy. His name is Banshee.

Alie: His name is Banshee?

Amanda: Yeah, I named him when I was seven.

Alie: Oh my gosh! He's so old! Well, you're so young. How did you obtain him?

Amanda: Oh my gosh, it's a terrible story, and I don't encourage it. This is why I don't really talk about him. Actually, it's a good...

Alie: Is it a cautionary tale?

Amanda: Yeah.

Alie: Did you buy him on the black market?

Amanda: No. I did get him from a pet store.

Alie: It happens!

Amanda: Yeah! So I was a little girl, like seven, I don't really remember. I was probably around 10. And I was like, "Dad, I really want a tortoise." I begged my father for a tortoise. *[laughs]*

Alie: Oh yay!

Amanda: He was on board with it because it seemed like an easy animal to take care of, no big deal. So we went to the pet store and I picked out a tortoise. It was relatively large... I mean I don't wanna say large. He was probably three years old and five inches across, which is pretty small.

Alie: So he was already... He wasn't like a tiny, quarter-sized tortoise. He was already doing his thing. He probably had a routine, a personality, he had a thing. And so you took him home and you're like, "I'm a tortoise owner."

Amanda: I was like, "Hey, ma, look what I got!"

Alie: And?

Amanda: Oh my God, she freaked! She was like, "What is that?" And she got on the computer and started looking up African Sulcata Tortoise, and she freaked out on my dad.

Alie: So these get large?

Amanda: They get huge! Huge. And they live forever. So she's doing her research and she freaked out on my dad. She was like, "What are we doing? We just adopted this thing that is gonna outlive our daughter!" And so we did it! They did it! They wanted to keep him. We all fell in love with him, and he's definitely been a part of the family for much of my life.

Alie: How big is he?

Amanda: He is probably about 125 lbs. right now.

Alie: Wait a second!

Amanda: I feel like he's still growing. I don't know, but I really hope he is not. He's huge!

Alie: Wait! How big is that? Is that the size of a coffee table? Half the size of a coffee table?

Amanda: Yeah, I mean...

Aside: She looked down at my coffee table, a wooden slab that is 51 inches long. I measured it later.

Amanda: Okay I'm looking at your coffee table. I'm thinking three quarters...

Alie: Oh my God, that's a huge...

Amanda: No, maybe half. Maybe a little more than half.

Alie: We're talking the size of maybe a cafe table.

Amanda: Yeah.

Alie: He's a huge tortoise!

Amanda: He's pretty big.

Alie: Where does he live?

Amanda: In my backyard. *[laughs]*

Alie: What does he eat?

Amanda: He lives with my parents still. He eats hay and grass. He grazes. Yeah, it's not an easy pet though. He has a pretty good space, but he needs a lot of space. And then we have to consider, you know, a burrow, and enrichment, and how to keep him happy and healthy, and it's a lot of work.

Alie: How have things changed when it comes to turtle ownership in the last couple decades, do you think?

Amanda: Oh my gosh. There is definitely more information. When we first got him there wasn't a whole lot. It was like, "You're fine feeding him fruit and vegetables from your fridge." And it's not. It's not okay. So there's a lot more information for sure. And I do think that people are understanding as far as enrichment and how to take care of them, but there's still a lot that is unanswered and we're still figuring out a lot.

Alie: So do you think that having Banshee... Do you think that he informed your interest in turtles? Or do you think he predated it because you already wanted a tortoise?

Amanda: I don't know. I'm not really sure why I wanted him. I don't know why I was so intrigued. It made me feel like I needed to get more involved. He's my pet and I kind of feel bad owning him, because I look at him, and now that I'm working with wildlife I'm like, "Man, this is what you're missing out on!" It's sort of difficult to think about him not being able to live that kind of life, like a lot of wild tortoises.

Alie: You mean like getting it on?

Amanda: Yeah! I mean it just happens all day long.

Alie: Right.

Amanda: It does!

Alie: Maybe it's something like being homeschooled. There are benefits. You don't have to deal with bullies, you don't have to deal with anyone throwing a milk carton at you, but you also miss out on some weird shit.

Amanda: That's true. Yeah. I do think that they can live a good life in captivity, although I don't think it's ideal, necessarily. I do think there are good owners, and people love their tortoises and their turtles, but it's hard! I think before you go trying to get a tortoise and deciding to adopt one, there's a couple things you need to look at. You need to make sure you have a back-up plan; who's going to take care of this animal when you're gone?

Alie: Oh my God! Isn't it crazy that when you write a will, and you're probably too young to have done so, you have to include something about Banshee?

Amanda: I do! Yeah, it's terrifying! Because I'm like, "I don't know, I don't even have kids; where's this tortoise gonna go?" It's very scary. And even now, he's still with my parents. I don't have a house. I don't know what's gonna happen, and so that's where, before you get an animal like this, you really have to know where you are. Are you settled down? And then what's gonna happen when you're gone?

Alie: So Google it! Get into it!

Amanda: And also know where it's coming from, because the pet trade can be pretty hard on wildlife. It's not good for wildlife, so definitely know where the animal is coming from.

Alie: Right. You hear those stories about dudes that get through TSA with parakeets in their pants.

Amanda: Gosh, it's so terrible!

Alie: I know, but it's also like, man, there's gotta be a better way to make a living.

Amanda: No kidding!

Alie: Than putting snakes in your pants? [*Man speaking in a croaking voice: "I'm a snaaake!"*]

Alie: When it comes to age and turtles and tortoises, because obviously Banshee is going to live to be 1 million years old, why do they live so long? I mean I saw this thing online about a turtle - she was 140 years old - and her newborn baby turtle. I was like, "they just keep going." Can you imagine being 140 years old and being like, "Here's my infant son?"

Amanda: Oh my gosh!

Alie: What's happening with them?

Amanda: They have a really slow metabolism. If you think about a hummingbird that's going 1,000 miles a minute, I don't really know how fast they go, but a hummingbird probably isn't going to last more than a couple of years.

Alie: Same with little mices.

Amanda: Exactly. They have a really high metabolism.

Alie: I think that the president of the United States uses this argument to avoid exercise, because he thinks you only have a certain number of heartbeats per lifetime.

Amanda: Yeah, no. That's not okay. Continue doing your exercise. [*laughs*]

Alie: He thinks you have a finite number and that's why he's not super active. I'm gonna fact-check this, just so that nobody just thinks that I'm shit-talking. This is just gonna be bolstered with fact.

Aside: [unknown voice reading from The New Yorker: "Other than golf, he considers exercise misguided, arguing that a person, like a battery, is born with a finite amount of energy."]

Okay, alright, so... moving on.

Alie: Why are they so damn slow?

Amanda: Their shell. The shell just doesn't give them... It's heavy, it's in the way. I really don't think they'd be so slow if they didn't have the shell. There are tortoises that... They're slow, but they can be fast when they want to.

Alie: They can book it?

Amanda: They can book it, yeah. I posted a video of a gopher tortoise on Twitter. This was, I don't know, probably a year ago. She saw me on a trail and she got freaked out, but her burrow was actually closer to me, so she booked it towards me. Everybody was

intrigued, they were like, "I had no idea a tortoise could run like that!" [*cartoon running fast dashing sound*]

Alie: And then what's the biggest myth about turtles that you're just 'over'?

Amanda: Oh my gosh, just the old man. Maybe the old man... [*laughs*]

Alie: That they look like grandpas?

Amanda: Yeah!

Alie: Do they have different personalities? Turtle to turtle?

Amanda: They do, they really do. Oh my gosh. Even in the field with wild animals, when I get to work out in the field sites with them, I feel like I can definitely identify some of them that I see, that I come across frequently, just based on their personality. Let me tell you about this girl, she's my favorite tortoise. Her name is Grumpy Gertrude. [*comical sad trumpet waah-waahh followed by audience laughter*]

Alie: Oh my God, I love her already!

Amanda: My advisor was the one who introduced me to her. When I would enter the field site - her burrow was right at the entrance - and so when you would come in, she would defend her territory. So anybody that came in, she would come out bobbing her head, which is a sign of defense, and just try to shoo us away. She is just very territorial and very aggressive. I have a video of her attacking my camera.

But then there's other moments, too, where she is very tolerant. I was at a different burrow and was working with another tortoise, and she saw me so she came out of her burrow. She just wanted to check stuff out! She wasn't defensive because it wasn't her territory. So she came out and she walked all over my gear. She's very curious, she's also very defensive.

Then there are others that are really shy. You'll handle them or take them out and they're not... they will not come out of their shell. So yeah, there's definitely personality.

Alie: And can they... they can get all the way in them? So that they're just like, "I'm a rock bitch!"

Amanda: Yeah, yeah.

Alie: But some, like sea turtles, can't do that?

Amanda: Correct.

Alie: But all other turtles and tortoises can be completely like, "Closed. Gone Fishin'."

Aside: So she says that soft-shell turtles - which are not tortoises or surtles, but are aquatic turtles who look kind of like a rubbery pancake made out of mud - they'll also flippity-flop about without tucking in their legs. Now, getting back to tortoises though.

Alie: What does your field work usually involve? Can you take me through a quick day in the life of Amanda Hipps?

Amanda: Oh my gosh, I love my field work! It's hot and muggy, it's South Florida scrub habitat, so there's no shade. It depends on what I'm doing. If I'm looking for insects, I am surveying burrows. I usually go in with a camera scope and I can get a view of what's inside the burrow. I can measure it in that sense too. Sometimes I see stuff with a camera. Sometimes I'll see snakes, sometimes I'll see frogs. It's really cool.

From there, I'll try to look for insects. I take a big, two-meter scoop and scoop out sand and sift through it, catch flies that are flying around. At night I'll go out with a black light and 'black light' the burrows to look for the specific burrow moths that live in there. They also eat shit, which is really cool.

Alie: Yes! But you're trying to figure out, okay, with the gopher tortoises, who is eating their shit? We have to find out how many species would be affected if these gopher tortoises were wiped. Right?

Amanda: Exactly.

Alie: And why are they getting so wiped? Cars?

Amanda: Cars... habitat loss.

Alie: We're making too many malls?

Amanda: Yeah, they're just... they're being pushed out. It's really sad to see, especially in south Florida where there's really high pressure to develop, and so they're just constantly being relocated, the tortoises. They're getting relocated, but a lot of the other animals are getting left behind.

Alie: Oh no! Ugh. So that research is important to protect them. What kind of measures are being taken right now to protect gopher tortoises?

Amanda: Well it's no longer... In the past you could basically just build on top of them. You can cover the burrows.

Alie: No!

Amanda: Yeah.

Alie: Like a mausoleum?

Amanda: Yeah.

Alie: That's so awful! How long would they be living under there?

Amanda: Probably months.

Alie: That's horrible!

Amanda: Because they can deal with very little oxygen.

Alie: Oh, no!

Amanda: Yeah, they would just be underground. And that's terrible.

Alie: So we're not doing that anymore?

Amanda: We're not doing that anymore. You do have to get a permit if you wanna build and there's tortoises on the land, so now they get relocated. There's a lot that goes into it, though. They have to get relocated, but you can't just dump them at another site. They're so specific to the area. Imagine being 60 years old and living in the same area and then getting relocated. If they're just put somewhere else, they're gonna continue looking for their home.

Alie: Oh, no!

Amanda: Yeah, so you really can't just take them somewhere else. There has to be what's called a 'soft release'. They set up pens and they have to basically keep them in these pens for one or two years, and they have to get acquainted to their new home.

Alie: And then kind of give up and be like, "Oh, I guess I live here now."

Amanda: "I guess this is it." Yeah. Eventually they can be taken out and they are able to go out into the tortoise population.

Alie: So it's a process, it's not just like, "See ya."

Amanda: Yeah.

Alie: Ugh. Are there any movies about turtles or tortoises that you love or hate?

Amanda: You know, *Ninja Turtles* [Alie laughs] is probably the only one that comes to mind.

Alie: Their burrows are sewers.

Amanda: Yeah. [laughs]

Alie: I didn't realize how accurate that was!

Amanda: So true!

Alie: Because those really are long tunnels!

Amanda: They are!

Alie: Who knew that was factual? The pizza's factual, right?

Amanda: Definitely.

Alie: Yeah, okay. The back flips: factual. Okay, Patreon questions. You ready for some lightning round?

Amanda: I am ready for this.

Alie: People love turtles, dude.

Amanda: I'm excited!

Alie: People! Love! Turtles! [*little boy saying, "I like turtles!"*]

Aside: Before we get to the Patreon questions, however, a quick break to tell you about a sponsor of the show who makes it possible for us to churn these out every week. And also a word about this week's charity, who is getting a donation from the Ologies community. Amanda chose the nonprofit AlongsideWildlifeFoundation.org, which is a 501(c)(3) nonprofit supported by a grassroots network of people just passionate about wildlife conservation. They do research and outreach, they promote science-based solutions for living alongside wildlife in perpetuity. They even raise money to give grants to scientists who can continue doing important work with wildlife. So, they rock. Thanks for picking them.

Alright, back to the show. Let's have those Patreon questions!

Amanda: Please tell me we've got a penis question. I know we already talked about it, but...

Alie: Oh, of course we did. Liam Chavez wants to know: Straight up, how did you get your job? I'm obsessed with turtles and tortoises, and I would love to do something with them either professionally or volunteering.

How can you get up in that turtle world?

Amanda: Okay, well, it's hard to say. I don't even know how I got this one.

Alie: You're like, "How did I get here? I love it!"

Amanda: I know, it sorta just happened again. How to get involved: you can look for whatever is in your area, figure out what species are around you, and see if you can volunteer. If you're out west, like here, there's the Desert Tortoise Council, and the Gopher Tortoise Council in the East.

Alie: You gotta network, turtle people! There's Turtle Twitter, there's hashtags.

Amanda: Oh my gosh!

Alie: Make turtle friends!

Amanda: It's so true. I think that is really how, ultimately, I ended up where I am. It's just connections and meeting people with similar interests.

Alie: Make turtle friends! There's turtle clubs. Are you kidding?

Amanda: For sure!

Alie: Every city has a turtle and tortoise club.

Amanda: I should join one! Why am I not in a tortoise club? *[laughs]*

Alie: I don't know. You gotta hang with those nerds! I looked up the local turtle and tortoise club when I was looking for a good cheloniologist.

Amanda: Oh my gosh!

Alie: Turtle people are out there, they're just in a burrow, in a shell. You just gotta get to know 'em.

Amanda: You just gotta find us!

Aside: Side note Liam Chavez, I found your address through Patreon, and I looked up what's close to you. I found the Bay Area Amphibian and Reptile Society, which is having a meeting on January 25th. So for more info, you can see BAARS.org. Everyone else, Google your city, plus "herpetological society." See what comes up! Make some turtle buds. Maybe wear an *Ologies* shirt there and find your people!

Alie: Lacie J Scheuer wants to know: Do turtles that hatch from the same nest hang out with each other for a while? And if so, how old are they when they go off on their own? Like do they hang for a while, do they learn behavior from other turtles or is it just like, "I'm out"?

Amanda: They're out.

Alie: Oooh!

Amanda: When I was monitoring nests in North Florida, they would hatch out of their shell, and you would let them go, and they would just start digging a burrow.

Alie: Oh!

Amanda: Yeah, or eating. The second they come out, they're off and they're just living their life. They're not hanging out with mom, they're not hanging out with each other, they're eating and they're trying to find a place to hide.

Alie: God, if only all babies were like that.

Amanda: I know, right, then I would have kids!

Alie: I know! Just poop out a dozen of them and you're like, "good luck!"

Amanda: "Alright, see ya!"

Alie: "Don't eat each other!" Jonathan C. asks: Have turtles been on earth longer than humans?

That answer is...

Amanda: Hell yeah!

Alie: Hell yeah! [*laughs*]

Amanda: They've been around for much longer.

Aside: Okay, so turtles - proto-turtles - evolved 260 million years ago, and humans, scientists say, between 300,000 and 195,000 years ago. It's being debated. Regardless, turtles win, and we suck.

Alie: Austin H. wants to know: How long does the average turtle live, and what are the most common causes of morbidity?

Amanda: Oh. Tortoises will, on average, live probably about 80 to 150 years, depending on the species.

Alie: [*whispers*]Damn!

Amanda: Gopher tortoises kind of average at 60 but the one... the oldest one that we know of, is in captivity and he's like 96. We don't really know how old gopher tortoises truly get, but probably between 60 and 150. The second question was...?

Alie: They die of what, boredom? What are they dying of? I mean, cars?

Amanda: Yeah, mostly cars. Cars are a really big problem for all turtles and tortoises, so...

Alie: What do you do when you see a turtle in the road? Have you risked life and limb to get a turtle out of the road?

Amanda: No, I don't ever recommend risking your life, but you can help them cross. Just make sure it's safe for you to do so. I do help them cross all the time but...

Alie: You do??

Amanda: I would not lunge in front of a car, to be honest. I do like my life. It's so common in Florida to see them crossing all year round. I will help them cross. It's always a good

idea to help them cross in the same direction that they're going, because they're very stubborn creatures and they know where they wanna go, so don't try to convince them otherwise! Don't try and convince them to go somewhere else, just move them in the direction that they're going. But it's pretty easy to move most turtles and tortoises. You can just kind of grab them by the sides and help them cross. Snapping turtles are a little different. You have to be a little careful.

Alie: Right. Why are snapping turtles such dicks?

Amanda: They're just... yeah, they're just angry.

Alie: Like, maybe something in their disposition just evolved to be like, "Listen, I'm real bitchy, I'm real defensive, Those of us with these beaks..."

Amanda: "I can use it!"

Alie: "Yeah, I'm gonna use it."

Amanda: Yeah, I would if I had that. *[laughs]*

Alie: *[laughing]* I probably would too. No one fucks with someone with a beak like that.

Amanda: So true!

Alie: So you can move them, but cars are a big one.

Amanda: Yes, yeah.

Alie: Okay, alright. So Morgan Sweet wants to know: Other than limit the use of off-road vehicles, what are some of the ways that we can help with tortoise conservation while still enjoying our public lands?

Amanda: Well, a lot of it is supporting the legislature. And voting.

Alie: Kelli Brockington notes that Cuff and Link from *Rocky*, which is now a *Creed* franchise, are, she thinks, Red Stripe Racers. How long can these guys live? Because apparently the same turtles that were in the original *Rocky* in '77, were in *Creed* in 2017!

Amanda: What??

Alie: I don't know. There were two turtles that were in *Rocky*...

Amanda: Oh, I think she's maybe thinking Red Ear Sliders.

Alie: Oh, Red Ear Sliders. Oh, Red Stripe Racers, that's so close! I thought that was a different species! So yeah, these same turtles were in two franchises. I guess they can live for a while.

Amanda: They're famous. Yeah, they're very old.

Alie: I wonder if they're the most famous turtles.

Amanda: I don't know. That's a really... I would love to know.

Alie: Yeah. Well, I'll look into it.

Amanda: Okay.

[Sylvester Stallone as Rocky Balboa in Rocky: "These are the exotic animals I was telling you about. These are my friends Cuff and Link."]

Aside: So these turtles, terrapins if you will, I know are alive and 44 years old. They appear to be aging very nicely. Or they've just had impeccable work done.

Alie: JCW. says: Why are there two distinct lineages of turtles; the snake necks and the non-snake neck turtles?

Amanda: Oh, I think he's thinking the side-necks. So there's two lineages. There's the cryptodira, which is the hidden-necks. Those are the turtles and tortoises that can pull their neck inside of their shell. Then there's the side-necks, and that's pleurodira. *[automated computer voice: "pleurodira"]* They can just, instead of pulling their neck inside, they're the side-necks so they just turn their neck to the side.

Alie: Oh! So they just put it under a shelf?

Amanda: Yes, that's exactly it.

Alie: Okay, I didn't know that! They tuck?

Amanda: Yeah, they tuck.

Alie: Interesting.

Amanda: As far as like, evolving, I'm not sure why.

Aside: Side-neck side note: So I looked into this, and apparently there's still a lot of mystery about the side-neck turtles, but some research came out just this past summer that may link the drift of continents to their distribution and evolution, and may have led to sea turtles. I mean: flipper feet, we got shovel hands, retractable heads, crazy dongs... Turtles, man, living the life.

Alie: Rae Casha says: I've seen a lot of videos when someone thinks they're helping a turtle by tossing it in the water, when it's actually a tortoise!

Amanda: Oh my gosh Alie, this happens all the time.

Alie: Oh, no! What's an easy way to tell the difference and should we just leave them alone? They probably know what they're doing unless it's crossing the street. In that case, I'll

definitely help a brother out. Rae Casha, okay, this is a depressing question but we should answer it.

Amanda: Yeah, this is a question we should talk about. It's a good question. So this happens with gopher tortoises all the time...

Alie: Oh my god!

Amanda: And I can probably imagine tortoises here, desert tortoises. Yeah, people confuse them. Gopher tortoises sometimes will live on the beach. They live in the dunes, they have burrows there and so sometimes they'll be taking a walk down the beach and people confuse them for sea turtles. They'll think that it needs saving, and they'll put it in the ocean. And this happens very frequently, so now a lot of beaches will have signs that say, "Please don't touch the tortoises." Like, just let them be.

Alie: Oh, no!

Amanda: First of all, we shouldn't be touching them, period, unless they need help crossing a road. They don't really need help. Turtles, especially if it's a sea turtle, you should probably be calling somebody. You shouldn't be touching it. If you see something that needs help, I would call FWC or your local DNR or something.

Alie: [*in sad voice*] Got it.

Aside: P.S. that's the Florida Fish and Wildlife Conservation Commission or the Department of Natural Resources. Now, if you're staring down the barrel of a turtle, how do you tell if it's a surtle or a tortoise?

Amanda: If you're looking at the limbs, that's probably the best way to tell. Tortoises have these stout, muscular limbs. They don't have webbed feet, so they're kind of just more built for digging. Turtles... you'll see their limbs have webbed feet and they can swim.

Alie: So one's stumpy, one's webby.

Amanda: Yeah.

Alie: So little elephant legs vs. kind of webby... webby, duck-leg limbs.

Amanda: Yeah, exactly. [*laughs*]

Alie: I am a scientist! [*laughs*] Let's see, Raquel Nuno wanted to know: Can they come out of their shell?

Amanda: See, yeah, these questions are so common! That's okay! No, they can't. Everything is in that shell, they're attached to their shell. The spine is attached to the shell, their ribs are attached to the shell.

Aside: So that question was from planetary scientist and selenologist, Raquel Nuno, who taught us all about the moon. And this is another wonderful reminder that even the smartest scientists keep asking questions! And Amanda says she gets that question *so much* because of cartoons. And I just did a Google image search of a "cartoon turtle leaving shell." So many little nude turtles! But the reality of a turtle leaving its shell would be like us just taking out our spines and hanging them up on a coat rack at the end of the day. It's Nightmare Town.

Alie: Jen Wu says: From my husband, who loves turtles, which turtle is the best?

Amanda: Ooooh. Hmm...

Alie: This is gonna be controversial.

Amanda: Yeah, this is a question I don't even want to get involved in. [*laughs*]

Alie: Enemies will be made; alliances will be forged.

Amanda: They will! Oh my gosh. The truth is I really don't have a favorite. [*"sh-sh-sh-sh-sh-sh-sure"*] I feel like my favorite is the last one that I've seen. I feel like every time I see one I'm just like, "you're my favorite!" And then I'll see the next one.

Alie: Grumpy Gertrude!

Amanda: Grumpy Gertrude is definitely, without a doubt, my number one. Yeah.

Alie: Okay. I love that right now, somewhere across the country, there is a tortoise named Gertrude who is beloved.

Sarah Crocker wants to know: Sexually mature at what age?

Amanda: Ooh! This is a good question! So this also depends on species and location. In South Florida, gopher tortoises will mature as soon as seven, because they're not having to hibernate. They're not having to stow away for the winter, so they're eating all year round. They're growing a lot faster, so they're maturing by age seven. In the northern part of the range, like Alabama, they can take 20 years to reach sexual maturity.

Alie: [*whispering*] Oh my God!

Amanda: So a lot of it is just dependent on location.

Alie: God, that's like sharks. So much puberty.

Amanda: Yes, yeah.

Alie: For decades! Just a slight, slight, hairy mustache and bad skin and uncontrollable boners. For decades. Them and sharks, they're like, "this sucks, man!"

Chris Brewer wants to know: Would you consider the tortoise to be the introvert of the animal kingdom?

Amanda: I don't think so.

Alie: Really?

Amanda: I mean, maybe, but working with gopher tortoises, I really thought differently about it. I know they have these really high social structures and I don't know if I believe that anymore.

Alie: Okay! I think that's smart. I think that's good to know. They're like, "No, I just don't want to talk to you, maybe. I'll talk to other turtles, though."

Jennifer Buz asks: Can they really breathe out of their butts? If so, please give all the details.

Amanda: Oh, wow. This is not something that is usually brought up with tortoises, but yeah, some aquatic turtles can have oxygen exchange through their butts...

Alie: Ahhh!

Amanda: If we wanna call that breathing, yeah I guess that's the case, but it's not happening like breathing through your mouth. It's just an oxygen exchange through tissues.

Alie: Does that help them if they're diving or if they're in the mud or something?

Amanda: Yeah.

Alie: Okay! Stick your butt up. Okay.

Amanda: It's not a snorkel. It's not a snorkel. [*Amanda and Alie laugh*]

Alie: A butt snorkel! [*bubbling water sounds, then a splat*]

Rich Gross says: A long time ago I was at a fair where they had a giant turtle and allowed people to ride it. How much were they hurting the turtle?

Amanda: Aw. Yeah, it's not good.

Alie: Okay. [*cartoon umpire saying, "Youuuuu're out!"*]

Teagan Wall... I saved the Patreon question that was perhaps the most important for last. Dr. Teagan Wall says: I've had my turtle, Yurtle, for almost 25 years. Does she love me? Can she love me?

Amanda: Yurtle!

Alie: I know.

Amanda: One hundred percent!

Alie: Oooh, that's amazing! *[DJ airhorn]*

Amanda: Okay so the... Is that the whole question?

Alie: That's the whole question.

Amanda: Oh my gosh I love it! Teagan... I would like to believe that my tortoise loves me. I don't know that he does. I know that he loves to eat, so when I come out with food he loves me.

Alie: I think they love you. I mean, if they can have buddies...?

Amanda: I do, and I think that my tortoise recognizes individuals. He knows me and he knows my mom because we're the ones that feed him, and so he does come to us. He's not gonna be quite as active or wanting to go towards a stranger.

Alie: Yeah, they know who you are! Of course!

Amanda: Yeah, I think he definitely recognizes us.

Alie: Okay, shoot. One more Patreon question. E. Brown wants to know: How does their longevity impact their perception of time? And is that why they seem so chill all the time?

Amanda: I don't know. That's something that we've never looked at but is a very interesting question.

Alie: I don't know. If I knew that I didn't have to hurry up so much, and that I could have children at 150 years old...

Amanda: This would be so good for me!

Alie: Oh God!

Amanda: I'm such a late bloomer that... *[Amanda and Alie laugh]*

Alie: You could take your time on everything! You kidding?

Amanda: I would. I mean, I have. *[Amanda and Alie laugh]*

Alie: You're doing stuff! You're getting degrees! You're saving gopher tortoises!

Amanda: Yeah, I'm just doing it a little bit later. But I'm happy with it, I'm happy.

Alie: It seems like you've fallen into exactly where you want to be.

Amanda: Yes, I have never been happier with my career choice.

Aside: She loves turtles so much, she can't even bear to shit-talk them. This! This is testudinological loyalty.

Alie: What is the worst thing about your job though, or about turtles? Do you have any shit you wanna talk about turtles?

Amanda: No! We can't go there Alie. [*Amanda and Alie laugh*]

Alie: What about your job?

Amanda: As far as my job, I think we're in a time right now where there is so much urban development and habitat loss, it's really hard to see all the habitat loss. There's been a couple of times where we've found tortoises at our field sites that have been hit by cars. So I think those are probably my worst days.

Alie: God, I bet. Ugh. Do you have burials for them? That's a stupid question, but I'm asking it anyway. What do you do when you see a dead tortoise?

Amanda: I actually collect them. What I'm doing right now is looking for what's called a gopher tortoise shell moth. These moths will feed specifically on dead gopher tortoise shells.

Alie: Oh my God!

Amanda: Yeah.

Alie: Find your niche!

Amanda: Exactly!

Alie: Bloom where you're planted, man.

Amanda: Basically, I take the carcass and put the shell out into my field site, and kind of just sit and wait for moths to appear, but it hasn't happened yet.

Alie: Do tortoises mourn other tortoises? Do they have big brains... tiny brains?

Amanda: They're pretty small. They have very small brains. I don't know. There hasn't been anything recorded where tortoises are mourning, so I'm not really sure. But I do wonder, it does make me wonder because they have these structures, these social structures. So I wonder, "Who is missing you? Who's trying to go to your burrow now when you're not coming back?"

Alie: I know! I wonder if they ever try to scoot them into their burrow like a mausoleum.

Amanda: I don't know.

Alie: You know what I mean? Ugh, final resting spot. Turtle death! Who knew?! I'm gutted! What is your favorite thing about turtles or your job?

Amanda: My favorite thing about my job is the people that I've met. Even just being on social media and just kind of connecting with people that have similar interests, even if they're not in the same field, has been so much fun. I think that's definitely my favorite part.

Alie: Turtle Twitter.

Amanda: Yeah, Turtle Twitter.

Alie: Get into it!

Amanda: Yes!

Alie: I feel like if turtles give you butterflies, you gotta get up and find your people. You gotta find your turtle people.

Amanda: Yeah! I mean, it took me so long to get to this point to really be like, "Oh, wow, this is where I'm supposed to be."

Alie: But it's about turtles, so it's supposed to take you forever!

Amanda: Exactly.

Alie: You're not studying hares. You know what I mean?

Amanda: That's so true.

Alie: Do you hate *The Tortoise and the Hare*? Are you like, "lay off the turtles" even though the tortoise ends up being the protagonist?

Amanda: The tortoise wins. Yeah, I really don't hate it, it's fine. It's just a fable. I did get a video once, it was on a camera trap, of a cottontail rabbit that was living with a tortoise in a burrow. I have so many videos of him just chilling and hanging out. There was one where he came over and the bunny kind of got up into the tortoise's face just to sniff it. It was so cute.

Alie: Aw! Where they friends?

Amanda: I don't think the tortoise gave two shits about the rabbit.

Alie: How long did they kick it together?

Amanda: He was hanging out for probably like two or three weeks in that burrow.

Alie: Oh my God! Has that gone viral on The Dodo yet or something?

Amanda: It hasn't!

Alie: Jeez Louise!

Amanda: I should post it. I think I posted it on Instagram.

Alie: It's like the best rap beef buried ever... actually burrowed. [*Alie and Amanda laugh*]

Aside: I very highly recommend following Amanda on Instagram and/or Twitter. You've got videos of tortoises, field work videos, and also follow her hashtag #shitbugs for updates on the dung-gobbling burrow mates she's studying, as well as videos about Grumpy Gertrude, tortoises and hares just kicking it..

Alie: Where can people find you?

Amanda: I'm on Instagram as @BioPhiliAmanda and Twitter.

Alie: Nice. Consistent handles?

Amanda: Yes

Alie: Dope, man. Makes things so easy!

Amanda: It does, it does.

Alie: Try to get the same handles man, 'whoof'. You gotta get in early, even if you gotta put an underscore.

Amanda: Oh my God, I changed mine so many times too, but I am set. This is it. [*laughs*]

Alie: Well thank you for all of the work you do protecting the turtles.

Amanda: Oh, gosh, I love it! Thank you for having me.

So ask smart people your stupidest questions because they didn't know at one point, either. Also, they love answering it. The links are in the show notes and see AlieWard.Com/Ologies for more links. Patreon.com/Ologies is where you can go to support the show and submit questions for the upcoming episodes. OlogiesMerch.com has shirts, and hats, and totes, and other merch. Thank you, Shannon Feltus and Boni Dutch, for that. [The Ologies Facebook group](https://www.facebook.com/OlogiesFacebookGroup) is a collection of wonderfuls, thanks to eagle-eye admins Hannah Lipow and Erin Talbert. Happy Birthday Ernie! From your old buddy Ward! We've known each other since we were four years old, me and Erin Talbert. Happy birthday, I love you!

The theme song was written by Nick Thorburn of the band Islands. Thank you to assistant editor, and host of the mental health podcast *My Good Bad Brain*, Jarrett Sleeper. And as always huge thanks to editor Steven Ray Morris who does a shell of a job! He hosts the podcasts *The Purrrcast* and *See Jurassic Right* about dinos and cats.

Now, if you listen to the end of the episode you know I tell you a secret. This week my secret is that if my apartment is messy, I get really, weirdly bummed-out and kinda cranky, and it always takes me a week or two to realize what the problem is. And then I'm like, "ugh! I just have to tidy up my

home." So as soon as this episode is up, I will be doing some laundry and maybe washing some floors. But in the end, I'll be in a better mood because of it.

Also have you ever had cheese tea? It's tea with cream cheese and whipped cream on top, and it's so good! I drank it twice... no, I drank it three times this week. At first I was like "Cheese tea? Get outta here!" And then I tried it and I was like, "Oh my God it's amazing!" So look it up, find some locally, report back. Cheese tea. Okay. Also, next week: Sea Turtles. Oh boy! It's a whole other world under the ocean. And then... aging. Okay, berbye.

Transcribed by your weirdo knitting neighbor, Lindsay N. in Baltimore.

Some links which may be of use:

[Handy lil' gopher tortoise fact sheet](#)

["Turtle makes love to a croc"](#)

[Warning: scary turtle dicks](#)

[Ectotherms, yes okay I meant ectotherms](#)

[Hot proto turtle gossip](#)

[Goodbye Goliath](#)

[Jonathan, a casual very old creature](#)

[Lonesome George's keeper misses him](#)

[Otolaryngological whisper facts](#)

[Turtle hearing, lamentably scarce research](#)

[Bay Area: meet some turtle friends](#)

[Seriously, like go to this Jan 25 meet-up](#)

[Little dude likes turtles](#)

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